LSRCA Report on Promoting Adoption of Erosion and Sediment Control Standards

December 18, 2017

Lake Simcoe Region conservation authority
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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>BMP(s)</td>
<td>Best Management Practice(s)</td>
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<tr>
<td>CA</td>
<td>Conservation Authority</td>
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<tr>
<td>CISEC</td>
<td>Certified Inspector of Sediment and Erosion Control</td>
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<td>ESC</td>
<td>Erosion and Sediment Control</td>
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<tr>
<td>LID</td>
<td>Low Impact Development</td>
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<tr>
<td>LSPA</td>
<td>Lake Simcoe Protection Act</td>
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<td>LSPP</td>
<td>Lake Simcoe Protection Plan</td>
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<td>LSRCA</td>
<td>Lake Simcoe Region Conservation Authority</td>
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<tr>
<td>MNRF</td>
<td>Ministry of Natural Resources and Forestry</td>
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<td>MOECC</td>
<td>Ministry of the Environment and Climate Change</td>
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<td>SWM</td>
<td>Stormwater Management</td>
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<td>TRCA</td>
<td>Toronto and Region Conservation Authority</td>
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1.0 INTRODUCTION

The Lake Simcoe Region Conservation Authority’s mission is to work with our community to protect and restore the Lake Simcoe watershed by leading research, policy and action. A key component of this is to ensure development is done in an environmentally friendly and sustainable manner. The Province of Ontario, through the Lake Simcoe Protection Plan (LSPP), is committed to improving the health of the Lake Simcoe watershed. An objective of the LSPP is to promote environmentally sustainable land and water uses, activities and development practices.

Soil erosion occurs naturally as a result of the dispersive action of rain and the power of water and wind to initiate soil detachment and transport soil particles across the surface. The extent of erosion losses will depend on climate, topography, and the ability of soils to resist detachment and infiltrate water, but a good vegetative cover can largely offset the effect of these factors. Plant cover and natural vegetative residue protect the soil from the impact of raindrops, slow runoff and enhance infiltration of water.

The benefits associated with vegetative cover are lost during the process of land development, because trees and plants are removed, natural drainage pathways are altered, and stable topsoil aggregates are stripped away as part of the grading process. If left uncontrolled, erosion of exposed soils can cause local air quality problems, degradation of aquatic habitats, and damage to downstream recreational areas and infrastructure. Monitoring in the Greater Toronto Area shows that suspended solid concentrations in untreated runoff from construction sites can be up to 30 times greater than that of stabilized residential areas and roughly 90 to 100 times greater than stream concentrations downstream of agricultural areas.

The pressures of urban development have large-scale impacts to the natural environment and in particular aquatic resources and their natural corridors. Changes to land use can decrease permeability, increase fine sediment inputs, impact water quality and increase runoff. These changes create an imbalance in the natural processes and lead to increased flood events, reduce base flows, decreased habitat diversity and channel erosion. Sedimentation from construction activities is a major contributor to these problems. This added sediment contributes to the destabilization of watercourses that not only has extreme ecological costs, but results in the loss of property, costly infrastructure repairs, and may require stabilization efforts that could take a lifetime to complete. It is everyone’s responsibility to prevent construction related sediment from impacting aquatic resources and other natural features.

This pilot project supports the LSPP goals of improving the Lake Simcoe watershed’s capacity to adapt to climate change as well as promoting environmentally sustainable development practices. It will provide insight into developing approaches to protect, improve and restore the elements that contribute to the ecological health of Lake Simcoe watershed. It could potentially be extrapolated to other sub-watersheds in the LSRCA and in the province.
1.1 Project Objectives

The Lake Simcoe Region Conservation Authority has developed a set of Erosion and Sediment Control (ESC) guidelines as part of its update of its 2016 Technical Guidelines for Stormwater Management (SWM) Submissions. The purposes of these guidelines are as follows:

- Reduce negative impacts on public and private land by controlling sediment on-site;
- Reduce negative impacts of sediment spills on natural heritage lands;
- Control erosion on development sites, and;
- Reduce or prevent the release of sediment and silt into fish habitat.

The objective of this project is to promote adoption of the LSRCA’s ESC guidelines and reduce the impact of sedimentation and erosion on Lake Simcoe and its tributaries.

