NPCA PLANNING AND PERMITTING PROCEDURE MANUAL

NOVEMBER 21, 2022

Niagara Peninsula CONSERVATION

www.npca.ca

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AMENDMENTS AND MANUAL REVISIONS

Revision	Date	Description of Changes	Report #

LAND ACKNOWLEDGEMENT

The Niagara Peninsula watershed is situated within the traditional territory of the Haudenosaunee, Attiwonderonk (Neutral), and the Anishinaabeg, including the Mississaugas of the Credit – many of whom continue to live and work here today.

This territory is covered by the Upper Canada Treaties (No. 3,4, and 381) and is within the land protected by the Dish with One Spoon Wampum agreement. Today, the watershed is home to many First Nations, Metis and Inuit peoples.

Through this Procedural Manual, NPCA re-confirms its commitment to shared stewardship of natural resources, and a deep appreciation of Indigenous culture and history in the watershed.

1.0 INTRODUCTION

1.1 About the Niagara Peninsula Conservation Authority (NPCA)

The NPCA was formed in 1959 under the authority of the Conservation Authorities Act, and is responsible for undertaking a variety of responsibilities under the Act. As one of 36 conservation authorities across the Province, the NPCA's mandate is to establish and undertake programs designed to further the conservation, restoration, development and management of natural resources across the watershed, as per the Conservation Authorities Act.

The Niagara Peninsula Conservation Authority (NPCA) is a community-based natural resource management agency that protects, enhances, and sustains healthy watersheds. With over 60 years of experience, the NPCA offers watershed programs and services that focus on flood and hazard management, source water protection, species protection, ecosystem restoration, community stewardship, and land management. The NPCA is one of 36 Conservation Authorities in the Province of Ontario and manages 41 Conservation Areas within the Niagara Peninsula watershed held in public trust for recreation, heritage preservation, conservation, and education.

1.2 Purpose of the Procedural Manual

The purpose of this Procedural Manual is to explain the planning and permitting application processes and provide guidance for NPCA Policy Document implementation. The NPCA Procedural Manual will aid landowners, developers, consultants, and other stakeholders who are interested in obtaining comments and/or approvals from the NPCA. Additionally, it is intended to improve clarity and transparency around NPCA's administrative review procedures and technical submission requirements. The manual assists applicants in better understanding NPCA's relationship with municipal planning approvals, as well as NPCA's permitting approval processes.

A brief description of the administrative processes associated with NPCA's review of planning and development related applications is provided highlighting the importance of consultation. Each section of this manual addresses different aspects of the role NPCA plays in the review of development proposals. In particular, NPCA's roles and responsibilities as a commenting agency under the Planning Act, and how NPCA administers Ontario Regulation 155/06, Environmental Assessments and other development related review services.

2.0 Role of the NPCA

As a corporate body created through provincial legislation as well as a registered charitable organization with several different functions, the NPCA's roles can be broadly categorized as follows:

- **Regulatory Authority**: Section 28 of the Conservation Authorities Act empowers conservation authorities to prohibit, restrict, regulate or give permission for certain activities in and adjacent to watercourses, valleylands, wetlands, shorelines and other hazardous lands. In administering NPCA's Section 28 regulation (O. Reg. 155/06), NPCA is the approval authority for permits under this regulation. In NPCA's review of applications under the Planning Act, NPCA staff ensure that proponents and the provincial or municipal planning authorities area aware of the Section 28 regulation and requirements under the Conservation Authorities Act, and assist in the coordination of these applications to eliminate unnecessary delay, duplication, or conflict in the process.

- **Delegated Provincial Interest**: As outlined in the Conservation Ontario/Ministry of Natural Resources and Forestry/Ministry of Municipal Affairs and Housing Memorandum of Understanding (MOU) on Conservation Authority Delegated Responsibilities (Appendix A), NPCA has a delegated responsibility in representing the provincial interest on natural hazards, other than those policies related to hazardous forest types for wildfire, encompassed in Section 3.1 of the PPS, 2020. This delegation requires NPCA to review and provide comments on municipal policy documents (e.g., Official Plans and comprehensive zoning by-laws) and applications submitted pursuant to the Planning Act as part of the Provincial One-Window Plan Review Service.

- **Public Body:** Pursuant to the Planning Act, NPCA is a "public body", and therefore where it has an interest, must be notified of municipal policy documents and planning and development applications under the Act. NPCA comments according to its Board-approved policies and as a watershed resource management agency to the municipality/planning approval authority on these documents and applications. The NPCA is also public commenting body pursuant to the federal and provincial environmental assessment (EA) Acts. NPCA reviews and comments on Individual and Class EAs that occur within NPCA's regulatory jurisdiction. Proponents of an EA are required to identify and consult with government agencies, including conservation authorities if the proposed project has the potential to affect an item related to the conservation authority's interest. In NPCA's review of applications under the Planning Act and environmental assessment Acts, NPCA staff will ensure that proponents and the provincial or municipal planning authorities area aware of the Section 28 regulation and requirements under the Conservation Authorities Act, and assist in the coordination of these applications to eliminate unnecessary delay, duplication, or conflict in the process.

- **Resource Management Agency:** In accordance with Section 20 and 21 of the Conservation Authorities Act and associated regulations, conservation authorities are local watershed-based natural resource management agencies that develop programs and services that reflect local resource management needs within its jurisdiction. Such programs, services and/or policies (e.g., watershed plans,

management plans, and NPCA Policy Document) are approved by the NPCA Board of Directors and may be funded from a variety of sources including municipal levies, fees for services through agreements, provincial and/or federal grants, self-generated revenue or cost apportionment agreements with partner municipalities.

- **Service Provider:** Conservation authorities may enter into agreements with other levels of government to undertake regulatory or approval responsibilities and/or reviews. The provision of planning advisory services to municipalities is implemented through service agreements or MOUs with participating municipalities as part of a conservation authority's approved program activity. In this respect, the conservation authority is essentially acting as a technical advisory to municipalities. The agreements cover the conservation authority's areas of technical expertise such as water management, natural hazards and natural heritage.

- **Landowner:** Occasionally conservation authorities become involved in the planning process as a proponent or landowner. Where there is a real or perceived conflict of interest between the role of the conservation authority as a proponent or landowner and the role of the conservation authority as a commenting agency, conservation authorities may request the planning authority to implement alternate review mechanisms to address the conservation authority's commenting responsibilities. Additionally, conservation authorities ensure that any comments provided as a landowner are separate from comments provided under a technical, advisory, and/or regulatory role.

Table 2.1 lists various legislation, programs, plans and policies affecting the NPCA's jurisdiction and the roles of the implementing agencies. This table is a simplistic summary of various statutes, plans and programs and may not be exhaustive, and should not be relied upon for legal or professional advice in connection with any particular matter.

Table 2.1: Legislation, programs and policies affecting NPCA's jurisdiction, and roles of agencies

	Lead Agency	Supporting Agency
Federal		
Fisheries Act (2013)	Fisheries and Oceans Canada (DFO)	NPCA may direct proponents to consult with DFO as a courtesy and provides advice that in-waters works should be outside the *fish* spawning season. However, it is the responsibility of the proponent to ensure compliance with the Act.

Navigation Protection Act (1985)	Transport Canada	NPCA directs proponents to Transport Canada when reviewing a watercourse crossing in navigable waters
Migratory Birds Convention Act (1994)	Environment Canada	NPCA provides advice to proponents that the removal or pruning of trees should take place outside the nesting season, however, it is the responsibility of the proponent to ensure compliance with the Act
Species at Risk Act (2002)	Environment Canada, Parks Canada and Fisheries and Oceans Canada	NPCA may direct proponents to the applicable federal authority as a courtesy
Canadian Environmental Assessment Act (2012)	Canadian Environmental Assessment Agency or lead regulatory authority	NPCA provides comments and technical clearance related to policies and regulation
Niagara River Remedial Action Plan Program	Environment and *Climate Change* Canada, Ontario Ministry of the Environment, Conservation and Parks, Ontario Ministry of Natural Resources and Forestry, and NPCA as the lead coordinating agency since 1999	
Provincial		
Planning Act (1990)	Municipalities are approval authorities	NPCA is a commenting agency and helps to ensure decisions are consistent with the natural hazards policies in the PPS, 2020, but not *hazardous forest types for wildland fire*, and where applicable conform with any natural hazards policies included in a *provincial plan*, but not *hazardous forest types for wildland fire*
Provincial Policy Statement (2020)	Ministry of Municipal Affairs and House; municipal planning decisions must be consistent with	NPCA has a delegated responsibility in representing the provincial interest on natural hazards, other than those policies

	matters of provincial interest outlined in the PPS, 2020	related to *hazardous forest types for wildfire*, encompassed in Section 3.1 of the PPS, 2020
Conservation Authorities Act (1990) and Regulations	Conservation Authorities	Many *watershed* partners
Environmental Assessment Act (1990)	Ministry of the Environment, Conservation and Parks	NPCA is a commenting agency
Greenbelt Act and Plan (2017)	Municipalities	NPCA is a commenting agency
Places to Grow Act (date) and Plan (date)	Municipalities	NPCA is a commenting agency
Niagara Escarpment Planning and Development Act and Plan (1990)	Niagara Escarpment Commission	NPCA is a commenting agency and provides technical clearance; municipalities are a commenting agency
Ontario Water Resources Act (1990) – Section 34 Permits to Take Water; Section 53 – Environmental Compliance Approvals for *Stormwater Management* Facilities	Ministry of the Environment, Conservation and Parks	NPCA is a commenting agency and provides technical clearance where appropriate
Endangered Species Act (2007)	Ministry of Natural Resources and Forestry (MNRF)	NPCA may direct proponents to MNRF (NPCA may provide data to the Province if available)
Clean Water Act (2006)	Ministry of the Environment, Conservation and Parks	Municipalities and NPCA
Building Code Act (1992)	Municipalities	NPCA Ontario Regulation 155/06 permits are applicable law. NPCA either issues a permit or provides a letter of clearance
Ontario Heritage Act	Municipalities; NPCA for projects on NPCA-owned lands to ensure archaeological assessments are conducted in consultation with indigenous communities	

Municipal		
Upper-tier, Single-Tier and Local Municipal Official Plans, Secondary Plans, Zoning By-laws, Site Plan Control By-laws, Tree By-laws, *Site Alteration* By-laws, and any other land use plans, policies and guidelines	Upper-tier, Single-Tier and Local Municipalities	NPCA provides input to the development of these municipal policies, plans and by-laws, and provides comments to municipalities in their application
Niagara Peninsula Conservation Authority (NPCA)		
Ontario Regulation 155/06 – Development, Interference with *Wetlands*, and Alterations to Shorelines and Watercourses (2006	NPCA	
NPCA Policy Document and Procedural Manual	NPCA	Municipalities and *watershed* partners provide input to the development of these policies and procedures
Watershed Plans	Municipalities undertake watershed or subwatershed studies to inform land use planning and growth area planning; NPCA undertakes watershed or subwatershed studies to support its *watershed* resource management mandate	Many *watershed* partners
Lake Ontario and Lake Erie Shoreline Management Plans	Ministry of Natural Resources and Forestry; NPCA	
Conservation Area Management Plans	NPCA	
Land Securement Strategy and Policy	NPCA	Many *watershed* partners

2.0 PLANNING APPLICATIONS

Through its various roles and responsibilities, NPCA provides comments on proposed development and infrastructure projects within its watershed. NPCA will aim to coordinate their reviews of Planning Act applications with permit requirements to streamline comments and approvals.

In some cases, provincial plan requirements may exceed NPCA regulatory requirements, and such greater requirements take precedence. For example, the provincial plans may have greater requirements for vegetation buffers or more restrictions on the uses permitted than the conservation authority regulatory requirements.

In participating in the review of development applications under the Planning Act, NPCA will:

- ensure that the applicant and municipal planning authority are aware of the Section 28 regulations and requirements under the Conservation Authorities Act, and
- assist in the coordination of applications under the Planning Act and the Conservation Authorities Act to eliminate unnecessary delay or duplication in the process.

The "principle of development" is established through Planning Act approval processes, whereas the Conservation Authority Act permitting process provides for technical implementation of matters pursuant to Section 28 of the Conservation Authorities Act. NPCA will ensure that concerns it may have regarding the establishment of the "principle of development" are conveyed to the municipality/planning approval authority during the preparation of a municipal Official Plan, secondary plan or Official Plan amendment, or during the Planning Act approvals process.

When an applicant submits a planning application to a municipality, municipal staff may screen the application to determine whether it is within the area of interest of NPCA based on service agreements and/or screening protocols developed in partnership between the agencies. When an application is circulated to NPCA, pre-consultation with municipal and NPCA staff is encouraged to scope technical studies that may be required, provide guidance related to other responsibilities delegated or assigned to NPCA and to ensure the application is complete. In general, planning and development related applications containing or adjacent to NPCA regulated areas are circulated by municipalities to NPCA for comment. Planning related applications circulated to NPCA for review typically include:

- Official Plans and Official Plan Amendments;
- Zoning By-laws and Zoning By-law Amendments;
- Plans of Subdivision and Plans of Condominium;
- Consents (severances and lot-line adjustments);
- Minor Variances; and

- Site Plans.

Through a comprehensive stakeholder and community engagement process, NPCA developed an updated "NPCA Policy Document: Policies for Planning and Development in the Watersheds of the Niagara Peninsula Conservation Authority". The policies contained in the Policy Document are the basis for NPCA's comments and technical guidance to applicants. For more information on specific policies pertaining to Planning Applications refer to the NPCA Policy Document [Insert weblink here]. Hard copy of the Policy Document is available for access at NPCA's Office or by contacting 905-788-3135.

2.1 NPCA's General Plan Review Process

Appendix C includes the general NPCA plan review process for various applications.

2.2 Screening and Circulation Process

Working with municipal partners, screening maps have been developed to help determine when an application may require review by NPCA. In general, NPCA's area of interest includes lands containing or adjacent to NPCA regulated areas or properties adjacent to NPCA owned property. Where a proposed development is located within or adjacent to an NPCA regulated aeras, the planning application is to be circulated to the NPCA for review.

2.3 Pre-Consultation

In addition to consulting with municipal staff, it is important for applicants to discuss development related proposals with NPCA staff prior to submitting a formal application. For most applications, this preliminary consultation is often done in coordination with the municipality to ensure all interests are met. Preliminary consultation should be done as early in the planning process as possible to determine how proposals may be affected by NPCA's programs and policies. During the preliminary consultation process NPCA staff will inform applicants of the general review process, indicate what components of the proposal are of interest, discuss potential study requirements and subsequent anticipated processing timelines. Preliminary consultation also allows NPCA staff to confirm what constitutes a complete application based on the preliminary discussions and assess the submission based on NPCA's checklists and technical guidelines.

Processing timelines will vary based on the completeness of the submission, nature and complexity of the proposal (minor or major) and quality of the technical submissions. NPCA staff are committed to providing a thorough and expeditious review of planning related proposals in an effort to meet the processing timelines as established by the approval authority, in consultation with NPCA and other relevant agencies. The submission of a complete application provides NPCA staff an opportunity to review the application in a comprehensive, efficient and timely manner. In addition, it is very important that applicants ensure the quality of the submission

meets good practice and industry standards to minimize the extent and number of resubmissions and avoid unnecessary delay. Please note that it is the responsibility of the applicant to undertake due diligence to determine all required planning and permitting approvals beyond those provided by NPCA staff.

2.4 Submission Requirements

To ensure NPCA's interests are met, and to appropriately assess the technical aspects of the proposal, the submission of a number of information items may be required. The level of detail required for most study and report requirements can vary depending on the location of the property and the nature of the proposal. In this regard, technical requirements may vary from brief discussions between qualified experts, to a letter of opinion, while in other cases a scoped or comprehensive environmental study such as an environmental impact study or comprehensive environmental management plan may be necessary. Pre-consultation meetings with NPCA and municipal staff prior to submission of an application will help to establish the requirements for, and the scope of, reports and studies where needed.

NPCA has developed checklists, technical manuals and guidelines outlining study content expectations and to help in facilitating the scoping process. In addition, a complete application checklist has been developed which should be included with initial submissions (after pre-consultation) to reduce requests for additional information and help increase efficiencies in the review process (see Appendix E). Applicable fees are due upon application submission and initial fees are often collected by the municipality and additional fees collected directly by NPCA where necessary (see Appendix F).

2.5 Review Procedures

Through the plan review and plan input role NPCA staff provides watershed partners with technical advice on issues related to natural hazard management, and natural heritage protection and water management where a Memorandum of Understanding is in place with a partner municipality (i.e. City of Hamilton and Haldimand County). The policies contained in NPCA's Policy Document provide the basis for NPCA staff's review and comment. This technical and scientific expertise provided by NPCA supports the environmental planning functions of municipalities.

When a planning application is received by NPCA, its review is managed by a planner in the Planning Department. The planner reviews the application to confirm what NPCA's areas of interest in the proposal and determines whether the submission is complete based on guidance provided during the pre- consultation discussions and/or based on NPCA's policies, checklists and technical guidelines. Where deemed necessary through the pre-consultation process, or in the event that pre-consultation with NPCA staff did not occur, a preliminary site visit to confirm NPCA's interests in the proposal may be required. Subsequent to this preliminary review, the application is internally circulated to the necessary NPCA technical staff for a thorough technical review.

Depending upon the location and nature of the proposal, the application may be circulated to NPCA's technical review staff (e.g., water resource engineer, planning ecologist) and NPCA land planning staff.

Upon completion of the technical review and all necessary site visits have been conducted, a letter from the planner is issued to the affected municipality and applicant outlining NPCA's comments. It is important to note that based on the initial review, additional technical studies, reports and/or a revised application may be needed prior to NPCA staff providing final comments – in particular, where pre-consultation with NPCA staff did not take place at the outset.

2.6 Level of Service and Timelines

NPCA staff are committed to meeting reasonable review times for all planning applications that are submitted. Review times for planning related applications are generally established by the municipality, and are on the premise that an appropriate level of pre-consultation has been conducted to ensure the submission is complete. In general, applications are reviewed based on the order they are submitted and/or as requested by the municipality recognizing NPCA is responsible to provide a consistent level of service to multiple watershed partners for all programs. Please refer to Appendix B for NPCA's Client Service Standards for Plan and Permit Review.

It should be recognized that review times and resubmission requirements are directly affected by the completeness and quality of the submission. It is the applicant's responsibility to ensure an appropriate level of pre-consultation has occurred and that technical submissions meet good practice and industry standards to minimize the extent and number of resubmissions and avoid unnecessary delay.

The NPCA recognizes the importance of providing our municipal partners with comments in a timely manner. Through recent amendments to the Planning Act, municipalities are required to refund application fees where a decision has not been on graduated basis:

For a Zoning By-law Amendment, if a decision is not made within:

- 90 days (120 days if combined with an OPA), refund 50% of the application fee;
- 150 days (180 days if combined with an OPA), refund 75% of the application fee; and
- 210 days (240 days if combined with an OPA), refund 100% 0f the application fee.

For Site Plan Control if a decision is not made within:

- 60 days, refund 50% of the application fee;
- 90 days, refund 75% of the application fee; and
- 120 days, refund 100% 0f the application fee.

3.0 ENVIRONMENTAL ASSESSMENTS

While crossing of the watershed natural system can be disruptive to the NPCA watershed, connections for roads, public transit, water, storm and sanitary sewers, utilities and other types of infrastructure are a necessity in an urbanizing region. NPCA's infrastructure policies seek to first avoid, then mitigate, remediate natural hazards where possible, and where appropriate, compensate for the impacts of infrastructure on the watershed natural system.

For public infrastructure and large private infrastructure projects, Ontario's Environmental Assessment Act is the principal review mechanism. Given then NPCA is a commenting agency under both the Planning Act and Environmental Assessment Act processes, the NPCA has the opportunity to review many types of infrastructure proposals from both public and private proponents. This is important for consideration of the cumulative impacts that come from multiple infrastructure projects being proposed in the NPCA watersheds. Further, where exposed at-risk infrastructure is proposed for replacement, repair or expansion, the NPCA works with the proponents to improve conditions through adapting and retrofitting infrastructure and remediating hazards, that reduces the risk to public safety and enhances the long-term functioning infrastructure.

3.1 Types of Environmental Assessments

The Environmental Assessment Act allows for two types of Environmental Assessments (EA): Individual and Class. An Individual EA is required for a project that is routine but does not have predictable and mitigable environmental effects. Class EAs are methods for dealing with projects that are recurring, usually similar in nature, often limited in scale, have a predictable range of environmental effects, and are responsive to mitigating measures.

3.2 Individual Environmental Assessments

Proponents of an EA should discuss their proposal with NPCA prior to submitting a formal document. This preliminary consultation should be done as early in the EA process as possible to find out how your proposal is affected by NPCA's programs and policies. Preliminary consultation serves to identify potential issues, constraints and study requirements. NPCA staff can inform you of what lies ahead in our review process, indicate whether your proposal is supported in principle and discuss anticipated processing timelines. Preliminary consultation also allows you to confirm what constitutes a complete application and assess your submission based on NPCA checklists and technical guidelines. The submission of a complete application provides NPCA staff an opportunity to review your application in a comprehensive, efficient and timely manner.

Review Procedures

When the Notice of Commencement is received, its review is facilitated by a planner in our EA review team. The planner first reviews the submission and confirms NPCA interest in the proposal. A letter detailing these interests, together with digital information on natural features and regulatory limits, is provided to the proponent. This information should be used in determining recommendations in the Individual EA. The following data are available to the proponent for most areas within NPCA watersheds and are provided when projects are initiated:

Natural Features and Regulation Data

- Baseflow Data
- Engineered Flood Elevation Data
- Engineered Flood Plain Maps
- Hydrogeological Data
- Natural Cover (forests, successional, etc.)
- Regulation Limits
- Special Policy Areas
- NPCA Property
- Vegetation Type (ELC Communities)
- Watercourses
- Watershed Boundaries

Please refer to NPCA's Open Data Portal for access to available information: https://gis-npca-camaps.opendata.arcgis.com/

Typically, staff will participate on a technical advisory committee that meets at strategic points throughout the course of the project. The planner is invited to be part of the public consultation process, and will review all information provided at the meeting. Further, staff will attend the meeting if technical support is required.

When the technical background studies or the Individual EA are prepared, they should be submitted to NPCA for comment. The planner will circulate the submission to NPCA technical staff for review. Depending upon the proposal, a submission may need to be reviewed by NPCA's technical staff. Once a submission is reviewed by technical staff, and all necessary site visits are conducted to determine or stake the limits of natural features or the physical top-of-bank (Appendix N), the planner coordinates the review comments and composes a letter detailing NPCA's issues, concerns or recommendations.

Submission Requirements

To ensure the interests of NPCA are met and to appropriately assess the technical aspects of a proposal, we require the submission of a number of information items as part of an Individual EA. Please note that not all of the items listed below will apply to each application, and depending on the study there may be additional requirements. Also note that the level of detail required for most of the studies and reports can vary widely depending on the property and the proposal. In some situations, a single-page letter from a qualified expert will be sufficient, while in other cases a major study will be necessary. Meeting with NPCA staff prior to the initiation of the Individual EA will determine which of the items must be provided with your submission, and facilitate a timely review.

Compulsory Requirements:

- Notice of Commencement, which describes the study area, outlines the proposal and provides contact names

Possible Technical Requirements:

- Archaeological Assessment by NPCA staff on NPCA Property
- Channel Crossings Assessment
- Conformity Reports (Greenbelt, Niagara Escarpment), Growth Plan, etc.)
- Environmental Impact Study
- Environmental Monitoring and Mitigation Plan
- Floodline Delineation Study/Hydraulics
- Geotechnical/Slope Stability Study
- Hydrogeological Assessment
- Stormwater Management Study
- Structural Elevations and Construction Details
- Feature-based Water Balance Analysis
- Watercourse Erosion Analysis
- Other reports/studies identified through consultation with NPCA staff

The checklists and technical guidelines produced by NPCA should be consulted in preparation of all Individual EAs and all supporting studies accompanying an application.

3.3 Class Environmental Assessments

Environmental Assessment (EA) is a planning and decision-making process used to promote environmentally responsible decision making. In Ontario, this process is defined and finds its authority in the Environmental

Assessment Act (EAA). The purpose of the EAA is to provide for the protection, conservation and wise management of Ontario's environment. The environment is broadly defined to include the natural, social, economic, cultural and built environments. All projects undertaken by a provincial ministry, municipality or designated public body are subject to the requirements of the EA Act, unless explicitly exempt.

For applications made pursuant to the Environmental Assessment Act, NPCA provides technical review on issues related to natural hazards and natural heritages within NPCA's regulated area. The policies contained in NPCA's Policy Document, the Provincial Policy Statement, the Niagara Escarpment Plan, and the Greenbelt Plan, along with other applicable legislation, and NPCA technical guidelines provide the basis for staff review and comment.

Preliminary Consultation

Similar to the plan review process, it is important for applicants to discuss their project with NPCA staff early in the process. This preliminary consultation process helps to identify how the proposal may be affected by NPCA's policies, including other partnering agencies such as DFO or the MNRF. During the pre-consultation process NPCA staff will inform applicants of the general review and approvals process, discuss potential study requirements and indicate whether the proposal is supported in principle. Anticipated processing timelines will be provided. Preliminary consultation also allows NPCA staff to confirm what constitutes a complete application and assess the submission based on NPCA's checklists and technical guidelines.

Processing timelines will vary based on the completeness of the submission, nature and complexity of the proposal (minor or major) and quality of the technical submissions. NPCA staff are committed to providing a thorough and expeditious review of EA applications in an effort to meet processing timelines. It is very important that applicants ensure the quality of the submission meets good practice and industry standards to minimize the extent and number of resubmissions and avoid unnecessary delay.

Review Procedures

When the Notice of Commencement is received, its review is facilitated by an NPCA planner. The planner first reviews the submission and confirms NPCA interest in the proposal. A letter detailing these interests, together with digital information on natural features and regulatory limits, is provided to the proponent. This information should be used in determining recommendations in the Municipal Class EA.

The following data are available to the proponent for most areas within NPCA watersheds and are provided when projects are initiated:

Natural Features and Regulation Data

- Baseflow Data
- Engineered Flood Elevation Data

- Engineered Flood Plain Maps
- Hydrogeological Data
- Regulation Limits
- Special Policy Areas
- NPCA Property
- Vegetation Type (ELC Communities)
- Watercourses
- Watershed Boundaries

Typically, staff will participate on a technical advisory committee that meets at strategic points throughout the course of the project. The planner is invited to be part of the public consultation process, and will review all information provided at the meeting. Further, staff may attend the meeting if technical support is required.

When the technical background studies or the Individual EA are prepared, they should be submitted to NPCA for comment. The planner will circulate the submission to NPCA technical staff for review. Depending upon the proposal, a submission may need to be reviewed by NPCA's technical staff, and all necessary site visits are conducted to determine or stake the limits of natural features or the physical top-of-bank (Appendix N), the planner coordinates the review comments and composes a letter detailing NPCA's issues, concerns or recommendations.

Submission Requirements

To ensure the interests of NPCA are met and to appropriately assess the technical aspects of the proposal, NPCA requires the submission of a number of information items as part of the Class EA. Please note that not all of the items listed below will apply to each application, and depending on the study there may be additional requirements. Also note that the level of detail required for most of the studies and reports can vary widely depending on the property and the proposal. In some situations, a single-page letter from a qualified expert will be sufficient, while in other cases a major study will be necessary. Meeting with NPCA staff prior to the initiation of the Class EA will determine which of the items must be provided with your submission, and facilitate a timely review.

<u>Compulsory Requirements</u>

- Notice of Commencement, which describes the study area, outlines the proposal and provides contact names

<u>Possible Technical Requirements</u>

- Archaeological Assessment by NPCA staff on NPCA Property
- Channel Crossings Assessment
- Conformity Reports (Greenbelt, Niagara Escarpment), Growth Plan, etc.)
- Environmental Impact Study
- Environmental Monitoring and Mitigation Plan
- Floodline Delineation Study/Hydraulics
- Geotechnical/Slope Stability Study
- Hydrogeological Assessment
- Stormwater Management Study
- Structural Elevations and Construction Details
- Feature-based Water Balance Analysis
- Watercourse Erosion Analysis
- Other reports/studies identified through the checklists or staff consultation

The checklists and technical guidelines produced by NPCA should be consulted in preparation of all Class EAs and all supporting studies accompanying an application.

Level of Service and Timelines

NPCA staff are committed to meeting reasonable review times for all applications that are submitted. Review periods are established on the premise that a level of pre-consultation has been conducted and that the guidelines and most recent policies of the NPCA have been addressed. Commitment to review times also assumes submissions are complete. NPCA is required to provide comments on applications within the time frame specified by the circulating agency.

In many cases, re-submissions are required to address outstanding information needs. The review of re-submissions can require significant time depending on the level of information that was added. Re-submission requirements can be minimized through pre-consultation and compliance with NPCA guidelines. An itemization of how the new or revised plans or studies address each of NPCA's comments from the previous submission will help to expedite the review process. Review times cannot be adhered to when submissions are incomplete and information is received in an uncoordinated approach.

3.4 Municipal Class Environmental Assessments

The Municipal Class EA is one of ten approved Class EAs in Ontario and covers a range of municipal projects and activities including municipal road, water, wastewater and transit projects.

The Municipal Class EA provides a planning process and ensures that projects falling within the class of undertakings will be planned in accordance with the approved planning process and other procedures set out in the Class EA. Projects can proceed without seeking further approval if they have been planned in accordance with the planning process outlined in the approved Class EA. This allows for a planning process that is appropriate for the project and which can be completed in a timelier manner.

Preliminary Consultation

Similar to the plan review process, it is important for applicants to discuss their project with NPCA staff early in the process. This preliminary consultation process helps to identify how the proposal may be affected by NPCA's policies, including other partnering agencies such as DFO or the MNRF. During the pre-consultation process NPCA staff will inform applicants of the general review and approvals process, discuss potential study requirements and indicate whether the proposal is supported in principle. Anticipated processing timelines will be provided. Preliminary consultation also allows NPCA staff to confirm what constitutes a complete application and assess the submission based on NPCA's checklists and technical guidelines.

Processing timelines will vary based on the completeness of the submission, nature and complexity of the proposal and quality of the technical submissions. NPCA staff are committed to providing a thorough and expeditious review of EA applications in an effort to meet processing timelines. It is very important that applicants ensure the quality of the submission meets good practice and industry standards to minimize the extent and number of resubmissions and avoid unnecessary delay.

Review Procedures

When the Notice of Commencement is received, its review is facilitated by an NPCA planner. The planner first reviews the submission and confirms NPCA interest in the project. An initial letter detailing NPCA's areas of interest, typically together with digital information on natural features and regulatory limits, is provided to the proponent. Typically, the EA Planner and technical staff, as required, will participate on a Technical Advisory Committee that meets at strategic points throughout the course of the project. Where appropriate, NPCA staff will attend public meetings to provide technical support.

When the technical background studies for the EA are prepared, they are submitted to NPCA for review and comment. The EA planner will circulate the submission to NPCA technical staff for review. Depending on the type of project, a submission may need to be reviewed by NPCA's technical staff. Once a submission is reviewed by technical staff, and all necessary site visits are conducted, the planner coordinates the review comments and composes a letter detailing NPCA's issues, concerns or recommendations. The proponent will then typically update the relative studies using NPCA comments as input. A meeting may be requested in order to discuss and ensure NPCA comments are addressed.

Depending on the type (schedule) of project, NPCA staff requests the proponent submit a draft final report for comment. The report outlines the planning process followed and justifies how conclusions were reached. The NPCA planner will review the report and compose a response letter to the proponent listing any outstanding issues, concerns or recommendations. Technical staff may review technical aspects of the report, as required.

When the proponent files the final report with the Ministry of the Environment, Conservation and Parks (MECP) he NPCA planner will review the report to ensure that all NPCA comments have been addressed satisfactorily.

Submission Requirements

To ensure NPCA's interests are met, and to appropriately assess the technical aspects of the proposal, the submission of a number of information items may be required. The level of detail required for most study and report requirements can vary depending on the location of the project and the nature of the proposal. In this regard, technical requirements may vary from brief discussions between qualified experts, to a letter of opinion, while in other cases a scoped or comprehensive environmental study such as an environmental impact study or comprehensive environmental management plan may be necessary. Pre-consultation meetings with NPCA and other agency staff prior to submission of an application will help to establish the requirements for, and the scope of, reports and studies where needed.

NPCA has developed checklists and technical manuals and guidelines outlining study content expectations and to assist in facilitating the scoping process. In addition, a complete application checklist has been developed which should be included with initial submissions (after pre-consultation) to reduce requests for additional information and help increase efficiencies in the review process.

Level of Service and Timelines

NPCA staff are committed to meeting reasonable review times for all Environmental Assessment applications that are submitted. Review times for EA related applications are established on the premise that an appropriate level of pre-consultation has been conducted to ensure the submission is complete. In general, applications are reviewed based on the order they are submitted and/or as requested by the proponent recognizing NPCA is responsible to provide a consistent level of service to multiple watershed partners for all programs.

It should be recognized that review times and resubmission requirements are directly affected by the completeness and quality of the submission. It is the applicant's responsibility to ensure an appropriate level of pre-consultation has occurred and that technical submissions meet good practice and industry standards to minimize the extent and number of resubmissions and avoid unnecessary delay.

4.0 MUNICIPAL DRAINS

Municipal Drains, designated through the Drainage Act. Under section 28 of the Conservation Authorities Act a watercourse is defined as an identifiable depression in the ground in which a flow of water regularly or continuously occurs. Most Municipal Drains meet the definition of a watercourse under the Act and are therefore regulated.

All Municipal Drainage projects are reviewed to ensure no impacts to flooding, erosion, wetlands, or conservation of land. For Municipal Drain Maintenance works the NPCA adheres to the provincially approved Drainage Act and Conservation Authorities Act Protocol to provide permissions for these works. For works outside of maintenance, a permit may be required for work to be completed. (Or, for new drains or improvements to existing drains a permit may be required for work to be completed)

4.1 DART Protocol

The Province provides direction for municipalities and conservation authorities to guide decision-making and approvals process for municipal drains. When making decisions related to municipal drains which fall within the NPCA's regulated areas, the NPCA will follow the Drainage Act and Conservation Authorities Act (DART) Protocol. In the absence of any approved protocols, the normal NPCA permitting process shall apply.

4.2 Existing Drains – Maintenance

Standard compliance elements are required for the following activities, as outlined in the Province's Drainage Act and Conservation Authorities Act Protocol. Provided these works do not occur within a wetland or wetland boundary, a work permit will not be required by the NPCA for:

i. Brushing bank slope;
ii. Brushing top of bank;
iii. Debris removal and beaver dam removal;
iv. Spot clean-out;
v. Culvert replacement;
vi. Bank repair or stabilization and pipe outlet repair;
vii. Dyke maintenance and repair;
viii. Water control structure maintenance and repair;
ix. Pump station maintenance and repair;
x. Bottom only cleanout (outside of regulated wetland limits);
xi. Bottom cleanout plus one bank slope (outside of regulated wetland limits); and,
xii. Full cleanout (outside of regulated wetland limits).

4.3 New Drains

As per the Drainage Act, any works (physical or adjustment of the assessment schedule) proposed on a municipal drain shall be submitted to the conservation authority for review. New drains or extensions/alterations to the original engineers report may require an NPCA Work Permit depending on location and any potential impacts under the Five Tests of the Conservation Authorities Act. Depending on the scope, nature and location of the work proposed, the NPCA may request an environmental appraisal (i.e. EIS) as per the Drainage Act review process.

5.0 MINISTER'S ZONING ORDERS

Preliminary Consultation

Preliminary Consultation involving a Minister's Zoning Order (MZO) is different than for other Planning Act processes. While the NPCA continues to identify NPCA interests and potential implications with NPCA's policies and regulation, a large focus is also on identifying technical studies, reports and plan that will be required as conditions of the MZO and an NPCA's Permit. The NPCA will endeavor to work with the municipality and proponent to ensure that all NPCA issues are identified and understood in advance of applying for an NPCA Permit.

Review Procedures

When reviewing a request for an MZO, the planner on the file will circulate the proposal internally to NPCA technical staff for comments. Technical staff will identify any study requirements necessary for the review of an NPCA Permit application. As per Section 28.0.1 of the Conservation Authorities Act, conservation authorities may only impose conditions to the permit, including conditions to mitigate:

- Any effects the development project is likely to have on the control of flooding, erosion, dynamic beaches or pollution or the conservation of land.
- Any conditions or circumstances created by the development project that, in the event of a natural hazard, might jeopardize the health or safety of persons or result in the damage or destruction of property.
- Any other matters that may be prescribed by the regulation.

NPCA technical staff will provide the planner with their comments and study requirements. The planner on the file will compile all internal comments and send them to the municipal planner on the file.

Submission Requirements

At minimum, the NPCA will require a plan and description of the proposed development. Due to the unstructured nature of the process for MZOs, it is acknowledged that the NPCA may not be given an opportunity to outline our requirements. Nonetheless, the NPCA will strive to work with our municipal partners to ensure there is sufficient information provided to provide meaningful comments to the approval authority.

Level of Service and Timelines

NPCA staff are committed to meeting reasonable review times for all MZO requests that are submitted. It is acknowledged that the review timeframe will vary from municipality to municipality and there may be situations where an MZO request is not circulated at all. In these instances, the NPCA will work with proponents to achieve an efficient Permit review process.

6.0 NIAGARA ESCARPMENT DEVELOPMENT PERMITS

Preliminary Consultation

It is important for applicants to discuss development related proposals with NPCA staff and NEC staff prior to submitting a formal application. Although the NEC does not have a formal preliminary consultation requirement, a preliminary consultation can be arranged for complex applications to ensure all interests are met. Preliminary consultation should be done as early in the planning process as possible to determine how proposals may be affected by NPCA's programs and policies, including other partnering agencies such as Fisheries and Oceans Canada (DFO) or the Ministry of Natural Resources and Forestry (MNRF). During the preliminary consultation process NPCA staff will inform applicants of the general review process, indicate what components of the proposal are of interest, discuss potential study requirements and subsequent anticipated processing timelines. Preliminary consultation also allows NPCA staff to confirm what constitutes a complete application based on the preliminary discussions and assess the submission based on NPCA's checklists and technical guidelines.

Review Procedures

Through the NEC Development Permit review process, NPCA staff provides NEC with technical advice on issues related to natural hazard, natural heritage protection and water management. The policies contained in NPCA's Policy Document provide the basis for NPCA staff's review and comment. This technical and scientific expertise provided by NPCA supports the decisions of the NEC.

When an NEC Development Permit application is received by NPCA, its review is managed by a planner in the Planning and Department. The planner reviews the application to confirm what NPCA's areas of interest in the proposal and determines whether the submission is complete based on guidance provided during the

preliminary consultation discussions and/or based on NPCA's policies, checklists and technical guidelines. Where deemed necessary through the preliminary consultation process, or in the event that preliminary consultation with NPCA staff did not occur, a preliminary site visit to confirm NPCA's interests in the proposal may be required. Subsequent to this preliminary review, the application is internally circulated to the necessary NPCA technical staff for a thorough technical review.

Upon completion of the technical review and all necessary site visits have been conducted, a letter from the planner is issued to the NEC outlining NPCA's comments. It is important to note that based on the initial review, additional technical studies, reports and/or a revised application may be needed prior to NPCA staff providing final comments – in particular, where pre-consultation with NPCA staff did not take place at the outset.

Submission Requirements

To ensure NPCA's interests are met, and to appropriately assess the technical aspects of the proposal, the submission of a number of information items may be required. The level of detail required for most study and report requirements can vary depending on the location of the property and the nature of the proposal. In this regard, technical requirements may vary from brief discussions between qualified experts, to a letter of opinion, while in other cases a scoped or comprehensive environmental study such as an environmental impact study or comprehensive environmental management plan may be necessary. Preliminary consultation meetings with NPCA and NEC staff prior to submission of an application will help to establish the requirements for, and the scope of, reports and studies where needed.

NPCA has developed checklists, technical manuals and guidelines outlining study content expectations and to help in facilitating the scoping process. In addition, a complete application checklist has been developed which should be included with initial submissions (after preliminary consultation) to reduce requests for additional information and help increase efficiencies in the review process (see Appendix E). Applicable fees are due upon application submission and initial fees are often collected by the municipality and additional fees collected directly by NPCA where necessary (see Appendix F).

Level of Service and Timelines

NPCA staff are committed to meeting reasonable review times for all planning applications that are submitted. Review times for planning related applications are generally established by the NEC, and are on the premise that an appropriate level of preliminary consultation has been conducted to ensure the submission is complete. In general, applications are reviewed based on the order they are submitted and/or as requested by the municipality recognizing NPCA is responsible to provide a consistent level of service to multiple watershed partners for all programs.

7.0 PERMIT APPLICATIONS

7.1 General Information

Niagara Peninsula Conservation Authority administers Ontario Regulation 155/06: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (see Appendix A). This regulation program is based on a risk management framework associated with natural hazard management and watershed health.

Natural hazard management involves planning for the risks associated with naturally occurring processes such as *flood hazards*, *erosion hazards*, *dynamic beach hazards* and other *hazardous land*. These risks include the potential for loss of life, property damage and social disruption as well as environmental impacts. Reducing the impacts of natural hazards to prevent or eliminate these risks is the key goal and is based on four main components:

Prevention of new development located within areas subject to potential loss of life and property damage from natural hazards;

Protection of existing development from natural hazards through implementation of structural and non-structural mitigation measures, including the acquisition of lands prone to natural hazards;

Emergency Response and Recovery Measures to evacuate residents and prepare mitigation measures through flood forecasting and warning systems, including disaster relief; and

Co-ordination between natural hazard management and planning and development related activities to ensure decision makers are well informed.

Since it is typically not possible to eliminate the threats of natural hazards, managing them is based on a risk management approach. This approach recognizes there is always a risk associated with natural hazard processes and establishes an appropriate level of risk for a community to be exposed to. The minimum standards for acceptable levels of risk to the public are set by the Province.

7.1.1 Ontario Regulation 155/06

The administration of Ontario Regulation 155/06 is pursuant to Section 28 of the *Conservation Authorities Act*. Pursuant to this Regulation, a permit is required from NPCA prior to any of the following works taking place:

- straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland;
- development, if in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development.

Development is defined in Section 28 of the Conservation Authorities Act as:

- the construction, reconstruction, erection or placing of a building or structure of any kind;
- any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure;
- site grading; or
- the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

The regulation includes maps identifying the approximate areas regulated by NPCA. The approximate regulation limit illustrated on the maps was established according to the specific criteria outlined in Section 2 of the Regulation. Copies of the maps are available at NPCA's Administration Office. It is important to recognize that the regulation is a 'text' based regulation – in other words, the maps associated with the regulation represent regulated areas based on best available information at the time. Where there is a conflict between regulated areas described in the regulation text and those illustrated on the maps, the text prevails. It is also important to recognize that the regulation limit does not represent a 'limit of development'. Rather, the regulation limit represents the area in which a permit (permission) from NPCA is required prior to any development or interference with a watercourse or wetland occurring. - insert statement that NPCA may use internal screening mapping to help identify unmapped potential regulated features and areas. At the time of preparing this document, NPCA is in the process of updating regulation mapping to reflect most up to date data sets.

7.1.2 Works for Which No Permit Is Required

The following activities may be undertaken without written permission provided that appropriate best management practices are implemented to control sediment and erosion, and provided there are no adverse impacts associated with the activity.

- Floating, removable or cantilever docks that do not interfere with the substrate of a watercourse or waterbody unless there is a shoreline alteration proposed to anchor the dock to land;
- Repairs and renovations to an existing structure within the existing roofline and exterior walls and above the existing foundation (window repair, siding, etc.);

- Accessory structures less than 10 square metres provided they are located outside of the flood plain/wetland/hazardous land and do not require a municipal building permit;
- Non-structural activities associated with existing agricultural use (cropping, pasturing, tilling, fence row clearing, stone pile removal, etc.);
- Landscaping that does not result in alterations to existing grade (e.g. gardens, nurseries, timber harvesting with stump removal, etc.);
- Patching or resurfacing of existing access routes (public roads, driveways, private access roads, and entrance ways) that do not result in alterations to existing grade;
- Drilled well installation;
- Fence installation, not including stone or concrete retaining walls, provided it does not increase the potential for flood damages.

As long as these activities do not result in the straightening, changing, diversion or interference in any way with a watercourse, or interference in any way with a wetland, they are not subject to Ontario Regulation 155/06 and do not require written permission from NPCA.

7.1.3 Internal NPCA Works

Works conducted on NPCA Regulated lands being undertaken by the NPCA are required to conform to the applicable policies in the NPCA's Policy Document. The review procedure is the same as any other Permit application except a clearance letter will be issued in lieu of a Permit.

When any ground disturbance is proposed on NPCA property, the proponent is required to undertake an archaeological assessment, prior to a clearance letter issuance and prior to any work commencing on the lands.

8.2 Types of Permit Applications

As per the NPCA 2020 Client Service Standards, Section 28 permit application review timelines are determined based on the complexity of the review and the feature being impacted. Timelines assume that pre-consultation has taken place with NPCA staff, a complete application has been submitted and no amendments or re-submissions are required. There are three different review categories: Major, Minor and Routine.

8.2.2 Routine Works – check with NPCA client standard

Routine permit applications are activities that are documented through another approval process or are determined to have limited impacts on the control of flooding, erosion, dynamic beaches, pollution or the conservation of land. Routine permit applications may be those involving, Standard Compliance Requirements under the Drainage Act and Conservation Authorities Act Protocol and non-habitable buildings and structures that are less than 15 m2 in size.

Routine Permit applications can require up to 14 days to complete a full review. Routine Permit applications may include but are not limited to:

- Any application where the staff review time is minimal (as determined during the pre-consultation)

8.2.3 Minor Works

Permit applications for development projects may be considered minor in nature due to the project size, level of risk, location, and/or other factors. These applications have minor impacts on the control of flooding, erosion, dynamic beaches, pollution or the conservation of land. Based on the proximity of the project to the hazard, the minor permit applications are reviewed by NPCA staff and generally require standard recommendations or conditions. Minor permit applications could be those involving, for example, minor fill; minor development; and minor site alteration where there is a high degree of certainty that issues associated with natural hazards are minimal.

Minor Permit applications can require up to 21 days to complete a full review. Minor Permit applications may include but are not limited to:

- Works not involving a technical study
- All works related to the Drainage Act not covered by the DART protocol

8.2.4 Major Works

Major applications for S. 28 permits require significant staff involvement. These applications involve highly complex projects, for example, large subdivisions requiring technical review supported by comprehensive analysis, or smaller scale site specific applications that require complex technical reviews. The proposals may involve developments with significant natural hazards, environmental impacts, or multiple approval processes requirements. Generally, these would include Plans of Subdivision and Condominium, large Site Plan Control applications, and major infrastructure development. Major applications could also include those where works have been undertaken, or are in process of being undertaken, without prior approval from the NPCA; and those where works have been undertaken that do not comply with the NPCA policies and restoration/remediation measures are required.

Major Permit applications can require up to 28 days to complete a full review. Major Permit applications may include but are not limited to:

- All works within the Lake Erie and Lake Ontario Shoreline
- Applications with 1 or more technical studies

- Any application where the volume of the submission warrants a longer review time (as determined during pre-consultation)

9.0 OTHER REVIEW SERVICES

9.1 Solicitor and Realtor Inquiries

NPCA offers a Solicitor and Realtor Inquiry service to assist in providing the public with the best information available regarding NPCA's interests throughout the watershed. Through this service, lawyers and real estate agents, acting on behalf of their clients, request information about NPCA's interests in a property. In responding to these requests, NPCA staff screen the property and issues a letter stating whether the property is affected by NPCA's regulatory program or any other interests or NPCA programs. In addition, the letter will outline where there may be an outstanding violation on the property and how to proceed to address the matter.

The letter that is issued by NPCA serves as a formal record, and provides valuable information to the client when making decisions about purchasing a property. However, the letter does not constitute a formal position on a planning or permit application nor does it replace the preliminary consultation process.

Solicitor and Realtor Inquiries should be made in writing and include the following:

- **Letter of Inquiry** – The Letter of Inquiry should note the location of the subject property, including street address, lot and concession number, municipality and outline what information is being requested.
- **Legal Survey** – The Legal Survey should be in its entirety and must depict the geographic location and extent of the property, with the property in question highlighted. In lieu of a survey, a site plan, Property Index Map, a municipal zoning schedule or an engineering drawing may be sufficient.
- **Review Fee** – refer to Plan Review Fee Schedule in Appendix F.

In general, applications are review based on the order in which they are submitted recognizing NPCA is responsible to provide a consistent level of service for all programs offered throughout the jurisdiction.

9.2 Property Inquiries and Building Permit Clearance

NPCA also offers a Property inquiry service. Property inquiries are typically requests from land owners (or potential purchasers) looking to obtain detailed information on the development potential of a property. Both pre-consultation and site visits are very important in expediting the review period needed to provide this service. Where a landowner is interested in meeting with NPCA staff to discuss NPCA's interests in a property, it is most helpful if the inquirer first call NPCA's office to discuss the matter with the appropriate staff member first. The NPCA staff member will undertake a brief preliminary review of the request and advise as to NPCA's interests in

the matter. Where formal correspondence is needed to obtain municipal clearances or for other purposes, a fee is required and the submission should include similar information to that outlined in Appendix E.

It is important to note that most Property Inquiries require a site visit to ensure NPCA staff have a clear understanding of the proposal and the existing condition of the site. Prior to a site visit being scheduled NPCA staff require the submission of a conceptual site plan, and in the case of a potential purchaser, written permission from the current land owner.

13.0 FEES

Fees for the processing of applications are set by the Board of Directors of the NPCA and must be paid at the time of submitting an application in accordance with the NPCA fee policy and schedule. All fees must be paid prior to the review and issuance of the work permit. The fee schedule is attached to the application form and is available on the NPCA's website (see Appendix F). Additional fees may be applicable depending on the scope of the application in accordance with the fee policy and schedule.

APPENDICES

A. Ontario Regulation 155/06

B. NPCA Client Service Standards for Plan and Permit Review

C. Procedure Flowcharts

D. Permit Application

E. Complete Application Checklist

F. NPCA Plan Review and Permit Fee Schedule

G. NPCA By-Law 01-2021, Being a By-Law to Amend the NPCA Administrative By-Law governing the calling of the meetings and the procedures to be followed at meetings MOUs

H. NPCA Interim s. 28 EIS Guidelines

I. NPCA Wetlands Procedure Document

J. NPCA Shoreline Protection Works Submission Guidance and Checklist

K. NPCA Landscaping Plan Guideline

L. NPCA Channel Modification Checklist and Submission Requirements

M. NPCA Best Practices for Preserving and Restoring Soil Health

N. NPCA Field Staking Protocol

O. Erosion and Sediment Control Guide for Urban Construction (TRCA, CVC, LSRCA)

P. Evaluation, Classification and Management of Headwater Drainage Features Guidelines (CVC, TRCA)

Q. Wetland Water Balance Risk Evaluation and Monitoring Protocol (TRCA)

Conservation Authorities Act
Loi sur les offices de protection de la nature

ONTARIO REGULATION 155/06

NIAGARA PENINSULA CONSERVATION AUTHORITY: REGULATION OF DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES

Consolidation Period: From February 8, 2013 to the e-Laws currency date.

Last amendment: 71/13.

Legislative History: 71/13.

This Regulation is made in English only.

Definition

1. In this Regulation,

"Authority" means the Niagara Peninsula Conservation Authority. O. Reg. 155/06, s. 1.

Development prohibited

2. (1) Subject to section 3, no person shall undertake development or permit another person to undertake development in or on the areas within the jurisdiction of the Authority that are,

(a) adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to inland lakes that may be affected by flooding, erosion or dynamic beaches, including the area from the furthest offshore extent of the Authority's boundary to the furthest landward extent of the aggregate of the following distances:

(i) the 100 year flood level, plus the appropriate allowance for wave uprush shown in the most recent document entitled "Lake Ontario Shoreline Management Plan" available at the head office of the Authority,

(ii) the 100 year flood level, plus the appropriate allowance for wave uprush shown in the most recent document entitled "Lake Erie Shoreline Management Plan" available at the head office of the Authority,

(iii) the predicted long term stable slope projected from the existing stable toe of the slope or from the predicted location of the toe of the slope as that location may have shifted as a result of shoreline erosion over a 100-year period,

(iv) where a dynamic beach is associated with the waterfront lands, the appropriate allowance inland to accommodate dynamic beach movement shown in the most recent document entitled "Lake Ontario Shoreline Management Plan" available at the head office of the Authority, and

(v) where a dynamic beach is associated with the waterfront lands, the appropriate allowance inland to accommodate dynamic beach movement shown in the most recent document entitled "Lake Erie Shoreline Management Plan" available at the head office of the Authority;

(b) river or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse, the limits of which are determined in accordance with the following rules:

(i) where the river or stream valley is apparent and has stable slopes, the valley extends from the stable top of bank, plus 15 metres, to a similar point on the opposite side,

(ii) where the river or stream valley is apparent and has unstable slopes, the valley extends from the predicted long term stable slope projected from the existing stable slope or, if the toe of the slope is unstable, from the predicted location of the toe of the slope as a result of stream erosion over a projected 100-year period, plus 15 metres, to a similar point on the opposite side,

(iii) where the river or stream valley is not apparent, the valley extends the greater of,

(A) the distance from a point outside the edge of the maximum extent of the flood plain under the applicable flood event standard, to a similar point on the opposite side, and

(B) the distance of a predicted meander belt of a watercourse, expanded as required to convey the flood flows under the applicable flood standard, to a similar point on the opposite side;

(c) hazardous lands;

(d) wetlands; or

(e) other areas where development could interfere with the hydrologic function of a wetland, including areas up to 120 metres of all provincially significant wetlands and wetlands greater than 2 hectares in size, and areas within 30 metres of wetlands less than 2 hectares in size. O. Reg. 155/06, s. 2 (1); O. Reg. 71/13, s. 1 (1-3).

(2) All areas within the jurisdiction of the Authority that are described in subsection (1) are delineated as the "Regulation Limit" shown on a series of maps filed at the head office of the Authority under the map title "Ontario Regulation 97/04: Regulation for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses". O. Reg. 71/13, s. 1 (4).

(3) If there is a conflict between the description of areas in subsection (1) and the areas as shown on the series of maps referred to in subsection (2), the description of areas in subsection (1) prevails. O. Reg. 71/13, s. 1 (4).

Permission to develop

3. (1) The Authority may grant permission for development in or on the areas described in subsection 2 (1) if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development. O. Reg. 155/06, s. 3 (1).

(2) The permission of the Authority shall be given in writing, with or without conditions. O. Reg. 155/06, s. 3 (2).

(3) Subject to subsection (4), the Authority's executive committee, or one or more employees of the Authority that have been designated by the Authority for the purposes of this section, may exercise the powers and duties of the Authority under subsections (1) and (2) with respect to the granting of permissions for development in or on the areas described in subsection 2 (1). O. Reg. 71/13, s. 2.

(4) A designate under subsection (3) shall not grant a permission for development with a maximum period of validity of more than 24 months. O. Reg. 71/13, s. 2.

Application for permission

4. A signed application for permission to undertake development shall be filed with the Authority and shall contain the following information:

1. Four copies of a plan of the area showing the type and location of the proposed development.
2. The proposed use of the buildings and structures following completion of the development.
3. The start and completion dates of the development.
4. The elevations of existing buildings, if any, and grades and the proposed elevations of buildings and grades after the development.
5. Drainage details before and after the development.
6. A complete description of the type of fill proposed to be placed or dumped.
7. Such other technical studies or plans as the Authority may request. O. Reg. 155/06, s. 4; O. Reg. 71/13, s. 3.

Alterations prohibited

5. Subject to section 6, no person shall straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or change or interfere in any way with a wetland. O. Reg. 155/06, s. 5.

Permission to alter

6. (1) The Authority may grant permission to straighten, change, divert or interfere with the existing channel of a river, creek, stream or watercourse or to change or interfere with a wetland. O. Reg. 155/06, s. 6 (1); O. Reg. 71/13, s. 4 (1).

(2) The permission of the Authority shall be given in writing, with or without conditions. O. Reg. 155/06, s. 6 (2).

(3) Subject to subsection (4), the Authority's executive committee, or one or more employees of the Authority that have been designated by the Authority for the purposes of this section, may exercise the powers and duties of the Authority under subsections (1) and (2) with respect to the granting of permissions for alteration. O. Reg. 71/13, s. 4 (2).

(4) A designate under subsection (3) shall not grant a permission for alteration with a maximum period of validity of more than 24 months. O. Reg. 71/13, s. 4 (2).

Application for permission

7. A signed application for permission to straighten, change, divert or interfere with the existing channel of a river, creek, stream or watercourse or change or interfere with a wetland shall be filed with the Authority and shall contain the following information:

1. Four copies of a plan of the area showing plan view and cross-section details of the proposed alteration.
2. A description of the methods to be used in carrying out the alteration.
3. The start and completion dates of the alteration.
4. A statement of the purpose of the alteration.
5. Such other technical studies or plans as the Authority may request. O. Reg. 155/06, s. 7; O. Reg. 71/13, s. 5.

Cancellation of permission

8. (1) The Authority may cancel a permission granted under section 3 or 6 if it is of the opinion that the conditions of the permission have not been met. O. Reg. 155/06, s. 8 (1); O. Reg. 71/13, s. 6 (1).

(2) Before cancelling a permission, the Authority shall give a notice of intent to cancel to the holder of the permission indicating that the permission will be cancelled unless the holder shows cause at a hearing why the permission should not be cancelled. O. Reg. 155/06, s. 8 (2).

(3) Following the giving of the notice under subsection (2), the Authority shall give the holder at least five days notice of the date of the hearing. O. Reg. 155/06, s. 8 (3); O. Reg. 71/13, s. 6 (2).

Period of validity of permissions and extensions

9. (1) The maximum period, including an extension, for which a permission granted under section 3 or 6 may be valid is,

(a) 24 months, in the case of a permission granted for projects other than projects described in clause (b); and

(b) 60 months, in the case of a permission granted for,

(i) projects that, in the opinion of the Authority or its executive committee, cannot reasonably be completed within 24 months from the day the permission is granted, or

(ii) projects that require permits or approvals from other regulatory bodies that, in the opinion of the Authority or its executive committee, cannot reasonably be obtained within 24 months from the day permission is granted. O. Reg. 71/13, s. 7.

(2) The Authority or its executive committee may grant a permission for an initial period that is less than the applicable maximum period specified in subsection (1) if, in the opinion of the Authority or its executive committee, the project can be completed in a period that is less than the maximum period. O. Reg. 71/13, s. 7.

(3) If the Authority or its executive committee grants a permission under subsection (2) for an initial period that is less than the applicable maximum period of validity specified in subsection (1), the Authority or its executive committee may grant an extension of the permission if,

(a) the holder of the permission submits a written application for an extension to the Authority at least 60 days before the expiry of the permission;

(b) no extension of the permission has previously been granted; and

(c) the application sets out the reasons for which an extension is required and, in the opinion of the Authority or its executive committee, demonstrates that circumstances beyond the control of the holder of the permission will prevent completion of the project before the expiry of the permission. O. Reg. 71/13, s. 7.

(4) When granting an extension of a permission under subsection (3), the Authority or its executive committee may grant the extension for the period of time requested by the holder in the application or for such period of time as the Authority or its executive committee deems appropriate, as long as the total period of validity of the permission does not exceed the applicable maximum period specified in subsection (1). O. Reg. 71/13, s. 7.

(5) For the purposes of this section, the granting of an extension for a different period of time than the period of time requested does not constitute a refusal of an extension. O. Reg. 71/13, s. 7.

(6) The Authority or its executive committee may refuse an extension of a permission if it is of the opinion that the requirements of subsection (3) have not been met. O. Reg. 71/13, s. 7.

(7) Before refusing an extension of a permission, the Authority or its executive committee shall give notice of intent to refuse to the holder of the permission, indicating that the extension will be refused unless,

(a) the holder requires a hearing, which may be before the Authority or its executive committee, as the Authority directs; and

(b) at the hearing, the holder satisfies the Authority, or the Authority's executive committee, as the case may be,

(i) that the requirements of clauses (3) (a) and (b) have been met, and

(ii) that circumstances beyond the control of the holder will prevent completion of the project before the expiry of the permission. O. Reg. 71/13, s. 7.

(8) If the holder of the permission requires a hearing under subsection (7), the Authority or its executive committee shall give the holder at least five days notice of the date of the hearing. O. Reg. 71/13, s. 7.

(9) After holding a hearing under subsection (7), the Authority or its executive committee shall,

(a) refuse the extension; or

(b) grant an extension for such period of time as it deems appropriate, as long as the total period of validity of the permission does not exceed the applicable maximum period specified in subsection (1). O. Reg. 71/13, s. 7.

(10) Subject to subsection (11), one or more employees of the Authority that have been designated by the Authority for the purposes of this section may exercise the powers and duties of the Authority under subsections (2), (3) and (4), but not those under subsections (6), (7), (8) and (9). O. Reg. 71/13, s. 7.

(11) A designate under subsection (10) shall not grant an extension of a permission for any period that would result in the permission having a period of validity greater than 24 months. O. Reg. 71/13, s. 7.

Appointment of officers

10. The Authority may appoint officers to enforce this Regulation. O. Reg. 155/06, s. 10.

Flood event standards

11. (1) The applicable flood event standards used to determine the maximum susceptibility to flooding of lands or areas within the watersheds in the area of jurisdiction of the Authority are the Hurricane Hazel Flood Event Standard, the 100 Year Flood Event Standard and the 100 year flood level plus wave uprush, described in Schedule 1. O. Reg. 155/06, s. 11 (1).

(2) The 100 Year Flood Event Standard applies to all watersheds within the area of jurisdiction of the Authority except for,

(a) the watersheds associated with Shriner's Creek, Ten Mile Creek and Beaverdams Creek (including Tributary W-6-5) in the City of Niagara Falls where the Hurricane Hazel Flood Event Standard applies; and

(b) Lake Ontario and Lake Erie in the Great Lakes-St. Lawrence River System, as described in the Schedule, where the 100 Year Flood Event Standard, plus wave uprush, applies. O. Reg. 155/06, s. 11 (2).

12. REVOKED: O. Reg. 71/13, s. 8.

13. OMITTED (REVOKES OTHER REGULATIONS). O. Reg. 155/06, s. 13.

SCHEDULE 1

1. The Hurricane Hazel Storm Event Standard means a storm that produces over a 48-hour period,

(a) in a drainage area of 25 square kilometres or less, rainfall that has the distribution set out in Table 1; or

(b) in a drainage area of more than 25 square kilometres, rainfall such that the number of millimetres of rain referred to in each case in Table 1 shall be modified by the percentage amount shown in Column 2 of Table 2 opposite the size of the drainage area set out opposite thereto in Column 1 of Table 2.

TABLE 1

73 millimetres of rain in the first 36 hours
6 millimetres of rain in the 37th hour
4 millimetres of rain in the 38th hour
6 millimetres of rain in the 39th hour
13 millimetres of rain in the 40th hour
17 millimetres of rain in the 41st hour
13 millimetres of rain in the 42nd hour
23 millimetres of rain in the 43rd hour
13 millimetres of rain in the 44th hour
13 millimetres of rain in the 45th hour
53 millimetres of rain in the 46th hour
38 millimetres of rain in the 47th hour
13 millimetres of rain in the 48th hour

TABLE 2

Column 1	Column 2

Drainage Area (square kilometres)	Percentage
26 to 45 both inclusive	99.2
46 to 65 both inclusive	98.2
66 to 90 both inclusive	97.1
91 to 115 both inclusive	96.3
116 to 140 both inclusive	95.4
141 to 165 both inclusive	94.8
166 to 195 both inclusive	94.2
196 to 220 both inclusive	93.5
221 to 245 both inclusive	92.7
246 to 270 both inclusive	92.0
271 to 450 both inclusive	89.4
451 to 575 both inclusive	86.7
576 to 700 both inclusive	84.0
701 to 850 both inclusive	82.4
851 to 1000 both inclusive	80.8
1001 to 1200 both inclusive	79.3
1201 to 1500 both inclusive	76.6
1501 to 1700 both inclusive	74.4
1701 to 2000 both inclusive	73.3
2001 to 2200 both inclusive	71.7
2201 to 2500 both inclusive	70.2
2501 to 2700 both inclusive	69.0
2701 to 4500 both inclusive	64.4
4501 to 6000 both inclusive	61.4
6001 to 7000 both inclusive	58.9
7001 to 8000 both inclusive	57.4

2. The 100 Year Flood Event Standard means rainfall or snowmelt, or a combination of rainfall and snowmelt, producing at any location in a river, creek, stream or watercourse a peak flow that has a probability of occurrence of one per cent during any given year.

3. The 100 year flood level means the peak instantaneous still water level plus an allowance for wave uprush and other water-related hazards for Lake Ontario and Lake Erie in the Great Lakes-St. Lawrence River System that has a probability of occurrence of one per cent during any given year.

O. Reg. 155/06, Sched. 1.

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NPCA Client Service Standards for Plan and Permit Review

Endorsed: May 21, 2020 NPCA Board Resolution FA-64-20

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NPCA Client Service Standards Plan and Permit Review

Table of Contents

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Version History

DOCUMENT UPDATED	DATE	VERSION

Background

In April 2019, Conservation Ontario (CO) Council endorsed the CO Client Service and Streamlining Initiative. This initiative identifies actions to be taken by CAs, in order to help the Province achieve its objective of increasing housing supply while protecting public health and safety, and the environment. These actions include: a) Improve Client Service and Accountability, b) Increase Speed of Approvals, and c) Reduce Red Tape and Regulatory Burden.

In June 2019, (and amended at CO Council in December 2019 based on further input from the Association of Municipalities of Ontario) CO developed three documents to support the initiative:

1. CA-Municipality MOU Template for Planning and Development Reviews;
2. Guideline for Client Service Standards for Conservation Authority Plan and Permit Review; and
3. Guideline for CA Fee Administration Policies for Plan Review and Permitting.

It is important to note that a number of CAs already have comprehensive service delivery standards, MOUs, and fee structures and associated fee policies/guidelines in place. The 2019 CO documents supplement existing CA documents to support the Province's objective as noted above.

CO used existing CA resources to form a guideline that includes best practices for client service standards. The CO guideline includes several best practices to assist CAs and applicants through the CA approval process. Local CA client service procedures and policies should be consistent with this CO guideline.

NPCA has utilized the CO Client Service Standards for Conservation Authority Plan and Permit Review guidance document to create a localized standard within the watershed.

Conservation Authority Roles and Activities

The role of the NPCA in plan input and review (i.e. Planning), and in permit review (i.e. Permitting) is summarized below.

Planning – Plan Input and Review

The NPCA is involved in the review of planning applications under the *Planning Act* in five ways: as an agency with provincially delegated responsibility for the natural hazard policies of the Provincial Policy Statement (PPS); as a municipal technical advisor; as a public body under various regulations made under the *Planning Act;* as a watershed-based resource management agency and as landowners.

- The NPCA is delegated responsibility under the Provincial One Window Planning System for Natural Hazards. NPCA reviews municipal policy documents and development applications under the *Planning Act* and ensures they are consistent with the natural hazard policies of the PPS. This delegated provincial responsibility is also typically included in local CA- Municipal Memorandum of Understandings (MOUs) for municipal plan review. In this delegated role, Conservation Authorities represent the "Provincial Interest" in planning exercises with respect to natural hazards.

- The NPCA may also provide technical advice to municipalities for planning applications through service agreements or MOUs. In this capacity, NPCA staff may provide technical input on potential environmental impacts and how impacts can be avoided or minimized. Comments may apply to a range of matters according to the MOU including, but not limited to: natural hazards, natural heritage, water quality and quantity, stormwater management, and other Provincial Plans such as the Niagara Escarpment Plan, Greenbelt Plan, Growth Plan for the Greater Golden Horseshoe; *Great Lakes Protection Act*, and *Clean Water Act*; as well as local Official Plan policy and zoning by-law implementation.

- *Planning Act* Regulations require municipalities to give notice to the NPCA regarding changes to policy documents such as Official Plans and Zoning By-laws and planning applications, such as plans of subdivision.

- The NPCA provides additional comments related to local watershed management as a watershed-based resource management agency.

- The NPCA is also a landowner, and as such, may become involved in the planning and development process either as a proponent or in a third-party capacity as an adjacent landowner.

Generally, municipalities act as planning approval authorities and are responsible for the planning process. It is recognized that the NPCA may not have a role in all *Planning Act* applications, but for purposes of this guideline and the identification of best practices, it is assumed that there is a review role for the NPCA. A summary of the roles of the NPCA in plan review is included below in **Table 1.**

Table 1: NPCA Role in Plan Review

Role	Type of Role	Required, Through Agreement or Voluntary	Representing	Result
Regulatory Agency (S. 28 of the *Conservation Authorities Act)*	Decision Making	Required	Provincial Interests	CA responsible for decision
Delegated "Provincial Interest"	Review/ Commenting	Required	Provincial Interest	Comments must be considered by municipality
Public Bodies	Review/ Commenting	All	Authority Interests	Comments should be considered by municipality
Service Provider	Service	Through Agreement	Terms of Agreement (MOU)	Dependent upon terms of the agreement
Landowners	Review/ Commenting / Proponents	Voluntary	Authority Interests	Comments may be considered by the municipality

Permitting – Permit Review

The CA issues permissions (permits) under Section 28 (S. 28) of the *Conservation Authorities Act*. Section 28 allows the CA to regulate development and activities in or adjacent to river or stream valleys, shorelines of the Great Lakes-St. Lawrence River system and inland lakes, watercourses, hazardous lands (e.g. unstable soil, bedrock, and slopes), wetlands and other areas around wetlands. Development taking place on these lands may require permission from the CA to confirm that the control of flooding, erosion, dynamic beaches, pollution or the conservation of land are not negatively affected.

The CA also regulates the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, and watercourse or for changing or interfering in any way with a wetland.

Upon proclamation of the new S. 28 under the *Conservation Authorities Act,* the NPCA would also consider whether the activity is likely to create conditions or circumstances that, in the event of a natural hazard, might jeopardize the health or safety of persons or result in the damage or destruction of property.

As CAs are responsible for the review of S. 28 permit applications, they have greater control over the timeliness of approvals as compared to their role in plan input and review.

Guideline: Client Service Standards for Plan and Permit Review

This guideline, on client service standards for plan and permit review, is divided into the following **key matters** that support process streamlining, efficiency and transparency:

- **Online decision support tools**
- **Application management and review**
- **Level of service**
- **Performance evaluation and reporting.**

In addition to the above, **Appendix A** includes the "general complete application submission for S. 28 permit applications", with important footnotes and **Appendix B** includes the NPCA client service delivery charter.

4. Online Decision Support Tools

The NPCA will ensure that decision support tools are available to the public on the NPCA website and at the NPCA main office. These tools and documents include:

- Online screening maps for regulated features
- CA-Municipal MOU or technical service agreements
- CA plan review and regulation approvals policies, procedures and guidelines
- CA technical checklist for planning applications
- CA complete application requirements for S. 28 permit applications
- CA fee policies and schedules for planning and permit applications
- CA Client Service Standards Commitment/Policy.

1.1 Online screening maps

Planning applications are typically examined by NPCA staff (including planners and water resources engineers). Applications may be reviewed by other technical staff such as hydrogeologists, geotechnical engineers, ecologists, regulations officers, etc. Critical advice with regards to projects/proposals is provided to applicants using the best available and most up to date science and information.

It is important to recognize that technical mapping will be periodically updated for various reasons, for example, site- specific studies or new and updated guidelines will influence the mapping. In the "Made-in-Ontario Environment Plan", the Province has also identified the need to support environmental planning and to update natural hazard technical guidelines to reflect climate change.

Online screening maps allow clients to efficiently screen development projects, while also supporting transparency and public access to essential information. The following best practices will help manage online screening maps, with a priority placed on the NPCA regulated area screening map:

- The NPCA will ensure that a Board approved screening map for the NPCA regulated areas is available to watershed municipalities and the public.

- The screening map will allow for users to view the NPCA regulated areas as a separate data layer [map showing the overall NPCA S. 28 Regulation Limits].

- The NPCA regulated area maps shall be updated per the "Procedure for Updating Section 28 Mapping: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulations", endorsed by Conservation Ontario Council April, 2018 (**Appendix E**).

- The NPCA regulated area maps will be reviewed and updated on an annual basis (at minimum) for housekeeping changes; and from time to time to maintain accuracy, for example when new provincial technical guidelines are available.

- The updated mapping shall be approved by the NPCA Board in a timely fashion, prior to making it available to the public.

- The NPCA shall ensure accurate reporting of mapping updates, public consultation (to provide information and receive comments), and notification to the Ministry of Natural Resources and Forestry (MNRF) per the "Procedure for Updating Section 28 Mapping: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulations", endorsed by Conservation Ontario Council April, 2018. The NPCA will notify the public of changes to mapped regulated areas.

- The NPCA regulated area screening map shall be searchable by municipal address and ARN if possible.

- The applicable criteria for the map showing areas regulated by the NPCA, (i.e. provincial technical guidelines), shall be made available on the NPCA website if the guideline is a public document. If the guideline is not made public, then the NPCA will provide general contact information such that the user can request further information from the organization or agency that issued the guideline.

- The NPCA will have an agreement that includes a clear disclaimer statement for users of the available map layers. The agreement should appear on top of the map layer such that the user must click “Accept” before being able to view the map layer. See the **Example Disclaimer Introduction box in Appendix C**, which as a best practice can be inserted at the beginning of the disclaimer statement for improved clarity. Note the following important matters regarding click-wrap and data sharing agreements:

    - There may be general clauses in the disclaimer that apply to all CAs, but the dataset-specific inclusions will vary from region to region depending on the source of the data, who owns the Intellectual Property (IP), and other variables. This variation will apply to each unique layer that the CA includes in their web mapping application.

    - Data layers such as natural feature mapping etc. are typically obtained from external sources; therefore diligence is required while displaying these. Links may be added to where additional data may be obtained beyond NPCA regulated area mapping such as Natural Heritage Information Centre (NHIC) etc. for wetland data, Areas of Natural and Scientific Interest (ANSI) etc.

    - NPCA has access to the Assessment Parcel layer as sub- licensees through the Ontario Parcel Alliance (OPA), which is administered by the Province of Ontario through Land Information Ontario (LIO). The OPA is an agreement between the Province, Municipal Property Assessment Corporation (MPAC) and Teranet and sets out specific requirements that need to be met before parcel data can be used on a web mapping application. (Note: a schedule needs to be completed and signed and the NPCA must display certain language in the application as a condition of use).

    - Orthophotography comes to the NPCA from a variety of sources – one of which is municipal partners. Each of these would come with their own specific agreement that would include various rights and obligations. Provincial acquisitions (like SWOOP, SCOOP, FRI and DRAPE), for example, stipulate that these images cannot be displayed on public facing web mapping applications under any circumstances within a two-year period following their capture. They then can be used with acknowledgment of the Crown copyright, etc.

    - A best practice for NPCA is to strive toward making NPCA owned data available for direct download through an open data licence and if possible, will be made available on the website and easily accessible by the public.

- At the discretion of the NPCA, other information layers may also be provided, for example: floodlines, wetlands, parcel boundaries, source protection areas, intake protection zones, wellhead protection areas, etc. The NPCA must ensure that relevant best practices are followed for all displayed layers.

- Mapping which informs plan review and technical services can be very complicated, and the services provided by each CA vary depending on their MOU with each municipality. The NPCA website and fee schedules will, if possible, include plain language descriptions of the types of services and mapping provided by the NPCA.

1.2 Other relevant documents

As a best practice, the NPCA will post relevant decision support tools and documents on the website. NPCA-Municipal/Regional/County MOUs or technical service agreements will be posted on the NPCA website to allow the public to understand how the NPCA works with local municipalities for plan review and technical services. In addition, the NPCA website will include other decision support tools such as: NPCA plan review policies/guidelines; CA Act regulation approvals policies/guidelines; NPCA technical checklist for planning applications; and NPCA complete application requirements and checklists for S. 28 permit applications. NPCA fee policies and schedules and the Client Service Standards Commitment/Policy will also be publicly available on the website.

2. Application Management and Review

2.1 Application Management

The following are best practices to ensure that applications are managed efficiently:

- The NPCA will implement an internal application tracking system to support efficiency and transparency. Applications are prioritized based on factors such as the order in which they are submitted, complexity, and whether the permit applications are complete or resubmissions required. Planning applications may be prioritized based on discussions with and in agreement with the associated municipality.

- The NPCA will identify a senior planning and permitting staff member as a one-point contact to be the ‘client service facilitator’ for issues management around plan review and/or permit applications. The senior NPCA staff person working in this capacity should participate in regular meetings with the development community in the watershed. For the NPCA this contact person will be the Director, Watershed Management or their designate.

- The NPCA will prioritize S. 28 permit applications for emergency works to respond to circumstances that pose a risk to life and/or property. The NPCA will note this (if required) in MOU's with the Region of Niagara, City of Hamilton and Haldimand County and any additional MOU's which may be required.

Each application differs on specifics of the project, location, and the nature, scale and scope of the proposed development. Applications also may have various supporting technical studies. The different types of applications that are received by the NPCA may include, for example:

- *Planning Act* Applications (Official Plan Amendments, Zoning By-law Amendments, Minor Variances, Plans of Subdivision and Condominium, Site Plan Control, etc.)

- Permissions under S. 28 of the *Conservation Authorities Act* (soil placement/re-grading, industrial development, construction of homes, relocations of watercourses, construction of accessory structures such as sheds, etc.).

Developments may undergo both planning and permitting review from the NPCA. Although there is a need to ensure that *Planning Act* applications are coordinated with S. 28 permit applications, these are **two distinct application processes**. *Planning Act* applications must meet requirements under the *Planning Act,* Provincial Policy Statement, Official Plans and any applicable provincial plan, whereas S. 28 applications need to meet the requirements of the *Conservation Authorities Act* and NPCA Regulation 155/06 (or as amended).

The emphasis should be on **land use planning first**, which must consider the same land use constraints that the NPCA regulates through the S.28 regulations. **Involvement of the NPCA in the planning process supports good land use planning, which in turn helps to avoid situations where an application is approved under the *Planning Act* that may not be approved under S.28 of the *Conservation Authorities Act.***

2.2 Application Categories

2.2.1 Plan Input and Review Activities under the Planning Act

Municipalities circulate the following types of planning documents and applications made under the *Planning Act* to the NPCA:

- Official Plans and Plan amendments
- Zoning By-laws and amendments, Holding By-laws, Temporary Use By-laws and Interim Control By-laws
- Plans of Subdivision or Condominium
- Site Plan Control
- Consents/Land Division
- Minor variances

2.2.1a Plan Input

Under the CO/MNRF/MMAH MOU on CA Delegated Responsibilities, NPCA has responsibility for representing the "Provincial Interest" for natural hazard policies (Section 3.1) of the Provincial Policy Statement, 2020 (PPS) under the *Planning Act.* The MOU with the Province commits all CAs to review policy documents and development proposals processed under the *Planning Act.* NPCA also has a commenting role in approval of new or amended 'Special Policy Areas' for flood plains under S. 3.1.3 of the PPS, where such designations are feasible.

Many CAs enter into technical service agreements or MOUs with municipalities for plan input advisory services. As a best practice, a CA-Municipal MOU would mutually establish service standards which should include the timelines for circulation and review of planning documents. NPCA MOU's can be reviewed at https://npca.ca/administration/permits.

2.2.1b Plan Review

Some applications require significant NPCA staff involvement for review. These may include highly complex projects requiring technical review and comprehensive analysis, or smaller, site specific applications with complex technical reviews. Some applications involve large developments with significant natural hazards, environmental impacts, or multiple approvals. Generally, these include Plans of Subdivision and Condominium, and complex Site Plan Control applications often coupled with Official Plan or Zoning By-law amendments.

Some projects have less of an environmental impact than major projects. They could require scoped technical studies. These projects typically have a lower level of hazard risk. Based on the proximity of the project to regulated areas, these planning applications are reviewed by NPCA staff and generally require standard recommendations to the municipality.

The NPCA determines the fees for each planning application in accordance with approved fee schedules. The fee schedules are based on the complexity of the application and technical review required, which influences the staff time and resources needed for the review. To review NPCA's current planning & regulation fee schedule, please visit https://npca.ca/administration/permits.

Certain activities proposed under planning applications may also trigger the need for a CA Act S. 28 permit (see below).

2.2.2 Permit Application Streams

As per the CO guideline, NPCA defines permit applications as "major", "minor" or "routine", to support the streamlining of the application review process. This is aligned with or exceeds the standards of the "Policies and Procedures for Conservation Authority Plan Review and Permitting Activities", published by the Ministry of Natural Resources and Forestry in 2010.

It is recognized that many CAs divide permit applications into more streams than the three described in this guideline, for example: minor, standard/routine, complex, compliance (where works have been undertaken or are in process of being undertaken without prior approval from the CA), restoration (where works have been undertaken that do not comply with the CA S. 28 policies and procedures, and restoration/remediation measures are required), etc.

It is also recognized that some CAs divide permit applications into different streams for the purpose of determining appropriate fees, or separately for the purpose of determining the permit decision timeline.

In the CA service standards, the CA will clearly define and distinguish streams that are for determining fees and streams that are for determining permit decision timelines. The NPCA, as a best practice, will provide a break-down of fees within each category of application to clarify fees or timelines for application submissions. For the purpose of determining permit decision timelines, the applications will be categorized into the three main streams of: **major, minor and routine permit applications**. This supports an easier understanding by the public and streamlining of the process.