The approach taken involved several components:

a) Developing an accountability and oversight framework for ESC activities on urban construction sites in the Lake Simcoe watershed
b) Designing and implementing an awareness program that educates municipalities and developers about the LSRCA’s ESC guidelines for urban construction sites through completion of two workshops in the fall of 2017.

c) Developing an evaluation tool for assessing the level of adoption of the LSRCA’s ESC guidelines at urban construction sites.

d) Piloting the evaluation tool in two priority subwatersheds.

Any use of the term “standards” within this document and in the evaluation tool should be interpreted as “guidelines” as in “recommended best practices” for erosion and sediment control.
2.0 PROJECT COMPONENTS

2.1 Accountability and Oversight Framework

The following methodology was used to develop an accountability and oversight framework:

- Review the findings and recommendations of the LSRCA’s 2016 ESC Research Study.
- Review the current accountability and oversight practices in the watershed.
- Examination of the tools currently available – Subdivision Agreements and By-Laws.

2.1.1 Summary of Research Findings and Recommendations in the LSRCA’s 2016 ESC Research Study

Federal and Provincial Regulators

Federal and provincial agencies responsible for the management of ESC in the Lake Simcoe Watershed noted that they have a reduced mandate which has limited their enforcement capacity. The reduction of capacity of federal and provincial agencies has increased the responsibility of local actors such as CAs, regional municipalities and municipalities to regulate and enforce compliance with ESC requirements of users within their jurisdiction. The research indicated that local actors were expected to adapt to the reduced mandate of federal and provincial agencies. One of the findings of the research is that local actors (municipal, industry, First Nations) have not been formally provided with information about the change in the mandate of federal and provincial agencies, and are therefore unclear about who is responsible for enforcing ESC compliance. In particular, there was no clear understanding amongst respondents if the CAs or municipalities were ultimately responsible for assuring that ESC controls were dutifully implemented. This uncertainty was greatest in small municipalities where funding and human resources were most constrained.

Recommendation:

- It was recommended that more specific guidance should be provided by the Provincial government on how ESC performance should be approved, inspected and enforced by all relevant levels of government (Provincial Ministries, Regional Municipalities / Municipalities, CAs).

Regional Municipalities / Municipalities

Municipalities are largely responsible for the issuing permits for development within their jurisdictions, which include the requirements related to ESC management. Most municipalities have by-laws in place that address ESC management through site alteration by-laws, fill by-laws or comprehensive development agreements. They are also responsible for ensuring that public works projects are in compliance with ESC control measures. The conditions of municipal approval may involve ensuring that other approvals are gained from other agencies (i.e., permits from CAs on designated lands, permits from MNRF on crown lands or if endangered species are present).
This research indicated that the capacity of municipalities to develop and implement comprehensive regulations, and monitor and enforce compliance is correlated to the size of their constituency (i.e., tax base).

Recommendation:
- Institutionalized processes are needed for increasing the capacity of smaller municipalities through collaboration with provincial agencies, regional municipalities, larger neighbouring municipalities or CAs, as appropriate.

**Conservation Authorities**
CAs, including the LSRCA, are mandated through the Conservation Authorities Act (1990) to provide authorization for any development or site alteration activities undertaken in regulated areas. Properties owners must obtain a permit from the CA before beginning any development, site alteration, construction, or placement of fill within the regulated area. The LSRCA also provides SWM and ESC review services to member municipalities

The LSRCA plays an important role in knowledge transfer and the standardization of by-laws throughout all municipalities in the watershed. Their facilitation of working groups, such as the quarterly Stormwater Management Technical Working Group represents a forum where provincial, municipal and regional municipal staff overseeing stormwater management and ESC practice can work together to develop harmonized approaches for watershed management.

Respondents from the LSRCA reported two main challenges in carrying out their mandated role in designated areas and additional support and capacity building role. The greatest challenge that was noted is that the LSRCA has limited enforcement capacity to ‘Immediately Stop Work’ at Project sites where ESC is not being adequately undertaken. This lack of enforcement capability hinders the CA’s ability and respondents from the LSRCA noted that a solution needs to be found. It is noted that expected changes to the CA Act in late 2017 or early 2018 will allow a CA to issue a stop work order.

A second challenge identified by the LSRCA is that the increased demand for services, including support to municipalities outside of regulated areas, needs to be appropriately resourced, in terms of people and funding.

Recommendations:
- The LSRCA should look for mechanisms to increase their capacity to support member municipalities in the review, approval, inspection and enforcement of ESC performance within and outside designated areas. This will include identifying ways to raise financial resources to support member municipalities.
- The LSRCA should continue to provide a knowledge transfer and facilitation role to member municipalities and other stakeholders (First Nations, Industry, Academia, other governmental agencies) in ESC, as well as other emerging issues (i.e., fill management and soil remediation).
Developers
A large proportion of respondents working in the property development industry noted that they would support ESC standards and guidelines that do not provide a competitive advantage based on the jurisdiction of their project and that they prefer an equal playing field for all those operating in their sector. One example of this approach, which was highlighted through this study is the model used in the aggregates industry.

Recommendations:
- Developers should consider identifying BMPs in ESC management in their internal corporate policies so that similar standards are applied at all their projects, irrespective of any differences in by-laws or legislative requirements in the different jurisdictions where they operate.
- Developers should include the costs of implementing ESC measures (including contingency money for any unforeseen remediation activities that are required) into their construction contracts. Consideration should be given to using ESC performance of construction contractors as a criterion for awarding contracts.

Agriculture Sector
The most common theme that arose from the research was that the quality of land and soil is very important to farmers. The primary driver for limiting erosion was to stop the amount of topsoil that was lost from soil and wind erosion as it is very valuable for agricultural productivity. Respondents indicated that ESC management at their properties was in the farmer’s best interest. Respondents from the farming community also noted that ESC rules and regulations must be developed in consideration of the scale of activities and capabilities of individual farmers.

Recommendations:
- Site alteration requirements for farmers should be tailored to the scope and scale of these activities, and the abilities of farmers to implement the requirements; and
- Programs should be developed to institutionalize ESC management in agricultural regions, when these projects make sense and are supported by local farmers.

First Nations
Representatives of two First Nations with reserve land and traditional territory in the Lake Simcoe Watershed were interviewed as part of this research. Both communities noted that environmental stewardship and sustainable development were priorities for their communities and they were committed to implementing development projects in consideration of the health of the Lake Simcoe Watershed.

Recommendation:
- Provincial agencies and CAs should continue to work with First Nations to increase their awareness of ESC management, support initiatives that promote improved ESC performance in their communities and support First Nations commitment to environmental stewardship of the Lake Simcoe watershed.
Other Recommendations

Training Recommendation:
- Conservation Authorities are to continue to ensure availability of Certified Inspector of Sediment and Erosion Control (CISEC) and other training opportunities within the Lake Simcoe watershed. Develop training or integrate training around the rules and regulations that must be adhered to, in the Lake Simcoe context, for effective ESC performance.

Training Recommendation:
- A profile should be developed of what a Qualified Professional in ESC should be (i.e., educational, professional designation and experiential criteria) and work with regulators to ensure that there are standardized expectations of who can provide declarations of ESC performance for industry-led monitoring and reporting processes.

Technology Recommendations:
- An inventory should be undertaken of all technology currently being used for ESC management and identify technologies that may support improvement in ESC performance in the Lake Simcoe watershed; and
- The LSRCA should continue to showcase and highlight different technologies, and their applications at the LSRCA Stormwater Management Technical Working Group Meetings to educate stakeholders and identify options that can be adopted within the Lake Simcoe watershed.

Soil Remediation and Testing Recommendations:
- A research study should be undertaken (similar to this ESC study) that identifies existing pieces of legislation and guidance that apply to fill management and soil remediation in the Lake Simcoe watershed and Province of Ontario;
- Research should be undertaken with stakeholders to more fully understand issues that drive and deter the adoption of effective fill management processes; and
- Opportunities should be identified to strengthen fill management processes (implementation, inspection, monitoring and enforcement) in the Lake Simcoe watershed.