- **Major applications** for S. 28 permits require significant staff involvement. These applications involve highly complex projects, for example, large subdivisions requiring technical review supported by comprehensive analysis, or smaller scale site specific applications that require complex technical reviews. The proposals may involve developments with significant natural hazards, environmental impacts, or multiple approval processes requirements. Generally, these would include Plans of Subdivision and Condominium, large Site Plan Control applications, and major infrastructure development. Major applications could also include those where works have been undertaken, or are in process of being undertaken, without prior approval from the NPCA; and those where works have been undertaken that do not comply with the CA S. 28 policies and restoration/remediation measures are required.

- Permit applications for development projects may be considered **minor** in nature due to the project size, level of risk, location, and/or other factors. These applications have minor impacts on the control of flooding, erosion, dynamic beaches, pollution or the conservation of land. Based on the proximity of the project to the hazard, the minor permit applications are reviewed by NPCA staff and generally require standard recommendations or conditions. Minor permit applications could be those involving, for example, minor fill; minor development; and minor site alteration where there is a high degree of certainty that issues associated with natural hazards are minimal.

- **Routine** permit applications are activities that are documented through another approval process or are determined to have limited impacts on the control of flooding, erosion, dynamic beaches, pollution or the conservation of land. Routine permit applications may be those involving, Standard Compliance Requirements under the Drainage Act and Conservation Authorities Act Protocol and non-habitable buildings and structures that are less than 10 m^2 in size.

A list of the Major, minor and routine permits are included in the permit application package located on the NPCA website at https://npca.ca/administration/permits. (**Appendix D**)

It is recommended that as part of the annual reporting to the NPCA Board of Directors on timelines, NPCA may further refine the descriptions of the permit categories based on the hazards found within the watershed and common development applications received.

Upon proclamation of the new S. 28 under the *Conservation Authorities Act,* the CA would also consider whether the activity is likely to create conditions or circumstances that, in the event of a natural hazard, might jeopardize the health or safety of persons or result in the damage or destruction of property.

2.3 Pre-consultation

2.3.1 Integrated Pre-consultation for Planning Applications

Generally, municipalities act as planning approval authorities and are responsible for the planning process, including pre-consultation under the *Planning Act.* As NPCA has a provincially delegated responsibility related to S. 3.1 of the PPS, it is important that NPCA is circulated applications well in advance of review deadlines to ensure that natural hazard matters are addressed.

Therefore, **integrated pre-consultation with the Planning Approval Authority is a best practice, best achieved through the CA-Municipal MOU by including provisions to involve the CA in pre-consultation** and associated meetings on *Planning Act* applications. This supports clarity and certainty on the extent of the NPCA review and responsibilities under the *Planning Act*, and also under S. 28 of the *Conservation Authorities Act*. For complex projects, it is recommended that other relevant approval agencies, such as the Ministry of

Transportation, participate in the integrated pre- consultation with the planning approval authority (see example of collaborative and efficient planning in text box below). For less complex planning applications, pre-consultation could be conducted through phone calls, emails, and a review of online screening maps.

As a best practice, the NPCA will, if possible, ensure that the comments provided as part of the pre- consultation are included in the municipal record. For complex projects, the initial pre-consultation meeting should include a discussion of major milestones with projected timelines, as well as a commitment to ongoing discussion throughout the process. As a best practice, the NPCA will document any follow-up technical meetings with the applicant and provide them with a copy to ensure clarity (including information related to projected timelines, process, checklists etc.). This will help to streamline the process for both the applicant and the NPCA.

The NPCA will work with municipalities and other agencies to ensure the pre-consultation processes are effective in specifying the application requirements, encouraging quality submissions, and meeting circulation timelines. Other best practices that support streamlined planning processes include allowing the NPCA to pre-screen natural hazard technical studies from an application prior to a municipality deeming it complete, including NPCA technical checklists as part of complete application requirements found within a municipality's Official Plan, establishment of clear submission guidelines, etc. For very complex projects, the NPCA may consider the use of a design charrettes involving all parties, which is an expanded and more intense version of a pre- consultation. Design charrettes can be quite successful when appropriate ground rules are established and sufficient information about the application and the site is available prior to the meeting.

It is recognized that substantial changes to a proposal or new information from a site visit after pre-consultation may warrant further pre-consultation and/or changes to the NPCA technical checklist for studies.

2.3.2 Pre-consultation for Permit Applications

Pre-consultation provides an opportunity for the NPCA and applicant to discuss the proposal; for the NPCA to determine whether the application is major, minor or routine; and to notify the applicant of complete application requirements for our review of the application. However, as mentioned earlier, as CAs are responsible for the review of S. 28 permit applications, there is greater control over the timeliness of approvals.

Applicants are strongly encouraged to engage in pre-consultation with the NPCA prior to submitting an application. **It is the applicant's responsibility to ensure an appropriate level of pre-consultation has occurred to avoid unnecessary delays in the review of their application.** Standard application review periods assume that pre-consultation has been conducted and that the application meets the requirements as outlined in the CA S.28 permit review guidelines.

The NPCA should ensure that staff resources are provided to offer timely pre-consultation opportunities. A best practice for NPCA is to ensure that the landowner or authorized agent is included in pre-consultation meetings or at a minimum receives correspondence regarding their application. This ensures clear communication with the agent/consultant, landowner and NPCA. At the pre-consultation meeting, the staff shall review the technical checklist with the applicant to identify the studies/technical information which may be required for the proposal.

The NPCA is responsible for the review of S. 28 permit applications, including arranging pre-consultation meetings, site visits, permit decision timelines, etc. As per the "Policies and Procedures for Conservation Authority Plan Review and Permitting Activities", published by the Ministry of Natural Resources and Forestry in 2010 the NPCA will determine whether the permit application is major or minor and outline any additional or outstanding information requirements **within 21 days of the pre-consultation meeting**, as indicated in **Table 2**. It is recognized that substantial changes to a proposal or new information from a site visit after pre-consultation may warrant further pre-consultation and/or changes to the NPCA complete application requirements.

Often because of the level of pre-consultation undertaken prior to submission of an application, the NPCA moves seamlessly towards processing the application and issuing the permit. NPCA may choose to only notify applicants where the application is determined to be major (for the purpose of permit decision timelines), or the application is incomplete within 21 days. There is no need to notify an applicant that the application is complete if the permission can be issued prior to end of the 21 day period.

The NPCA will document and track comments provided during the pre- consultation and thereafter. Details will be provided to the applicant to ensure everything is clear from the onset (expectations, process, checklists etc.) to streamline the process for both the applicant and the NPCA.

2.4 Application Submission Quality

Applicant requirements will be scoped based on the complexity of the project. For applications requiring technical studies, applicants are strongly encouraged to ensure that these studies are properly scoped through pre-consultation before planning and permit applications are submitted. Specific guidance in this regard will need to be sought from NPCA staff. Properly developed technical studies will support timely review by the NPCA. Guidelines for review timelines cannot be adhered to when submissions are incomplete, and information is received in an uncoordinated fashion.

Technical submissions by the applicant must meet good practice and industry standards to minimize resubmissions and avoid unnecessary delay. As a best practice NPCA should consider requiring the applicant, as part of the covering letter, to have a professional confirm that an application is complete (where warranted). Ultimately, quality control is the responsibility of the applicant, to ensure studies are consistent and properly referenced.

2.4.1 Planning Application Submissions

The commitment to review timelines assumes that application submissions are complete. Some Official Plans stipulate the complete application requirements. Planning applications will be deemed complete by the municipality, not by the NPCA, however consultation with NPCA staff before deeming an application complete is a best practice when the NPCA will be reviewing technical studies and/or plans in support of an application submission.

As a best practice, the NPCA will work with the municipality to get NPCA technical checklists included as part of complete application requirements in municipal Official Plans. Therefore, municipalities would inform the applicant about the NPCA technical checklists as part of municipal complete application requirements.

The NPCA should request the municipality to require the applicant to include a sign off sheet with the technical work to confirm that the work meets good practice and acceptable, current industry standards for technical studies and was completed by persons with relevant qualifications and experience. This best practice may help ensure adequate quality of technical studies, which supports NPCA review.

During the review of the application, NPCA staff may request additional information if it has been determined that the application does not contain sufficient and/or good quality technical analysis. Note that reviews may be done by "peer reviewers" as well as NPCA staff. Delays in timelines for decision making may occur due to requests for additional information to address errors or gaps in information submitted for review.

2.4.2 Permit Application Submissions

Upon receipt of an application, NPCA staff will review the application requirements for the specific project. **Within 21 business days of receipt** of a permit application, the NPCA will either issue the permit or for more complex projects, notify the applicant in writing whether the application has been deemed complete or not, as indicated in **Table 2**. In order to make the determination of a complete application the NPCA checks if the application meets submission requirements. The complete application determination does not mean that the application meets all of the tests of the S. 28 regulation. A general list of recommended requirements for a complete application for S. 28 permits is provided in **Appendix A**.

The NPCA will require the applicant to confirm all technical work adheres to current industry standards for technical studies. This confirmation must be completed by persons with relevant qualifications and experience (i.e. a certificate of completion by a Professional Engineer). This will help ensure adequate quality of technical studies, which supports NPCA review.

If the applicant disagrees with the complete application decision the applicant may first contact the senior NPCA staff serving as a 'client service facilitator' for applications issue management. If not satisfied, the applicant may request an administrative review by the NPCA Chief Administrative Officer and then if not satisfied, the NPCA Board. The review will be limited to a complete application review only and will not include review of the technical merits

of the application. During this review, this list of required information will be assessed, and a determination will be made.

During the review of the application, NPCA staff may request additional information if it has been deemed that the application does not contain sufficient technical analysis. Delays in timelines for decision making may occur due to requests for additional information to address errors or gaps in information submitted for review. A S. 28 permit application may be put in abeyance or returned to the applicant, pending the receipt of further information leading to a re-submission. If necessary, this could be confirmed between both parties in correspondence or in an email or as a signed "Agreement to Defer Decision", to clarify mutually agreeable tasks and timelines, and avoid premature refusals of permits due to inadequate information.

2.5 Re-submission

Amendments to previous submissions or additional information such as technical analysis required as a result of the review process or site inspection may affect the application review timelines and/or categorization of the permit application. Re-submissions are different between plan review and permitting. As NPCA manages the S. 28 permitting process, there are best practices that NPCA can use to ensure better quality submissions that help streamline the process.

Some best practices are summarized below.

- When a planning or permit application is determined to be incomplete, the NPCA will provide a document containing a detailed list of information needed. The applicant must describe how each item is addressed in a covering letter upon re-submission, to indicate that all deficiencies have been addressed and itemized. This will help expedite the subsequent review process.
- Meeting with NPCA staff to review substantial changes to an application is a positive step and can decrease review times.
- If a re-submission also modifies other areas of a report or plans that affect an area of interest to the NPCA, it is a best practice for an applicant or consultant to identify these new changes as well.
- The NPCA will adopt a 'start and stop' best practice, whereby the decision timeline for a **permit application** is stopped – until a re-submission is made.

Re-submissions affect the Level of Service timelines for permit decisions. Re-submissions that are the result of insufficient studies/submissions may be subject to additional fees, which shall be clearly laid out in the NPCA Board approved fee schedule.

Re-submissions can be minimized through: pre-consultation and meeting the NPCA complete submission requirements – for S. 28 permit applications; and meeting the municipal complete application requirements as well as the NPCA technical checklist for planning applications. This message should be reiterated to applicants at the pre-consultation stage.

3. Level of Service

NPCA is committed to meeting timelines for development applications, and meeting service standards. The key steps that form the cornerstone of an efficient and effective review process are provided in **Table 2** below.

Table 2: Steps to an Efficient and Effective Conservation Authority Review Process

	Planning Act Application	S. 28 Permit Application
Pre-consultation	Integrated pre-consultation with the Planning Approval Authority	Pre-consultation with the applicant
Application circulation/submission	Consultation with NPCA staff prior to municipality deeming applications complete. Complete circulation of the planning application, including the necessary technical reports and plans by the municipality to the NPCA well in advance of the review deadline set by the municipality. Consultation with NPCA staff before deeming an application complete is a best practice when the NPCA will be reviewing technical studies and/or plans in support of an application submission.	Complete submission of the S. 28 application, including the necessary technical reports.
Quality of submission	Good-quality applications including submission of all components, such as technical studies, requested during pre-consultation.	

An overarching best practice is preparing a schedule and taking a project management approach where all parties commit to meeting the schedule.

3.1 Planning Applications Timelines

Decision making timelines for municipal planning are set out in the *Planning Act*. It is important to note that each municipality has its own planning process; therefore, the standardization of NPCA comment timelines for planning applications may not be consistent across the watershed or even the province.

As a best practice, the CA-Municipal MOU would mutually establish service standards which would include the timelines for circulation and review of planning applications. Refer to the CO template for CA-Municipal MOU. There may be some modification to these review timelines for individual applications with discussion and agreement amongst the applicant, municipal and NPCA staff during the pre-consultation stage and provided that the requirements of the *Planning Act* are met.

To achieve a streamlined approval process, the NPCA relies heavily on each municipality to include the CA in pre-consultation meetings, consult with the CA prior to deeming applications complete; and to circulate the planning application, technical reports and plans well in advance of the NPCA review deadline set by the municipality. This, along with the NPCA participation during pre-consultation and the applicant meeting the NPCA technical checklist with good quality studies, is vital to the NPCA meeting level of service timelines for planning applications.

Other best practices for the NPCA include ensuring that front line staff are trained to understand the tight planning turnaround times and the importance of good information and data management.

3.2 Permit Applications Timelines

Service standards for Section 28 permit applications are specified by the Ministry of Natural Resources and Forestry (MNRF) in the "Policies and Procedures for Conservation Authority Plan Review and Permitting Activities (2010)". As part of the commitment to improve client service and accountability and increase speed of approvals, Conservation Ontario has created the **Client Service Standards for Conservation Authority Plan and Permit Review Guideline**. This CO guideline recommends new service standards for S.28 approvals that NPCA is supportive of.

As a best practice, the NPCA will make every effort to be consistent with the timelines shown in **Table 3**. It is important to note that the NPCA has the ability to identify a target timeline for completion that is reduced from these timelines.

Table 3: Level of Service for CA Review of S. 28 Permit Applications

Note: The timelines contained within this table have been developed as best-practices for the NPCA. The timeline guideline is recommended as a client service target for CAs and represents a significant improvement to the timelines provided in the MNRF 2010 Guideline entitled "Policies and Procedures for Conservation Authority Plan Review and Permitting Activities". The timeline guidelines for major permits change from a total of 132 to 63 calendar days and for minor permits change from a total of 72 to 42 calendar days. **All timelines presented exclude statutory holidays and the time required for the applicant to respond to NPCA comments on an application.**

Application Process Step	Timeline
Notification of complete application requirements for the purpose of review of the permit application by the NPCA, start of documentation, and discussion of timelines and fees – **Pre-consultation**	• **Major permit applications: Within 14 days** of the pre- consultation meeting. • **Minor permit applications: Within 7 days** of the pre- consultation meeting. This will include **confirmation of whether the application is considered major or minor**, if the applicant has provided adequate information (including the scope and scale of the work) for the NPCA to make that determination. NPCA will only notify applicants where the application is determined to be **major**. This eliminates unnecessary paperwork for minor applications. Substantial changes to a proposal or a site visit after pre-consultation may impact this timeline.
Notification whether the permit application is considered complete **(i.e. it has met submission requirements) for the purpose of NPCA review**	• **Major permit applications: Within 21 days** of the application being received. • **Minor permit applications: within 14 days of the application being received.** NPCA will only notify applicants where the application is determined to be **major**. This eliminates unnecessary paperwork for minor applications. • **Routine permit applications: within 10 days of the applications being received.** NPCA will only notify applicants where the application is determined to be **major**. This eliminates unnecessary paperwork for minor applications. • NPCA may issue a permit prior to the end of the 21 day period. In that case, no notification of complete application would be received. • Note that if the application is incomplete, the decision timeline does not begin.

Decision (recommendation to approve or refer to a hearing) or Comments to Applicant – **Major application**	• **Within 28 days** after a complete application is received. • Within 30 additional days upon each **re-submission** made to address CA comments.
Decision (recommendation to approve or refer to a hearing) or Comments to Applicant – **Minor application**	• **Within 21 days** after a complete application is received. • 15 additional days upon each **re-submission** made to address CA comments.
Decision (recommendation to approve or refer to a hearing) or Comments to Applicant – **Routine application**	• **Within 14 days** after a complete application is received. • 7 additional days upon each **re-submission** made to address CA comments.

If the NPCA has not made a decision with regard to an application made under S.28 within the appropriate timeframes noted above, the applicant may first contact the 'client service facilitator' for applications issue management first. If the applicant is not satisfied with the response from the client service facilitator, the applicant can submit a request for administrative review by the Chief Administrative Officer, and then if not satisfied, the NPCA Board. The review will be limited to a complete application review and timeframe review only and will not include review of the technical merits of the application. It should be noted that the review timelines may be affected by unexpected circumstances. Clear communication is essential in these situations to establish expectations and new timelines if warranted.

3.3 Summary of Best Practices

Table 4 summarizes the best practices provided within this guideline to support the streamlining of NPCA review of planning and permit applications. It is divided into those best practices that support the NPCA review of planning applications or permitting applications or both. It is important to refer to the sections identified for the full context and applicability of the practice.

Table 4: Summary of Best Practices

No.	Summary of Best Practices	Section
CA Review of *Planning Act* Applications		
1.	The CA-Municipal MOU would include provisions to involve the NPCA in pre-consultation	2.3.1 Pre-consultation for Planning
2.	The NPCA should work with the municipality to get CA technical checklists included as part of complete application requirements in municipal Official Plans	2.4.1 Planning Application Submissions
3.	The NPCA should request the municipality to: include a signoff sheet with the technical work to confirm that the work meets good practice and acceptable, current industry standards for technical studies and was completed by persons with relevant qualifications and experience.	2.4.1 Planning Application Submissions
4.	The CA-Municipal MOU would mutually establish service standards which would include the timelines for plan review applications	3.1 Planning Application Timelines
CA Review of applications made under S. 28 of the *Conservation Authorities Act*		
1.	A map showing areas regulated by the NPCA will be displayed as a separate data layer in the online screening map	4.2 Online Screening Maps
2.	The NPCA will ensure that an approved and updated screening map showing areas regulated by the NPCA is available to watershed municipalities and the public. The updates will be done per the "Procedure for Updating Section 28 Mapping: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulations", endorsed by Conservation Ontario (April, 2018).	4.2 Online Screening Maps

No.	Summary of Best Practices	Section
3.	The screening map will be searchable by municipal address if possible.	4.2 Online Screening
4.	The NPCA will make the mapping rationale available.	4.2 Online Screening
5.	The NPCA will have an agreement that includes a clear disclaimer statement.	4.2 Online Screening
6.	NPCA website and fee schedules shall include plain language descriptions of the types of services and mapping provided by the NPCA.	4.2 Online Screening Maps
7.	The NPCA will define permit applications as “major”, “minor” or “routine”	2.2.2 Permit Application Streams
8.	The NPCA should try to ensure that the landowner or authorized agent is included in pre-consultation meetings or as a minimum receive correspondence regarding their application	2.3.2 Pre-consultation for Permit Applications
9.	The NPCA will require the applicant to: confirm all technical work adheres to current industry standards for technical studies. This confirmation must be completed by persons with relevant qualifications and experience (i.e. a certificate of completion by a Professional Engineer). This will help ensure adequate quality of technical studies, which supports NPCA review.	2.4.2 Permit Application Complete Submissions
10.	The NPCA will make every effort to be consistent with the suggested process and timelines provided in the Ministry of Natural Resources and Forestry (MNRF) publication “Policies and Procedures for Conservation Authority Plan Review and Permitting Activities (2010)” and this CO guideline.	3.2 Permit Application Timelines
11.	The NPCA should review the technical checklist for studies to applicants at the pre-consultation meeting	2.5 Re-submission

No.	Summary of Best Practices	Section
CA Review of *Planning Act* and S. 28 Applications		
1.	The NPCA will manage applications efficiently by: • Implementing an internal application tracking system. • Identifying a senior NPCA staff contact to be the 'client service facilitator' for plan review and/or permit applications issue management. • The NPCA will strive to prioritize applications for emergency works to respond to circumstances that pose a risk to life and/or property. The NPCA will note this in the local CA- Municipal MOU.	2.1 Application Management
2.	The NPCA will post all online decision support tools online.	4. Online Decision Support Tools (and 1.1,1.2)
3.	The NPCA will identify a senior CA staff serving as a 'client service facilitator' for planning and permit applications issue management	2.1, 2.4.2, 3.2, Appendix B

4. Annual Reporting to the NPCA Board of Directors

Beginning in 2020, high growth CAs (such as NPCA) should report at least annually to their Board of Directors on the timeliness of their approvals under Section 28 of the *Conservation Authorities Act.* ***NPCA is committed to reporting this information to the Board of Directors at minimum annually.*** NPCA has implemented processes to report on the timeliness of our reviews and will constantly review and enhance this information. Once the Board has received the information, the annual report will be placed on the NPCA's website, as part of the client-centric checklist material. **Table 5** summarizes how the report may be presented to ensure comparability between CAs. CA staff may choose to include in their report common reasons for variance from the timeline guidelines. This could assist with the development of future guidance material to address these areas of variance.

Table 5: Annual Reporting on Timelines for Permissions under Section 28 of the *Conservation Authorities Act*

Conservation Authority	Number of Permits Issued Within Policy and Procedure timeline(i)		Number of Permits Issued Outside of Policy and Procedure Timeline		Reason for Variance from Policy and Procedure (Optional)	
	Major	Minor	Major	Minor	Major	Minor
	Number of Permits Issued Within CO Guideline timeline			Number of Permits Issued Outside of CO Guideline timeline			Reasons for Variance from Guidelines (Optional)		
	Major	Minor	Routine	Major	Minor	Routine	Major	Minor	Routine

4.1 Annual Reporting to Conservation Ontario Council

As per the CO Council endorsed Client Service and Streamlining Initiative Workplan, for 2020 two interim reports for high growth CAs (such as the NPCA), will be brought to CO Council for information purposes. These reports will be sent to Conservation Ontario staff in May and November. These interim reports from CAs to CO will assist with identifying any issues with the reporting template early on in the process. The final report on annual timeliness will be received by Conservation Ontario Council in April, 2021. For annual reporting from high growth CAs for 2021 and beyond, CAs will be requested to provide annual reporting in February for consideration by Conservation Ontario Council at their AGM.

4.2 Reporting on Level of Service for Applications Made Under the *Planning Act*

CAs are deeply embedded and integrated within the planning system and must work closely with their municipal partners to ensure that their service expectations are being met. As stated previously however, while CAs have multiple roles in the Planning regime, generally, municipalities act as planning approval authorities under the *Planning Act* and are responsible for the planning process.

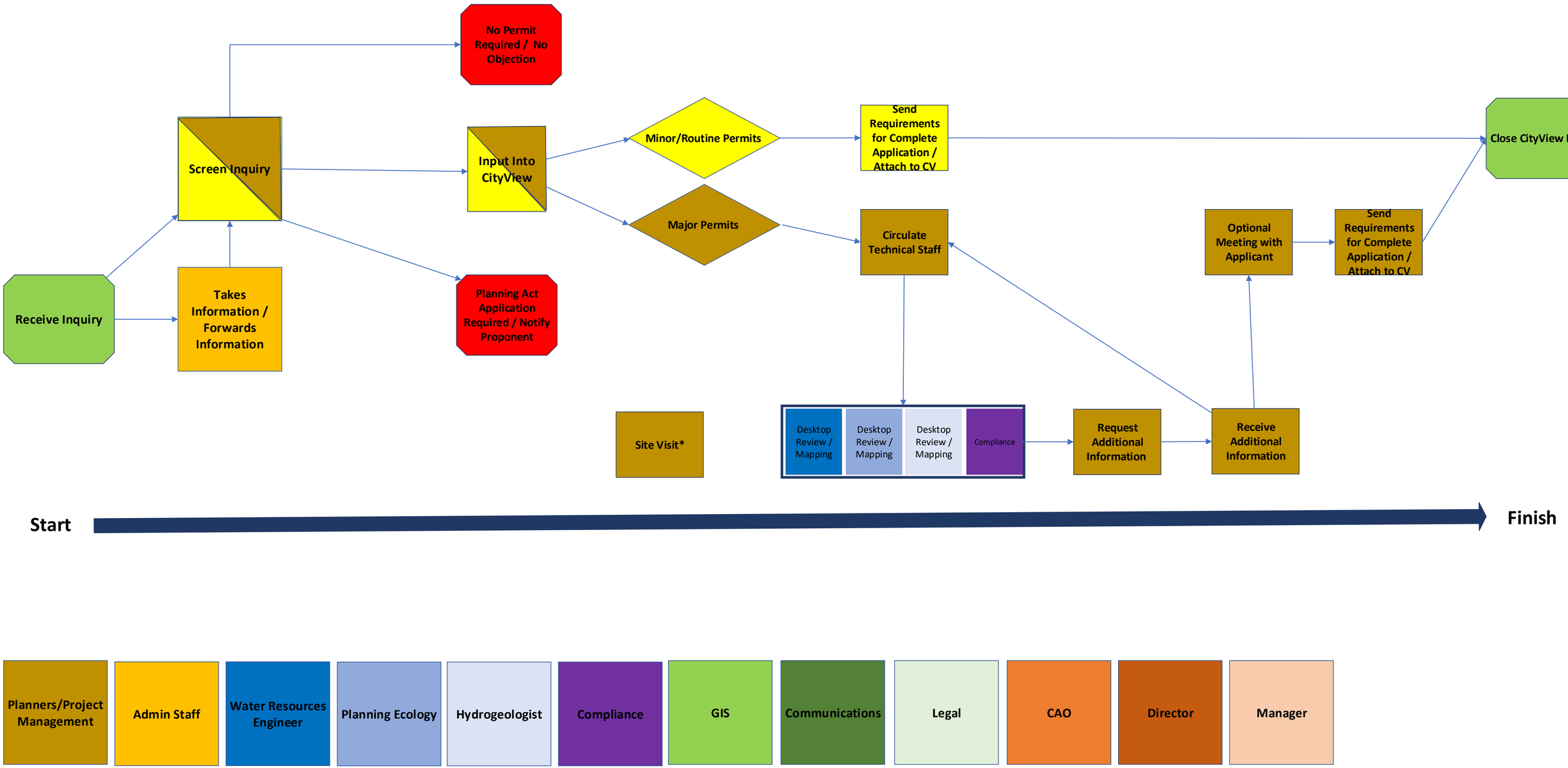
As municipalities are adjusting their processes to respond to new timeline requirements under the *Planning Act* and new requirements are anticipated to be established for CAs related to the creation of municipal MOUs and a hazard program and service regulation, Conservation Ontario (and the NPCA) will await additional information from the Province prior to establishing any supplemental guidance related to reporting on *Planning Act* timelines and there will be no requirement for high growth CAs to report to CO Council.

Sources of Information

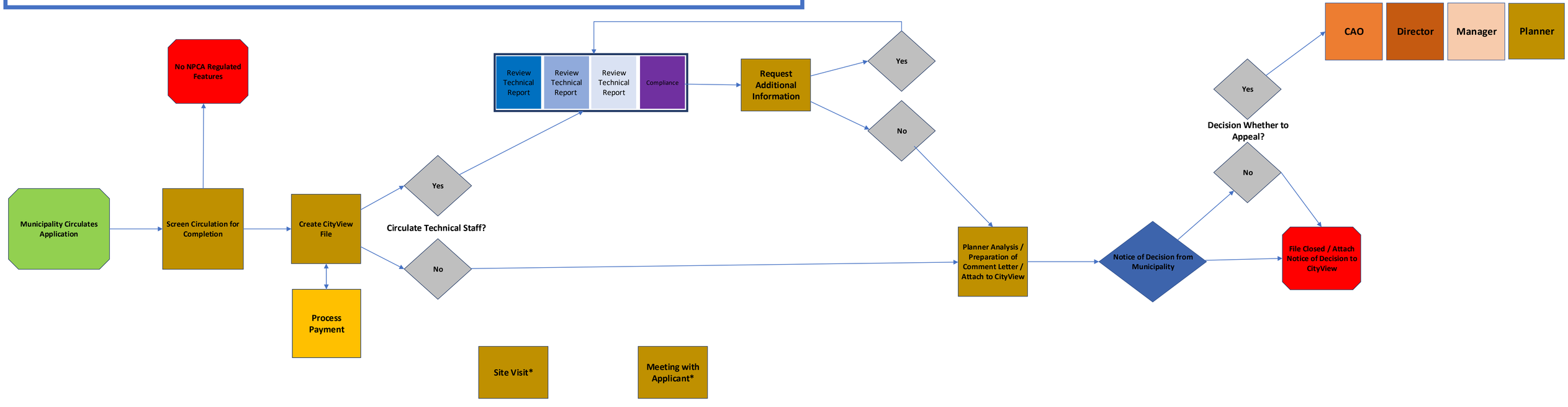
- Provincial Direction:
  - Policies and Procedures for Conservation Authority Plan Review and Permitting Activities. Ministry of Natural Resources and Forestry. 2010.
- Conservation Ontario Council endorsed procedures:
  - Procedure for Updating Section 28 Mapping: Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulations. Conservation Ontario Section 28 Regulations Committee. 2018
- CA Policy and Procedural Manuals:
  - Planning and Development Procedural Manual. Toronto and Region Conservation Authority. 2010.
  - Plan Review Manual. Lower Trent Region Conservation Authority. March 2019.
  - Planning and Development Administrative Procedural Document. Credit Valley Conservation Authority. 2011.
  - Rules of Procedure for Permit Application Review and Approval in Accordance with Ontario Regulation 180/06 as amended by Ontario Regulation 63/13 made under Section 28 of the Conservation Authorities Act. Lakehead Region Conservation Authority. July 2018.
  - Ontario Regulation 163/06 Policy document. Lower Trent Region Conservation Authority. October 2018.
  - NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act
- Performance Reporting:
  - CA Staff Report to Board on Customer Service Plan for the Planning and Regulations Program. Long Point Region Conservation Authority. June 17, 2017.
- CA-Municipal Memoranda of Understanding:
  - Memorandum of Understanding Between The Regional Municipality of Halton, City of Burlington, Town of Halton Hills, Town of Milton, Town of Oakville, Halton Region Conservation Authority, Credit Valley Conservation Authority, and Grand River Conservation Authority. For An Integrated Halton Area Planning System. July 16, 2018.
- Online Mapping Resources:
  - Lake Simcoe Region Conservation Authority. Ontario Regulation 179/06 Regulated Areas Mapping. Available at: https://maps.lsrca.on.ca/EH5Viewer/index.html?viewer=LSRCARegulations
  - NPCA Ontario Regulation 155/06 Regulated Areas Mapping. Available at: https://npca.ca/administration/permits

APPENDICES LIST

Permit Pre-Consultation Process

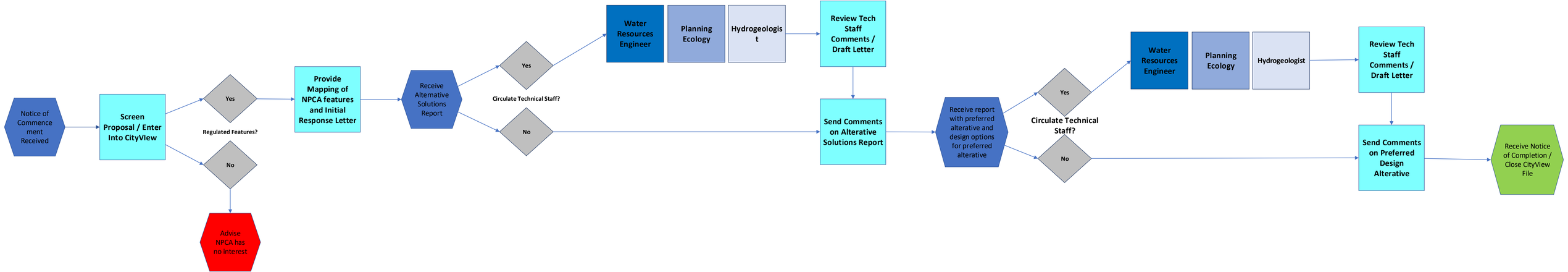


Planning Act Application Process



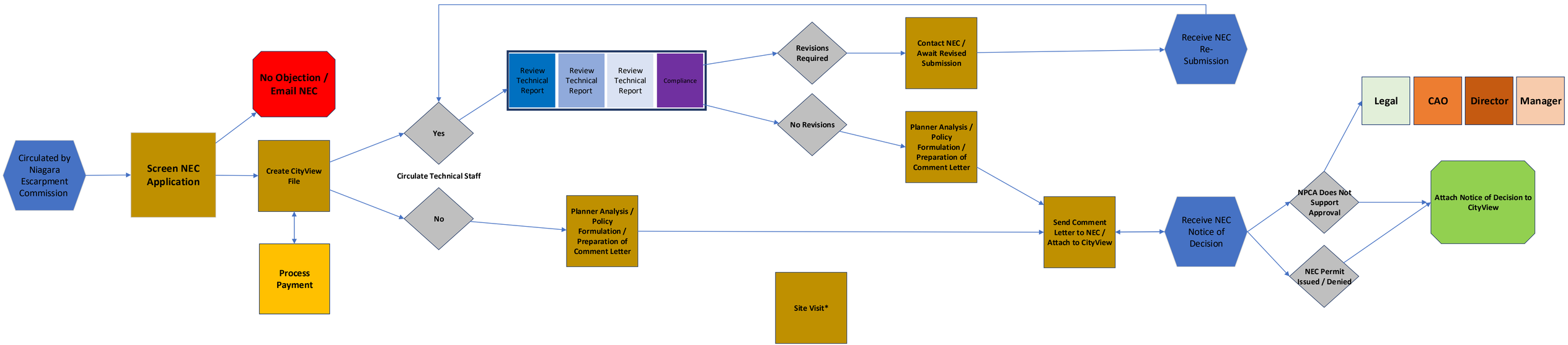
Watershed Planner | Admin Staff | Water Resources Engineer | Planning Ecology | Hydrogeologist | Compliance | GIS | Communications | Legal | CAO | Director | Manager | Planning Tech

Process Template



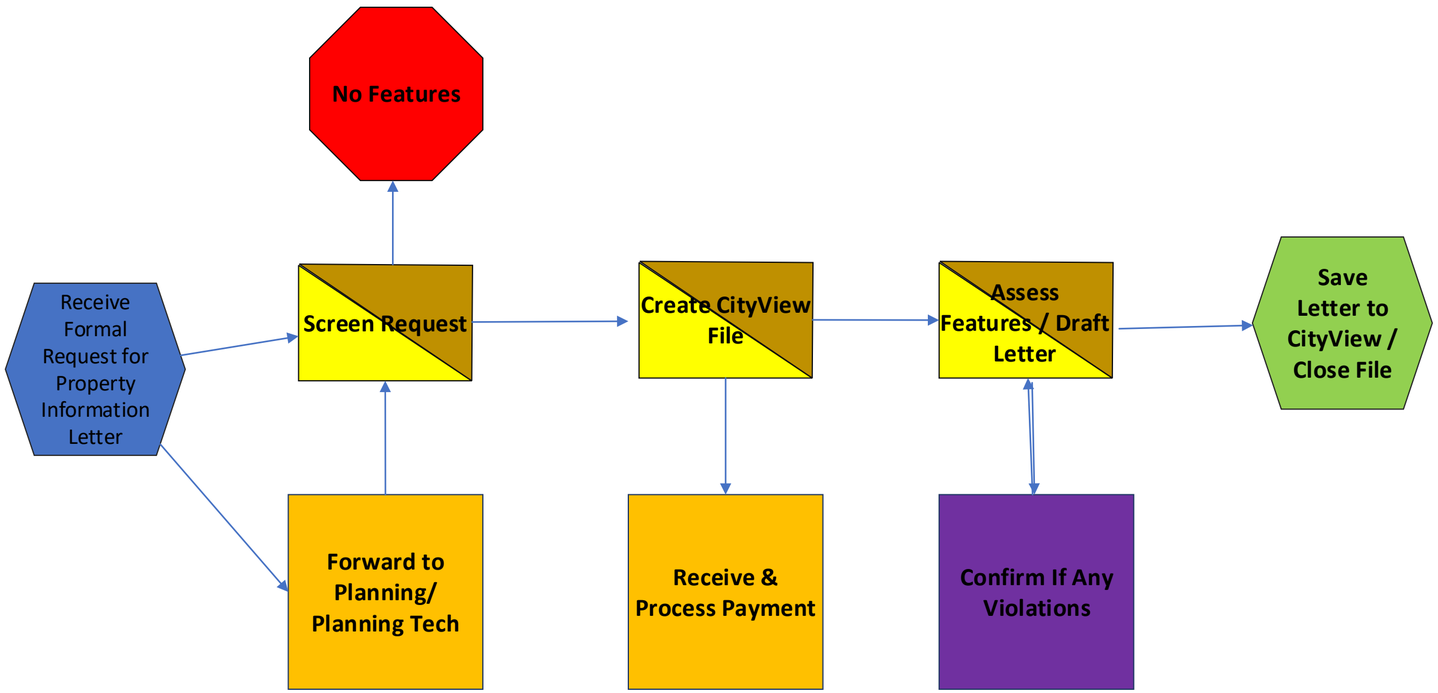
Planners/Project Management | Admin Staff | Senior Planner | Admin Staff | Water Resources Engineer | Planning Ecology | Hydrogeologist | GIS | Communications | Legal | CAO | Director | Manager | Compliance

Niagara Escarpment Commission Process



Planners/Project Management | Admin Staff | Water Resources Engineer | Planning Ecology | Hydrogeologist | GIS | Communications | Legal | CAO | Director | Manager

Property Information Request



Planners/Project Management

Admin Staff

Water Resources Engineer

Planning Ecology

Hydrogeologist

GIS

Communications

Legal

CAO

Director

Manager

Compliance

NIAGARA PENINSULA CONSERVATION AUTHORITY
250 Thorold Road West, 3rd Floor, Welland, Ontario L3C 3W2
Telephone 905.788.3135 | Facsimile 905.788.1121 | www.npca.ca

PERMIT APPLICATION PACKAGE

NIAGARA PENINSULA CONSERVATION AUTHORITY
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NPCA WORK PERMIT PRE-CONSULTATION REQUEST FORM

Given that the Niagara Peninsula Conservation Authority (NPCA) has the responsibility to regulate activities in natural and hazardous areas, if you are planning to do any works or development near rivers, streams, wetlands, slopes, or the shores of Lakes Ontario or Erie, you may require a permit.

A pre-consultation meeting is strongly encouraged prior to submitting an application as per the NPCA Client Service Standards for Plan and Permit Review Policy. Pre-consultation provides an opportunity for the NPCA and applicant to discuss the proposal; for the NPCA to determine whether the application is major, minor or routine in nature; clarify the application process; and to provide the applicant with complete application requirements needed for our review of the application. The pre-consultation is held at the NPCA main office if possible but other options are available.

It is the applicant's responsibility to ensure an appropriate level of pre-consultation has occurred to avoid unnecessary delays in the review of their application. Standard application review periods assume that pre-consultation has been conducted and that the application meets the requirements as outlined in the Conservation Authorities Section 28 permit review guidelines.

The NPCA will ensure that staff resources are provided to offer timely pre-consultation opportunities. NPCA encourages that the landowner or authorized agent is included in pre-consultation meeting(s) or at a minimum receives correspondence regarding their application. This ensures clear communication with the agent/consultant, landowner and NPCA. At the pre-consultation meeting, staff will review the technical checklist with the applicant to identify the appropriate studies/technical information which may be required for the proposal.

Applicant requirements will be scoped based on the complexity of the project. For applications requiring technical studies, the submissions must meet good practice and industry standards and applicants are strongly encouraged to ensure that these studies are properly scoped through pre-consultation before permit applications are submitted. Specific guidance in this regard will need to be sought from NPCA staff. Properly developed technical studies will support timely review by the NPCA. Guidelines for review timelines cannot be adhered to when submissions are incomplete, and information is received in an uncoordinated fashion.

Technical submissions must meet good practice and industry standards to minimize re-submissions and avoid unnecessary delay. It is recommended that as part of the covering letter, to have a professional confirm that an application is complete (where warranted). Ultimately, quality control is the responsibility of the applicant, to ensure studies are consistent and properly referenced (e.g. location, city).

The NPCA shall document and track comments provided during the pre- consultation and thereafter. This will be provided to the applicant to ensure everything is clear from the onset (expectations, process, checklists etc.) to streamline the process for both the applicant and the NPCA.

Submission Requirements for Pre-Consultation:

- No later than 5 business days prior to the requested meeting, the applicant and/or their representatives must submit this form and provide two (2) copies of a drawing (no larger than 11x17) in hardcopy and in PDF format which illustrates the following:
- Location of property and immediate surroundings (including property dimensions)
- Use of adjoining lands
- Location of existing and proposed structures and features such as pedestrian and vehicular access, parking, septic system and water supply (well or cistern), road allowances, rights of way, streets and highways, watercourses, drainage ditches and natural features (trees and vegetation)
- The proposed use of the buildings and structures following completion of the development
- Other relevant information, as appropriate, to assist staff in understanding the proposal

Timing and Record of Pre-Consultation

Complete and return the pre-consultation request form and the supporting submission material to the Permit & Compliance department. Upon receipt of a completed form and submission material, NPCA staff will schedule a pre-consultation meeting between the applicant/agent and the relevant NPCA staff. Pre-consultation meetings are held on the second and fourth Wednesday of the month between 9 am and 4 p.m. (no meetings will be scheduled between 12:00p.m. and 1:00p.m.). Your submission will allow staff the opportunity to prepare for and gather any information necessary to properly consider the proposal and make appropriate recommendations at the pre-consultation meeting.

Within 21 days of the pre-consultation meeting, NPCA will provide the applicant/agent with a signed Record of Pre-Consultation. The Record of Pre-Consultation will contain a list of information and material that will be required to process the subject application(s). The Record of Pre-Consultation must be submitted with the application along with all of the required information and materials to be considered a complete application. It is recognized that substantial changes to a proposal or new information from a site visit after pre-consultation may warrant further pre-consultation and/or changes to the NPCA complete application requirements.

FOR STAFF USE ONLY	
Pre-Consultation Meeting Request Accepted By:	Date of Submission:
Date of Pre-Consultation Meeting:	Time of Pre-Consultation Meeting:
Required NPCA Staff:	

NIAGARA PENINSULA CONSERVATION AUTHORITY
250 Thorold Road West, 3rd Floor, Welland, Ontario L3C 3W2
Telephone 905.788.3135 | Facsimile 905.788.1121 | www.npca.ca

SECTION 1 – CONTACT INFORMATION	
Owner Information	
Registered Owner(s):	
Mailing Address (Street address, unit number, city and postal code):	
Phone Number:	Fax Number:
Email Address:	
Applicant/Authorized Agent Information (if applicable)	
Owner's Authorized Agent:	
Mailing Address (Street address, unit number, city and postal code):	
Phone Number:	Fax Number:
Email Address:	

SECTION 2 – PROJECT INFORMATION	
Have you had any previous discussions with NPCA staff with respect to this proposal? ☐Yes ☐No If yes, who did you consult with? _____	
Municipal Address:	
Assessment Roll Number:	Municipality Property Located in:
Please provide a detailed description of the proposal (use additional sheet(s) if necessary):	

250 Thorold Road West, 3rd Floor, Welland, Ontario L3C 3W2
Telephone 905.788.3135 | Facsimile 905.788.1121 | www.npca.ca

Section 4 – Additional Attendees for the Applicant		
Discipline	**Name of Consultant**	**Name of Firm**
Engineer		
Agent		
Project Manager		
Landscape Architect		
Contractor		
Architect		
Other:		
Other:		

Section 5 - Declaration

I, _____, certify that the information provided in this document is true to the best of my knowledge and that all required supporting documentation has been enclosed and submitted with this form.

_____ _____

Signature Date

NIAGARA PENINSULA CONSERVATION AUTHORITY
250 Thorold Road West, 3rd Floor, Welland, Ontario L3C 3W2
Telephone 905.788.3135 | Facsimile 905.788.1121 | www.npca.ca

APPLICATION CHECKLIST

To ensure that your application will be processed in a timely manner, you must provide a complete application package that includes (check all applicable boxes*):

- ☐ A signed Record of Pre-Consultation
- ☐ A completed application form signed and dated
- ☐ Application fee (Credit Card or Electronic Funds Transfer Only)
- ☐ 2 hard copies and one digital copy of the plan of area showing the type and location of development
- ☐ A drawing of the proposal that includes the following (either as part of the illustration or as notes:
    - o Name of applicant and legal description of the property (e.g. municipal street address, lot, concession, municipality;
    - o Scale, date and directional arrow;
    - o Dimensions of the property (a copy of the legal survey is highly recommended);
    - o Location and dimensions of all existing or proposed structures, grading, filling, excavation, and the distance to any waterbody (e.g. wetlands, streams, lakes, etc.), valley, floodplain, slope, shoreline and beach on or adjacent to the property;
    - o Existing and proposed metric geodetic elevations of the property and of the lowest opening(s) in any new buildings, or additions to buildings (as applicable);
    - o Proposed use of each floor, including basement, in any new buildings, or additions to buildings (as applicable);
    - o Drainage details before and after development
    - o Location and type of sediment and erosion control measures (e.g. silt fence);
    - o Soil stabilization measures proposed (e.g. seeding, sodding, planting);
    - o Construction equipment and access routes to be used;
    - o Location of cross section(s) indicated on the plan view drawing;

- ☐ A complete description of the type of fill proposed to be placed
- ☐ Photographs are highly recommended (electronic format only)
- ☐ Written confirmation no Planning Act approvals required from municipality
- ☐ Signed Application Checklist form
- ☐ Completed Landowner Authorization Form (required if owner is assigning another party to act as an agent for the project);
- ☐ The following technical studies as identified in the pre-consultation meeting:
  - o _____
  - o _____
  - o _____
  - o _____
- ☐ A description of the methods and equipment to be used in carrying out the alteration and access/egress to the work (if applicable)
- ☐ A signed Application Checklist
- ☐ A pdf of the entire application package.

Notes:

1. The applicant is encouraged to submit copies of documents as originals may not be returned;

2. Calculations and notes from a qualified engineer or a licensed surveyor may be requested by the NPCA to support the application at the cost of the applicant;

3. The applicant is responsible for ensuring compliance with all other applicable federal, provincial, regional and municipal statutes, regulations or by-law.

4. A copy of this application will be forwarded to the municipality the works are to occur in.

_____ _____

Signature of Owner/Agent Date

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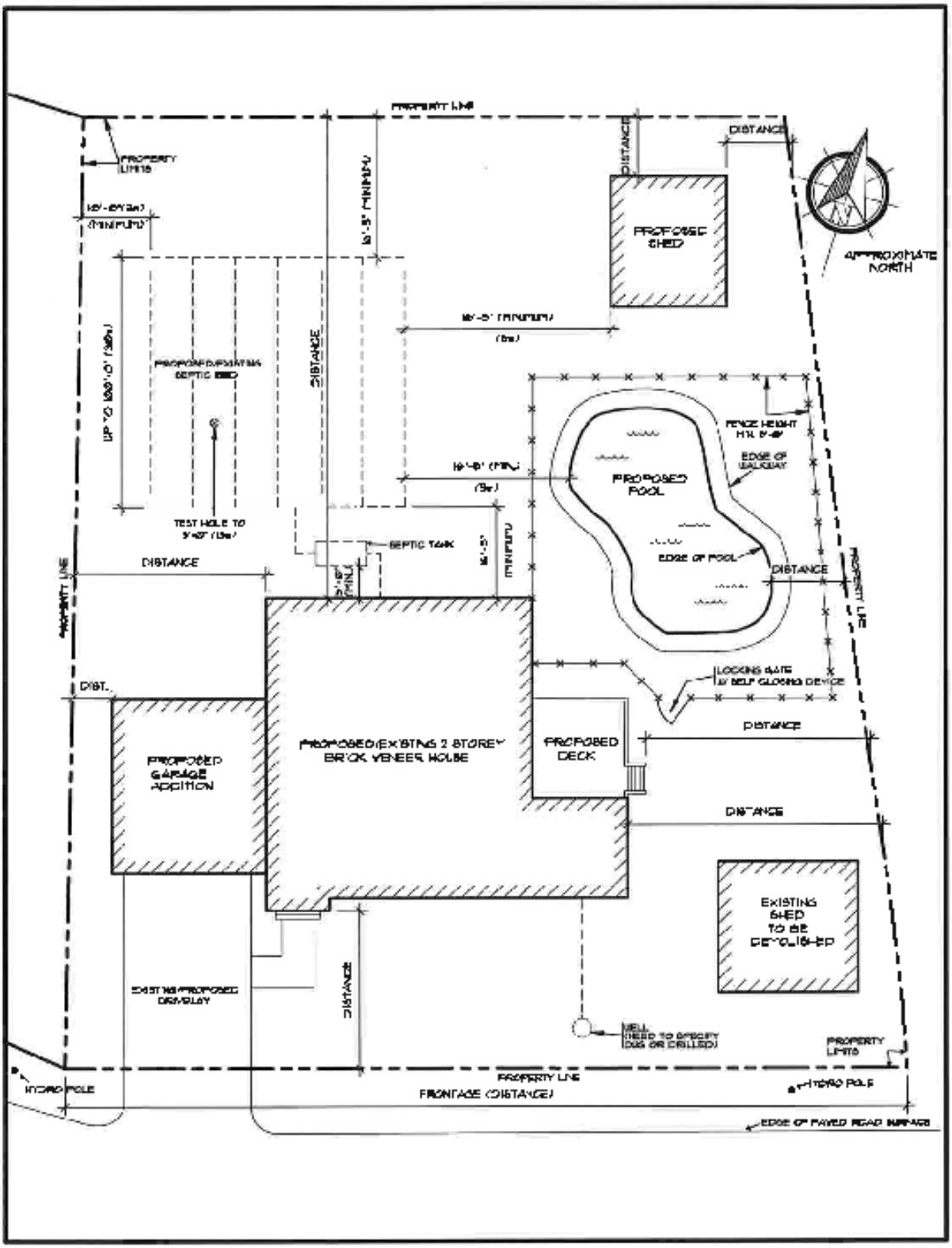
SITE PLAN EXAMPLE



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Permit Application Categories

As per the NPCA 2020 Client Service Standards, Section 28 permit application review timelines are determined based on the complexity of the review and the feature being impacted. Timelines assume that pre-consultation has taken place with NPCA staff, a complete application has been submitted and no amendments or re-submissions are required. There are three different review categories: Major, Minor and Routine.

Major Permit applications can require up to 28 days to complete a full review. Major Permit applications may include but are not limited to:

- All works within the Lake Erie and Lake Ontario Shoreline
- Applications with 1 or more technical studies
- Any application where the volume of the submission warrants a longer review time (as determined during pre-consultation)

Minor Permit applications can require up to 21 days to complete a full review. Minor Permit applications may include but are not limited to:

- Works not involving a technical study
- All works related to the Drainage Act not covered by the DART protocol

Routine Permit applications can require up to 14 days to complete a full review. Routine Permit applications may include but are not limited to:

- Any application where the staff review time is minimal (as determined during the pre-consultation)

Please note that the determination of time frame of the submission is separate to the fee associated with the application. Fees are approved by the NPCA Board as part of our fee schedule and available on our website. To ensure proper fees, please confirm during your pre-consultation.

Review times for permit renewals or amendments to active permits default to the timelines of the original submission unless there is a requirement for new or updated studies. In these instances, pre-consultation would be required again, and the review time would not commence until a new completed application is received.

Please note, that should you not receive your permit in the agreed upon timeframe from your pre-consultation, please contact the Client Service Facilitator (as identified in the NPCA Client Service Standards for Plan and Permit Review document) to discuss. The Client Service Facilitator is the Director, Watershed Management Leilani Lee-Yates. Ms. Lee-Yates can be reached at 905-788-3135 ext 229 or llee-yates@npca.ca.

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Application for Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Permit (Ontario Regulation 155/06)

OFFICE USE ONLY Date Application Received	
Date Payment Received	
Date of Pre-consultation	
Date of Complete Application	
Major/Minor/Routine Permit	
Courier of Permit? Y/N	
CityView File Number	

Please be advised normal review time for a permit that has completed pre-consultation is:

Major Permit – 28 days after a complete application is received with no re-submission
Minor Permit – 21 days after a complete application is received with no re-submission
Routine Permit – 14 days after a complete application is received with no re-submission

However, more complex applications may take longer and will be discussed with the applicant.

Note, an acceptance of a complete application does not constitute permit approval.

Owner Information

Name			
Mailing Address			
City/Province		**Postal Code**	
Home Phone		**Mobile**	
Business Phone		**Facsimile**	
Email address			

Agent Information

Name			
Mailing Address			
City/Province		**Postal Code**	
Business Phone		**Mobile**	
Facsimile			
Email address			

Property Information

Address	
Municipality	
Assessment Role Number (ARN)	

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Application is hereby made to carry out one or ore of the following works:

- ☐ **New Structure**
- ☐ **Alteration/Addition to Existing Structure**
- ☐ **Grading/Site Alteration (including placement of fill)**
- ☐ **Alter a Watercourse (including culvert Installation and storm outfall)**
- ☐ **Shoreline (Lake Ontario, Lake Erie, Niagara River or other watercourse)**
- ☐ **Ponds**
- ☐ **Dams**
- ☐ **Utilities**
- ☐ **Septic**
- ☐ **Municipal or Provincial Infrastructure**
- ☐ **Other**

Details of Proposed Works:

_____

_____

_____

_____

Proposed Start Date: _____ **Proposed Completion Date:** _____

I have confirmed with the local municipality, and supplied to the NPCA in writing, that my proposed development does not require any approval under the *Planning Act* (e.g. Zoning By-law Amendment, Minor Variance, Site Plan Control, etc.) or other municipal approvals. Be aware that if a Work Permit is issued and it is subsequently discovered that *Planning Act* or other municipal approval are required, the NPCA may not be able to support the *Planning Act* application or this permit may be revoked. This application does not absolve the applicant of the responsibility of obtaining necessary permission from applicable federal, provincial or municipal government.

- **I have confirmed with the local municipality** ☐ **Yes** ☐ **No**
- **Confirmation from municipality attached to this application** ☐ **Yes** ☐ **No**

Additional information:

- ☐ Previous NPCA Permit
- ☐ Concurrent Planning Application
- ☐ Planning Act Decision Last 12 mos.
- ☐ Applications Made to Other Agencies (e.g. MNRF, MECP, NEC, DFO)
- ☐ Fill Remaining on site (if applicable)
- ☐ Municipal Building Permit Required

Would you like to be present if staff need to visit the property? ☐ **Yes** ☐ **No**

Standard Conditions of Permit

1. Permits granted by the Niagara Peninsula Conservation Authority (NPCA) are valid for up to two years from the date of issue unless otherwise stated on the permit. Consent is hereby given to the NPCA and its employees, to access the property for the purpose of obtaining information, monitoring any approved construction, and any and all other works or activities related to the permission.

2. Permits granted by the NPCA do not exempt the applicant from obtaining permission from other agencies, boards, governments, or other approvals as may be required. It is the responsibility of the owner to ensure that a valid permit is in effect at the time the work is occurring.

3. Any false information or misleading statements made on this application will render any permission granted by the Niagara Peninsula Conservation Authority null and void.

4. As per Section 12.3.3 of the NPCA Policy Document, **fees are non-refundable.**

Authorized Signature

I declare that I have read and agree to the standard conditions for the permit application and that all of the information provided is correct to the best of my knowledge.	
Signature of Owner(s)	Date

***A Landowner Authorization form (attached) is required if the solicitor/contractor/agent is completing the application form on behalf of the owner(s).**

General Information for Applicants

Maps that illustrate the extent of the lands under the jurisdiction of the Niagara Peninsula Conservation Authority are available at the Administration Office in Welland or online using the "Watershed Explorer" tool at www.npca.ca

Any questions or comment regarding permit application should be directed to the **Supervisor, Permits & Compliance** (905) 788-3135.

NOTICE OF COLLECTION

Pursuant to section 29(2) of the Municipal Freedom of Information and Protection of Individual Privacy Act, 1990, the personal information contained on this form is collected under the legal authority of the Conservation Authorities Act, R.S.O. 1990, c27, as amended. This information is used to assess applications for and, where approved, issue the Permit. Information on this form may be disclosed to Government and Municipal Agencies for review and comment and to members of the public through the Freedom of Information Process. The name of the applicant, location of the work and a description of the project may be published in NPCA documents including agendas, reports and meeting minutes which are posted on the NPCA website. Questions about the collection of personal information should be directed to the Freedom of Information Officer, Niagara Peninsula Conservation Authority, 250 Thorold Road West, 3rd Floor, Welland, Ontario, L3C 3W2, (905) 788-3135.

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LANDOWNER AUTHORIZATION

If an application is to be submitted by a solicitor/contractor/agent on behalf of the legal owner(s) of the subject property, this Landowner Authorization form must be completed and signed by the owner(s). If the owner is a corporation acting without agent or solicitor, the application must be signed by an officer of the corporation and the corporations' seal (if any) must be affixed. Authority staff reserve the right to discuss any or all aspects of the permitting process with the property owner.

If the application is to be prepared by a solicitor/contractor/agent, authorization should not be given until the application and its attachments have been examined and approved by you, the owner(s).

I/WE_____, being the legal owner(s) of the property

described as Lot ___, Concession ___, Part/Lot No. _____, on Plan _____ in the

Municipality/Township of _____, located at Civic Address

_____ and having a

Tax Assessment Roll Number (ARN) of _____, hereby

authorize _____,
(print full name of solicitor/contractor/agent)

To submit the enclosed application to the Niagara Peninsula Conservation Authority and to provide any information or material required by staff of the NPCA relevant to the application for the purpose of obtaining a permit in accordance with the requirements of Ontario Regulation 155/06 (as amended).

Signature of Legal Owner _____ Date _____

Signature of Legal Owner _____ Date _____

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APPLICATION CHECKLIST

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- ☐ Application fee (Credit Card or Electronic Funds Transfer Only)
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- ☐ A drawing of the proposal that includes the following (either as part of the illustration or as notes:
    - o Name of applicant and legal description of the property (e.g. municipal street address, lot, concession, municipality;
    - o Scale, date and directional arrow;
    - o Dimensions of the property (a copy of the legal survey is highly recommended);
    - o Location and dimensions of all existing or proposed structures, grading, filling, excavation, and the distance to any waterbody (e.g. wetlands, streams, lakes, etc.), valley, floodplain, slope, shoreline and beach on or adjacent to the property;
    - o Existing and proposed metric geodetic elevations of the property and of the lowest opening(s) in any new buildings, or additions to buildings (as applicable);
    - o Proposed use of each floor, including basement, in any new buildings, or additions to buildings (as applicable);
    - o Drainage details before and after development
    - o Location and type of sediment and erosion control measures (e.g. silt fence);
    - o Soil stabilization measures proposed (e.g. seeding, sodding, planting);
    - o Construction equipment and access routes to be used;
    - o Location of cross section(s) indicated on the plan view drawing;

- ☐ A complete description of the type of fill proposed to be placed
- ☐ Photographs are highly recommended (electronic format only)
- ☐ Written confirmation no Planning Act approvals required from municipality
- ☐ Signed Application Checklist form
- ☐ Completed Landowner Authorization Form (required if owner is assigning another party to act as an agent for the project);
- ☐ The following technical studies as identified in the pre-consultation meeting:
  - o _____
  - o _____
  - o _____
  - o _____
- ☐ A description of the methods and equipment to be used in carrying out the alteration and access/egress to the work (if applicable)
- ☐ A signed Application Checklist
- ☐ A pdf of the entire application package.

Notes:

1. The applicant is encouraged to submit copies of documents as originals may not be returned;

2. Calculations and notes from a qualified engineer or a licensed surveyor may be requested by the NPCA to support the application at the cost of the applicant;

3. The applicant is responsible for ensuring compliance with all other applicable federal, provincial, regional and municipal statutes, regulations or by-law.

4. A copy of this application will be forwarded to the municipality the works are to occur in.

_____ _____

Signature of Owner/Agent Date

NIAGARA PENINSULA CONSERVATION AUTHORITY

SCHEDULE "A" – PLAN REVIEW FEES (effective November 2, 2020)

Application Type	Fee	
Official Plan Amendments • *Standard*[2] • *Major*[3]	 **$570** **$2770**	
Zoning By-law Amendment • *Standard*[2] • *Major*[3]	 **$570** **$1875**	
Site Plan Control • *Single Residential* • *Multiple Residential, Commercial, Industrial*	 **$570** **$800**	
Complex[4] *Application*	**$7425**	
Consent	**$570**	
Minor Variance	**$410**	
Plan of Subdivision/Condominium (with no previous site plan circulation) • *Charges for review to provision of Conditions of Draft Approval only on a new application; involvement subsequent to draft approval is subject to additional fees.*	*Less than 100 lots* **$570**	*More than 100 lots* **$2770**
• *Clearance of Conditions for Subdivision Registration (per phase)*	**$570**	**$2300**
• *Draft Plan Modifications*[5] *(alterations to site/plan layout)*	**$570**	**$570**
• *Draft Plan Extension*[6] *(original conditions about to lapse for draft approval)*	**$570**	**$570**
Niagara Escarpment Plan • *Development Permit* • *Niagara Escarpment Plan Amendment*	 **$570** **$2770**	
Reactivation Fee (all application types) after three (3) years of dormancy. ***$205***		

Interpretation

[1] Plan Review Fee is for the provision of comments to municipal planning authority or the Niagara Escarpment Commission on privately initiated site specific development applications pursuant to the Ontario Planning Act and Niagara Escarpment Plan Act. Technical Report review fees (Schedule "C") shall apply as applicable. CA Act regulatory approvals (Schedule "B") normally follow planning approvals where required. All fees are exclusive of Technical Review Fees (see Schedule "C"); supplementary Technical Report Review Fees will be added on as per issue basis in addition to any and all fees outlined in Schedule "A" herein. The "notes to Schedule "A" (below) form part of this Schedule.

[2] "**Standard**" - An application where no technical studies are required.

[3] "**Major**" - Applications where one or more technical study is required. See Schedule "C" Technical Review Fees for applicable fees.

[4] "**Complex**" - Planning Act (e.g. OPA/ZBA) and/or Site Plan for aggregate applications, golf courses, trailer parks, campgrounds, lifestyle communities.

[5] "**Modification**" means alteration to layout, blocks, roads etc.

[6] "**Extension**" means that approval is about lapse and the original conditions of approval need to be revised and updated necessitating a full review.

SCHEDULE "A" - NOTES

A. Reviews are undertaken in accordance with the Conservation authorities mandate and are directly related to circulation requirements associated with the Ontario Planning Act, Niagara Escarpment Planning and Development Act and Provincial (MMAH) "One Window" review. Some review matters relate to Municipal Memorandums of Understanding for the provision of planning advice. Section 21(1)(m) of the Conservation Authorities Act empowers individual Conservation Authorities to charge user fees for such services.

B. Applicants are encouraged to consult with staff prior to submission of all applications to determine the extent and nature of the information required to accompany the application and to determine the appropriate fee.

C. Plan review applications that fall into one or more categories will be charge one fee, at the highest rate, when the applications are submitted at the same time

D. Fees shall be paid at the time of the filing of an application with the municipality. All fees must be received prior to the release of written comments to an approval authority.

E. Subdivisions that have several phases will be charged a separate clearance fee at the time of clearing of each phase.

F. Additional fees – NPCA reserves the right to request additional fees should the review require a greater level of effort. Additional fees are required after the second submission for all applicant initiated revisions and for the review of reports/plans not reflecting changes as requested by the NPCA.

G. The Consent fee may be collected for a Part Lot Control application within a plan of subdivision that was registered prior to May 4, 2006 where a new lot is created within or adjacent to a NPCA Regulated Area.

NIAGARA PENINSULA CONSERVATION AUTHORITY

SCHEDULE "B" - PERMIT FEES (effective November 2, 2020)

Development, Interference with Wetlands and Alterations to Shorelines and Watercourse Regulation 155/06 (Section 28 of the Conservation Authorities Act)

Description	Fee
Fill - placement or removal of fill in excess of 25 cubic metres	**$1565**
Works on a valley slope and/or erosion prone area	**$830**
Public Roads - New/Replacement Bridge or Culvert Crossing - span > 3m	**$1345**
Public Roads - New/Replacement Bridge or Culvert Crossing - span < 3m	**$730**
Public Roads - Bridge Culvert maintenance incl. repair to soffit, wing walls & other superstructure, repair of inlet/outlet erosion	**$305**
Access Crossings - new/replacement primary access (e.g. main driveway)	**$995**
Access Crossings - new/replacement secondary bridge (e.g. low flow, foot bridge, golf course crossing)	**$500**
Access crossings - maintenance to deck, wing walls or other superstructure	**$350**
Dams: New/Replacement and major maintenance	**$3185**
Dams: Maintenance	**$1200**
Shoreline: New/Replacement Shoreline Protection Works (e.g. walls, stone barriers)	**$1920**
Shoreline: Maintenance of wall or barrier	**$350**
Ponds: New pond with diversion structure/channel connection	**$900**
Ponds: New pond construction or enlargement of existing pond without channel connection	**$350**
Utilities: Utility watercourse crossing (open cut)	**$1875**
Utilities: Utility in floodplain or other Regulated feature	**$1405**
Utilities: Storm drainage outfall construction	**$785**
Utilities: Outfall Maintenance	**$305**
Buildings: New Construction, reconstruction, redevelopment, additions (greater than or equal to 1000 square feet)	**$1405**
Buildings: New Construction, reconstruction, redevelopment, additions (less than 1000 square feet)	**$700**
Buildings: Accessory Structures (e.g. in ground pools, decks, docks, gazebos)	**$305**
Watercourse Alteration: Channels - Channel works > 500 m (incl. Realignment, invert cleanout, erosion protection	**$3185**
Watercourse Alteration: Channels - Channel works < 500 m	**$1920**
Watercourse Alteration: Channels repair of localized erosion failure	**$500**
Watercourse Alterations: Channels - minor intermittent drainage courses where no fish or ecological restrictions are present	**$305**
Other: Great Lake Dredging	**$1920**
Other: Miscellaneous - small watercourse, valleyland, shoreline works not defined above	**$305**
Permit Renewal Fee (if application to renew submitted within 6 months of expiry	**$235**
Works without a Permit	See Note F

SCHEDULE "B" - NOTES

A. Pursuant to the provisions of Ontario Regulation 155/06 and the NPCA's regulation policies, permission is required, prior to undertaking development in hazardous areas, in or adjacent to wetlands and before straightening, changing, diverting or interfering in any way with the existing channel of a lake, river, creek stream or watercourse or prior to changing or interfering in any way with a wetland. The Technical Review Fees (Schedule "C") does not apply to NPCA permits.

B. Fees are approved by the NPCA Board of Directors and apply to application review only; acceptance of an application as complete is not to imply permission may be granted permission will be forthcoming only if submission address statutory requirements and are in conformity with approved CA policies in effect at the time an application is made or where allowances are granted by the NPCA Board of Directors. **All fees are payable at the time the application is submitted failing which the application cannot be deemed complete or processed.**

C. Permit applications that fall into one or more categories will be charge one fee, at the highest rate, when the applications are submitted at the same time.

D. **Development:** for definition see Section 28(25) of the Conservation Authorities Act of Ontario (R.S.O. 1990, Chpt. 27)

E. **Watercourse**: for definition see Section 28(25) of the Conservation Authorities Act of Ontario (R.S.O. 1990, Chpt. 27)

F. Unauthorized works in a regulated feature are charged 2 times the normal Permit fee plus a $150.00 administration fee.

SCHEDULE "C" – TECHNICAL REPORT REVIEW FEES (effective November 2, 2020)

Technical reports are routinely prepared by accredited professionals in the fields of water resources engineering, groundwater science, site servicing, geotechnical engineering, environmental assessments, ecology and planning in support of proving the feasibility of development. Such experts are familiar with professional standards and provincial and local requirements in such matters. The CA review involves a determination or the provision of advice on whether the applicable guidelines have been appropriately addressed.

Description	Fee
Stormwater Management Minor (the area is less than 5 ha)	**$585**
Stormwater Management Major (the area is more than 5 ha)	**$1755**
Review of Floodplain mapping prepared by applicant up to 500 linear metres	**$1345**
Review of Floodplain mapping prepared by the applicant over 500 linear metres	**$2575**
Grading and Drainage Plan Review Minor (the area is less than 5 ha)	**$380**
Grading and Drainage Plan Review Major (the area is more than 5 ha)	**$1170**
Geotechnical Report Review up to 200 linear metres of slope crest	**$505**
Geotechnical Report Review over 200 linear metres of slope crest	**$1345**
Hydrogeological Report Review Minor (less than 5 lots)	**$1015**
Hydrogeological Report Review Major (more than 5 lots)	**$1755**
Coastal Engineering Report Review (up to 200 linear m of Great Lakes shoreline)	**$505**
Coastal Engineering Report Review (more than 200 linear m of Great Lakes shoreline)	**$1345**
EIS Terms of Reference Review (to be deducted from EIS fee when EIS submitted)	**$350**
EIS Minor (one feature e.g. watercourse)	**$1015**
EIS Major (more than one feature e.g. wetland, watercourse, valley)	**$2205**
EIS Third submission (Addendum)(minor changes)	**$585**
EIS Third submission (Addendum)(major changes e.g. features not addressed, additional site visit or meetings required)	**$1170**

SCHEDULE "C" - NOTES

A. Technical review fees of $72/hour will be charged where more than two (2) reviews are required by the Conservation Authority due to submission of incomplete reports from the applicants. All fees are made payable to the Niagara Peninsula Conservation Authority.

B. Technical review fees also apply to the review of preliminary studies submitted prior to a formal planning, NPCA permit or municipal building permit application. If a formal planning or permit application is received by the NPCA within one (1) year of the review of the preliminary study and the proposal is the same as the preliminary one, the technical review fee will be discounted from the NPCA fee.

C. Where the NPCA has reviewed as part of a planning act application and the same study is needed to support a NPCA permit application, the permit fee will be one-half (1/2) of the relevant fee.

NIAGARA PENINSULA CONSERVATION AUTHORITY

SCHEDULE "D" – INQUIRIES/MINOR WORKS (effective November 2, 2020)

Description	Fee
Solicitor, Real Estate, Appraiser	**$250**
Building Permit Clearance	**$65**
Minor Works Letter	**$120**

SCHEDULE "D" - NOTES

A. Technical review fees (see Schedule C) apply to Building Permit Clearance (e.g. where municipal Zoning By-laws include overlay zones for the identification of natural heritage and/or natural hazard features)

B. The Building Permit Clearance fee is not collected for new homes in Registered Plans of Subdivision that have been reviewed by the NPCA.

NIAGARA PENINSULA CONSERVATION AUTHORITY

NPCA By-Law 01-2021

Being a By-Law to Amend the NPCA Administrative By-Law governing the calling of the meetings and the procedures to be followed at meetings

---

WHEREAS Section 19.1 of the Conservation Authorities Act, R.S.O. 1990, c.C.27 in part prescribes that:

An authority may make by-laws,

(a) respecting the meetings to be held by the authority, including providing for the calling of the meetings and the procedures to be followed at meetings, specifying which meetings, if any, may be closed to the public;

e) providing for the composition of its executive committee and for the establishment of other committees that it considers advisable and respecting any other matters relating to its governance;

(g) requiring accountability and transparency in the administration of the authority including
(ii) establishing a code of conduct for the members of the authority, and
(iii) adopting conflict of interest guidelines for the members of the authority;

(j) respecting such other matters as may be prescribed by regulation.

AND WHEREAS in accordance with the aforementioned Section 19.1, the Niagara Peninsula Conservation Authority did on the 22nd day of October 2020, adopt an Administrative By-Law to govern the calling of the meetings and the procedures to be followed at meetings;

AND WHEREAS the Niagara Peninsula Conservation Authority now deems it expedient to amend its Administrative By-Law to comply with amendments to the Conservation Authorities Act enacted under Bill 229, Protect, Support and Recover from COVID-19 Act (Budget Measures), 2020 and Bill 245, Accelerating Access to Justice Act, 2021;

NOW THEREFORE, BE IT RESOLVED:

1. **THAT** the following clause be added as the final statement within Section II. NPCA Administrative By-law – Introduction:

   "An additional member may be appointed to the authority by the Minister as a representative of the agricultural sector."

2. **THAT** the following clause be inserted into Section II. NPCA Administrative By-law – NPCA Mandate – Section A. Definitions:

> *"**"Participating Municipality"** means a municipality that is designated by or under the Act as a participating municipality in a conservation authority. The Participating Municipalities of the NPCA are the Regional Municipality of Niagara, the City of Hamilton and Haldimand County".*

3. **THAT** Section II. NPCA Administrative By-law – NPCA Mandate – B. Governance- Subsections 1.1 to 1.4 entitled Board Members be repealed and replaced with the following:

> ***"1. Board Members***
>
> ***a) Appointments***
>
> *Participating municipalities within the jurisdiction of the Niagara Peninsula Conservation Authority may appoint Board Members in accordance with Section 14 of the Act. An additional member may be appointed to the authority by the Minister as a representative of the agricultural sector.*
>
> *Appointed Board Members must reside in a participating municipality within the Authority's area of jurisdiction and may include citizens as well as elected members of municipal councils.*
>
> *Collectively, the appointed Board Members comprise the Authority, and for the purposes of this by-law are referred to as the Board of Directors.*
>
> *At least 70% of a municipality's appointees must be selected from among the members of the municipal council, unless the municipality obtains permission from the Minister to select less than 70% of its appointees from among the members of the municipal council.*
>
> ***b) Term of Board Member Appointments***
>
> *In accordance with Section 14 of the Act, a Board Member shall be appointed for a term of up to four years at the discretion of the appointing municipal council; such term beginning at the first meeting of the Authority following his or her appointment and ending immediately before the first meeting of the Authority following the appointment of his or her replacement. The C.A.O/Secretary-Treasurer shall notify the appropriate municipality in advance of the expiration date of any Board Member's term, unless notified by the municipality of the Board Member's reappointment or the appointment of his or her replacement. A Board Member is eligible for reappointment. A Board Member can be replaced by a Participating Municipality at the municipality's discretion prior to the end of their term."*

4. **THAT** Section II. NPCA Administrative By-law – NPCA Mandate – B. Governance- Subsection 2.1 entitled Bound by Conservation Authorities Act, item c) be repealed and replaced with the following wording:

> *"(c) to acquire by purchase, lease or otherwise any land that it may require, and, subject to subsection (2), to sell, lease or otherwise dispose of land so acquired;"*

5. **THAT** Section II. NPCA Administrative By-law – NPCA Mandate – B. Governance, 4. Committees (page 16) Subsection 4.1. Current Standing Committees be amended to denote the addition of "The NPCA Wainfleet Bog Advisory Committee" and with the Terms of Reference affixed to the Administrative By-Law Appendix 5 to form a part of thereof.

6. **THAT** Section II. NPCA Administrative By-law – NPCA Mandate – C. Meeting Procedures, 3. Annual Meeting, Subsection 3.3 be amended with the addition of the following provision:

> *"The term of office for the Chair and Vice-Chair shall be limited to two (2) consecutive years. unless otherwise decided by a resolution of the Board of Directors and approved by the Minister per Section 17 of the Act. The election or acclamation of the Chair and Vice-Chair shall be held yearly at the Annual General Meeting. Successors to the position of Chair and Vice-Chair shall be a Board Member appointed by a different municipality to the incumbent."*

7. **THAT** the Administrative By-Law Appendix 3 – Hearing Procedures be repealed in its entirety and replaced with the Appendix 3 - Hearing Procedures as attached, to hereinafter form a part of the Administrative By-Law.

8. **THAT** this by-law shall come into force and take full effect on the date of passing.

9. **THAT** this by-law shall take precedence over and supersede any other provision of the Administrative By-Law with which it is inconsistent.

READ a first and second time this 17th day of December, 2021.

READ a third time and finally passed this 17th day of December, 2021.

Signed:

December 17, 2021

Chandra Sharma — Date
Chief Administrative Officer/
Secretary-Treasurer

December 17, 2021

Brenda Johnson, Chair — Date

Appendix 3 – Hearing Procedures

1.0 PURPOSE OF HEARING GUIDELINES

The purpose of the Hearing Guidelines is to reflect the changes to the 1998 Conservation Authorities Act and provide a step-by-step process to conducting hearings required under Section 28 (12), (13), (14), and Section 28.0.1(7) of the Conservation Authorities Act. The Act requires that the applicant be provided with an opportunity for a hearing by the local Conservation Authority Board, or Executive Committee (sitting as a Hearing Board) as the case may be, for an application to be refused or approved with contentious conditions. In the case of hearings related to applications submitted pursuant to Section 28.0.1 of the Conservation Authorities Act, the Authority must grant permission to the applicant, provided the requirements set out under this section are met. In this scenario, a hearing will only be held to determine conditions which will be attached to a permission. Further, a permit may be refused if in the opinion of the Authority the proposal adversely affects the control of flooding, pollution or conservation of land, and additional erosion and dynamic beaches. In the case of applications submitted pursuant to Section 28.0.1 of the Conservation Authorities Act, the Authority may refuse to grant a permit only if i) a zoning order has not been made to authorize the development project, ii) the project is proposed to be carried out in the Greenbelt Area, and iii) if all other prescribed requirements have not been satisfied. The Hearing Board is empowered by law to make a decision, governed by the Statutory Powers Procedures Act.

The Hearing Rules are adopted under the authority of Section 25.1 of the Statutory Powers Procedures Act (SPPA). The SPPA applies to the exercise of a statutory power of decision where there is a requirement to hold or to afford the parties to the proceeding an opportunity for a hearing before making a decision. The SPPA sets out minimum procedural requirements governing such hearings and provides rule-making authority for to establish rules to govern such proceedings.

The Hearing Board shall hear and decide whether the application will be approved with or without conditions or refused. In the case of hearings related to applications submitted purposed to Section 28.0.1, the Hearing Board shall determine what conditions, if any, will be attached to the permission.

These guidelines have been prepared as an update to the October 1992 hearing guidelines and are intended to provide a step-by-step process to conducting hearings required under Section 28 (12), (13), (14) of the Conservation Authorities Act. Similar to the 1992 guidelines, it is hoped that the guidelines will promote the necessary consistency across the Province and ensure that hearings meet the legal requirements of the Statutory Powers Procedures Act without being unduly legalistic or intimidating to the participants. Additional considerations have been included related to hearings under Section 28.0.1 (7) of the Conservation Authorities Act.

2.0 PREHEARING PROCEDURES

2.1 Apprehension of Bias

In considering the application, the Hearing Board is acting as a decision-making tribunal. The tribunal is to act fairly. Under general principles of administrative law relating to the duty of fairness, the tribunal is obliged not only to avoid any bias but also to avoid the appearance or apprehension of bias. The following are three examples of steps to be taken to avoid apprehension of bias where it is likely to arise.

(a) No member of the Authority taking part in the hearing should have prior involvement with the application that could lead to a reasonable apprehension of bias on the part of that member. Where a member has a personal interest, the test is whether a reasonably well-informed person would consider that the interest might have an influence on the exercise of the official's public duty. Where a member is a municipal councillor, the Municipal Conflict of Interest Act applies. In the case of a previously expressed opinion, the test is that of an open mind, i.e. is the member capable of persuasion in participating in the decision making.

(b) If material relating to the merits of an application that is the subject of a hearing is distributed to Board members before the hearing, the material shall be distributed to the applicant at the same time. The applicant may be afforded an opportunity to distribute similar pre-hearing material. These materials can be distributed electronically.

(c) The applicant will be given an opportunity to attend the hearing before a decision is made; however, the applicant does not have to be present for a decision to be made.

(d) Where a hearing is required for applications submitted pursuant to Section 28.0.1 of the Conservation Authorities Act (e.g., to determine the conditions of the permission), final decisions on the conditions shall not be made until such a time as the applicant has been given the opportunity to attend a hearing.

Individual Conservation Authorities shall develop a document outlining their own practices and procedures relating to the review and reporting of Section 28 applications, including the role of staff, the applicant and the Authority or Executive Committee as well as, the procedures for the hearing itself. Such policy and procedures manual shall be available to the members of the public upon request and on the Authority's website. These procedures shall have regard for the above information and should be approved by the Conservation Authority Board of Directors.

2.2 Application

The right to a hearing arises where staff is recommending refusal of an application or is recommending conditions to the approval of an application. Additionally, in the case of applications submitted pursuant to Section 28.0.1 of the Conservation Authorities Act, the Authority shall not attach conditions to a permission unless the applicant has been given the opportunity to be heard by the Authority. The applicant is entitled to reasonable notice of the hearing pursuant to the Statutory Powers Procedures Act.

2.3 Notice of Hearing

The Notice of Hearing shall be sent to the applicant within sufficient time to allow the applicant to prepare for the hearing. To ensure that reasonable notice is given, it is recommended that prior to sending the Notice of Hearing, the applicant be consulted to determine an agreeable date and time based on the local Conservation Authority's regular meeting schedule.

The Notice of Hearing must contain or append the following:

(a) Reference to the applicable legislation under which the hearing is to be held (i.e., the Conservation Authorities Act).

(b) The time, place and the purpose of the hearing. OR for Electronic Hearings:
The time, purpose of the hearing, and details about the manner in which the hearing will be held.

Note: for electronic hearings the Notice must also contain a statement that the applicant should notify the Authority if they believe holding the hearing electronically is likely to cause them significant prejudice. The Authority shall assume the applicant has no objection to the electronic hearing if no such notification is received.

(c) Particulars to identify the applicant, property and the nature of the application which are the subject of the hearing.

Note: If the applicant is not the landowner but the prospective owner, the applicant must have written authorization from the registered landowner.