Consolidated Erosion and Sediment Control Standards Recommendations:
- Identify the appropriate level of government, or government agency, to develop an ESC standard. The majority of respondents noted that this could be the Provincial Government or Conservation Authority
- Develop a clear ESC standard in consideration of all existing legislation, by-laws and guidance documents. This standard should provide technical direction based on scientific knowledge and metrics.
The ESC standard should be based on sector, rather than jurisdiction. That is, subdivision developers should face similar requirements irrespective of the municipality in which they operate. This should also apply for other sectors (i.e., agriculture, aggregates, linear infrastructure).

2.1.2 Accountability and Oversight Framework based on the LSRCA ESC Research Study – Current Practices.

The LSRCA ESC Research Study states the following:

“There are a multitude of regulations, guidance and planning requirements for stormwater management and ESC that are applicable to the Lake Simcoe Watershed, as presented in this literature review. Navigating through these requirements was outlined as a major constraint by industry, First Nations and municipal stakeholders, and one of the key findings of the research was that there was a need for a clear regulatory framework that comprehensively addressed all the ESC requirements for the entire system. Respondents noted that they wanted a comprehensive guidance document on how to address all the acts and regulations as they pertained to ESC management.

In addition, ESC regulations are primarily being implemented and enforced based on the jurisdiction where Projects are being implemented. Oftentimes, ESC performance may vary depending on the municipality’s capacity to implement and enforce ES controls. The research suggests that it may be prudent for requirements to be set out by sectors (property developers, farmers, aggregate producers) so that there are standardized requirements for ESC users who operate in multiple jurisdictions in Ontario.”

There are currently three main instruments by which ESC measures are implemented and overseen in the Lake Simcoe watershed.

1) Permits issued by the LSRCA under Ontario Regulation 179/06 (Section 28 of the Conservation Authorities Act).
2) Permits issued by the local municipality under a Site Alteration / Fill By-Law made under Section 142 of the Municipal Act 2001 SO.
3) Subdivision Agreements signed between landowners and the local municipalities, implemented under the Planning Act.

Permits issued by the LSRCA under Ontario Regulation 179/06:
The Conservation Authorities Act (1990) empowers the 36 provincial CAs to establish and undertake programs for the conservation, restoration, development and management of local watersheds. Within their respective areas of jurisdiction, CAs can make regulations prohibiting, regulating or requiring CA permission for development where flood control, erosion, pollution dynamic beaches or conservation of land may be affected. ESC controls are required to ensure that the control of pollution or erosion is not affected during the development of a site. These requirements only apply in areas regulated by the LSRCA.
**Site Alteration / Fill Permits Issued by the Municipality:**

Section 142 of the Municipal Act 2001 SO authorizes a Municipality to pass by-laws to prohibit, regulate or require a permit for, and impose conditions upon, the placing or dumping of Fill, removal of topsoil or alteration of the grade of land. Most municipalities in Southern Ontario have developed Site Alteration By-Laws. These by-laws limit activities, such as removing or adding soil, which might change the level of a property. Documents such as grading plans and ESC plans are typically required as part of a permit application along with other supporting information. The by-law also establishes penalties for non-compliance with the by-law. Recent proposed changes to the Municipal Act (Bill 68) will allow these by-laws to be in effect in areas under jurisdiction of conservation authorities.

**Subdivision Agreements:**

The Planning Act establishes a plan of subdivision approval process in Sections 51, 51.1 and 51.2. The Planning Act does not explicitly mention ESC; however, it is implicitly implied in Section 51 subsection 24(h) under the plan of subdivision approvals. Once a plan is deemed to be acceptable to the municipality, conditions of draft plan approval are issued, one of which is a requirement that the developer will enter into a Subdivision Agreement with the local municipality. Typical LSRCA SWM / ESC conditions of draft plan approval are as follows:

C-2 That prior to final plan approval and any major site alteration, the following shall be prepared to the satisfaction of the LSRCA and City/Town/Municipality:

a) A detailed SWM Report in accordance with LSRCA Technical Guidelines for SWM Submissions and in conformity with the SWM Master Plan approved under Strategic Action 4.5-SA of the Lake Simcoe Protection Plan;

b) A detailed erosion and sediment control plan;

f) A Detailed Low Impact Development (LID) Evaluation demonstrating the means to maximize the use of LID measures consistent with Policy 1.6.6.7 of the Provincial Policy Statement (2014);

C-3 That the owner shall agree in the Subdivision Agreement to carry out, or cause to be carried out, the recommendations and requirements contained within the plans and reports as approved by the LSRCA and the Town/City/Municipality.

C-4 That the owner shall agree in the Subdivision Agreement to retain a qualified professional to certify in writing that the works were constructed in accordance with the plans and reports as approved by the LSRCA and the Town/City/Municipality.

C-5 That the owner shall agree in the Subdivision Agreement to ensure that proper erosion and sediment control measures will be in place in accordance with the approved Grading and Drainage Plan, and Erosion and Sediment Control Plan prior to any site alteration or grading.
2.1.3 Effectiveness and Interdependencies of Subdivision Agreements and By-Laws in relation to the Oversight of ESC Activities

The following table represents a comparison between Subdivision Agreements and Site Alteration By-laws in terms of pros and cons of each as well as interdependencies.

Table 2.1: Comparison between Subdivision Agreements and Site Alteration By-laws

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<th>Instrument</th>
<th>Areas where applicable</th>
<th>Pros / Cons and Interdependencies</th>
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| Subdivision Agreements (SA)         | Within the land area defined in an Agreement signed under the Planning Act (i.e. Subdivision Agreement). | Pros:  
• Agreement allows municipality to draw upon letters of credit to complete or repair works under specific circumstances such as emergencies or dangerous conditions.  
Cons:  
• Not applicable unless an Agreement has been signed and registered on title against the lands.  
• To enforce, Municipality needs to draw on posted securities. There are specific conditions associated with cashing letters of credit, which can cause delays in completing repairs.  
• Subdivision agreements are signed agreements between specific parties and subject to dispute resolution, which may end in lawsuits from one side or the other depending on circumstances.  
Interdependencies: An SA is only applicable once an agreement has been signed. Prior to this, SAB would apply to a development site. In many case, initial site grading commences prior to the SA. In this case, the SAB permit can be used to issue a site alteration permit in order to control ESC measures during the initial grading process. |

| Site Alteration By-Laws (SAB)       | Most areas outside of those that are subject to Agreements signed under the Planning Act. Not applicable in areas covered by the Drainage, Tile Drainage or Aggregate Resources Acts or in other areas specifically identified in the By-Law. Not currently applicable to areas regulated by the LSRCA (to change in late 2017 or early 2018 – Bill 68). | Pros:  
• Covers far greater areas compared to SA  
• Does not need signed agreement  
• By-Laws are considered statutory authority under provincial legislation (Municipal Act) and orders to comply, stop work orders, specific penalties and/or fines can be issued (does not need to draw on a posted security).  
• By-Law enforcement personnel have “right-to-enter” authority for private property when executing their duties as an enforcement officer.  
Cons:  
• Not currently applicable in areas regulated by the LSRCA.  
• Most Municipal By-Law enforcement personnel do not have the technical expertise with respect to drainage and engineering related construction.  
• By-Law departments typically respond on a complaint basis (reactive rather than pro-active).  
• Most By-Law departments are geared towards issues related to property standards, noise complaints, parking infractions, etc., which may limit amount of time dedicated to ESC issues.  
Interdependencies: There is no overlap between the development of a property under a |
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<th>Pros / Cons and Interdependencies</th>
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<td>signed SA and permits issued under the SAB. The SAB would apply prior to an SA being signed and after the subdivision has been assumed by the municipality.</td>
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2.1.4 Recommended Accountability and Oversight Framework - Best Practices for Identifying and Managing ESC Risks.

Best practices for identifying and managing ESC risk are summarized below:

- **Training, Accreditation, and Experience** required for ESC monitoring team/oversight, to support effective ESC upkeep.

- **Technology for Tracking, Inspection, and Enforcement** by the ESC inspector, ESC program manager, site operator/owner, and enforcement agencies (as applicable) will support timely communication and oversight. Technological instruments, such as drones and tablets, will also provide more effective observational and reporting improvements to better translate what is required for ESC maintenance and repairs to site contractors and owners responsible to upkeep and meeting certain conditions defined in permitting agreements.