(d) The reasons for the proposed refusal or conditions of approval shall be specifically stated. This should contain sufficient detail to enable the applicant to understand the issues so he or she can be adequately prepared for the hearing. It is sufficient to reference in the Notice of Hearing that the recommendation for refusal or conditions of approval is based on the reasons outlined in previous correspondence or a hearing report that will follow.

(e) A statement notifying the applicant that the hearing may proceed in the applicant's absence and that the applicant will not be entitled to any further notice of the proceedings.

Except in extreme circumstances, it is recommended that the hearing not proceed in the absence of the applicant.

(f) Reminder that the applicant is entitled to be represented at the hearing by a representative such as counsel, if desired. The conservation authority may be represented at the hearing by counsel or staff.

(g) A copy of the Authority's Hearing Guidelines.

It is recommended that the Notice of Hearing be directed to the applicant and/or landowner by registered mail. Please refer to **Appendices 3-A.1 and 3-A.2** for an example Notice of Hearing.

2.4 Presubmission of Reports

If it is the practice of the local Conservation Authority to submit reports to the Board members in advance of the hearing (i.e., inclusion on an Authority/Executive Committee agenda), the applicant shall be provided with the same opportunity. The applicant shall be given two weeks to prepare a report once the reasons for the staff recommendations have been received. Subsequently, this may affect the timing and scheduling of the staff hearing reports.

2.5 Hearing Information

Prior to the hearing, the applicant shall be advised of the local Conservation Authority's hearing Procedures upon request.

3.0 HEARING

3.1 Public Hearing

Pursuant to the Statutory Powers Procedure Act, hearings, including electronic hearings, are required to be held in public. For electronic hearings, public attendance should be synchronous with the hearing. The exception is in very rare cases where public interest in public hearings is outweighed by the fact that intimate financial, personal or other matters would be disclosed at hearings.

3.2 Hearing Participants

The Conservation Authorities Act does not provide for third party status at the local hearing. The hearing however is open to the public. Any information provided by third parties should be incorporated within the presentation of information by, or on behalf of, the applicant or Authority staff as appropriate.

3.3 Attendance of Hearing Board Members

In accordance with case law relating to the conduct of hearings, those members of the Authority who will decide whether to grant or refuse the application must be present during the full course of the hearing. If it is necessary for a member to leave, the remaining members can continue with the hearing and render a decision.

3.4 Adjournments

The Board may adjourn a hearing on its own motion or that of the applicant or Authority staff where it is satisfied that an adjournment is necessary for an adequate hearing to be held.

Any adjournments form part of the hearing record.

3.5 Orders and Directions

The Authority is entitled to make orders or directions to maintain order and prevent the abuse of its hearing processes. A hearing procedures example has been included as **Appendix 3-B**.

3.6 Information Presented at Hearings

(a) The Statutory Powers Procedure Act requires that a witness be informed of their right to object pursuant to the Canada Evidence Act. The Canada Evidence Act indicates that a witness shall be excused from answering questions on the basis that the answer may be incriminating. Further, answers provided during the hearing are not admissible against the witness in any criminal trial or proceeding. This information should be provided to the applicant as part of the Notice of Hearing.

(b) It is the decision of the hearing members as to whether information is presented under oath or affirmation. It is not a legal requirement. The applicant must be informed of the above, prior to or at the start of the hearing.

(c) The Board may authorize receiving a copy rather than the original document. However, the Board can request certified copies of the document if required.

(d) Privileged information, such as solicitor/client correspondence, cannot be heard. Information that is not directly within the knowledge of the speaker (hearsay), if relevant to the issues of the hearing, can be heard.

(e) The Board may take into account matters of common knowledge such as geographic or historic facts, times measures, weights, etc. or generally recognized scientific or technical facts, information or opinions within its specialized knowledge without hearing specific information to establish their truth.

3.7 Conduct of Hearing

3.7.1 Record of Attending Hearing Board Members

A record shall be made of the members of the Hearing Board.

3.7.2 Opening Remarks

The Chairperson shall convene the hearing with opening remarks which generally; identify the applicant, the nature of the application, and the property location; outline the hearing procedures; and advise on requirements of the Canada Evidence Act. Please reference **Appendices 3-C.1 and 3-C.2** for the Opening Remarks model. In an electronic hearing, all the parties and the members of the Hearing Board must be able to clearly hear one another and any witnesses throughout the hearing.

3.7.3 Presentation of Authority Staff Information

Staff of the Authority presents the reasons supporting the recommendation for the refusal or conditions of approval of the application. Any reports, documents or plans that form part of the presentation shall be properly indexed and received.

Staff of the Authority should not submit new technical information at the hearing as the applicant will not have had time to review and provide a professional opinion to the Hearing Board.

Consideration should be given to the designation of one staff member or legal counsel who co-ordinates the presentation of information on behalf of Authority staff and who asks questions on behalf of Authority staff.

3.7.4 Presentation of Applicant Information

The applicant has the opportunity to present information at the conclusion of the Authority staff presentation. Any reports, documents or plans which form part of the submission should be properly indexed and received.

The applicant shall present information as it applies to the permit application in question. For instance, does the requested activity affect the control of flooding, erosion, dynamic beach or conservation of land or pollution? The hearing does not address the merits of the activity or appropriateness of such a use in terms of planning.

- The applicant may be represented by legal counsel or agent, if desired
- The applicant may present information to the Board and/or have invited advisors to present information to the Board
- The applicant(s) presentation may include technical witnesses, such as an engineer, ecologist, hydrogeologist etc.

The applicant should not submit new technical information at the hearing as the Staff of the Authority will not have had time to review and provide a professional opinion to the Hearing Board.

3.7.5 Questions

Members of the Hearing Board may direct questions to each speaker as the information is being heard. The applicant and /or agent can make any comments or questions on the staff report.

Pursuant to the Statutory Powers Procedure Act, the Board can limit questioning where it is satisfied that there has been full and fair disclosure of the facts presented. Please note that the courts have been particularly sensitive to the issue of limiting questions and there is a tendency to allow limiting of questions only where it has clearly gone beyond reasonable or proper bounds.

3.7.6 Deliberation

After all the information is presented, the Board may adjourn the hearing and retire in private to confer. The Board may reconvene on the same date or at some later date to advise of the Board's decision. The Board members shall not discuss the hearing with others prior to the decision of the Board being finalized.

4.0. DECISION

The applicant must receive written notice of the decision. The applicant shall be informed of the right to appeal the decision within 30 days upon receipt of the written decision to the Ontario Land Tribunal.

It is important that the hearing participants have a clear understanding of why the application was refused or approved. The Board shall itemize and record information of particular significance which led to their decision.

4.1 Notice of Decision

The decision notice should include the following information:

(a) The identification of the applicant, property and the nature of the application that was the subject of the hearing.

(b) The decision to refuse or approve the application, and in the case of applications under Section 28.0.1 of the Conservation Authorities Act, the decision to approve the application with or without conditions. A copy of the Hearing Board resolution should be attached.

It is recommended that the written Notice of Decision be forwarded to the applicant by registered mail. A sample Notice of Decision and cover letter has been included as **Appendix 3-D**.

4.2 Adoption

A resolution advising of the Board's decision and particulars of the decision should be adopted.

5.0 RECORD

The Authority shall compile a record of the hearing. In the event of an appeal, a copy of the record should be forwarded to the Ontario Land Tribunal. The record must include the following:

(a) The application for the permit.
(b) The Notice of Hearing.
(c) Any orders made by the Board (e.g., for adjournments).
(d) All information received by the Board.
(e) Attendance of hearing Board members.
(f) The decision and reasons for decisions of the Board.
(g) The Notice of Decision sent to the applicant.

Appendix 3-A.1

NOTICE OF HEARING

IN THE MATTER
OF
The Conservation Authorities
Act, R.S.O. 1990, Chapter 27

AND IN THE MATTER OF an application
by

FOR THE PERMISSION OF THE
CONSERVATION AUTHORITY
Pursuant to Regulations made
under
Section 28, Subsection 12 of the said
Act

TAKE NOTICE THAT a Hearing before the Executive Committee of the Conservation Authority will be held under Section 28, Subsection 12 of the Conservation Authorities Act at the offices of the said Authority (ADDRESS), at the hour of **, on the day of , 202X**, [for electronic hearings, include details about the manner in which the hearing will be held] with respect to the application by (***NAME***) to permit development within an area regulated by the Authority in order to ensure no adverse affect on (***the control of flooding, erosion, dynamic beaches or pollution or conservation of land./alter or interfere with a watercourse, shoreline or wetland***) on Lot , Plan/Lot , Concession , (***Street***) in the City of , Regional Municipality of , River Watershed.

TAKE NOTICE THAT you are invited to make a delegation and submit supporting written material to the Executive Committee for the meeting of (***meeting number***). If you intend to appear [For electronic hearings: or if you believe that holding the hearing electronically is likely to cause significant prejudice], please contact (***name***). Written material will be required by (***date***), to enable the Committee members to review the material prior to the meeting.

TAKE NOTICE THAT this hearing is governed by the provisions of the Statutory Powers Procedure Act. Under the Act, a witness is automatically afforded a protection that is similar to the protection of the Ontario Evidence Act. This means that the evidence that a witness gives may not be used in subsequent civil proceedings or in prosecutions against the witness under a Provincial Statute. It does not relieve the witness of the obligation of this oath since matters of perjury are not affected by the automatic affording of the protection. The significance is that the legislation is Provincial and cannot affect Federal matters. If a witness requires the protection of the Canada Evidence Act that protection must be obtained in the usual manner. The Ontario Statute requires the tribunal to draw this matter to the attention of the witness, as this tribunal has no knowledge of the affect of any evidence that a witness may give.

AND FURTHER TAKE NOTICE that if you do not attend at this Hearing, the Executive Committee of the Conservation Authority may proceed in your absence, and you will not be entitled to any further notice in the proceedings.

DATED the ___ day of , _____202X

The Executive Committee of the
Conservation Authority

Per:
Chief Administrative Officer/Secretary-Treasurer

Appendix 3-A.2

NOTICE OF HEARING

(Subsection 28.0.1 (7) of the *Conservation Authorities Act*)

IN THE MATTER
OF
The Conservation Authorities
Act, R.S.O. 1990, Chapter 27

AND IN THE MATTER OF an application
by

FOR THE PERMISSION OF THE
CONSERVATION AUTHORITY
Pursuant to Regulations made
under
Section 28.0.1, Subsection 7 of the said
Act

TAKE NOTICE THAT a Hearing before the Executive Committee of the Conservation Authority will be held under Section 28.0.1, Subsection 7 of the Conservation Authorities Act at the offices of the said Authority (ADDRESS), at the hour of **, on the day of , 202X**, [for electronic hearings, include details about the manner in which the hearing will be held] with respect to the application by (***NAME***) to permit development within an area regulated by the Authority in association with a Minister's Zoning Order (REGULATION NUMBER) on Lot , Plan/Lot , Concession , (***Street***) in the City of , Regional Municipality of , River Watershed.

TAKE NOTICE THAT you are invited to make a delegation and submit supporting written material to the Executive Committee for the meeting of (***meeting number***). If you intend to appear [For electronic hearings: or if you believe that holding the hearing electronically is likely to cause significant prejudice], please contact (***name***). Written material will be required by (***date***), to enable the Committee members to review the material prior to the meeting.

TAKE NOTICE THAT pursuant to Section 28.0.1 of the *Conservation Authorities Act*, a conservation authority is required to grant the permission applied for and may only impose conditions to the permission. The Hearing will therefore focus on the conditions to be imposed to the granting of the permission.

TAKE NOTICE THAT this hearing is governed by the provisions of the Statutory Powers Procedure Act. Under the Act, a witness is automatically afforded a protection that is similar to the protection of the Ontario Evidence Act. This means that the evidence that a witness gives may not be used in subsequent civil proceedings or in prosecutions against the witness under a Provincial Statute. It does not relieve the witness of the obligation of this oath since matters of perjury are not affected by the automatic affording of the protection. The significance is that the legislation is Provincial and cannot affect Federal matters. If a witness requires the protection of the Canada Evidence Act that protection must be obtained in the usual manner. The Ontario Statute requires the tribunal to draw this matter to the attention of the witness, as this tribunal has no knowledge of the affect of any evidence that a witness may give.

AND FURTHER TAKE NOTICE that if you do not attend at this Hearing, the Executive Committee of the Conservation Authority may proceed in your absence, and you will not be entitled to any further notice in the proceedings.

DATED the ___ day of , _____202X

The Executive Committee of the
Conservation Authority

Per:
Chief Administrative Officer/Secretary-Treasurer

Appendix 3-B

HEARING PROCEDURES

1. Motion to sit as Hearing Board.

2. Roll Call followed by the Chairperson's opening remarks. For electronic hearings, the Chairperson shall ensure that all parties and the Hearing Board are able to clearly hear one another and any witnesses throughout the hearing.

3. Staff will introduce to the Hearing Board the applicant/owner, his/her agent and others wishing to speak.

4. Staff will indicate the nature and location of the subject application and the conclusions.

5. Staff will present the staff report included in the Authority/Executive Committee agenda.

6. The applicant and/or their agent will present their material

7. Staff and/or the conservation authority's agent may question the applicant and/or their agent if reasonably required for a full and fair disclosure of matters presented at the Hearing.[1]

8. The applicant and/or their agent may question the conservation authority staff and/or their agent if reasonably required for full and fair disclosure of matters presented at the Hearing.[2]

9. The Hearing Board will question, if necessary, both the staff and the applicant/agent.

10. The Hearing Board will move into deliberation. For electronic meetings, the Hearing Board will separate from other participants for deliberation.

11. Members of the Hearing Board will move and second a motion.

12. A motion will be carried which will culminate in the decision.

13. The Hearing Board will move out of deliberation. For electronic meetings, the Hearing Board will reconvene with other participants.

14. The Chairperson or Acting Chairperson will advise the owner/applicant of the Hearing.

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[1] As per the Statutory Powers Procedure Act a tribunal may reasonably limit further examination or cross-examination of a witness where it is satisfied that the examination or cross-examination has been sufficient to disclose fully and fairly all matters relevant to the issues in the proceeding.

[2] As per the Statutory Powers Procedure Act a tribunal may reasonably limit further examination or cross-examination of a witness where it is satisfied that the examination or cross-examination has been sufficient to disclose fully and fairly all matters relevant to the issues in the proceeding Board decision.

15. If decision is "to refuse" or “approve with conditions”, the Chairperson or Acting Chairperson shall notify the owner/applicant of his/her right to appeal the decision to the Ontario Land Tribunal within 30 days of receipt of the reasons for the decision.

16. Motion to move out of Hearing Board and sit as Executive Committee.

Appendix 3-C.1

CHAIRPERSON'S REMARKS WHEN DEALING WITH HEARINGS (Section 28, Subsection 12 of the *Conservation Authorities Act*) WITH RESPECT TO ONTARIO REGULATION 155/06

We are now going to conduct a hearing under section 28 of the Conservation Authorities Act in respect of an application by _____: , for permission to:_____

The Authority has adopted regulations under section 28 of the Conservation Authorities Act which requires the permission of the Authority for development within an area regulated by the Authority in order to ensure no adverse affect on (the control of flooding, erosion, dynamic beaches or pollution or conservation of land) or to permit alteration to a shoreline or watercourse or interference with a wetland.

The Staff has reviewed this proposed work and prepared a staff report, a copy of which has been given to the applicant and the Board. The applicant was invited to file material in response to the staff report, a copy of which has also been provided to the Board.

Under Section 28 (12) of the Conservation Authorities Act, the person requesting permission has the right to a hearing before the Authority/Executive Committee.

In holding this hearing, the Authority Board/Executive Committee is to determine whether or not a permit is to be issued, with or without conditions. In doing so, we can only consider the application in the form that is before us, the staff report, such evidence as may be given and the submissions to be made on behalf of the applicant. Only Information disclosed prior to the hearing is to be presented at the hearing.

The proceedings will be conducted according to the Statutory Powers Procedure Act. Under Section 5 of the Canada Evidence Act, a witness may refuse to answer any question on the ground that the answer may tend to incriminate the person, or may tend to establish his/her liability to a civil proceeding at the instance of the Crown or of any person.

The procedure in general shall be informal without the evidence before it being given under oath or affirmation unless decided by the hearing members.

If the applicant has any questions to ask of the Hearing Board or of the Authority representative, they must be directed to the Chairperson of the board.

Appendix 3-C.2

CHAIRPERSON'S REMARKS WHEN DEALING WITH HEARINGS (Section 28.0.1, Subsection 7 of the *Conservation Authorities Act*) WITH RESPECT TO ONTARIO REGULATION 155/06

We are now going to conduct a hearing under section 28.0.1 of the Conservation Authorities Act in respect of an application by _____: , for permission to:_____

Under Section 28.0.1 of the Conservation Authorities Act, an Authority is required to grant permission for any application submitted under a regulation made under subsection 28(1) for permission to carry out all or part of a development project, in an area regulated by the Authority, associated with a Minister's Zoning Order, provided the criteria listed under subsection 28.0.1 (1) are met. A permission is subject to any conditions as may be prescribed by the Authority.

The Staff has reviewed this proposed work and prepared a staff report, including the proposed conditions of approval for the proposed work, which has been given to the applicant and the Board. The applicant was invited to file material in response to the staff report, a copy of which has also been provided to the Board.

Under Section 28.0.1 (7) of the Conservation Authorities Act, the person requesting permission has the right to a hearing before the Authority/Executive Committee.

In holding this hearing, the Authority Board/Executive Committee is to determine the prescribed conditions to be attached to the approved permission. In doing so, we can only consider the application in the form that is before us, the staff report, such evidence as may be given and the submissions to be made on behalf of the applicant. Only Information disclosed prior to the hearing is to be presented at the hearing.

The proceedings will be conducted according to the Statutory Powers Procedure Act. Under Section 5 of the Canada Evidence Act, a witness may refuse to answer any question on the ground that the answer may tend to incriminate the person, or may tend to establish his/her liability to a civil proceeding at the instance of the Crown or of any person.

The procedure in general shall be informal without the evidence before it being given under oath or affirmation unless decided by the hearing members.

If the applicant has any questions to ask of the Hearing Board or of the Authority representative, they must be directed to the Chairperson of the board.

Appendix 3-D

NOTICE OF DECISION

(Date)
BY REGISTERED MAIL
(name) (address)

Dear:

RE: NOTICE OF DECISION
Hearing Pursuant to Section 28(12) of the Conservation Authorities Act
Proposed Residential Development
Lot , Plan ; ?? Drive City of
(Application #)

In accordance with the requirements of the Conservation Authorities Act, the (***name***) Conservation Authority provides the following Notice of Decision:

On (***meeting date and number***), the Hearing Board/Authority/Executive Committee refused/approved your application/approved your application with conditions. A copy the Boards/Committee's resolution # has been attached for your records. Please note that this decision is based on the following reasons: (***the proposed development/alteration to a watercourse or shoreline adversely affects the control of flooding, erosion, dynamic beaches or pollution or interference with a wetland or conservation of land***).

In accordance with Section 28 (15) of the Conservation Authorities Act, An applicant who has been refused permission or who objects to conditions imposed on a permission may, within 30 days of receiving the reasons under subsection (14), appeal to the Minister who may refuse the permission; or grant permission, with or without conditions. Through Order in Council 332/2018 the responsibility for hearing the appeal has been transferred to the Ontario Land Tribunal. For your information, should you wish to exercise your right to appeal the decision, a letter by you or your agent/counsel setting out your appeal must be sent within 30 days of receiving this decision addressed to:

Ontario Land Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario M5G 1E5

A carbon copy of this letter should also be sent to this conservation authority. Should you require any further information, please do not hesitate to contact (***staff contact***) or the undersigned.

Yours truly,

Chief Administrative Officer/Secretary Treasurer

Enclosure

NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX H

INTERIM ENVIRONMENTAL IMPACT STUDY GUIDELINE

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

www.npca.ca

TABLE OF CONTENTS

Introduction

The Environmental Impact Study (EIS) Guideline is intended to provide guidance for implementing the Niagara Peninsula Conservation Authority's (NPCA) policies in relation to Ontario Regulation 155/06 and the Conservations Authorities Act.

How to use this Guideline

This EIS Guideline is intended to provide direction to landowners considering **development** or **site alteration** in or near NPCA regulated features and areas and EIS practitioners to determine when an EIS is required and the procedure for completing an EIS in support of an NPCA work permit. The Guideline also helps explain roles and responsibilities of the NPCA in relation to the EIS process and provides tools for improving the process and considering options for study avoidance, where appropriate. A brief summary of the intended purpose of each major section is provided below as a quick reference guide in using this document.

Section 1 | EIS Primer. This section contains a high-level, plain language overview of what an EIS is, why and when they are needed, roles and responsibilities of parties, who prepares them, and how they fit into the NPCA work permit process.

Section 2 | EIS Process. This section provides an overview of the EIS process and explains the various steps and tools used with each.

Section 3 | EIS Content. This section provides direction on the technical content and approach to completing an EIS, including minimum submission requirements for a complete EIS.

Terms identified in this document have been bolded (see Appendix A – Definitions).

1.0 Environmental Impact Study Primer

1.1 What is an EIS?

An Environmental Impact Study (EIS) is a tool for objectively assessing the environmental impacts of a proposed **development** or **site alteration** under s. 28 of the Conservation Authorities Act and NPCA's implementing regulation O. Reg. 155/06. An EIS is required where **development** or **site alteration** is proposed wholly or partially within, or adjacent to, a feature or area regulated by the NPCA such as **wetlands**, **watercourses** and hazard lands.

Within the context of the NPCA's regulatory framework, an EIS is a process that addresses the potential impact of **development** and/or **site alteration** on NPCA regulated features or areas including **wetlands**, **watercourses** and hazardous sites. The EIS documents the existing conditions of the NPCA's regulated feature(s) and functions on and around the site of such projects, identifies the potential impacts associated with the project, and recommends ways to avoid (preferred) or mitigate (where they cannot be avoided) negative impacts. Wherever possible, an EIS also identifies opportunities to restore or enhance natural features and functions to increase the resiliency of the natural environment within the Niagara Peninsula **watershed**. An EIS may also be used to inform refinements to portions of NPCA regulation mapping as it enables site level delineation of features, functions and areas on the ground. This can lead to boundary adjustments, and additions of any areas containing features or areas that may not have been captured in coarse-scale mapping (e.g., a previously unmapped **wetland** area).

1.2 Impact Studies: Terminology and a One-Study Approach

Terminology associated with EIS's varies across jurisdictions, plans or planning process scales; however, the basic approach and purpose of the impact assessment remains relatively consistent regardless of variation of terminology. Examples of terminology that refers to an Environmental Impact Study may include Environmental Impact Assessment, Natural Heritage Evaluation, Natural Heritage Study. Although guidelines, study requirements and approaches may differ slightly, the similarities across these study requirements can support a 'One-Study' approach to assessing environmental impacts within the NPCA's jurisdiction. The guidance provided herein will be applicable in supporting a 'One-Study' approach for a proposed **development** or **site alteration** that requires an NPCA work permit application.

The goal of the 'One Study' approach is to encourage all agencies to address their environmental study requirements through the identification of a suitable scope of work and reporting requirements as part of an EIS in the Niagara Peninsula **watershed**, to the extent this is feasible where Planning Act or Niagara Escarpment Planning and Development Act approvals are required in addition to an NPCA work permit. The

NPCA in partnership with municipal partners can guide applicants in identifying a single scope of work for EIS studies where the requirement for multiple studies applies. It is important to note that while the NPCA is not the approval authority for a Planning Act application or Niagara Escarpment (NEC) Development Permit, the NPCA still has a Regulatory role following these processes. If an applicant does not address NPCA concerns during the Planning Act/NEC Development Permit process, they run the risk of the NPCA not being able to support a work permit.

This guideline document outlines the NPCA's EIS requirements for s. 28 work permit applications. It is important to note that if other agency approvals are required, the applicant is advised to contact the relevant agency. Appendix B includes a list for a list agency contacts to assist applicants with obtaining required information if needed.

1.3 Why is an EIS needed?

The purpose of an EIS is to evaluate whether a proposed **development** or **site alteration** will result in no negative impact(s) to that portion of the regulated feature or area affected by the **development** or **site alteration**. The EIS does this by identifying components of the regulated features or areas including natural hazards, with the associated hydrology and ecological functions and assessing the potential environmental impacts, requirements for impact avoidance and mitigation measures, and opportunities for restoration or **enhancement**. Through Section 28 of the Conservation Authorities Act, conservation authorities have the power to prohibit, regulate or require permission for **development**, where the following five tests may be affected by the **development**: a) Flooding; b) Erosion; c) **Dynamic Beaches**; d) **Pollution**; and, e) the **Conservation of Land**.

1.4 When is an EIS required?

An EIS may be required where **development** or **site alteration** is proposed wholly or partially within, or adjacent to, an NPCA regulated feature or area as defined in the Conservation Authorities Act and associated regulations, and where in the opinion of NPCA staff, the proposed **development** has potential to impact natural and/or hydrological features and functions (i.e. **conservation of land**, interference with a **watercourse** or **wetland**, control of **pollution**, etc.). Section 12.4.4 of NPCA's policy document provides general direction for undertaking an EIS. In general, an EIS may be requested to address forms of **development** which have unknown risks or impacts, or where mitigation measures may be required to reduce the potential for risks and impacts related to the natural hazard, the proposed **development** and the five tests (flooding, erosion, **dynamic beaches**, **pollution**, and **conservation of land**).

Further, an EIS may be required as part of an NPCA Permit application or it may be submitted as part of a Planning Act application (e.g. Official Plan Amendment, Zoning By-law Amendment, Plan of Subdivision, etc.). Where an EIS is also required for a Planning Act application, there may be additional scoping requirements from other agencies (e.g. local/upper tier municipality) for other natural heritage features such as significant woodlands, significant **wildlife habitat**, species at risk, etc. It is important that an EIS addresses the requirements of all agencies involved.

Table 1 illustrates when an EIS may be required by the NPCA for a s. 28 work permit. It should be noted that where requirements differ, the most restrictive provisions apply. Should the policies or regulations change, those changes will replace the requirements set out in Table 1. Pre-consultation will be directed at ensuring that the various regulatory and approval requirements are addressed in an integrated and coordinated manner to avoid duplication or conflict.

Table 1: EIS Requirements

NPCA Regulated Feature	Is an EIS Required?	
	Development within NPCA Regulated Feature	**Development** within **area of interference** of an NPCA Regulated Feature
Provincially Significant Wetland	EIS required	EIS may be required for **development** within 120 meters
Wetland >2 ha. in size	EIS may be required	EIS may be required for **development** within 120 meters
Wetlands < 2 ha. in size	EIS may be required	EIS may be required for **development** within 30 meters
Watercourses	EIS may be required	EIS may be required for interference within existing channel
Hazardous Sites (Dunes, karst, **dynamic beaches**, slopes etc.)	EIS may be required	EIS may be required within 50 metres of the hazard
Valley Lands	EIS may be required	EIS may be required within 15 metres of the stable top of slope

1.5 Scope of an EIS

The study requirements of the EIS are determined through scoping. The scoping is based on the scale and complexity of the proposed work, the regulated feature(s) and **ecological function**(s) known to be present or potentially present, and the magnitude of the anticipated impacts associated with the proposed **development** or **site alteration**. An EIS may need input from other studies required as part of the application such as a geotechnical study, fluvial geomorphology assessment, hydrogeological study, coastal engineering report, stormwater management plan, **water balance** study, etc. It is important that the appropriate components of each study be integrated through the EIS, and vice versa, to ensure consistency of recommendations and mitigation measures.

1.6 Role of Applicant and Who Prepares an EIS?

1.6.1 What is the role of the Applicant?

The applicant has an important role throughout the EIS process to:

- Liaise and engage with the NPCA and / or other relevant agencies, as early as possible and as appropriate from project screening, pre-consultation through to EIS approval;
- Arrange for the completion of the EIS, which will generally include engaging consultant(s) with expertise in coordinating and/or conducting EISs, as appropriate for the scope and scale of the proposed **development** or **site alteration**; and
- Become familiar with the EIS process and understand the key steps and components of an EIS.

Applicants should also be aware of the following when engaging in the EIS process:

- Terms of Reference (TOR) for the EIS must be approved by NPCA staff prior to proceeding with the study to ensure scope of work to be completed is understood and agreed upon;
- Time required to prepare an EIS may be dependent, in part, upon the field data collection required. Different field studies have different 'field seasons' or periods in which the data must be collected (e.g., breeding bird data must be collected during the breeding bird season);
- Review of an EIS is generally an iterative process requiring more than one submission to incorporate any recommended amendments to plans or studies (e.g., opportunities to avoid impact through design alterations), and ensure that the EIS is complete and appropriate information and analyses have been completed to the satisfaction of the NPCA.

1.6.2 Who Prepares an EIS?

An EIS is to be prepared by a professional or team of professionals with relevant and applied expertise in environmental impact assessment studies. An EIS will be led by, or include substantive contributions by ecologists, biologists or comparable professionals. Components of the EIS or additional studies integrated into the EIS will be completed by a professional or team of professionals who have the appropriate knowledge and applied experience in the relevant disciplines for the required study component(s) (e.g., a hydrogeologist, fluvial geomorphologist, etc.). All EIS practitioners shall be retained at the expense of the applicant.

Individuals with alternative titles to those provided within this Guideline, who have the appropriate qualifications and experience to complete a study component, may be engaged as appropriate. Curriculum Vitae are to be provided within the EIS appendices to allow NPCA staff to verify the qualifications of persons who are involved in carrying out an EIS, such as educational qualifications, experience, and special certifications (e.g. Ecological Land Classification, Ontario Wetland Evaluation System, electro-fishing, etc.).

Some examples of study components and appropriate professionals are provided below:

- Biophysical Inventories shall be conducted by individuals with applied experience in natural heritage / biological inventories appropriate for the features and function in the study area. This may include ecologist(s) or biologist(s) specializing in one or more area (e.g., aquatic, fish & fish habitat, terrestrial, botany, wildlife, Species at Risk).
- **Wetland** or Site Water Balance(s) / Hydrogeological Studies / Surface Water Studies shall be conducted by individuals with applied experience in water resource engineering, hydrology, or hydrogeology, as appropriate for the specific work to be completed. **Wetland water balances** generally require input from an ecologist / biologist (or comparable) in addition to those disciplines listed above as it considers the form, function and requirements of the **wetland** and its hydrologic requirements for persistence on the landscape, as changes to the **wetland's** hydrology can have negative impacts on the ecology of the **wetland**.
- Landform and Fluvial Geomorphology Studies shall be conducted by individuals with training and experience in geomorphology, fluvial geomorphology or comparable knowledge / experience and as appropriate for the specific requirements of the work to be completed.

It is important that the study components be integrated through with the EIS; this allows for cumulative and interconnected impacts on the natural environment to be considered holistically.

2.0 EIS Process

2.1 Step 1 | Project Screening

Appendix C includes an illustration of the EIS process. The first step is determining whether an EIS is required. Project screening should occur through pre-consultation with NPCA staff for a permit application or when Planning Act application involves regulated features or areas. Where an NEC **development** permit application involves regulated features or areas, NPCA staff will screen the project at the time of receiving the initial application submission (Figure 1).

Projects may not be required to proceed past Step 1: Project Screening. It is through this initial step that EIS triggers are assessed. To avoid triggers, project exemptions and opportunities to waive the EIS requirement are considered.

There are some instances where minor **site alterations** do not require NPCA work permits and therefore are exempt from the EIS process. For example: non-structural agricultural activities (cropping, tilling, fence row clearing, etc.), landscaping and placement of **fill** not in excess of 50 cubic meters. For additional information on NPCA work permits please review the NPCA's Policy Document for the administration of Ontario Regulation 155/06 (May 2020 consolidation) which may be updated from time to time.

Note: proceeding through the EIS process does not indicate, imply, or guarantee that a project will be supported and / or approved. Projects with high risk of not being supported will be identified through Project Screening (Figure 1) and discussed with the applicant.

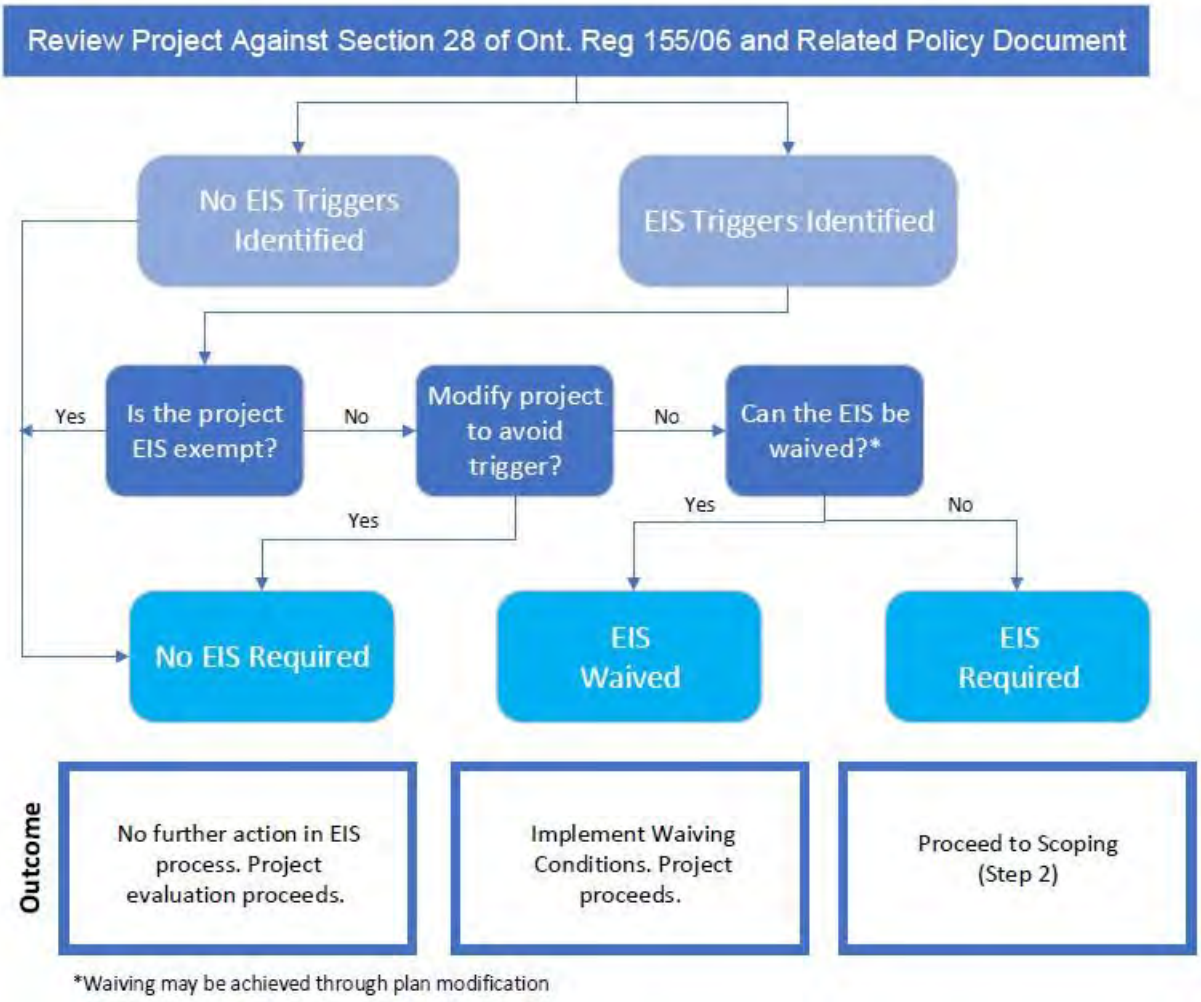


Figure 1: Project Screening Process

2.1.1. EIS Triggers

Where pre-consultation is required for **development** and **site alteration**, this may occur in consultation with the applicable municipality, the NEC and/or other applicable agencies. The NPCA screens the project against NPCA policies to determine if an EIS is triggered and, if triggered, whether the project is exempt from the EIS requirement. NPCA policies require that projects which propose to alter or interfere with an NPCA regulated feature will not have a negative impact on the ecological and/or hydrological function.

Notwithstanding the above triggers NPCA staff will evaluate each individual application to determine whether an EIS is required which includes consideration of: the nature of the proposed **development** /**site alteration**, adjacent land use(s), the extent of existing natural **buffer**, the existing condition of the feature, other **ecological function** considerations specific to the feature.

2.1.2 EIS Exemptions and Waiving

There are some instances where an EIS is not required as previous work may have been completed that adequately addresses the impacts associated with a project. A project may be exempt from the requirement of an EIS if it meets the following:

- Has been subject to the completion of an Environmental Assessment under the Ontario Environmental Assessment Act;
- Has been subject to the completion of an Environmental Assessment under the Canadian Environmental Assessment Act;
- Is work being conducted under the Drainage Act; and
- As determined through the Memorandum of Understanding between Conservation Ontario and Hydro One Networks Inc.

If an EIS is triggered and the project is not exempt, opportunities to avoid or waive may be considered. EIS avoidance may be possible if an applicant modifies their proposal to avoid an EIS in consideration of the above trigger policies. EIS waiving may be possible if the impacts of the proposed works are minor in nature and can be addressed through appropriate mitigation measures and best management practices.

A **development** or **site alteration** with no or very low risk of impact to the Regulated feature may be suitable for waiving of the EIS requirement as the impacts of the proposed works are likely minor and are readily mitigated through standard best management practices and conditions in an NPCA Permit. Where it is the opinion of NPCA staff, and supported with justification from staff, that the project meets the no negative impact test, the EIS requirement may be waived. Conditions may be identified for the permit and form a requirement of the waiving (e.g. mitigation measures, site plan changes, etc.).

As part of developing a Procedural Manual for the implementation of NPCA's policies, a formal waiving tool will be developed with input from municipal partners, other stakeholders, and community members.

2.1.3 Supporting Materials and Information

The following information may be required to screen the property and assess if an EIS could be waived:

- A description of the proposed project (**development** or **site alteration**), including the nature and scale of the proposed **development** or **site alteration**. For agricultural projects, the intended proposed use shall be identified.
- An accurate site plan, drawn to scale, including dimensions and distances from the Regulated feature that shows the following:

- Location and extent of the **development** or **site alteration**, including any **building**, grading, underground servicing, required site works (fencing, sidewalks, lighting) etc.;
- Material storage or staging areas;
- Roads, driveways, and parking areas;
- Amenity areas;
- Wells and septic systems (current and proposed locations if applicable); and,
- Stormwater management facilities, including any outlets.

A site visit with NPCA staff, the applicant and their consultant will be required, unless it is determined by NPCA staff that a site visit is not warranted.

2.2 Step 2 | Scoping the EIS and Terms of Reference Approval

2.2.1 EIS Scoping

Scoping establishes the extent of work required for an EIS. Scoping occurs upon confirmation that an EIS is required and is concluded with the preparation of an approved Terms of Reference (TOR).

The scope of the EIS will depend on the scope and scale of the proposal, its relationship to adjacent land uses, and the proposed works. The scope will be established on a site-by-site basis to identify the appropriate study requirements to address the potential impacts of the proposed **development** or **site alteration**. Smaller scale **development** or **site alteration** proposals will be appropriately scoped to avoid placing an undue burden on the applicant.

The Scoping and Terms of Reference Checklist (Appendix D) is coordinated by NPCA staff with input from other agencies, as appropriate. This checklist is used to document and provide initial direction with respect to the scope and scale of the EIS and is used by the applicant to inform the preparation of the TOR.

During the completion of the EIS, features and / or functions unanticipated during the scoping exercise may be identified. If this occurs, the applicant shall contact the NPCA and other review agencies as applicable, as soon as possible to discuss potential policy implications and determine if additional studies may be required.

A site visit may be required to facilitate scoping of the EIS.

2.2.2 Submission and Approval of Terms of Reference

Based on the Scoping and Terms of Reference Checklist (Appendix D) and in the context of the regulated features and their functions present and the proposed project, the applicant will submit a draft Terms of Reference (TOR) for the EIS to the NPCA. Collection and detailed review of available background and secondary

source information by the qualified professional preparing the TOR shall be completed to support the development of the TOR. The NPCA will review the TOR with other involved agencies, as appropriate, and identify any modifications required. Iterative submission and review of the draft TOR may be necessary to achieve a TOR that is acceptable to all parties. The NPCA, in coordination with other applicable agencies, as established through the One-Study process, will provide final approval of the TOR for the EIS. Upon approval, the applicant may formally proceed to undertake the EIS.

Most EISs will require season-specific field studies (e.g., amphibian or breeding bird surveys). Where timing of the TOR approval process could result in missing a field season, delaying the project schedule, the applicant may choose to conduct these studies adhering to accepted field methods and survey periods prior to receiving final approval of the TOR. The applicant shall confirm the proposed surveys and methods with the appropriate agency in advance of undertaking them.

2.3 Step 3 | Information Gathering and Draft EIS Preparation

Following the approval of the TOR, the information gathering phase is initiated. The information gathering phase includes further review and additional collection of background and secondary information sources where additional sources are identified, undertaking the field program, completion and review of studies that inform the EIS (e.g., stormwater, hydrogeological, etc.). Completion of analyses (e.g., significance assessments) will generally occur during and after completion of the information gathering phase, as appropriate.

When all data collection and analysis is completed, the draft EIS shall be prepared by the applicant in accordance with the approved TOR. The EIS will be considered draft until the NPCA and other relevant agencies' comments through the One-Study approach have been addressed to the satisfaction of the agencies (as applicable).

The NPCA has open data that may benefit background data collection to be completed during the EIS process. Please see NPCA's open data portal available at: https://gis-npca-camaps.opendata.arcgis.com/.

2.4 Step 4 | Draft EIS Submission

The EIS shall be submitted as part of a complete application for an NPCA Permit, or in the case of the One-Study approach circulated by the municipality for a Planning Act application or circulated by the NEC for a Development Permit. The NPCA will use the EIS Submission Checklist (Appendix D) to confirm that the EIS meets submission requirements and has been prepared in accordance with an approved TOR. If the submitted draft EIS does not meet the submission standards or was not prepared in accordance with the approved TOR, the NPCA may return the submission to the applicant. The identified deficiencies must be addressed, and the EIS re-submitted prior to the initiation of the NPCA's review process.

For an NPCA Permit application, the NPCA will coordinate review of, and comment on, the EIS and will liaise with the applicant and their consultant team. Commenting agencies in conjunction with the NPCA, if applicable, will consider how the EIS demonstrates compliance with applicable Federal, Provincial, and municipal policy and legislation related to environmental protection.

The NPCA or other planning approval authorities / agencies through the One-Study approach may require that the applicant attend a meeting to discuss the EIS.

Review of the EIS is often an iterative process. Based on the nature and extent of comments, a resubmission(s) of the EIS, addenda, or alterations to the site plan may be required to address key issues and comments identified by the NPCA. Ensuring a complete and high-quality draft EIS will assist in reducing the total review process timeline.

As part of the Draft EIS submission, please ensure that all survey data sheets, and representative soil samples are included for the study area.

2.4.1 Comment and Response

A Comment and Response Matrix is provided in Appendix F. The applicant is encouraged to use this matrix, or a similar comment matrix to help manage the review process.

Applicants are required to provide a cover letter documenting how agency comments on the EIS have been addressed. The Comment and Response Matrix, or a comparable comment response matrix, is to be used to track comment responses.

2.5 Step 5 | Final EIS & Data Package Submission

The EIS is considered final when all substantive and technical comments have been addressed to the satisfaction of the NPCA, and other relevant agencies through the One-Study approach. The NPCA, in consultation with the other relevant agencies, will provide approval of the EIS to the applicant.

The NPCA will consider the final EIS in making a decision on the NPCA work permit application. It is important to note that an approved EIS does not guarantee the approval of an NPCA work permit application. It should also be noted that entering the EIS process does not imply or guarantee that an EIS will be approved, or a project supported.

The applicant is required to submit a data package upon approval of the EIS, which includes:

- The approved EIS report with any associated addenda;

- A revised **development** or **site alteration** proposal (if required) and/or a table that identifies how the final EIS recommendations will be implemented;
- GIS data package; ESRI format for mapping
- Survey results tables; and
- Survey Datasheets.

The Final EIS Submission Package Checklist (Appendix G) outlines the requirements of the final EIS and data package to be submitted by applicants. A complete data package must be provided for the final submission of the EIS to be considered complete. Data submitted with a Final EIS may be utilized to update publicly available NPCA regulatory screening information.

3.0 Contents of an Environmental Impact Study

The following sections outline the structure and content of a typical EIS. This outline shall be interpreted as the minimum standard for content in an EIS. The actual fieldwork, supporting studies and content required for an EIS will be determined on a case-by-case basis through scoping and confirmed through the approval of the Terms of Reference (TOR) for the EIS.

3.1 Introduction

The introduction to the EIS shall:

- Briefly describe the site location, existing land uses on the site and surrounding area;
- Briefly describe the proposed **development** or **site alteration**;
- Define the study area boundary and the rationale for the extent of the study;
- Identify why an EIS is required for the proposed **development** or **site alteration** (i.e. the NPCA policy requirement and the portion of the regulated feature(s) triggering the EIS); and
- Describe the scoped issues and tasks required for the EIS based on the approved TOR and if applicable, a description of any previous pre-consultation meetings, agency meetings or site visits (the approved TOR shall be included as an appendix to the EIS).

3.2 Policy Context

Briefly describe the legislative and regulatory context for the proposed project, if applicable:

- Clearly identify current NPCA Regulations and Policies, Provincial legislation, regulations, plans and policies which apply to the subject site, such as but not limited to:
- Ontario Regulation 155/06, as amended from time to time;

- NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act, as amended from time to time;
- Federal Fisheries Act, 1985, and associated regulations;
- Federal Species at Risk Act, 2002, and associated regulations and recovery documents;
- Provincial Endangered Species Act, 2007, and associated regulations, recovery strategies and government response statements;
- Provincial Policy Statement (2020);
- List of consultation undertaken as part of the project:
    - Agencies (e.g. MECP, NEC, NDMNRF, DFO etc.); and,
    - Public or stakeholder groups (if any) (record of consultation shall be included as an appendix to the EIS).

If the EIS is subject to the One-Study approach, other relevant agencies may have additional requirements related to policy context, such as Provincial Plans and municipal policies. It is important to provide an adequate description of the proposed **development** or **site alteration** to facilitate review of the EIS and decision making on the outcomes of the EIS by the NPCA.

In the context of the study area, a description of the proposed **development** or **site alteration**, shall be provided including:

- Overview / summary of any iterative design process(es) up to and including alternative proposals considered that demonstrate efforts to avoid or minimize impacts. Rationale for the chosen option shall be provided.
- The proposed site plan accurately overlaid (i.e. georeferenced, NAD 83, Zone 17N) on recent aerial photography (orthoimagery) of the subject property. This should show (as applicable to the project):
    - Subject lands boundary / property limit;
    - **Development** or **site alteration** footprint (limits of grading or other works);
    - Lot lines / fabric;
    - Roads (new or improvements to existing);
    - Servicing (e.g., easements, alignments, etc.);
    - Stormwater facilities and outlets;
    - Land use(s) (e.g., low, medium, high density residential, commercial, etc.);
    - Open space and parks;
    - Trails;
    - Proposed **buffers**, and/or **enhancement** areas
    - Setbacks (e.g., from Top of Bank)

  - NPCA regulated features (e.g. **wetlands**, **watercourses**, valley lands, etc).
  - Other features or areas to be retained, as applicable.
- Phasing and timing of **development** or **site alteration** (if any / known);
- Relevant information integrated from other studies in describing the proposed **development** or **site alteration**, as appropriate.

3.4 Biophysical Inventory

The biophysical inventory shall include a thorough description of existing conditions in the study area based on background information and field surveys including:

a) The existing conditions described shall include, but not necessarily be limited to:

- Summary of surveys conducted: Survey type, date(s), start / finish time, weather conditions (as applicable), surveyors (personnel involved in undertaking field work);
- Physiography (topography, soils, bedrock);
- **Surface water** and **ground water features**;
- Fish and aquatic habitat;
- Vegetation (vegetation communities, vegetation inventory, provincially, regionally, and locally rare plant species);
- Wildlife (e.g. breeding birds, amphibians, reptiles, and other wildlife);
- Significant wildlife habitat (to be screened for using the appropriate MNRF criteria schedules);
- *Species at Risk (SAR) and SAR habitat;
- **Wetlands**;
- **Valleylands**;
- **Watercourses**;
- Floodplains;
- Ground water recharge/discharge areas;
- Headwater Drainage Feature Assessment;
- Feature Based Water Balance Risk Evaluation; and,
- Feature Based Water Balance Study.

*Consultation with MECP may be required with respect to survey methods, species presence / absence determinations, habitat delineation, potential impacts and any resultant mitigation, registration, authorization or permitting under the ESA (2007) and amendments or successor legislation. Any applicable correspondence with MECP shall be appended to the EIS.

*__Wetlands__ that are connected downstream through surface flow are considered to be **headwater drainage features** for the purposes of this Guideline.

It is important to note that the definition of **hydrologic function** includes "water's interaction with the environment including its relation to living things" (PPS, 2020). Unpredictable changes in water levels or wide variations in water levels can have negative impacts to the flora and fauna within a regulated feature. Therefore, the assessment of **hydrologic function** must include an ecological component as it relates to its reliance on hydrology.

Please refer to Appendix H for general field survey requirements and timelines.

b) The biophysical inventory shall include all regulated features and functions present on the subject property, adjacent lands and within areas as defined by the agreed upon boundary of the study area(s) as determined through the TOR. Data sources (i.e., data from agencies and previous studies vs. data collected in the field) should be clearly indicated.

c) Clearly identify known existing features (e.g. **wetlands**, **watercourses**, flood plain etc)

d) Integrate relevant information from other studies (e.g., geotechnical, geomorphological, **water balance** etc.), as appropriate.

e) Prepare report figures that clearly and accurately show the location of natural features and, where possible, natural functions, overlaid on recent aerial photography (or satellite imagery) of the subject property.

Note: Data tables in excel format and ESRI compatible GIS files are to be submitted as part of the final EIS submission package. Refer to the Final EIS Submission Checklist (Appendix G) for submission requirements. Provision of this information may be a condition of approval.

There are many **wetland** functions that can be identified at different scales, and that can be lumped or separated out depending on the approach taken. Table 3 lists examples of hydrologic and ecological **wetland** functions.

Table 2: Wetland Function Examples

Broad Function Type	Broad Functional Group	Functions
Hydrologic	Water Regime	• Erosion control • Contribution to groundwater discharge • Contribution to groundwater recharge • Maintenance of local **water balance** • Conveyance and flood attenuation function • Contribution to living things
	Biogeochemical	• Carbon/organic sequestration and storage • Nutrient and organic export • Water quality functions (including excess nutrient and other contaminant removal) • Contribution to living things
Ecological	Habitat for Flora and Fauna and Biological Productivity	• Habitat for flora and fauna that contribute to biodiversity and ecological integrity, including but not limited to; o Breeding bird habitat for area-sensitive species o Breeding habitat for amphibians o Breeding habitat for colonial species o Winter **wildlife habitat** o Habitat for concentrations of migratory species o Habitat for vegetation communities of interest o Fish and fish habitat o Areas with diverse vegetation communities • Serving to promote ecological connectivity; • Provisions of significant habitats (including species of concern) and significant communities within the **watershed**.

3.5 Biophysical Analysis of Opportunities and Constraints

The biophysical analysis shall identify regulated features and functions present on the subject site and identify constraints and **enhancement** opportunities. The biophysical analysis shall, at a minimum:

a) Assess the form, and function of regulated feature found on the subject property and within the study area that may influence the proposed **development** or **site alteration**. Assessment of form and function is to be done in accordance with applicable provincial guidance documents, or other relevant policies, guidelines, or guidance documents, as applicable (e.g. Ontario Wetland Evaluation System);

b) Delineate the precise boundaries of NPCA regulated features (e.g. **wetland** staking). Feature limits will generally be flagged or staked and confirmed in the field and surveyed to a sub-meter level of accuracy. Digital dataset(s) (i.e. georeferenced GIS dataset(s), NAD83, UTM Zone 17N) of the confirmed features are to be provided to the NPCA and other agencies as appropriate as part of the final EIS submission package. Delineation of all **wetland** boundaries is to be completed using protocols

and methodologies as identified in the Ontario Wetland Evaluation System (OWES) for Southern Ontario.

Please note that all revisions to **evaluated wetland** boundaries, or changes in **wetland** significance require an audit, including review and approval by the MNDMNRF prior to submission of the EIS.

c) Apply a **systems approach** that considers the form and function(s) of regulated features, the importance of protecting and enhancing ecological features, ecological functions and ecological interactions in the environment including:
   i. Identification of constraints; with associated mapping;
   ii. Identification of **enhancement** opportunities; with associated mapping and,
   iii. Assessment and recommendation of appropriate **buffers**, and where appropriate **enhancement** areas, with associated mapping.

d) Prepare figure(s) showing constraints to **development** or **site alteration** based on the results of the Biophysical Inventory and Biophysical Analysis. These figures must establish the boundary of regulated features and identify other areas for protection and restoration that collectively provide long term protection of natural habitats and native biodiversity.

e) Outcomes from consultation(s) and/or processes with agencies (e.g., DFO, MECP, MNDMNRF, and the NPCA) should be discussed here. A record of consultation shall be provided as an appendix to the EIS.

Enhancements are identified as opportunities that go beyond mitigating impacts, contributing to the long-term protection of the natural features. **Enhancement** opportunities have the objective of increasing the ecological integrity and resilience of existing natural features and functions of the regulated features. **Enhancement** opportunities can range in scope and scale and may include, for example:

- Enhanced **buffer** design(s) that support existing or increase habitat features and/or diversity;
- Areas for **enhancement** / restoration (from small to large) that:
  - Support or increase habitat features and/or diversity;
  - Connect or join fragmented natural features to form larger contiguous areas in order to create and improve habitat; and
  - Reduce edge-to-interior ratio of natural features;
- Activities that assist in removal and management of invasive species;
- Protection and restoration of water catchment areas for **wetlands**;
- Moving existing **infrastructure**, trails, etc. to reduce existing impacts and risks. For new or expanded areas where the applicant has demonstrated no negative impact to the feature(s)' form and function,

NPCA may consider a "net environmental gain" approach to the preservation and **enhancement** of the natural features, based on the principles outlined in NPCA policy 8.2.5, Wetland Conservation and 9.2.7, Conservation and Restoration Projects.

3.5.1 Identification of Opportunities and Constraints

Opportunities and constraints of NPCA regulated features must be identified for the subject site and shall include at a minimum:

- Discuss and depict regulated feature Opportunities and Constraints.
- Identify all the constraints to potential **development** or **site alteration** related to NPCA regulated features and areas identified for protection, as well as natural hazards, including their respective constraints and setbacks.
- Identify opportunities for **development** or **site alteration** on the subject property that work within the limitations of the site-specific constraints.
- Identify opportunities for restoration, **enhancement** and/or stewardship opportunities.
- Depict constraints and opportunities in a Figure.
- Include an environmental policy analysis confirming how the proposal meets (or does not meet) the applicable policies and legislation as described in the Policy Context section.

3.6 Impact Assessment and Mitigation

The impact assessment, identification of mitigation strategies and consideration of **cumulative impacts** are interrelated. As such, it is recommended that these be considered as linked components with descriptions and / or key outcomes presented in a table presenting all three components. The Impact Assessment, Mitigation Measures and Cumulative Impacts Table contained in Appendix F provides an example template. Note that detailed descriptions of some items that will be repeated through the table (e.g., mitigation measures) may be best described in text and listed in the table to reduce total length and improve readability.

3.6.1 Impact Assessment

The impact assessment section is intended to predict, based on best available information, the environmental consequences (positive or negative) that may result from the proposed **development** or **site alteration**. This is undertaken based on the understanding of the natural environment and the proposed **development** or **site alteration** developed through the preceding sections. The EIS must consider the impacts in the context of the sensitivity of natural features and functions present.

Impacts are to be quantified wherever possible (e.g., area(s) of vegetation removed by vegetation type and / or feature). This may include integration of data and analyses from other reports to inform the assessment of ecological / environmental impacts (e.g., pre- and post- **water balance** for the subject property, **wetland**(s), or **watercourse**(s)). All conclusions (impact or 'no impact') shall be science-based and defensible, and include evidence to support the conclusion (e.g., empirical evidence, references, etc.).

As noted, a table format is the preferred approach for the impact assessment and is to be paired with figure(s) that overlay the proposed **development** or **site alteration** on the outcomes of the biophysical inventory and analyses to facilitate the assessment and analysis. The impact assessment is to address the following minimum requirements:

a. All NPCA regulated features, functions and areas are listed and assessed for anticipated and potential impact(s);

b. Identify all anticipated and potential impacts (a list of potential environmental impacts is contained in Appendix E). The impacts shall consider, at a minimum, the following activities and aspects of **development** or **site alteration**, where applicable:
   - Earth works, grade alterations, stockpiling;
   - Equipment storage, maintenance and refueling;
   - Servicing (linear **infrastructure** alignments, features crossings, maintenance, etc.);
   - Stormwater management, including pond locations, thermal impacts, outlets, and maintenance;
   - **Buffer** and linkage widths (in meters) and area of Enhancement Areas (in hectares) should be indicated on the plan;
   - Roads and transportation, including temporary construction access and **watercourse** crossings and permanent **infrastructure**, maintenance, and use impacts;
   - Form, type and density of proposed **development** including lot limits and layouts, trails and recreation, parks, open space.

c. Impacts are to be assessed in terms of:
   - Likelihood of occurrence;
   - Magnitude;
   - Geographic extent;
   - Timing (e.g., during sensitive biological periods / cycles); and
   - Duration.

d. Impacts are to be identified in the following categories:

- **Direct**;
- **Indirect** (including induced); and
- **Cumulative**.

3.6.2 Mitigation

It is anticipated that opportunities to avoid (preferred) or minimize impacts have been explored and integrated, where feasible, in the preferred / proposed design. The remaining impacts (i.e. those presented in the impact assessment section will be addressed through mitigation (least preferred). Mitigation strategies are intended to address or minimize the anticipated and potential impacts such that there is no negative impact to the regulated feature resulting from the **development** or **site alteration**.

The EIS shall present the overall mitigation strategy, as applicable, and describe each recommended mitigation measure (e.g. Low Impact Development). The anticipated efficacy of the mitigation strategy and individual mitigation measure(s) in maintaining the features (form) and function of natural features and in reducing or eliminating potential impacts from the anticipated **development** or **site alternation**. Where appropriate (e.g., for non-standard approaches), figures and diagrams that illustrate proposed mitigation measures and detailed methods that provide direction for implementation are to be included. As new strategies and methods for the mitigation of **development** or **site alteration** impacts can be expected to continuously emerge, applicants should refer to and cite current and / or emerging approaches, best practices, etc. Efficacy and/or examples of successful use of proposed measures is to be explored where there is not a currently accepted 'best practice'.

It is recommended that proposed mitigation measures be documented in table format with anticipated and potential impacts to facilitate review of how the proposed mitigation will address identified impacts.

3.7 Monitoring Plan

A monitoring plan, where required, is intended to assess the implementation and efficacy of mitigation measures. The requirement for and preliminary scope of a monitoring plan is established through 'Scoping the EIS'. This preliminary scope may need to be revised to reflect the information presented in the EIS (i.e., feature sensitivity and significance, impact assessment, mitigation and **cumulative impacts**). The scope and extent of the monitoring plan should be prepared in consultation with NPCA and other agencies, as appropriate.

Generally, the monitoring plan will include three phases for the project: pre-construction (i.e., pre-**development**), during-construction and post-construction. It should include an environmental inspection plan to be conducted through all phases of **development** or **site alteration** outlining what is to be monitored, the frequency of monitoring, a reporting schedule and protocols that will ensure protection of natural features and

functions, ceasing works temporarily until suitable mitigation measures are identified and implemented, rectifying the causes of environmental damage, and restoring areas that have been impacted by construction activities. The EIS should identify how the monitoring plan will be implemented (e.g. through site plan control, conditions of planning approval or regulations by the approval authority, etc.) and detail any securities requirements or other measures needed to guarantee mitigation measures are successfully implemented.

An example of a post-construction monitoring plan timeline may look like the follis provided below:

Table 3: Example Post-Construction Vegetation Monitoring Plan Timeline

Component	Timing	Frequency
Vegetation – ELC, Canopy Health	May 1 to October 1 (3-seasons)	Years 1, 3 and 5
Invasive Plant Species	Twice during growing season in retained and created features	Years 1, 3 and 5
Planted Vegetation – Growth Rate	Summer (one season)	Years 1, 3 and 5
Planted Vegetation - Survivorship	Summer (one season)	Years 1, 2, 3 and 5
Planted Vegetation - Performance	Summer (one season)	Years 1, 3 and 5
Planted Vegetation - Cover	Summer (one season)	Years 1, 3 and 5
Planted Vegetation – Node Coverage	Summer (one season)	Years 1, 3 and 5

3.8 Conclusions and Recommendations

The key findings of the report including biophysical inventory and analysis, assessment of impacts, impact avoidance measures, mitigation measures and opportunities for environmental **enhancements** shall be summarized. A summary table documenting all mitigation measures, **enhancement** opportunities, and monitoring requirements to be implemented through the proposed **development** and **site alteration** and detailing the timing for their implementation should be included. As applicable, recommended conditions of approval to ensure successful implementation should be identified.

The conclusions should include a final recommendation to support / not support the **development** or **site alteration** proposal based on the results of the study and identify mechanisms that the recommendations of the EIS will be implemented to achieve no negative impact to the regulated features and areas in accordance with the O. Reg 155/06.

3.9 References

A list of all relevant references, background information sources, etc. used in the preparation of the EIS shall be included in the report.

3.10 Appendices and Supporting Material Requirements

The EIS will include numerous appendices and some supporting materials will be required as part of the submission. Below is a list of the minimum requirements for all submissions (i.e., initial through to final):

- Approved Terms of Reference (TOR)
- Record of Consultation
- Data Tables (field surveys / biophysical inventory)
- Figures
- Supporting Materials (as appropriate) Final Submission
- ESRI compatible GIS files (NAD 83, UTM Zone 17T) of all relevant natural heritage data (e.g., feature and area boundaries, significant species locations, etc.); and
- Digital copies of data tables (i.e., inventory results) in .xls or .csv format.

Note that items other than those listed may be included as appendices to streamline the main body text, where appropriate. For example, an impact assessment, mitigation and **cumulative impacts** table may be included in the body of the report, or as an appendix.

Appendices and supporting materials required as part of a submission package for draft submissions (initial and any re-submissions required) are provided in the EIS Submission Package Checklist (Appendix G).

References

This guideline was developed referencing the following best management practice and technical guidance documents:

EIS Guideline References

1. Beacon Environmental, December 2010 Environmental, Recommendations for Conducting Wetland Environmental Impact
2. Halton Region Environmental Impact Assessment (EIA) Guideline (2020): https://www.halton.ca/The-Region/Regional-Planning/Regional-Plans,-Strategies-and-Studies/Environmental-Impact-Assessment-Guide-Update
3. Hamilton EIS Guidelines: https://www.hamilton.ca/sites/default/files/media/browser/2015-05-31/eis-guidelines-2015
4. Niagara Region EIS Guidelines: https://www.niagararegion.ca/culture-and-environment/pdf/environmental-impact-study-guidelines.pdf

Technical and Policy Guidance Documents

1. Environmental Guide for Fisheries, April 2020; Ministry of Transportation of Ontario.
2. Erosion and Sediment Control Guide for Urban Construction, Toronto and Region Conservation Authority, 2019. 236 pp.
3. Fisheries and Oceans Canada (DFO) Aquatic Species at Risk (SAR) Mapping: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html
4. Land Information Ontario (LIO) Aquatic Resources Areas and Watercourse Data: https://data.ontario.ca/
5. Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch.
6. Lee, H.T., May 2008. Southern Ontario Ecological Land Classification: Vegetation Type List. Ontario Ministry of Natural Resources. London, ON. 35 pp.
7. Niagara Peninsula Conservation Authority, Lake Ontario Shoreline Management Plan Update, 2009. 69 pp.

8. Niagara Peninsula Conservation Authority. 2010. Natural Areas Inventory, Volume 1 and 2.

9. Niagara Peninsula Conservation Authority, Lake Erie Shoreline Management Plan Update. 2010. 93 pp.

10. Niagara Peninsula Conservation Authority, A Guide to Celebrate Niagara Peninsula's Native Plants (Sixth Edition), 2014.

11. Niagara Peninsula Conservation Authority. September 2018. NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act.

12. Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

13. Ontario Ministry of Municipal Affairs and Housing. Provincial Policy Statement, 2020.

14. Ontario Ministry of Natural Resources. March, 2010. Natural Heritage Reference Manual for the Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer for Ontario. 248 pp.

15. Ontario Ministry of Natural Resources and Forestry. 2014. Significant Wildlife Habitat Mitigation Support Tool. MNRF, Peterborough, Ontario.

16. Ontario Ministry of Natural Resources and Forestry. 2014. Ontario Wetland Evaluation System, Southern Manual. Third Edition (Version 3.3).

17. Ontario Ministry of Natural Resources and Forestry. January, 2015. Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. 40 pp.

18. Ontario Regulation 155/06. 2018. Niagara Peninsula Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.

19. Stanfield, Les. 2017. Ontario Stream Assessment Protocol (Version 10).

20. Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC). 2014. Evaluation, Classification and Management of Headwater Drainage Features Guidelines. Available from https://trca.on.ca/dotAsset/180724.pdf

21. Wetland Water Balance Risk Evaluation (TRCA, 2017). Available from https://trca.ca/app/uploads/2017/12/WetlandWaterBalanceRiskEvaluation_Nov2017.pdf

22. Wetland Water Balance Modelling Guidance Document, Toronto and Region Conservation Authority, 2020. Available from https://sustainabletechnologies.ca/app/uploads/2021/10/TRCA-Wetland-Modelling-Guidance-Document-August_2020-Final_.pdf

23. Wetland Water Balance Monitoring Protocol, Toronto and Region Conservation Authority, 2016. Available from https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2016/08/17180016/TRCA-Wetland-Water-Balance-Monitoring-Protocol-1.pdf

List of Appendices to EIS Guideline

Appendix A: Definitions

AREA OF INTERFERENCE[10] means the areas adjacent to wetlands where development could impact the hydrologic function of the wetland are referred to as areas of interference. The areas of interference are considered to be a regulated area under the Ontario Regulation 155/06. The area of interference differs, depending on the classification of the wetland:

a) For Provincially Significant Wetlands or wetlands greater than 2 hectares, the area of interference can be up to 120 meters from the boundary of the wetland.
b) For wetlands less than 2 hectares the area of interference is 30 meters.

BUFFER[5] means a naturally vegetated area of land located adjacent to regulated features and bordering lands that are subject to development or site alteration.

BUILDING[10] means any structure used for the shelter or accommodation of persons, animals, goods or chattels or equipment, having a roof which is supported by columns or wall and including any tents or awnings which are situated on private property.

CONSERVATION OF LAND[10] means the protection, management, or restoration of lands within the watershed ecosystem for the purpose of maintaining or enhancing the natural features and hydrologic and ecological functions within the watershed.

CUMULATIVE IMPACT[5] means the effect on the physical and natural resources resulting from the incremental activities of development over a period of time and over an area.

DEVELOPMENT[10] means:

a) the construction, Reconstruction, erection or placing of a Building or Structure of any kind; or
b) any change to a Building or Structure that would have the effect of altering the use or potential use of the Building or Structure, increasing the size of the Building or Structure, or increasing the number of dwelling units in the Building or Structure; or
c) site grading; or
d) the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

DIRECT IMPACTS[5] means impacts that occur through direct interaction of development or site alteration and/or its associated activities with features and / or functions of the natural environment.

DYNAMIC BEACH[10] means an area of inherently unstable accumulations of shoreline sediment along the Great Lakes-St. Lawrence River system and large inland lakes, as identified by provincial standards, as amended from

time to time. The dynamic beach hazard limit consists of the flooding hazard limit plus a 30 m dynamic beach allowance.

ECOLOGICAL FUNCTION[2] means the natural processes, products or services that living and nonliving environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions.

ENHANCEMENTS[5] means ecologically supporting areas adjacent to regulated features and/or measures internal to the features that increase the ecological resilience and function of individual features or groups of features.

EVALUATED WETLAND[5] means a wetland that has been evaluated using the criteria outlined in the most recent Ontario Wetland Evaluation System Manual (2014), as updated from time to time.

FILL[10] means a form of development under the Conservation Authorities Act and includes earth, sand, gravel, rubble, rubbish, garbage, or any other mater whether similar to or different from any of the aforementioned materials, whether originating on the site or elsewhere, used or capable of being used to raise, lower, or in any way effect the existing grade (does not include herbaceous or woody plant material).

FIVE TESTS[10] means the five tests of Subsection 3(1) of Ontario Regulation 155/06 and includes the control of flooding, erosion, dynamic beaches, pollution, and conservation of land.

FLOOD PLAIN[2] means, for river, stream, and small inland lake systems, the area, usually lowlands adjoining a watercourse which has been or may be subject to flooding hazards and is based on an analysis of precipitation, snow melt, or a combination thereof, having a return period of 100 years on average, or having a 1% chance of occurring or being exceeded in any given year.

GROUND WATER FEATURE[2] means water-related features in the earth's subsurface, including recharge/discharge areas, water tables, aquifers and unsaturated zones that can be defined by surface and subsurface hydrogeologic investigations.

HEADWATER DRAINAGE FEATURE[9] means non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands, but do not include rills or furrows.

HYDROLOGIC FUNCTION[2] means the functions of the hydrological cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things.

INDIRECT IMPACTS[5] means impacts that are not directly associated with the development or site alteration activity, but generate impacts through or as a result of growth-related changes associated with the activity.

INFRASTRUCTURE[2] means physical structures (facilities and corridors) that form the foundation for development. Infrastructure includes: sewage and water systems, septage treatment systems, stormwater management systems, waste management systems, electricity generation facilities, electricity transmission and distribution systems, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities.

PROVINCIALLY SIGNIFICANT WETLAND[10] means wetlands so classified by the Ministry of Norther Development, Mines, Natural Resources and Forestry based on the Ontario Wetland Evaluation System 2014 Southern Manual, as amended from time to time.

POLLUTION[10] means any deleterious physical substance or other contaminant that has the potential to be generated by development in an area to which a regulation made under Section 28 of the Conservation Authority Act applies.

SITE ALTERATION[2] means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site.

SURFACE WATER FEATURE[2] means water-related features on the earth's surface, including headwaters, rivers, stream channels, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands, and associated riparian lands that can be defined by their soil moisture, soil type, vegetation or topographic characteristics.

SYSTEMS APPROACH[5] means a comprehensive approach to natural heritage system planning that considers the importance of maintaining and protecting ecological features and functions of the environment and ecological interactions that occur over varying scales of time and space.

VALLEYLANDS[10] means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year.

WATER BALANCE[8] means the accounting of the inflows and outflows of water in a system, which are attributed to the various components of the hydrological cycle.

WATERCOURSE[10] means an identifiable depression in the ground in which a flow of water regularly or continuously occurs.

WATERSHED[10] means an area that is drained by a river and its tributaries.

WETLAND[10] means land that:

a) is seasonally or permanently covered by shallow water or has a water table close to or at its surface,

b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse,

c) has hydric soils, the formation of which has been caused by the presence of abundant water, and

d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been favoured by the presence of abundant water and no longer exhibits wetland characteristics referred to in clause c) or d).

WILDLIFE HABITAT[2] means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species.

Definition Sources:

[2] Provincial Policy Statement (2014) 3 Greenbelt Plan (2017)

[5] Prepared for the purpose of this Guideline (based on various source documents)

[7] TRCA 2017: Wetland Water Balance Risk Evaluation
https://trca.ca/app/uploads/2017/12/WetlandWaterBalanceRiskEvaluation_Nov2017.pdf

[8] TRCA 2016: Wetland Wat4er Balance Monitoring Protocol
https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2016/08/17180016/TRCA-Wetland-Water-Balance-Monitoring-Protocol-1.pdf

[9] CVC and TRCA 2014: Evaluation, Classification and Management of Headwater Drainage Features Guidelines
https://cvc.ca/wp-content/uploads//2021/06/HDFA-final.pdf

[10] NPCA 2018: NPCA Policy Document: Policies for the Administration of Ontario Regulations 155/06 and The Planning Act, https://npca.ca/images/uploads/common/LandUsePlanning.pdf

Appendix B: Contact Information for Other Relevant Agencies

Niagara Region
Planning and Development Services
1815 Sir Isaac Brock Way
P.O. Box 1042
Thorold, ON L2V 4T7
Canada
Tel: **905-980-6000**

City of Hamilton (Hamilton City Hall)
City Planning
71 Main Street West
Hamilton, Ontario
L8P 4Y5
Tel: 905-546-2489

Haldimand County
Planning Services
53 Thorburn Street South
Cayuga, Ontario
Canada, N0A 1E0
Tel: 905-318-5932

Ministry of Northern Development, Mines, Natural Resources and Forestry (Guelph District, Vineland Field Office)
4890 Victoria Ave N, PO Box 5000,
Vineland, ON L0R 2E0
Tel: 905-562-4147

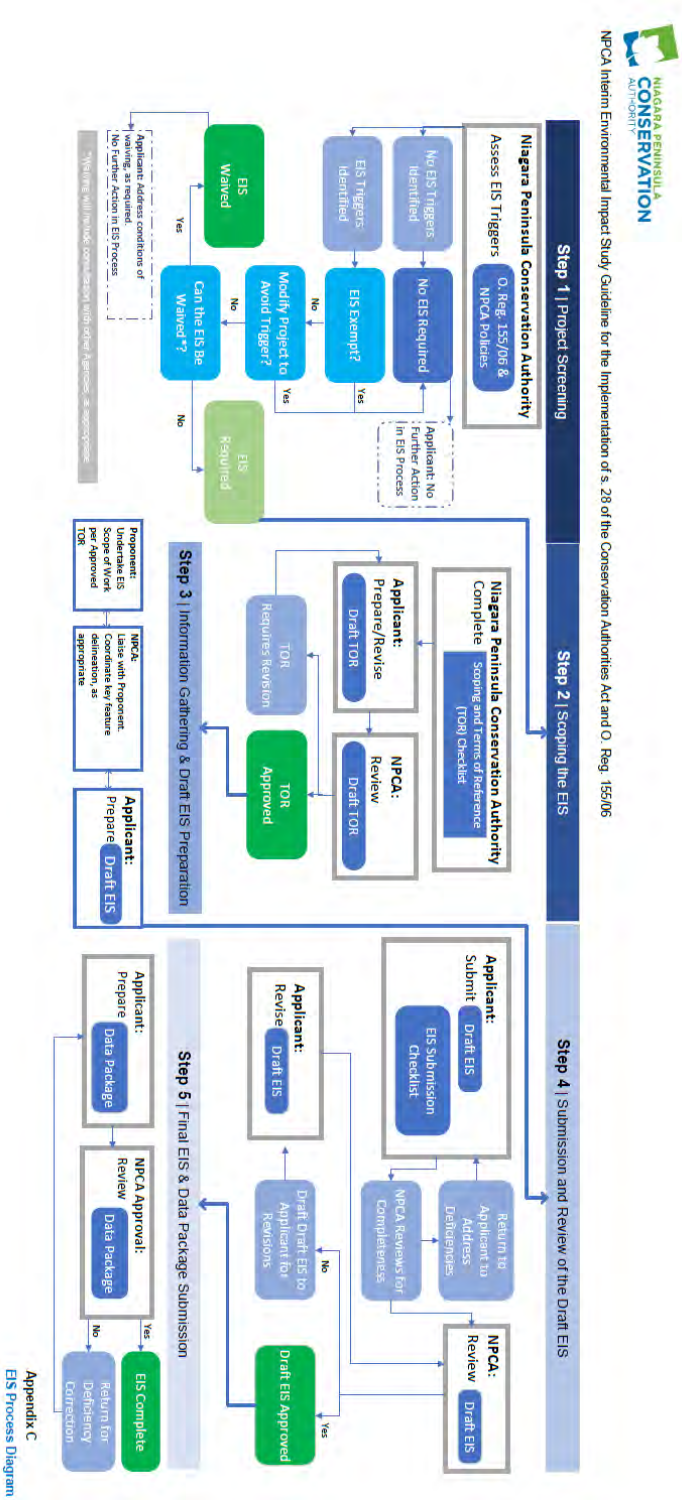
Department of Fisheries and Oceans
(Regional Office Central and Arctic)
520 Exmouth St
Sarnia ON N7T 8B1
Toll-free: 1-866-290-3731
Telephone: 519-383-1809

Environment Canada (Ontario Office)
4905 Dufferin Street
Toronto, Ontario
M3H 5T4
Tel: 416-739-4826

Niagara Escarpment Commission
232 Guelph Street
Georgetown, Ontario
L7G 4B1
Tel: 905-877-5191

Ministry of Environment, Conservation and Parks
SAROntario@ontario.ca
Tel: 416-325-4000 (general inquiries)

Appendix C: EIS Process Diagram



Appendix D: EIS Scoping and Terms of Reference Checklist

The **Scoping Checklist** provides a brief summary of components to be considered in the preparation of an EIS Terms of Reference. Scoping is to be completed in consideration of the following:

- Scope and scale of the proposed *development* or *site alteration*;
- Scope and scale of potential impacts resulting from the proposed *development* or *site alteration*;
- Sensitivity or complexity of the features on or adjacent to the proposed project to proposed development and site alteration, and specific impacts associated with the proposed project;
- Surrounding land use context (e.g., existing *development*);

Depending on the items above, not all elements listed below will necessarily be required. Large projects, those with a higher risk of potential impact, and those with complex natural heritage featuresand functions will generally require a more comprehensive set of assessments, analyses, etc. Smaller scale projects with lower potential impacts and where natural heritage features and functions are less complex are suitable for a scoped EIS and a greater number of items may be 'scoped out' (i.e., not required). In all cases, some items listed below may not be required depending on the specific site conditions and project.

Part 1 – Project Information

1-A | General Information

Project Name: Click or tap here to enter text.

Applicant: Click or tap here to enter text.

Primary Contact: Click or tap here to enter text.

Contact Information: Click or tap here to enter text.

Project Location: (Street Address or Lot and Concession):Click or tap here to enter text.

Consultant: Click or tap here to enter text.

Consultant Lead Contact Information: Click or tap here to enter text.

NPCA File Number: Click or tap here to enter text.

Other Agency File Number (if applicable): Click or tap here to enter text.

1-B | Project Type

- ☐ Accessory Structures (e.g. in ground pools, decks, docks, gazebos)
- ☐ Buildings: New Construction, reconstruction, redevelopment, additions (less than 1000 square feet)
- ☐ Buildings: New Construction, reconstruction, redevelopment, additions (greater than or equal to 1000 square feet)
- ☐ Building: Addition to existing dwelling
- ☐ Septic System or other service
- ☐ Other development or site alteration
- ☐ Subdivision
- ☐ Commercial/Industrial
- ☐ Lot Severance for single detached dwelling on an existing lot
- ☐ Other: _____

Part 2 – Scoping of Inventories and Delineations

This section provides general guidance on what types of field inventories and feature delineations are anticipated to be required for the EIS. The applicant (or consultant) is to provide detailed description(s) of the proposed approach (survey type, specific methods, seasons, etc.), rationale and locations for surveys as part of a Draft Terms of Reference.

This section includes scoping of the project area and if applicable, the adjacent lands.

☐	**Species at Risk** ☐ Screening Assessment[1] ☐ Targeted surveys are anticipated to be required. To be confirmed through Screening Assessment and/or in consultation with MECP, as appropriate ☐ **All of the above**
☐	**Significant Wildlife Habitat**

[1] The Terms of Reference (TOR) is to include a preliminary Species at Risk (SAR) screening assessment to identify if anySAR have potential to occur within or adjacent to the study area within a distance appropriate to determine impacts to the species or influence of species presence on the proposed *development* or *site alteration*. This may include species listed Provincially (ESA 2007) or federally (SARA 2004), as applicable to the species type and project.

	☐ Screening Assessment[2] ☐ Field program to address assessment of Significant Wildlife Habitat, as appropriate ☐ **All of the above**
☐	**Terrestrial** ☐ Ecological Land Classification (ELC)[3] ☐ Botanical Inventory ☐ Avifauna (Birds) ☐ In-field Habitat Assessment ☐ Incidental/ General Observations[4] ☐ Detailed or Targeted Survey(s) ☐ Herpetofauna (Amphibians and Reptiles) ☐ In-field Habitat Assessment ☐ Incidental/ General Observations[5] ☐ Detailed or Targeted Survey(s) ☐ Mammals ☐ In-field Habitat Assessment ☐ Incidental/ General Observations ☐ Detailed or Targeted Survey(s) ☐ Terrestrial Crustaceans (e.g., chimney crawfish) ☐ In-field Habitat Assessment ☐ Incidental/ General Observations ☐ Detailed or Targeted Survey(s)

[2] A Screening Assessment for *Significant Wildlife Habitat* (SWH) includes a desktop and secondary-source level assessmentof habitats present against criteria for SWH in the applicable Ecoregion Criteria Schedule for the Project. This assessment approach is suitable for identifying most candidate habitat areas (e.g., by vegetation community); for most SWH types this approach is not enough to confirm presence or absence. Where candidate areas may be impacted, additional field surveys toconfirm will be required.

[3] Ecological Land Classification codes should follow the ELC Second Approximation (Lee 2008). Each ELC polygon requires representative soil sample(s).

[4] This survey approach should be limited to only those projects with low risk of impact to this species group and where the potential presence of Species at Risk or *Significant Wildlife Habitat* is very low.

[5] This survey approach should be limited to only those projects with low risk of impact to this species group and where the potential presence of Species at Risk or *Significant Wildlife Habitat* is very low.