The following subsections outline the best practices recommended to identify and manage ESC risk in more detail.

2.1.4.1 Training, Accreditation, and Experience

An ESC monitoring program should be established with appropriately trained, experienced and directed staff to deliver a solid risk management effort throughout the ESC plan development and implementation phases of the ESC program.

A qualified professional engineer (P.Eng.), professional geoscientist (P.Geo.), certified engineering technologist (C.E.T.), and/or other experienced practitioner with a certain ESC accreditation (e.g., CPESC, CISEC) are all examples of appropriate practitioners suitable to develop the ESC program, based on knowledge and practice. The specific ESC training and accreditation is described in more detail below.
**Certified Professional in Erosion and Sediment Control (CPESC)**

The CPESC training program and designation is for many disciplines and specialties that work to produce site-specific plans and designs that comprehensively address current and potential erosion and sedimentation issues with practices and measures that are cost effective, understandable and that meet environmental and regulatory requirements.

The CPESC accredited practitioner should also have the experience and field practice, to provide direction and/or field inspection support.

**Certified Inspector of Sediment and Erosion Control (CISEC)**

A CISEC accredited practitioner, is one who has demonstrated his or her proficiency in observing, inspecting, and reporting on the implementation ESC Reports and Plans.

In any case, the insight and oversight required based on the scale and level of complexity for an ESC program should be framed by a qualified practitioner that has at least one of the above accreditations, to develop the plan and oversee the implementation.

**Additional ESC Field Training**

Field demonstration is an essential component of an effective ESC training program, as it provides trainees with the opportunity to learn first-hand the purpose and proper application of various ESC products and how they should be installed and maintained.

Additional ESC training opportunities exist for practitioners to remain current and learn about new products, including the ESC field training facility at the Living Campus at Kortright Centre in Vaughan, Ontario. This will assist with providing a better understanding of how the products are actually installed and key things to look for during an inspection. The facility was designed to address a need for practical, targeted training aimed at construction and development industry professionals who design, implement, inspect and maintain ESC measures including contractors, design engineers, plan reviewers, inspectors and environmental monitors.

**Experience**

Proof is in the pudding, and it is only until practitioners continue to gain knowledge and practice through various project experiences, that they are truly putting their training and accreditation to good use.

The knowledge and practical insight gained from implementing a variety of ESC measures for various land development and/or stream restoration efforts with new innovation (e.g., polymers and tackifiers, new types of pre treatment / inlet controls), and tried and true tested products (e.g. filter socks, silt fences, terraseeding) is only gained through practice and diligent oversight.
Also, the review and modification of ESC plans as environmental and construction phasing conditions and alterations play out, is a heads-up approach that experienced ESC practitioners will be sure to follow.

### 2.1.4.2 Technology for Tracking, Inspection, and Enforcement

Application of technology to support ESC inspection, reporting and oversight have seen significant improvements in practice in the last decade.

The following relatively new tools are recommended for practitioners for identifying and managing ESC risks at urban construction sites.

**Web based monitoring and reporting applications**

These applications may be used through smartphones or tablets in the field, capturing both pictures and geo-referencing to instantly enable information to be accessed by a distribution list that may include project proponents and their consultants and contractors and municipal, CA and other regulators. These apps provide a low cost and low effort way to collect and distribute ESC monitoring reports, and allow for tracking follow-up activities if any actions are required in real time.

Some private consulting firms have also developed and/or adapted their own application software to suit their specific needs to serve clients and present an internal cultural of accountability and consistently, to ensure ESC plans are implemented and adjusted (as needed) throughout scheduled phasing of construction effectively.

**Rain Gauges**

Private industry and municipalities are utilizing rain gauge notifications that send a message to users on its distribution list if there is a significant amount of rainfall within a certain period of time in the forecast. Although this practice has not been readily adopted for urban construction sites, it would be another additional improvement to tie into any local distribution list or develop this type of reporting system for during-construction subdivision oversight.

**Drones**

Other examples of technologies that are being used include the use of drones after storm events to provide aerial photos and video to identify any erosion or sediment spills. Drones are being used by several municipalities and engineering consulting firms working in the Lake Simcoe Watershed.
**Real-Time water quality monitoring**

To evaluate the effectiveness of ESC measures during short-term construction and adequacy of SWM during long-term site operation, continuous monitoring of temperature, TSS (turbidity) and flow (depth), at appropriate locations will support the demonstration of effective performance, or re-assessment of the implementation plan.

Suitable on and off site locations may be instrumented with data logging and quasi “realtime” wireless reporting to a password protected Internet website. An email/SMS based warning system working with the rain gauge monitoring will also work in concert with this type of monitoring to flag excessive rainfall occurrences and turbidity/temperature exceedances to operations personnel and their support staff for response.

**2.2 Awareness Program**

A component of this project was to increase awareness of the LSRCA’s current ESC guidelines for both municipalities and developers in the Lake Simcoe watershed and provide information to these groups on the ESC Site Evaluation Tool currently being piloted as part of this project.

Two workshops were held in October of 2017. The first was held at the East Gwillimbury Sports Complex on October 2, 2017. The second workshop was held at the Town of Innisfil’s offices on October 11, 2017. In attendance were engineering consultants, municipal and Conservation Authority staff, developers and a contractor. A total of 88 people attended these workshops (63 at East Gwillimbury and 25 at Innisfil). Presentations were provided on the LSRCA’s 2016 Erosion and Sediment Control Research Study, LSRCA ESC Guidelines, ESC Evaluation Tool as well as examples of current industry Best Management Practices. A breakdown of the make-up of the 88 attendees is shown in Figure 2.1 below. More details on these workshops are included in Appendix A.

![Figure 2.1 – Summary of ESC Workshop Attendees](image-url)
2.3 Development of the ESC Site Evaluation Tool

In developing a suitable format for the evaluation tool, it was decided to follow a similar approach to the TRCA document entitled “Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands”. This document provided an inspection checklist for evaluating SWM facilities. The LSRCA’s tool builds on this checklist approach and contains the following main sections:

- Site Information
- Erosion and Sedimentation Control Inspection Results
- Assessment of Level of Adoption of LSRCA Erosion and Sediment Control Standards.

Key site information can be entered such as development name, municipality, location, date of inspection etc. A scoring system is applied to rate how well specific ESC measures have been implemented with “0” representing “no issues identified” up to “4” representing “immediate installation of ES controls required”. The site is given an overall grade from “A” (Excellent) to “F” (Fail). The last section of the tool is an assessment of the site’s level of compliance with LSRCA Standards (Guidelines) ranging from a “High” level of compliance down to a “Low” level. Comments and site photos can be inserted in the document that has been developed in the form of an Excel spreadsheet.

This tool is intended to be user friendly with numerous drop down menus and comment sections.

A hard copy of the ESC tool is included in Appendix B along with a Guidance Document that outlines how the tool is to be used.

2.4 Piloting the Site Evaluation Tool

2.4.1 Results

Two priority subwatersheds were selected to pilot the Tool; these being the catchment area draining to Kempenfelt Bay / North Cook’s Bay and the catchment area draining to South Cook’s Bay.

Figure 2.2 highlights the location of these subwatersheds.
Forty one (41) site inspections were carried out in the priority subwatersheds in the summer and fall of 2017. The results of these inspections are summarized in Table 2.2. As shown, for overall site rating (of the 41 inspections), 14 were rated excellent, 17 were rated good, 4 were rated as needing improvement, 4 were rated marginal and 2 failed. In terms of the level of adoption of LSRCA standards / guidelines, 29 were rated high, 8 were rated medium and 4 were rated low.

The **Overall Site Rating** was done using the following criteria:

**A: Excellent.** All applicable ESC measures have been installed and have been given a score of between 0 and 2. There is no evidence of sediment migration onto adjacent lands. General housekeeping on site is excellent. Records have been kept regarding previous inspections. Additional ESC controls stored on site.

**B: Good.** All applicable ESC measures have been installed and have been given a score of between 0 and 2 but there may be evidence of minor sediment migration on to adjacent lands.
in one general location. General housekeeping on site is good. Records have been kept regarding previous inspections. Additional ESC controls stored on site.