☐	☐ Insects ☐ In-field Habitat Assessment ☐ Incidental/ General Observations ☐ Detailed or Targeted Survey(s) **Aquatic** ☐ In-field Habitat Assessment/ General Assessment ☐ Incidental/ General Observations ☐ Detailed or Targeted Survey(s)
☐	**Delineation of Features**[6] ☐ Wetland[7]* ☐ Riverine Flood Hazard/ Erosion Hazard ☐ Floodplain ☐ Hazard Land ☐ Watercourse ☐ Shoreline Flood and Erosion Hazard *At this time, the NPCA is requesting consultants to pre-stake the feature prior to NPCA conducting a site visit. **NOTES:**

[6] Where Species at Risk are found to occur, delineation of habitat will also be required, but cannot be known at the scoping stage. Delineation of habitat is to be done in consultation with, or be approved by the MECP, as appropriate.
[7] Any changes to provincially evaluated wetlands must be reviewed and approved by the NDMNRF prior to inclusion within the EIS and correspondence from the NDMNRF appended to the EIS.

Part 3- Other Studies[8]

☐	**Geotechnical** ☐ Secondary Source ☐ Study Required
☐	**Hydrogeological** ☐ Secondary Source ☐ Study Required
☐	**Geomorphological** ☐ Secondary Source ☐ Study Required
☐	**Surface Water (e.g. hydrologic review, fluvial geomorphology)** ☐ Secondary Source ☐ Study Required
☐	**Natural Hazard(s)** ☐ Secondary Source ☐ Study Required
☐	**Wetland Water Balance (Risk Evaluation)**[9]
☐	**Other (Specify)**_____

[8] These studies are generally prepared as stand-alone reports. Relevant information on the interaction of these processes and functions with natural heritage features and functions is to be addressed in the EIS. It is strongly encouraged that the programs for these studies be integrated with the EIS Terms of Reference to ensure information appropriate to information the EIS is collected. This includes slopes, valleylands, dunes, karst formations etc.

[9] This study will determine the need for further wetland hydrologic monitoring.

Part 4- Terms of Reference Requirements

☐ **Introduction**

- ☐ Description of Subject Property
- ☐ Description
- ☐ Of proposed development or site alteration
- ☐ Description of known site history pertinent to the EIS (e.g., former land use(s), grading, filling)
- ☐ Description of landscape context
- ☐ **Map:** location of subject property, orthophotography base.

☐ **Policy Context**

- ☐ Legislative, regulatory and policies applicable to the property and the proposed development or site alteration
- ☐ Current land use designation and zoning
- ☐ Proposed land use designation and zoning to support proposed development if a *Planning Act* application is also required.

☐ **Background Review**

- ☐ List relevant natural heritage and hazard information secondary sources (e.g., species atlases, databases);
- ☐ List relevant existing studies, plans etc. (if/ as available)
- ☐ **Map:** location of subject property, orthophotography base.

☐ **Biophysical Inventory**

- ☐ Define and provide rational for study area
- ☐ Detailed study approach and methods for all identified inventories and delineations identified in **Part 2.** Where there is rationale to exclude a specific feature or area
- ☐ From assessment, provide rationale for consideration. Appropriate justification /rationale for single-season or multi-season surveys shall be provided (e.g.,vegetation community / ELC, wetland delineation, etc.)
- ☐ Map: location of proposed surveys, subject property, proposed study area, orthophotography base.

☐ **Biophysical Analysis**

Describe the general approach and anticipated approach and/or method(s) of analyses for the following:

- ☐ Species at Risk: Preliminary screening assessment to be provided as part of the TOR. This will inform the field program staff.
- ☐ Significant Wildlife Habitat: Preliminary screening assessment to be provided as part of the TOR. This will inform the field program staff.
- ☐ Evaluation of regulated features and/or areas within the study area against appropriate policies and guidelines.[10]
- ☐ Enhancement Area(s)
- ☐ Natural Hazard within the study area
- ☐ Buffer recommendations

☐ **Alternative Assessment**

Outline approach to identifying or assessing alternatives to avoid or minimize impacts.

☐ **Impact Assessment**

Confirm scope includes an impact assessment that will consider direct, indirect and cumulative impacts and provide general approach to impact assessment.

☐ **Mitigation**

Confirm scope includes identification of mitigation measures that effectively address anticipated impacts resulting from the proposed development or site alteration. Mitigation isto include recommendations for enhancement or restoration.

☐ **Monitoring Program**

If a monitoring program may be required, confirm that consideration and recommendationsfor a monitoring plan (or rationale that one is not required) will be included in the EIS.

☐ **Recommendations and Conclusions**

Confirm that recommendations and conclusions with respect to the 'no negative impact' or 'interference with' tests be included in the EIS.

[10] This may include provincial, federal legislation, policies, plans and guidance documents, asappropriate and applicable to the study area, project type, species and features.

☐ **Maps and Figures**

Outline anticipated maps and figures to be prepared for and included in the EIS todocument and support assessment(s), recommendations, and conclusions.

☐ **Field Notes / Data Sheets**

Field notes / data sheets are required to be appended to the completed EIS. Please ensure that soil data is included with the appended data.

Note: Maps / figures may be combined for ease of production and review. The maps / figures listed areprovided to illustrate the information that is to be included as part of the TOR submission.

CHECKLIST COMPLETION RECORD

A record of the individuals who complete the checklist is provided below.

COMPLETED BY:	
Name: Click or tap here to enter text.	Name: Click or tap here to enter text.
Position: Click or tap here to enter text.	Position: Click or tap here to enter text.
Agency: Click or tap here to enter text.	Agency: Click or tap here to enter text.
Contact Information: Click or tap here to enter text.	Contact Information: Click or tap here to enter text.
Date: Click or tap to enter a date.	Date: Click or tap to enter a date.

Appendix E: EIS Impact Assessment, Mitigation Measures and Cumulative Impacts Template

The Impact Assessment, Mitigation Measures and Cumulative Impacts Table provides a composite table of impacts, mitigation and cumulative impacts. Providing this information in table format facilitates review and clearly presents these key components of the EIS in supporting and assessing conclusions of 'no negative impact'. Detailed descriptions of some components that will be repeated throughout the table (e.g., mitigation measures) should be provided in text so that lists can be used in the table to reduce overall table length and improve readability.

Impact	Development / Site alteration Activity or Condition Creating the Impact	Description of Impacts by Feature and/or Function	Mitigation Measures	Efficacy
List each impact type / category in a separate row. e.g., vegetation removal, changes to surface drainage, etc.	*List the activities, conditions or components of the development or site alteration that will or have potential to result in the impact identified in the first column.* e.g., clearing, grading, creation of impermeable surfaces, etc.	*Describe the potential impact to the feature(s) and / or function(s) using the following categories:* • *Direct* • *Indirect (including Induced)* • *Cumulative*	*List recommended mitigation strategies to address impacts.*	*Assess efficacy of the mitigation measures / strategy in addressing the impact(s) described in the third column.*

Appendix F: EIS Comment Response Matrix Template

ENVIRONMENTAL IMPACT STUDY – CONSOLIDATED COMMENTING & RESPONSE TABLE	
PROJECT NAME:	PROPONENT:
PROJECT NUMBER / REFERENCE:	PROJECT TYPE: [Development / Site Alteration / Agricultural]
SUBMISSION INFORMATION	**REVIEW AGENCY INFORMATION**
EIS PREPARED BY:	
1ST SUBMISSION DATE:	[AGENCY] [commenting / lead staff member]
2ND SUBMISSION DATE:	[AGENCY] [commenting / lead staff member]
3RD SUBMISSION DATE:	[AGENCY] [commenting / lead staff member]

COMMENT #	SECTION	SUB-SECTION	ADDITIONAL REFERENCE	COMMENTING AGENCY	COMMENT
SECTION [#, TITLE]					

RESPONSE / ACTION TAKEN	RESOLUTION / OUTSTANDING CONCERN	RESPONSE / ACTION TAKEN	RESOLUTION / OUTSTANDING CONCERN

Appendix G: EIS Submission Checklist

The EIS shall be submitted as part of a complete application. The applicant's consultant will use the **EIS Submission Checklist** to confirm that the EIS meets submission requirements and has been prepared in accordance with an approved TOR. The NPCA will review the submission and checklist to confirm it satisfactorily meets submission requirements. If the submitted EIS does not meet the submission standards or was not prepared in accordance with the approved TOR, the NPCA may return the submission. The identified deficiencies must be addressed, and the EIS re-submitted prior to the initiation of the review process.

Applicant:_____ Consultant:_____

Phone:_____ Phone:_____

Email:_____ Email:_____

Address:_____ Address: _____

Development or Site Alteration Application Property Address:

Complete Application Verification Checklist

(For Use by the NPCA)

- ☐ 8 ½ by 11 paper (maps, figures and appendices may be on 11 by 17), double sided in a standard fontof reasonable size
- ☐ A title page that includes: the name of the applicant, address of the subject property, lists the author(s)of the report, the consulting firm(s) and the date the report was completed
- ☐ Copy of approved Terms of Reference appended to EIS
- ☐ Digital copy of report, data and shapefiles
- ☐ Complete EIS Submission Checklist completed and signed by applicant (or delegate)

EIS Submission:

- ☐ Accept
- ☐ Return (if submission is returned, please provide written justification to proponent and request submission

Signature:_____ Date: _____

EIS Completion Checklist
(For Use by Applicant / EIS Consultant)

Reporting Standard

☐ 8 ½ by 11 paper (maps, figures and appendices may be on 11 by 17), double sided in a standard font of reasonable size.

☐ A title page that includes: the name of the applicant, address of the subject property, lists the author(s) of the report, the consulting firm(s) and the date the report was completed.

☐ Provide contact information for the consulting company/principal author of the report.

☐ Digital copy of report, data and shapefiles.

Content

The following is a checklist of all the potential sections that may need to be addressed as part of andEIS. This checklist shall be used in the context of the approved EIS Terms of Reference. In the notessection below to describe why a piece was not included, such as it not being required in the Terms of Reference.

Date of approved Terms of Reference: _____

Introduction

☐ Descriptions of the subject property (natural features and areas, land cover, existing hard surfaces or buildings).

☐ Descriptions of the type and scale of the development or site alteration proposal (including any required servicing, infrastructure upgrades or stormwater facilities, existing or proposed trails).

☐ Description of the historical and present use of the subject property.

☐ Description of the site context/study area and the subject property's relationship to the surrounding landscape.

☐ Identification of why the EIS is required for the proposed development or site alteration.

☐ Map(s) of the development or site alteration location, subject property and study area.

- Orthographic map with known natural heritage features/ areas overlaid.

Policy Context

☐ Identify the current land use designations and zoning for the subject property and for the adjacent lands.

☐ Identify the type of required applications / permits.

☐ Map(s) of the development or site alteration location and extent of area to be studied including clear identification / delineation of NPCA regulated features.

☐ Identify environmental legislative, regulatory and policy requirements that may affect the development or site alteration proposal, including clauses relevant to the proposal.

Summary of Data Collection Approaches and Methods

☐ Identify relevant information from existing studies, plans, databases and other sources to be analyzed as part of the EIS.

☐ Summarize data collection methods, including detailed description of field methods and analytical methods utilized in the characterization of the study area.

Biophysical Inventory

☐ Describe the study methods for regulated features and areas, wildlife, wildlife habitat and Species at Risk in detail (including time of year, level of search effort, etc.) as well as for delineating feature boundaries.

☐ Identify and describe all known or candidate regulated features and areas within the study area and specify their boundaries.

☐ Characterize the existing conditions of the following based on the accumulated data:

- Geology and soils
- Hydrology and hydrogeology
- Aquatic and fish habitat
- Terrestrial and wetland vegetation
- Wildlife
- Natural hazards

☐ Include map(s) showing locations for field studies (study area boundary, plots, stations, transect(s)), regulated features and areas (including their limits), etc.

☐ Include completed SAR Screening Table as an appendix. Include completed significant wildlife habitat Screening Table as an appendix.

Data Analysis

Regulated Features and Areas, and Natural Hazard Assessment

☐ Assess the various NPCA regulated features and areas against the appropriate policies and guidelines to determine significance.

☐ Assess the various NPCA regulated features and areas against the appropriate policies and guidelines related to natural hazards.

☐ Include an assessment of appropriate buffers and/or setbacks.

Opportunities and Constraints

☐ Discuss and depict Regulated Features and Areas, and Natural Hazard Opportunities and Constraints.

☐ Identify all of the constraints to potential development or site alteration related to regulated features and areas identified for protection, as well as natural hazards, including their respective buffers and setbacks.

☐ Identify opportunities for development or site alteration on the subject property that work within the limitations of the site-specific constraints.

☐ Identify opportunities for restoration and enhancement opportunities.

☐ Depict constraints and opportunities in a Figure.

☐ Environmental Policy Analysis.

☐ Include an environmental policy analysis confirming how the proposal meets (or does not meet) the applicable policies and legislation as described in the Policy Context section (see above).

Impact Analysis and Mitigation

☐ Detailed description of the proposed development or site alteration as it relates to potential impacts to the NPCA regulated features and areas identified for protection, and/or their ecological functions. Consider elements such as: built form, grading, stormwater management, servicing, trails and post-development use of the land.

☐ Include a water balance (or appended/cross reference to a supporting study) with a supporting impact analysis in the EIS when addressing hydrological impacts.

☐ Include an impact assessment that considers both short-term and long-term impacts, including:

- Direct Impacts
- Indirect Impacts (including induced)
- Cumulative Impacts

*It is recommended to use a table format to summarize the impact analysis section.

☐ The Evaluation of Alternative Options/Measures describes how impacts can be mitigated through use of Best Management Practices, and innovative measures. The iterative process undertaken by the design team is included in this section.

☐ Summarize preferred alternative(s) for the proposal.

☐ Recommend Mitigation Measures (including avoidance, enhancement, and restoration).

Monitoring

☐ Include a Monitoring Plan for performance and effectiveness of mitigation measures. Consider whether adequate baseline information has been collected and provide recommended time frame for monitoring program.

Recommendations and Conclusion

☐ Recommendations and Concluding Statement.

Appendices and attachments

☐ EIS Terms of Reference and approval

☐ Mapping and figures

☐ Species lists

☐ Field survey data sheets

☐ Additional technical studies, as applicable

Files and Permissions

☐ Digital copy of EIS and appendices are provided in PDF or Word format

☐ If available at time of submission, species data provided as an excel file

☐ If available at time of submission, GIS shapefiles provided in ESRI Compatible Format**

I_____, agent for_____, confirm that the attached Environmental Impact Study (EIS) addresses the scope of work outlined in the approved Terms of Reference, contains the above study requirements and has been completedin accordance with the NPCA's EIS Guideline.

Signature:_____Date: _____

Appendix H: General Field Survey Requirements

Survey	Optimal Inventory Period	Methodology and Protocols
Ecological Land Classification (ELC)	• May to September	• ELC System for Southern Ontario First Approximation (Lee et al., 1999) or as updated from time to time.
Wetland Evaluation and Delineation (OWES)	• Evaluation: variety of seasons to ensure the full evaluation occurs as per OWES. • Delineation: May to September	• Ontario Wetland Evaluation System (OWES) four Southern Ontario (3rd Edition, 2014) or as updated from time to time.
Vegetation Inventory	• Spring: May to early June • Summer: mid-June to August • Fall: September to October	• Full vegetation species list to be provided, can be combined with ELC and/or OWES as appropriate.
Birds	• Breeding birds: May 24 to July 10 • Marsh birds: April to July (species dependent) • Migrants and overwintering birds: species and site specific • Owls: November to April (species specific)	• Ontario Breeding Bird Atlas protocols • Marsh Monitoring Program protocols • Area searches and wandering transects
Amphibians	• Early spring to summer • Active Visual Encounter Surveys (VES) on rainy late March – early April nights	• Bird Studies Canada Great Lakes Marsh Monitoring Program (3 separate spring/early summer seasonal survey timing windows). • Active VES for salamanders
Reptiles	• April to June • Late Summer/Fall for migration or congregating species • Weather dependent	• Species and habitat dependent • May include cover board surveys, spring emergence surveys, basking surveys etc. • Consultation recommended ahead of work.
Bats	• During leaf off season for cavity tree surveys	• Species and habitat dependent • MNRF guidelines where applicable

	• Extent of acoustic monitoring to be determined through consultation with review agencies	
Fish Survey and Fish Habitat	• Late Spring to June for intermittent watercourses • June – early September for residents	• Using Ontario Stream Assessment Protocol (OSAP Section 3)
Drainage Patterns, Headwater Drainage Features and Watercourses	• Multiple assessments: spring freshet/rain events, late April-May, July-August • Aquatic habitat assessment in late April-May	• OSAP • Evaluation, Classification and Management of Headwater Drainage Features, prepared by CVC/TRCA (2014) • Ministry of Transportation Environmental Guide for Fisheries

Please note that the methodologies and protocols described in Appendix H are not an exhaustive list and alternative methodologies and protocols may be proposed by the applicant or identified by review agencies on a site-specific basis or as a result of the initial inventory results.

Niagara Peninsula Conservation Authority:

250 Thorold Road, 3rd Floor
Welland, Ontario
L3C 3W2
www.npca.ca

NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX I

INTERIM WETLANDS PROCEDURE DOCUMENT

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

www.npca.ca

TABLE OF CONTENTS

Introduction and Preamble

This document presents the Niagara Peninsula Conservation Authority's (NPCA) implementation procedure for those parts of Section 28 of Ontario's Conservation Authorities Act and the "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation", (Ontario Regulation 155/06 [O. Reg. 155/06]) that pertain to wetlands. Additionally, the NPCA is completing a review and policies for the administration of Ontario Regulation 155/06. On March 18, 2022, Report FA-10-22 was received by the NPCA's Board of Directors. The purpose of Report FA-10-22 was to provide the Board with an overview of the completed Phase 1 review of the "NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act" (May 1, 2020, consolidation), and the Phase 2 workplan for completing the updated Policy Document and new Procedural Manual. The report identified immediate technical analysis required to support policy development in Phase 2, and the need to develop interim guidance documents until such time as the Procedural Manual is approved, including creation of an interim Wetlands Procedure Document.

Interim to the completion of the Procedural Manual, staff have identified the need to develop a Wetlands Procedure Document that will outline the process and study requirements for the identification, evaluation, study, protection and enhancement of regulated wetlands. This interim document is to be read in conjunction with the NPCA Interim Section 28 Environmental Impact Study Guideline (May 9, 2022).

This document is intended to provide NPCA staff, the Board of Directors, municipal staff, developers and the public with the specifications and references with which the Authority will further the conservation, restoration and management of wetlands within its jurisdiction through NPCA work permits. Although this document speaks specifically to wetlands as features, readers should be aware that wetlands are associated with other hazards, such as flooding and hazardous (unstable) soils. These hazards are also regulated by Ontario Regulation 155/06 and their review will be incorporated into the decision making of NPCA.

If you are considering developing in an area that may contain wetlands, it is highly recommended that you visit NPCA's Planning and Permitting website at: https://npca.ca/services/permits, and contact the NPCA Watershed Planner identified as overseeing files within your municipality. NPCA staff will be able to assist you with your proposed project and the use of this document.

2.0 Definitions

The following definitions will be used for the purpose of this procedural manual.

Area of Interference (other areas):

a) Means the areas adjacent to wetlands where development could impact the hydrologic function of the wetland are referred to as areas of interference. The areas of interference are considered to be a regulated area under the Ontario Regulation 155/06. The area of interference differs, depending on the classification of the wetland: For Provincially Significant Wetlands or wetlands greater than 2 hectares, the area of interference can be up to 120 metres from the boundary of the wetland.

b) For wetlands less than 2 hectares the area of interference is 30 metres

Buffer:

Means a naturally vegetated area of land located adjacent to regulated features and bordering lands that are subject to development or site alteration.

Conservation of Land:

Means the protection, management, or restoration of lands within the watershed ecosystem for the purpose of maintaining or enhancing the natural features and hydrologic and ecological functions within the watershed.

Dynamic Beach:

Means an area of inherently unstable accumulations of shoreline sediment along the Great Lakes-St. Lawrence River system and large inland lakes, as identified by provincial standards, as amended from time to time. The dynamic beach hazard limit consists of the flooding hazard limit plus a 30 m dynamic beach allowance.

(Erosion) Hazard:

Means the loss of land, due to human or natural processes, that poses a threat to life and property. The erosion hazard limit is determined using considerations that include the 100-year erosion rate (the average annual rate of recession extended over a one hundred year time span), an allowance for slope stability, and an erosion/erosion access allowance.

Five Tests:

Means the five tests of Subsection 3(1) of Ontario Regulation 155/06 and includes the control of flooding, erosion, dynamic beaches, pollution, and conservation of land.

(Flooding) Hazard:

Means the inundation, under the conditions specific below, of areas adjacent to a shoreline or a river or stream systems and not ordinarily covered by water:

a) Along the shorelines of the Great Lakes-St. Lawrence River System and large inland lake, the flooding hazard limit is based on the one hundred year flood level plus an allowance for wave uprush and other water related hazards;

b) Along river, stream and small inland lake systems, the flooding hazard limit is defined as he one hundred year food.

Hydrologic Function:

Means the functions of the hydrological cycle that include the occurrence, circulation, distribution and chemical and physical properties of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere, and water's interaction with the environment including its relation to living things. The Southern Ontario Wetland Evaluation System (OWES) states "it must be recognized that many non-hydrological functions of a wetland depend, in part on the wetland's hydrological setting and that changes in the basin beyond the boundaries of the wetland could have an effect on the ecological value of the wetland".

Pollution:

Means any deleterious physical substance or other contaminant that has the potential to be generated by development in an area to which a regulation made under Section 28 of the Conservation Authorities Act applies.

Wetlands:

The Conservation Authorities Act defines a wetland as an area that:

a) is seasonally or permanently covered by shallow water or has a water table close to or at its surface,
b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse,

c) has hydric soils, the formation of which has been caused by the presence of abundant water, and

d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been favoured by the presence of abundant water,

but does not include periodically soaked or wet land that is used for agricultural purposes and no longer exhibits a wetland characteristic referred to in clause c) or d).

3.0 Environmental Impact Study Primer

The mandate of the NPCA relative to wetlands emerges from the following legislative sources:

i) The Authority's legislated responsibilities under the Conservation Authorities Act R.S.O. and Regulations there to;

ii) The Authority's responsibilities to represent Provincial interests regarding Natural Hazards as outlined in the Provincial Policy Statement, 2020, and further, as a responsibility delegated to the CA by the Ministry of Environment, Parks and Conservation (MECP);

iii) Being a "public body" under the Ontario Planning Act, the NPCA is to be notified of specified planning and development applications and proposals, and the Authority may comment on these relative to its mandate.

Through s. 28 of the Conservation Authorities Act, Conservation Authorities regulate development and activities in or adjacent to river or stream valleys, Great Lakes and inland lakes shorelines, floodplains, watercourses, hazardous lands and wetlands. They do so to ensure that flooding, erosion, dynamic beaches, pollution or the conservation of land are not affected (the five tests). They also regulate the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or for changing or interfering in any way with a wetland.

4.0 Legislation – The Conservation Authorities Act and Ontario Regulation 155/06

Section 28 of Ontario's Conservation Authorities Act establishes an Authority's jurisdiction over wetlands, as defined in the Act, within its regulatory watershed. Section 21.1 (1) 1. of the Act further establishes the "mandatory programs and services that are required by regulation". Sections 2 (1)(d) and (e) and 5 of Ontario Regulation 155/06 thus prohibit development in and around and change or interference in any way with a

wetland. Sections 2 (2) and 2 (3) provide for regulatory limits and related mapping products. Lastly, Sections 3 and 4, and 6 through 8 then establish the conditions that must be met such that the NPCA may temporarily or permanently grant permission to develop in or alter a wetland.

4.1 What is an EIS?

Section 28 (10) and (11) provides for general exceptions to the provisions of the NPCA's regulation. Therefore, Ontario Regulation 155/06 does not apply to: the use of water for domestic or livestock purposes; the rightful use of water for municipal purposes; the functions of any board or commission of the provincial government; nor does it apply to the rights and powers under the Electricity Act and the Public Utilities Act. Permission is also not required by the Authority for activities approved under Ontario's Aggregate Resources Act.

4.2 Natural Hazards

Where additional hazards exist on a site such as flood hazards or unstable soil or slope hazards, other applicable policies ("NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act", Niagara Peninsula Conservation Authority, 2018, as amended) shall also be addressed. The contents of this wetland policy document shall be interpreted in direct reference to and aligned with the contents of the NPCA's above noted primary policy document.

5.0 Types of Wetlands

As defined by the Province of Ontario under the Ontario Wetland Evaluation System (OWES), there are four types of wetlands, which include bogs, fens, swamps and marshes. Within the NPCA's watershed swamps are the most common, generally characterized as slough forest swamps. Further description of these four wetlands can be found in Appendix A.

6.0 Importance of Wetlands

Wetlands are an essential natural resource. In Southern Ontario, wetlands are an integral component of the ecology. They are amongst the most biologically diverse ecosystems on Earth.

"Wetlands provide functions that have both ecosystem and human values. From an ecosystem perspective these include primary production, sustaining biodiversity, wildlife habitat, habitat for species at risk, maintenance of natural cycles (carbon, water) and food chains. From a human perspective, wetlands provide social and economic values such as flood attenuation, recreation opportunities, production of valuable products, improvement of water quality and educational benefits." (source: Draft: Guidelines to Support Conservation Authority Administration of the "Development, Interference with Wetlands and Alteration to

Shorelines and Watercourses Regulation" MNR/Conservation Ontario Section 28 Peer Review and Implementation Committee, April 21, 2008)

Wetlands can have a wide range of functions, including moderation of water flow by absorbing significant amounts of surface runoff and then:

i. Either slowly releasing it, even significantly later during drier periods; and,
ii. Transferring water into the groundwater system.

Wetlands contribute to the maintenance of water quality by filtering and capturing pollutants, sediments, soil-bound nutrients, etc. Wetlands, in the Southern Ontario context, are a significant support for flora and fauna (plants, trees, fish and wildlife).

Wetlands are vital to the health of the environment and crucial for maintaining the diversity of animal and vegetation species. Wetlands contribute to economic, cultural and social well-being by ensuring a healthy environment and providing people the opportunity to enjoy and appreciate its qualities.

The appropriate maintenance and management of wetlands will contribute to community sustainability into the future. Sound wetland management leads to a healthy environment, and healthy communities.

Wetlands can only be appropriately managed through awareness, political resolve and the collective, cooperative efforts of public agencies, private sector interests and residents. The effective management of wetlands requires a shared responsibility among all of the communities and constituents within the Niagara Peninsula Conservation Authority's jurisdictional area.

7.0 Wetlands and Areas of Interference Functions

Wetlands retain waters during periods of high-water levels or peak flows (i.e., spring freshet and storm events) allowing the water to be slowly released into the watercourse, infiltrate into the ground, and evaporate. As well, wetlands within the floodplain of a watercourse provide an area for the storage of flood waters and reduce the energy associated with the flood waters. Table 1 provides wetland function examples.

Table 1: Wetland function examples

Broad Function Type	Broad Functional Group	Functions
Hydrologic	Water Regime	• Erosion control • Contribution to ground water discharge • Contribution to groundwater recharge • Maintenance of local water balance • Conveyance and flood attenuation function • Contribution to living things
	Biogeochemical	• Carbon/organic sequestration and storage • Nutrient and organic export • Water quality functions (including excess nutrient and other contaminant removal) • Contribution to living things
Ecological	Habitat for Flora and Fauna and Biological Productivity	• Habitat for flora and fauna that contribute to biodiversity and ecological integrity, including but not limited to; o Breeding bird habitat for area-sensitive species o Breeding habitat for amphibians o Breeding habitat for colonial species o Winter wildlife habitat o Habitat for concentrations of migratory species o Habitat for vegetation communities of interest o Fish and fish habitat o Areas with diverse vegetation communities • Serving to promote ecological connectivity; • Provisions of significant habitats (including species of concern) and significant communities within the watershed.

In addition, wetlands retain and modify nutrients, chemicals and silt in surface and groundwater thereby improving water quality. This occurs temporarily in the plants of the wetland but long term in the organic soils.

Wetlands provide a variety of hydrologic functions. Over 60 potential hydrological functions such as flood water attenuation and groundwater recharge were identified for wetlands when the MNDMNRF was developing the OWES. Confirmation of many of these functions requires hydrological experts and field studies by qualified hydrologists.

Upon creating the OWES a final analysis determined that five hydrological functions were selected for inclusion in the OWES evaluation based on the general agreement on the nature of the function, the importance of each function, and the relative ease of assessment of the function by non-hydrologists.

The functions selected are:

(1) flood attenuation

(2) the retention and modification of nutrients and other elements in surface water and via groundwater discharge– i.e. water quality improvements;

(3) the long-term storage of atmospheric carbon
(4) shoreline erosion control and
(5) groundwater recharge.

8.0 Development and Interference

There are three ways in which Ontario Regulation 155/06 addresses wetlands and areas of interference (Figure 1):

1) Development within the wetland boundary (section 2.1 (d) of the Regulation):

To be regulated, the activity must meet the definition of development. Applications for development must be assessed with respect to the five "tests" outlined in the Conservation Authorities (control of flooding, erosion, pollution, dynamic beaches and the conservation of land). Generally, an Environmental Impact Study (EIS) is required to ensure there will be no adverse impact on the hydrologic and ecological features and functions of the wetland.

2) Development within the "area of interference" (section 2.1 of the Regulation):

To be regulated, the activity must meet the definition of development and be assessed with regard to interference with the hydrologic function of the adjacent wetland, including areas within 120 m of a Provincially Significant Wetland (PSW) and wetlands greater than 2 hectares in size, and 30 m from a wetland less than 2 hectares in size. Hydrologic functions include both water regime and biogeochemical processes. If a measurable hydrologic impact to the wetland is predicted then the development must be assessed with respect to the five "tests" outlined in the Conservation Authorities Act (control of flooding, erosion, pollution, dynamic beaches and the conservation of land). Although not illustrated in Figure 1, Regulated areas can extend beyond the 120m and 30m distances if the activity is deemed to have a measurable impact on the hydrologic function of the wetland.

3) Interference with wetlands (section 5 of the Regulation):

To be regulated, the activity must occur within the wetland boundary and must constitute interference in any way with the wetland. An example of an activity that does not strictly meet the definition of "development" and could represent interference is vegetation removal. Interference is interpreted as any anthropogenic act or instance which hinders, disrupts, degrades or impedes in any way the natural features or hydrological and ecological functions of a wetland.

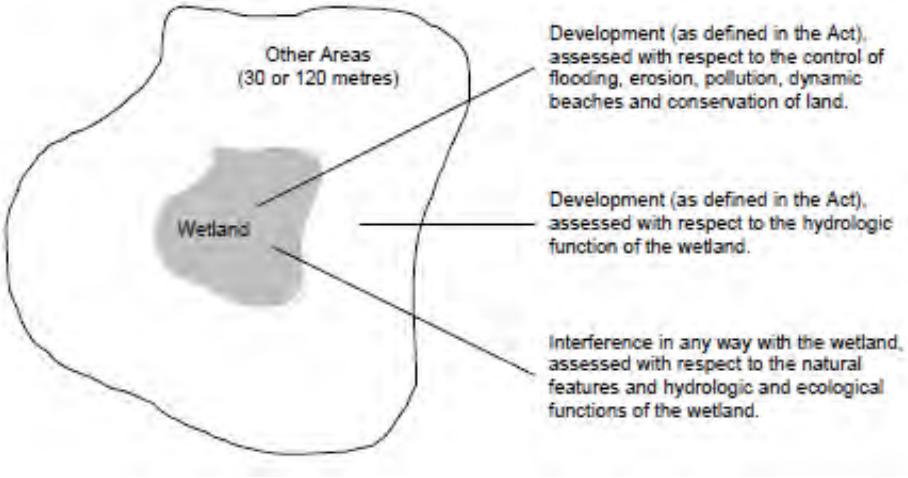


Figure 1: Three Ways through which the Conservation Authorities Act and individual Conservation Authority Regulations Address Wetlands and Other Areas (i.e. Areas of Interference), (Source: Guidelines to Support Conservation Authority Administration of the "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation", Ministry of Natural Resources/Conservation Ontario, April 21, 2008)

Removal, filling, dredging, or changing the hydrologic regime of wetlands (e.g., ponds or drains) can result in reducing the capacity of wetlands to retain water. This can result in higher flows in watercourses with resulting increases in flooding and erosion. As well, with no ability to retain water, the ability to recharge the aquifer is reduced, and the hydrologic cycle is modified.

Development in wetlands has the potential to interfere with many of the natural features or ecological functions of wetlands. Development may remove or impact wildlife species and their habitat, degrade or remove natural vegetation communities and impair water quality and quantity in both surface and groundwater. As a result, development within wetlands can impact conservation of land.

Many wetlands form on organic soils and, as a result, when reviewing development within a wetland, the soil composition should be reviewed. Where the soils are organic, Section 7 of the NPCA Policy Document, which deals with hazardous lands, should also be reviewed and considered in the decision making. Pollution from development (e.g., sedimentation) has the potential to interfere with the wetland. Any runoff to a wetland must demonstrate no negative impact to the feature and function.

When reviewing an application with respect to interference or development related to a PSW, the evaluation done under the OWES may be used as an information resource, because it identifies the features and functions of the wetland. It should be noted that when reviewing applications with respect to development under the

regulation, the significance of the wetland as determined by the OWES is not a reason to deny or approve the application. The application must be reviewed with respect to the five tests: control of flooding, erosion, pollution, dynamic beaches or the conservation of land. Many individual and cumulative hydrologic impacts to a wetland commonly occur within the catchment area of the wetland. It is important to consider the linkages between small wetlands and headwater areas, impacts of stormwater, and upstream constrictions to flow. Impacts to the hydrologic function of a wetland due to development within the "area of interference" may also result from changes in imperviousness/infiltration due to a removal or change in vegetation, soil compaction during construction, disruption, or alteration of groundwater flow paths due to underground construction, etc.

As part of the review of an application, the NPCA may request an EIS to address potential impacts to a wetland. An EIS is a mechanism for assessing impacts to determine the suitability of a proposal and the minimum buffer from development to ensure no negative impact on the wetland. The submission of an EIS does not guarantee approval of the works. An EIS must be carried out by a qualified professional, with recognized expertise in the appropriate area of concern and shall be prepared using established procedures and recognized methodologies to the satisfaction of NPCA. Please refer to the NPCA's Interim EIS Guidelines for the Implementation of s. 28 of the Conservation Authorities Act and Ontario Regulation 155/06 (May 9, 2022) for more details on standard EIS requirements related to wetlands.

9.0 Wetland Boundary Delineation

As per NPCA Policy, Section 8.1.3.1, wetland boundaries are often found in areas of gradual ecological change, where changes in soil moisture results in transitions from upland to wetland plant species. The wetland boundary is established where 50% of the plant community consists of upland plant species (i.e. the percentage of area covered by upland plant species, not to the number of different upland plant species). Topography and soil data also provides guidance for where the wetland boundary should be drawn. Wetland boundary mapping is typically generalized from aerial imagery and other secondary source materials. Field visits by qualified biologists are required to accurately define the wetland boundary for development purposes. In cases where vegetation cannot be used for interpretation, such as instances where vegetation has recently been removed, soil sampling will be used to help determine boundaries.

10.0 Development within the Wetland Boundary

The Conservation Authorities Act defines development as: (a) the construction, reconstruction, erection or placing of a building or structure of any kind, (b) any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or

structure or increasing the number of dwelling units in the building or structure, (c) site grading, or (d) the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

Development within a wetland is prohibited unless in the opinion of the conservation authority, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land (also known as the 'five tests') will not be affected by the development.

It should be noted that when reviewing an application for 'development' under the Regulation, the significance of the wetland as determined by the OWES is not a reason to deny or approve an application. The application must be reviewed against the 'five tests'.

11.0 Rationale of Provincially Significant Wetland Scoring Criteria

To aid in identifying those wetlands that have value at a provincial scale, MNDMNRF has developed, and administers, the OWES. OWES is a science-based ranking system that provides a standardized approach to determining the relative value of wetlands.

High value wetlands are considered to be provincially significant and commonly are referred to as "Provincially Significant Wetlands" (PSW. The OWES consists of the ministry's technical manual that is used to evaluate the significance of wetlands, for land use planning purposes.

The methodology outlined in the OWES are the "evaluation procedures" referred to in Ontario's Provincial Policy Statement (PPS, 2020), issued under the authority of the Planning Act.

12.0 Evaluated Wetlands

NPCA Policy Section 8.1.2.1, Provincially Significant Wetlands

The majority of identified wetlands within the NPCA's watershed are classified as Provincially Significant Wetlands (PSWs. PSWs are wetlands which have been identified by the Province of Ontario using evaluation methodology established by the Province. PSWs are determined by a science-based ranking system known as the Ontario Wetland Evaluation System (OWES). This methodology features a standardized method of assessing wetland functions and societal values, which enables the Province to rank wetlands relative to one another. This information is provided to Conservation Authorities and municipalities to support decision-making. A wetland that has been evaluated using the criteria outlined in the OWES is known as an evaluated wetland. Refer to the OWES manual for additional details on the criteria for classifying wetlands.

NPCA Policy Section 8.1.2.2, Non-Provincially Significant Wetlands

The term non-provincially significant wetland is used to describe any evaluated wetland which does not meet the score to be considered Provincially Significant.

Evaluated **Provincially Significant Wetland (PSW)** are wetlands which have been evaluated, using evaluation procedures established by the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF). Those wetlands that are identified by the MNDMNRF as a PSW will be classified under NPCA Policy as PSW and will be subject to the relevant Regulations and Policies under Ontario Regulation 155/06, and policies as established by the Province under the PPS, 2020 and this procedure.

The OWES scores wetlands based on four principal components: Biological, Social, Hydrological, and Special Features. Each component can receive a maximum score of 250 points, for a maximum score for any wetland of 1000 points. In order for a wetland to be considered Provincially Significant an overall score of 600 points is required. Alternatively, a wetland which scores 200 points for either the Biological or Special Features component is considered Provincially Significant.

In Southern Ontario, a PSW is any wetland that:

1. Achieves a total score of 600 or more points, or
2. Achieves a score of 200 or more points in either the Biological component or the Special Features component.

Wetlands which have been evaluated, using evaluation procedures established by the MNDMNRF, and determined by the MNDMNRF as not meeting the criteria of a PSW are classified as Non-PSW (also known as

Locally Significant Wetlands (LSW)) and will be subject to the relevant Regulations, Policies and Guidelines under Ontario Regulation 155/06 and this procedure.

In Southern Ontario, an evaluated **Non-Provincially Significant Wetland** is any wetland that scores below the threshold considered Provincially Significant, therefore, categorized as non-provincially significant wetlands, in recognition of the value which all wetlands provide.

Although, the OWES for southern Ontario is designed to identify important wetlands on a provincial scale, all wetlands have value, both to society and intrinsically.

Other wetlands such as non-provincially significant wetlands are significant on a local scale and may be protected. These wetlands can include: (a) evaluated wetlands that have been identified as not provincially significant; and (b) partially evaluated and unevaluated wetlands that have been confirmed as wetland habitat and mapped using the ground-based OWES methodology or interpretations of remote-sensed imagery.

12.1 Current Process to Map and refine Evaluated Wetlands

Mapping

The Province of Ontario, through the MNDMNRF has identified, evaluated wetlands using OWES. Updated mapping can be found online via open data through the Land Information Ontario (LIO) website. LIO helps public and private organizations and individuals find, access and share geographic data. LIO also coordinates the collection of aerial photography for Ontario. It is noted that wetland files are open files and can be updated from time to time as new information becomes available.

Evaluated Wetland Boundary Refinement

Evaluated wetland boundary refinement requests are audited and approved by MNDMNRF. An example of a boundary refinement may include data gathered from site-specific field investigation by conservation authority staff or other qualified professionals. These are typically minor modifications. Examples might include a minor wetland boundary modification of a few square meters within a specific area of the property. These modifications generally relate to individual properties (although the regulation limit may impact several properties) and are identified as a result of the NPCA work permit (or municipal plan review) process. All evaluated wetland boundary revisions are subject to the MNDMNRF's review and approval of the OWES re-evaluation report.

It is required that the landowner retains the services of a third-party consultant qualified to undertake a re-evaluation of the current wetland boundary utilizing the OWES and that, the report shall be submitted to the

satisfaction of the MNDMNRF. The applicant should submit the report to MNDMNRF in accordance with provincial technical requirements.

Once the refinement has been audited, reviewed and approved by the MNDMNRF, NPCA staff will determine if the NPCA is able to support the revision of the wetland boundary refinement (if it is recommended) through internal NPCA consultation which may or may not include additional technical review and site inspections of the property.

If the refinement is approved by MNDMNRF, MNDMNRF mapping of evaluated wetland boundaries are revised and associated NPCA Regulatory Mapping is updated (NPCA internal layer and provincial OWES LIO layer). Then NPCA Planning or Permitting files involving the subject property move forward based on the revised wetland boundaries.

Please note that EISs may be submitted with a revised boundary which is under review by the MNDMNRF, however, NPCA Planning and/or permit approvals can only proceed following confirmation that the MNDMNRF is in support of proposed boundary refinements.

13.0 Unevaluated Wetlands

NPCA Policy, Section 8.1.2.3, Unevaluated Wetlands

Some wetlands within the watershed have not been evaluated and delineated under the OWES. In those instances, the following policies apply:

a) Prior to development or site alteration on a property with an unevaluated wetland, a wetland evaluation shall be required prior to completion of an EIS if required, or the approval process, and approved by the MNDMNRF.

b) Exceptions to (a) may be considered in cases where an appropriate natural buffer (as determined by the NPCA) is proposed between the NPCA staked wetland boundary and all site alteration and development (including grading), or small scale non-permanent development (such as small backyard sheds not requiring planning approval) which in the opinion of NPCA will have no negative impact on the ecological and hydrologic function of the wetland. These cases will only be considered for small-scale development through the work permit process, or through some minor variances where an appropriate buffer is maintained.

c) Areas identified through natural areas inventories, EIS's or other appropriate identification methodology (e.g., Ecological Land Classification) shall identify the area as a potential unevaluated wetland subject to these policies.

Unevaluated wetlands are those that have not been evaluated using evaluation procedures established in the OWES. These wetlands could be mapped or unmapped and will be subject to NPCA Policies and this procedure. Please note that while not all wetlands within the NPCA's jurisdiction have been evaluated, all wetlands which meet the definition of a wetland under the Conservation Authorities Act are considered regulated features by the NPCA, until such time they have been evaluated, using evaluation procedures established by the MNDMNRF, at which time they will be managed in accordance with the policies and requirements relevant to their designated classification if applicable.

Unevaluated wetlands may be identified through review of available information such as Land Information Ontario (LIO), Ecological Land Classification (ELC), Environmentally Sensitive Areas (ESA) as identified by the Province, NPCA's Natural Areas Inventory (NAI), aerial photography interpretation, or site visits by qualified professionals. Additionally, mapping of unevaluated wetlands may be available from the Province of Ontario through projects such as the Great Lakes Shoreline Ecosystem (GLSE) project.

To collect appropriate data on the unevaluated wetland, an OWES evaluation may be required to define, identify and measure the wetland functions and values. This evaluation should be completed during the active growing season (May to October).

In order for an unevaluated wetland to be regulated by the NPCA it must meet the definition of a wetland as defined in the Conservation Authorities Act. Sufficient information must be collected by a qualified professional to demonstrate that the four components of the definition are met. Where a surface water connection between a wetland and surface watercourse is not apparent, it is assumed that a groundwater connection exists between them, unless there is information provided by the applicant and/or their consultant to the contrary.

The NPCA has several on-line reference materials and open data sources, to assist with determining if an area has unevaluated wetland, including:

- NPCA Explore Our Data Inventory: https://gis-npca-camaps.opendata.arcgis.com/
- Natural Areas Inventory Vol 1: https://npca.ca/images/uploads/board_files/NAI-Vol-1.pdf
- Natural Areas Inventory Vol 2: https://npca.ca/images/uploads/common/NAI-Vol-2.pdf
- ELC Community Class Service: https://gis-npca camaps.opendata.arcgis.com/datasets/camaps::elc-community-class-series-1/explore

13.1 Steps to Determine the Presence of Wetlands within the Project Study Area

The NPCA requires the following steps to be taken to determine if there is a wetland within the project study area.

1. NPCA staff identify the presence of an unevaluated wetland through background information review, air photo interpretation and/or a site visit.

2. NPCA staff identify the wetlands to the applicant and may require that they retain a qualified professional to delineate/verify wetlands, which may require additional studies that will be scoped in consultation with the NPCA.

3. NPCA staff determine if a wetland evaluation is required based on available information (size, proximity to evaluated wetlands, known or assumed functions, etc.):

    a. Yes – an OWES Evaluation is required
    b. Yes – a scoped evaluation to complex the wetland is required (i.e., the unevaluated wetland is within 750 M of an evaluated wetland)
    c. No – Proceed to consult with NPCA staff to complete a constraints analysis.

4. If a wetland evaluation is required consultation with the MNDMNRF is necessary to determine their requirements.

5. Following MNDMNRF wetland evaluation and approval, NPCA mapping is updated (NPCA internal layer and provincial OWES LIO layer)

Please note that if MNDMNRF decides that an evaluation is not required, the NPCA may still require further details and studies to address Ontario Regulation 155/06 and related policies.

14.0 Constraints and Opportunities

As part of an EIS, the biophysical analysis shall identify the significance of regulated features and areas, and their functions present in the study area and identify constraints and enhancement opportunities. Constraints within the study area may affect the developable area on the property. Enhancements are identified as opportunities that go beyond mitigating impacts, contributing to the long-term protection of the natural features. Enhancement opportunities have the objective of increasing the ecological integrity and resilience of existing regulated features and areas and their associated functions. Enhancement opportunities can range in

scope and scale. Opportunities and constraints of NPCA regulated features must be identified for the subject site. Please refer to Section 3.5 of the NPCA's Interim Section EIS Guideline (May 9, 2022) for further details.

15.0 Wetland Reconfiguration and Recreation

NPCA Policy, Section 8.1.2.3 (d), Wetland Reconfiguration and Recreation for Non-Provincially Significant Wetlands

Where an unevaluated wetland is determined to be a non-PSW wetland and there is no reasonable alternative to avoid development within the non-PSW, in accordance with the Protection Hierarchy (avoid/minimize/mitigate first), the NPCA may allow for the reconfiguration and re-creation of the wetland:

- The wetland to be reconfigured or re-created is within a Settlement Area;
- The wetland to be reconfigured or re-created has been evaluated in accordance with OWES Protocol and approved by the MNRF and is not a PSW under the OWES Protocol;
- The Protection Hierarchy has been followed and all efforts to protect the feature have been exhausted first;
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- The applicant is required to enter into a restoration agreement with the NPCA that will be registered on the title of the property containing the reconfigured wetland that will provide the necessary details to implement Section 8.1.2.3 (d) of the NPCA Policy Document; and
- Additional information, such as an EIS, hydrologic study, restoration plan and or other studies as required depending on site-specific characteristics.

Under current NPCA policy, Wetland Reconfiguration and Compensation for Non-Provincially Significant Wetlands is only considered where no reasonable alternative exists to locate a proposed development, site alteration or activity outside of a Non-Provincially Significant Wetland, and when the policy is implemented, NPCA staff aim to achieve a net gain to the natural system functions.

The following requirements must be submitted as part of an EIS to the satisfaction of NPCA staff in order for staff to consider a proposal for the reconfiguration or re-creation of a non-provincially significant wetland, in accordance with NPCA Policy, Section 8.1.2.3 (d). Please also refer to the Interim Section 28 EIS Guideline (May 9, 2022), for additional study and reporting requirements.

1. The geographic coordinates of the location where measures to compensate are proposed.

2. A small-scale site plan identifying the general location and boundaries of the location where the measures are proposed to be implemented.

3. Demonstration (conceptually) that the created wetland habitat will provide the same or greater capacity to produce the form and function of the wetland(s) to be relocated.

4. A detailed description of the compensation design and explanation of how those design measures will meet their objectives.

5. Detailed planting/restoration plans which include native species suitable for the ecosystem to be created, inclusion of habitat features (large woody debris, nesting boxes, etc.), native seed mix, identification of proposed planting density. Proposed methods must be based on best available practices with references to these standards and practices.

6. Compensation area(s) must be shown to be wetland creation (i.e., what was dry and upland is created into wetland and not enhancement of existing wetlands).

7. Grading/Engineering Plans/Erosion and Sediment Control Plans (Detail Design Drawing Packages indicating staging, sequencing, type and placement of controls during all phases of work).

8. Demonstrated long-term sustainable hydrologic inputs to the compensatory wetland(s) to ensure that the wetland(s) are viable and self-sustained given the current and future anticipated landscape.

9. A detailed description of the monitoring measures and targets that will be put in place to assess the effectiveness of the selected wetland design measures. The monitoring plan must include:
   A. Targets and objectives shall be established to be met within the monitoring plan and agreed to by NPCA staff. The targets and objectives should be based on ecological and hydrological outcomes.
   B. Anticipated risks must be accounted for with associated remedial management actions that shall be implemented if triggered.
   C. Methods used to monitor, detect changes and trends are required to be identified and meet the satisfaction of NPCA staff.

10. A description of the contingency measures and associated monitoring measures that will be put into place if the selected wetland design measures are not successful in meeting their objectives. This should include a monitoring plan that has, for example; five years of monitoring data that spans over a minimum of 10 years to show progressive and measurable success towards established objectives and targets. Monitoring reports including recommended and implemented actions should be submitted as agreed upon by the NPCA and to the satisfaction of NPCA based on fulfilling the Reconfiguration and Compensation Plan.

11. A detailed description of any anticipated adverse effects that could result from the implementation of the Reconfiguration and Compensation Plan. Any activity that requires permitting/authorization from NPCA and any other relevant agency must be included in the Plan.

12. The timeline for the implementation of the Reconfiguration and Compensation Plan.

13. Reasonably accurate estimate(s) of the cost of implementing each element of the Reconfiguration and Compensation plan.

14. If the implementation of the Plan requires access to lands, water sources or waterbodies that are not owned by the applicant, a description of the steps proposed to be undertaken to obtain the authorization(s) required for the applicant, to access the lands, water sources or waterbodies in question is required. It is the applicant's responsibility to provide this information with their application and to secure the necessary approval before the Reconfiguration and Compensation Plan is implemented.

15. Time lags between the adverse effects to the wetland(s) in question resulting from the proposed work and the benefits from the proposed wetland design measures – ranging from months to even years – may contribute to loss of contributing functions (e.g., hydraulic and ecologic). **Time lags should be avoided where possible by implementing the wetland design measures prior to carrying on the work that negatively affects or alters wetlands**. In exceptional circumstances when a time delay is unavoidable, NPCA will require the Reconfiguration and Compensation Plan to include measures that account for the time delay to make up for the lost wetlands and their functions. This generally will necessitate a greater replacement ratio of wetlands (e.g., for every unit of wetland destroyed, numerous units may be required as compensation. This ratio will be determined by NPCA staff).

Proposals for wetland reconfiguration or compensation will only proceed to an NPCA work permit if all the requirements noted in this section are provided to the satisfaction of NPCA staff. In some cases, NPCA staff may require additional information or technical study requirements based on the non-provincially significant

wetland and study area characteristics. NPCA work permits are subject to conditions that may be imposed by NPCA staff, including a security deposit from the applicant to ensure the works are carried out in accordance with the approved EIS and restoration agreement.

16.0 Conclusion

The "Interim Wetland Procedure Document for the Implementation of s. 28 of the Conservation Authorities Act and O. Reg. 155/06" presents the NPCA's implementation procedure for those parts of s. 28 of Ontario's Conservation Authorities Act and the "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation", (Ontario Regulation 155/06) that pertain to wetlands.

The NPCA is completing a review and policies for the administration of Ontario Regulation 155/06. This document will guide staff's implementation of our current policies until such time that the NPCA Policy Document is updated, and the new Procedural Manual is approved. As part of the NPCA's policy review and Procedural Manual development, staff will continue to consult with stakeholders, partner municipalities and members of the public on the gaps to wetland policies identified through the Phase 1 policy review work. A final wetland procedure document will be included in the new NPCA Procedural Manual.

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Appendix A – Types of Wetlands

Bogs

Bogs are peat-covered areas or peat-filled depressions with a high-water table and a surface carpet of mosses, chiefly Sphagnum. The water table is at or near the surface in the spring, and slightly below during the remainder of the year. The mosses often form raised hummocks, separated by low, wet interstices. The bog surface is often raised, or, if flat or level with the surrounding wetlands, it is virtually isolated from mineral soil waters. Hence, the surface bog water and peat are strongly acidic and upper peat layers are extremely deficient in mineral nutrients. Peat is usually formed in situ under conditions of closed drainage and low oxygen levels.

Bogs may be treed or treeless but the tree cover does not exceed 25% and consists largely of black spruce (Picea mariana). Tamarack (Larix laricina) may be present but only in small numbers and usually only near the edge. For the OWES purposes, bogs may support more than 25% cover of live tall shrubs, typically stunted black spruce. Bogs are frequently characterized by a layer of ericaceous shrubs such as leatherleaf (Chameadaphne calyculata). Although bogs are usually covered with Sphagnum, they also can support sedges such as few flowered sedge (Carex oligosperma) among others.

The following criteria can assist evaluators in the identification of a bog. They are listed in order of importance. If all the first 5 criteria are not met, then it is not likely that the wetland is a bog.

1. Raised peat hummocks are present.
2. The wetland is ombrotrophic, (i.e., dependent on atmospheric moisture for its nutrients)
3. There is low plant diversity (usually less than 14 species of vascular plants)
4. Few or no fen indicator plant species are present
5. Few or no tamaracks (Larix laricina) or eastern white cedar are present.
6. Low pH (often less than 4.7)1
7. Tree cover does not exceed 25 %[2]

Fens

Fens are peatlands characterized by surface layers of poorly to moderately decomposed peat, often with well-decomposed peat near the base. Fen peats generally consist of mosses and sedges. Sphagnum, if present, is usually composed of different Sphagnum species than occur in bogs. There are two main fen types: nutrient rich fens typically are fed by groundwater and have a high pH. Nutrient-poor fens, such as those in moraine dominated landscapes, can occur in isolated depressions with less groundwater inputs and a lower pH (but not

as low as in bogs). Nutrient-poor fens usually develop in situations of restricted drainage where oxygen saturation is relatively low and mineral supply is restricted. Usually very slow internal drainage occurs through seepage down very low gradient slopes, although sheet surface flow may occur during spring melt or periods of heavy precipitation or if a major local or regional aquifer discharges into the wetland. Rich fens can develop directly on limestone rock where minerotrophic waters are emerging through constant groundwater discharge.

Fens have a higher diversity of plants compared to bogs which typically have less than 14 species of vascular plants. The presence of fen indicator species is a key to identifying this wetland type. For example, several moss species with narrow pH tolerances are common in fens and, if the evaluator is able to identify them, can be used as fen indicators. Sphagnum species may form a mat in poor fens, however they can be absent from rich fens. Fens can be dominated by sedges and grasses, especially in rich fens. Low shrubs, e.g., sweet gale (Myrica gale) or ericaceous species can occur with the latter particularly common as a low shrub layer in poor fens. Sometimes there is a tall shrub layer that can exceed 25% cover, and this often includes stunted tamarack (Larix laricina) and eastern white cedar. There can be a sparse layer of trees, often of tamarack or eastern white cedar (Thuja occidentalis) and, in poor fens also black spruce (Picea mariana). Live tree cover can't exceed 25%. if live tree cover is greater than 25% then the area must be identified as a swamp even if fen indicator species are present.

"Peatland" is a general term for all types of peat-covered lands. Peat is defined as partially decomposed plant material that accumulates under saturated soil conditions.

Peatlands develop via an interaction of climate, hydrology, topography, chemistry and vegetation succession. A common method of describing peatlands is based on the degree to which the peatland receives groundwater as compared to only precipitation (Mitsch and Gosselink 2000):

1. Rich fens, also known as minerotrophic peatlands, are true fens that receive water that has passed through mineral soil and typically have a high groundwater level and occupy a low point or relief in a basin.
2. Poor fens, also known as mesotrophic peatlands, are intermediate between mineral-nourished (minerotrophic) and precipitation-dominated (ombrotrophic) peatlands.
3. True raised bogs, also known as ombrotrophic peatlands, have developed peat layers higher than their surroundings and receive nutrients and other minerals exclusively by precipitation.
4. Kettle Peatlands "Kettle" landforms are depressions in the landscape, e.g., topographic low areas on bedrock. In many cases, they have been formed as a result of glacial activity. Large blocks of ice broke off the edge of retreating ice lobes during the last glaciation and became covered by glacial outwash. When the ice melted, kettle holes were left in the outwash plains.

Many of these depressions became small lakes or ponds with limited outflow but many others have filled in with peat deposits and peatland vegetation. They are referred to as "kettle peatlands".

5. In southern Ontario kettle peatlands are commonly found within features such as the Oak Ridges Moraine, Galt Paris Moraine and the Niagara Escarpment. Most are situated over calcareous materials and can range from rich to intermediate-poor fens.

Swamps

Swamps are wooded wetlands with 25% cover or more of trees or tall shrubs (see below for exceptions to the 25% woody vegetation rule).

In swamps, standing to gently flowing waters occur seasonally or persist for long periods on the surface. Frequently there is an abundance of pools and channels indicating subsurface water flow. The substrate is usually continuously waterlogged. Waters are circumneutral to moderately acid in reaction and show little deficiency in oxygen or in mineral nutrients. The vegetation cover may consist of coniferous and/or deciduous trees, tall shrubs, herbs and mosses. Many swamps are characteristically flooded in spring, with dry relict pools apparent later in the season. There is usually no deep accumulation of peat.

Swamps include both forest swamps (having mature trees) and thicket swamps (or shrub carrs). Thicket swamps are characterized by thick growths of tall shrubs such as willow species, red-osier dogwood, buttonbush and speckled alder. Both forest and thicket swamps have similar characteristics of water levels and chemistry. Both are assessed as "swamp" wetland type, but can be distinguished by the predominance of either "tree" or "shrub" form. Silver maple, hybrid soft maple, white elm, black/green ash and yellow birch are among the best indicators of a deciduous swamp while white cedar, eastern hemlock, tamarack and black spruce indicate conifer swamps. White cedar, eastern hemlock and yellow birch, however, also grow well in upland sites.

Marsh (includes Open Water Marshes)

Marshes are wet areas periodically inundated with standing or slowly moving water, and/or permanently inundated areas characterized by robust emergents, and to a lesser extent, anchored floating plants and submergents. Surface water levels may fluctuate seasonally, with declining levels exposing drawdown zones of matted vegetation or mud flats. Water remains within the rooting zone of plants during at least part of the growing season. The substratum usually consists of mineral or organic soils with a high mineral content, but in some marshes there may be as much as 2 m of peat accumulation. Waters are usually circumneutral to slightly alkaline and there is relatively high oxygen saturation.

Marshes characteristically show zones or mosaics of vegetation, frequently interspersed with channels or pools of deep or shallow open water. They include open expanses of standing or flowing water which are variously called ponds, shallow lakes, oxbows, reaches or impoundments. Marshes may be bordered by peripheral bands of trees and shrubs but the predominant vegetation consists of a variety of emergent non-woody plants such as rushes, cattails, bulrushes, sedges, grasses and herbs. Low shrubs such as sweet gale, red-osier dogwood, waterwillow, and winterberry may also occur. Where open water areas occur, a variety of submerged or floating plants flourish, such as stonewort (Chara), pondweeds, water-milfoils, waterweeds, bladderworts, coontails, tape-grass, water lilies, duckweeds and watermeals.

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NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX J

NPCA SHORELINE SUBMISSIONS – APPLICANT FACTSHEET

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

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Purpose

The intent of this document is to guide permit applicants including landowners, contractors, agents and consultants on the information required by the NPCA a submission to be considered a complete application specifically in relation to proposed shoreline protection, restoration, maintenance, or repair works. The guidance herein will assist with streamlining regulatory review, limit unexpected project costs and delays when obtaining permits from the NPCA for proposed shoreline construction projects, such as lake front protection undertakings.

Submission Requirements

☐ Application Form – a completed application form signed by both the landowner and contractor undertaking the work must be submitted. All appropriate fields are to be completed.

- ☐ Where the proposed works are across multiple properties a signed application form by each landowner is required.
- ☐ Where someone other than the landowner is obtaining the NPCA permit (agent), a landowner authorization form is required.

☐ Application Fee – the appropriate permit application fee must be paid in full as part of a complete permit application. A fee reduction may be applied where proposed shoreline protection works span and are continuous on multiple properties.

To ensure that applications are processed in a timely manner, please ensure that the appropriate information is being submitted to the NPCA for the proposed shoreline protection works. This may include:

☐ Identify whether the proposed works are for:

- ☐ A new shorewall, repair or maintenance of an existing shorewall and/or emergency works due to significant storm damage.

☐ A scaled and dimensioned plan AND profile drawing(s) of the proposed works including:

- ☐ Property identification and property boundaries including a geographic north arrow.
- ☐ Existing site conditions, including any existing shore protection, any neighbouring shore protection, stairs, decks, structures, etc.

- ☐ Proposed shore protection works including design, location and dimensions clearly showing the location and extent of the proposed works in relation to property lines, existing shore protection, existing hazards and how the proposed protection will be tied into neighbouring protection if applicable.
- ☐ Proposed shore protection works are to be clearly shown and dimensioned in relation to permanent existing features which are not subject to disturbance during construction – such as property boundaries or on-site structures (rocks and trees are not considered suitable as they are subject to movement and removal).
- ☐ A clear statement in a prominent location on the drawing indicating that any material used in construction or backfilling activities is to be imported to the site and not sourced on site – No sand or rock is to be removed from the beach during construction of any proposed shore protection works unless authorized by the NPCA.
- ☐ Location and type of erosion and sediment control measures (e.g., heavy duty silt fence with non-woven geotextile), if appropriate and required.
- ☐ Distance to normal high waters edge from proposed works, if appropriate and required.
- ☐ Title block showing the date or the drawing or last revision and scale.

☐ Current photographs of shoreline and should include;

- ☐ Entire project area.
- ☐ Nearshore area inclusive of any adjacent vegetation.
- ☐ Any structures or features that will be disturbed as the result of the proposed works.

IMPORTANT. Information presented in any permit application plans and drawings must provide the NPCA with enough detailed information to understand the design and location of the proposed works prior to construction. The NPCA must be able to inspection the site following project completion and confirm construction and location is as per the approved design.

Supporting Information

Additional information may be required from the applicant or agent prior to, during or after any review by NPCA staff including:

- ☐ Identifying the means of access for machinery and materials to the proposed site – any crossing of private or public property will require permission from the appropriate parties. Examples include:
  - ☐ Accessing across a property not owned by the applicant.
  - ☐ Works being done on property not owned by the applicant.
  - ☐ New shoreline protection works that are proposed to tie into existing shoreline protection works on another property not owned by the applicant.
- ☐ A detailed technical plan or review of any proposed works. This may include a coastal engineer's and/or geotechnical engineer's and/or environmental professional's review. Any such plan or review required by the NPCA will be at the expense of the applicant.
- ☐ Sequencing of works (e.g. grading, filling, excavation and vegetation removal).
- ☐ Identify if in-water works are anticipated with inclusion of effective mitigation measures if appropriate and required.
- ☐ Soil stabilization measures (e.g., seeding and planting with native species to achieve 100% coverage of areas disturbed).
- ☐ Identify if trees or other vegetation are to be removed/damaged (Note* if trees and shrubs are anticipated to be removed, NPCA staff may seek restoration planting to mitigate impacts).
- ☐ Timing of proposed works.

If the proposed works require the applicant to cross, conduct work on, or tie into existing shoreline protection works then the NPCA cannot issue a permit until the applicant has either:

1. Indicated a clear method of undertaking the work without accessing other owner's properties, or
2. Demonstrated to the satisfaction of the NPCA that the necessary permissions have been obtained (adjacent landowner consent).

Other Regulatory Considerations

In relation to proposed shoreline works of any kind, the NPCA has an important role, often as the lead regulatory agency. Consideration should be given to and discussed with the applicant in relation to other potential regulatory requirements listed below.

- Department of Fisheries and Oceans. DFO regulates many types of in-water works. Applicants may need the review and approval of DFO for the proposed works under the federal Fisheries Act and should be directed here (https://www.dfo-mpo.gc.ca/index-eng.html , info@dfo-mpo.gc.ca).

- Ministry of Natural Resources and Forestry. MNRF regulates shoreline works on lands owned by the province of Ontario under the Public Lands Act. Applicants may need the review and approval of the MNRF for the proposed works under the Public Lands Act and should be directed here (https://www.ontario.ca/page/ministry-natural-resources-and-forestry , Aylmer District Office, 519-773-9241, Vineland Field Office, David.denyes@ontario.ca,).

- Ministry of Environment, Conservation and Parks. MECP regulates activities which involve species at risk, and/or the placement of fill. Applicants may need the review and approval of the MECP for the proposed works under the Endangered Species Act and/or the Environmental Protection Act and should be directed here (https://www.ontario.ca/page/ministry-environment-conservation-parks , SAROntario@ontario.ca).

- Local municipalities. The local municipality regulates activities on lands owned by the municipality (road allowances) and regulates activities which involve the placement of fill, vegetation removal, and property access. Applicants may need the review and approval of the local municipality for the proposed works and related activities under the Municipal Act and various local bylaws pursuant to the Municipal Act and should be directed to their local municipality.

Additional Resources

This section is intended to assist with the submission requirements checklist to inform the application.

To ensure the proposed works are in accordance with NPCA policies and standards, please review the following information:

- NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/05 and (2018) https://npca.ca/images/uploads/common/LandUsePlanning.pdf

- NPCA Lake Erie Shoreline Management Plan Update (2010) https://npca.ca/images/uploads/common/Lake_Erie_Shoreline_Management_Plan_Update_2010.pdf

- NPCA Lake Ontario Shoreline Management Plan (2009) https://npca.ca/images/uploads/common/Lake_Ontario_Shoreline_Management_Plan.pdf

For information on soil stabilization and sediment and erosion control measures please review the following source(s):

- Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019) https://s3-ca-central-1.amazonaws.com/trcaca/app/uploads/2020/01/30145157/ESC-Guide-for-Urban-Construction_FINAL.pdf

For information on restoration planting please review the following source(s):

- NPCA's A Guide to Celebrate Niagara Peninsula's Native Plants available at https://npca.ca/images/uploads/common/Native_Plant_Guide.pdf

For information on species at risk please review the following information:

- Land Information Ontario (LIO) Make a Map: Natural Heritage Areas from the Ministry of Northern Development, Mines, Natural Resources and Forestry https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA

NPCA staff are only able to issue a work permit when it is determined that an application is complete and would be permitted by approved policies. NPCA staff cannot approve an application that does not meet policy, and/or would be in contravention of the Conservation Authorities Act and Ontario Regulation 155/06.

Where an applicant is either unable or unwilling to submit the requested technical information, the application may be referred to a Hearing under the Conservation Authorities Act.

If you have any questions regarding the NPCA's application requirements for proposed shoreline protection works, please contact us.

NPCA Watershed Planner Contact Info:

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NPCA SHORELINE PROTECTION WORKS – APPLICANT CHECKLIST

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

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Introduction

NPCA permit applications for shoreline protection works shall include the following information. Once completed, sign and date this checklist and submit it as part of the application package to the NPCA for review. Please refer to the NPCA's factsheet on shoreline protection works permit requirements for additional information.

Application Form and Fee

☐ Complete application form signed by both the landowner and contractor undertaking the work must be submitted. Identify if the proposed works are for new shoreline protection, repair or maintenance and/or emergency works.

☐ Landowner Authorization form where someone other than the landowner is obtaining the NPCA permit (agent or contractor).

☐ Application Fee

Drawings and Plans

☐ A scaled and dimensioned plan AND profile drawing(s) of the proposed works including:

- ☐ Property identification and property boundaries including a geographic north arrow.
- ☐ Existing site conditions, including any existing shore protection, any neighbouring shore protection, stairs, decks, structures, etc.
- ☐ Proposed shore protection works including design, location and dimensions clearly showing the location and extent of the proposed works in relation to property lines, existing shore protection, existing hazards and how the proposed protection will be tied into neighbouring protection if applicable.
- ☐ Proposed shore protection works are to be clearly shown and dimensioned in relation to permanent existing features which are not subject to disturbance during construction – such as property boundaries or on-site structures (rocks and trees are not considered suitable as they are subject to movement and removal).
- ☐ A clear statement in a prominent location on the drawing indicating that any material used in construction or backfilling activities is to be imported to the site and not sourced on site – No

sand or rock is to be removed from the beach during construction of any proposed shore protection works unless authorized by the NPCA.

☐ Title block showing the date or the drawing or last revision and scale.

Supporting Information

☐ Identifying the means of access for machinery and materials to the proposed site – any crossing of private or public property will require permission from the appropriate parties.

☐ Current photographs of shoreline and should include:

- ☐ Entire project area.
- ☐ Nearshore area inclusive of any adjacent vegetation.
- ☐ Any structures or features that will be disturbed as the result of the proposed works.

☐ The NPCA may require a detailed technical plan or review of any proposed works. This may include a coastal engineer's and/or geotechnical engineer's and/or environmental professional's review. Any such plan or review required by the NPCA will be at the expense of the applicant.

Signature of Applicant **Date**

If you have any questions regarding the NPCA's application requirements for proposed shoreline protection works, please contact us.

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NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX K

DRAFT NPCA LANDSCAPING PLAN GUIDELINE

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

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Niagara Peninsula Conservation Authority Guidelines

The Niagara Peninsula Conservation Authority (NPCA) strives to protect life and property from natural hazards such as flooding and erosion and to prevent environmental degradation, loss of natural features and their ecological and hydrological functions, and to pollution near or within natural features. To do this, the NPCA undertakes a wide range of programs and services. In the planning and development process, the NPCA exercises its roles and responsibilities in accordance with the Province's Policies and Procedures for Conservation Authority Plan Review and Permitting Activities (2010), including:

- A regulatory agency under Section 28 of the Conservation Authorities Act;
- A body with delegated authority under Section 3 of the Provincial Policy Statement, to represent the 'Provincial Interest' regarding natural hazards in the review of municipal policy documents and planning applications under the Planning Act;
- A public commenting body under the Planning Act, Clean Water Act and other Acts and Provincial Plans;
- A service provider for environmental advice and technical clearance to municipalities in accordance with signed Memoranda of Agreement;
- A resource management agency operating on a local watershed basis; and
- A landowner in the watershed.

The NPCA's Planning and Regulations staff (i.e., watershed planners, regulations officers, planning ecologists, water resource engineers, technologists, and hydrogeologists) work together on interdisciplinary teams to deliver timely and comprehensive reviews and advice to provincial agencies, municipalities and landowners across the NPCA's jurisdiction.

Section 28 (1) of the Conservation Authorities Act allows conservation authorities to make regulations to protect life and property from natural hazards. The NPCA's regulation is Ontario Regulation 155/06. Under Ontario Regulation 155/06, the NPCA regulates:

- All development in or adjacent to river or stream valleys, wetlands, and surrounding lands where development could interfere with the hydrologic function of the wetland, Lake Ontario shorelines, and hazardous lands such as karst, and any prescribed allowances;
- Alterations to a river, creek, stream, or watercourse; and
- Interference with wetlands.

Permission is required from the NPCA for undertaking any works within regulated areas. Any development, which in the opinion of the CA, does not affect the control of flooding, erosion, pollution, conservation of land,

or dynamic beaches may be approved or approved with conditions. Interference to watercourses and wetlands may be approved, approved with conditions, or refused. The NPCA's Board-approved Policies and Guidelines for the Administration of Ontario Regulation 155/06 and Land Use Planning Policy Document outlines the policies and technical requirements which must be met before permission may be granted. As part of an NPCA permit application, an applicant must demonstrate that the NPCA's Board-approved policies and technical standards can be met.

The NPCA also provides technical advice to its municipal partners on a range of environmental matters, including stormwater management (SWM) and natural heritage, through service agreements or Memoranda of Understanding/Agreement (MOU/MOA). Technical advice is also provided to municipal partners in the NPCA's capacity as a public commenting body and a resources management agency.

These Guidelines provide clear expectations regarding the criteria and approaches that are acceptable to the NPCA and are used by staff to assess the technical merits of a landscaping and rehabilitation plans for works proposed in NPCA regulated areas. Applicants proposing landscaping and rehabilitation works should follow these Guidelines when preparing plans to be submitted as part of an NPCA permit application. By doing so, more efficient, and consistent reviews, fewer resubmissions, and faster approvals are anticipated.

These guidelines are specific to the NPCA and do not replace or supersede any other federal, provincial or municipal requirements.

OBJECTIVE	The purpose of the Guidelines for Landscaping and Rehabilitation Plans is to: • Identify the NPCA's regulatory and technical requirements for landscaping and/or rehabilitation plan submissions • Outline the NPCA's key expectations for landscaping and rehabilitation design
APPLICATION AND USE	Applies to all landscaping and rehabilitation plan submissions associated with Ontario Regulation 155/06 permit applications. These Guidelines have been developed for: • Qualified professionals such as landscape architects and ecologists tasked with preparing landscaping and rehabilitation plans • NPCA staff to assess the technical merits of landscaping and rehabilitation plans to facilitation quicker and more consistent reviews
ADDITIONAL REFERENCE MATERIALS (to be read in conjunction with this document	• Ontario Regulation 155/06 Niagara Peninsula Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses • NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act, May 21, 2020 (as amended) • List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E), MNRF, 2017 • A Guide to Celebrate Niagara Peninsula's Native Plants, NPCA, 2014 • Natural Heritage Areas Inventory, Volumes 1 and 2, (NPCA, 2010)
VERSION	Version 1.0

Abbreviations

The following table lists the various abbreviations used within this document:

Table 0-1: List of Abbreviations

ARL	Approximate Regulation Limit	**CA**	Conservation Authority
NPCA	Niagara Peninsula Conservation Authority	**DBH**	Diameter at Breast Height
ELC	Ecological Land Classification	**MECP**	Ministry of Environment, Conservation and Parks
NAI	Natural Areas Inventory	**O. Reg 155/06**	Ontario Regulation 155/06
SWM	Stormwater Management		

1.0 Introduction

The purpose of the Guidelines for Landscaping and Rehabilitation Plans is to:

- Identify the NPCA's regulatory and technical requirements for a landscaping and rehabilitation plan submission for a permit within the NPCA's regulated areas
- Outline the NPCA's key expectations for landscaping and rehabilitation design

This document focuses primarily on the NPCA's expectations related to the ecological aspects of landscaping and rehabilitation plans. Other disciplines may also provide relevant direction such as water resource engineering, hydrogeology and geotechnical engineering.

Complex permit applications for larger scale works may require a landscaping and rehabilitation plan completed by a qualified professional. Single landowner residential development will be encouraged to adopt the principles in these guidelines, where possible, for simple permit applications for smaller scale works. Consultation with the NPCA is advised to ensure the appropriate sections of the guidelines are used.

1.1 Guideline Outline

This document is divided into five sections and a supporting appendix. For all projects requiring the NPCA's permission, the General Standards must be followed. In addition to the General Standards, the Project Specific Standards also apply to those identified in Section 3.

- Section 1 – Introduction – Outlines the purpose of the NPCA's Guidelines for Landscaping and Rehabilitation Plans.
- Section 2 – General Standards – Outlines the general requirements for landscaping and rehabilitation plans proposed in the NPCA's regulated areas.
- Section 3 – Project Specific Standards – Outlines the NPCA' standards for planting and provides direction for specific landscaping or rehabilitation works, such as:
    - Rehabilitation in floodplains and/or along watercourses;
    - Stabilizing temporary channels;
    - Planting plans for stormwater management facilities; and,
    - Planting plans in the setback adjacent to regulated natural areas (e.g., wooded features, wetlands and shoreline).
- Section 4 – Wildlife Habitat Features – Summarizes various techniques that can be applied to creating and enhancing wildlife habitat features within the NPCA's regulated area.

- Section 5 – Submission and Drawings – Summarizes the key requirements and standards outlined in the guideline and provides a checklist with all information to be included in a submission to the NPCA.
- Appendix 1 – Best Practices, Helpful Tips and Other Considerations – Provides tips and considerations that are not required as part of a submission but are encouraged.

****These Guidelines are specific to the NPCA and do not replace or supersede any other federal, provincial or municipal requirements. ****

1.2 NPCA's Role in Reviewing Landscaping and Rehabilitation Plans

The NPCA protects, manages, and enhances the area within its jurisdiction (see Figure 1-1) through a wide variety of programs and services, including the administration of regulations and the provision of planning services.

Figure 1-1: Niagara Peninsula Conservation Watershed

Under Ontario Regulation 155/06 (O. Reg. 155/06), the NPCA regulates:

- All development in or adjacent to river or stream valleys, wetlands and surrounding lands where development could interfere with the hydrologic function of the wetland, Lake Ontario/Erie/Niagara River shorelines, or hazardous lands such as karst and any associated allowances;

- Alterations to a river, creek, stream, or watercourse; and
- Interference with wetlands.

Permission is required from the NPCA for undertaking any development within regulated areas. "Development" means,

a) the construction, reconstruction, erection or placing of a building or structure of any kind,
b) any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure,
c) site grading, or
d) the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

The NPCA's Board-approved Policies and Guidelines for the Administration of Ontario Regulation 155/06 and the Planning Act (2022) outlines the policies and technical requirements which must be met before permission may be granted. As part of an NPCA permit application, an applicant must demonstrate that the NPCA's Board-approved policies and technical requirements can be met to the satisfaction of the NPCA.

In addition, the NPCA provides plan review services to municipalities for environmental advice and technical clearance.

The NPCA's review of proposed landscaping and rehabilitation plans provides for a streamlined and integrated assessment of the merits of the proposal that is linked to the NPCA's roles and responsibilities.

2.0 General Standards

This section outlines landscaping and rehabilitation requirements for works proposed in the NPCA's regulated areas, such as floodplains, watercourses, valleys, wetlands and lands adjacent to wetlands. Additional project specific guidance is provided in Section 3.

Landscaping and rehabilitation are required when alteration or rehabilitation works are proposed within a regulated area. Landscaping and rehabilitation plans may be a component of an overall NPCA permit. Applicants are encouraged to consult with NPCA staff prior to submitting a plan.

Drawing or Submission Requirements

When preparing a landscaping or rehabilitation plan, each plan must include and/or show the following:

- ☐ Written and graphic scale on all drawings (e.g., 1:200)
- ☐ North arrow
- ☐ Property boundary
- ☐ Full area of disturbance, including all grading works, (i.e., digital submission, and/or 8.5 x 11 hardcopy)
- ☐ Air photo(s) with proposed works overlaid (digital submission only)
- ☐ Vegetation protection measures and erosion control measures (if not provided on other drawings)
- ☐ Stamp of a qualified professional (if applicable) and drawing date
- ☐ NPCA's Approximate Regulated Limit (ARL) or confirmed regulated area by NPCA staff (e.g., NPCA staff staking)
- ☐ Plantable area in square metres (m^2)
- ☐ Description of the proposed approaches for topsoil, timing of work, species selection, tree and shrub plantings, groundcover and stabilization of soils

Before drawings are drafted, all higher-level plans and policies (e.g., site-specific environmental impact assessments/studies, subwatershed studies, secondary plans, etc.) that pertain to the proposed development should be reviewed. These high-level policies and plans may identify goals that should be achieved through landscaping or rehabilitation works. They may also provide direction on the expected outcome of landscaping and rehabilitation works.

Understanding existing site context and conditions is a critical consideration for plan preparation. Professionals preparing the plan are encouraged to visit the site early in the planning stage to familiarize themselves with the site. The existing or adjacent natural environment can be used as a reference to identify appropriate species selection and composition for planting.

A suite of factors will influence the survival of the proposed plantings. Species suited to the environmental conditions, the current and anticipated stresses due to development, and the anticipated uses of the site should be selected. Depending on these factors, additional measures may be recommended by staff as part of the landscaping works.

2.1 Site Preparation

There are several steps that can be completed to minimize materials needs and reduce the footprint of disturbance on a given site. Simple notes on plans can provide clear direction on how to clear the site of vegetation and protect features identified for preservation.

When preparing a landscaping or rehabilitation plan, each plan must:

☐ Demarcate the limits of construction with erosion and sediment fencing and/or tree protection fencing to avoid encroachment into the natural area. This will minimize disturbance to preserve the quality of the topsoil.

☐ Undertake any required tree removals without grubbing the soil, to the extent feasible to minimize disturbance to the soil and subsequent erosion risks.

2.2 Topsoil

Healthy soils are essential for effective vegetation establishment, increasing success rates of restoration projects while minimizing management costs, maintenance and replanting. Outlined below are the NPCA's requirements related to topsoil application and the stockpiling of materials. These requirements are based on industry best practices and NPCA's experience with successful landscaping and rehabilitation projects.

When preparing a landscaping or rehabilitation plan, each plan must:

Topsoil

☐ Indicate if the existing topsoil is viable and if there is enough depth for anticipated plantings and seeding.

☐ Specify aeration and/or adding compost, compost tea, leaf mulch and/or locally sourced mycorrhizal inoculant if the existing soil is compacted or degraded.

☐ Ensure a minimum depth of 20 cm of clean topsoil is specified unless the area has been compacted or soil is sterile and a minimum of 45 cm of clean topsoil where soil has been compacted. Confirm the proposed topsoil depths are supported by engineering studies.

☐ Specify mixing imported soil with native soil to ensure soil microorganisms are adapted to the site.

☐ Specify that clean topsoil is proposed in a consistent depth throughout the area.

☐ Phase works during construction to the extent possible to minimize disturbance. Care should be taken so as not to place fill within regulated areas or unnecessarily use heavy equipment.

☐ Show how compaction will be minimized and mitigated in instances where encroachment into the natural area cannot be prevented. Consider application of a medium such as woodchips in locations where vehicle movement is proposed in natural areas.

Stockpile

☐ Show all topsoil stockpile locations on site, outside of the NPCA's regulated limits, to a recommended maximum specified height limit of 130 cm. Stockpiling to greater heights and remaining for periods

longer than six months will generally sterilize the topsoil. Where this cannot be avoided, the addition of compost is recommended at the end of the stockpiling period.

☐ Seed stockpiles with nurse crop or alternative winter cover to help retain the quality of the topsoil and minimize erosion.

☐ Install appropriate erosion and sediment control measures around the topsoil pile and other exposed areas to prevent sediment-laden runoff from reaching watercourses and other sensitive areas.

☐ Keep stockpiled topsoil separate from subsoil.

2.3 Timing

For landscaping and rehabilitation projects to be successful and avoid sensitive timing windows for wildlife, consideration must be given to the best and most appropriate time of year to undertake the proposed works. The timing of works should be included on submitted plans, as this will determine if additional maintenance measures are required. Figure 2-1 below outlines the appropriate time to plant various vegetation types based on best practices.

Figure 2-1: When to Plant New Stock

*Plantings for Bioengineering (PFB)

When planting trees and shrubs, deciduous plants should be transplanted in the fall after leaves drop or in the spring before the leaves emerge, while conifers should be planted in the spring. Some species such as oaks can

only be transplanted in the spring. Bioengineering plantings must be installed when dormant. Caution should be exercised when proposing landscaping during periods when risk of freezing is high.

When preparing a landscaping or rehabilitation plan, each plan must:

☐ Indicate a contingency plan for seeding if works cannot be completed immediately after construction.

☐ Include notes on maintenance should landscaping be completed during sub-optimal periods.

☐ Provide an advisory note indicating that planting of herbaceous material is to be completed outside of frost period with sufficient time for plants to take root.

2.4 Species Selection

A well-designed landscape incorporating native species will function well ecologically and hydrologically with the existing surroundings. The NPCA endeavours to protect and enhance natural features, and hydrologic and ecological functions within the watershed by promoting the use of native self-sustaining vegetation.

When preparing a landscaping or rehabilitation plan, each plan must:

☐ Illustrate transplanting, planting or salvaging of only native species.

☐ Ensure that no invasive species or plant associations that support the lifecycle of pests are proposed (e.g., do not plant the hosts of blister rust together: Ribes and Pinus species).

☐ Include a diversity of species with different flowering times.

☐ Include a minimum of five species per targeted plant type (e.g., tree, shrub, forbs, graminoid, aquatic, etc.).

☐ Avoid species with allelopathic effects to ensure the optimal growth of other species (or ensure tolerance of species planted in association).

☐ Incorporate bioengineering measures where appropriate.

☐ Include locally native species representative of existing vegetation or edge habitat communities when planting adjacent to vegetation communities or in natural areas.

☐ Integrate early successional species.

☐ Incorporate companion plantings for shading, where appropriate.

☐ Include at least one submergent or floating-leaved plant and one emergent species, in aquatic planting plans.

☐ Use List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E), MNRF, 2017 for a list of suitable species. Species selected must be native to the NPCA's watershed.

2.4.1 Species at Risk, Provincially or Regionally Rare Species

The NPCA does not support the planting of any species at risk, provincially rare or regionally rare species unless undertaken specifically under the direction of a recovery initiative. The planting of these species may lead to genetic issues as well as potential future complications for landowners by the creation of habitat for these species. Confirm current species status with federal, provincial and regional lists prior to submission. Regional rarity can be found in the Niagara Peninsula Watershed Natural Areas Inventory (NAI).

2.4.2 Trees and Shrubs

Trees and shrubs provide important services and critical ecological and hydrological functions in the landscape. Trees and shrubs can reduce the rate of erosion by protecting the soil from rain impacts and holding soil in place with their roots. Trees and shrubs also reduce flooding by increasing infiltration.

When preparing a landscaping or rehabilitation plan, each plan must:

- ☐ Propose no fewer than five tree species and five shrub species in areas currently or intended to be forested.
- ☐ Include a variety of tree sizes and successional species to accelerate establishment of a natural vegetation structure. Specific size variations are provided in the project specific standards subsections.

Select species representative of natural plant associations and appropriate successional stage.

- ☐ Use adjacent vegetation communities, where applicable, as examples of vegetation associations.
- ☐ Mimic a naturalistic, rather than geometric layout to the greatest extent possible in the planting plan.
- ☐ Design cover structure and layering (e.g., groundcover, understory canopy, heterogeneous canopy height, etc.) to maximize structural complexity.
- ☐ Install plant species not susceptible to ice/storm damage as well as spreading, suckering vegetation away from structures
- ☐ Transplant/salvage only non-invasive woody vegetation that is under 20 cm diameter at breast height (DBH).
- ☐ Include larger stock and/or fast-growing shrubs and trees near or adjacent to streams and ponds to provide immediate shading (i.e., Acer saccharinum, Salix spp., Sambucus canadensis, Populus spp.).
- ☐ Consider contingency measures for animal damage during species selection and post-planting care.
- ☐ Provide a tree planting detail on the drawings showing the stakes, wrap, mulch, soil amendments and size of hole.

Due to factors such as area of disturbance, stock availability, and survivability, the NPCA may support planting of younger and smaller stock on a case-by-case basis. Consultation with staff is recommended.

Whips can be substituted for caliper stock at a 10 to 1 ratio, where appropriate.

- 1 deciduous caliper stock is >4 cm DBH
- 1 conifer caliper stock is >150 cm in height

2.4.3 Ground Cover/Stabilization

Ground cover and stabilization measures are key in preventing immediate erosion and sedimentation, improving the ecological function and significantly contribute to the restoration efforts. When preparing plans, it is key to consider the application, composition and timing of the ground cover/stabilization proposed.

When preparing a landscaping or rehabilitation plan, each plan must:

Application

☐ Specify application of ground cover in a nutrient rich medium using Terraseeding, hydroseeding or similar techniques that incorporates both seed mix and growth media during the application process or with weed-free "sod blocks."
☐ Limit mulch to a depth of 5 cm and only in planting nodes.
☐ Avoid broadcasting the entire watercourse corridor or natural area with mulch.
☐ Select plastic-free mulch.

Composition

☐ Include plugs or potted stock for immediate results, and plants grown from seed for target community composition, where possible.
☐ Plant both native graminoids and wildflowers for structural diversity and blooming periods to capture a larger suite of biological services. Include deep rooting, native perennial grass species for soil stabilization.
☐ Provide the seed mix species composition and application rate on plans. The NPCA recommends a seeding rate of 25-30 kg/ha. Verify species-appropriate quantities with a qualified professional.
☐ Salvage seed depending on site conditions and existing vegetation. Areas with invasive species or dominated by non-native species are not suitable salvage sites.
☐ Use more than one nurse crop to prolong coverage over multiple seasons.
☐ Do not use conventional sod in naturalized regulated areas.

Timing

- ☐ Optimize timing of works and germination of nurse crops.
- ☐ Apply a combination of nurse crops to establish quick vegetative cover over various seasons.
- ☐ Avoid seeding during the drought-prone periods, unless additional maintenance measures can be completed (i.e. frequent watering).
- ☐ Stabilize topsoil with approved nurse crop seed mixes for groundcover.
- ☐ Add additional stabilization measures (e.g., hydroseeding in combination with engineered methods such as erosion matting and nurse crops) if required due to seasonal conditions and depending on timing of work. Re-evaluate the depth of the topsoil prior to planting if not stabilized immediately.
- ☐ Delay spreading of topsoil until following spring if topsoil cannot be stabilized within the current year's growing season.

Additional Considerations

- ☐ Indicate scheduled weeding plan to ensure intended vegetation grows.
- ☐ Use biodegradable erosion matting such as plant fibre blankets for short-term stabilization.
- ☐ Consider pit and mound construction as a topographic approach when used with an appropriate planting regime. To minimize erosion and runoff, each pit should not be surrounded on four sides by a mound, and vice versa.
- ☐ Ensure the nurse crop is certified and does not contain any invasive species.

2.5 Planting According to Moisture Regime

To achieve a successful outcome, it is necessary to consider the site's moisture regime when determining what to plant in which location. Many plants have specific needs as it relates to moisture level and will not thrive if these needs are not met. The five zones describe typical conditions encountered. The hydrologic/moisture zones represent the tolerance of plants to differing degrees of water inundation (Figure 2-2).

- **Deep Water Zone:** water depth 0.5 m to 2 m below surface.
- **Aquatic Zone:** depth from 0.5 m to the permanent pool level/normal water level.
- **Flood/Shoreline Zone:** permanent pool to extended detention elevation or 5-year storm.
- **Lowland Zone:** extended detention elevation to the regional storm or based on vegetation community present.
- **Upland Zone:** above the regional storm elevation.

Consider and include moisture zones when developing plans.

FIGURE 2-2: Moisture Zones

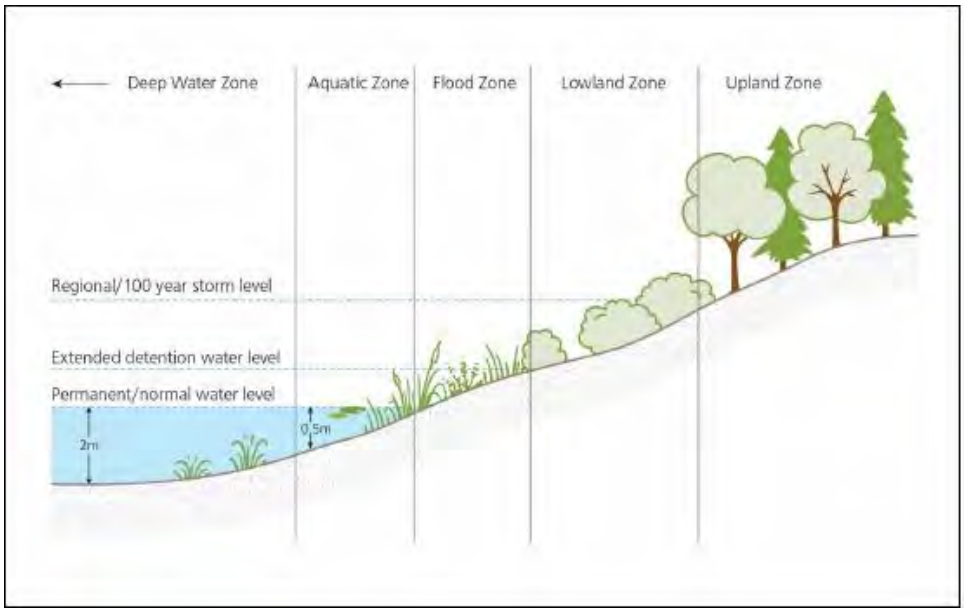


Figure 2-2 is provided for schematic purposes only. Plantings in each zone are subject to the type of rehabilitation project.

The NPCA's Guide to Celebrate Niagara Peninsula's Native Plants provides a list of native species suitable for a variety of hydrologic and light conditions, please note that this is not an exhaustive list of species native to the NPCA's Watershed. This Guide is available at www.npca.ca. For a fulsome list of species native to the NPCA's watershed please consult the List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E), MNRF, 2017.

2.6 Post Planting Care

Post-planting care refers to the maintenance and monitoring required to achieve self-sustaining vegetation. It can ensure survivability of the newly installed material and soil stabilization to prevent sedimentation and erosion. Specifications for frequency and duration of maintenance and monitoring will vary based on the nature of the project. Certain projects may warrant pre-installation meetings between the designer and contractor or ongoing supervision by the qualified professional to address issues as they arise. Prior to installation, a qualified professional must verify that the proper species have been sourced. Drawings must include all details regarding monitoring and maintenance for clear communication between the designer, review agencies and contractors.

Post-planting site visits should be carried out throughout the warranty period to ensure vegetation has reached a free-to-grow state. These visits may involve watering, removal of invasive and non-native species, adding mulch, removing stakes, removing litter and resolving any problems. Sites should be visited after inclement weather, especially during the period of establishment, to confirm that the proposed plantings have not been uprooted, to address erosion or ponding of water, and to determine if the approach is working satisfactorily. The NPCA should be contacted if changes to the approved plan are necessary.

When preparing a landscaping or rehabilitation plan, each plan should:

- ☐ Outline the vegetation monitoring plans in the General Notes. The plan should include how the performance and effectiveness of interim measures (e.g., nurse crops) will be monitored, the duration and frequency of the program, and how plant health will be protected during droughts and other extreme weather (e.g., high rainfall or wind events) until plantings have reached a free-to-grow state.
- ☐ Include coir disks around the base of trees and shrubs to retain water.
- ☐ Ensure mulch extends beyond the root ball and does not touch the base of the tree and shrubs.
- ☐ Indicate the removal of plant tags.
- ☐ Include tree protection measures such as rodent guards and stakes.
- ☐ Indicate all temporary stabilization measures such as rodent guards and stakes will be removed at the appropriate time after planting, generally within 2 years.
- ☐ Indicate that pruning of all dead or damaged tree and shrub branches will be done by a qualified professional.
- ☐ Include replacement of dead or dying plantings prior to the end of two years or the end of the warranty period from the nursery/contractor.

3.0 Project Specific Standards

This section outlines project specific requirements for landscaping and restoration associated with works within regulated areas such as floodplains and watercourses, temporary channels, stormwater management facilities and areas adjacent to natural hazards or features. These requirements are in addition to the general requirements outlined in Section 2.

3.1 Floodplains and Watercourse

Plantings associated with floodplains and watercourse alterations must:

- stabilize the side slopes and floodplain of the creek block;

- prevent erosion on meander bends;
- mitigate pollution (e.g., thermal impacts, sediment and other deleterious materials, etc.);
- enhance fish and wildlife habitat; and,
- protect and enhance the natural heritage system.

3.1.1 Planting Requirements

Floodplain and watercourse alteration requirements apply to the entire width of the creek block, including floodplain and, side slopes (excluding trails). Appropriate species selection is essential to ensure long term viability and success of the plantings.

When preparing a landscaping or rehabilitation plan, each plan must:

☐ Provide both general and species-specific habitat features.

☐ Include a variety of pioneer, successional and late successional species for rehabilitation works. Pioneer flood tolerant species ensure rapid rehabilitation, while mid-successional species provide longer-term structural diversity based on growth rates and shade tolerance.

☐ Ensure plantings consist of 5% caliper, balled and burlap and/or wire basket material and 95% whips and/or saplings.

☐ Include trees at a density of 10 trees per 100m2 and a shrub to tree ratio of 5:1, in communities dominated by trees and shrubs.

☐ Provide tree and shrub plantings within the first metre adjacent to the creek to maximize the benefit of shading, bank stability and instream habitat. Vegetation should provide shade on 60-80% of the surface of streams.

☐ Use bioengineering along banks where possible.

☐ Include ground cover throughout the entire area of disturbance within the floodplain and where enhancement will improve the riparian/creek corridor.

☐ Vegetate the entire cross-section of intermittent channels and to the approximate bankfull limits of permanent channels.

☐ Illustrate the topsoil tapering to a thin layer near the bottom of the bank or low flow limits.

3.1.2 Bioengineering

Bioengineering is the rehabilitation technique of using dormant cuttings of hardy native plant material. It is an encouraged approach for watercourse and valley rehabilitation works as a method to stabilize or protect erodible soils. It can provide immediate mechanical stability while a vigorous root matrix establishes within the soil. As the stabilization is provided by living vegetation, the reinforcement provided grows stronger and more

effective over time. Types of Bioengineering can include installing live fascines, brush layering, live crib walls, live staking and brush mattresses. The plant material used for bioengineering is installed in a dormant state.

Two factors should be considered when determining whether bioengineering is an option:

- Shear Stress: determine the shear stress that is anticipated to be enacted on the bioengineering material via precipitation, meltwater or creek flow to confirm if the approach will work.
- Timing: install bioengineering structures during the required planting timing window to ensure the survival of the planting material and the success of the bioengineering project. The collection of material and installation should occur between October 31 and March 31.

3.2 Temporary Channels

Temporary channels are used to divert flows during construction of stormwater infrastructure or permanent/ultimate watercourse realignments. It is important to quickly stabilize these channels to prevent sediment from entering downstream, or from impairing aquatic species passage.

The following approaches for temporary channels in regulated areas should be considered:

☐ Using erosion control blankets depending on construction timing and duration.
☐ Lining bed with rocks and/or vegetation.
☐ Planting native vegetation to ensure full coverage, especially in cases where works will be completed over a longer timeframe (i.e., greater than one year).

Using sod mats for stabilization where appropriate.

3.3 Stormwater Management Ponds

Plantings contribute significantly to the proper functioning of Stormwater Management (SWM) Ponds. SWM vegetation benefits and functions include:

- improving water quality by preventing the release of sediment into local creeks and tributaries;
- stabilizing the side slopes of the pond;
- mitigating pollution and nutrient loading of waterways;
- reducing the exchange of sediments and toxins into watercourses;
- minimizing establishment and growth of invasive species;
- reducing water temperatures through shading;
- providing aesthetic benefits; and,
- carbon capturing and cycling.

Municipalities may have additional requirements for stormwater ponds and should be consulted throughout the design process.

3.3.1 Planting Requirements

Appropriate species selection for these areas is critical for long-term survivability of the vegetation and function of the facility to achieve the abovementioned benefits and functions.

When preparing a landscaping or rehabilitation plan, each plan must:

- ☐ Provide shade on the southern exposure of pond, inflow and outflow channels whenever possible to reduce warming. Plant a portion of the required caliper species on the south side of the pond and close to the permanent pool level.
- ☐ Select flood tolerant species adapted to anticipated water flow velocities.
- ☐ Protect planting nodes from waterfowl if required. Dense shrubby vegetation placed close to the permanent waterline will help to discourage loafing and nesting geese.
- ☐ Include nodes of 5 - 30m2, spaced out no more than 6 m.
- ☐ Show species in randomized patterns to mimic a natural layout. Avoid a grid layout.
- ☐ Locate woody plants in a manner that does not impede the flow of water in or out of SWM pond facilities.
- ☐ Provide the total plantable area per moisture zone.
- ☐ Provide no-maintenance, non-invasive species with a mix of locally native forb and grass species.

It is best practice to increase planting densities, as vegetation will have to be removed during sediment dredging operations.

The planting details provided above are also presented in Table 3-1.

Table 3-1: Planting Criteria per Moisture Zone

Zone	Water Depth	Planting Criteria
Deep Water Zone	0.5 m to 2 m below surface	• Group aquatic plants and space them 0.5m to 1m apart. • Aim for 40% cover (at full growth) of the area as defined by the normal water level to 0.75m depth.
Aquatic Zone	Depth of 0.5 m to the permanent pool level/normal water level	• Include a minimum of four aquatic plant species.

		• Aquatic species should include at least one species of submergent and floating – leaved plant, at least one species of robust, broadleaved and narrow-leaved emergent. • Provide cattails (Typha latifolia) and pioneer rush and bulrush species (e.g., Juncus effusus, Juncus torreyi and Scirpus cyperinus) as interim vegetation in sediment forebay to aid in sediment trapping. Limit the plantings of cattails to areas away from maintenance access areas.
Flood/Shoreline Zone	Permanent pool/normal water level to extended detention elevation	• Include a minimum of four aquatic forbs and graminoid plant species as plugs and seeds • Provide at least five species of shrubs should be planted • Provide at least 25 shrubs per 100 m^2

Lowland Zone	Extended detention elevation to the regional storm elevation	• Indicate a density of no less than 5 trees per 100 m^2 and 25 shrubs per 100 m^2 in the dryland area of the lowland and upland zone
		
		• Include a variety of tree planting stock sizes and successional species to accelerate establishment of a natural vegetation structure. Use the following percentages to determine the amount of each size to plant:
		  • 5% caliper, balled and burlap and/or wire basket material (4 cm caliper for deciduous trees; minimum 150 cm for conifers),
		  • 95% whips and/or saplings provide larger caliper sized trees to shade SWM ponds. Place plantings immediately adjacent to pools to maximize the immediate shading and stabilizing benefits. Smaller species can be interspersed in these areas to allow for gradual growth and stabilization.
		
		• Include a variety of shrub sizes between 0.4 – 1 m in height. At least 5 species of shrubs and trees should be planted

Upland Zone	Above the regional storm elevation	

		• 5 trees per 100 m^2 • 25 shrubs per 100 m^2 • Include groundcover

3.3.2 Calculation of Plant Material for Aquatic Species

The total aquatic plantable area is defined by the normal water line/permanent pool level down to 0.75 m depth.

To achieve 40% cover, the quantity of aquatic plants is calculated based on 6 plants per 1 m^2. Below is a formula to determine aquatic plant numbers to achieve at least 6 plants per 1 m^2 for the Deep Water and Aquatic Fringe Zone:

Plantable area (m^2) X 40% (cover) X 6 plugs per m^2 (plants/m^2) = proposed planting number

Sample calculation for 10,000 m^2 for area between normal water line down to 0.75 m deep:

10,000 m^2 X 40% X 6 plants/m^2 = 24,000 plants/plugs for the area

Provided below in Table 3-2 is an example of SWM calculations to be included in the submission.

Table 3-2: SWM Pond Planting Calculations

Zone	Area	Required Densities	Required Quantity of Plantings
Deep Water Zone Aquatic Zone	1200 m^2	• Aquatic plants should be planted in groupings, spaced 0.5 m to 1 m apart and cover 40% (at full growth) of the area defined by the normal water level to 0.75 m depth • (Plantable area m^2) x (40%) x (6 plugs per m^2)	• 2880 plugs
Flood/Shoreline Zone	1100 m^2	• 25 shrubs per 100 m^2 • Groundcover	• 275 shrubs • Groundcover
Lowland Zone Upland Zone	2000 m^2	• 5 trees per 100 m^2 • 25 shrubs per 100 m^2 • Groundcover	• 100 trees • 500 shrubs • Groundcover

**Quantity of required plants/m2 is subject to change based on municipal requirements or ecological requirements of receiving watercourse.*

3.3.3 Topsoil in SWM Ponds

The first 2 m below the permanent water level along the edge of the pond receives 0.30 m of clean topsoil in keeping with the MECP SWM Guidelines. All areas above the permanent water level receive 0.45 m to 1.0 m of clean topsoil. The subsoil is to be de-compacted/scarified to ensure proper integration between subsoil and topsoil.

The engineer should confirm the suitability of subsoil and topsoil material, and de-compaction options with the landscape architect.

3.3.4 SWM Pond Outlet Structures

SWM pond outlets may be designed as: swales/channels, flow spreaders, infiltration trenches, stonecore wetlands, etc. Regardless of the design, the area around the outlet should be well-vegetated to achieve water quality objectives as well as ecological targets in the receiving watercourse. Establish a continuous band (minimum 3 m in width) of woody riparian vegetation around or along the outlet structure to facilitate shading and stabilization. Plant a combination of fast-growing riparian pioneer species (e.g., poplars, dogwoods, alders and willows) as well as longer lived, large canopy species (e.g., silver maples). Plant the larger planting material adjacent to the outlet feature to provide a more immediate shading effect.

3.3.5 Temporary SWM Pond Stabilization

Temporary SWM ponds may be installed as an interim facility. It is important to quickly stabilize these temporary SWM ponds to prevent sediment from entering downstream.

The following approaches for temporary SWM ponds that outlet to regulated areas should be considered:

- ☐ Use erosion control blankets depending on construction timing and duration.
- ☐ Plant native riparian groundcover vegetation to ensure full coverage, especially in cases where works will be completed over a longer timeframe (i.e., greater than one year).
- ☐ Use sod mats where appropriate.

3.4 Areas Adjacent to Natural Hazards and Wetlands

Plantings in the regulated allowance of natural hazards and wetlands are important for preserving the health of the natural area and improving the ecological function of the watershed. While regulation and policy determine the allowance width, the width of the planting area and composition of the plantings can be determined by an environmental impact study, equivalent ecological study or as determined by the NPCA. The planting area in the regulated allowance is intended to be established and maintained as natural, self-

sustaining vegetation. The NPCA promotes rehabilitating sites using planting densities appropriate to the desired Ecological Land Classification (ELC) vegetation community. Appropriate planting densities should be established through consultation with the NPCA.

It is important to consider any existing naturally occurring vegetation adjacent to a natural area when planting. The density and size requirements for planting may be reduced based on existing vegetation provided the existing areas that are not disturbed during any phase of construction. Requirements will be determined on a site-by-site basis. The planting guidelines in the following subsections are based on the most common vegetated treatments.

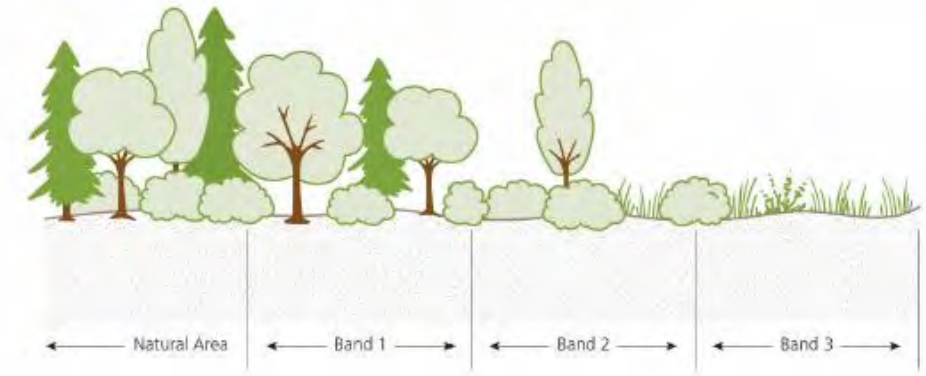
When preparing a landscaping or rehabilitation plan, each plan must:

- ☐ Identify if a fence is necessary to deter encroachment into the planting area.
- ☐ Include thorny species, such as raspberries, blackberries and hawthorns, in the perimeter vegetation screen of natural area plantings to help deter encroachment and trampling by people and certain types of wildlife.
- ☐ Plant shrubs which are equal to or larger than 1-gallon pots or equivalent.
- ☐ Include wildlife habitat features, where appropriate.
- ☐ Provide winter cover for wildlife and wind and snow breaks by clumping conifers and using small shade tolerant conifers as understorey among deciduous trees.

Since each site is unique, landscaping plans will be reviewed on a site-by-site basis to determine the most appropriate planting approach.

Regardless of the natural hazard or wetland present, the planting area is made up of three distinct vegetated bands. The purpose of these bands is to create transitions between the natural hazard or wetland, and the proposed development. Band 1 is located closest to the natural feature and tends to be the most densely planted. The width of Band 1 should be a minimum of 5 m for all allowances 15 m wide or less. For all allowances greater than 15 m, the width of Band 1 is half of the total allowance width. Band 2 is made up of sparser woody plantings interplanted with groundcover plantings while Band 3 blends into the surrounding developable envelope consisting only of native herbaceous and graminoid species. The width of Band 2 and 3 will be determined on a site-by-site basis. As illustrated in Figure 3-1, the minimum planting densities are broken down into three bands to create a gradual transition between the natural area and the proposed development.

Figure 3-1: Vegetation Bands Adjacent to Natural Hazards and Wetlands



There are a variety of ecological community types that might be classified as natural hazards. This section pertains to wetlands, valleys (typically woodlands) and shorelines, as these comprise most natural areas that require adjacent landscaping. Plantings adjacent to all other ecological community types are dealt with on a site-by-site basis. Table 3-3 outlines the planting criteria by vegetation community.

Table 3-3: Bands Criteria by Habitat

Habitat	Band 1	Band 2	Band 3	Considerations
Woodlands and Swamps	☐ Indicate tree density of 5 trees per 100 m^2 ☐ Indicate shrub density of 5 shrubs per tree planted (25 shrubs per 100 m^2) ☐ Locate proposed trails, if any, in other bands and/or away from the natural feature	☐ Indicate tree density of 3 trees per 100 m^2 ☐ Indicate shrubs in this band at a shrub to tree ratio of 5:1	☐ Indicate a ground cover mix as prescribed in the General Standards Section of this document	
Thickets and Thicket Swamps	☐ Plant at a density of 25 shrubs per 100 m^2 ☐ Plant appropriate groundcover/seed mix around and between shrubs	☐ Plant bands 2 and 3 as a gradient to transition from woody vegetation to ground cover species dominated adjacent to the development		
Shallow marshes, meadow marshes, along wetland pond edges, wet meadows/prairies, or similar shallow aquatic habitats	☐ Plant at a density of 15 shrubs per 100 m^2 in a gradient with most shrubs located adjacent to the remaining natural area ☐ Plant appropriate groundcover/seed mix around and between shrubs	☐ Plant a secondary band of herbaceous cover adjacent to the proposed development		☐ The widths of bands 2 and 3 will be determined on a site-by-site basis and will vary depending on the quality of the natural area. ☐ Shrubs plantings are recommended closest to herbaceous wetlands as a mitigation measure. In certain instances, planting a reverse vegetation band around a herbaceous wetland (e.g. Shrubs in Band 3) may be recommended to prevent encroachment into the critical function zone of the wetland.

Vegetated Shoreline along Lake Erie and Lake Ontario	☐ Plant 5 trees and 5 shrubs per 100 m^2 within the band immediately adjacent to the shoreline ☐ Plant coniferous trees as they provide ideal habitat and foraging areas for birds throughout the year as well as a wind and snow break. ☐ Plantings may be clustered to preserve views of the lake.	☐ Plant native herbaceous species in bands 2 and 3	☐ Shoreline plantings are exposed to extreme conditions along the Lake Ontario and Lake Erie shoreline. Due to these harsh environments, a qualified coastal and geotechnical engineer may need to be consulted. Not all plants are suitable for use in bioengineering and stabilization works along the shoreline and specified species need to be resistant to wind, tolerant to sun and fluctuating water levels. ☐ It is essential to consider groundcover in the planting plan. Exposed areas are subject to erosion via wind and rain. Ground cover can protect these areas to prevent topsoil loss and sediment release into the water. A dense tree/shrub zone is beneficial along shorelines as it: • Protects against erosion in a harsh environment; • Deters geese; • Provides habitat for migrating wildlife; and, • Provides mutual support against the elements when planted near existing trees and shrubs. ☐ It is important to design landscaping that requires minimal to no fertilizer to prevent runoff from entering the lake and contributing to algae blooms.

Provided below in Table 3-4 is an example of band plantings to be included in the submission

Table 3-4: Example Band Plantings

Band	Area	Requirement Densities	Required Quantity of Plantings
Band 1	4000 m^2	Total Tree (5 trees/ 100 m^2)	200
		5% Caliper	10
		50% whip and/or sapling	100
		45% seedling and/or plug	90
		Total Shrubs (5 Shrubs per Tree)	1000
		Groundcover	Refer to section or provide seed mix, percentage and application
Band 2	2000 m^2	Total Tree (3 trees/ 100m^2)	60
		5% Caliper	3
		50% whip and/or sapling	30
		45% seedling and/or plug	27
		Total Shrubs (5 Shrubs per Tree)	300
		Groundcover	Refer to section or provide seed mix, percentage and application
Band 3	2000 m^2	Groundcover	Refer to section or provide seed mix, percentage and application

4.0 Wildlife Habitat Features

Landscaping and rehabilitation works can help improve the ecological function of the watershed by including the creation or enhancement of a variety of wildlife habitat features. Wildlife habitat features can foster biodiversity by supporting wildlife populations in the local ecosystem, from invertebrates like bees, butterflies and other pollinators, to amphibians, birds and many other animals. Among other benefits, a diverse ecosystem with a variety of plants and wildlife habitats can reduce the risks of pest outbreaks, provide natural balance and improve the resiliency of the ecosystem. A fundamental characteristic of ecosystems is that biological complexity and diversity requires habitat with structural complexity.

When preparing a landscaping or rehabilitation plan, each plan should:

- Include wildlife habitat features.
- Demonstrate how structure and diversity are achieved.
- List maintenance requirements, if any, of the structure (e.g., cleaning of bird and bat boxes, weed turtle nesting sites, etc.).

4.1 Types of Wildlife Habitat Features

The following subsections provide examples of various wildlife habitat feature types which can contribute to the structural complexity. While these are not requirements for all projects, incorporating them is encouraged to provide diversity and a benefit to the overall system.

4.1.1 Topographic Diversity

Topographic diversity creates habitat heterogeneity by creating micro-climates with varying levels of shade and moisture. To support topographic diversity:

- Incorporate small pockets of wet meadow/wetlands/shallow seasonal pools within the newly graded areas to provide greater variety in terrestrial habitat, short term water retention and in some locations, a more natural floodplain form.
- Design wetland habitat to mimic hummocky features or varied microtopography, including basking mounds, oxbows and pit-and-mound features.

4.1.2 Rock Piles

Rock piles offer structures for loafing, perching, basking and refuge to various wildlife. To support habitat diversity:

- Add rock piles into vegetated areas. Rock piles may vary considerably in size, shape and composition, depending on factors such as the intended purpose, target species, topography and vegetation. Materials may vary, but typically consist of flat rocks, riverstone, cobble and/or small boulders. Riprap is not appropriate for creating wildlife habitat purposes.

4.1.3 Brush Piles

Brush piles on the ground are important components of wildlife habitat as they provide cover and protection during various life stages. To support habitat diversity:

- Stack small piles of brush (1 to 2 m in height, 3 to 5 m in width and 5 to 10 m in length) to create hiding cover and denning sites for small mammals and nest sites and shelter for birds.
- Seed/plant native groundcover and vines under and around the brush pile to encourage vegetation to grow over and around the structure, enhancing cover for wildlife.
- Include large wood structures like logs and limbs to provide habitat for small wildlife, such as birds, salamanders, toads, frogs and invertebrates.
- Reuse native, non-invasive woody material removed on or near the site where possible.

4.1.4 Hibernacula

Hibernacula is another important component of creating wildlife habitat. Since the creation or enhancement of hibernacula is a relatively complex project, consultation with NPCA staff is recommended.

4.1.5 Nesting Sites

Several specific criteria must be met when creating a nesting site, depending on the target species. Installing bird boxes is relatively straightforward. Fine woody debris and mulch piles can be used as basking and nesting sites for reptiles when positioned in partially shaded locations. However, for many species such as reptiles, nest site design details are critical. Consultation with NPCA staff is recommended.

4.1.6 Snags and Perching Trees

Snags and perching trees for raptor habitat ensures that habitat is available for large avian predators and similar wildlife. These in turn provide important ecosystem services and functions, including small animal control. To support raptor habitat:

- Retain tall trees for owl and raptor perches. De-limb trees and leave standing as snags for other wildlife habitat features as well (e.g., woodpeckers, owls, warblers, tree frogs).
- Install snags on tablelands away from floodplain.
- Maintain a minimum of 10 m separation distance between installed snags from prey habitat (i.e., hibernacula, brush piles and turtle nesting sites).
- To improve the snag's longevity, include a layer of gravel 15 cm deep in the post-hole, below the post as a drainage layer, reducing decay at the base of the post/tree, and mound the earth slightly around the installed snag at grade to encourage runoff to flow away from the post to reduce moisture retention against the post.
- Include boulders at grade to provide extra ballast, or support for the snag where appropriate.
- Locate snags and perching trees away from trails to be consistent with municipal hazard tree guidelines.

4.1.7 Instream Habitat

Works in or near water should consider opportunities for creating habitat heterogeneity for fish and other aquatic wildlife consistent with what is present in the referenced reach. To support fish and aquatic habitat:

- Provide cover, lunkers, vegetative overhangs such as large woody objects (e.g., logs, root wads, etc.) or boulders. Streambank vegetation plantings contribute to habitat for aquatic organisms and provide allochthonous materials to the stream.

- Coordinate design with the fluvial geomorphologist to ensure the features do not negatively affect the form and function of the stream.

Example of habitat structure on the edge of a wetland.

Example of a rock pile in a constructed wetland.

5.0 Submission and Drawings

Once the landscaping and rehabilitation plan is complete and ready for submission, a copy of the Landscaping Checklist must be completed and signed by the qualified professional to be considered a complete submission. While not all the information below is applicable to all projects, applications must include the information in the General Section to ensure a timely review and reduce the number of resubmissions.

Table 5-1: Drawing Requirements

1st Submission
☐ All planting plans are completed, stamped and signed by a qualified professional if applicable.
☐ Key map, written and graphic scale, north arrow, project name and location, name and contact information for applicant/owner and qualified professional are shown on the plan.
☐ Property boundary and NPCA regulated areas are shown clearly on all drawings.
☐ A reference to project goals and site condition/context on drawings is included.
☐ All features shown on landscaping drawings are consistent with other works (e.g., location of ESC, tree protection fencing, location of proposed structures, etc.).
☐ All sensitive timing windows are noted where appropriate on drawings.
☐ Areas of retention and/or species to be protected are shown on all drawings (e.g., vegetation protection and/or erosion and sediment control measures)
☐ Extent of disturbance is shown on drawings.
☐ Location of infrastructure (above and underground) that may affect the proposed landscaping plans (e.g., utility lines, snow storage, etc.) is shown on drawings.
☐ Summary table providing the calculations in square metres for the total plantable area for the areas to be vegetated (excluding any infrastructure such as trails), and total number of trees and shrubs and seed mix in each submission.
☐ Details as outlined in the General and Project Specific standards are included.
☐ Digital and if necessary, hardcopy drawings folded to a standard letter size (8 1/2" x11").
Additional Submissions
☐ A cover letter outlining the changes to the revised landscaping plan and highlighting the changes on the plans directly.
Upon Completion of Works
☐ A certified letter from the qualified professional confirming that plans have been implemented as per the approved plans. ☐ Discrepancies between the proposed and as-built plans and the rationale for these are included in the certified letter. Remediation may be required where the difference is substantial.
Submission Prepared by:
Date:

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Toronto and Region Conservation Authority (TRCA) 2019. **Erosion & Sediment Control Guide for Urban Construction**. Available online: https://s3-ca-central-1.amazonaws.com/trcaca/app/uploads/2020/01/30145157/ESC-Guide-for-Urban-Construction_FINAL.pdf.

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7.0 Glossary of Terms

Terms	Definitions
Allelopathic	A chemical emitted from certain plants that reduces some plant's ability to grow optimally. Example of allelopathic plants are: Black Walnut, *Juglans nigra*, Sumac, *Rhus Typhina* and goldenrods *Solidago spp.*
Allochthonous	An input into a system of an organic nature such as woody materials or aquatic invertebrates.
Ball and Burlap	The intact ball of earth containing the roots of nursery stock that has been hand dug, balled and wrapped in burlap.
Bareroot	The root system of nursery stock without a ball of earth.
Bioengineering	Soil bioengineering is an established method of stabilizing or protecting erodible soils using dormant cuttings of hardy, native plant material. Structures provide immediate mechanical stability while a vigorous root matrix is established within the soil. As the stabilization is provided by living vegetation, reinforcement provided grows stronger and more effective over time.
Caliper	The above ground diameter of a distinct part of a nursery stock stem, measures in accordance with the Canadian Standards for Nursery Stock. The NPCA considers deciduous trees with a diameter of 4 cm or greater and a conifer with a height of 150 cm or greater as caliper stock. Generally supplied in 7 gallon or larger containers.
Coefficient of wetness	A measure of the tolerance of a plant species to soil moisture conditions. It is a value on a scale from -5 to +5 that represents the soil moisture regime for the plant species.
Companion planting	A nodal planting made up of an assortment of species that mutually benefits each other. The shade intolerant species are located on the outside of the node to maximize on sunlight and provide a barrier to shade intolerant located in the middle of the node.
Crown	Part of the plant directly above where the branching begins.
Cultivar	A variety of a plant developed from a natural species and maintained under cultivation.
Diameter at Breast Height (DBH)	Standard measurement to establish the diameter of a tree. The diameter at breast height (DBH) is measured at 137 cm above the ground.
Dripline	The edge of the tree canopy.
Ecological Land Classification	The Ontario Ministry of Natural Resources and Forestry (MNRF) system that classifies ecological units based on bedrock, climate (temperature, precipitation), physiography (soils, slope, aspect) and corresponding vegetation.
Fascine	A long bundle of overlapping live shrub cuttings held together by twine.
Free-to-Grow	A self-sustaining state of a plant that no longer requires maintenance and is generally free of vegetative competition. To achieve a free-to-grow state, the landscape plans should indicate growth measures such as the target size of caliper, root collar measurement, height of the plant, crown or other targets for determining when maintenance is no longer required.
Forb	A non-woody flowering plant. Also referred to as an herbaceous plant.

Graminoid	A grass like plant often referring to the *Poaceae* (grasses), *Cyperaceae* (sedges) and *Juncacea* (rushes) families.
Herbaceous	An adjective representing herb like plants. More generally, herbaceous plants are non-woody flowering plants. Also referred to as a forb.
Landscaping and Rehabilitation Plan	Proposed planting plan. Throughout this document, the term landscaping and rehabilitation plans refers to all restoration, reforestation and enhancement planting plans.
Live Stake	Cuttings from live, rootable woody species.
Locally Common Species	A plant species observed in over 15 natural areas in the respective NAIs.
Locally Native	A species identified in the Natural Area Inventory as naturally occurring within a specified jurisdiction (e.g., Niagara Peninsula Watershed).
Locally Rare Species	A species considered rare at a local (e.g., local or regional municipality) level.
Regionally Uncommon Species	A plant species listed as Regionally Uncommon in the NAI.
Native	Indigenous to a region, having evolved there as part of an ecosystem over a long period.
Natural Feature	Features and areas, including wetlands, coastal wetlands, watercourses, valleys, which are important for their biodiversity/biological/ecological, environmental and social values as a legacy of the natural landscapes of an area.
Naturalized	Non-native species which are established in a region and able to reproduce successfully and live alongside native species in the wild. Naturalized species may be introduced intentionally or unintentionally.
Non-Native	A species that does not originate from a specified jurisdiction (e.g. Niagara Region). Sometimes described as 'Introduced'.
Nurse Crops	Fast growing annual groundcover species that establish within one growing season and provide stabilization. Typically, short lived.
Plant Type	Refers to trees, shrubs, forbs, vines, ferns and graminoids.
Plugs	A cylinder of soil in which a plant is grown, generally used for seedlings and rooted cuttings.
Potted	Plants with an intact soil ball and placed in a container, in lieu of burlap.
Regionally Rare Species	Species listed as Regionally Rare in the NAI
Provincially Rare Species	A species with a subnational (provincial) rank of S1 to S3.
Qualified Professional	A person with specific qualifications, training, and experience authorized to undertake work in accordance with the policies in accepted arboriculture, forestry, landscape architecture, ecology or scientific principles, provincial standards, criteria and guidelines, and/or to the satisfaction of the Niagara Peninsula Conservation Authority.
Sapling	A young tree without branches; in some species and grades spurs may be present. Also referred to as a whip.
Seedling	A cylinder of soil in which a plant is grown. Also referred to a plug.
Self-Sustaining Vegetation	Vegetation dominated by plants that can grow and persist without direct human management, protection or tending.

Shear Stress	The force applied to the stream bank from the flowing water, which can cause the movement of soil particles.
Shoot	A bud, young leaf, or other new growth on a plant.
Sod Block/Mat	A mat of existing vegetation that is removed from a site prior to works and stored to be used in the rehabilitation of the site post construction.
Species at Risk	A species that has been designated by either the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or the Committee on the Status of Species at Risk in Ontario (COSSARO) and the Ontario Ministry of Natural Resources and Forestry as being Extinct, Extirpated, Endangered, Threatened or Special Concern.
Stormwater Management	The control of rainfall, snowmelt and runoff from activities such as watering lawns, washing cars and draining pools, that seeps into the ground or runs off the land into storm sewers, watercourses and lakes.
Stormwater Management Facility	The entire stormwater management area including the pond, the outlet and accessory areas.
Stormwater Management Pond	Dry pond - A detention basin designed to temporarily store collected stormwater runoff and release it at a controlled rate through an outlet. Dry ponds may have a deep pool of water in the sediment forebay to reduce scour and re-suspension of sediment, but do not have a permanent pool of water in the main basin. This means that there is no opportunity for settling of contaminants between storm events and dilution of stormwater contaminants during storms. Wet pond - A detention basin designed to temporarily store collected stormwater runoff and release it at a controlled rate. It is different from a dry pond in that it maintains a permanent pool of water between storm events which provides quality control.
Submergent	Rooted hydrophytes with leaves entirely under the water surface.
Topsoil	Upper, outermost layer of soil, with the most organic matter and nutrients.
Watershed	All land and water within the confines of a drainage basin.
Whip	A young tree without branches. Also referred to as a sapling.
Woodland	Forested, treed, and woodlot areas, including cultural Vegetation Types as defined by the Ecological Land Classification system or the *Forestry Act.*

Appendix 1: Best Practices, Helpful Tips and Other Considerations

This appendix provides more direction on approaches that can be taken to ensure a project's success and reduce submissions. This advice represents best management practices and evidence-based successful approaches adopted in the NPCA's watershed. The sections are organized by the subsections of the General Standards.

Before drawings are drafted, review all higher-level policies, studies and plans that pertain to the proposed development. These high-level policies, studies and plans may identify goals that should be achieved through landscaping or rehabilitation works. They may also provide direction on the expected outcome of landscaping and rehabilitation works.

When an ecological and/or hydrological study has not been completed, identify and account for the form and function of natural features in the landscaping plans. In all cases, ensure consistency between the landscaping plans and other drawings (e.g., erosion and sediment control, site plan, etc.).

Guideline Outline

This document is divided into five sections:

A. **Design Considerations** – Lists factors to consider when preparing a Landscaping and Rehabilitation Plan.
B. **Edge Management Plan** – Describes a specific landscaping or rehabilitation plan for works along the edge of a regulated area.
C. **Topsoil** – Outlines additional tips for ensuring the quality of topsoil.
D. **Planting Considerations** – Lists several considerations for plant selection and planting approaches.
E. **Wildlife** – Considerations for wildlife in Landscaping and Rehabilitation Plans.

A. Design Considerations

Several factors could affect the landscaping and rehabilitation plans. While these factors do not all need to be provided on a plan, except for the ARL, the list below outlines most factors to be considered during the preparation of plans such as the site context, existing site condition, the timing of the proposed plantings and the planting plan's coordination with the development application. This list is not comprehensive but provides a starting point for typical considerations in plan preparation.

Site Context

- NPCA's Approximate Regulated Limit - where applicable and as defined by the regional or municipal official plan or higher planning document.
- Existing Challenges - light, noise, particulates, road salt, etc.

Site Condition

- Vegetation - existing and surrounding vegetation, species tolerances, invasive species and plants that host pests, potential for plant salvage and/or seed harvest.
- Wildlife - sensitive timing windows, colonization potential, wildlife exclusion measures, wildlife encounter protocols, etc.
- Soils and Physiography - soil composition, depth, quality, drainage, slope and aspect, wetness/dryness of site, existing erosion.
- Hydrology - fluvial geomorphology, floodplain, meander belt, low water and high-water mark, potential groundwater interactions.
- Elements - prevalent wind patterns, shade/part-shade from adjacent trees or buildings, landforms or structures, micro-climate.
- Structures - existing infrastructure and utilities located above and below ground, historic land uses that may be in or adjacent to proposed works.

Timing

- Season, duration, and phasing of proposed works.
- Native species stock availability.

Design Conditions

- Extent of proposed development and how it may impact site conditions (e.g., soil compaction, stockpiling, road salt, wind tunnels, etc.).
- Stabilization requirements.
- Grading.
- Altered hydrology, potential wetness/dryness of site.
- Post-construction or post-development use.
- Adjacent sites.
- Suitability of project for low impact development (LID).

B. Edge Management Plan

An Edge Management Plan may be recommended as part of a site-specific environmental impact study/assessment where tree, shrub or vegetation clearing/disturbance involves the existing edge of a regulated natural feature (e.g., wetland, valley). This Plan typically consists of plantings to restore functions and protect the feature from adjacent disturbances. Impacts from such disturbance can include changes to light penetration, increased air movement and associated drying effects, loss of trees/shrubs and groundcover, introduction of exotic or invasive species, decreased biodiversity, alterations of habitat form and function, overall loss of resilience, etc.

C. Topsoil

Proper topsoil application and management is key to pollution prevention, sedimentation and reducing the ecological footprint. In many instances, the quality and quantity of topsoil at the site pre and post development is unknown and consequently will affect the survivability of the plants. Determining the appropriate amount and types of amendments by completing a soil test and sourcing amendments from renewable resources are two examples of topsoil best management practices.

Soil Tests

Excessive application of soil amendments may negatively result in nutrient loading and potentially leaching into nearby waterways. Prior to completing any works, determine if the existing topsoil is salvageable and/or requires amendments by completing a soil test. Should soil amendments be deemed necessary, the NPCA recommends sourcing soil amendments from sustainable practices such as incorporating leaf mulch, or compost from municipal compost systems that meet Category AA or A of the MECP Ontario Compost Standard Quality.

Peat Moss

Avoid using peat moss as it is a non-renewable resource. Its harvest damages the wetlands it is removed from, making its use unsustainable. Where organic content of soil needs to be amended, alternatives can include coir mulch, compost, fine-textured wood mulch or leaf mulch, which may be available from municipal leaf-collection programs.

D. Planting Considerations

Listed below are various considerations for ensuring appropriate naturalization techniques are adopted.

Establishing Long-term Native Cover

When creating a seed mix, consider including seeds that will germinate immediately the following growing season (nurse crop) and in three to five years. Keep in mind that some native seeds are hard to grow and may not bloom within the two-year warranty and monitoring period. For example, Impatiens sp. seeds undergo a double dormancy and may not grow until two to three years after seeding.

Ground Cover Seed Distribution

Consider the distribution method for seed application. Some native seeds may get caught or not germinate in the hydroseeding slurry. Pair the size of seed and medium (tackifier and mulch) appropriately or use an alternative method (e.g., drill seeding, Terraseeding, or broadcast spreading). Specify on the plans:

- Equipment will be seed free prior to starting a new project.
- Seeds to be hand-broadcast on the surface and ensure seed to soil contact for a small site.
- Fluffy seeds are sowed separately.
- Seed grasses with complete awns as it increases germination and buries itself.

Naturalization with Local Species

The NPCA promotes naturalization of regulated areas by using locally native and representative vegetation.

Seed and stock collected from within the NPCA's seed zone (Zone 37) are ideal for use, as they contain genetic traits that have evolved through long-term adaptation by the species to local micro-climates and other conditions.

Pests

Consideration should be given to the increasing threat of pests on our native flora. The NPCA recommends planting a diversity of species when developing a landscape plan to ensure the site is more resilient to future pests. For more information consult the Canadian Food Inspection Agency and the Tree, Insects and Diseases of Canada from Natural Resources Canada to determine native alternatives that are not host species to various pests.

Seed/Sod Mat/ Soil Salvage

Prior to construction, collect any suitable native seeds, sod mats or soil present. When development projects will take several years to complete, harvest and store local seed for post-construction rehabilitation. Depending on the extent of disturbance, the seeds harvested from these areas will likely be suitable for the

conditions of the area once works are complete. Exercise care when stratifying seeds to maintain viability during the storage period.

Timing

Summer plantings are inevitable. Caution should be used when planting during the typical high temperature summer months due to drought conditions. Survivability during non-optimal planting periods include:

- Keeping planting stock out of the sun,
- Planting prior to or after peak sun periods, and
- Increasing the frequency of watering

The appropriate time of sowing nurse crop depends on the species and its hardiness to frost. Confirmation of the appropriate nurse crops should be provided once the timing of works has been determined.

Trees and Shrubs Planting Notes

Additional direction in the planting notes or detail can help ensure that the plantings get installed correctly and survive. Consider the following advice when composing the landscaping notes:

- Loosen the roots of rootbound individuals and splay immediately before planting for caliper and potted stock. Rootbound plants may need their roots pruned. If roots need to be pruned, use only sharp tools to ensure a clean cut. Pruned ends should face obliquely downwards.
- Scarify the sides of the planting hole, when planting in clay or compacted soils, to loosen soil and allow for ease of root growth.
- Plant on firm subsoil, no deeper than the depth of the rootball.
- Plant trees at ground level, not mounded or depressed. Plant shrubs slightly above grade by no more than 2.5 cm.
- Loosen soil within the planting hole to encourage ease of root growth. Remove substantial rocks and large stones. No air pockets should be present during backfill.
- Stake and tie all caliper trees to prevent uprooting in high wind conditions. Ties should consist of tree ties, or galvanized wire in conjunction with protective material at the point of contact with the tree trunk. Ties should hold the tree firmly in place while being loose enough to allow some gentle swaying of the trunk and should not come into contact with branches.
- Specify staking and tie installation and removal.

- Apply mulch in a donut formation around tree trunk at 7.5 - 10 cm in depth approximately to the drip line of the tree. Allow soil to be exposed at the base of the tree, to prevent moisture from being trapped against the trunk.

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NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX L

CHANNEL MODIFICATION CHECKLIST AND SUBMISSION REQUIREMENTS 2022

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

www.npca.ca

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1.0 Introduction

Prior to proceeding with a proposed alteration to a watercourse (i.e. channel realignment), a permit must be obtained as these works are regulated under Ontario Regulation 155/06. The following outlines submission requirements in support of a permit to be obtained at the detailed design stage. Submissions at other planning stages should demonstrate that the following objectives can be met.

**Note: The NPCA recognizes Natural Channel Design (NCD) is an approach to watercourse restoration and realignment which attempts to reconstruct channels to emulate the natural physical form of the river or stream that would be appropriate for that location. The result should be a channel that is in balance with the natural process of erosion and deposition in the watercourse so that the ecological functions of the watercourse, which depend on these processes, can be maintained or restored. In the near future, NPCA anticipates undertaking more fulsome work to develop a Natural Channel Design document. ** It is recommended that the creation of a Natural Channel Design document includes an assessment and review, perhaps by a consultant (e.g., similar to what was completed for the Buffer Width Discussion paper).*

2.0 Objectives

1. Preserve and enhance the physical and ecological function of the watercourse and the natural system.
2. Ensure no adverse impacts on the watercourse upstream or downstream of the proposed alteration.
3. Ensure no increase in upstream and downstream flooding.
4. Ensure no decrease in riparian/floodplain storage.
5. Preserve and/or restore natural vegetation such as trees and shrubs to the maximum possible extent.
6. Implement adequate erosion and sediment control (in-stream and off-stream) during and after construction.
7. Protect sensitive species during and after construction, including critical life processes.
8. Ensure no net loss of the productive capacity of the watercourse for fisheries.

3.0 Submission Requirements

The following is a list of the detailed documentation, calculations and plans that the proponent must provide in support of the permit application. It is recommended that a pre-application meeting take place between the proponent and NPCA staff to identify pertinent issues and study requirements. The level of detail required for the submission may be adjusted at this point to reflect the level of project complexity. This meeting may

provide an opportunity for NPCA staff to provide the proponent with available data for the study area. Channel modification plans must be prepared by a professional engineer with final documents stamped and signed.

3.1 Design Brief / Report

A design brief is required, either separately or as part of another reporting requirement (e.g., Storm Water Management Design Brief, Fisheries Act documentation). Typical components that comprise a Design Brief report are provided below. Calculations and field data, if applicable, should be included in appendices. Previous correspondence should be noted and if possible, meeting minutes attached. For re-submissions, provide a table that outlines previous comments and how they have been satisfied and where in the report and/or plans the issues have been addressed. This will facilitate a faster review.

a. Introduction
    i. Background Information (e.g., proponent, location)
    ii. Project Description (including rationale for proposed modification)

b. Existing Conditions
    i. Fluvial Geomorphology
        - Channel Morphology
        - Substrate Characterization
        - Hydrology and Sediment Regime (including baseflow)
        - Channel Stability
        - Upstream and Downstream Conditions
        - Historical Channel Condition and Change
    ii. Terrestrial Resources
        - Vegetation Assessment (ELC mapping and location of species of concern)
        - A tree inventory will be required where the project is in or adjacent to a wooded area, or where there are a number of mature trees present
    iii. Fisheries (see Fisheries Act submission requirements if applicable)
        - Aquatic Habitat Assessment
        - Fisheries Community Inventory

c. Proposed Watercourse Alteration
    i. Geomorphic Basis for Design
    ii. Proposed Channel Morphology (plan form, cross-section, bed profile)
    iii. Proposed Substrate (provide calculations to support size)

iv. Bank Stabilization
v. Erosion Protection (if applicable)
vi. Connection to Existing Channel
vii. Hydraulic Analysis
- Flood Elevations (existing vs. proposed - 2 year to Regional)
- Riparian Storage (existing vs. proposed - to Regional Flood elevation)
- Baseflow Estimates
- Velocity Calculations

d. Environmental Preservation and Mitigation
i. Terrestrial Resources
- Preservation and Removal of Vegetation (including timing)
- Restoration Plan
- Access Routes
- Working and Staging Areas

ii. Fisheries (see also Fisheries Act submission requirements if applicable)
- Timing Windows
- Fish Passage (assess expected velocities and potential for various species to pass)
- Substrate
- Morphologic Diversity
- Riparian Cover Restoration Plan
- Fish Rescue Plan
- Compensation Measures (if applicable)
- Monitoring Plan

e. Erosion and Sediment Control Guide for Urban Construction (see also Erosion and Sediment Control Guide for Urban Construction, TRCA 2019)
i. Construction Timing and Phasing Plans
ii. In-Stream Construction Practices
- By-Pass or Diversion Method(s)
- Dewatering

iii. Erosion Control
- Topsoil and Materials Stockpile Locations and Stabilization
- Stabilization of Disturbed Areas (following construction)

iv. Sediment Control

- Perimeter Controls
- Settling Controls

f. Filtration Controls
   i. In-Stream Controls
   ii. Inspection and Maintenance Requirements

3.2 Figures

The following is a list of figures and their associated requirements for an alteration to a watercourse permit submission:

Figure	Description/Requirements
Context Plan	Site Location
	Location of the watercourse (and any required re-alignment)
	Regional Flood and Fill Lines
Design Drawings	Layout/configuration of the channel in plan and profile (including existing alignment and profile) and typical cross-sections
	Identification of low-flow channel and bankfull channel
	Details on in-water works, if required, including 'working in the dry', dewater of work area, fish rescue plan and fisheries timing window
	Details of Compensation Features and fisheries mitigation, if required
	Details on erosion protection works in support of all proposed treatment types
Tree Removal/Preservation Plan	Identification of vegetation type within work area, location of trees to be removed and preserved, protection measures for remaining stand
Landscape/Restoration Plan	Detailed plan identifying species (including scientific names) and quantities for trees, shrubs and seed mixes, and location, size and condition of plant material (See also TRCA Post-Construction Restoration Guidelines)
	Details on erosion control and/or bioengineering treatment type
Hydraulic Analysis Plan	Location plan of all model cross-sections used in the analysis (i.e., if new sections are required over and above the existing conditions model)
	Existing and proposed Regional and 100-year floodlines
Erosion and Sediment Control Plans	Location of control techniques, i.e., silt fences
	Detail drawings for control techniques
	Notes on maintenance of control techniques
	Notes on construction procedure and/or phasing including timing
	Construction access

Note: *All design briefs, drawings and supported hydraulic calculations are to be submitted, stamped, and signed by a professional engineer. All geomorphic analyses and channel realignment designs are to be completed by a professional engineer or professional geoscientist qualified to practise fluvial geomorphology.*

4.0 References

Toronto and Region Conservation Authority (2019) Erosion and Sediment Control Guide for Urban Construction. https://sustainabletechnologies.ca/app/uploads/2020/01/ESC-Guide-for-Urban-Construction_FINAL.pdf.

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NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX M

DRAFT NPCA BEST PRACTICES FOR PRESERVING AND RESTORING SOIL HEALTH

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

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1.0 Purpose

This document provides guidelines and recommendations to protect, preserve, and restore healthy soils in areas impacted by development or site alteration within or directly adjacent to natural and restored features. It sets minimum standards for soil health and quantity to ensure suitable growing conditions for vegetation. By providing healthy soils within restoration areas there is greater success and less need for maintenance or replacement of plant material.

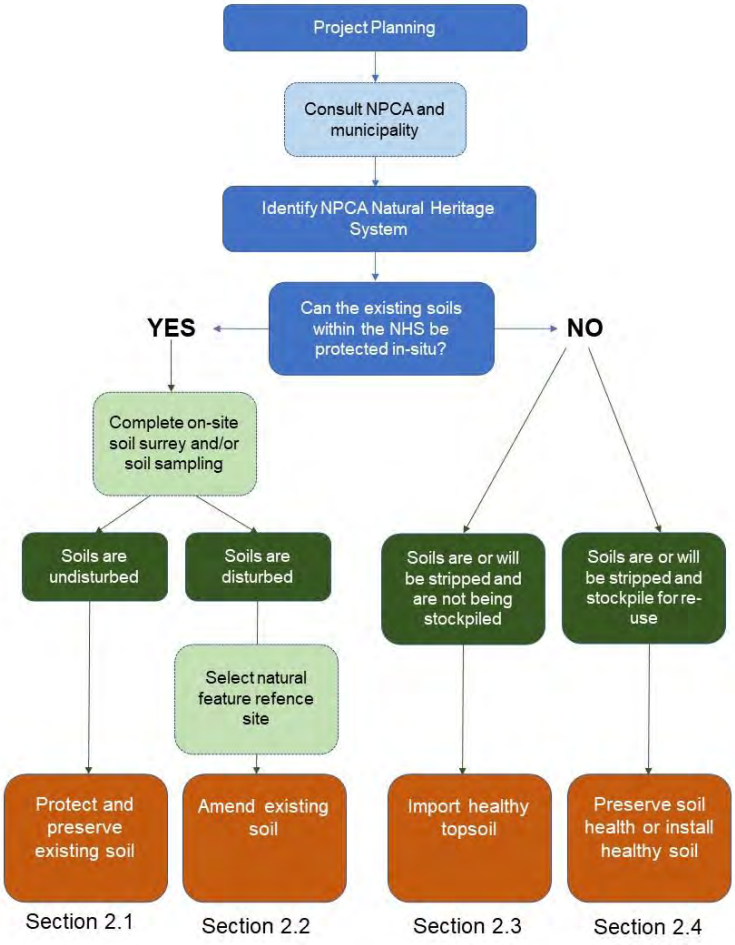
This guideline does not act as a blueprint for all projects. Proper consultation with all involved agencies is still recommended. It is intended that the recommendations contained in this guideline will be reflected in environmental impact studies/environmental assessments, detailed construction drawings and project specifications. Incorporating these recommendations within a project proposal will result in fewer revisions and a more timely review.

This guideline is not intended to address or replace soil management recommendations on contaminated sites or sites requiring further study/action under the Ontario Environmental Protection Act.

2.0 Soil Management Recommendations

Consultation with NPCA is important at the initial phases of a project in order to identify the affected portions of the natural hazard land. Appropriate actions can then be taken to preserve, protect and restore sensitive features and adjacent lands throughout subsequent phases. The flow chart shown in Figure 1 can then be used to determine which soil management recommendations may apply to a project based on the existing and proposed conditions on a project site. Multiple soil management recommendations may apply to any particular project.

Figure 1: Decision matrix for determining soil management recommendations



Recommendations are based on an on-site soil survey which allows a proponent to determine whether existing soils within the natural hazard lands are disturbed or undisturbed and whether amendments are necessary. An on-site soil survey should involve the following:

- Test pits in each target area of the natural hazard land to determine the presence of soil, depth of soil horizons, and texture of soil horizons.
- Visual inspection for signs of compaction and/or contamination (current or presumed)
- Visual inspection to determine vegetation growth and health (from a qualified person such as a biologist or ecologist).
- Searches of historic land use changes on the site to determine the potential for contamination and disturbance.

Where the on-site soil survey indicates or confirms the possibility of disturbance within the natural hazard land, soil testing – on-site and/or laboratory analysis – may be required to confirm existing soil parameters: compaction, organic matter content, pH, and depth. Acceptable ranges/values for each parameter are listed in Table 2 of Appendix A. Soils outside of the range/value for a parameter may be classified as disturbed. Table 2 was developed through a review of best practices in the field of soil health. If laboratory testing is required, soil samples must be sent to an accredited soil testing laboratory (see Appendix A). Existing soil should be tested via multiple samples taken at evenly distributed locations throughout the target area (i.e., Hazard Land). A minimum of five measurements per hectare is recommended. If the area is smaller than 1 ha, a minimum of five samples should be taken.

Condition of Soil:	Existing topsoil and subsoil undisturbed
Management Option:	Protect and preserve existing soil
Applicable to:	Existing natural hazard land features, existing buffers to features, proposed restoration areas

2.1 Protect and Preserve Existing Soil

General Recommendations:

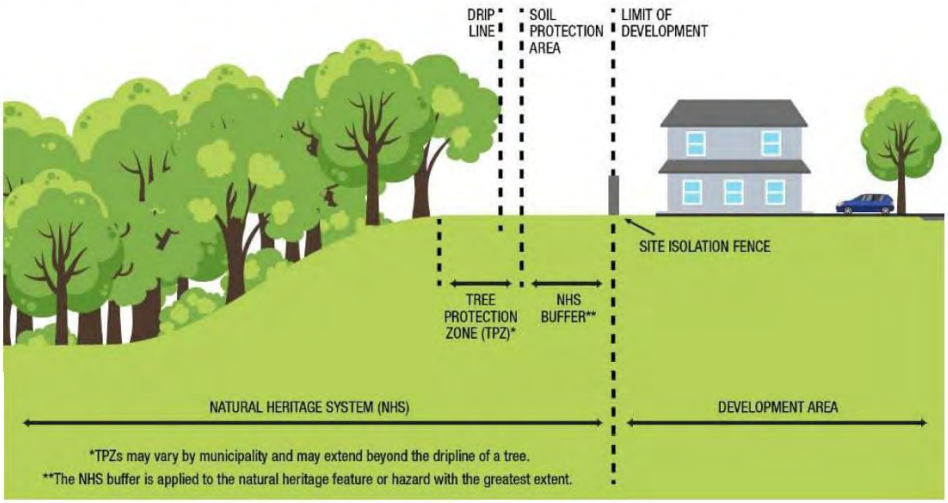
1. After verifying the soils are undisturbed, a soil protection area should be delineated with isolation fencing. This can be coordinated with other required fencing as set out by the NPCA such as tree hoarding, erosion and sediment control or other barrier fencing to provide design efficiencies. Fencing, as depicted in Figure 2, must encompass the area at the greatest limit of:

a) the ecological buffer to any recognized natural hazard land as delineated and prescribed by the Conservation Authority or other agency (e.g. woodland dripline, wildlife habitat, top of bank, top of slope, etc.); or

b) the tree protection zone which may be outlined by municipal tree protection standards (where they exist).

Figure 2: Limit of Site Isolation Fencing

Figure 2: Limit of Site Isolation Fencing



2. Within the soil protection area, traffic, parking, stockpiling, staging and material storage are not permitted.

3. Ensure fencing is coordinated among site plan, grading plans, erosion/sediment control plans and restoration plans.

4. Fencing should be informed by/comply with Erosion and Sediment Control and/or tree protection guidelines as set out by NPCA.

5. Areas within the soil protection area that are bare at the time of project initiation should be seeded with an appropriate seed mix for the site conditions to discourage non-native plant establishment, promote ecological function and prevent soil loss. See Seed Mix Guidelines: Seed-Mix-Guidelines-Update_January-19-2022.pdf (trcaca.s3.ca-central-1.amazonaws.com).

6. If work has been prescribed within the soil protection area that would impact existing vegetation (e.g., invasive species removal), a mitigation plan is recommended and further consultation with NPCA is advised. Examples of mitigation considerations include appropriate timing of work to minimize compaction, using no or low-pressure machinery, using soil mats or mulch to reduce compaction, etc.

Condition of Soil:	Existing topsoil and subsoil undisturbed
Management Option:	Amend existing soil
Applicable to:	Existing buffers to features, proposed restoration areas

2.2 Amend Existing Soil

Process Recommendations:

1. The results of the on-site soil survey and/or laboratory testing should be evaluated against acceptable ranges for soil health parameters indicated in Table 2 of Appendix A. This will determine if amendments are necessary prior to landscaping and restoration work.

2. Disturbed sites should also be evaluated against a natural feature reference site to determine if the existing depth of topsoil is sufficient to promote the long-term growth and establishment of the target ecological community. The selection of a natural feature reference site should be done in consultation with NPCA and the local municipality.

3. For topsoil depth deficiencies: Where deficiencies are identified, a plan must be developed in concert with NPCA and the local municipality to achieve the target. The recommended depth will vary depending on the natural feature reference site and target ecological community.

4. For compaction and organic matter deficiencies, incorporate compost amendments in one of the following ways (see Figure 3):

a) Where existing topsoil is compacted or deficient in organic matter:

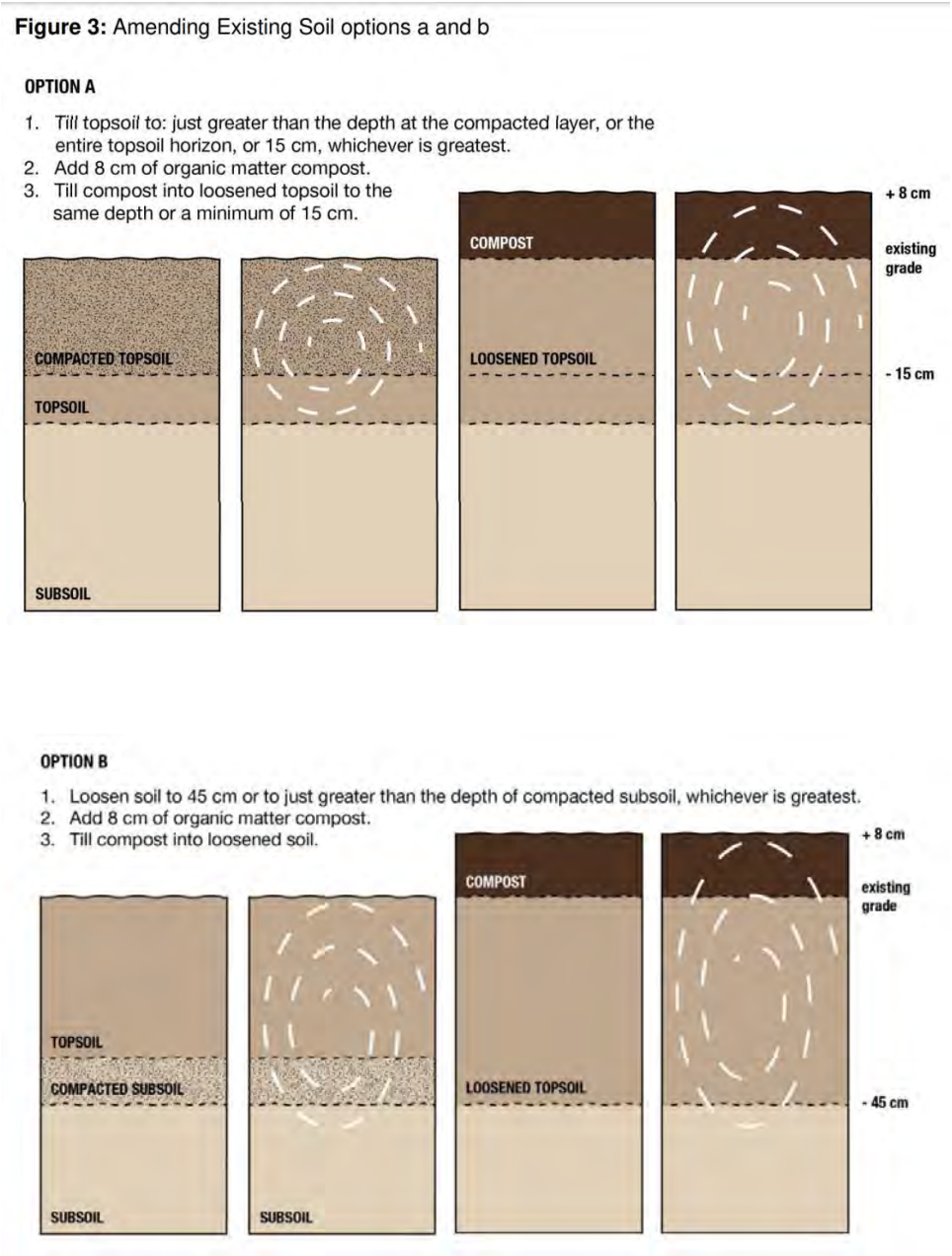
- Amend at a default rate: Till the topsoil to just greater than the depth of the compacted area, or the entire topsoil horizon, or 15 cm, whichever is greatest. Spread 8 cm of organic matter compost on the surface of the tilled soil and till the compost into the loosened soil to the same depth if possible, or a minimum of 15 cm. This option may be pursued if a proponent decides to forgo detailed soil analysis/testing.
- Alternatively, amend via a custom calculated rate based on the results of soil testing to determine the depth and quantity of organic matter compost amendments needed to make a final topsoil that meets the thresholds for organic matter content and compaction in Table 2 of Appendix A.

b) Where topsoil is present (and not being stripped) but deficient in organic matter and subsoil is compacted (e.g., former agricultural fields):

- Loosen subsoil by deep tilling/subsoiling/ripping to a depth greater than the compacted subsoil depth indicated by soil sampling, or to a depth of 45 cm, whichever is greatest. Spread 8 cm of organic matter compost on the surface of the tilled soil and till the compost into the loosened soil.

- Alternatively, amend via a custom calculated rate based on the results of soil testing to determine the depth and quantity of organic matter compost needed to make a final topsoil that meets the thresholds for organic matter content and compaction in Table 2 of Appendix A

Figure 3: Amended Existing Soil Options A and B



5. For pH amendments: If pH amendments are specified in the soils analysis results, the project ecologist should review the existing soil pH against the intended restoration target and the suitability of the proposed plantings to determine if pH amendments are required for the target to be achieved. Results should be discussed with the NPCA.

6. Where topsoil is absent or has been stripped, see section 2.3 Import Healthy Topsoil.

General Recommendations:

7. Compost used for organic matter amendments must meet Ontario Compost Quality Standards (MOE, 2012). Use compost that meets category AA for amending site subsoil, or category AA or A for amending site topsoil. Compost should be obtained from a supplier certified by the Compost Council of Canada's Compost Quality Assurance (CQA) program and meet the CQA program requirements for use as a soil amendment (A&L Canada Laboratories, 2004). Consult local municipal by-laws as appropriate.

8. Organic matter used for amendments must not contain or be derived from sphagnum peat or contain uncomposted manure.

9. Soil can be loosened by deep tilling/subsoiling/ripping. This is only effective if done under dry conditions; it must not be done when soil is wet or frozen. Loosening should be timed to ensure subsequent traffic does not re-compact the soil.

10. Improving soil health and planting conditions includes amending the entire planting area, not only the immediate area around the plant material/roots.

11. In some situations tilling/subsoiling/ripping activities to amend the soil are not recommended, such as within tree protection zones or certain natural heritage features and ecological buffers. If plans are required for a project, they must clearly indicate areas where soil loosening activities will and will not occur. Please consult with NPCA and the local municipality.

12. Areas that have bare soil after loosening and amendment should be seeded with an appropriate cover crop and/or seed mix for the site and intended restoration target in order to discourage non-native plant establishment, promote ecological function and prevent soil loss.

See Seed Mix Guidelines: Seed-Mix-Guidelines-Update_January-19-2022.pdf (trcaca.s3.ca-central-1.amazonaws.com).

Condition of Soil:	Topsoil absent/stripped; subsoil present only
Management Option:	Import healthy soil
Applicable to:	Existing buffers to features, proposed restoration areas

2.3 Import Healthy Topsoil

Process Recommendations (see figure 4):

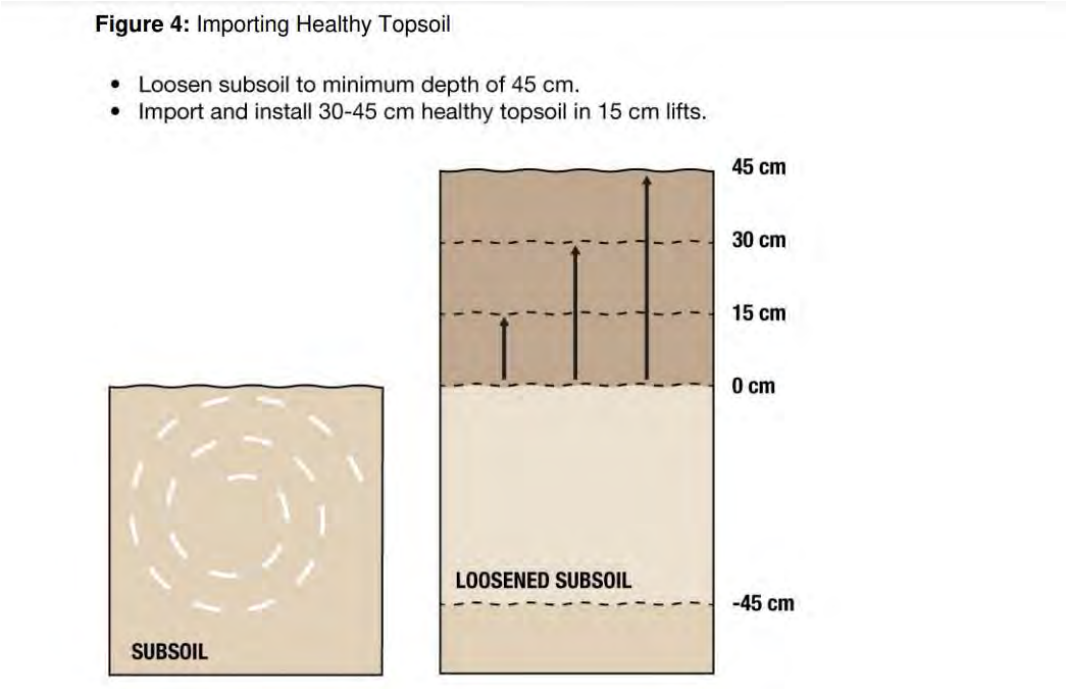
1. Prior to importing new topsoil, till and/or scarify the existing subsoil to address any compaction to a depth of 45cm.

2. Import new topsoil that meets the specifications in Table 2 of Appendix A. Imported topsoil must also meet any requirements/standards set out by the local municipality, where they exist.

3. Spread topsoil over the entire area to a settled depth of 30 – 45 cm for a final uncompacted soil depth of 75 – 90 cm.

4. It is recommended that topsoil be placed in lifts of 15 cm.

Figure 4: Healthy Topsoil



General Recommendations:

1. Use only low ground pressure machinery (e.g., rated to <4 PSI) to re-apply the topsoil or compost amendments in order to avoid additional compaction.

2. Reduce machinery traffic required to re-spread topsoil or compost amendments by defining access areas/pathways.

3. Loosening the soil can be affected by deep tilling/subsoiling/ripping. This is only effective if done under dry conditions; it must not be done when soil is wet or frozen. Loosening should be timed to ensure subsequent traffic does not re-compact the soil.

4. Ensure that topsoil has been wetted after machinery has ceased operation on the site. Topsoil must be allowed to settle for at least one week prior to verification tests.

5. Depth and compaction must be verified in the field at the completion of the works, prior to planting. Post-installation depths are best measured using soil pits. Post-installation soil compaction is best measured on-site using cone-penetrometer tests. A minimum of five sample locations per area should be tested to verify both depth and compaction.

6. In some situations, tilling/subsoiling/ripping activities to amend the soil are not recommended, such as within the dripline of a tree, tree protection zones associated with existing trees or certain natural heritage features and ecological buffers. If plans are required for a project, they must clearly indicate areas where soil loosening activities will and will not occur. Please consult with NPCA.

Condition of Soil:	Topsoil soil will be stockpiled
Management Option:	Preserve soil health
Applicable to:	Topsoil stockpiles, areas where stockpiled soil will be re-spread

2.4 Preserve Soil Health, Install Healthy Soil

Table 1 lists the best management practices that apply to soils that have been/will be stockpiled and ultimately will be used for restoration within the natural hazard land. Soil that is being stockpiled for other applications is outside the scope of this document.

Table 1: Management recommendations for stockpiled topsoil

Parameter	Recommendation
Selection of Soil Salvage Sites / Preventing Invasive Species Spread	1. Avoid salvaging soil for use in the natural hazard land from areas with high concentration of invasive species. 2. Machinery and equipment used in the salvage and/or re-spreading of soils that have also been previously used in invasive-species infested areas should be cleaned before use to minimize potential spread.
Height of Stockpiles	1. Less than 1.3 m for topsoil. 2. Design to maximize surface area to volume ratio of the stockpile to minimize impacts to soil microorganisms. 3. Stockpiles material should be dry
Separation of Layers	1.Soil horizons should be stripped in shallow layers. 2. Separate stockpiles should be created for: - Topsoil vs. subsoil. - Uppermost layer of topsoil (typically the most productive). - Soils with different textures (i.e.: sandy soils vs. clay soils) (see Figure 5a).
Erosion Control	Stockpile areas are to have appropriate erosion and sediment controls (as dictated by local municipal standards and NPCA requirements).
Stabilization	Soils that are stockpiled and not actively used for a period of time, should be stabilized with an appropriate treatment for the time of year, intended use and site activities. Options include stabilizing with an appropriate cover crop, or through the use of a mulch blanket or pervious geotextile.
Duration	Minimize duration of stockpiling to reduce potential for anoxic conditions. Topsoil should be stockpiled for no longer than one year. If longer, further discussion with NPCA is required to address the ecological function of soil.
Testing (pre- and post-installation)	1. Conduct a test of existing soil conditions to determine the depth and composition of topsoil and subsoil prior to stripping and stockpiling. This will affect how the stockpiling occurs.

	2. Evaluate the quality and quantity of stockpiled soil prior to respreading to ensure it meets the values in Table 2 of Appendix A. 3. Depth and compaction must be re-tested in the field at the completion of works, prior to planting. Post-installation depths are best measured using soil pits. Post-installation soil compaction is best measured on-site using cone-penetrometer tests. A minimum of five sample locations per area should be tested to verify both depth and compaction.
Rebuilding the Soil Profile (amending and installing stockpiled soil)	1. Prior to re-spreading stockpiled soil, mix individual stockpiles to inoculate interior layers with soil from the outermost levels. Do not mix soil from different stockpiles (see Figure 5b). 2. When re-spreading soil from multiple stockpiles, always use the same sequence of horizons to avoid burying surface layers with underlying material (see Figure 5b). 3. If stockpiled topsoil meets the specifications in Table 2 of Appendix A for organic matter: follow the recommendations in section 2.3 for installation. 4. If stockpiled topsoil does not meet the specifications in Table 2 of Appendix A for organic matter content: Loosen existing subsoil to a depth of 45 cm. Amend stockpiled topsoil with organic matter compost at a ratio of 3:1 and apply to the subsoil in lifts. Each lift can be composed of 4 cm compost and 12 cm of topsoil (see figure 5c). Incorporate the compost and topsoil through tilling to a depth of approximately 15 cm prior to adding an additional lift. Continue this process to produce a settled, amended topsoil depth of 30 – 45 cm and a total depth of uncompacted soil of 75 – 90 cm.

Figure 5a: Create separate stockpiles (max. 1.3 m high) for soils of different layers or textures.

Figure 5a: Create separate stockpiles (max. 1.3 m high) for soils of different layers or textures.

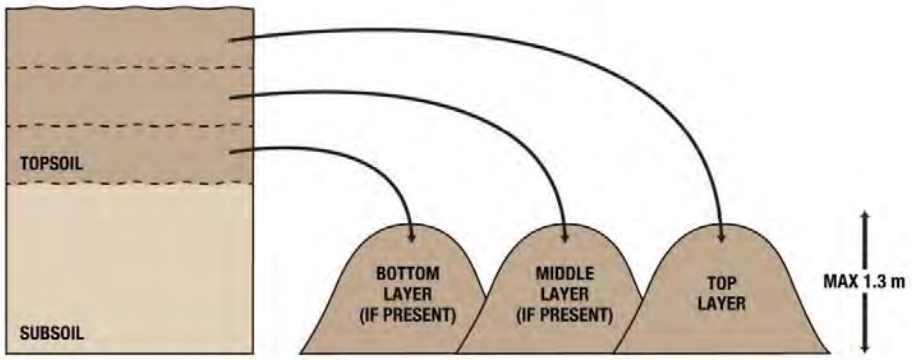


Figure 5b: Rebuild the soil profile (if topsoil is healthy).

Figure 5b: Rebuild the soil profile (if topsoil is healthy).

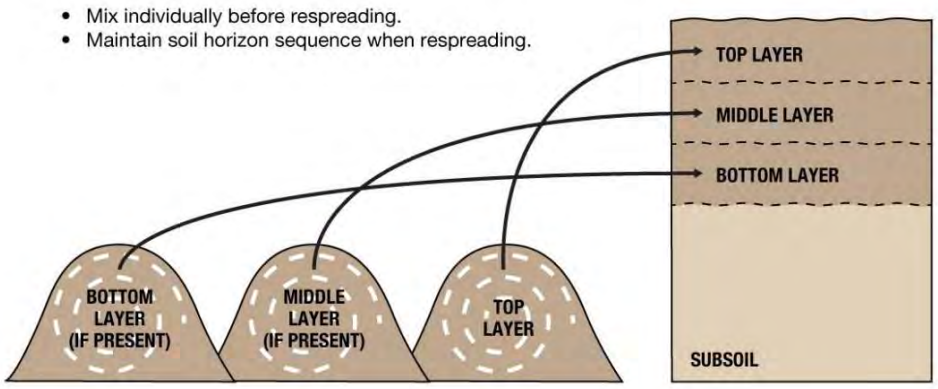
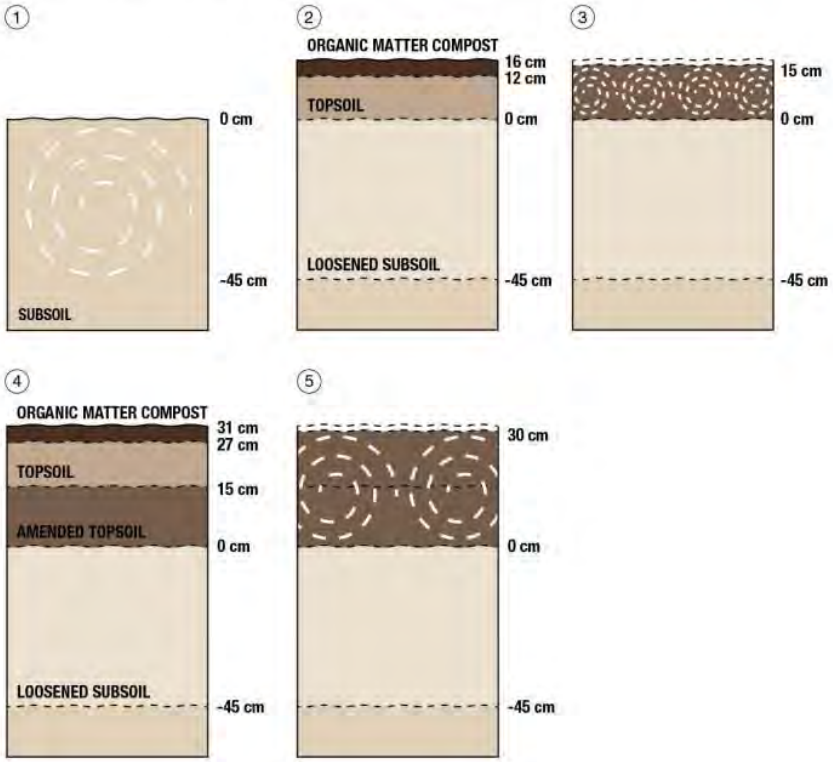


Figure 5c: Rebuild the soil profile when stockpiled soils are deficient in organic matter

Figure 5c: Rebuild the soil profile when stockpiled soils are deficient in organic matter.

1. Loosen soil to 45 cm.
2. Layer 12 cm of topsoil and 4 cm of organic matter compost.
3. Till compost and topsoil, settled to 15 cm.
4. Layer 12 cm of topsoil and 4 cm of organic matter compost.
5. Till compost and topsoil, settled depth of 30 cm.



3.0 Glossary

A horizon: Typically, the upper-most layer of mineral soil closest to the surface.

Buffer: means an area or band of permanent natural self-sustaining vegetation, located adjacent to a regulated feature and area and usually bordering lands that are subject to development or site alteration. The purpose of the buffer is to protect the features and areas and their ecological functions by mitigating impacts of the proposed development or site alteration.

Disturbed soils: Soils that do not meet the definitions of undisturbed or stripped.

Hazardous Lands: When applying the Conservation Authorities Act, hazardous land means land that could be unsafe for development because of naturally occurring processes associated with flooding, erosion, dynamic beaches or unstable soil or bedrock.

On-site soil survey: An investigation of existing soil conditions on a site to confirm soil presence, texture, depth, compaction, signs of contamination and any other parameter of concern.

Restoration Area: An area of land that will receive activities that initiate or accelerate the recovery of an ecosystem with respect to its health, integrity and sustainability (adapted from the Society for Ecological Restoration).

Soil protection area: An area in which the existing soil will be protected in-situ. Development and site alteration in this area is typically restricted in order to preserve soil health and physical properties.

Stockpiled soil: Soil that has been stripped/excavated from the original grade and stored (typically on-site) for later re-use.

Stripped soils: Soil where the A horizon (or more) has been stripped and relocated.

Subsoil: Soils lacking in organic matter and consequently not desired for growing medium, typically referred to as “B” horizon

Topsoil: Naturally produced and harvested soil from the A horizon or upper layers of a soil (O horizon).

Undisturbed soils: Soils where:

- the original A horizon is intact and has not been previously stripped, excessively compacted or otherwise contaminated;

- the A horizon is at least 15 cm deep and subsoil horizons with acceptable compaction, if the area has been previously farmed; and,
- existing vegetation growth is supported and in good health as determined by an ecological professional. Soils in existing forested areas are presumed to be undisturbed. If existing soil is functional but does not meet the acceptable range for depth or organic matter in Table 2 of Appendix A, consideration can be made for leaving it in place.

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Appendix A

The acceptable parameters for soil health are described in Table 2 for each type of soil condition referred to in this document. Information has been adopted and adapted from multiple sources representing local and international best practices for soil health. The table does not represent a full suite of physical, chemical and biological parameters that affect soil health. Specific circumstances may exist that warrant additional parameters than those in Table 2 to be assessed (e.g. contaminated sites) which is outside of the scope of this document.

If laboratory testing is required, testing is to be performed by an accredited commercial soil laboratory using accredited test methods. See http://www.omafra.gov.on.ca/english/crops/resource/soillabs.htm for a list of current accredited soil testing laboratories in Ontario.

Table 2: Acceptable Soil Health Parameters

Parameter	Undisturbed Soils	Disturbed Soils	Stripped Soils	Stockpiled Soils
Topsoil Depth	Retain existing topsoil depth.	Maintain/restore a topsoil depth comparable to a ***natural feature reference site***.	Re-spread 30 – 45 cm topsoil on top of 45cm scarified subsoil	Re-spread 30 – 45 cm topsoil on top of 45cm scarified subsoil
Organic matter content	As existing	10 – 13% by dry weight	10 – 13% by dry weight	10 – 13% by dry weight
Soil pH	As existing	6.0 – 7.5	6.0 – 7.5	6.0 – 7.5
Soil Texture	As existing	No range exists. Soil treatments to be tailored to existing or expected site conditions for the local area and target ecological community. To be designed by the ecological professional.		
Soil Compaction	Bulk Density or Penetration-Resistance tests are acceptable. **Bulk Density** can be calculated based on a soil core taken in the field and will vary based on soil texture which may not be consistent over a site. This test is most accurate when samples are handled			

Parameter	Undisturbed Soils	Disturbed Soils	Stripped Soils	Stockpiled Soils

with care to avoid agitation during transport.

Soil Texture	Ideal Bulk Densities for plant growth[2] (g/cm^3)
Sands, loamy sands	<1.60
Sandy loams, loams	<1.40
Sandy clay loams, clay loams	<1.40
Silts, silt loams	<1.40
Silt loams, silty clay loams	<1.40
Sandy clays, silty clays, clay loams	<1.10
Clays (>45% clay)	<1.10

Alternatively, compaction can be measured in-situ as a function of **penetration-resistance**.[3] Penetration-resistance is the preferred method of testing for compaction in soils that have been modified by loosening activities, and for verifying post-installation compaction for soils that have been stripped/stockpiled and re-spread.

Soil Texture	Surface Resistance PSI	Surface Resistance kg/cm2	Surface Resistance KPa
Sandy – loamy sand, sandy laom, sandy clay cloam and sandy clay	<=260	<=18.3	<=1793
Silty – loam, silty loam, silty clay loam, and silty clay	<=260	<=18.3	1793
Clay – clay loam	<=225	<=15.8	<=1551

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NPCA Planning and Permitting Procedural Manual (Oct.27, 2022) - APPENDIX N

DRAFT NPCA FIELD STAKING PROTOCOL 2022

FOR THE IMPLEMENATATION OF S. 28 OF THE CONSERVATION AUTHORITIES ACT AND O. REG. 155/06

Niagara Peninsula CONSERVATION

www.npca.ca

TABLE OF CONTENTS

1.0 Introduction

This Protocol describes NPCA's approach for field staking of NPCA regulatory limits. It also includes administrative procedures to be undertaken by the applicant and NPCA staff prior to and after the staking exercise.

Typically, staking takes place as part of the planning process (under the Planning Act) or the section 28 Conservation Authorities Act permitting process (NPCA's Ontario Regulation 155/06).

It is important to note that field staking is only part of the process for establishing the boundaries of the natural system and that the top of bank or features staked may not be the greatest constraint applicable to a site. The natural system is comprised of water resources, natural features and areas, natural hazards, and potential natural cover and/or buffers. Not all these components of the Natural System have boundaries that are staked through an on-site field exercise.

Natural features that are typically not staked include:

- Watercourses
- Headwater drainage features
- Fish habitat
- Wildlife habitat
- Dunes
- Karst
- Regulatory flood plain
- Buffers
- Long term stable top of bank
- Stable toe of slope

Rather, these features, areas and hazard limits are identified and delineated through technical studies.

Natural features that typically are staked include:

- Physical top of bank of a valley corridor or watercourse
- Physical toe of slope of a valley corridor
- Wetlands

To note, where the applicant does not own the land, written permission must be obtained from the landowner (be it a private citizen, corporation, municipality, or the Crown) and submitted to NPCA.

2.0 Administrative Procedures for Staking a Wetland

Delineation of wetland boundaries is based on the criteria and procedures outlined in the Ontario Wetland Evaluation System, Southern Manual. Wetland boundaries are usually areas of gradual ecological change (i.e., transition areas). A wetland boundary is established where greater than 50 percent of vegetation cover consists of wetland plant species. This is based on the percentage of area cover by upland vs wetland plant species, not the number of different plant species. Topography and soil data may also be used to identify where the wetland boundary will be established.

For sites with unevaluated wetlands, especially where multiple wetland units are present on and off site, consultation by the applicant with the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) may be recommended or required to confirm or delineate individual wetland units that may form part of a larger wetland complex.

Wetlands can be staked whether or not they are located within other features to be staked, such as below top of bank or within a woodland.

For more information regarding the process and study requirements for the identification, evaluation, study, protection and enhancement of regulated wetlands please see NPCA's (July 27, 2022) **Interim Wetlands Procedural Document**.

Prior to a staking being scheduled, the landowner must submit a request for a staking to NPCA, which includes an acknowledgement of the conditions outlined below.

1. All necessary permission(s) to access areas to stake the wetland(s) have been received be it by the landowner, private citizen, corporation, municipality or the Crown and submitted to NPCA prior to the site visit.
2. A Feature Staking Fee is paid in accordance with the NPCA Permitting Administration Fee Schedule.
3. The wetland boundary is required to be staked by a Qualified Wetland Evaluator/Professional prior to the site visit with NPCA.
4. Wood stakes or marking flags must be firmly placed in the ground and numbered at the discretion of the NPCA.

To note, in many cases the outer boundary of a wetland can be clearly delineated by using plant species. However, there are times where there are contradictory messages from different vegetation layers or cases where wetland boundaries that occur in zones of gradual ecological change (ecotones) can sometimes seem indefinite. In these cases, other criteria such as substrates may help identify wetland boundaries. Therefore, the

nature of the underlying substrate can provide important information to help determine wetland boundaries. NPCA staff may ask for soil / substrate data on-site in the above cases. The consultant will need to be able to provide NPCA with substrate data upon request.

At the time of the site visit, the following will be required to be on site.

5. The landowner's Qualified Wetland Evaluator/Professional and Ontario Land Surveyor (OLS) must be present on site. It is the responsibility of the landowner to arrange for an OLS and Qualified Wetland Evaluator/Professional to be present.

6. Extra wood stakes, and/or extra flags and any other measures necessary for field staking. A topographic map of the subject property and the surrounding area is also helpful but not mandatory.

During the wetland staking NPCA staff will field verify the limits of the wetland boundary in consultation with the landowner's Qualified Wetland Evaluator/Professional.

Following the site visit, additional information will be required from the applicant to be submitted to NPCA.

7. The applicant will be required to submit the survey (on base topographic mapping) to NPCA which must include the following information:
    - The staked wetland and location of stakes
    - Date of the staking
    - Names and agencies in attendance
    - GIS data package; ESRI format for mapping to the satisfaction of the NPCA
    - One drawing illustrating all NPCA regulated features impacted by the proposed development with their appropriate setbacks and buffers.

The above information should be overlaid on a recent colour air photo.

3.0 Administrative Procedures for Staking Physical Top of Bank and Toe of Slope of a Valley Corridor

3.1 Physical Top-of-Bank

The physical top-of-bank is that point where there is a break in slope or grade which distinguishes the valley corridor landform from its surrounding landscape. The staking of this feature is the responsibility of NPCA planning staff, who may consult with NPCA technical staff as desired. The physical top of bank is based on NPCA staff's professional judgment and can generally be described as the first main point of inflection or start of downward valley slope as observed from the adjacent tableland and does not include plateaus within the valley corridor with secondary points of inflection. *Delineation of the physical top of bank is based on existing conditions at the time of staking.

Staking takes place from the top of the valley slope looking down, rather than from on the valley slope looking up. The top of valley bank to be staked should be consistent with the elevation trend of the valley, both upstream and downstream of the subject site. A trending elevation may be visible while standing on site; staff may also use digital elevation modelling tools (e.g., LIDAR, DTM) to help confirm the elevation trend for a corridor and the location of the top of bank on the subject property.

For rolling hills-type of topography, the top of bank is delineated based on the elevation trend of the valley on site and up and downstream of the site. There may be small knolls on the tableland adjacent to top of bank, which should not be included.

Ideally, the greater extent of the physical top of bank is staked as one line that defines the entire feature.

The preferred option will be determined based on location, scale, municipal planning policies and protocols etc., and should be established prior to scheduling the site staking. For large sites, a single line will be preferred.

3.2 Toe-of-Slope

Staking the toe-of-slope is not a common occurrence given that new development is not permitted within valley corridors. However, in special circumstances, such as historically urbanized valley corridors, staking toe-of-slope may be necessary.

The physical toe-of-slope is defined as that point where there is a break in slope or grade which distinguishes the bottom of the valley corridor slope from the valley floor. The staking of this feature is the responsibility of NPCA planning staff, who may consult with NPCA technical staff as desired. The physical toe of slope is based on NPCA staff's professional judgment and can generally be described as the first main point of inflection or start of the upward valley slope as observed from the adjacent valley floor. *Delineation of the physical toe of slope is based on existing conditions at the time of staking. Staking takes place from the toe of the valley slope looking up, rather than from on the valley slope looking down.

Ideally, the greater extent of the physical toe of slope is staked as one line that defines the entire feature.

**In the case of unauthorized filling or grade alteration having occurred, altering the original top of bank or toe of slope, NPCA staff may require confirmation of the pre-disturbance topography as part of the geotechnical study for determining the location of the stable top of bank or stable toe of slope.*

The preferred option will be determined based on location, scale, municipal planning policies and protocols etc., and should be established prior to scheduling the site staking. For large sites, a single line will be preferred.

Prior to a staking being scheduled, the landowner must submit a request for a staking to NPCA, which includes an acknowledgement of the conditions outlined below.

1. The landowner and/or his or her agent, the landowner's Ontario Land Surveyor (OLS), municipal staff (to be invited by the landowner) and NPCA planning and technical staff will meet on site. It is the responsibility of the landowner to arrange for an OLS to be present, with a sufficient number of wood stakes, flags and any other measures necessary for field staking. A topographic map of the subject property and the surrounding area is also helpful but not mandatory.

2. NPCA staff, in consultation with municipal staff, will stake the limits of the toe-of-slope and/or physical top-of-bank. NPCA staff may identify locations where additional technical assessments may be required (see Staking Protocol above).

3. NPCA staff will issue a "staking letter" to the landowner and/or his or her agent, confirming the staking. The letter outlines the following:
    - The staking is valid for 5 years;
    - The applicant must submit a stamped survey of the staked feature(s) and/or top-of-bank, provided by the accredited OLS, to NPCA within 6 months of the staking;

- Should substantial differences be identified between the location of feature(s) and/or top-of-bank on the survey and the feature(s) and/or top-of-bank on the ground, or should the survey appear to be inconsistent with the illustrated locations and/or NPCA staff field notes, a new staking will be required;
- Additional study requirements to be completed to assist in the determination of development limits.

4. The applicant will submit the survey (on base topographic mapping) to NPCA, which must include the following information:
    - The staked natural heritage feature(s) and/or physical top-of-bank (location of stakes to be identified);
    - Date of staking;
    - Names and agencies in attendance
    - GIS data package; ESRI format for mapping to the satisfaction of the NPCA
    - OLS stamp.

Note: Both a hard copy and a digital version (as a PDF, not CAD) of the survey are requested.

5. The applicant will submit additional technical studies prepared and stamped by qualified professionals, if required (e.g., geotechnical study, flood study, ecological evaluation).

6. The applicant will submit one drawing illustrating all NPCA regulated features:
    - Staked physical top-of-bank;
    - Staked physical toe-of-slope;
    - Long-term stable slope, as determined through study;
    - Long-term stable toe, as determined through study;
    - Regulatory flood plain limit, as determined through study;
    - Staked limit of natural features or areas, as determined on site;
    - Requisite areas of potential natural cover and/or buffers (from the greatest extent of all hazards and features) as determined by applicable policy.

The above should be overlaid on a recent colour air photo.

4.0 References

Ministry of Natural Resources. Ontario Wetland Evaluation System Southern Manual 3rd Edition, Version 3.3 (2014). https://dr6j45jk9xcmk.cloudfront.net/documents/2685/stdprod-103924.pdf

NPCA (July 27, 2022) Interim Wetlands Procedural Document. https://ehq-production-canada.s3.ca-central-1.amazonaws.com/29f1012a839b98d5f11fb30f120c106fce4546d7/original/1660765732/3c0b02423dff9b839ba93ba66e3f7aff_Interim_Wetlands_Procedure_Document_-_August_2022.pdf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIBJCUKKD4ZO4WUUA%2F20220902%2Fca-central-1%2Fs3%2Faws4_request&X-Amz-Date=20220902T181127Z&X-Amz-Expires=300&X-Amz-SignedHeaders=host&X-Amz-Signature=d85eabfa43113b81c8bcc230f074c22aa4f744d32af74e0d7666da5eb4e569ee

NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and The Planning Act (May 21, 2020 Consolidation) https://npca.ca/images/uploads/common/NPCA_Policy_Document_2018_%28May_2020_Office_Consolidation%29.pdf

TRCA (December 2017) Field Staking Protocol. https://trcaca.s3.ca-central-1.amazonaws.com/app/uploads/2018/10/17170129/TRCA-Field-Staking-Protocol.pdf

Niagara Peninsula Conservation Authority:

250 Thorold Road, 3rd Floor
Welland, Ontario
L3C 3W2
www.npca.ca

Erosion & Sediment Control

Section	Content description	Reference	Section included?	If no, provide reason
Contact information / definition of roles	i. Identify, and define roles of, key personnel including but not limited to: • Site owner, project manager / design engineer, ESC inspector, 24 hour emergency contact ii. Outline chain of communication	Chp. 5.0, Table 5.1	☐ Yes ☐ No	
Site location	Location, key map and site area (ha) **provide in report or reference plan with this information		☐ Yes ☐ No	
Existing site conditions	Detail existing site conditions, including: i. land cover and use ii. vegetation iii. general topography iv. existing flow patterns and external drainage v. adjacent properties and their land uses, including identification of any protected natural heritage features[1] vi. soil characteristics.		☐ Yes ☐ No	
Receiving water system	Provide the following information about water system(s) that will receive runoff / discharge from the site: i. Identification / names of features/systems that will be receiving site flows, whether natural (e.g. streams) or other (e.g. sewer system). ii. Classification of natural receiving water body (coldwater, warmwater, species at risk habitat) iii. Summary of current aquatic habitat conditions iv. Identification of confined or unconfined valleys v. Physical description of receiver (e.g. critical erosion areas, channel dimensions, slope, etc.)		☐ Yes ☐ No	
Proposed Site Alteration	Provide a brief discussion of the proposed activities, including: i. description and location of permanent and temporary SWM measures ii. plans for using permanent SWM facilities for sediment control during construction	LID protection measures (s. 7.6)	☐ Yes ☐ No	

	iii. LID details if applicable, including types, locations, and any controls / methods applied to prevent sedimentation			
Construction phasing	i. Provide a brief discussion on proposed construction phasing to minimize unnecessary stripping of the site and efforts to re-stabilize inactive areas where possible. ii. Describe boundary of work zone(s), work proposed during each stage, and approximate time to complete each stage. iii. Identify any applicable ecological timing windows that affect schedule.	Minimized or phased land clearing guidance (App. B, p. B1-2)	☐ Yes ☐ No	
Erosion Risk Assessment	For applicable sites, provide documentation and results of Erosion Risk Assessment (ERA) which are detailed in Chapter 6.0.	ERA (Chp. 6.0)	☐ Yes ☐ No	
Design details and calculations for ESC measures	Provide details on how ESCs will be implemented for each construction stage, including supporting calculations and design details. • For sediment ponds, include detailed calculations related to permanent pool and active storage volumes, pond outlet and emergency spillway • Where applicable, consider ERA outcomes when selecting and placing BMPs. • Describe plans for site restoration / permanent stabilization, including proposed seed mix with species and percentage composition.	ESC BMP design (App B) Sediment pond design (p. B2-32) Seeding & restoration (App. G) ERA outcomes for ESC planning (s. 6.2.5)	☐ Yes ☐ No	
Inspection, monitoring and maintenance	Describe the ESC inspection and monitoring program by detailing: i. inspection frequency ii. documentation and reporting protocol iii. chain of communication iv. anticipated repair / maintenance timelines and v. monitoring protocols	Inspection and monitoring guidance (Chp 10) Recommended protocols for continuous turbidity monitoring (s.10.2)	☐ Yes ☐ No	
Emergency Contacts	Provide list of emergency contacts (e.g. site supervisor, regulatory agency enforcement officer) and define the triggers (e.g. chemical spill, elevated stream turbidity levels) that constitute an emergency.	Turbidity targets (s. 10.2.2)	☐ Yes ☐ No	

		Spills response (s. 7.7)		
Sealing	Report should be sealed, signed, and dated by a Professional Engineer.		☐ Yes ☐ No	
Supporting documents	If applicable, include: (i) soils report, (ii) sample ESC inspection form, (iii) monitoring protocol		☐ Yes ☐ No	

1 – Protected natural heritage features include: watercourses, wetlands, woodlands, valleylands, Areas of Natural and Scientific Interest (ANSI), Environmentally Significant Areas (ESA), habitat of endangered and threatened species, fish habitat, seeps and springs, and significant wildlife habitat.

Erosion & Sediment Control Drawings Checklist

Item	Description	Reference	Item complete?	If no, provide reason
General items				
Drawing formatting	• Site address and application number • Key plan including site limits • Drawing scale • North arrow • Legend which includes identification of standard drawing elements and ESC measures		☐ Yes ☐ No	
Emergency contacts	In the event of an emergency, the following contacts need to be provided in the ESC notes on all drawings: • The engineer responsible for the ESC drawings • Site supervisor • Pertinent agency enforcement officer		☐ Yes ☐ No	
Standard notes	Examples include: • The ESC strategies outlined on the plans are not static and may need to be upgraded/amended as site conditions change to prevent sediment releases to the natural environment. Any changes from the approved ESC plans will be documented and reported to the Enforcement Office. • Inspection of the proposed erosion and sediment control measures will occur at the frequency defined in section 10.1.2. • All damaged ESC measures will be repaired and/or replaced within 48 hours or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact. • Disturbed areas left for 30 days or longer must be stabilized. • Temporary sediment conveyance systems and sediment pond to be immediately stabilized (include stabilization method if possible, and notes on seasonally appropriate stabilization practices) ***Notes provided are for general reference only. Additional notes will be required as necessary based on ESC measures and strategy employed.***	Consult with local CA for notes required	☐ Yes ☐ No	

Sealing	All drawings must be sealed, signed, and dated by a Professional Engineer.		☐ Yes ☐ No	
Stage 1: Topsoil stripping, grading, and re-stabilization				
Drawing 1: Existing Site Conditions	• Contour elevations at 0.5-1.0 m intervals; • Drainage boundaries and directions; • Vegetation locations • Highly erodible areas, with a plan provided for any downstream areas where erosion risk is a concern; • Water body locations; • Regional storm floodplain and regulation areas.		☐ Yes ☐ No	
CONDITIONAL REQUIREMENT: Proposed site alterations	*Include only if the submission does not include other engineering drawings (e.g. SWM plan, or stage 3 or 4 ESC plan) that would show these details.* • Show proposed site condition **excluding** ESC measures • A cut/fill plan showing existing and proposed contours and spot elevations • Clearing, grading, and site boundary limits • Proposed SWM measures and their locations, including LID		☐ Yes ☐ No	
Drawing 2: Stage 1 ESC Plan	• Based on existing conditions drawing	Staged ESC planning (s. 7.2) Minimized or phased land clearing (p. B1-2) ESC BMPs guidance (App. B) Dewatering protocols (s. 7.4) Buffers (p. B1-2) Perimeter controls (App. B) Vehicle tracking controls (p. B2-48)	☐ Yes ☐ No	
	• Construction phasing details, including limits of disturbance, phasing boundaries and construction sequencing details.		☐ Yes ☐ No	
	• Drainage areas identification, including delineation of all external and internal drainage boundaries, labels for catchment sizes (ha) and runoff coefficients, and depiction of overland flow routes		☐ Yes ☐ No	
	• Location and details for all ESC measures, including dewatering protocols to ensure appropriate treatment of pumped water.		☐ Yes ☐ No	
	• Identification of appropriate buffers / setbacks from natural features.		☐ Yes ☐ No	

	• Placement of perimeter controls, with appropriate setbacks / buffers applied and consideration of more robust controls upslope of sensitive areas	Interceptor swales (p. B1-9)	☐ Yes ☐ No	
	• Vehicle access points - locations and ESC measures applied – and identification of internal haul roads.	Check dams (p. B2-8 to B2-17)	☐ Yes ☐ No	
	• Details on stormwater conveyance measures, including interceptor swale dimensions and design flows, erosion prevention measures, and placement of check dams.	Sediment control ponds (p. B2-32)	☐ Yes ☐ No	
	• Details for temporary sediment control ponds, including: i. Plan view of pond showing grading requirements ii. Cross-sections of the pond, including length, width, and outlet structure iii. Stage-storage tables showing adequate depth and volume iv. Details of storm inlet, outlet, emergency overflow and any associated drainage facilities v. Stabilization techniques vi. Plans for decommissioning or conversion to permanent SWM facility.	LID protection during construction (s. 7.6)	☐ Yes ☐ No	
	• Where applicable, LID locations and any measures applied to mitigate compaction of infiltration LID areas.		☐ Yes ☐ No	
	• Stockpiles and/or berm locations, sizes and ESC measures, including stabilization for stockpiles idle for > 30 days.		☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	
Stage 2: Site servicing				
Drawing 3: Stage 2 ESC Plan	• Coordination with Stage 1 and Stage 3 Construction Activities		☐ Yes ☐ No	

	• Overlay of draft subdivision plan provided on ESC Plan (showing ultimate roadway and lot layout)		☐ Yes ☐ No	
Drawing 3: Stage 2 ESC Plan **(continued)**	• Updated locations and details for all ESC measures, including dewatering protocols to ensure appropriate treatment of pumped water.	ESC BMPs guidance (App. B) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	
	• Where applicable, LID locations and any measures applied to protect against sedimentation and compaction of infiltration LID areas.	LID protection during construction (s. 7.6)	☐ Yes ☐ No	
	• Updated drainage area details, including delineation of all external and internal drainage boundaries, labels for catchment sizes (ha) and runoff coefficients, and depiction of overland flow routes • Catchbasin inlet protection types and locations	Inlet protection (p. B2-21)	☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	
Stage 3: Building construction				
Drawing 4: Stage 3 ESC Plan	• Updated drainage area details, including delineation of all external and internal drainage boundaries, labels for catchment sizes (ha) and runoff coefficients, and depiction of overland flow routes • Catchbasin inlet protection types and locations (e.g. all rear lot and street catchbasins)	Inlet protection (p. B2-21)	☐ Yes ☐ No	
	• Updated locations and details for all ESC measures, including dewatering protocols to ensure appropriate treatment of pumped water.	ESC BMPs guidance (App. B) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	

	• Updated details on stormwater conveyance measures, including interceptor swale dimensions and design flows, erosion prevention measures, and placement of check dams.	Interceptor swales (p. B1-9) Check dams (p. B2-8 to B2-17)	☐ Yes ☐ No	
	• Plan for dewatering sediment control ponds during construction of permanent stormwater management facilities, including: i. details on discharge locations; ii. measures for treating sediment laden water; and iii. erosion prevention measures at discharge points.	Sediment ponds maintenance (p. B2-32) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	
	• Where applicable, LID locations and updated details on any measures applied to protect against sedimentation and compaction of infiltration LIDs.	LID protection during construction (s. 7.6)	☐ Yes ☐ No	
	• Updated stockpiles and/or berm locations, sizes and ESC measures, including stabilization for stockpiles idle for > 30 days.		☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	
Stage 4: Final stabilization and decommissioning				
Drawing 5: Stage 4 ESC Plan	• Planting / site restoration plan depicting all permanent stabilization measures and timelines	Erosion control BMPs (App. B1) Restoration guidelines (App. G)	☐ Yes ☐ No	
	• Plan for dewatering sediment control ponds during construction of permanent stormwater management facilities, including: iv. details on discharge locations; v. measures for treating sediment laden water; and erosion prevention measures at discharge points.	Sediment ponds maintenance (p. B2-32) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	

	• Removal / decommissioning of ESC measures depicted in drawing and / or drawing notes.		☐ Yes ☐ No	
	• Where surface infiltration LIDs are planned for the site, provide details on LID planting / stabilization.		☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	




Evaluation, Classification and Management of Headwater Drainage Features Guidelines

Approved July 2013 (Finalized January 2014)

CVC
CREDIT VALLEY CONSERVATION

Toronto and Region Conservation
for The Living City®

This document received TRCA Authority Board approval on July 26, 2013. Here is the Board resolution:

RES.#A119/13 - **HEADWATER DRAINAGE FEATURES GUIDELINES**
Approval of the final Evaluation, Classification and Management of Headwater Drainage Features Guidelines (Revised July 2013) prepared for Toronto and Region Conservation Authority, Credit Valley Conservation and other conservation authorities.

Moved by: Dave Ryan
Seconded by: Colleen Jordan

WHEREAS Toronto and Region Conservation Authority (TRCA) has been undertaking research on headwater drainage features (HDFs) since 2007;

AND WHEREAS the Interim Headwater Guidelines were developed in 2007 and revised in 2009 to direct proponents of headwater drainage feature alteration on management options in order to protect headwater functions;

AND WHEREAS the guidelines have been updated and finalized based on the results of further research and feedback from those using the guidelines;

AND WHEREAS the updated guidelines include methods for evaluating HDFs consistent with the Ontario Stream Assessment Protocol (OSAP), which is the provincial standard for conducting monitoring in wadable streams;

THEREFORE LET IT BE RESOLVED THAT the updated and finalized Evaluation, Classification and Management of Headwater Drainage Features Guideline (July 2013) be approved;

AND FURTHER THAT that the municipal clerks in TRCA's jurisdiction and the Greater Golden Horseshoe conservation authorities be so advised.

CARRIED

NB: Subsequent to approval of this version by TRCA's board, some changes were made to provide further clarification based on additional comments that were received from industry partners.

ACKNOWLEDGEMENTS

The following is a list of supporters and contributors that assisted us in completing this guideline. We would like to sincerely thank the following organizations (in no particular order) and their dedicated staff/participants. We would like to specifically acknowledge the contributions of Les Stanfield to this document:

The Oak Ridges Moraine Foundation
Regional Municipality of Peel
Regional Municipality of York
University of Waterloo
Halton Conservation
Lake Simcoe and Region Conservation Authority
Central Lake Ontario Conservation Authority
Ganaraska Region Conservation Authority
Ministry of Natural Resources (Southern Science and Information Section)
Lake Simcoe Clean Up Fund
Fisheries and Oceans Canada
Great Lakes Sustainability Fund
Toronto Remedial Action Plan
Headwater Steering Committee
Southern Ontario Stream Monitoring and Research Team

We would like to thank the following consultants for providing their comments on this version and/or previous versions of the document: Cam Portt, George Coker, Paul Villard, Rick Hubbard, Michael Roy, Sal Spitale and Brent Teglar.

Please reference this document as:

Evaluation, Classification and Management of Headwater Drainage Features Guideline. Toronto and Region Conservation Authority and Credit Valley Conservation, TRCA Approval July 2013 (Finalized January 2014).

TABLE OF CONTENTS

TABLES

FIGURES

INTRODUCTION

Conservation Authorities (CAs) are concerned with both rural and urban development or activities that can alter and/or eliminate headwater drainage features (HDFs) both individually and cumulatively. Such activities could have broad implications for water quality and quantity, recharge/infiltration, and the overall health of the local HDF and downstream habitats. These HDFs provide a multitude of functions, and alterations to these features can have implications on aquatic and terrestrial integrity within our watersheds. The spatial extent of HDFs can account for 70-80% of the total catchment area within a watershed (Gomi *et al.* 2002). Furthermore, 90% of a river's flow may be derived from catchment headwaters (Saunders *et al.*, 2002). Headwater systems are considered important sources of food, sediment, water, nutrients, and organic matter for downstream reaches. However, due to their small size and because these functions are poorly understood and typically underestimated, headwater drainage features can be vulnerable to impacts resulting from agricultural, aggregate and urban land uses, such as tile drainage, channel lowering, relocation, and enclosure (i.e. piping). In March 2007, Toronto Region Conservation Authority (TRCA) completed a literature review summarizing the state of the science around the natural functions of HDFs. This document has been augmented by several targeted research projects in the GTA designed to better understand both the ecology and the factors that impact HDFs (http://trca.on.ca/the-living-city/water-flood-management/headwater-study.dot). All of the research confirms that these features, though variable in terms of their form and functions, contribute in some way to maintaining healthy watersheds. These Guidelines reflect the best science available and are intended to support future decisions that will ensure the processes and pathways that these features support are maintained or improved.

The 1998 amendments to the *Conservation Authorities Act,* and subsequent approval of individual Section 28(1) Regulations by the Minister of Natural Resources in May 2006, gave all Conservation Authorities the legal right to apply a consistent definition of "watercourse," which is: *"An identifiable depression in the ground in which a flow of water regularly or continuously occurs"* (Section 28 (5) of the Conservation Authorities Act). Characteristics that qualify a feature as an HDF could also qualify that same feature as a watercourse under this definition and be subject to the conservation authorities' Section 28 regulations.

These guidelines have been developed to provide direction to practitioners for those features that are not clearly covered by existing policy and legislation as being important eco-hydrological features (e.g. perennial streams and provincially significant wetlands), but may contribute to the overall health of a watershed. The guidelines are intended to be used by practitioners contemplating alterations to HDFs and to address any type of alteration from restoration to feature removal from the landscape. This guideline can also be used to help direct watershed planning activities such as development of natural system planning, stewardship activities, and watershed planning. Upon consideration of the attributes and functions of HDFs, the evaluation (Part 1), classification (Part 2) and management (Part 3) of each drainage feature must be completed/determined to address the protection, conservation and mitigation of headwater functions (e.g. flow storage and conveyance, fish habitat, amphibian habitat, sediment and nutrient regulation, etc.). While the evaluation and classification is undertaken at the site specific scale, the management recommendations should consider the cumulative effects on the drainage network. The management recommendations are to be implemented through development design, including stormwater management and sustainable management practices, and where available, must take into consideration the recommendations of the relevant Fisheries Management Plan (FMP), Subwatershed or Watershed Plans.

Since HDFs vary widely in their flow, form and function (Williams, 2006), these guidelines utilize standardized survey methods and a tiered study design that directs practitioners to collect more rigorous data based on the risk of functional impairment to an HDF. The methods prescribed herein follow existing modules of the Ontario Stream Assessment Protocol (OSAP; Stanfield, 2010) and new modules have been developed to accommodate the needs of these guidelines. In this way, all data collected using these guidelines will contribute to a better understanding of HDFs facilitate effective comparisons between features and will enable an assessment of the effectiveness of the guidelines over time. As such, this approach supports the adaptive management cycle (Holling, 1978). Training in the application of OSAP modules is highly recommended. The modules can be found at: http://trca.on.ca/the-living-city/monitoring/ontario-stream-assessment-protocol.dot

PART 1: EVALUATION

The data collected in this part of the guideline will be used to classify the features and provide appropriate management options. Part 1, Evaluation is divided into 4 sections. Section A describes the study design considerations to be considered in determining where field work should be conducted. Section B addresses project scoping through a desktop exercise, and is intended to provide a framework for determining which protocols to apply. Sampling effort is described in Section C. Finally, Section D provides advice on information management, to both assist with preparing the data for classification and to ensure the information is available for future analysis.

The guidelines recognize that all HDFs contribute, to some degree, to the overall health of a watershed, and that their individual contribution to watershed health varies. As a result, these guidelines attempt to evaluate, in a consistent way, the contribution of sediment, food and flow transport to downstream reaches, as well as the use of these features by biota. Since not all HDFs are equivalent, a tiered approach is used to inventory the HDFs that balances information needs with the likelihood that alterations to HDF conditions might result in cumulative impacts to local and watershed health. Hence, the level of sampling effort will be commensurate with the sensitivity of the reach and potential impacts of alteration.

Pre-consultation should occur with the Conservation Authority to determine scope and to identify data gaps. Be advised that if the scoping exercise with the CA does not occur prior to the initiation of the assessment and aspects are scoped out of the field program that are not agreeable to the CA, that this may result in delays to the project and the possible requirement for additional data collection during the appropriate seasons. The outcome of applying this guideline should be integrated with the results of other studies such as an Environmental Impact Study/Natural Heritage Evaluation (EIS/NHE), and relevant information should be used to tie back to aquatic functions, and vice versa. Ultimately, the results of this guideline should be incorporated into an EIS/NHE, if one is required.

Since many of the management actions are implemented based on the seasonal contribution of HDFs to biota (fish, amphibians, etc), a large component of the field methods is directed at collecting information on the form and surficial flow patterns of each feature as well as the biota that utilize these habitats. A hierarchical approach is applied that focuses on first determining the nature of the feature, that is, whether it persists over time and the nature of its flow patterns. This information will direct subsequent field sampling efforts that will document conditions for each HDF.

The following definition of a headwater drainage feature will be used for the purposes of this guideline: ***non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands*, but do not include rills or furrows.***
[NB: *wetlands that are connected downstream through surface flow are considered to be headwater drainage features for the purposes of this guideline. A wetland definition is provided in the definitions section at the end of this document. Wetland size does not matter with regard to this wetland definition.]

A. STUDY DESIGN

A preliminary study design should be developed through a desktop exercise to help determine where sampling should occur. Local and watershed conditions should be screened using existing secondary information to determine the potential location of HDF's. These guidelines are to be applied to any drainage feature that is:

- part of the drainage network (i.e. drainage channels that are identified from aerial photography, and/or drainage lines result from ArcHydro analysis), or
- a groundwater seepage area or spring, or
- a connected headwater wetland (a surface outlet connects to downstream), **and**
- not a mapped or known perennially flowing stream.

Features within a valley are typically not considered HDFs and therefore are not addressed by this guideline, but still need to be considered through CA policies. In addition, while unconnected wetlands are not considered in this guideline, they still need to be assessed through an EIS, as required. If no HDFs have been identified through these methods, and/or there has been agreement with the Conservation Authority that there is no HDF present on the site through site inspection, then the guideline will not apply.

The study area should be examined using desktop information, such as ArcHydro analysis (may be available from the Conservation Authority), aerial photo interpretation, catchment size information, or using existing watercourse/OBM layers, to determine if there are any potential HDFs present and where they are located. The study design can be developed by conducting and aerial photo interpretation analysis at a scale no greater than 1:20,000, but preferably 1:10,000 or smaller. If available, ArcHydro can also be a helpful tool in determining where flow is expected to occur on the landscape.

Figure 1 shows an example of recommended sampling locations determined at a scale of 1:4,000. Sampling should occur in order to collect data from distinct HDFs within the study area. A new sampling location should occur where vegetation, flow or other habitat conditions change significantly and could result in a different classification. These changes will define the limits of the segment represented by that sampling point. For example, a new sampling location should be located downstream of the confluence of two distinct ArcHydro drainage lines, or where the feature type changes (e.g. defined channel to wetland, pond, etc.). A sample site will include 40 m upstream and downstream of the sampling location (or 40 m upstream depending on scope), so ensure that there is no overlap between sample sites. It is not necessary to sample unconnected wetlands (i.e. wetlands that do not have an obviously surface water outlet draining to downstream). The sampling strategy may change depending on field conditions. The headwater drainage features should be walked from end to end to determine where it is no longer a headwater drainage feature.

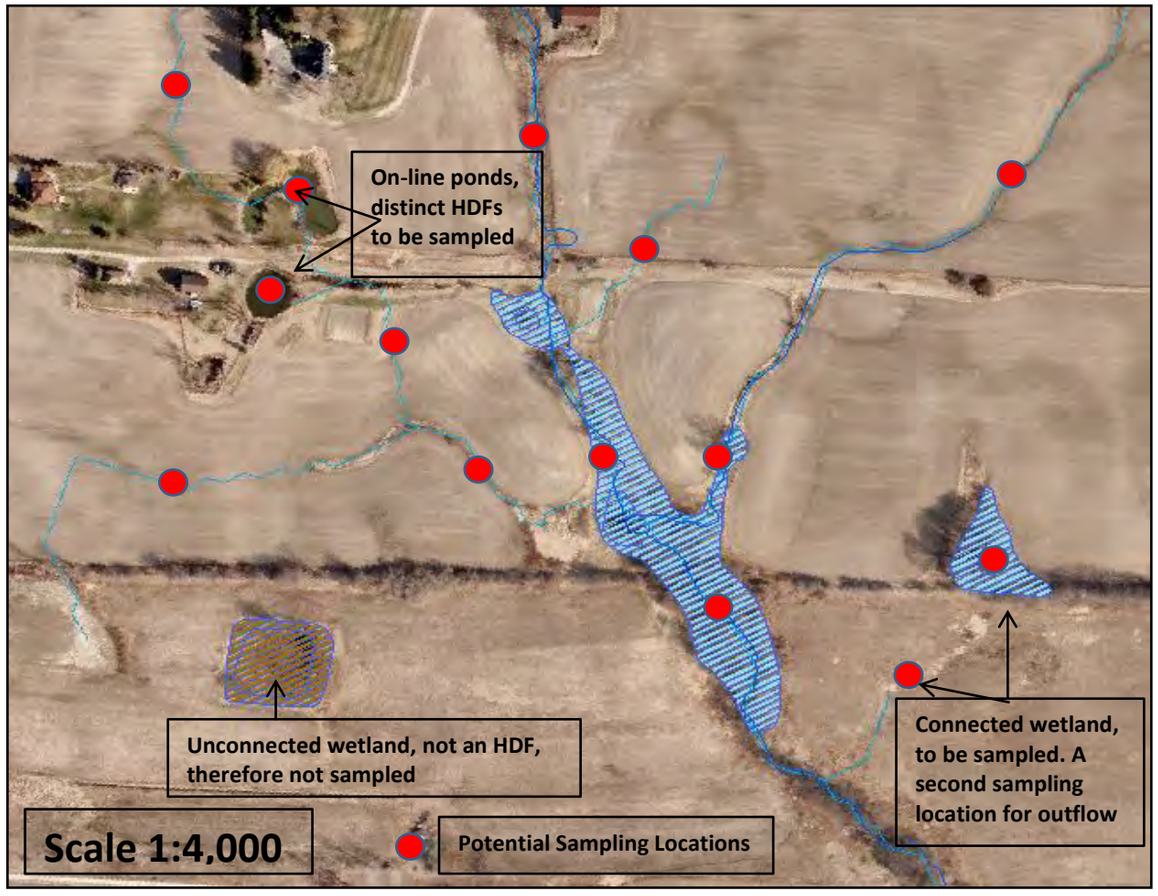


Figure 1: Example study design showing potential sampling locations. Distinct HDFs occur when a new feature type (i.e. pond, wetland, etc.) is encountered or when downstream of a confluence with another feature. Light blue lines indicate drainage lines as identified through ArcHydro analysis. Blue hatch indicates wetlands.

B. DATA GATHERING

The next step is to consult with other secondary sources of information to determine the sensitivity of the features to the proposed alteration. Existing sources of information should be sought to determine:

I. Presence of Sensitive Biota

Once a potential HDF has been identified, existing biological information should be consulted to determine the presence of sensitive species in the study area, including Species at Risk (e.g. Redside Dace, Jefferson salamander), or habitats where sensitive species may be found, such as designated natural areas (e.g. Provincially Significant Wetlands). Conservation Authorities and the Ministry of Natural Resources can be sources of these kinds of information. If any of these are present on, adjacent to or downstream of the study area, there may be regulatory or policy requirements that override the requirements contained within this guideline. It is recommended that the appropriate agencies be consulted. If existing information (e.g. Watershed Plan, Fisheries Management Plan, fish collection records, data points) indicates that there are sensitive species present on, adjacent to or downstream of the site, or that there is a likelihood that these species may be present but no current data exists, this will increase the sensitivity of the HDF and therefore increase the data requirements if alteration is proposed. Likelihood of the presence of habitat should also be considered based on a review of desktop information (e.g. aerial photos). Sensitive species include both terrestrial species, such as breeding amphibians, as well as aquatic species. Presence of sensitive taxa at or downstream of a study area will likely indicate a greater sensitivity to disturbances within an HDF and hence greater information needs.

II. Feature Form and Flow

The hydroperiod (seasonal pattern of water level fluctuation) of HDFs helps determine seasonal use of the feature by species that require water to carry out their life processes. The longer a feature contains water (i.e. longer hydroperiod) and the greater the volume of water, the greater the likelihood that the feature will provide important eco-hydrological functions. Indicators of longer hydroperiods, such as standing/open water, meanders, and channel definition, will necessitate a more intensive field survey than if only poorly defined HDFs with limited flow periods are present. Aerial photos are good sources of this information, but there may be other sources as well, such as Ontario Base Maps, Ecological Land Classification, soil mapping, topographic mapping, etc.

III. Proposed Activity

Some activities pose a greater risk to degrade the natural functionality of an HDF, than do others. Projects that have a neutral or positive benefit to an HDF are therefore of lower risk to ecosystem health than those that that have a negative impact. Table 1 below provides a listing of examples of positive/neutral and negative alterations.

Table 1: Examples of alterations and their expected effects

Positive/Neutral Alterations	Negative Alterations
In-situ restoration	Relocation
Protection	Removal
Cattle fencing	Ditching
Wetland re-creation	Channelization
Flow reinstatement	Channel lowering
Tile drain removal	Terracing
Riparian replanting	Piping
Riparian buffers	Tile drain installation
Natural channel design	Flow diversion

C. SCOPING AND SAMPLING EFFORT

The amount of effort required to document conditions in a study area varies based on the flow conditions, types of habitat present, the presence of sensitive species, and the degree to which alterations to feature/habitat are being considered. Check with the Conservation Authority to ensure that there is agreement on the level of sampling effort required. Where Species at Risk are possible or known to be present, alternate sampling strategies may be necessary, and the local Ministry of Natural Resources (MNR) district office should/must be contacted.

Table 2 below indicates mandatory and additional data requirements, and the associated sampling intensity given sensitivity, hydroperiod and alteration potential. Surveyors can choose to collect only mandatory information at the start of the process if there are no negative alterations to the HDF proposed, or if the proposed alterations are yet unknown. However, if alterations are proposed later, data gaps will need to be addressed during the appropriate seasons, which may delay the project. Alternatively, surveyors can choose to collect additional information at the beginning of the process if it is likely that alterations will be proposed. It should be noted that these additional data requirements are also useful for positive alterations, and facilitate proper enhancement of existing habitat characteristics.

Where an Ontario Stream Assessment Protocol (OSAP) module is noted, the entire module is to be applied. However, the data collected in certain modules, such as OSAP Section 4, Module 10 (or OSAP S4.M10 for short) can be scoped if agreed to in advance with the Conservation Authority. The classification system outlined in Part 2 focuses on data collected through an evaluation of feature type, flow and riparian conditions as determined through application of OSAP S4.M10. However, the other information collected using the OSAP protocols can be useful for a number of other applications and should be collected when these data can assist in addressing other watershed or landuse planning objectives. For example, some data may help design the drainage system if alterations are proposed and to identify restoration opportunities. Additional data may be required to assist in developing natural heritage networks, directing watershed research (e.g. intensive sediment transport studies), or developing integrated watershed restoration priorities or monitoring programs. Table 3 below outlines the data for this module, and recommends how to scope data collection based on the study objectives.

Feature type, flow and riparian conditions should be documented in all circumstances. However, where negative (or sometimes positive) alterations are proposed, more comprehensive information may be necessary in order to adequately document the conditions that will need to be replaced or restored and to evaluate the project.

Table 2: Types of surveys to be carried out based on sensitivity, feature form and flow. In most cases, Standard Survey Type will be used. It may be possible to scope the data collected through these surveys if agreed to in advance by the Conservation Authority/municipality.

Survey Type	**Sensitivity, Feature Form and Flow***	**Mandatory Data Requirements**		**Additional Data Requirements For HDF Alterations**	
		Flow Condition	**Riparian**	**Fish and Fish Habitat**	**Terrestrial Assessment**
Rapid	Sensitive species/habitat unlikely and/or ill-defined form, only ephemeral flow likely	OSAP S4.M10 (Headwaters)	OSAP S4.M10 (Headwaters)		
Standard	Sensitive species/habitat possible and/or ill-defined form, intermittent flow likely	OSAP S4.M10 (Headwaters)	OSAP S4.M10 (Headwaters)	OSAP S3.M1 and/or OSAP S3.M2 (Fish); OSAP S4.M9 (Barriers)	Marsh Monitoring Protocol for amphibians; Ecological Land Classification; Ontario Wetland Evaluation System (for wetlands ≥ 0.5 ha)
Diagnostic	Sensitive species/habitat likely/present and/or perennial flow is possible*	OSAP S4.M10 (Headwaters); OSAP S4.M5 (Standard flow survey); OSAP S4.M6 (Stream response to rainfall)	OSAP S4.M10 (Headwaters)	OSAP S3.M1 and/or OSAP S3.M2 (Fish); OSAP S4:M9 (Barriers)	Marsh Monitoring Protocol for amphibians; Ecological Land Classification; Ontario Wetland Evaluation System (for wetlands ≥ 0.5 ha)

***Prior to completion of field surveys, it is not always possible to discern the hydroperiod of the feature. If the feature is known to have perennial flow, this guideline does not apply. However, if the hydroperiod is uncertain, this guideline should be applied.**

Table 3: Recommendations for scoping of data collection for OSAP S4.M10. Closed circles (●) indicate required data collection, and open circles (○) indicate recommended data collection, which can be further scoped depending on the study design.

	Data Collection Objectives	
Recommended Data Collection (OSAP S4.M10 field sheet)	Minimum to Complete Guideline Classification	*Positive or Negative Alterations Proposed to HDF
Mandatory fields at top of Page 1 (Site description, etc.)	●	●
Upstream Data Only		
Feature Type	●	●
Riparian Conditions	●	●
Flow Conditions	●	●
Feature Vegetation	●	●
Feature/Bankfull Width/Depths		●
Sediment Deposition/Transport		○
Flow Measures		●
Longitudinal Gradient		○
Both Upstream and Downstream Data		
Downstream data for all listed above		●
Water Quality Parameters		○
Site Features	●	●
Downstream Flow Measures		●
Channel Connectivity	●	●

*Positive alterations can include planning, strategic, or research initiatives that ultimately lead to restoration of HDFs, such as Natural Heritage System planning, restoration prioritization, and erosion/nutrient transport research.

Based on the above preliminary assessments, a strategy will emerge for the types of surveys to be conducted in each HDF segment, assuming that data does not already exist for the study area. If there are several HDFs in a study area a sampling strategy table should be generated to guide field work, indicating the sampling effort required for each feature.

Regardless of the data collected in a study area, it is imperative that accurate site descriptions and geo-coordinates are collected so that the information can be placed in time and space. Therefore, surveyors should fill out site description information for each location that represents a new sample site.

The following outlines the recommended sampling approaches based on the sensitivity of the feature to the proposed alteration, and what this will likely mean for watershed functions:

I. Rapid Methods

For low sensitivity sites, all components of the headwater sampling protocol (OSAP S4.M10) are to be applied, unless scoped in advance with the Conservation Authority. This module documents the HDF form and flow conditions, riparian vegetation and site features that are important components of habitat. It is a rapid assessment protocol, and should only take about 15-25 minutes to complete per site. Typically, determining the seasonality of flows within each HDF can be challenging, unless a permanent sampling device is installed (i.e. pressure transducer or crest stage gauge), however vegetation and channel form can be good indicators. However, the guidance provided in Table 3 will assist with determining seasonality. The site features portion of this module extends beyond the site boundaries to include all modifiers that could influence the HDF.

II. Standard Methods

In addition to the OSAP S4.M10 module, an electrofishing survey (OSAP S3.M1) should be conducted at a minimum of one sample site for each stream segment containing water during the sample period. While spring sampling is recommended, there may be timing restrictions on when sampling can occur that must be approved by the local MNR office. The ecological land classification protocol (ELC, 1998) should be applied to the riparian zone of each segment as a means of documenting community type. If appropriate habitat exists to potentially support amphibian breeding, a survey should be conducted following the Marsh Monitoring Protocol. Wetlands are very rare in southern Ontario, therefore, an evaluation as per the Ontario Wetland Evaluation Manual for Southern Ontario (OWES, 3rd Edition) may be required for any areas that contain facultative/obligate wetland species with a surface area that exceeds 0.5 ha and that are hydrologically linked to other wetland areas. Thresholds for these surveys vary by MNR district; therefore surveyors should contact either the local MNR office or the local Conservation Authority staff for clarification. (Note: although a wetland may not need to be evaluated using OWES, all HDF wetlands need to be evaluated and classified using these guidelines.). All potential barriers within the study area should also be assessed to determine whether there are existing barriers to fish that could be considered as part of remediation activities. Apply the barrier assessment module to each potential barrier in the study area (OSAP S4.M9). Additionally, if habitats exist that are not readily sampled by electrofishing, surveyors should consider using alternate methods to ensure that taxa that might utilize only this type of habitat are enumerated (e.g., seining [OSAP S3.M2], minnow traps, dip-nets, etc).

III. Diagnostic Methods

Greater certainty of conditions is required for HDFs that are considered to have higher sensitivity or longer hydroperiods. Existing hydrological models are unable to adequately predict flow in headwater streams, hence more diagnostic methods for quantifying and validating flow needs of the stream will be required (OSAP S4.M5; S4.M6). This information will be helpful in determining the water balance requirements for the feature. Therefore in addition to the modules recommended for rapid and standard methods, one site should be sampled for fish assemblages along each segment containing water in the spring and another in summer.

D. Information Management and Communication

Implementation of these guidelines requires that practitioners make strategic decisions about where, when and how much habitat is to be inventoried within a study area. It is important to document these decisions and the rationale that led to them. Prior discussion with the CA may be beneficial to identify areas to be sampled.

All data should be recorded onto standard OSAP sampling forms and transferred to a database (e.g. Flowing Waters Information System) for long term storage and to assist with information transfer and querying (e.g. classification). Additionally, a study area sampling map should be generated that indicates the geo-referenced location of all sample sites and the connections to other drainage features, particularly watercourses, ponds, wetlands, barriers and tile drains, etc. The data should then be summarized in a table indicating the segment surveyed and associated feature type, flow condition, riparian conditions, and fish and amphibian information (as necessary).

PART 2: CLASSIFICATION

The purpose of this section is to outline a method for using the information collected during the evaluation phase (Part 1 above) in order to apply the appropriate classification to the HDFs being assessed and identify the functions provided by those features that must be considered in subsequent analysis. Classification should occur on a segment-basis and includes fragmentation information collected from the barrier surveys. Therefore, results of all surveys on a segment are combined and the composite results based on the highest level of function observed in a feature are used to generate classifications. The results of the classification should be recorded and summarized in Table 8. Note that the classes are hierarchical.

STEP 1 – HYDROLOGY CLASSIFICATION

Classify the flow conditions into one of the following categories with direction from Table 4 below:

A. **Important Functions – Perennial:** Water is present throughout the year, as either flowing or standing surface water (wetlands or refuge pools) as a result of year round groundwater discharge (i.e. seeps, springs, wetlands or upwellings). Flow may be interstitial or even subsurface in some segments. Channel form is typically complex with clearly defined bed and banks, evidence of erosion/sedimentation, and sorted substrate. In the case of wetlands, standing water is present through the summer months. Fish and Invertebrates can be used to assist in determining hydroperiod. Organisms that benefit from perennial flow (caddisfly larvae, Mayfly nymphs, stonefly nymphs, black flies, salmonids, darters, white sucker etc.) may be found on the underside of stones and rocks.

B. **Valued Functions – Intermittent:** Water is present in the spring as a result of seasonally high groundwater discharge or seasonally extended contributions from wetlands or other areas that support intermittent flow or water storage conditions. These features are typically still flowing in late spring but dry or surface-damp by July. There may be some substrate sorting and channel form. Invertebrates can be used to assist in determining hydroperiod, including presence of damselfly nymphs, clams, and scuds and absence of caddisfly larvae, Mayfly nymphs, stonefly nymphs, black flies etc. in summer.

C. **Contributing Functions – Ephemeral:** Provides ephemeral flow or water storage functions during and (for a short time) after spring freshet and following large rain events only. These features are typically dry or surface-damp by mid-May. Typically, there is limited substrate sorting and channel form. Invertebrates may be used to help determine hydroperiod, including presence of worms, leaches in the absence of the perennial and intermittent indicators or no aquatic macroinvertebrates.

D. **Recharge Functions**– **Dry or Standing Water**: No surface flow occurs. Through additional investigations, such as boreholes, soil maps, etc., it has been determined that coarse-textured soils described as sand and/or gravel occurs and the majority of potential flow will be infiltrated. These features may have ill-defined channels as a relic of past flows; however the key function is groundwater recharge and maintenance of downstream aquatic functions via groundwater connections to streams. No surface flow conveyance, allochthonous or sediment transport provided.

E. Limited Functions – Dry or Standing Water - The pre-screened drainage feature has been field verified to confirm that no flow occurs during any of the flow assessment periods outlined in Table 4 below. – generally characterized by no definition or flow, no groundwater seepage or wetland functions, and evidence of cultivation, furrowing, presence of a seasonal crop, lack of natural vegetation, and fine textured soils (i.e. clay and/or silt).

Table 4: Hydrology classification using flow condition and feature type as evaluated using data from OSAP S4.M10. More than one field assessment is required in order to assess hydrology, particularly if the assessment occurs prior to spring plowing/tilling.

Assessment Period	Limited or Recharge	Valued or Contributing	Important
Spring freshet (late March – mid-April)	FC = 1 or 2 AND FT = 4 or 7	FC = 3, 4, or 5 AND FT = 2, 3, 4, or 8; OR if wetland (FT = 6) occurs upstream	FC = 3, 4, or 5 AND FT = 2, 3, 4, or 8; OR if wetland (FT = 6) occurs upstream
Late April - May	FC = 1 or 2 AND FT = 4 or 7	i. FC = 1 or 2 AND FT = 1, 2, 3 or 4 OR if wetland (FT = 6) occurs upstream; OR ii. FC = 3, 4, or 5 AND FT = 4, 5 or 7 OR if wetland (FT = 6) occurs upstream	i. FC = 1 or 2 AND FT = 1, 2, 3 or 4 OR if wetland (FT = 6) occurs upstream; OR ii. FC = 3, 4, or 5 AND FT = 4, 5 or 7 OR if wetland (FT = 6) occurs upstream
July - August			FC = 3, 4 or 5 AND FT = 1 or 2; OR FT = 6 AND FC = 2

The following categories are hierarchical with highest level of function increasing from left to right. The highest level of function satisfied according to the conditions outlined above is to be used to classify hydrology for features.

NB: OSAP Flow condition codes (FC): 1= no surface water (dry), 2 = standing water, 3 = interstitial flow, 4 = surface flow minimal (<0.5l/s), 5 = surface flow substantial (>0.5l/s)
OSAP Feature type codes (FT): 1 = defined natural channel (visible banks), 2 = channelized (historically natural channel, now straight with banks), 3 = multi-thread (> 1 channel), 4 = no defined feature (overland flow only), 5 = tiled drainage (buried stream/pipe with outlet), 6 = wetland, 7 = swale, 8 = roadside ditch (channelized running parallel with roadway), 9 = online pond outlet

Modifiers

Agricultural tilling can make determination of feature type difficult or erroneous. It is strongly recommended that at least one assessment period occur prior to spring tilling/plowing otherwise additional assessments may be required to adequately characterize the feature.

Many headwater drainage features have been negatively affected by agricultural practices or development. Impacts include: dredging, vegetation removal, cultivation, crop planting, piping, tile drains, terracing, nutrient input, etc. The presence or absence of these modifiers can provide clues as to the hydrology of the feature (e.g. a feature that is not plowed through may indicate that in the late spring when a farmer is preparing the fields, this feature is too wet to drive a tractor through or it is wet long into the growing season and does not provide suitable conditions for crop growth). Modifiers should be noted. The suspected impacts of the modifier and changes expected to occur when the modifier is removed should be discussed. Clues from upstream and downstream classification as well as historic aerial photography may be helpful in determining the appropriate, original function of the affected reach.

On-line or in-line ponds are typically created on headwater features to provide a source for irrigation or water for livestock. Although these features can provide flow retention, extended discharge, permanent fish habitat, and amphibian breeding areas, their disruption to natural geomorphological processes and thermal impacts are generally not desirable. On-line and in-line ponds should be assessed to identify their positive contribution and negative impacts to the system. If the pond is to be removed, the positive

attributes should be considered for replication in the restoration of the headwater feature. Barriers can restrict the movement of fish upstream into the features being assessed. Consideration should also be given to the potential for fish to use the habitats of the feature in the event that barrier removal or mitigation is undertaken.

Classification should consider the influence of modifiers and professional judgment used to determine the appropriate classification, where applicable. The results of this process need to be clearly articulated in the table.

STEP 2 – RIPARIAN CLASSIFICATION

Classify the feature with regard to riparian conditions based on criteria provided in Table 5 below:

A. Important Functions – the feature type is wetland and/or any of the riparian corridor categories (0-1.5 m, 1.5-10 m, or 10-30 m on either side of the feature) is dominated by forest or thicket/scrubland communities or wetland.
B. Valued Functions – any of the riparian corridor categories (0-1.5 m, 1.5-10 m, or 10-30 m on either side of the feature) is dominated by meadow and there are no important riparian functions.
C. Contributing Functions – the riparian corridor (0-1.5 m, 1.5-10 m, or 10-30 m on either side of the feature) is dominated by lawn and there are no important or valued riparian functions.
D. Limited Functions – the riparian corridor (0-1.5 m, 1.5-10 m, or 10-30 m on either side of the feature) is dominated by cropped land or no vegetation, and there are no important, valued or contributing riparian functions.

Table 5: Riparian condition classification using data from OSAP S4.M10. If the data for the left and right bank categories differ, classification will be according to that which is highest functioning.

Riparian Conditions	OSAP Riparian Codes Observed	OSAP Code Descriptions	ELC Equivalent Codes for Riparian Codes Observed
Important Functions	5, 6, 7 (and/or feature type=wetland)	Scrubland, forest, or wetland	Thicket, plantation, woodland, forest (CUT, CUS, CUW, CUP, TPS, TPW, FO)
Valued Functions	4	Meadow	Meadow (CUM)
Contributing Functions	2	Lawn	-
Limited Functions	1 or 3	None or cropped land	-

STEP 3 – FISH AND FISH HABITAT CLASSIFICATION

This section only needs to be completed if an alteration (see Part 1) is proposed.

A. Important Functions – Fish are present year round (permanent habitat) in standing pools; or suitable habitat present for fish spawning/rearing; or feature designated as occupied SAR habitat. (Note: if feature has permanent flow in defined channel then it is not considered to be an HDF).
B. Valued Functions – Seasonal habitat provided areas used for feeding, cover, refuge, migration and contributing habitat for species-at-risk.
C. Contributing Functions – Contributing fish habitat. Transport of allochthonous materials (detritus, insects, etc.) to downstream fish-bearing reaches provides sources of food.

Table 6: Fish and fish habitat classification using data from OSAP S3.M1 module.

Fish and Fish Habitat	**Fish Observations**
Important Functions	Any fish present species present in spring and mid-summer; suitable spawning habitat for any fish species; species-at-risk present at any time; or feature provides critical habitat to downstream species-at-risk
Valued Functions	Fish present in spring only or suitable habitat identified for feeding, cover, refuge, migration; or contributing habitat for species-at-risk.
Contributing Functions	Allochthonous transport through feature to downstream habitat

STEP 4 – TERRESTRIAL HABITAT CLASSIFICATION

This section only needs to be completed if an alteration (see Part 1) is proposed.

A. Important Functions - Wetlands with breeding amphibians.
B. Valued Functions – General amphibian habitat: stepping stone habitat (stop over to higher quality habitat) or suitable for feeding or hydration for low mobility wildlife (i.e. amphibians). Wetland habitat occurs within the corridor, but no breeding amphibians are present.
C. Contributing Functions – Movement corridors: the feature has riparian conditions that connects two other features upstream and downstream (e.g. forest or wetland features that will be protected through the planning process), thereby providing movement opportunities for non-amphibian (i.e. higher mobility) species. No wetland habitat occurs within the corridor, but other vegetation may be present to facilitate wildlife movement.
D. Limited Functions – No terrestrial habitat present.

Table 7: Terrestrial habitat classification using data from OSAP S4.M10. and the Marsh Monitoring Protocol (MMP) for amphibians[1]

Terrestrial Habitat	OSAP S4.M10 Feature Type Code (and Description)	Marsh Monitoring Protocol call code
Important Functions	6 (wetland)	1, 2 or 3
Valued Functions	6 (wetland); considering wetland pockets associated with the HDF that are within 400 m of other wetlands upstream and downstream is recommended for assessing stepping stone habitat function	0
Contributing Functions	This is assessed at the landscape scale, potentially with guidance from an EIS. However, one recommendation is to use the following criteria: RC[3] = 5, 6, 7 within 0-10 m that functions as riparian habitat along corridor with the sampling point connecting two habitat features upstream and downstream to facilitate movement of wildlife through the corridor	
Limited Functions	1-5 (one of: defined channel, channelized, no defined channel, buried drainage) or 7-9 (one of: swale, roadside ditch, on-line pond)	0

[1]Both OSAP and MMP criteria need to be satisfied to fulfill the classification category.
[2] Environment Canada (2013) reviews a number of studies that consider the critical function zone from wetland habitat for amphibians. Depending on the species the critical range varies, but for some species such as Green Frog and Bullfrog, the mean range is 485 and 406 m respectively. For other anurans mean ranges are much less. Therefore, it is recommended that 400 m is a reasonable distance to wetlands when considering stepping stone function.
[3]OSAP Riparian condition (RC) codes: 1 = none; 2 = lawn; 3 = cropped land; 4 = meadow; 5 = scrubland; 6 = forest; 7 = wetland

PART 3: MANAGEMENT RECOMMENDATIONS

The Management Recommendations have been structured as a science-based decision making framework that applies the precautionary principle. Upon the evaluation (Part 1) and classification (Part 2) of the flow attributes and functions of HDFs, management recommendations for the protection, conservation and mitigation of the associated functions are to be implemented through the design of the project, including consideration for maintaining flow (e.g. stormwater management and incorporating Low Impact Development (CVC 2010; TRCA 2012; TRCA 2010). The classification categories identified in Part 2 provide the basis of the management recommendations provided here. A flow chart (Figure 2) guides practitioners through the process of translating the classification results to management recommendations.

These guidelines focus on the individual assessment and conservation of HDFs. The cumulative effects and threshold of changes downstream, however, must also be considered, especially when a significant number of HDFs will potentially be altered or replaced. In these situations, it is strongly recommended that cumulative effects be addressed through a subwatershed study that can address such issues. Although hydrological models are often used in such circumstances, other functions and synergistic effects may not be adequately assessed. Scientific tools for cumulative effects or thresholds related to concepts such as “how many and which headwater drainage features can be altered before mainstem reaches of rivers become impaired” are still lacking. There is work currently in progress that is moving towards addressing this scientific question. In the meantime, proponents and agencies are encouraged to heed the precautionary principle, and to share monitoring results to facilitate an adaptive management approach. A more holistic or stream network approach must also be looked at after individual assessments as the ecological result can be greater than the sum of all parts. Related guiding

principles, such as maintaining similar natural ratios of HDF types across a subwatershed should also be considered. Respecting and mimicking natural patterns of transition from seemingly “insignificant” HDFs individually to more intermittent channels using protection or LID may offer a better approach from an ecosystem perspective but some level of cumulative impact assessment should be undertaken to ensure the objectives of a healthy watershed are being achieved.

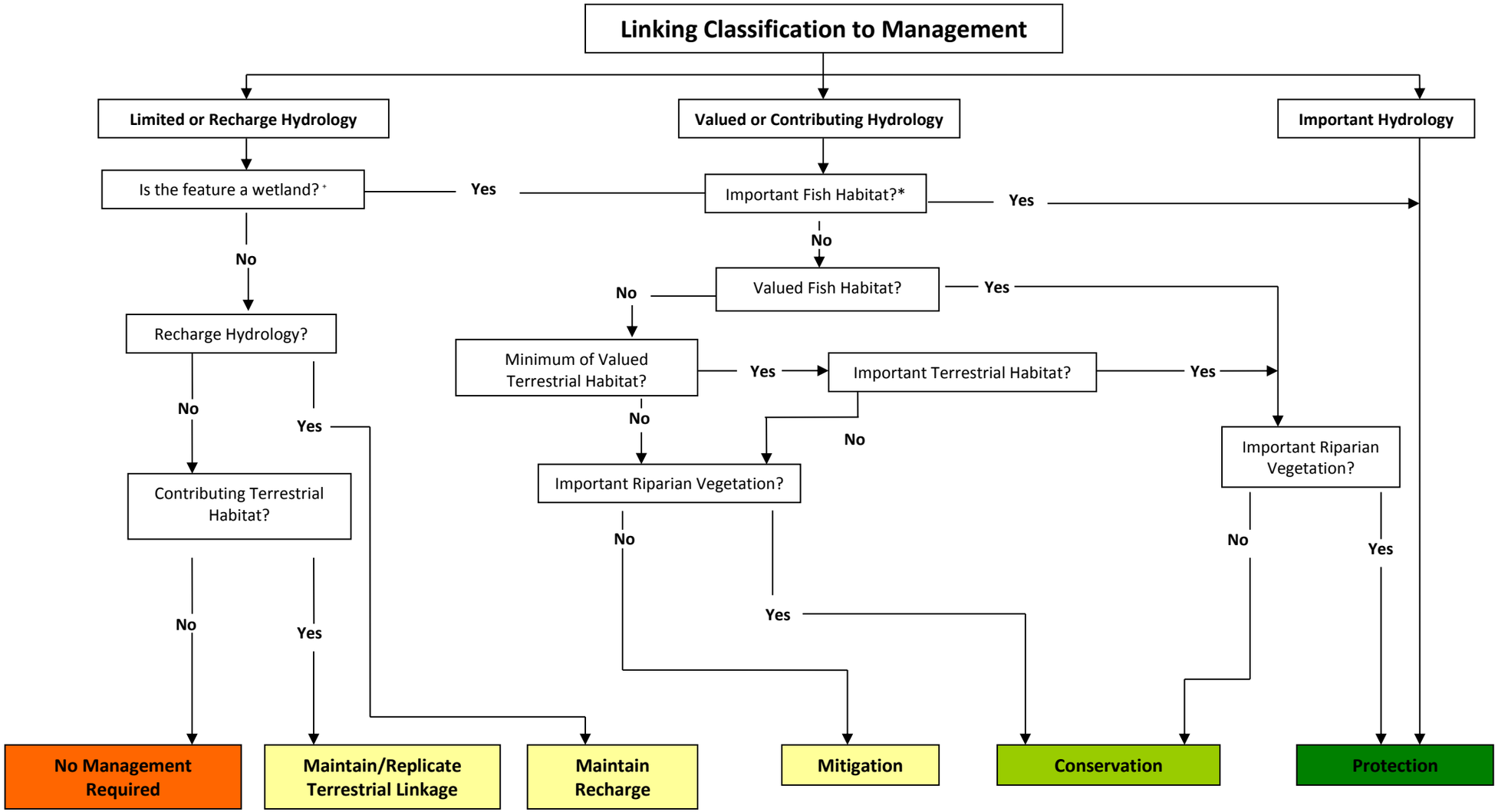
In the event that a lower level of protection is identified for a segment downstream of a segment with a higher level of protection, the more conservative approach shall be adopted for both segments and the downstream segment should be reclassified to match the upstream segment. The management options provided should be considered where efforts to relocate or redesign the proposal have been considered and alteration to the natural feature is deemed acceptable. Be aware that policies for certain areas could apply more restrictive requirements over what is presented below (e.g. fish habitat, both direct and indirect, qualifies as a Key Natural Heritage Feature in the Oak Ridges Moraine Conservation Plan, and is therefore subject to the associated policies).

NOTE: Where an HDF has been altered and/or eliminated without a permit under a conservation authority’s Section 28 Regulation, a “No Management Required” category will not be assigned, and restoration of the HDF may be required.

Summarize the results of step 1-4 in the table below.

Table 8: Summary of functional classifications and management

Drainage Feature Segment	STEP 1		STEP 2	STEP 3	STEP 4	Management Recommendation
	Hydrology	Modifiers * Identify all modifiers provide attachment with discussion regarding impacts and potential restoration options	Riparian	Fish Habitat	Terrestrial Habitat	(see Figure 2)



*Other Conservation Authority policies or other legislation with respect to wetlands, watercourses and/or species at risk need to be assessed in the context of this key.
+Note that headwater wetlands are considered to be HDFs in the context of this guideline.

Figure 2: Flow chart providing direction on management options

RECOMMENDED MANAGEMENT

A. Protection – Important Functions: e.g. swamps with amphibian breeding habitat; perennial headwater drainage features; seeps and springs; SAR habitat; permanent fish habitat with woody riparian cover

- Protect and/or enhance the existing feature and its riparian zone corridor, and groundwater discharge or wetland in-situ;
- Maintain hydroperiod;
- Incorporate shallow groundwater and base flow protection techniques such as infiltration treatment;
- Use natural channel design techniques or wetland design to restore and enhance existing habitat features, if necessary; realignment not generally permitted;
- Design and locate the stormwater management system (e.g. extended detention outfalls) are to be designed and located to avoid impacts (i.e. sediment, temperature) to the feature.

B. Conservation – Valued Functions: e.g. seasonal fish habitat with woody riparian cover; marshes with amphibian breeding habitat; or general amphibian habitat with woody riparian cover.

- Maintain, relocate, and/or enhance drainage feature and its riparian zone corridor;
- If catchment drainage has been previously removed or will be removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage), as feasible;
- Maintain or replace on-site flows using mitigation measures and/or wetland creation, if necessary;
- Maintain or replace external flows,
- Use natural channel design techniques to maintain or enhance overall productivity of the reach;
- Drainage feature must connect to downstream.

C. Mitigation – Contributing Functions: e.g. contributing fish habitat with meadow vegetation or limited cover

- Replicate or enhance functions through enhanced lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets, or replicate through constructed wetland features connected to downstream;
- Replicate on-site flow and outlet flows at the top end of system to maintain feature functions with vegetated swales, bioswales, etc. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage);
- Replicate functions by lot level conveyance measures (e.g. vegetated swales) connected to the natural heritage system, as feasible and/or Low Impact Development (LID) stormwater options (refer to Conservation Authority Water Management Guidelines for details);

D. Recharge Protection – Recharge Functions: e.g. features with no flow with sandy or gravelly soils

- Maintain overall water balance by providing mitigation measures to infiltrate clean stormwater, unless the area qualifies as an Area of High Aquifer Vulnerability under the Oak Ridges Moraine Conservation Plan (ORMCP) or Significant Recharge Areas under the Source Water Protection Act. These areas will be subject to specific policies under their respective legislation.
- Terrestrial features may need to be assessed separately through an Environmental Impact Study to determine whether there are other terrestrial functions associated with them.

E. Maintain or Replicate Terrestrial Linkage – Terrestrial Functions: e.g. features with no flow with woody riparian vegetation and connects two other natural features identified for protection

- Maintain the corridor between the other features through in-situ protection or if the other features require protection, replicate and enhance the corridor elsewhere
- If the feature is wider than 20 m, it may need to be assessed separately through an Environmental Impact Study to determine whether there are other terrestrial functions associated with it.

F. No Management Required – Limited Functions: e.g. features with no or minimal flow; cropped land or no riparian vegetation; no fish or fish habitat; and no amphibian habitat.

- The feature that was identified during desktop pre-screening has been field verified to confirm that no feature and/or functions associated with headwater drainage features are present on the ground and/or there is no connection downstream. These features are generally characterized by lack of flow, evidence of cultivation, furrowing, presence of a seasonal crop, and lack of natural vegetation. No management recommendations required.

Table 9: Summary of management recommendation and implications for development proposals

Management implications	Protection	Conservation	Mitigation	Recharge Protection[1]	Maintain Terrestrial Linkage	No Management Recommendation Required
Must remain open	Yes	Yes	Yes	N/A	Yes	N/A
Relocate using natural channel design	Not permitted, enhancement only	May be considered, not preferred	Natural Channel Design not required[2]	N/A	N/A	N/A
Maintain or replicate groundwater or wetlands	Maintain or enhance	Maintain or replicate, restore if possible	N/A	Maintain overall infiltration rates at site	N/A	N/A
Maintain hydroperiod	Yes	Yes	Yes	N/A	N/A	N/A
Direct connection to downstream	Yes	Yes	Yes	N/A	N/A	N/A
Replicate function through enhanced lot level conveyance	N/A	N/A	Replicate using bioswales, LID[3], vegetated swales or constructed wetlands	N/A	N/A	N/A

[1] Recharge zone may qualify as an High Aquifer Vulnerability Area and is therefore subject to the policies of the Oak Ridges Moraine Conservation Plan
[2]Unless the management recommendations call for restoration of lost function or enhancement and creation fish habitat
[3]LID means low impact development measures (see TRCA and CVC's Stormwater Management Criteria Document or Low Impact Development Planning and Design Guide for further detail)
Note: Replicated functions must be located downstream of stormwater management facilities.

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DEFINITIONS

Allochthonous	Energy sources derived from outside the lotic system, that is, from the terrestrial environment. Leaves, twigs, fruits, etc. are typical forms of terrestrial coarse particulate organic matter that have entered the water by direct litterfall or lateral leaf blow.
Ephemeral flow	Water flows for a short period of time in response to localized precipitation (e.g. spring freshet or storm events). Surface water channel is likely above the local groundwater table.

Furrow	A long narrow trench made in the ground by a plow, especially for planting seeds or for irrigation.
Intermittent flow	Water flows for several months during the year because of a connection with seasonally high groundwater table or flow contributions from wetlands. Typically flow ceases during the summer months (July and August).
Ill-defined feature	A feature that has limited discernible bed and/or banks due to intermittent or ephemeral flows. Typical form includes, weakly developed bed material sorting and channel meander definition.
Headwater drainage feature	Non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands, but do not include rills or furrows (also see watercourse definition).
Hydroperiod	The seasonal pattern of water level fluctuation.
Perennial flow	Continuous year-round surface flow occurs in most years. Baseflow conditions are supported by year round groundwater discharge and/or wetland/surface storage areas.
Rill	A narrow and shallow incision into soil resulting from erosion by overland flow or surface runoff that has been focused into a 'thin thread' by the soil surface texture or roughness. Generally, rills are less than 0.2 m deep and may have limited downstream/downslope extent.
Watercourse	An identifiable depression in the ground in which a flow of water occurs regularly or continuously (Conservation Authorities Act).
Wetland	land that: (a) is seasonally or permanently covered by shallow water or has a water table close to or at surface, (b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse, (c) has hydric soils, the formation of which has been caused by the presence of abundant water, and (d) has vegetation dominated by hydrophytic plants or water tolerant plants, the dominance of which has been favoured by the presence of abundant water, but does not include periodically soaked or wet land that is used for agricultural purposes and no longer exhibits a wetland characteristic referred to in clause (c) or (d) (*Conservation Authorities Act*).



WETLAND WATER BALANCE MONITORING PROTOCOL

Toronto and Region Conservation Authority
September 2016

Toronto and Region Conservation for The Living City

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Please reference this document as:

Wetland Water Balance Monitoring Protocol, Toronto and Region Conservation Authority, 2016

This document was endorsed by the TRCA Authority Board on September 23, 2016.

RES.#A142/16 - **TRCA WETLAND BALANCE MONITORING PROTOCOL**

Authority approval of TRCA's Wetland Water Balance Monitoring Protocol, a technical guideline developed to support Appendix D: Water Balance for Protection of Natural Features of TRCA's Stormwater Management (SWM) Criteria document (2012) and The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority.

Moved by: Jennifer Innis
Seconded by: Jack Heath

AN AMENDMENT WAS ADDED TO THE RESOLUTION:

AMENDMENT

RES.#A143/16 - THAT the following be inserted before the last paragraph of the main motion:
THAT staff report back after two years on the results of the monitoring;*

Moved by: Jennifer Innis
Seconded by: Jack Heath

THE AMENDMENT WAS CARRIED; THE MAIN MOTION, AS AMENDED, WAS CARRIED;
THE RESULTANT MOTION READS AS FOLLOWS:

WHEREAS Toronto and Region Conservation Authority (TRCA) staff review and provide advice on applications for development and site alteration affecting wetlands under the planning, environmental assessment and permitting processes;

WHEREAS in 2014 and 2015, in response to requests from the development industry for more technical guidance, TRCA staff developed the draft Wetland Water Balance Monitoring Protocol to articulate TRCA objectives and study requirements for establishing a water balance monitoring program for the protection of wetland hydrology through the development process;

AND WHEREAS in 2015, TRCA staff sought input on the draft Protocol from partner municipalities, provincial agencies, the Building Industry and Land Development Association (BILD), consulting firms, and neighbouring conservation authorities, and have now finalized the Protocol based on the input received;

THEREFORE LET IT BE RESOLVED THAT the Authority endorse the TRCA Wetland Water Balance Monitoring Protocol for use by proponents of development and infrastructure, consultants, and TRCA staff in the planning and development submission, review and approval process;

THAT staff report back after two years on the results of the monitoring;*

AND FURTHER THAT the Ministry of Natural Resources and Forestry, Ministry of Transportation, Ministry of the Environment and Climate Change, Ministry of Municipal Affairs and Housing, regional and local municipalities in TRCA's jurisdiction, Conservation Ontario, and neighbouring conservation authorities be so advised.

*Note: by this it is meant that TRCA staff will report back to the Authority two years after the Monitoring Protocol has been in use.

TABLE OF CONTENTS

1. INTRODUCTION

This *Wetland Water Balance Monitoring Protocol* has been produced to provide consistent guidance to proponents of urban development, infrastructure or water extraction applications (e.g. water taking, pits, quarries, etc.) where they have the potential to impact wetland features. The guidelines assist in developing monitoring programs and associated reporting, once it has been determined through the planning, environmental assessment, or permitting processes that a wetland water balance analysis is required. Pre-development monitoring programs will include 1-3 years of monitoring, depending on planning stage and scope considerations (for further detail, see Figure 1). Post-planning monitoring, including both during and after construction, will be determined on a site-by-site basis.

This Monitoring Protocol is intended to be applied where it has been determined through the environmental assessment and planning processes that a wetland will remain on the landscape as a natural feature, and includes constructed natural wetlands, but excludes stormwater management ponds and wastewater polishing wetlands. A water balance may be required for a variety of types of development applications, as determined through consultation with TRCA, depending on the scope and scale of anticipated impacts and the sensitivity of natural features. A water balance is unlikely to be required for linear infrastructure, such as roads and railways, where TRCA's regular permitting process will generally be sufficient to address potential impacts to natural features and associated mitigation options (e.g. equalization or micro-drainage culverts under the road or railway).

Hydrology is the scientific study of the properties, distribution, and circulation of the water on Earth and in the atmosphere in all of its forms. It is a key factor that determines a wetland's ecological composition, structure and function. One of the most significant impacts to wetlands caused by land-use changes is the alteration of wetland hydrology. As natural cover is replaced by impervious cover and runoff is efficiently directed towards drainage conveyance systems, the components of a wetland's water balance may become highly altered, changing a wetland's natural hydrological regime. Similarly, large-scale groundwater withdrawals or aggregate extraction activities have the potential to reduce flows to wetlands with strong hydrological connections to aquifer systems.

For a glossary of terms, refer to Appendix D of the Stormwater Management Criteria (TRCA, 2012).

A *water balance* is the accounting of the inflows and outflows of water in a system, which are attributed to the various components of the hydrological cycle. The water balance includes, for example, the amount and timing of surface and/or ground water flow that feed a wetland and allow it to function as habitat for flora and fauna. Changes to the wetland's hydrology can have negative impacts on the ecology of the wetland. In order to assist in mitigating these impacts, the *Water Balance for the Protection of Natural Features* criteria were developed as outlined in Appendix D of the Stormwater Management Criteria Guideline (TRCA, 2012). This protocol is intended to provide additional clarity on completing Step 2 and Step 6 in Appendix D, and should be used in conjunction with them. A summary of the steps presented in Appendix D of the SWM Criteria Guideline is provided at the end of this document as Appendix 1, to illustrate how the Monitoring Protocol fits into the overall water balance process.

The pre-development monitoring data are to be used to:

1) Develop a calibrated wetland water balance model for existing conditions;
2) Collect data that can be used to compare pre-to-post development conditions; and
3) Guide mitigation efforts during and after construction.

The data obtained through the monitoring process will be used to assess the water balance for the wetland, evaluate the effectiveness of mitigation measures applied to reduce impacts on wetlands, and to facilitate adaptive management (post-construction adjustments to infrastructure to achieve desired results). To gather usable and effective data, it is necessary to develop a study design and monitoring program that is capable of achieving the desired objectives as outlined in the SWM Criteria guidelines. The appropriate water balance components need to be quantified and results must be presented clearly during reporting.

1.1 Wetland Water Balance Study

In 2012, TRCA and CVC initiated a long-term study (i.e. 10+ years) that is intended to examine the biological and hydrological relationships in wetlands, as well as the hydrological impacts of land use development on natural heritage features. The study is initially focusing on wetlands, with watercourses and woodlands to be studied in later phases of the project. In large part, the intent of this project is to gain a better understanding of wetland hydrology and the sensitivity of different wetland communities to hydrological changes. We are also experimenting with various instrumentation methods, modelling analyses and mitigation approaches to identify and disseminate best practices. This work will include the development of tools, such as this monitoring protocol, that will be used to provide additional direction on the water balance analysis process as the study progresses, and will ultimately provide information to inform future updates to TRCA's and CVC's stormwater management criteria guidelines. The insights garnered through the study will assist with future land-use planning, impact assessment, and mitigation. As a secondary benefit, the study may also enhance our understanding of wetland ecological goods and services (e.g. flood attenuation, groundwater recharge, etc.) and provide insights into wetland restoration initiatives.

The *Wetland Water Balance Monitoring Protocol* will be a living document and will be informed by findings of the CVC and TRCA study. Lessons learned will be used to update and improve the Protocol over time in order to ensure regulatory and policy mandates are achieved in the protection of these sensitive natural features.

1.2 Wetland Water Balance in the Planning and Development Process

It is critically important that baseline monitoring occurs early on in the planning process, as comprehensive monitoring requires three years of baseline data. It is also essential that consultation with the conservation authority and municipality occur throughout the process to ensure that information provided is useful and complete. Figure 1 below outlines the information inputs required at each step within the planning process, as well as outputs that should result from that stage. For simplicity, and to recognize that planning processes vary from municipality to municipality, we have categorized the planning process into early, intermediate, and late planning stages.

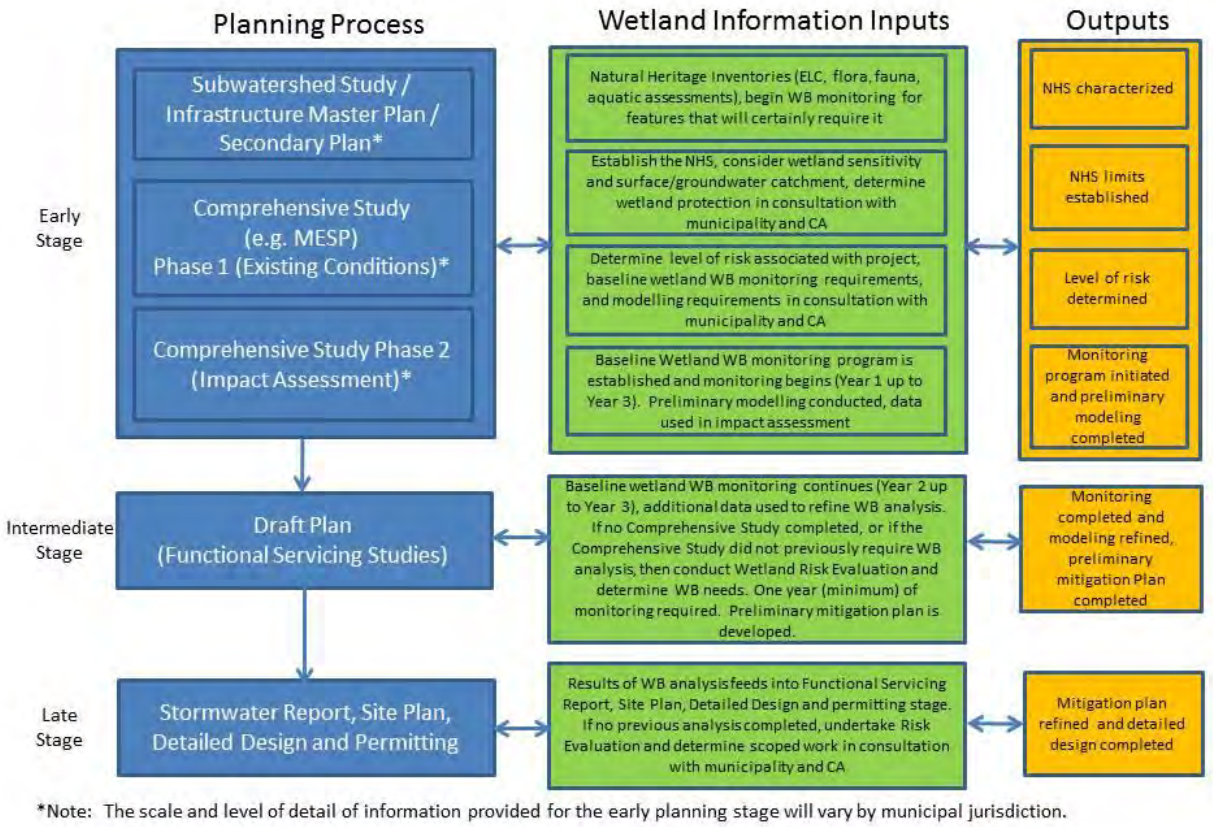


Figure 1: Wetland Water Balance in the planning process

Early Stage

The early stage is comprised of subwatershed studies and/or secondary plans, Infrastructure Master Plans, and Phases 1 and 2 of Comprehensive Studies, such as Master Environmental Servicing Plans (MESP), which include both existing conditions and impact assessment for the proposed development. During the early stage, natural heritage inventories will be undertaken to characterize the ecological features and their functions. It is recommended that during the early stage water balance monitoring be initiated for features where there is a high level of certainty that this type of monitoring will be required later on (e.g. Provincially Significant Wetlands). Also, during the early stage, typically the natural heritage system (NHS) is established based on the features and functions identified. The limits of the NHS should consider wetland sensitivities and protection requirements in consultation with the municipality and the conservation authority. Natural Heritage System limits for sensitive features should accommodate surface water catchments and groundwater recharge areas contributing significant quantities of water to features. In instances where this is accomplished, the need for a water balance analysis is typically negated.

Where the protection of the wetland's surface water catchment and recharge areas is not achieved, the requirement for a water balance analysis will be determined. In consultation with the conservation authority and municipality, the level of risk to the wetland from the proposed development will be

determined based on the sensitivity of the wetland and the scope and scale of changes to water inputs and outputs. The level of risk will help determine whether a water balance analysis is required, and the level of effort required for monitoring and modelling analysis. We reiterate that water balance monitoring and modelling can be avoided by eliminating or reducing development or water extraction/discharge activities within the surface and groundwater catchments of the wetland.

Once the level of risk is classified and the monitoring requirements are determined, then the baseline wetland water balance monitoring program is established. A minimum total of three years of monitoring is required in instances where the early stage of planning includes wetland water balance monitoring in the terms of reference. Between 1 and 3 years of monitoring are completed during the early stage with any remaining years completed during the intermediate stage. These data are used as inputs for preliminary modelling conducted as part of the initial impact assessment.

The outputs of this stage are:

1) Characterization of the NHS;
2) Establishment of NHS limits;
3) Determination of the level of risk to the wetland(s);
4) Initiation of baseline monitoring; and
5) Completion of preliminary modelling.

Intermediate Stage

The intermediate stage includes the functional servicing studies in support of Draft Plan approval. At this stage, wetland water balance monitoring continues in order to complete the required three years of monitoring, if it was not completed during the early stage. Preliminary mitigation options should be identified at this point, and a mitigation plan developed to ensure that mitigation features are properly accommodated in the functional servicing design. Ideally, flexibility would be built into the design of mitigation features to allow for any necessary post-construction adjustments resulting from discrepancies between modelled and actual system behaviour. Draft Plan approval would follow completion of a minimum of 3 years of data collection; data collection will not be permitted to be a condition of Draft Plan approval. While the first year(s) of data are used to undertake preliminary modelling in the early stage, the second and/or third years of data are used to refine the modelling analysis and impact assessment during the intermediate stage.

In the event that no comprehensive study was previously completed, or if the comprehensive study did not include wetland water balance as part of the terms of reference, and it is determined that a water balance analysis is required for the wetland, a minimum of one year of monitoring is required.

The outputs of this stage are:

1) Completion of monitoring;
2) Refinement of the modelling analysis; and
3) Development of a preliminary mitigation plan.

Late Stage

The late stage includes stormwater management reports and detailed design in support of the site plan and permit approvals. At this stage, the results of the water balance analysis completed at the intermediate stage feed into the development of the detailed design in support of final approvals. If

water balance analyses were not previously completed, then determine scoped work in consultation with the conservation authority and municipality. As stated previously, we recommend including flexibility where possible in the design of the mitigation features to allow for some degree of post-construction adjustment to flow conveyance systems, if necessary.

The outputs of this stage are:

1) Development of a mitigation plan, if not completed earlier; and
2) Completion of detailed design.

2. WETLAND WATER BALANCE EQUATION

The wetland water balance equation is used to understand a wetland's hydrological dynamics and to quantitatively describe a wetland's inputs and outputs. There are seven components to a wetland water balance that play varying roles in the model depending on a wetland's hydrological regime. Given that some small components may still make important contributions to water quantity and water chemistry at critical times of the year, all of the water balance components must be considered in order to understand the inputs and outputs of the system. The contribution of water balance components may differ between the pre-to-post development scenarios. The equation can be described as the change in storage being equal to the inputs minus the outputs, as follows:

Change in Storage = Inputs – Outputs

$$\Delta S = P + S_i + G_i - ET - S_o - G_o$$

S = Storage
P = Precipitation
S_i = Surface water inflows
G_i = Groundwater inflows
ET = Evapotranspiration
S_o = Surface water outflows
G_o = Groundwater outflows

The *hydroperiod* of a wetland is the seasonal pattern of water level fluctuation, i.e. the change in the storage component of the water balance. It is determined by the cumulative influence of all the water balance components. Through its influence on the extent of aquatic habitat and the range of water and soil moisture conditions experienced throughout the year, the hydroperiod determines to a large extent the species that can exist within a wetland. Any given species will have a range of conditions it can tolerate, and may also have threshold conditions that preclude its survival. For instance, some frogs require standing water during the spring breeding period but not later in the year, and may be preyed on by fish in perennially flooded environments. Similarly, many treed swamps require dry periods during a portion of the year, even if only for short durations, to ensure root respiration can occur to allow trees to survive. See the text box below and Figure 2 for a description and visual representation of a hydroperiod analysis.

Hydroperiod Analysis

There are five components of the wetland hydroperiod that are important to understanding the eco-hydrological processes and monitoring needs of the wetland:

***Frequency*– how often a water level above a given magnitude recurs over some specific time interval**

***Duration*– the period of time associated with a specific water level condition (e.g. standing water)**

***Timing*– the time of year at which a specific water level condition occurs, which may be of ecological significance**

***Magnitude*– the maximum and minimum water levels or flow conditions over a given time period**

***Rate of change*– how quickly water levels or flows change from one magnitude to another (i.e. flashiness).**

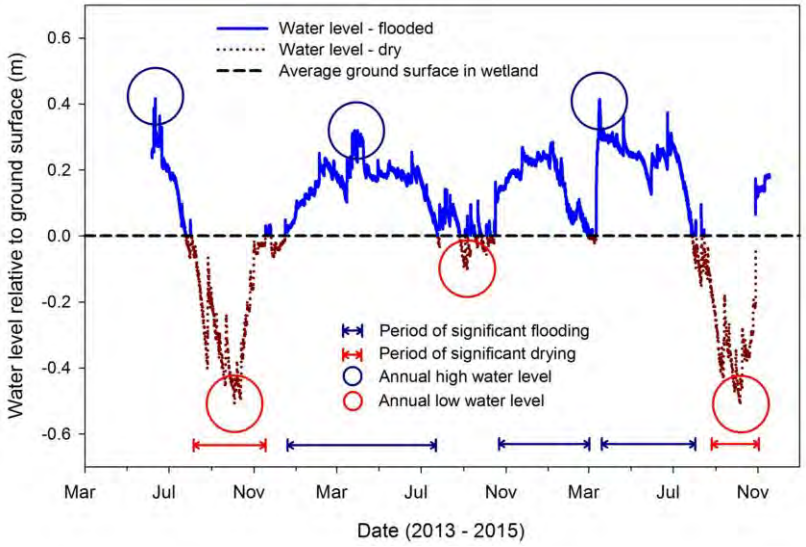


Figure 2: An example of a visual analysis of a hydroperiod over 3 years of baseline monitoring; highlighted on the hydroperiod are the annual minimum and maximum water levels (*magnitude*), the *timing* of these events, and the *duration* and *frequency* of conditions where the water level is consistently either above or below the average ground surface for extended periods.

The steps outlined in Section 3 below will help determine which water balance components are important to the wetland in question. Note that the version of the water balance equation presented here does not include a residual or error term, but that it is nonetheless important to estimate the degree of uncertainty associated with each water balance component. It is also important to note that the S_i and S_o terms include interflow for the purposes of the modelling exercise as surface water models tend to be better equipped to accommodate interflow. This is in contrast to the definition provided in Appendix D of the SWM Criteria Guideline (TRCA, 2012) which suggests that interflow is considered to be a component of the groundwater system. Interflow is an important component to consider since it affects conditions in the shallow subsurface where the roots of vegetation occur.

3. DESIGNING A WETLAND WATER BALANCE MONITORING PROGRAM

A multi-disciplinary team of ecologists, hydrologists, and hydrogeologists must be involved in the process of developing a wetland water balance monitoring program.

Step 1 – Framing the questions to guide monitoring program design
At the initial stages of designing a wetland water balance monitoring program, there are a number of questions that need to be contemplated. Some of these questions may be answered easily with existing/secondary data (Ecological Land Classification, topographic mapping, etc.—see Step 2 below) while others must be tested through the monitoring program. Below is a list of general questions; however, there may be other questions that arise through consultations with the conservation authority and/or the municipality:

- What types of wetland units will be affected by the proposal, and how many of them are there?
- What is the shape and size of the wetland and its catchment?
- Are the wetland units mainly groundwater-fed or surface water-fed? Does this change throughout the year?
- What is the size and location of the up-gradient area that may be contributing significant groundwater inputs?
- What are the surficial soils and what is the physiography of the area?
- What are the existing land-uses and drainage patterns within the catchment (e.g. tile drains, crop/vegetative cover, topography, etc.)?
- Are the wetland units connected hydrologically? What are the hydrological flow paths associated with the wetland units?
- Is the wetland type isolated (internally draining), palustrine (intermittent/no inflow and intermittent/permanent outflow), riparian, or lacustrine?
- What is the hydroperiod of the wetland units?
- What are the ecological functions that may be sensitive to changes in hydroperiod?

While study questions are framed at the beginning of the study design process, this process is iterative and additional questions may arise once the wetland characterization and data collection steps are underway. It is important to document the questions. In the steps that follow, we examine how to answer the questions through data collection.

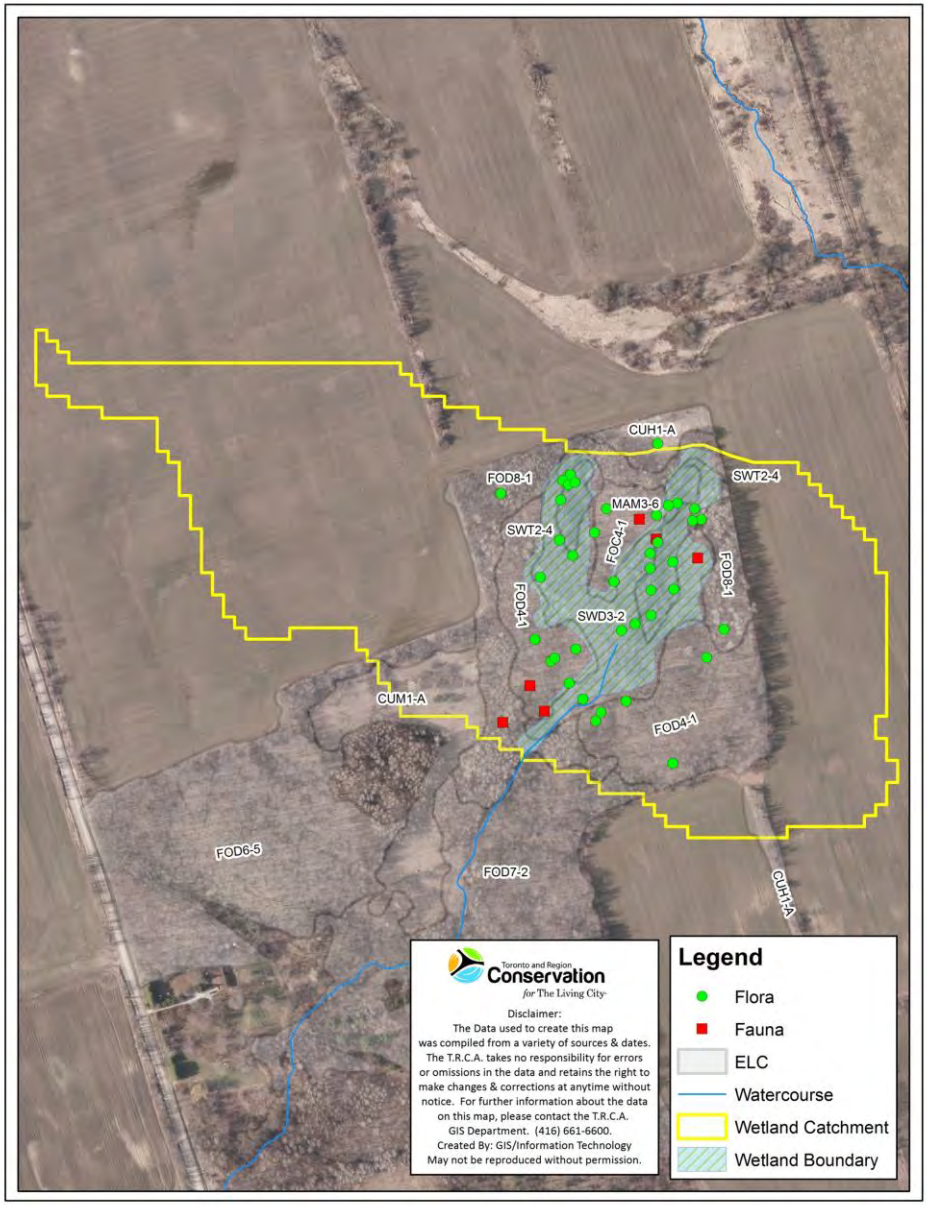
Step 2 – Characterizing the wetland ecology and hydrology
The next step in designing an effective wetland water balance monitoring program is developing an understanding of the dynamics and sensitivities of the system through initial information collection. Various sources of information can be used to characterize the wetland ecology and hydrology including existing/secondary information and site surveys. If existing information is used, a reconnaissance survey of the site is required to confirm previous findings and validate assumptions made upon reviewing this information (e.g. confirming an outflow exists at a palustrine wetland). At a minimum, the following information needs to be gathered and reviewed:

- Detailed topographic mapping and/or wetland bathymetry (as precise as possible, e.g. 25 cm; capture highs and lows within the wetland for hummocky wetlands,). Surveying during late autumn or spring can reduce constraints caused by leaf cover.
- Surficial soils mapping and/or physiography

EXAMPLE - Characterizing the wetland

This map of a study wetland illustrates data obtained at the initial information collection stage. This information provides a good initial understanding of the wetland's dynamics and sensitivities.

The wetland is palustrine as there is a concentrated flow path at the outflow. There are two hydrologically connected wetland units in this single wetland. It contains sensitive flora and fauna (e.g. spring peepers).



- Surface water catchment area
- Position within regional hydrogeologic context
- Significant groundwater recharge area / groundwater catchment (if applicable)
- Flow measurements at any concentrated inflow or outflow locations
- Groundwater indicators (e.g. mottles, gleys)
- Description of the wetland vegetation communities (Ecological Land Classification or Ontario Wetland Evaluation System)
- Species of conservation concern, including L-ranks
- Presence of any Significant Wildlife Habitat

Step 3 – Developing the conceptual model

Once the wetland ecology and basic hydrology have been characterized, the next step is to develop the conceptual model. The components of the wetland water balance equation that affect the wetland need to be determined on a site-specific basis. For example, some wetlands will have an outflow into a defined surface water feature with a measurable S_o (see Section 2). Other wetlands may be internally draining (S_o=0), and are only linked to the downstream surface water system through a groundwater connection.

Each of the various components of the water balance equation, including evapotranspiration, will need to be measured or estimated independently. It may be valid to assume the $\triangle S$ term is zero where water levels remain very stable, but it should be estimated where water levels change over the duration of the monitoring period. Because the calculation of a component may contain errors, the equation may not always balance. An estimation of the measurement error within each component should be attempted to determine which terms may contain the largest proportion of error in the water balance.

Step 4 – Data collection and instrumentation

The collection of baseline data is important as it sets the parameters to be measured for the duration of the monitoring period. Without proper baseline data, it is impossible to compare future data to the pre-development scenario.

The wetland sensitivities established in Step 1 and 2 will help determine the targets and scope for wetland monitoring. The level of risk that the project poses to the wetland will inform whether a comprehensive or scoped monitoring program is required. Ongoing monitoring of ELC, flora and fauna may be part of a monitoring program not specific to wetland water balance monitoring, such as species at risk monitoring. However, monitoring of flora and fauna beyond the inventories completed during the NHS characterization phase of the Early Planning Stage (see Figure 1) is not a requirement of wetland water balance monitoring. The main goal of wetland water balance monitoring is to ensure that the wetland's hydrological conditions will persist following development, thereby enabling the suite of flora and fauna species reliant on those conditions to also persist. However, other stressors may influence their absence from the wetland after development. Nevertheless, ecological data could still be useful in helping to assess the efficacy of mitigation measures.

In the event that ecological data are collected for another purpose, the monitoring protocols used to collect these data must adhere to standard data collection protocols for amphibians, birds and vegetation communities. See TRCA's Environmental Impact Study Guidelines (TRCA, 2007) for further detail, but note that these guidelines only detail point-in-time methods. TRCA 2011 (a, b, and c) outlines

methodologies that have been developed for long-term monitoring purposes, albeit at the regional scale. The specific metrics used to track changes over time should be established during this step.

Targets and triggers for remedial action, where necessary, will be defined prior to the start of construction in consultation with TRCA and the municipality. These will be defined in terms of the relative difference between the hydroperiod in the post-development scenario and baseline monitoring data. Any required triggers and interim mitigation measures should be included on approved development plans.

Monitoring and Reporting Tips

- Provide a map showing the wetland boundary and its catchment. Include mapping of any relevant factors that could influence baseline conditions (e.g. tile drains, culverts, grading changes, etc.)
- All variables to be measured should be identified at the baseline data collection stage and should remain consistent throughout the data collection process to facilitate proper comparison over time.
- During design of the monitoring program, establish the monitoring metrics to be tracked over time in consultation with conservation authority and municipal staff.
- Data should be presented consistently throughout the years using the same scales. Each reporting year should include summary tables and charts which show year-over-year comparisons.

There are many types of instrumentation that can be used to collect data to determine a wetland's water balance. The amount of instrumentation at a particular site will be dictated by site conditions, such as vegetation communities and wetland bathymetry. Not all equipment will be required at all sites; however, at minimum, nested piezometers (one deep and one shallow) and one staff gauge will likely be required at each defined inflow and outflow point to characterize each wetland. Refer to Figure 2 and Figure 3 for examples of drive-point piezometers and monitoring wells, respectively. It is important to use a high-precision digital GPS or other surveying system to obtain accurate elevation measurements of all water level instrumentation. This allows comparison of water levels at different locations and screened depths throughout a site. Precipitation data can be obtained through the conservation authority's rain gauge network. Evapotranspiration measurements or estimates can be compared to data collected by TRCA. Various other types of instrumentation are outlined in Table 1 below.

Table 1: Summary of monitoring equipment/techniques and their descriptions.

Instrument /Technique	Variable	Description
Piezometer	G_I and G_O	Piezometers are vertical pipes installed within and/or around the wetland that contain a short screen. They are used to monitor groundwater elevations in a particular geological formation, and are typically installed by hand. Nested, or paired, piezometers, one shallow and one deep, are required to determine vertical hydraulic gradients (recharge versus discharge). A minimum vertical distance of 1 m between screens is recommended for this purpose. Groundwater levels should be recorded with a data logger using an hourly time-step. Piezometers should ideally be installed to capture the full range of water level variation above and below ground. Barometric pressure loggers are required to correct for atmospheric pressure changes.
Monitoring well	G_I and G_O	A monitoring well is an instrument that is installed outside the wetland to measure lateral groundwater movements around the wetland. These wells are typically deeper than piezometers, contain a longer screen, and are usually drilled in upland areas using machinery. At least three triangulated monitoring wells are required to determine the direction of groundwater flow within the wetland's catchment.
Rain Gauge	P	A rain gauge is typically used to record rainfall at 15-minute or finer resolution intervals, or on an event basis. A variety of techniques exist for estimating water contributions from snowpack. Both of these data may be available from nearby existing rain/snow gauges, depending on site location. Ask the conservation authority for available data.
Staff Gauge	ΔS	Staff gauges measure the change in surface water storage within the wetland and help to define the hydroperiod of the feature. These can be installed by hand within depression areas. Water levels should be recorded with a data logger using an hourly time-step.
Flow Meter	S_I and S_O	A flow meter measures concentrated inflow or outflow discharges, but cannot be left in place with a data logger. They can either be used in an engineered structure (e.g. culvert), or in conjunction with a series of stage measurements to develop a rating curve. However, this equipment needs to be paired with a level logger in order to generate continuous stage data.
Flume or Weir	S_I and S_O	A flume or weir measures surface inflow or outflow water levels at a point of concentrated flow. These water levels are then matched to pre-calibrated rating curves in order to estimate discharge. Water levels should be recorded at hourly or finer resolution. Check with the CA to ensure that the flume or weir does not alter the hydrology or limit fish passage.
Hydraulic Conductivity Tests	S_I, S_O, G_I, and G_O	Various methods including slug tests, bail tests, and short-term pumping at piezometers may be used to assess the hydraulic conductivity of the subsurface soils. Proper characterization of wetland soils is particularly important when infiltration within the wetland is a dominant component of the water budget (i.e. internally-drained wetlands).
Boreholes	S_I, S_O, G_I, and G_O	Boreholes are useful for determining the composition of soils within the catchment or the wetland in order to understand the stratigraphy (e.g. to help determine the location of well screens). Boreholes are drilled using machinery, or hand-augured soil cores may be taken within the wetland itself to avoid unnecessary disturbance.

Examples of Equipment

Photo Credit: Steve Usher

Figure 2: Typical construction of mini-piezometers (left) and mini-piezometer tips (right).

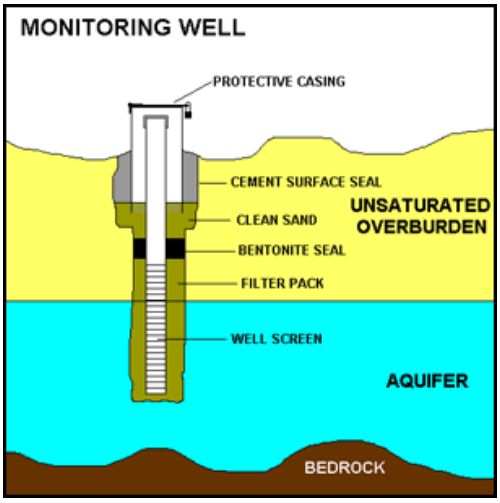


Photo credit: Geologic Resources

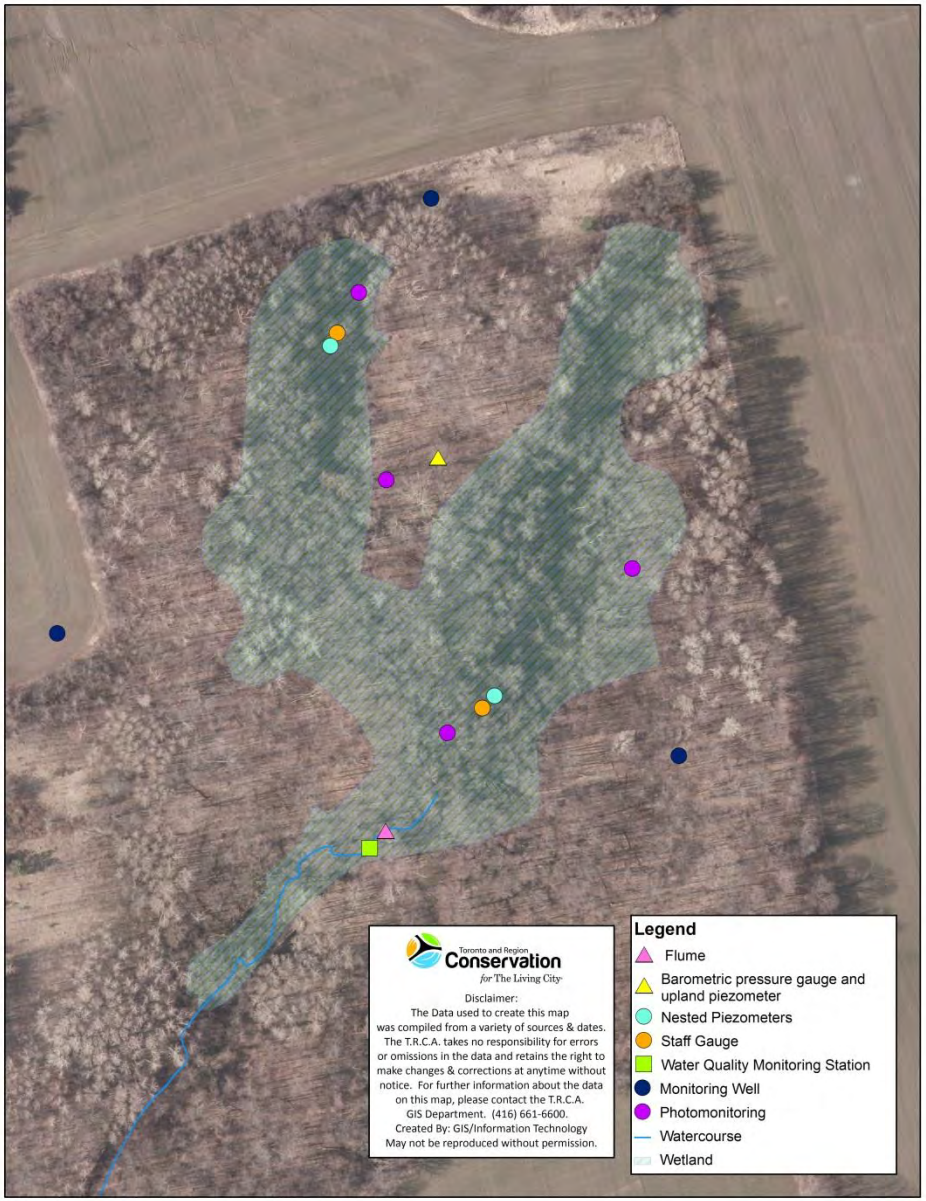
Figure 3: Monitoring well schematic

Some references for standard monitoring well and piezometer installations are provided at the end of this document.

EXAMPLE – Data collection and instrumentation

This map illustrates the various types of instrumentation that can be installed at the study site and the locations that were selected for their installation.

A flume or flow meter/level logger can be used to measure the outflow discharge. One nested piezometer, one surface water well, and a photo monitoring station are shown in each wetland unit. Monitoring wells are distributed around the wetland to establish the direction of groundwater flow. A barometric pressure gauge is located between the wetland units.



Step 5 – Phasing and timing

There are several phases in a wetland water balance monitoring program and determining the timing and duration of the data collection period is an important part of the study design. Data collection will occur during three phases: the baseline (pre-development) phase, the development phase and the post-development phase.

The data collected during the pre-development phase will be used to calibrate and verify the existing conditions water balance model. A minimum of one full year of baseline data is critical to this process; however, more baseline years will assist in accounting for climatic and ecological variability, errors or data gaps. At sites where the need for a wetland water balance has been identified early, and which involve a longer planning process such as a subwatershed plan, a block plan or a Master Environmental Servicing Plan, three years of baseline data collection is typically required. Where fewer years of data have been collected, it will be necessary to ensure that the data quality is high and that the data are placed within the context of a long-term data set (i.e. to determine whether the monitoring period is normal or extreme relative to 30-year climate averages). If it is a climatologically extreme year, effort should be made to understand how the wetland would function in an average year. This can be done using baseline meteorological data provided by TRCA and based on the conceptual model of the wetland's hydrology, or using a calibrated model where one has been developed.

The study design will determine in what years and for how long data collection must continue. It is important that the monitoring data is collected for several years into the post-development phase to verify the effectiveness of mitigation measures, once

Installation Tips

- Use data loggers with a minimum 10 m range to ensure that all data are captured both pre- and post-development.
- When manually installing piezometers or wells and there is standing water, ensure that you pre-mark the side of the casing at the appropriate place accounting for the water level to ensure that the instrument is pounded to the correct depth.
- Ensure that wells are properly vented using either specially designed caps, or by drilling or grinding a hole or slit into the well just below the top of the casing
- Use existing water level data (if available) to determine how much stick-up is required. The top of the well casings should never be submerged. Similarly, wells should be installed such that they capture the entire range of water level fluctuations below ground, where possible.
- Ensure that the elevation survey captures the ground elevation and stick-up (i.e. the top of the pipe protruding from the ground) at the piezometer/well.
- Drill a few boreholes prior to installation in order to know how deep instruments need to go. The screens should be pounded into till or mineral soils where possible to avoid leakage into wells through the organic layer.
- Ensure that you record the length of the wells, cable lengths, and lengths of screens.
- Ensure that manual measurements are taken a minimum of seasonally, but preferably monthly, to corroborate automated water level measurements.

implemented, in maintaining water balance to the wetland. This will require structuring the monitoring program around phases of development rather than designing the program for a certain period of time.

Data Management Tips

- Ensure that water level data collected using pressure transducers match manual water level measurements.
- Manual measurements can be used to "anchor" water levels at a point in time if elevation reference points change or if transducers drift from factory calibrations of pressure. Further technical details outlining this process are provided in Appendix 2.
- Time-stamped photographs can also be useful in corroborating water levels.
- Make sure that any suspicious or unreliable data are deleted prior to analysis
  - Delete unusual data occurring during field activities, such as during installation and removal of equipment.
  - Ensure that rates of change in water level make sense given other relevant data (e.g. precipitation, evapotranspiration, surface water outflow rates).
- Beware of water level data from wells screened in low-permeability layers; "recovery curves" as water levels rebound following installation can extend for days to months, and are not representative of the true hydraulic head within the hydrogeologic layer. Other artefacts can also affect wells in very low-permeability environments

4. Post-Planning Monitoring Phases

While the monitoring program begins with the initial data collection and installation of the instrumentation, the program continues through the development and post-development phase. This process is outlined visually in Figure 4. The development and post-development phases may require different approaches if the findings of the monitoring program suggest that monitoring locations, frequency, or instrumentation need to be adapted to ensure that the stated monitoring objectives are achieved.

Development Phase

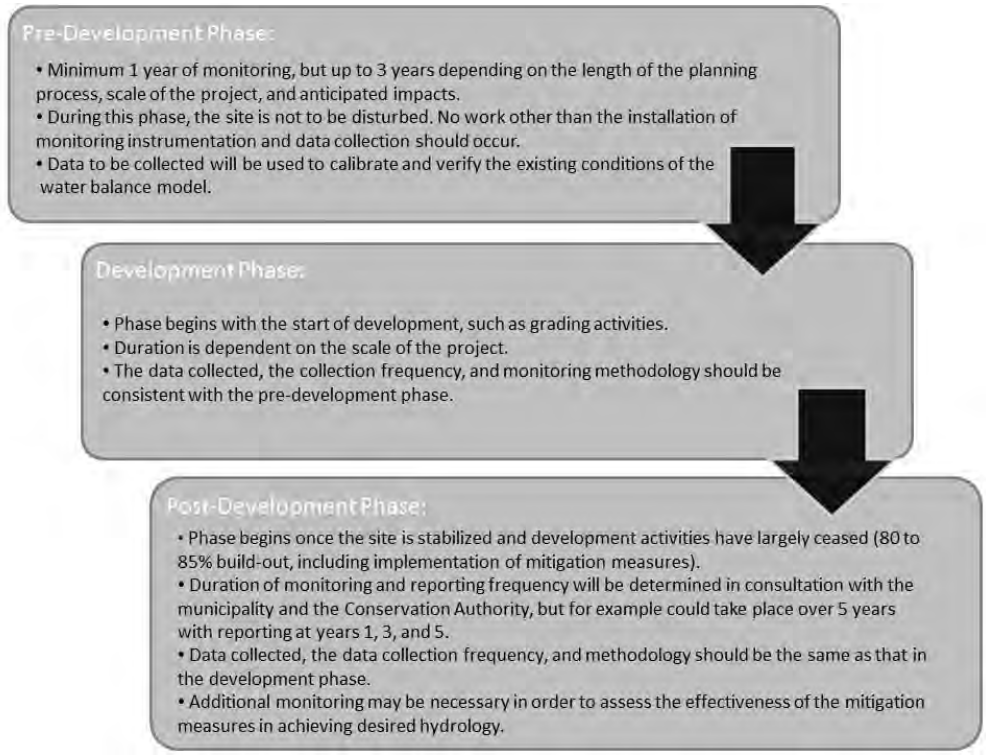
Development phase monitoring is necessary to ensure that the wetland is protected during the construction and pre-mitigation period. The data collection program that was initiated at the pre-development stage will continue into the development phase. Water quality data should also be collected as part of the monitoring program during this period. The photographic monitoring that began at the initial information collection stage should also continue throughout construction.

On large construction projects, there is often a substantial amount of time when a wetland's groundwater or surface water catchment has been altered, but mitigation measures have not yet been implemented. In these cases, it may be necessary to use triggers which initiate interim mitigation measures to protect the wetland. Triggers are defined in terms of specific hydroperiod conditions observed within the wetland. Interim mitigation measures may include pumping water into or out of the wetland to restore water levels if disturbances to the surface water or groundwater catchments have caused a wetland to become too dry or wet. Any required triggers and interim mitigation measures should be determined prior to the commencement of construction in consultation with the municipality and the Conservation Authority, and included on approved development plans.

Post-Development Phase

As discussed above, a monitoring plan must include a post-development data collection phase that should continue for a predetermined period. Post-development data collection is required to characterize the new wetland hydrology following construction and to understand any changes to the wetland's ecological function. The hydrological monitoring instrumentation should remain in place post-development for a period agreed upon with the agencies, and continuous hydrological data should be collected during these years. The first year of post-development data collection may begin at 80-85% build-out as long as all mitigation measures designed to protect wetland hydrology have been implemented. As the purpose of post-development monitoring is to capture the passive operation of the mitigation system, this phase of the monitoring may not begin until these measures have been fully implemented.

Figure 4 – Phasing and timing of monitoring program



5. REPORTING

Reporting of the findings of the wetland water balance monitoring work should occur at key points throughout the various stages of development. The baseline data requires assessment prior to finalizing a water balance mitigation design and should be submitted to review agencies during the mitigation design process to ensure the mitigation strategy will be effective. It is important that data is presented in the same units and on the same scales at all monitoring locations and all stages throughout the water balance process.

Development phase reporting will vary from project to project. For example, if triggers for action during construction have been deemed necessary, development phase reporting frequency may be more intensive. The increased frequency of reporting will ensure that certain hydrological thresholds are not exceeded or, if they have been exceeded, that appropriate action has been taken. A schedule for development phase reporting should be developed at the monitoring program design stage and will be informed by the predicted impacts of the project on the wetlands to be protected.

Post-development reporting allows for an evaluation of the overall project as well as for the potential for adaptive management. This could mean reporting at the end of years 1, 3 and 5 post-development, as an example. This final reporting stage is integral to furthering our understanding of wetland water balance modelling and the effectiveness of mitigation measures and thus promoting the long-term health of wetland communities.

6. REFERENCES

TRCA Environmental Impact Statement Guidelines, Toronto and Region Conservation Authority, November 2007.

TRCA Wetland Vegetation Monitoring Protocol: Terrestrial Long-term Fixed Plot Monitoring Program, Toronto and Region Conservation Authority, November 2011a.

TRCA Wetland Amphibian Monitoring Protocol: Terrestrial Long-term Fixed Plot Monitoring Program, Toronto and Region Conservation Authority, November 2011b.

TRCA Wetland Bird Monitoring Protocol: Terrestrial Long-term Fixed Plot Monitoring Program, Toronto and Region Conservation Authority, November 2011c.

Stormwater Management Criteria, Toronto and Region Conservation Authority, August 2012, v.1.

Well Installation References:

Aller, L., T. W. Bennett, G. Hackett, R.J. Petty, J.H. Lehr, H. Sedoris, D.M. Nielson, and J.E. Denne. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells, U.S. Environmental Protection Agency, 1991.

Protocol for the Contaminated Sited Regulation Under the Environment Act, Protocol No. 7: Groundwater Monitoring Well Installation, Sampling and Decommissioning, Yukon Environment, 2011.

Alberta, weblink to recommendations, regulations, and best practices:
http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/epw13739

Ontario, weblink to MOECC recommendations, regulations, and best practices:
http://www.ontario.ca/environment-and-energy/wells-your-property

Appendix 1: Overview of Wetland Water Balance Process

The Monitoring Protocol is meant to provide additional clarity and guidance on Step 2 and Step 6 in TRCA's *Stormwater Management Criteria Guideline*, Appendix D: Water Balance for Natural Features. The following list summarizes the steps involved in this process for the purpose of illustrating where the Monitoring Protocol fits within the water balance submission process. For the sake of conciseness, many sub-components of the steps are omitted from this summary. We strongly recommend that proponents refer directly to the Stormwater Management Criteria Guideline in addition to this Protocol.

Step 1 – Determine the Need for a Water Balance: Identify the existing and proposed land uses, contributing catchment areas for both surface water and groundwater, and the scale of anticipated changes to water inputs/outputs, and/or catchment size.

Step 2 – Establishing Baseline Conditions: Collect background and baseline data on wetland hydrology and ecology, as detailed in the Monitoring Protocol.

Step 3 – Developing the Existing Conditions Water Budget Model: Use baseline data and information obtained through field and background studies to inform the development of a water budget model using an approved continuous model (where required, as determined through consultation with TRCA).

Step 4 – Comparing Pre-development and Post-development: In consultation with the Conservation Authority, determine hydroperiod targets for the post-development scenario and use model analysis and/or other analyses to determine the post-development hydroperiod that would result from the proposed design.

Step 5 – Applying Mitigation: Determine if the proposed design and mitigation measures are sufficient to meet the hydroperiod targets determined earlier in Step 4.

Step 6 – Reporting and Monitoring: Compile a report based on the data collected and analyses completed in the above steps and submit to the Conservation Authority for review. This will include a post-development monitoring plan, with guidance from this Monitoring Protocol, along with thresholds in post-development monitoring results that would act as triggers for remedial action.

Appendix 2: Correcting Water Level Data using Manual Measurements

This section provides guidance on manually correcting water level data using manual measurements. Correction is important as pressure transducer measurements can drift over time from factory calibrations, and elevation reference parameters can also change. Many pressure transducer interface programs can automatically convert measurements to water level elevations using known reference points, which may be a preferred option. Nonetheless, this information may be useful where software does not allow different reference points to be used at different times, or where data have not been corrected prior to export.

Step 1 – Determine locations of relaiable anchor points: It is critically important to have a high degree of confidence in the manual water level measurements used for correction. Ensure that recorded distances were converted correctly into water level elevations, and corroborate measurements with notes and photographs where they are available. Remove any questionable anchor points.

Step 2 – Apply correction factors to start and end of data: Find the first and last anchor points for each period of continuous data. Calculate the difference between the automated and manual measurements at these points, and apply (add or subtract) this correction factor for any or all measurements before the initial anchor point and after the final anchor point, respectively. This process is shown in Figure A1 below.

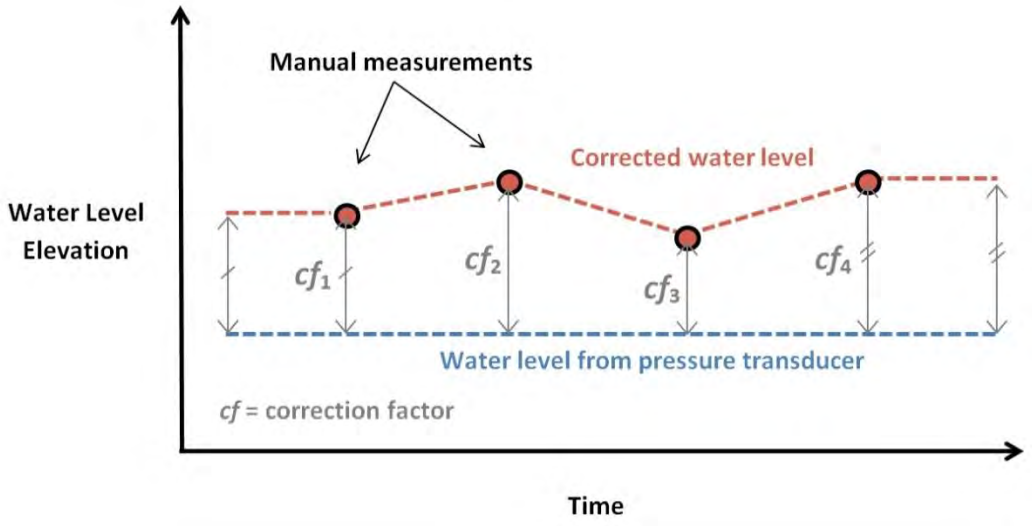


Figure A1: Diagram showing the general process for the correction of automated water level data using manual measurements as anchor points.

Step 3 – Calculate and apply correction factors between anchor points: Calculate the difference between the automated and manual measurements at each additional anchor point. Apply these correction factors to the water level data at these times. For each time in between two anchor points,

the following formula can be used to calculate the correction factor applied to correct automated readings:

$$\text{Correction Factor} = cf_1 + \left[\frac{i_n}{i_t} \times (cf_2 - cf_1)\right]$$

Where cf_1 and cf_2 are the correction factors at the first and the second (timewise) anchor points, respectively, i_t is the total number of timesteps between the two anchor points, and i_n is the time step increment within this range (a number between 1 and i_t). An example calculation in Microsoft Excel is provided in Figure A2 below.

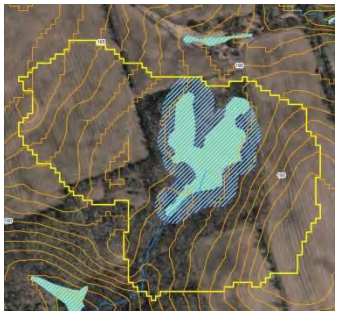
E6 =$D$5+(((ROW(D6)-ROW($D$5))/(ROW($D$17)-ROW($D$5)))*($D$17-$D$5))

	A	B	C	D	E	F
1						
2	**Timestamp**	**Water level (masl)**	**Manual measurement (masl)**	**Difference (= D - C)**	**Correction factor**	**Corrected water level (= C + F)**
3						
4						
5	8/8/13 12:00	146.0801	146.21	0.1299	0.1299	146.2100
6	8/8/13 13:00	146.0796			0.1333	146.2129
7	8/8/13 14:00	146.0801			0.1367	146.2167
8	8/8/13 15:00	146.0788			0.1400	146.2188
9	8/8/13 16:00	146.0798			0.1434	146.2232
10	8/8/13 17:00	146.0818			0.1467	146.2285
11	8/8/13 18:00	146.0796			0.1501	146.2296
12	8/8/13 19:00	146.0778			0.1534	146.2312
13	8/8/13 20:00	146.0776			0.1568	146.2343
14	8/8/13 21:00	146.0823			0.1601	146.2424
15	8/8/13 22:00	146.0813			0.1635	146.2448
16	8/8/13 23:00	146.0831			0.1668	146.2499
17	8/9/13 0:00	146.0798	146.25	0.1702	0.1702	146.2500
18	8/9/13 1:00	146.0796				
19	8/9/13 2:00	146.0816				
20	8/9/13 3:00	146.0798				
21	8/9/13 4:00	146.0783				

Figure A2: An example set-up for a manual water level correction procedure in Microsoft Excel. The equation shown in cell F6 is:

=$D$5 + (((ROW(D6)-ROW($D$5))/(ROW($D$17)-ROW($D$5)))*($D$17-$D$5))

Where D5 and D17 are the correction factors at times one and two, respectively. The formula is applied to calculate the correction factor in column E for rows 6 through 16 in this example.


WETLAND WATER BALANCE RISK EVALUATION

Toronto and Region Conservation Authority
November 2017

Toronto and Region Conservation for The Living City

ACKNOWLEDGMENTS

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The Regional Municipality of Peel
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The Regional Municipality of Durham
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We gratefully acknowledge the contributions of the members of the Wetland Water Balance External Stakeholder Committee throughout the development of this document. The stakeholder committee included technical experts in water resources engineering, ecology, hydrogeology, and planning with representation from both the public and private sectors.

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Please reference this document as:

Wetland Water Balance Risk Evaluation, Toronto and Region Conservation Authority, 2017

This document was endorsed by the TRCA Authority Board on November 17, 2017.

RES.#A210/17 - **WETLAND WATER BALANCE RISK EVALUATION**

Approval of TRCA's Wetland Water Balance Risk Evaluation, a technical guideline developed to streamline implementation of Water Balance for Protection of Natural Features of TRCA's Stormwater Management Criteria document (2012) and The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority.

Moved by: Ronald Chopowick
Seconded by: David Barrow

WHEREAS wetlands play a crucial role as part of the "green infrastructure" of the Toronto region by providing flood attenuation, filtering of air and water pollutants, wildlife habitat and greenspace for communities to enjoy;

AND WHEREAS Toronto and Region Conservation Authority (TRCA) staff review and provide advice and recommendations on applications for development, infrastructure and site alteration affecting wetlands for planning, environmental assessment and permitting applications;

AND WHEREAS in 2016, TRCA staff developed the draft Wetland Water Balance Risk Evaluation (Risk Evaluation) to provide guidance to proponents on how to assess the risk that their proposal may pose to the water balance of a wetland and streamline the application review process by indicating under which scenarios TRCA would request a wetland water balance analysis, and if so, to identify the level and scope of the analysis required;

AND WHEREAS in April of 2017, TRCA staff sought input into the development of the draft Risk Evaluation from partner municipalities, provincial agencies, the Building Industry and Land Development Association (BILD), consulting firms and neighbouring conservation authorities, and have now finalized the Risk Evaluation based on the input received;

THEREFORE LET IT BE RESOLVED THAT the TRCA Wetland Water Balance Risk Evaluation be endorsed for use by proponents of development and infrastructure, consultants and TRCA staff in the planning and development submission, review and approval process;

AND FURTHER THAT the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Transportation (MTO), the Ministry of the Environment and Climate Change (MOECC), the Ministry of Municipal Affairs (MMA), TRCA's member municipalities, Conservation Ontario and neighbouring conservation authorities be so advised.

CARRIED

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1. INTRODUCTION

1.1 Purpose

The *Wetland Water Balance Risk Evaluation* (Hereafter *Risk Evaluation*) supports the Stormwater Management Criteria Document (*SWM document;* TRCA, 2012) that describes requirements for proposals to maintain the water balance of natural features designated for protection. The *Risk Evaluation* has been developed to aid proponents of development or infrastructure proposals in determining the level of risk a proposal has to the ecological integrity of a wetland through changes to its hydrology and is intended to be applied early in the planning process (Figure 1). The level of risk assigned to a particular proposal determines whether pre-development hydrological monitoring of the feature is required and the scope of the feature-based water balance analysis that is required. Proponents should refer to the *SWM document* for overarching guidance concerning the water balance requirements, in particular to Appendix D: Water Balance for Protection of Natural Features. The *Risk Evaluation* and other supporting tools under development or completed are indicated in relation to the corresponding steps in the *SWM document* in Figure 2.

1.2 Applicability

The *Risk Evaluation* should be applied when a proposal has the potential to impact the water balance of a wetland that has been determined to be protected as part of a planning or infrastructure review and approval process. A water balance will not generally be required for linear infrastructure, such as roads and railways, where TRCA's regular permitting process would generally be sufficient to address potential impacts to natural features and associated mitigation options.

For the purposes of this document, impact to wetland water balance occurs in the following circumstances:

- When there is alteration to the surface water catchment of a wetland determined to be protected;
- When water taking requiring Ministry of Environment and Climate Change (MOECC) Environmental Activity and Sector Registry (EASR) registration (i.e. > 50,000 L/day) is anticipated within the surface water catchment of a wetland or on a property that contains a wetland determined to be protected

The *Risk Evaluation* should be applied to all wetlands determined for protection except for lacustrine wetlands on the Lake Ontario shoreline, riverine wetlands located on stream segments of Strahler order ≥4 or with catchments >2500 ha, stormwater management ponds, or wastewater polishing wetlands.

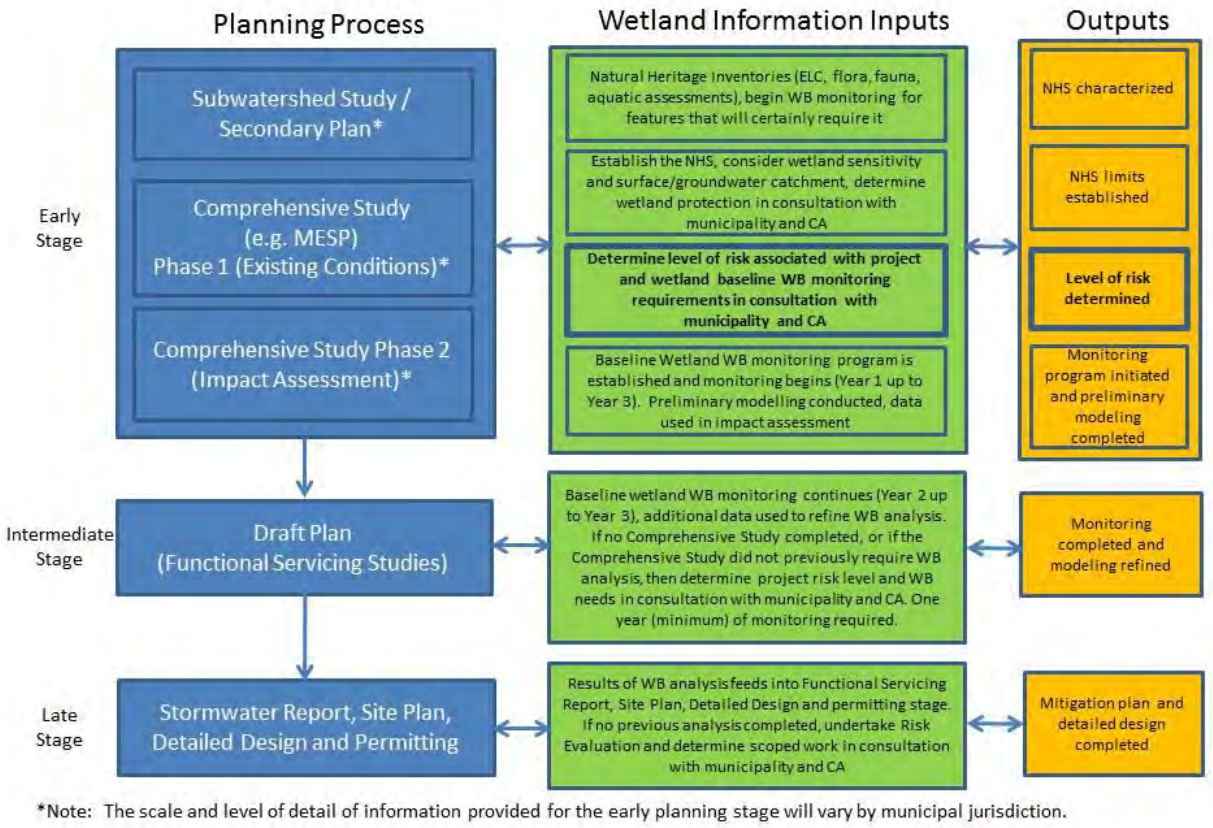

Figure 1: Wetland Water Balance in the planning process. The Risk Evaluation is bolded.

1.3 Relationship between wetland hydrology and ecology

The hydrology of a wetland directly determines many aspects of its physical, chemical, and ecological characteristics, and as such it is perhaps the most important variable influencing ecological function (Mitsch and Gosselink, 2007). Land development and infrastructure construction can affect the hydrology of a wetland in a number of ways, some of which may have a negative impact on the ecological function of a wetland. For example, water taking directly from a wetland or from an aquifer that discharges directly to a wetland has a clear potential to directly alter the wetland's water balance. Land use change within the surface water catchment of a wetland may alter the water balance by changing the ratio of surface runoff to infiltration within the catchment as well as the proportion of water lost to evapotranspiration. This is an issue particularly when there is a substantial increase in the proportion of impervious cover such as paved surfaces and roofs (Hicks and Larson, 1997; Reinelt and Taylor, 2001). Alteration to the size of the catchment area draining to a wetland due to land grading activities or stormwater management system design also has the potential to significantly change the water balance.

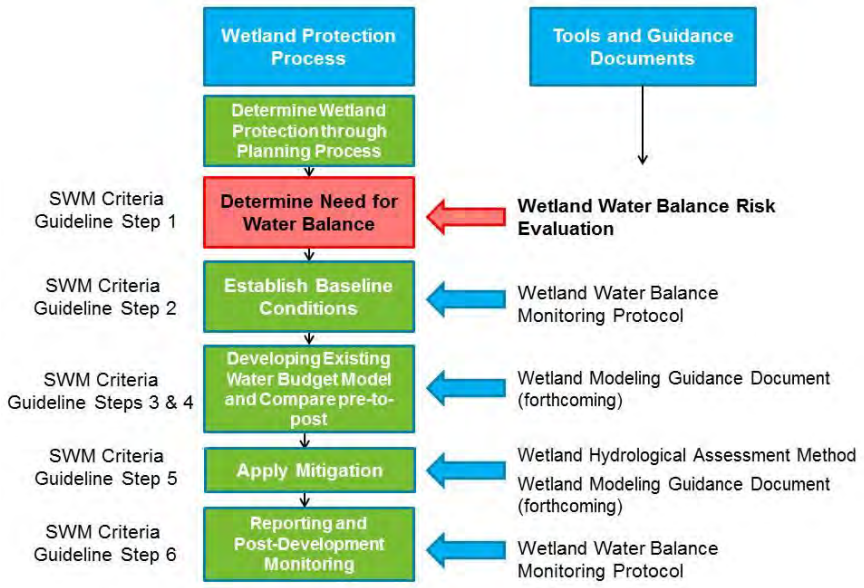

Figure 2: Wetland Water Balance tools and guidelines and their relation to steps in the SWM document.

It is important to note that wetland hydrology encompasses much more than the average annual depth of water in a wetland. Aspects of wetland hydrology such as the proportion of total inflow derived from surface water or groundwater, the timing and duration of inflows, and the timing of water level drawdown over the growing season all contribute to the maintenance of a particular ecological function. For example, amphibian species may require water for breeding during spring but may also require habitat to be seasonally dry to prevent predatory fish from establishing in this habitat. Similarly, some obligate wetland plants will be outcompeted by facultative upland plants if a wetland dries out too early, leading to shifts in the ecological community. Significant differences in wetland ecology and associated ecosystem services can occur between relatively small differences in hydrological regime on the order of tens of centimeters (Baldwin *et al.*, 2001; Mitsch and Gosselink, 2007; Moor *et al.*, 2017).

The term *hydroperiod* is used to refer to the pattern of water level change within a wetland over time, both above and below ground, and is a measure of the net sum of interaction between the different water balance components (i.e. the change in storage). The *hydroperiod* is a key measure by which to track changes in the water balance over time, and is the primary focus of wetland hydrological monitoring, as outlined in the *Wetland Water Balance Monitoring Protocol* (TRCA, 2016).

1.4 Classification of risk

The *Risk Evaluation* assigns a level of risk to a proposal considering two main factors:

i) The potential magnitude of hydrological change that would occur in the absence of a mitigation strategy, and;

ii) The sensitivity of the wetland to hydrological change.

The potential magnitude of change and the sensitivity of the wetland are evaluated together using a decision tree (Figure 3, page 18) which determines the overall level of risk of the proposal to the hydrology of the wetland. This level of risk is important as it determines:

- Whether pre-development water balance monitoring is required (refer to *Wetland Water Balance Monitoring Protocol*), and;
- The scope of modeling that is required to predict hydrological changes, and the corresponding effort required to develop a mitigation strategy

The *Risk Evaluation* recognizes that the effort put into analyzing potential changes to the water balance of a wetland, and designing a mitigation strategy, should be proportional to the magnitude of the potential impact of the proposal if the mitigation strategy is to be successful.

2. COMPLETING A WETLAND WATER BALANCE RISK EVALUATION

The *Risk Evaluation* follows a four step process:

Step 1. Determine which retained wetland(s) may be impacted by the proposal.

Step 2. Determine the magnitude of potential hydrological change.

Step 3. Determine the sensitivity of the wetland and its associated flora and fauna to hydrological change.

Step 4. Integrate information from step 1, 2, and 3 to assign a level of risk to the proposal.

All steps in the *Risk Evaluation* are completed using geospatial information and other data provided by the proponent (Table 1). The majority of the data is derived from previous, existing, or parallel studies. Some of the required data may be available from the appropriate conservation authority (CA).

Table 1: Data required to complete the Risk Evaluation.

All data are to be collected and compiled by the proponent. Some data may be available from the conservation authority (CA) (see suggested data source).

Criteria	Data	Definition and required information	Suggested data source
Magnitude of potential hydrological change	**Wetland feature limits**	The size and shape of the wetland feature(s) in question. Under normal circumstances this should be based on staked and surveyed feature limits.	Feature limits are delineated early in planning process in consultation with the CA, MNRF, and/or municipal staff.
	Extent and size of pre-development catchment	Surface water catchment of the wetland, delineated using appropriate methods.	The CA may be able to provide derived catchment boundaries or raw DEM.
	Total development area of catchment (C_{dev})	Area of the feature's catchment lying outside of any identified natural system (e.g. natural heritage areas, natural hazard zones, and their associated buffers), but inclusive of any existing developed areas within the catchment.	The CA may be able to provide spatial layers containing the natural system and natural hazard limits. Municipalities should be consulted for natural heritage system boundaries too.
	Area of the wetland catchment owned by the proponent	The development area of the wetland catchment (C_{dev}) that is owned by the proponent.	Provided by the proponent.
	Percent of impervious cover planned within the proponent's holdings (*IC*)	The anticipated proportion of impervious cover within the area of the wetland catchment owned by the proponent, as determined from average values for a given land cover type, or from knowledge of proponent's preliminary design.	Analysis conducted by the proponent. The CA and/or municipality can provide average values for given land cover type. Where no information is available, a conservative *IC* value will be assigned based on land use zoning.

	Proposed extent and size of post-development catchment	The anticipated size of the feature's catchment resulting from grade changes and/or implementation of the stormwater management plan, based on the best available information.	Provided by the proponent.
	Anticipated magnitude and duration of water taking	The magnitude and approximate duration of any water taking anticipated from groundwater or surface water bodies directly connected to the wetland, and associated discharge of this water. This is determined using the best data available about site conditions and the proposed development form at the time the *Risk Evaluation* is applied.	Provided by the proponent.
	Location and extent of any Locally Significant Recharge Areas	Locally Significant Recharge Areas are defined in this document as areas within the wetland's catchment covered by sand, gravel, or otherwise having high hydraulic conductivity. These may be identified through preliminary geotechnical site investigations, visual means, monitoring data, or numerical model outputs.	Provided by the proponent. Maps of areas identified as Ecologically Significant Groundwater Recharge Areas (GRAs), High Volume GRAs, or Significant GRAs may be available from the CA (e.g. TRCA SWM Criteria Document, Appendix C).
Sensitivity of the wetland	**Vegetation community type**	Classification according to the Ontario Ecological Land Classification System.	Classification may be available from the CA and/or municipality, and if not, should be carried out by the proponent.

Fauna species present	A list of species found in the wetland should be created and cross referenced with the sensitivity ranks defined by the CA (Appendix 3).	Data from existing wildlife surveys, or can be collected by the proponent using sampling protocols approved by the CA and/or municipality. The CA may require updated fauna data collection if existing records are considered too old to be reliably representative of current conditions.
Flora present	A list of floral species found in the wetland should be created and cross referenced with the sensitivity ranks defined by the CA (Appendix 3).	Data from existing surveys, or can be collected by the proponent using approved sampling protocols. The CA may require updated fauna data collection if existing records are considered too old to be reliably representative of current conditions.
Habitat features	The presence of features which provide habitat for wildlife and/or fish, including amphibian breeding, bird breeding, reptile or amphibian overwintering habitat (see OMNRF, 2014 for further details).	Data is to be collected and provided by the proponent. Interpretation of SWH to be determined by proponent in consultation with the CA and/or municipality.
Wetland hydrological type	The wetland is hydrologically classified as Isolated, Palustrine, Riverine, or Lacustrine. Hydrological type classification follows the convention of the Ontario Wetland Evaluation System, Southern Manual.	Wetland classification is performed by the proponent.

Step 1: Determine which retained wetland(s) may be impacted

The catchment area of any and all potentially impacted wetlands should be delineated with appropriate techniques and using a high resolution digital elevation model. Impact to the catchment of a wetland occurs when the proposal changes the size of the catchment, the amount of impervious cover within the catchment, or when water taking is anticipated to require MOECC EASR registration (i.e. >50,000 L/day); see Section 1.2 (Applicability) for further details. In recognition of the hydrological connections between many wetland catchments (i.e. the catchment of downstream wetlands may contain those of upstream wetlands), determining which wetlands to evaluate should be done in consultation with CA staff and the municipality. Lacustrine wetlands on the Lake Ontario shoreline and Riverine wetlands located on stream segments of Strahler order ≥4 or catchments >2500 ha are excluded from the *Risk Evaluation*.

Step 2: Determine the magnitude of potential hydrological change

The following criteria are used to evaluate the magnitude of potential hydrological impact that a proposal may have on a wetland:

i) The proportion of impervious cover in the catchment of the wetland that would result from the proposal.

ii) The degree of change in the size of the wetland catchment.

iii) Water taking from, or discharge to, surface water bodies or aquifers directly connected to the wetland.

iv) The impact on locally significant recharge areas.

The data required to evaluate the magnitude of potential hydrological change (Table 1) are collected by the proponent and used as inputs for the criteria listed in Table 2 to evaluate the magnitude of potential hydrological change. The highest magnitude category with one or more criteria satisfied determines the potential magnitude of change (Table 2).

i) Impervious Cover

An increase in impervious cover within the catchment of a wetland will result in an increase in the volume of rain and snowmelt that reaches the wetland as runoff and a higher peak event runoff rate. Further, baseflow and/or interflow contributions may be reduced if infiltration and groundwater recharge are diminished. Untreated stormwater from road surfaces is also linked to increasing sediment loads and concentrations of contaminants such as salt and hydrocarbons. Research into the relationship between impervious cover (IC) within a wetland's catchment and its ecological integrity suggests that there are two thresholds governing wetland response. Between 3.5 and 10 % IC, plant density and the diversity of amphibians and macro-invertebrates begin to significantly decline (Taylor, 1993; Taylor *et al.*, 1995; Hicks and Larson, 1997; Reinelt and Taylor, 2001). A second threshold between 20 and 25 % IC, beyond which only certain hardy and/or exotic plant and amphibian species are able to persist within a wetland (Boward *et al.*, 1999; Reinelt and Taylor, 2001; Chin, 1996). The *Risk Evaluation* uses threshold

values of 10 and 25 % IC because there is relative certainty that exceeding these thresholds will lead to ecological degradation in the absence of a well-designed mitigation strategy.

In recognition of both the impact of any one development as well as the cumulative impact of all developments in the catchment of a wetland, an impervious cover score (S) is used to evaluate this criterion (Equation 1). The impervious cover score evenly distributes the proportion of impervious cover that represents a given threshold of hydrological disturbance across all the development land within the wetland's catchment regardless of the number of different landowners. The impervious cover score also considers the area of the catchment that is protected by natural heritage and natural hazard designations to ensure that the thresholds of disturbance that are determined by the score are not unduly restrictive. This creates a fair playing field for all proponents by ensuring that those developing later are not penalized by bearing the full cost of a water balance analysis that is triggered primarily by the actions of earlier developers, while still ensuring adequate protection of the wetland(s). See Appendix 1 for further rationale and example applications of this equation.

Equation 1: $$S = \frac{IC \cdot C_{dev}}{C}$$

Where S is the impervious cover score, IC is the proportion of impervious cover (as a percentage between 0 and 100) proposed within the area of wetland catchment that is within the proponent's holdings, C_{dev} is the total development area of the catchment (in ha), and C is the size of the wetland's catchment (in ha). I all cases, the pre-development catchment is used.

ii) Catchment Size

Increasing or decreasing the catchment size can change the timing, frequency, and volume of runoff reaching the wetland. The same magnitude thresholds used for impervious cover (10% and 25 %) are used as thresholds to define catchment size alteration. The value used to assess this criterion should be based on the best information available regarding the proposed development form at the time that the *Risk Evaluation* is applied. In all cases, the pre-development catchment size should be used to define changes to catchment size.

Some proposals may involve proposed changes to both catchment size and impervious cover. In such cases, the interaction between these two criteria may produce complex non-linear changes in catchment hydrology. Proposals involving a change in both catchment size and imperviousness may therefore require that the thresholds defining the potential magnitude of hydrological change be modified to reflect interactive effects between these two criteria, as deemed appropriate by a water resources engineer or other qualified CA staff.

iii) Water Taking

Where wetlands are directly connected to surface water bodies or to unconfined aquifers, water takings or associated discharges have potential to impact wetland hydrology, with corresponding impacts to ecology. For the purposes of the *Risk Evaluation*, a wetland within or adjacent to a proposed undertaking is considered impacted when water taking is anticipated to

require MOECC EASR registration (>50,000 L/day). This criterion will be assessed using the best available information about site conditions and the proposed undertaking. The key underlying variables of interest from an ecological perspective are the change in surface water or groundwater depth and the timing of drawdown that may result from the activity; this is because these variables are strongly linked to wetland ecology through both physical and biogeochemical parameters. As significant differences in wetland ecology and associated ecosystem services can occur between relatively small differences in hydrological regime on the order of tens of centimeters (Baldwin *et al.*, 2001; Mitsch and Gosselink, 2007; Moor *et al.*, 2017), any water taking which is likely to result in direct alteration of wetland water levels is of potential concern. If proponents anticipate that high volume dewatering will be required but do not believe that this dewatering poses a risk to nearby wetlands, the onus will be on the proponent to demonstrate that no impact to the wetland will occur.

iv) Recharge Areas

Certain areas within a wetland's surface water and groundwater catchments may be more sensitive to change than others, particularly where these areas act as locally significant groundwater recharge areas. When development or infrastructure occurs within these areas, there is an increased risk of a significant change to the wetland's water balance as these areas may contribute disproportionately to shallow groundwater discharge to the wetland. Identification of recharge areas will rely on preliminary site investigations and existing regional data sets, when these data are available (e.g. numerical model outputs). Impacts to recharge areas are defined here as replacement of existing soils with significantly less permeable materials.

Table 2: Criteria used to evaluate the probability and magnitude of hydrological change.

Criteria	High magnitude	Medium magnitude	Low magnitude
Impervious cover Score (*S*) within catchment, as determined using Equation 1	> 25 %	10-25 %	< 10 %
Increase or decrease in catchment size	> 25 %	10-25 %	< 10 %
Water taking or discharge	Dewatering exceeding MOECC EASR limits (> 400,000 L/day) for > 6 months anticipated	Dewatering within MOECC EASR limits (50,000 - 400,000 L/day) for > 6 months anticipated OR Dewatering exceeding MOECC EASR limits (>400,000 L/day) for < 6 months anticipated	Dewatering within MOECC EASR limits (50,000 - 400,000 L/day) for < 6 months anticipated*
Impact to recharge areas*	Impact (e.g. replacement with impervious cover) to >25% of locally significant recharge areas*	Impact (e.g. replacement with impervious cover) to 10-25% of locally significant recharge areas*	Impact (e.g. replacement with impervious cover) to <10% of locally significant recharge areas*

Note: Where there is no proposed alteration to the catchment imperviousness or size and water taking is below MOECC EASR registration requirements (< 50,000 L/day), a feature-based water balance analysis as defined in the TRCA *SWM document* (2012) is not required. See section 1.4 (Applicability).

* Defined in Table 1

Step 3: Determine the sensitivity of the wetland

The sensitivity of a wetland to hydrological change is assessed based on the abiotic and biotic characteristics of the wetland that are directly related to hydrology and/or ecology. Other aspects of wetland ecology not relating directly to hydrology may be evaluated through parallel processes external to this *Risk Evaluation.* To assess the sensitivity of a wetland to hydrological change five criteria are used:

i) The vegetation community

ii) Fauna species

iii) Flora species

iv) Significant wildlife habitat for hydrologically sensitive species

v) Hydrological classification

The sensitivity of a wetland to hydrological change is assessed using the data listed in Table 1 which are compiled and provided by the proponent. The compiled data are then used to determine the sensitivity of the wetland using the criteria listed in Table 3. The highest magnitude sensitivity category in Table 3 with one or more criteria satisfied determines the overall sensitivity of the wetland to hydrological change.

i) Vegetation community

Vegetation communities vary due to abiotic variables including soils, climate, physiography, and hydrology. This variation is used to delineate areas of natural cover in the Ontario Ecological Land Classification (ELC) system. Different ELC communities vary in their sensitivity to hydrological change. Some vegetation communities can withstand some hydrological change without dramatic change to their composition, whereas others require specific hydrological conditions to persist. In recognition of the range of sensitivity between communities, CA ecologists have ranked ELC communities by their sensitivity to hydrological change into three levels (Appendix 2).

ii) Fauna species

Many fauna species are adapted to particular hydrological conditions, or are associated with specific vegetation within wetlands. Some of these fauna have adapted to wetlands with specific hydrology, with some species utilizing temporary pools as refuge from competitors and predators, some requiring permanent water, and others only requiring standing water during certain time periods that coincide with specific biological needs. There is considerable variation in the ability of species to withstand hydrological change of their habitats. Fauna species were categorized based on their sensitivity to hydrological change by CA ecologists into three levels of sensitivity (Appendix 3). The individual species with the highest sensitivity level determines the sensitivity of the fauna community to hydrological change.

iii) Flora species

There a strong correlation between the hydrology of a wetland and the vegetation community present in the wetland. Some vegetation species require specific hydrological conditions while others can make use of a broader range of hydrological conditions. Vegetation species were categorized based on their sensitivity to hydrological change by CA ecologists into three levels of sensitivity (Appendix 3). The high sensitivity category is met when multiple high sensitivity species are detected at a feature, the medium sensitivity category is met when multiple species with medium sensitivity are detected, and the low sensitivity category is meet in all other cases.

iv) Significant wildlife habitat for hydrologically sensitive species

Wetlands provide habitat for a large number of species and some of this habitat is very sensitive to hydrological change. For example, seasonal or vernal pools contain water for short periods of time, and some species have adapted to the seasonality of these pools because it excludes competitors or predators or provides habitat for juveniles. Other wetlands provide habitat during critical life stages at specific times of the year. If the hydrology of the wetland is altered, the timing between the need of the organism and habitat availability may be altered such that the habitat no longer functions for the species. Furthermore, wetlands provide habitat for some species that are difficult to detect at a particular feature because they are locally rare, cryptic, or use habitats seasonally. In recognition of the significant habitat wetlands may provide, and of the fact that some species may not be detected by surveys, CAs exercise the precautionary principle by stating that significant wildlife habitat *for species ranked as having high sensitivity to hydrological change (Appendix 3)* requires increased protection. See OMNRF (2014) for further details on significant wildlife habitat and significant wildlife habitat schedules for the appropriate ecoregion.

v) Hydrological classification

The hydrogeomorphic setting of a wetland influences its sensitivity to hydrological change. For instance, the hydroperiod of riverine wetlands is controlled predominantly by the water levels associated with a river or larger stream, and is therefore less likely to be affected by changes to local-scale hydrology. In contrast, isolated wetlands have no defined surface water outlet, and therefore any increased volume of runoff must either be infiltrated or lost to evapotranspiration, and similarly any reduction in surface water inflows will not be compensated for by any other inflow processes. This makes isolated wetlands more sensitive to hydrological change than other types of wetlands.

The *Risk Evaluation* uses four distinct hydrological wetland classifications defined in the Ontario Wetland Evaluation System (OMNR 2013): *isolated, palustrine, riverine*, and *lacustrine*. Isolated wetlands have no channelized surface water inlets or outlets, and are fed by local runoff and/or groundwater. Palustrine wetlands have either no or intermittent channelized surface water inflows and permanent or intermittent channelized surface water outflows. Lacustrine wetlands are associated with the shorelines of lakes (water bodies 8 ha or larger and deeper than 2 m in places during average low water conditions), and riverine wetlands are associated with the main

channel of a permanently flowing watercourse. In assessing the hydrological wetland classification it is important to distinguish true lacustrine and riverine wetlands (in which the hydrology is dominated by larger water bodies) from wetlands that are only ephemerally connected to lakes and rivers (where the hydrology is dominated by local surface water or groundwater). Wetlands classified as lacustrine or riverine may be reviewed by CA staff to ensure classification was appropriate.

Table 3: Criteria used to evaluate the sensitivity of the wetland to hydrological change.

Criteria	High sensitivity	Medium sensitivity	Low sensitivity
Vegetation community type (ELC)*	Presence of a high sensitivity vegetation community	Presence of a medium sensitivity vegetation community	No high or medium sensitivity criteria satisfied
High sensitivity fauna species**	Presence of a high sensitivity species	Presence of a medium sensitivity species	No high or medium sensitivity species
High sensitivity flora species**	Presence of multiple high sensitivity species	Presence of multiple medium sensitivity species OR Presence of one high sensitivity species	No high or medium sensitivity criteria satisfied
Significant Wildlife Habitat	Presence of Significant Wildlife Habitat, as defined by OMNRF (2014), for high sensitivity species**	N/A	No high criteria satisfied
Hydrological classification considering ecology	Isolated/palustrine AND Presence of medium or high sensitivity vegetation communities* OR medium or high sensitivity flora or fauna species**	Isolated/palustrine AND No medium or high sensitivity vegetation communities* AND no medium or high sensitivity flora or fauna species** present	Riverine/lacustrine

* See Appendix 2 for community rankings by hydrological sensitivity
** See Appendix 3 for species rankings by hydrological sensitivity

Step 4: Risk characterization

The risk of a proposal to the hydrological and ecological integrity of a wetland is determined using the criteria evaluated in Steps 2 and 3. The level of risk assigned to a proposal determines whether hydrological monitoring of the wetland is required before the proposal is executed and the scope of the feature-based water balance analysis that is appropriate. The level of risk assigned to a proposal is proportional to the magnitude of change that is likely to occur and the sensitivity of the wetland to hydrological change. In general, a higher risk category means increased water balance monitoring and more detailed modelling, in recognition of the fact that a significant disturbance to the wetland's hydrology is more likely for these scenarios unless the mitigation strategy is informed by a detailed understanding of the water balance. In all cases it is expected that the water balance of all risk-evaluated wetlands will be maintained (there may be some limited exceptions to this, as outlined in Section 3).

Using a decision tree (Figure 3), the proposal will be categorized into one of three possible levels of risk: Low, Medium, or High.

Low Risk: Low risk proposals occur when it is unlikely that the proposed activity will have a substantial impact on wetland hydrology. As the risk is low, pre-development water balance monitoring of wetland hydrology is not required. Proponents are required to calculate the alteration to the water balance that would result from any changes to the catchment size, runoff coefficients, or impervious cover resulting from the proposed activities using a non-continuous model (e.g. Thornthwaite-Mather method) with outputs reported at monthly resolution. A mitigation plan is required to demonstrate that the design and any associated stormwater management system will compensate for any changes to monthly water balance through appropriate mitigation strategies (e.g. low impact development features). The proponent may balance the overall wetland water balance using a variety of techniques, but clean sources of supplemental water (e.g. roof runoff, runoff from greenspace) are preferred. Determination of whether the post-development hydroperiod will be sufficiently close to the pre-development hydroperiod to achieve protection of the wetland should be made in consultation with CA staff and the municipality.

Medium Risk: Monitoring of wetland hydrology is required, as outlined in the *Wetland Water Balance Monitoring Protocol* (TRCA, 2016), to establish pre-development conditions and provide a baseline against which to measure any changes in water balance during and following completion of the proposed undertaking. An estimate of each of the individual terms of the pre- and post-development water balance is required, with the relative proportion of inflow derived from surface water and groundwater estimated using monitoring data in conjunction with other data collected in support of completing the *Risk Evaluation*.

Proponents are required to calculate the alteration to the water balance that would result from the proposal using a continuous model (e.g. EPA SWMM) at daily aggregated to weekly resolution. The model is to be calibrated using monitoring data and should use modeling techniques appropriate to the context of the application (appropriate CA staff can provide direction). If the water balance analysis concerns the impact of groundwater withdrawals on a

wetland, a model capable of accurately representing subsurface processes may be required to evaluate the anticipated effects and associated level of risk. All model outputs should be at daily aggregated to weekly resolution.

For medium risk proposals, the mitigation plan should provide details on the design features and water management techniques that will be used to maintain the overall water balance of the wetland in the post-development scenario, including maintaining the relative balance of surface to subsurface inflow processes at pre-development levels. The mitigation plan should include a comparison between: A) the pre-development wetland hydroperiod as derived by running a calibrated wetland model with a long-term climate dataset under pre-development land use, and; B) the post-development hydroperiod derived by running the same calibrated wetland model with a long-term climate dataset under post-development land use conditions, including all mitigation design measures. Determination of whether the post-development hydroperiod will be sufficiently close to the pre-development hydroperiod to achieve protection of the wetland should be made in consultation with CA staff and the municipality. CA staff may be able to provide tools for hydroperiod comparison and statistical analysis, in addition to long-term climate data, upon request.

For proposals in which the period between the start of construction and the implementation of functioning water balance mitigation measures is anticipated to exceed two years (i.e. there is an extended build-out phase), an interim mitigation plan may be required. Proponents should consult with CA and municipal staff to determine whether an interim mitigation plan is required. A mitigation plan should outline active management measures for supplementing the water balance during construction and define triggers for when action is required. Such measures may be necessary to protect the ecological and hydrological functions of the wetland from multi-year disturbances which degrade the wetland to a point where these functions cannot be restored. In the case where supplemental water is needed to augment the interim water balance, clean sources of water are preferred (e.g. roof runoff, runoff from greenspace).

High Risk: Pre-development monitoring of wetland hydrology is required, as outlined in the *Wetland Water Balance Monitoring Protocol* (TRCA, 2016), to establish pre-development conditions and provide a baseline against which to measure any changes in water balance during and following completion of the proposal. An estimate of each of the individual terms of the pre- and post-development water balance is required, with the relative proportion of inflow derived from surface water and groundwater estimated using monitoring data in conjunction with other data collected in support of completing the *Risk Evaluation*. This is also a requirement for Medium Risk undertaking; however additional emphasis is placed on the evaluation of the degree of interaction between the wetland and groundwater for High Risk undertakings.

For high risk proposals, a continuous hydrological model (e.g. EPA SWMM) with daily aggregated to weekly resolution is required. The model is to be calibrated using monitoring data and should use modeling techniques appropriate to the context of the application (appropriate CA staff can provide direction). Where groundwater processes constitute a significant proportion of the total inflows or outflows to the feature, an integrated model (e.g. GSFLOW, MIKE-SHE) may be required to appropriately address the impacts of the proposal and the effectiveness of

any associated mitigation measures. The decision by the CA to require an integrated model will always consider the scale of the proposal and the size of the wetland in question, in addition to the value added by integrated modeling of the water balance. If the only issue of concern with an application is the impact of groundwater withdrawals on a wetland, a model capable of accurately representing hydrogeologic processes (only) may be used in place of a fully integrated model to evaluate the anticipated effects of the proposal and mitigation on the feature water balance, as deemed appropriate through consultation with appropriate CA staff.

The mitigation plan for High Risk proposals should provide details on the design features and water management techniques that will be used to maintain a post-development water balance that is similar to the pre-development water balance. Maintaining the water balance requires maintaining a similar ratio of surface to subsurface inflow processes as in the pre-development condition. The mitigation plan should include a comparison between: A) the pre-development wetland hydroperiod as derived by running a calibrated wetland model with a long-term climate dataset under pre-development land use, and; B) the post-development hydroperiod derived by running the same calibrated wetland model with a long-term climate dataset under post-development land use conditions, including all mitigation design measures. Determination of whether the post-development hydroperiod will be sufficiently close to the pre-development hydroperiod to achieve protection of the wetland should be made in consultation with CA staff and the municipality. CA staff may be able to provide tools for hydroperiod comparison and statistical analysis in addition to long-term climate data upon request.

For proposals in which the period between the start of construction and the implementation of functioning water balance mitigation measures is anticipated to exceed two years (i.e. there is an extended build-out phase) , an interim mitigation plan may be required. Proponents should consult with CA and municipal staff to determine whether an interim mitigation plan is required. A mitigation plan should outline active management measures for supplementing the water balance during construction and define triggers for when action is required. Such measures may be necessary to protect the ecological and hydrological functions of the wetland from multi-year disturbances which degrade the wetland to a point where these functions cannot be restored. In the case where supplemental water is needed to augment the interim water balance, clean sources of water are preferred (e.g. roof runoff, runoff from greenspace).

1

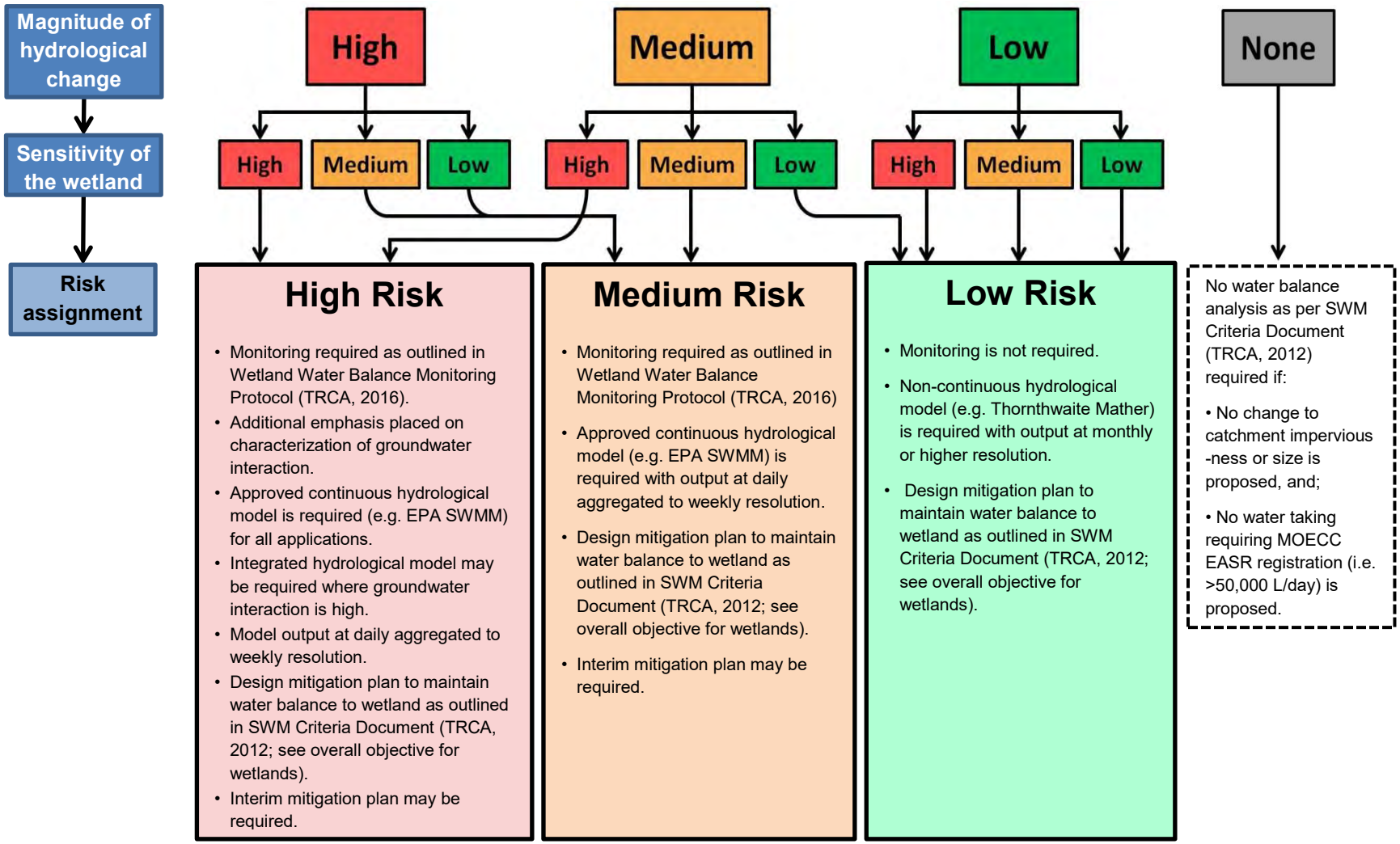

Figure 3: Wetland Risk Evaluation Decision Tree

3. ECOSYSTEM SERVICES AND ADDITIONAL CONSIDERATIONS

Wetlands provide many essential ecosystem services in urban and urbanizing areas. The focus of the *Risk Evaluation* is on protecting the ecology of a wetland by assessing the risk of a proposal to the maintenance of hydrological conditions. However, the focus on ecology does not reduce the importance of other functions wetlands provide such as flood attenuation and runoff detention, groundwater recharge to aquifers, groundwater discharge, nutrient retention, carbon sequestration, and erosion control. In fact, all of the aforementioned ecosystem functions are linked to wetland hydrology. Thus, altering hydrology has the potential to alter the capacity of a wetland to provide several ecosystem services that are of importance at a watershed scale. The intent of the *Risk Evaluation* is not to diminish the importance of any other ecosystem service provided by a wetland that is not explicitly addressed herein. That being said, biological indicators (fauna and flora) are used to characterize the capacity of wetlands to provide certain functions, and by focusing the *Risk Evaluation* on biological endpoints it is assumed that other functions will be protected. It is possible that in some cases particular functions will not be maintained, and in these cases impact on and maintenance of the additional service should be considered as well. If there is doubt about whether a particular ecosystem service will be maintained, the potential threat to that service should be evaluated in consultation with appropriate CA staff and the municipality.

In some cases where the existing level of wetland service provision or ecological function is low, it may be acceptable for there to be a divergence between the pre- and post-development hydroperiod such that the ecological function or other wetland services are enhanced. For example, where there is an opportunity to restore wetland habitat that is degraded or to create wetland habitat in an area with a limited amount of wetland habitat. The CA and municipality should be consulted in these cases to determine whether or not alteration to the water balance of a wetland is acceptable and appropriate.

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APPENDIX 1: CALCULATING THE IMPERVIOUS COVER SCORE

The *Risk Evaluation* uses a calculated value to classify the potential hydrological change that a given proportion of impervious cover within a wetland's catchment represents. Equation 1 allows a proponent to calculate the imperviousness cover score (S) that applies to a proposal, considering the proportion of impervious cover planned within the proponent's land (IC), the total catchment size (C), and the total development area of the catchment (C_{dev}). See Table 1 for definitions of these terms. The value of S is then compared to threshold values defining the boundaries between the low, medium, and high magnitude of potential hydrological change categories (10 % and 25 % respectively).

Equation 1: $S = \frac{IC \cdot C_{dev}}{C}$

This approach to determining the impact of impervious cover was selected over a simpler "total impervious cover within catchment" criterion for two main reasons:

1) The wetland's catchment may be controlled by multiple landowners who do not know each other's development intentions and timelines. This leaves the wetland vulnerable to degradation if none of the proposals individually requires a more stringent water balance analysis (i.e. has a high or medium risk outcome), but the cumulative impact of all proposals is nonetheless substantial and would have triggered a more stringent water balance analysis had they constituted a single proposal. The impervious cover score approach avoids unforeseen cumulative effects.

2) The use of a single "total impervious cover within catchment" criterion would mean that, in the case of multiple landowners within a catchment, it would be likely that those developing later would bear the costs of any more stringent water balance analyses required (i.e. a high or medium risk outcome), even if they have contributed a much smaller proportion of impervious cover to the wetland's catchment than those who developed earlier. The impervious cover score approach ensures that proponents do not have to pay for mistakes made in the past or by other actors.

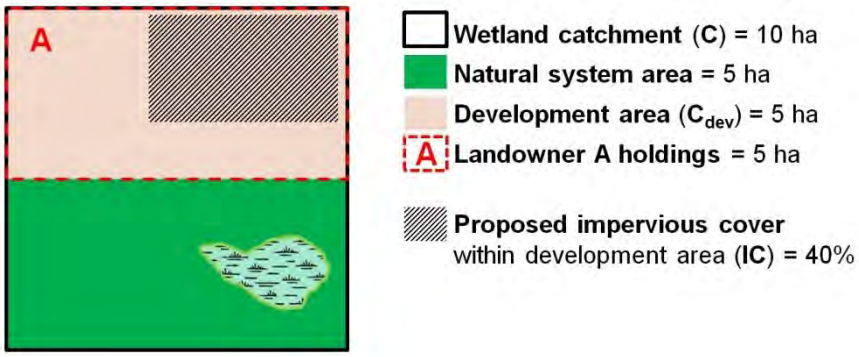
This approach to determining the potential of a proposal to cause hydrological change distributes the impervious cover representing a given threshold of disturbance evenly across all of the development land within the wetland's catchment, regardless of the number of different landowners (see Example 3). It also considers the area of the catchment that is protected by natural heritage or natural hazard designations so as not to be unduly restrictive to proponents in setting the disturbance thresholds for impervious cover. This creates a fair playing field for all developers by ensuring that those developing later are not penalized by bearing the full cost of a water balance analysis that is triggered primarily by the actions of earlier developers

Four examples illustrating the application of this approach to different development scenarios are presented in this appendix. In each example, the shaded area representing various

proposed impervious cover values illustrates the area of the catchment that would be covered if all of the impervious area were concentrated into one contiguous block.

Example 1 – One proponent with known impervious cover

Equation 1 can be applied to determine the impervious cover score (S) for a proposal if the proportion of impervious cover within the proponents holdings (IC) is known. Equation 1 considers the area of the wetland catchment that will not be developed by including the development area of the catchment (C_{dev}) as well as the total catchment area (C). In Example 1 the total catchment area is 10 hectares (C = 10), the total development area of the catchment is 5 hectares (C_{dev} = 5), and the proponent wishes to develop their holdings within the catchment to an impervious cover proportion of 40 percent (IC = 40%):



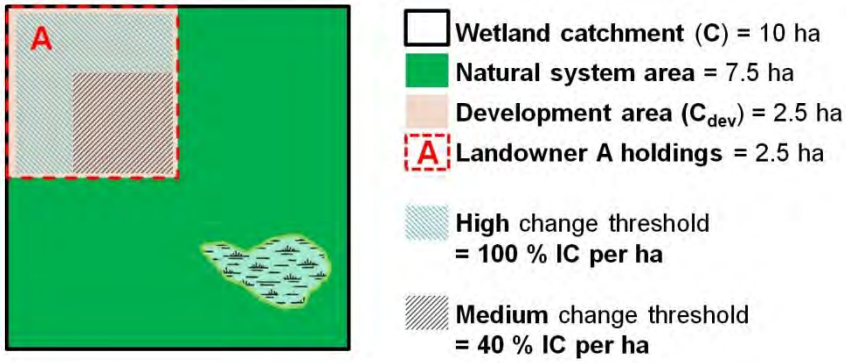
$$S = \frac{IC \cdot C_{dev}}{C} = \frac{40 \cdot 5\ ha}{10\ ha} = 20\ \%$$

The impervious cover score is 20%, and therefore the proposal would be classified as having a medium magnitude of potential hydrological change, because S is greater than 10% but less than 25%.

Example 2a – Determining impervious cover that corresponds to thresholds

In order to find the impervious cover proportion within a landowner's holdings (IC) that corresponds to the threshold impervious cover scores for either a high ($\mathcal{S}$**= 25%**) or medium ($\mathcal{S}$**= 10%**) magnitude of hydrological change classification, Equation 1 can be rearranged to solve for IC (Equation 2).

Equation 2: $$IC = \frac{S \cdot C}{C_{dev}}$$

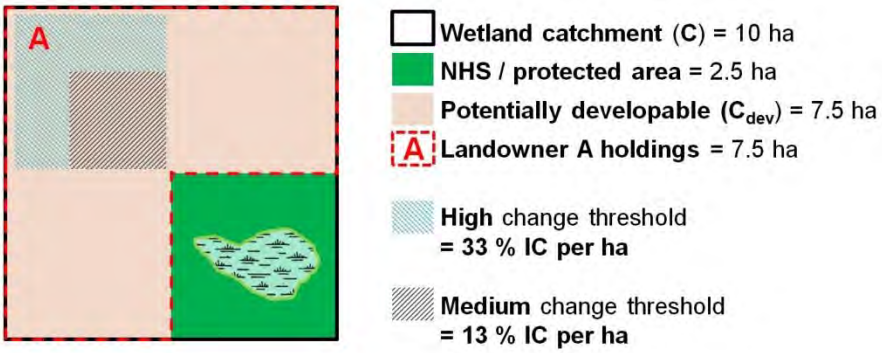


High magnitude: $$IC = \frac{S \cdot C}{C_{dev}} = \frac{25 \cdot 10}{2.5} = 100\%$$

Medium magnitude: $$IC = \frac{S \cdot C}{C_{dev}} = \frac{10 \cdot 10}{2.5} = 40\%$$

In Example 2, a "high magnitude of potential hydrological change" (high magnitude) classification is produced if the impervious cover in the proposal exceeds 100 % (that is, a high magnitude classification for the impervious cover criterion is not physically possible in this example). A medium magnitude outcome occurs if the proportion of impervious cover in the proposal is greater than or equal to 40 %. These impervious cover scores correspond to a *total* catchment (C) impervious cover value of 25 % for the lower boundary of the high magnitude category, and 10 % for the lower boundary of the medium magnitude category, in keeping with the threshold impervious cover values established in the scientific literature.

Example 2b – Determining impervious cover that corresponds to threshold scores



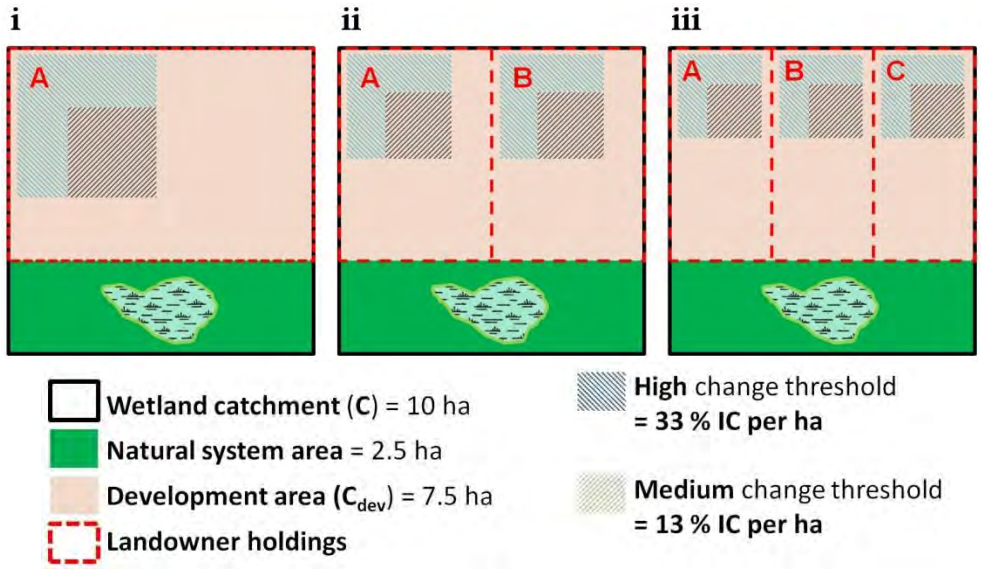
High magnitude: $IC = \frac{S \cdot C}{C_{dev}} = \frac{0.25 \cdot 10}{7.5} =$ 0.33 or 33%

Medium magnitude: $IC = \frac{S \cdot C}{C_{dev}} = \frac{0.1 \cdot 10}{7.5} =$ 0.13 or 13%

In Example 2b, a high magnitude classification is produced if the impervious cover in the proposal exceeds 33%, while a medium magnitude outcome occurs if the proportion of impervious cover in the proposal is between 13% and 33%. The impervious cover scores correspond to a *total* catchment (C) impervious cover value of 25% for the lower boundary of the high magnitude category, and 10% for the lower boundary of the medium magnitude category.

Example 3 – Multiple landowners and proposals

In many cases there will be multiple landowners and developers working within the same wetland catchment. The impervious cover value can be calculated for any of the individual landowners



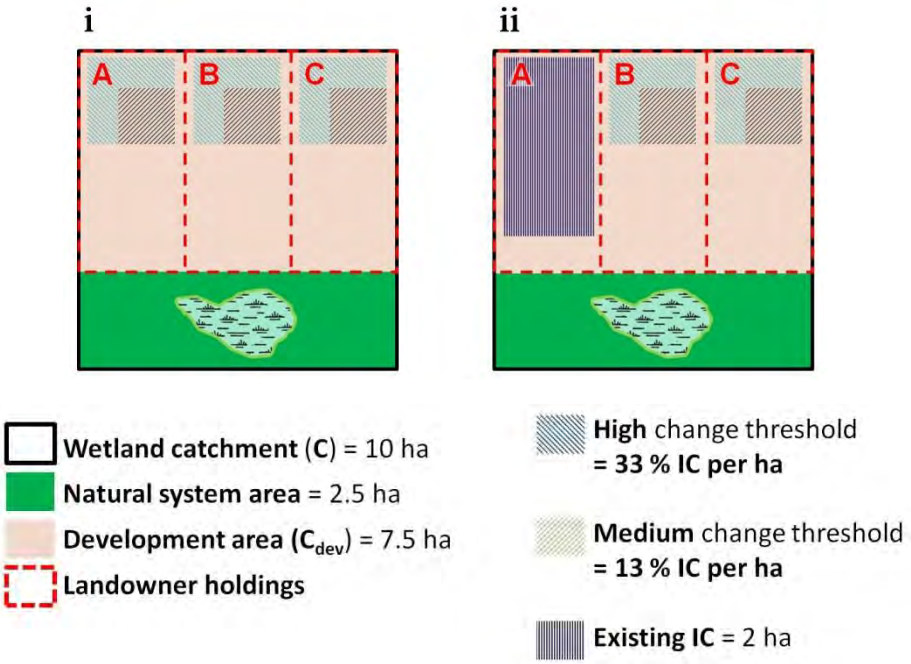
High magnitude: $IC = \frac{S \cdot C}{C_{dev}} = \frac{0.25 \cdot 10}{7.5} = 33\%$

Medium magnitude: $IC = \frac{S \cdot C}{C_{dev}} = \frac{0.1 \cdot 10}{7.5} = 13\%$

In Example 3, three different scenarios are shown with between one and three proponents owning land within the same wetland catchment. This example shows that in each case (i, ii, and iii) a high magnitude classification is produced if the impervious cover in the proposal exceeds 33%, and a medium magnitude outcome occurs if the proportion of impervious cover in the proposal is between 13% and 33%, regardless of the number of different proponents. The calculation does not consider the amount of land each individuals land owner holds, it considers the total development area within the wetland catchment and returns a percent of impervious surface. In each case (i, ii, and iii) the impervious cover scores correspond to a *total* catchment (C) impervious cover value of 25% for the threshold of the high magnitude category, and 10% for the threshold of the medium magnitude category. The same impervious cover score thresholds for the high and medium magnitude categories apply to each landowner in (iii), irrespective of development or land acquisition timelines. This ensures that total catchment imperviousness does not exceed one of the potential hydrological change thresholds without requiring an appropriately scoped water balance study.

Example 4 – Existing development within catchment (infill scenario)

In some cases proposals to develop land within a wetland catchment with existing development will occur. Example 4 is similar to Example 3, except that in Example 4 (ii), there is existing development within the catchment.



High magnitude: $IC = \frac{S \cdot C}{C_{dev}} = \frac{25 \cdot 10}{7.5} = 33\%$

Medium magnitude: $IC = \frac{S \cdot C}{C_{dev}} = \frac{10 \cdot 10}{7.5} = 13\%$

The thresholds corresponding to the high and medium magnitude outcomes do not change between case (i) and case (ii) despite the higher existing total impervious cover within the catchment overall. The equation only considers the proportion of the catchment (C) that is considered development area (C_{dev}), i.e. the area of the catchment outside of the natural system, and does not consider any existing impervious cover. The impervious cover score approach allows the Risk Evaluation to be applied to infill development scenarios and existing urban areas in which a wetland has been determined to be protected. In many older semi-urbanized or fully urbanized areas, remaining wetland communities and functions may have already shifted to reflect the altered drainage conditions within the catchment. Baseline conditions may have changed, and the objective may be to maintain the new hydrological and ecological conditions.

APPENDIX 2: LIST OF WETLAND COMMUNITY TYPES WITHIN TORONTO AND REGION CONSERVATION AUTHORITY JURISDICTION BY HYDROLOGICAL SENSITIVITY

A list of wetland community types (Ecological Land Classification Ontario) ranked by sensitivity to hydrological change is used to evaluate the wetland sensitivity criteria in Step 3 of the *Risk Evaluation* (Section 2.3). Ranking of communities into different sensitivity categories was done by TRCA ecologists. Note that other CAs adopting this document may wish to modify Appendix 2 and Appendix 3 to suit the ecological communities and conservation priorities in their jurisdictions.

Wetland communities were sorted by L-rank (L1-L5) for the native communities and L+ and L+? for exotic communities. Generally, L1-L2 communities were assigned a high-sensitivity rating due to their stringent habitat needs, L3-L4 communities were assigned a medium sensitivity, and L5 communities were assigned a low sensitivity. Further details about this list and the methodology used to produce it can be provided by TRCA upon request.

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
White Pine - Red Maple - Birch - Leatherleaf Treed Kettle Bog	BOT2-1A	High	Nutrient poor system. Community slow to recover from hydrological changes
Leatherleaf Shrub Kettle Bog	BOS2-1	High	Nutrient poor system. Community slow to recover from hydrological changes
Tamarack - Leatherleaf Treed Kettle Bog	BOT2-1	High	Nutrient poor system. Community slow to recover from hydrological changes
Slender Sedge Open Fen	FEO1-2	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Beaked Sedge Open Fen	FEO1-5	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Willow Shrub Fen	FES1-A	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Tamarack Treed Fen	FET1-1	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Leatherleaf - Forb Shrub Fen	FES1-4	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Low White Cedar Shrub Fen	FES1-9	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Tamarack - White Cedar Treed Fen	FET1-2	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Bog Buckbean - Sedge Open Fen	FEO1-4	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
Willow Shrub Mineral Fen	FES2-A	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
White Cedar - Scots Pine Low Treed Mineral Fen	FET2-B	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
White Cedar Low Treed Mineral Fen	FET2-A	High	Mineral rich community. Groundwater fed. Community slow to recover from hydrological changes
Bluejoint - Switchgrass Tallgrass Meadow Marsh	MAM6-A	High	Community slow to recover from hydrological changes
Nelson's Scouring Rush - Baltic Rush Coastal Fen	MAM4-A	High	Community slow to recover from hydrological changes
Unvegetated Mineral Vernal Pool	MAS2-H	High	Community slow to recover from hydrological changes
Narrow-leaved Sedge Organic Shallow Marsh	MAS3-3	High	Community slow to recover from hydrological changes
Unvegetated Organic Vernal Pool	MAS3-E	High	Community slow to recover from hydrological changes
Calla Lily Organic Shallow Marsh	MAS3-11	High	Community slow to recover from hydrological changes
Narrow-leaved Sedge Organic Meadow Marsh	MAM3-5	High	Community slow to recover from hydrological changes
Swamp Loosestrife Organic Shallow Marsh	MAS3-12	High	Community slow to recover from hydrological changes
Broad-leaved Sedge Organic Shallow Marsh	MAS3-4	High	Community slow to recover from hydrological changes
Bur-reed Organic Shallow Marsh	MAS3-7	High	Community slow to recover from hydrological changes
Horsetail Organic Shallow Marsh	MAS3-B	High	Community slow to recover from hydrological changes
Manna Grass Organic Shallow Marsh	MAS3-C	High	Community slow to recover from hydrological changes
Bluejoint Organic Meadow Marsh	MAM3-1	High	Community slow to recover from hydrological changes
Broad-leaved Sedge Organic Meadow Marsh	MAM3-6	High	Community slow to recover from hydrological changes
Mineral Fen Meadow Marsh	MAM5-1	High	Community slow to recover from hydrological changes
Forb Organic Shallow Marsh	MAS3-10	High	Community slow to recover from hydrological changes
Bulrush Organic Shallow Marsh	MAS3-2	High	Community slow to recover from hydrological changes
Rice Cut-grass Organic Shallow Marsh	MAS3-8	High	Community slow to recover from hydrological changes
Bur-reed Mixed Shallow Aquatic	SAM1-5	High	Community slow to recover from hydrological changes
Crowfoot Mixed Shallow Aquatic	SAM1-C	High	Community slow to recover from hydrological changes
Bladderwort Mixed Shallow Aquatic	SAM1-6	High	Community slow to recover from hydrological changes
Bushy Naiad Submerged Shallow Aquatic	SAS1-B	High	Community tolerant of slight hydrological change

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
Water Lily - Bullhead Lily Mixed Shallow Aquatic	SAM1-A	High	Community slow to recover from hydrological changes
Tamarack - Black Spruce Organic Coniferous Swamp	SWC4-1	High	Community slow to recover from hydrological changes
Tamarack - Balsam Fir - Spruce Organic Coniferous Swamp	SWC4-A	High	Community slow to recover from hydrological changes
Swamp Maple - Conifer Organic Mixed Swamp	SWM5-2	High	Community slow to recover from hydrological changes
Red (Green) Ash - Hemlock Mineral Mixed Swamp	SWMA-A	High	Community slow to recover from hydrological changes
Buttonbush Mineral Thicket Swamp	SWT2-4	High	Community slow to recover from hydrological changes
Mountain Maple Organic Thicket Swamp	SWT3-3	High	Community tolerant of slight hydrological change
Silky Dogwood Organic Thicket Swamp	SWT3-B	High	Community tolerant of slight hydrological change
Tamarack Organic Coniferous Swamp	SWC4-2	High	Community slow to recover from hydrological changes
Buttonbush Organic Thicket Swamp	SWT3-4	High	Community slow to recover from hydrological changes
Spiraea Organic Thicket Swamp	SWT3-A	High	Community slow to recover from hydrological changes
Hemlock Organic Coniferous Swamp	SWCA-A	High	Community slow to recover from hydrological changes
White Birch - Cottonwood Coastal Mineral Deciduous Swamp	SWD4-A	High	Community slow to recover from hydrological changes
Red Maple Organic Deciduous Swamp	SWD6-1	High	Community slow to recover from hydrological changes
Silver Maple Organic Deciduous Swamp	SWD6-2	High	Community slow to recover from hydrological changes
Red Maple - Conifer Organic Mixed Swamp	SWM5-1	High	Community slow to recover from hydrological changes
Poplar - Conifer Organic Mixed Swamp	SWM6-2	High	Community slow to recover from hydrological changes
Winterberry Mineral Thicket Swamp	SWT2-B	High	Community slow to recover from hydrological changes
Winterberry Organic Thicket Swamp	SWT3-7	High	Community slow to recover from hydrological changes
Swamp Maple - Conifer Mineral Mixed Swamp	SWM2-2	High	Community slow to recover from hydrological changes
Hemlock Mineral Coniferous Swamp	SWC2-2	High	Community slow to recover from hydrological changes
Red Maple - Conifer Mineral Mixed Swamp	SWM2-1	High	Community slow to recover from hydrological changes
Yellow Birch Organic Deciduous Swamp	SWD7-2	High	Community slow to recover from hydrological changes
White Cedar - Conifer Organic Coniferous Swamp	SWC3-2	High	Community slow to recover from hydrological changes
Birch - Conifer Organic Mixed Swamp	SWM6-1	High	Community slow to recover from hydrological changes
White Cedar - Hardwood Organic Mixed Swamp	SWM4-1	High	Community slow to recover from hydrological changes
Threesquare Mineral Shallow Marsh	MAS2-6	Medium	Community tolerant of slight hydrological change

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
Sweet Flag Mineral Shallow Marsh	MAS2-F	Medium	Community tolerant of slight hydrological change
Jewelweed Organic Meadow Marsh	MAM3-8	Medium	Community tolerant of slight hydrological change
Narrow-leaved Sedge Mineral Shallow Marsh	MAS2-3	Medium	Community tolerant of slight hydrological change
Horsetail Mineral Shallow Marsh	MAS2-C	Medium	Community tolerant of slight hydrological change
Rush Mineral Meadow Marsh	MAM2-C	Medium	Community tolerant of slight hydrological change
Rice Cut-grass Organic Meadow Marsh	MAM3-3	Medium	Community tolerant of slight hydrological change
Buejoint Mineral Meadow Marsh	MAM2-1	Medium	Community tolerant of slight hydrological change
Narrow-leaved Sedge Mineral Meadow Marsh	MAM2-5	Medium	Community tolerant of slight hydrological change
Broad-leaved Sedge Mineral Meadow Marsh	MAM2-6	Medium	Community tolerant of slight hydrological change
Horsetail Mineral Meadow Marsh	MAM2-7	Medium	Community tolerant of slight hydrological change
Forb Organic Meadow Marsh	MAM3-9	Medium	Community tolerant of slight hydrological change
Broad-leaved Sedge Mineral Shallow Marsh	MAS2-4	Medium	Community tolerant of slight hydrological change
Bur-reed Mineral Shallow Marsh	MAS2-7	Medium	Community tolerant of slight hydrological change
Broad-leaved Cattail Organic Shallow Marsh	MAS3-1A	Medium	Community tolerant of slight hydrological change
Bulrush Mineral Meadow Marsh	MAM2-E	Medium	Community tolerant of slight hydrological change
Rice Cut-grass Mineral Shallow Marsh	MAS2-8	Medium	Community tolerant of slight hydrological change
Manna Grass Mineral Shallow Marsh	MAS2-G	Medium	Community tolerant of slight hydrological change
Bulrush Mineral Shallow Marsh	MAS2-2	Medium	Community tolerant of slight hydrological change
Forb Mineral Shallow Marsh	MAS2-9	Medium	Community tolerant of slight hydrological change
Broad-leaved Cattail Mineral Shallow Marsh	MAS2-1A	Medium	Community tolerant of slight hydrological change
Watercress Mixed Shallow Aquatic	SAM1-3	Medium	Community tolerant of slight hydrological change
Water Milfoil Mixed Shallow Aquatic	SAM1-7	Medium	Community tolerant of slight hydrological change
Water Lily - Bullhead Lily Floating-leaved Shallow Aquatic	SAF1-1	Medium	Community tolerant of slight hydrological change
Wild Celery Submerged Shallow Aquatic	SAS1-5	Medium	Community tolerant of slight hydrological change
Pondweed Mixed Shallow Aquatic	SAM1-4	Medium	Community tolerant of slight hydrological change
Waterweed Submerged Shallow Aquatic	SAS1-2	Medium	Community tolerant of slight hydrological change
Water Milfoil Submerged Shallow Aquatic	SAS1-4	Medium	Community tolerant of slight hydrological change

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
Coon-tail Submerged Shallow Aquatic	SAS1-A	Medium	Community tolerant of slight hydrological change
Duckweed Floating-leaved Shallow Aquatic	SAF1-3	Medium	Community tolerant of slight hydrological change
Duckweed Mixed Shallow Aquatic	SAM1-2	Medium	Community tolerant of slight hydrological change
Pondweed Submerged Shallow Aquatic	SAS1-1	Medium	Community tolerant of slight hydrological change
Stonewort Submerged Shallow Aquatic	SAS1-3	Medium	Community tolerant of slight hydrological change
Spiraea Mineral Thicket Swamp	SWT2-6	Medium	Community tolerant of slight hydrological change
Nannyberry Mineral Thicket Swamp	SWT2-10	Medium	Community tolerant of slight hydrological change
Mountain Maple Mineral Thicket Swamp	SWT2-3	Medium	Community tolerant of slight hydrological change
White Cedar - Conifer Mineral Coniferous Swamp	SWC1-2	Medium	Community tolerant of slight hydrological change
Bur Oak Mineral Deciduous Swamp	SWD1-2	Medium	Community tolerant of slight hydrological change
Red Maple Mineral Deciduous Swamp	SWD3-1	Medium	Community tolerant of slight hydrological change
Willow Organic Deciduous Swamp	SWD7-A	Medium	Community tolerant of slight hydrological change
Birch - Conifer Mineral Mixed Swamp	SWM3-1	Medium	Community tolerant of slight hydrological change
Poplar - Conifer Mineral Mixed Swamp	SWM3-2	Medium	Community tolerant of slight hydrological change
Silky Dogwood Mineral Thicket Swamp	SWT2-8	Medium	Community tolerant of slight hydrological change
Yellow Birch Mineral Deciduous Swamp	SWD4-4	Medium	Community tolerant of slight hydrological change
Black Ash Organic Deciduous Swamp	SWD5-1	Medium	Community tolerant of slight hydrological change
Swamp Maple Organic Deciduous Swamp	SWD6-3	Medium	Community tolerant of slight hydrological change
Alder Organic Thicket Swamp	SWT3-1	Medium	Community tolerant of slight hydrological change
Red-osier Organic Thicket Swamp	SWT3-5	Medium	Community tolerant of slight hydrological change
White Cedar Organic Coniferous Swamp	SWC3-1	Medium	Community tolerant of slight hydrological change
Paper Birch - Poplar Organic Deciduous Swamp	SWD7-1	Medium	Community tolerant of slight hydrological change
Willow Organic Thicket Swamp	SWT3-2	Medium	Community tolerant of slight hydrological change
White Ash Mineral Deciduous Swamp	SWD2-A	Medium	Community tolerant of slight hydrological change
White Cedar Mineral Coniferous Swamp	SWC1-1	Medium	Community tolerant of slight hydrological change
Black Ash Mineral Deciduous Swamp	SWD2-1	Medium	Community tolerant of slight hydrological change
Swamp Maple Mineral Deciduous Swamp	SWD3-3	Medium	Community tolerant of slight hydrological change

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
White Elm Mineral Deciduous Swamp	SWD4-2	Medium	Community tolerant of slight hydrological change
Alder Mineral Thicket Swamp	SWT2-1	Medium	Community tolerant of slight hydrological change
Red (Green) Ash Mineral Deciduous Swamp	SWD2-2	Medium	Community tolerant of slight hydrological change
Silver Maple Mineral Deciduous Swamp	SWD3-2	Medium	Community tolerant of slight hydrological change
Paper Birch - Poplar Mineral Deciduous Swamp	SWD4-3	Medium	Community tolerant of slight hydrological change
Willow Mineral Thicket Swamp	SWT2-2	Medium	Community tolerant of slight hydrological change
White Cedar - Hardwood Mineral Mixed Swamp	SWM1-1	Medium	Community tolerant of slight hydrological change
Fowl Manna Grass Organic Meadow Marsh	MAM3-4	Medium	Maybe sensitive to hydrological change
Fowl Manna Grass Mineral Meadow Marsh	MAM2-4	Medium	Maybe sensitive to hydrological change
Rice Cut-Grass Mineral Meadow Marsh	MAM2-D	Medium	Maybe sensitive to hydrological change
Reed Canary Grass Organic Meadow Marsh	MAM3-2	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Common Reed Organic Meadow Marsh	MAM3-a	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Giant Manna Grass Mineral Shallow Marsh	MAS2-e	Medium	
Narrow-leaved Cattail Organic Shallow Marsh	MAS3-1b	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Common Reed Organic Shallow Marsh	MAS3-9	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Purple Loosestrife Organic Shallow Marsh	MAS3-a	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Reed Canary Grass Organic Shallow Marsh	MAS3-d	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Floating-heart Mixed Shallow Aquatic	SAM1-b	Medium	
Exotic Organic Thicket Swamp	SWT3-c	Medium	Substrate sensitive to change. Organic soils are slow to accumulate
Jewelweed Mineral Meadow Marsh	MAM2-9	Low	Community moderately tolerant of hydrological changes
Forb Mineral Meadow Marsh	MAM2-10	Low	Community moderately tolerant of hydrological changes
Liverwort Floating-leaved Shallow Aquatic	SAF1-A	Low	Community moderately tolerant of hydrological changes
Manitoba Maple Mineral Deciduous Swamp	SWD3-4	Low	Community moderately tolerant of hydrological changes
Willow Mineral Deciduous Swamp	SWD4-1	Low	Community moderately tolerant of hydrological changes

Vegetation Community	ELC Code	Sensitivity	Assumptions/Basis
Red-osier Mineral Thicket Swamp	SWT2-5	Low	Community moderately tolerant of hydrological changes
Red-top Mineral Meadow Marsh	MAM2-3	Low	Community moderately tolerant of hydrological changes
Reed Canary Grass Mineral Meadow Marsh	MAM2-2	Low	
Miscanthus Mineral Meadow Marsh	MAM2-f	Low	
Cool-season Grass Mineral Meadow Marsh	MAM2-g	Low	
Reed Canary Grass Mineral Shallow Marsh	MAS2-d	Low	
European Alder Mineral Deciduous Swamp	SWD4-b	Low	
Exotic Mineral Thicket Swamp	SWT2-a	Low	

APPENDIX 3: LIST OF HYDROLOGICALLY SENSITIVE FAUNA AND FLORA WITHIN TORONTO AND REGION CONSERVATION AUTHORITY JURISDICTION BY HYDROLOGICAL SENSITIVITY

This appendix contains two lists, one of hydrologically sensitive fauna (grouped into herpetofauna, birds, mammals and fish) and a second list of individual flora ranked by sensitivity. Fauna rankings were derived from the sources cited in the references section in addition to the professional experience of TRCA staff. Note that other CAs adopting this document may wish to modify Appendix 2 and Appendix 3 to suit the ecological communities and conservation priorities in their jurisdictions.

Flora rankings were assigned using a combination of co-efficient of Conservatism values (CC), L-Ranks and expert opinion. The Terrestrial Natural Heritage Access Database was queried to produce a list of all species sensitive to hydrology. The coefficient of wetness score (CW, range 5 to - 5), which defines a species' likelihood to occur in a wetland was then used to separate terrestrial species from wetland species (i.e. only facultative to obligate wetland species with a CW score of -2 to -5 were included). Species were then sorted in descending order based on their coefficient of conservatism value, CC (range 0 to 10). Conservatism value describes a species ability to persist and adapt to change in its habitat. Species with higher CC values are unlikely to tolerate change because they are specialists that are confined to specific environmental conditions and habitat types. Species with lower CC values are more generalist in nature, and can tolerate a wider range of conditions and habitats and as such are less sensitive to disturbance. Species with a CC value of 8 to 10 were deemed highly sensitive, 4 to 7 were deemed moderately sensitive and 0 to 3 were deemed mildly sensitive to changes in hydrology. Those species highlighted pale brown may be sensitive to hydrology (currently unclear). Where possible, species that act as groundwater indicators were indicated.

Fauna List			
Fauna	**Sensitivity**	**Sensitive Periods**	**L-Rank**
Herpetofauna-			
gray treefrog	High	late Apr-early Oct	L2
wood frog	High	late Mar-end Aug	L2
northern spring peeper	High	start Apr-end Sep	L2
western chorus frog	High	end Mar-end July	L2
northern leopard frog	High	late Sep-mid Aug	L3
mink frog	High	all year	L2
American bullfrog	High	all year	L2
pickerel frog	High	early Oct-late Aug	L2
mudpuppy	High	all year	LX
eastern newt	High	all year	L2

Fauna	Sensitivity	Sensitive Periods	L-Rank
blue-spotted salamander	High	Mar-Aug	LX
Jefferson salamander complex	High	early Mar-Sep	L1
yellow-spotted salamander	High	Mar-Oct	L1
Blanding's turtle	High	all year	L1
common map turtle	High	all year	L2
common musk turtle	High	all year	LX
common snapping turtle	High	all year	L2
midland painted turtle	High	all year	L3
green frog	Medium	all year	L4
American toad	Medium	late Apr-mid Sep	L4
northern watersnake	Medium	Apr-Oct	L2
Birds-			
American coot	High	early Apr-late Oct	L2
American bittern	High	early Apr-mid Oct	L2
least bittern	High	late Apr-late Oct	L2
common moorhen	High	early Apr-mid Sep	L2
pied-billed grebe	High	early Apr-end Oct	L3
red-necked grebe	High	late Apr-mid Oct	L3
canvasback	High	late Apr-end Sep	L2
hooded merganser	High	mid Mar-late Oct	L3
Virginia Rail	Medium	early Apr-mid Sep	L3
Northern waterthrush	Medium	start May-mid Aug	L3
blue-winged teal	Medium	early Apr-early Oct	L3
green-winged teal	Medium	mid Apr-early Sep	L2
prothonotary warbler	Medium	early May-end Aug	L2
sora	Medium	early Apr-end Sep	L3
American black duck	Medium	early Mar-end Oct	L3
gadwall	Medium	end Mar-mid Oct	L4
marsh wren	Medium	late Apr-mid Sep	L3
wood duck	Medium	early Mar-end Oct	L4
great blue heron	Low	start Apr-early Oct	L3
great egret	Low	mid Apr-late Sep	L3
green heron	Low	early Apr-end Sep	L4
black-crowned night heron	Low	early Apr-late Oct	L3
alder flycatcher	Low	late May-late Aug	L4
Canada goose	Low	early Mar-early Oct	L5
common yellowthroat	Low	start May-late Aug	L4
mallard	Low	mid Mar-end Oct	L5
swamp sparrow	Low	early Apr-end Aug	L4
Wilson's snipe	Low	start Apr-early Sep	L3

Fauna	Sensitivity	Sensitive Periods	L-Rank
Mammals-			
muskrat	High	all year	L4
mink	Low	all year	L4
beaver	Low	all year	L4
star-nosed mole	Low	all year	L3
Fish-			
northern pike	High		
blackchin minnow	High		
northern redbelly dace	Medium		
central mudminnow	Medium		
brook stickleback	Low		
fathead minnow	Low		

Flora List							
Scientific Name	**Common Name**	**Sensitivity**	**L-Rank**	**CC**	**CW**	**GW Obligate**	**GW Fac-ultative**
Acorus americanus	sweet flag	High	L3	8	-5		
Andromeda polifolia var. latifolia	bog rosemary	High	L1	10	-5		
Arethusa bulbosa	dragon's mouth orchid	High	LX	10	-5		
Betula pumila	dwarf birch	High	L1	9	-5		
Bidens beckii	water-marigold	High	L1	8	-5		
Calamagrostis stricta ssp. inexpansa	northern reed grass	High	L2	8	-4		
Calla palustris	water arum	High	L2	8	-5		
Calopogon tuberosus	grass pink	High	L1	9	-5		
Calypso bulbosa	calypso	High	LX	10	-3		
Cardamine bulbosa	spring cress	High	L2	8	-5		
Carex billingsii	Billings' three-seeded sedge	High	L1	9	-5		
Carex buxbaumii	dark-scaled sedge	High	L2	10	-5		
Carex chordorrhiza	creeping sedge	High	L2	10	-5		
Carex disperma	two-seeded sedge	High	L3	8	-5	x	
Carex garberi	Garber's sedge	High	L2	10	-3		
Carex grayi	Gray's sedge	High	L3	8	-4		
Carex laevivaginata	smooth-sheathed sedge	High	L3	8	-5	x	
Carex lasiocarpa	slender woolly sedge	High	L2	8	-5		
Carex leptalea	bristle-stalked sedge	High	L3	8	-5	x	
Carex limosa	mud sedge	High	L2	10	-5		
Carex lupulina	hop sedge	High	L4	10	-4		
Carex magellanica ssp. irrigua	stunted sedge	High	L2	10	-5		
Carex pauciflora	few-flowered sedge	High	LX	10	-5		
Carex prasina	drooping sedge	High	L2	10	-5		
Carex scabrata	rough sedge	High	L4	8	-5	x	
Carex schweinitzii	Schweinitz' sedge	High	L2	9	-5	x	
Carex tenuiflora	sparse-flowered sedge	High	L2	10	-5		
Carex trisperma	three-seeded sedge	High	L3	9	-5	x	
Chamaedaphne calyculata	leatherleaf	High	L3	9	-5		
Chrysosplenium americanum	golden saxifrage	High	L3	8	-5	x	
Cirsium muticum	swamp thistle	High	L1	8	-5		
Cladium mariscoides	twig-rush	High	L1	9	-5		
Dichanthelium acuminatum ssp. lindheimeri	Lindheimer's panic grass	High	L2	8	-5		
Drosera intermedia	spatulate-leaved sundew	High	LX	9	-5		
Eleocharis flavescens var. olivacea	olive-fruited spike-rush	High	L1	8	-5		
Eleocharis quinqueflora	few-flowered spike-rush	High	L2	10	-5		
Epilobium strictum	downy willow-herb	High	L3	9	-5		
Equisetum palustre	marsh horsetail	High	L1	10	-3		
Equisetum pratense	thicket horsetail	High	L3	8	-3		
Eriophorum gracile	slender cotton-grass	High	L1	10	-5		
Eriophorum tenellum	rough cotton-grass	High	L1	10	-5		
Eriophorum vaginatum ssp. spissum	dense cotton-grass	High	L1	10	-5		
Eriophorum virginicum	tawny cotton-grass	High	L2	10	-5		
Eriophorum viridicarinatum	thin-leaved cotton-grass	High	L2	9	-5	x	
Galium labradoricum	Labrador bedstraw	High	L1	9	-5		
Gaultheria hispidula	creeping snowberry	High	L1	8	-3		

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Fac-ultative
Glyceria borealis	northern manna grass	High	L3	8	-5		
Glyceria septentrionalis	eastern manna grass	High	L3	8	-5		
Hippuris vulgaris	mare's tail	High	LX	10	-5		
Hydrophyllum canadense	Canada waterleaf	High	L3	8	-2		
Ilex mucronata	mountain holly	High	L2	8	-5		
Juncus brachycephalus	small-headed rush	High	L2	10	-3		
Kalmia polifolia	bog laurel	High	L2	10	-5		
Listera cordata	heart-leaved twayblade	High	L1	8	-3		
Lobelia kalmii	Kalm's lobelia	High	L1	9	-5		
Lonicera oblongifolia	swamp fly honeysuckle	High	LX	8	-5		
Maianthemum trifolium	three-leaved false Solomon's seal	High	L3	10	-5		
Menyanthes trifoliata	bog buckbean	High	L2	9	-5		
Mimulus moschatus	musk-flower	High	L2	9	-5		
Parnassia parviflora	small-flowered grass of Parnassus	High	L1	9	-5		
Pedicularis lanceolata	swamp lousewort	High	LX	9	-4		
Peltandra virginica	tuckahoe	High	L3	9	-5		
Petasites frigidus	palmate-leaved sweet coltsfoot	High	L1	8	-3		
Picea mariana	black spruce	High	L2	8	-3		
Platanthera blephariglottis var. blephariglottis	white-fringed orchis	High	LX	10	-5		
Platanthera clavellata	club-spur orchis	High	LX	8	-4		
Platanthera obtusata	small northern bog orchis	High	LX	9	-3		
Platanthera psycodes	small purple-fringed orchis	High	LX	8	-3		
Pogonia ophioglossoides	rose pogonia	High	L1	10	-5		
Potamogeton oakesianus	Oake's pondweed	High	L2	10	-5		
Potamogeton spirillus	spiral pondweed	High	LX	8	-5		
Potamogeton strictifolius	narrow-leaved pondweed	High	LU	8	-5		
Rhododendron groenlandicum	Labrador-tea	High	L2	9	-5		
Rhynchospora alba	white beak-rush	High	L1	10	-5		
Ribes hudsonianum	northern black currant	High	L1	8	-5		
Sagittaria graminea ssp. graminea	grass-leaved arrowhead	High	LX	8	-5		
Salix candida	hoary willow	High	L2	10	-5		
Salix pedicellaris	bog willow	High	L2	9	-5		
Samolus parviflorus	Valerand's water-pimpernel	High	LU	8	-5		
Sarracenia purpurea	pitcher-plant	High	L1	10	-5		
Scheuchzeria palustris	bog arrow-grass	High	LX	10	-5		
Schoenoplectus smithii var. smithii	Smith's club-rush	High	LX	10	-5		
Scleria verticillata	low nut-rush	High	L2	10	-5		
Solidago patula	rough-leaved goldenrod	High	L4	8	-5		
Solidago uliginosa	bog goldenrod	High	L2	9	-5		
Sparganium natans	lesser bur-reed	High	L2	8	-5		
Spiranthes lucida	shining ladies' tresses	High	L2	9	-4	x	
Spiranthes romanzoffiana	hooded ladies' tresses	High	L1	9	-4	x	
Stuckenia filiformis ssp. filiformis	thread-leaved pondweed	High	LX	8	-5		
Symphyotrichum boreale	bog aster	High	L2	10	-5		
Torreyochloa pallida var. fernaldii	Fernald's manna grass	High	L2	8	-5		
Toxicodendron vernix	poison sumach	High	LX	8	-5		
Triantha occidentalis ssp. brevistyla	sticky false asphodel	High	LX	10	-5		
Triglochin maritima	seaside arrow-grass	High	L1	8	-5		

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Facultative
Triglochin palustris	marsh arrow-grass	High	LX	10	-5		
Utricularia intermedia	flat-leaved bladderwort	High	L1	8	-5		
Utricularia minor	small bladderwort	High	L2	8	-5		
Vaccinium corymbosum	highbush blueberry	High	L1	8	-3		
Vaccinium macrocarpon	large cranberry	High	L2	10	-5		
Vaccinium oxycoccos	small cranberry	High	L2	10	-5		
Valeriana uliginosa	swamp valerian	High	L1	10	-4		
Viola sagittata var. ovata	arrow-leaved violet	High	L1	9	-2		
Woodwardia virginica	Virginia chain-fern	High	L1	10	-5		
Zizania palustris var. palustris	northern wild rice	High	L2	9	-5		
Agalinis paupercula	small-flowered gerardia	High	L1	8	-5		
Carex trichocarpa	hairy-fruited sedge	High	L3	8	-5		
Elodea nuttallii	Nuttall's water-weed	High	L3	8	-5		
Gentianopsis crinita	fringed gentian	High	L2	8	-4	x	
Physostegia virginiana ssp. virginiana	false dragonhead	High	L3	8	-3		
Platanus occidentalis	sycamore	High	L2	8	-3		
Salix myricoides	blue-leaved willow	High	LX	10	-3		
Abies balsamea	balsam fir	Medium	L3	5	-3		x
Alisma gramineum	grass-like water-plantain	Medium	LX	6	-5		
Alnus incana ssp. rugosa	speckled alder	Medium	L3	6	-5		x
Alopecurus aequalis	short-awned foxtail	Medium	L3	7	-5		
Angelica atropurpurea	angelica	Medium	L3	6	-5		
Anthoxanthum nitens ssp. nitens	sweet grass	Medium	L1	5	-3		
Asclepias incarnata ssp. incarnata	swamp milkweed	Medium	L4	6	-5		
Beckmannia syzigachne	slough grass	Medium	L3	4	-5		
Bidens discoidea	small beggar's-ticks	Medium	L3	6	-3		
Bidens vulgata	tall beggar's-ticks	Medium	L5	5	-3		
Bolboschoenus fluviatilis	river bulrush	Medium	L3	7	-5		
Brasenia schreberi	water-shield	Medium	L1	7	-5		
Bromus ciliatus	fringed brome grass	Medium	L3	6	-3	x	
Callitriche palustris	marsh water starwort	Medium	L3	6	-5		
Caltha palustris	marsh marigold	Medium	L4	5	-5	x	
Campanula aparinoides	marsh bellflower	Medium	L3	7	-5		
Cardamine douglassii	purple cress	Medium	L3	7	-3		
Cardamine nymanii	cuckoo-flower	Medium	L2	7	-5		
Cardamine pensylvanica	bitter cress	Medium	L4	6	-4		
Carex alopecoidea	foxtail wood sedge	Medium	L3	6	-4		
Carex aquatilis	water sedge	Medium	L2	7	-5		
Carex atherodes	awned sedge	Medium	L3	6	-5		
Carex bromoides	brome-like sedge	Medium	L4	7	-4		
Carex brunnescens ssp. brunnescens	brownish sedge	Medium	L3	7	-3		
Carex canescens ssp. canescens	silvery sedge	Medium	L3	7	-5		
Carex castanea	chestnut-scaled sedge	Medium	L3	7	-4		
Carex comosa	bristly sedge	Medium	L3	5	-5		
Carex crinita	fringed sedge	Medium	L3	6	-4		
Carex diandra	lesser panicled sedge	Medium	L3	7	-5		
Carex echinata ssp. echinata	little prickly sedge	Medium	L1	7	-5		
Carex flava	yellow sedge	Medium	L3	5	-5	x	
Carex formosa	handsome sedge	Medium	L2	6	-2		
Carex hystericina	porcupine sedge	Medium	L4	5	-5		x

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Facultative
Carex interior	fen star sedge	Medium	L3	6	-5	x	
Carex lacustris	lake-bank sedge	Medium	L4	5	-5		
Carex lurida	sallow sedge	Medium	L3	6	-5		
Carex prairea	fen panicled sedge	Medium	L2	7	-4		
Carex projecta	necklace sedge	Medium	L4	5	-4		
Carex pseudocyperus	pseudocyperus sedge	Medium	L4	6	-5		
Carex scoparia	pointed broom sedge	Medium	L3	5	-3		
Carex stricta	tussock sedge	Medium	L4	4	-5		x
Carex tribuloides	blunt broom sedge	Medium	L4	5	-4		
Carex tuckermanii	Tuckerman's sedge	Medium	L3	7	-5		
Carex utriculata	beaked sedge	Medium	L3	7	-5		
Carex vesicaria	inflated sedge	Medium	L2	7	-5		
Cephalanthus occidentalis	buttonbush	Medium	L3	7	-5		
Chelone glabra	turtlehead	Medium	L3	7	-5	x	
Cicuta bulbifera	bulblet-bearing water-hemlock	Medium	L5	5	-5		
Cinna latifolia	nodding wood reed	Medium	L4	7	-4		
Circaea alpina	smaller enchanter's nightshade	Medium	L3	6	-3		
Comarum palustre	marsh cinquefoil	Medium	L3	7	-5		
Coptis trifolia	goldthread	Medium	L2	7	-3		
Corallorhiza trifida	early coral-root	Medium	L1	7	-2		
Cornus amomum ssp. obliqua	silky dogwood	Medium	L4	5	-4		
Cuscuta gronovii	swamp dodder	Medium	L4	4	-3		
Cyperus diandrus	low umbrella-sedge	Medium	LX	6	-4		
Cypripedium reginae	showy lady's slipper	Medium	L2	7	-4	x	
Cystopteris bulbifera	bulblet fern	Medium	L4	5	-2	x	
Decodon verticillatus	swamp loosestrife	Medium	L2	7	-5		
Doellingeria umbellata var. umbellata	flat-topped aster	Medium	L3	6	-3		x
Drosera rotundifolia	round-leaved sundew	Medium	L1	7	-5		
Dryopteris clintoniana	Clinton's wood fern	Medium	L3	7	-4		x
Dryopteris cristata	crested wood fern	Medium	L4	7	-5		x
Dryopteris x benedictii	Benedict's wood fern	Medium	L3	7	-3		
Dulichium arundinaceum	three-way sedge	Medium	L2	7	-5		
Eleocharis acicularis	needle spike-rush	Medium	L3	5	-5		
Eleocharis elliptica	elliptic spike-rush	Medium	L2	7	-3		
Eleocharis intermedia	matted spike-rush	Medium	L2	7	-3		
Eleocharis palustris	Small's spike-rush	Medium	L3	6	-5		
Elodea canadensis	common water-weed	Medium	L4	4	-5		
Epilobium leptophyllum	narrow-leaved willow-herb	Medium	L3	7	-5		
Equisetum fluviatile	water horsetail	Medium	L3	7	-5		
Equisetum sylvaticum	woodland horsetail	Medium	L3	7	-3		
Equisetum variegatum ssp. variegatum	variegated scouring-rush	Medium	L4	5	-3	x	
Fraxinus nigra	black ash	Medium	L4	7	-4		x
Galium obtusum	obtuse bedstraw	Medium	L3	6	-5		
Galium palustre	marsh bedstraw	Medium	L5	5	-5		
Galium tinctorium	stiff marsh bedstraw	Medium	L3	5	-5		
Galium trifidum ssp. trifidum	small bedstraw	Medium	L4	5	-4		
Geum rivale	water avens	Medium	L3	7	-5	x	
Glyceria canadensis	rattlesnake grass	Medium	L2	7	-5		
Gratiola neglecta	clammy hedge-hyssop	Medium	L2	7	-5		

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Fac-ultative
Helianthus giganteus	tall sunflower	Medium	LX	6	-3		
Heteranthera dubia	water star-grass	Medium	L2	7	-5		
Hydrocotyle americana	marsh pennywort	Medium	L4	7	-5	x	
Hypericum majus	larger Canada St. John's-wort	Medium	L2	5	-3		
Ilex verticillata	winterberry	Medium	L3	5	-4		
Iris versicolor	blue flag	Medium	L3	5	-5		
Iris virginica var. shrevei	southern blue flag	Medium	L4	5	-5		
Juncus acuminatus	sharp-fruited rush	Medium	L2	6	-5		
Juncus articulatus	jointed rush	Medium	L5	5	-5		
Juncus brevicaudatus	short-tailed rush	Medium	L2	6	-5		
Juncus canadensis	Canada rush	Medium	L2	6	-5		
Juncus effusus	soft rush	Medium	L5	4	-5		
Larix laricina	tamarack	Medium	L3	7	-3		
Lathyrus palustris	marsh vetchling	Medium	L2	6	-3		
Lindera benzoin	spice-bush	Medium	L2	6	-2		
Lindernia dubia var. dubia	false pimpernel	Medium	L3	7	-5		
Liparis loeselii	Loesel's twayblade	Medium	L3	5	-4	x	
Lobelia cardinalis	cardinal flower	Medium	L1	7	-5		
Lobelia siphilitica	great blue lobelia	Medium	L3	6	-4		x
Ludwigia palustris	water purslane	Medium	L3	5	-5		
Lysimachia terrestris	swamp candles	Medium	L3	6	-5		
Lysimachia thyrsiflora	tufted loosestrife	Medium	L4	7	-5		
Mimulus ringens	square-stemmed monkey-flower	Medium	L4	6	-5		
Mitella nuda	naked mitrewort	Medium	L3	6	-3	x	
Muhlenbergia glomerata	marsh wild Timothy	Medium	L3	7	-4		
Myosotis laxa	smaller forget-me-not	Medium	L4	6	-5		
Myrica gale	sweet gale	Medium	L2	6	-5		
Myriophyllum heterophyllum	variable water-milfoil	Medium	L2	7	-5		
Myriophyllum sibiricum	northern water-milfoil	Medium	L2	6	-5		
Myriophyllum verticillatum	whorled water-milfoil	Medium	L1	7	-5		
Najas flexilis	bushy naiad	Medium	L3	5	-5		
Nuphar variegata	bullhead lily	Medium	L3	4	-5		
Nymphaea odorata	fragrant water lily (sensu lato)	Medium	L3	5	-5		
Nymphaea odorata ssp. odorata	fragrant water-lily	Medium	L3	5	-5		
Nymphaea odorata ssp. tuberosa	tuberous water-lily	Medium	L3	5	-5		
Onoclea sensibilis	sensitive fern	Medium	L5	4	-3		x
Osmunda regalis var. spectabilis	royal fern	Medium	L3	7	-5		
Osmundastrum cinnamomeum	cinnamon fern	Medium	L3	7	-3		
Packera aurea	golden ragwort	Medium	L2	7	-3		
Penthorum sedoides	ditch stonecrop	Medium	L4	4	-5		
Persicaria amphibia	swamp smartweed (sensu lato)	Medium	L4	5	-5		
Persicaria hydropiperoides	mild water-pepper	Medium	L4	4	-5		
Persicaria punctata	dotted water-pepper	Medium	L3	4	-5		
Persicaria sagittata	arrow-leaved tear-thumb	Medium	L2	5	-5		
Physocarpus opulifolius	ninebark	Medium	L3	5	-2		
Pilea fontana	spring clearweed	Medium	L4	5	-3		
Platanthera hyperborea	northern green orchis	Medium	LU	5	-4		
Platanthera lacera	ragged fringed orchis	Medium	L1	6	-3		
Pontederia cordata	pickerel-weed	Medium	L2	7	-5		
Potamogeton amplifolius	large-leaved pondweed	Medium	L2	5	-5		

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Fac-ultative
Potamogeton epihydrus	ribbon pondweed	Medium	L2	5	-5		
Potamogeton foliosus	leafy pondweed	Medium	L4	4	-5		
Potamogeton gramineus	grass-like pondweed	Medium	L3	4	-5		
Potamogeton illinoensis	Illinois pondweed	Medium	L2	6	-5		
Potamogeton natans	floating pondweed	Medium	L3	5	-5		
Potamogeton nodosus	knotty pondweed	Medium	L2	7	-5		
Potamogeton perfoliatus	clasping-leaved pondweed	Medium	L2	7	-5		
Potamogeton praelongus	white-stem pondweed	Medium	L2	7	-5		
Potamogeton pusillus ssp. pusillus	small pondweed	Medium	L1	5	-5		
Potamogeton pusillus ssp. tenuissimus	least pondweed	Medium	L2	4	-5		
Potamogeton richardsonii	redhead pondweed	Medium	L3	5	-5		
Potamogeton zosteriformis	flat-stemmed pondweed	Medium	L3	5	-5		
Proserpinaca palustris	mermaid-weed	Medium	LX	7	-5		
Ranunculus aquatilis var. diffusus	white water crowfoot	Medium	L2	5	-5		
Ranunculus flabellaris	yellow water crowfoot	Medium	L2	7	-5		
Ranunculus hispidus var. caricetorum	swamp buttercup	Medium	L4	5	-5		
Rhamnus alnifolia	alder-leaved buckthorn	Medium	L3	7	-5		
Ribes glandulosum	skunk currant	Medium	L3	6	-3		
Ribes hirtellum	smooth gooseberry	Medium	L3	6	-3		
Ribes triste	swamp red currant	Medium	L3	6	-5		
Rosa palustris	swamp rose	Medium	L2	7	-5		
Rubus hispidus	swamp dewberry	Medium	L2	6	-3		
Rubus pubescens	dwarf raspberry	Medium	L4	4	-4		x
Rumex britannica	great water dock	Medium	L4	6	-5		
Rumex verticillatus	swamp dock	Medium	L3	7	-5		
Sagittaria cuneata	arum-leaved arrowhead	Medium	L3	7	-5		
Sagittaria latifolia	common arrowhead	Medium	L4	4	-5		
Sagittaria rigida	sessile-fruited arrowhead	Medium	L2	6	-5		
Salix bebbiana	Bebb's willow	Medium	L4	4	-4		x
Salix lucida	shining willow	Medium	L3	5	-4		x
Salix serissima	autumn willow	Medium	L2	6	-5		
Schoenoplectus acutus var. acutus	hard-stemmed bulrush	Medium	L3	6	-5		
Scirpus cyperinus	woolly bulrush	Medium	L4	4	-5		
Scirpus hattorianus	smooth-sheathed black-fruited bulrush	Medium	LU	6	-3		
Selaginella eclipes	meadow spike-moss	Medium	L1	7	-4		
Sium suave	water-parsnip	Medium	L4	4	-5		
Sparganium americanum	Nuttall's bur-reed	Medium	LU	6	-5		
Sparganium emersum	green-fruited bur-reed	Medium	L3	5	-5		
Spirodela polyrhiza	greater duckweed	Medium	L4	4	-5		
Stuckenia pectinata	sago pondweed	Medium	L4	4	-5		
Symplocarpus foetidus	skunk cabbage	Medium	L4	7	-5	x	
Teucrium canadense ssp. canadense	wood-sage	Medium	L3	6	-2		
Thelypteris palustris var. pubescens	marsh fern	Medium	L4	5	-4		
Triadenum fraseri	marsh St. John's-wort	Medium	L2	7	-5		
Utricularia vulgaris	common bladderwort	Medium	L3	4	-5		
Veronica americana	American speedwell	Medium	L4	6	-5	x	
Veronica anagallis-aquatica	water speedwell	Medium	L4	7	-5		x
Veronica scutellata	marsh speedwell	Medium	L3	7	-5		

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Facultative
Viburnum nudum var. cassinoides	withe-rod	Medium	L2	7	-3		
Viburnum opulus ssp. trilobum	American highbush cranberry	Medium	L2	5	-3		
Viola cucullata	marsh blue violet	Medium	L4	5	-5		
Viola labradorica	dog violet	Medium	L5	4	-2		
Viola macloskeyi	northern white violet	Medium	L3	6	-5		
Viola renifolia	kidney-leaved violet	Medium	L3	7	-3		
Viola sororia var. affinis	Le Conte's violet	Medium	L4	6	-3		
Zannichellia palustris	horned pondweed	Medium	L1	4	-5		
Acer saccharinum	silver maple	Medium	L4	5	-3		
Acer x freemanii	hybrid swamp maple	Medium	L4	5	-4		
Agalinis tenuifolia	slender gerardia	Medium	L3	7	-3		
Arisaema triphyllum	Jack-in-the-pulpit	Medium	L5	5	-2		x
Aronia melanocarpa	black choke-berry	Medium	L2	7	-3		
Bidens tripartita	three-parted beggar's-ticks	Medium	L5	4	-3		
Boehmeria cylindrica	false nettle	Medium	L4	4	-5		
Carex aurea	golden-fruited sedge	Medium	L4	4	-4		
Carex cryptolepis	small yellow sedge	Medium	L2	7	-5		
Carex debilis var. rudgei	white-edged sedge	Medium	L3	4	-3		
Carex intumescens	bladder sedge	Medium	L4	6	-4		
Carex lacustris x trichocarpa	hybrid Paludosae sedge	Medium	L3	6	-5		
Carex pellita	woolly sedge	Medium	L4	4	-5		
Carex sychnocephala	dense long-beaked sedge	Medium	L3	5	-4		
Carex viridula ssp. viridula	greenish sedge	Medium	L3	5	-5		
Ceratophyllum demersum	coontail	Medium	L4	4	-5		
Cicuta maculata	spotted water-hemlock	Medium	L5	6	-5		
Cinna arundinacea	tall wood reed	Medium	L3	7	-3		
Cyperus bipartitus	two-parted umbrella-sedge	Medium	L3	4	-4		
Cyperus odoratus	fragrant umbrella-sedge	Medium	L3	5	-3		
Cyperus strigosus	straw-coloured umbrella-sedge	Medium	L3	5	-3		
Dryopteris carthusiana	spinulose wood fern	Medium	L5	5	-2		
Eleocharis erythropoda	creeping spike-rush	Medium	L5	4	-5		
Eleocharis obtusa	blunt spike-rush	Medium	L3	5	-5		
Gentiana andrewsii	bottle gentian	Medium	L3	6	-3		
Glyceria grandis	tall manna grass	Medium	L5	5	-5		
Impatiens capensis	orange touch-me-not	Medium	L5	4	-3		x
Impatiens pallida	yellow touch-me-not	Medium	L4	7	-3		
Juncus alpinoarticulatus	Richardson's rush	Medium	L3	5	-5		
Juncus arcticus ssp. balticus	Baltic rush	Medium	L4	5	-5		
Juncus nodosus	knotted rush	Medium	L4	5	-5		
Leersia virginica	white grass	Medium	L4	6	-3		
Lycopus americanus	cut-leaved water-horehound	Medium	L4	4	-5		
Lycopus uniflorus	northern water-horehound	Medium	L5	5	-5		
Malaxis monophyllos var. brachypoda	white adder's mouth	Medium	L1	7	-3		
Pilea pumila	dwarf clearweed	Medium	L5	5	-3		
Poa palustris	fowl meadow-grass	Medium	L5	5	-4		
Pyrola asarifolia	pink pyrola	Medium	L2	7	-3		
Salix amygdaloides	peach-leaved willow	Medium	L4	6	-3		
Salix eriocephala	narrow heart-leaved willow	Medium	L5	4	-3		
Salix nigra	black willow	Medium	L3	6	-5		
Schoenoplectus pungens var.	three-square	Medium	L4	6	-5		

Scientific Name	Common Name	Sensitivity	L-Rank	CC	CW	GW Obligate	GW Facultative
pungens							
Schoenoplectus tabernaemontani	soft-stemmed bulrush	Medium	L4	5	-5		
Scirpus microcarpus	barber-pole bulrush	Medium	L5	4	-5		
Scutellaria galericulata	common skullcap	Medium	L5	6	-5		
Scutellaria lateriflora	mad-dog skullcap	Medium	L5	5	-5		
Spartina pectinata	prairie cord grass	Medium	L3	7	-4		
Symphyotrichum puniceum var. puniceum	swamp aster	Medium	L5	6	-5		
Thuja occidentalis	white cedar	Medium	L4	4	-3		x
Vallisneria americana	tape-grass	Medium	L3	6	-5		
Viola blanda	sweet white violet	Medium	L3	6	-2		
Alisma triviale	water-plantain	Low	L5	3	-5		
Bidens cernua	nodding bur-marigold	Low	L5	2	-5		
Carex stipata	awl-fruited sedge	Low	L5	3	-5		
Eupatorium perfoliatum	boneset	Low	L5	2	-4		x
Eutrochium maculatum var. maculatum	spotted Joe-Pye weed	Low	L5	3	-5		x
Salix discolor	pussy willow	Low	L4	3	-3		x
Salix eriocephala x petiolaris	hybrid shrub willow	Low	L4	3	-3		
Sparganium eurycarpum	great bur-reed	Low	L3	3	-5		
Stellaria longifolia	long-leaved chickweed	Low	L4	2	-4		
Typha latifolia	broad-leaved cattail	Low	L4	3	-5		
Bidens frondosa	common beggar's-ticks	Low	L5	3	-3		
Epilobium coloratum	purple-leaved willow-herb	Low	L5	3	-5		
Equisetum hyemale ssp. affine	scouring-rush	Low	L5	2	-2		x
Juncus torreyi	Torrey's rush	Low	L5	3	-3		
Leersia oryzoides	rice cut grass	Low	L5	3	-5		
Persicaria lapathifolia	pale smartweed	Low	L5	2	-4		
Persicaria pensylvanica	Pennsylvania smartweed	Low	L4	3	-4		
Salix petiolaris	slender willow	Low	L4	3	-4		
Scirpus atrovirens	black-fruited bulrush	Low	L5	3	-5		
Scirpus pendulus	drooping bulrush	Low	L3	3	-5		
Spiraea alba	wild spiraea	Low	L4	3	-4		

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