**C: Needs Improvement.** The site is in okay shape. All applicable ESC measures have been installed and the important ESC measures have been given a score of between 0 and 2. A number of secondary ESC measures have received scores of 3. There may be evidence minor sediment migration on to adjacent lands in one general location. General housekeeping on site needs improvement. Records have not been kept regarding previous inspections. Additional ESC controls not stored on site.

**D: Marginal.** The site is in poor shape. All applicable ESC measures have been installed, however, a number of important measures have received scores of 3 meaning that immediate repair / restoration is needed. There may be evidence of moderate sediment migration on to adjacent lands at one or more location.

**F: Fail.** The site is in very poor shape. ESC measures have not been installed correctly or have been poorly maintained with many receiving scores of 3. There is at least one important ESC measure with a score of 4 meaning that it has not been installed at all. There may be evidence of significant sediment migration on to adjacent lands at one or more location.

**Definitions**

*Important ESC Measure* – ESC at critical low points in the site where a breach could result in significant sediment release into undisturbed or external lands.

*Secondary ESC Measure* – Internal ESC where there is a downstream ESC also in place.

*Minor* – Sediment deposit is close to the site boundary (<15 m) and can be easily cleaned up in a few hours.

*Moderate* - Sediment deposit is close to the site boundary (<15 m) but will require at least one day to clean up.

*Significant* – Sediment deposit extends further from the disturbed site (>15 m) and will require extensive cleanup work.

The **Level of Compliance Rating** was based on the following criteria:

**High:** 80% - 100% of the applicable erosion and sediment controls in the above table were given a compliance rating of 0 or 1.

**Medium:** 60% - 79% of the applicable erosion and sediment controls in the above table were given a compliance rating of 0 or 1.

**Low:** Less than 60% of the applicable erosion and sediment controls in the above table were given a compliance rating of 0 or 1.
Table 2.2 Summary of Inspection Results

<table>
<thead>
<tr>
<th>Priority Subwatershed</th>
<th>Overall Result of Site Inspection; Number of Development Sites rated:</th>
<th>Degree of Compliance with LSRCA ESC Standards / Guidelines; Number of Development Sites rated:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A – Excellent</td>
<td>H - High</td>
</tr>
<tr>
<td></td>
<td>B – Good</td>
<td>M - Medium</td>
</tr>
<tr>
<td></td>
<td>C – Needs Improvement</td>
<td>L - Low</td>
</tr>
<tr>
<td></td>
<td>D – Marginal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F – Fail</td>
<td></td>
</tr>
<tr>
<td>Kempenfelt Bay &amp; North Cook’s Bay</td>
<td>1   6   0  1  0</td>
<td>6  2  0</td>
</tr>
<tr>
<td>South Cook’s Bay</td>
<td>13  11  4  3  2</td>
<td>23  6  4</td>
</tr>
</tbody>
</table>

As shown by the results of these inspections, approximate 75% percent of the site inspections resulted in overall ratings of either excellent or good. The remaining 25% ranged from “Needs Improvement” all the way down to “Fail”. Similarly, 68% of the sites showed “High” compliance with LSRCA standards / guidelines. A more detailed summary of the inspection results is included in Appendix C.

It can be concluded that the state of sediment and erosion control on development sites in these portions of the Lake Simcoe watershed are in relatively good shape. However, significant environmental damage can be done by even one large site with poor ESC. As a result, it is critical that inspections and maintenance be rigorously enforced and all actors in the field of ESC seize any opportunity to improve ESC.

2.4.2 Barriers and Gaps in Knowledge Encountered in ESC Tool Pilot

One of the greatest barriers to effective erosion and sediment control on any given site is the lack of stabilization of sites that have been disturbed for greater than 30 days. This best management practice has been shown to be the most effective way of reducing potential erosion and sedimentation by controlling sediment at the source. Due to a number of factors including site phasing, grading operations that take a number of months, on-going site servicing and concern about excessive costs, this BMP is very rarely employed. As a result, additional long-duration pressure is put on ESC measures that are generally designed to be only temporary. Another barrier is the lack of ESC monitoring / maintenance over time and the failure to modify and /or maintain ESC controls as sites progress from rough grading to servicing to home building phases.
The main gaps in knowledge are what were identified in the 2016 ESC Research Study. Briefly, these can be summarized as follows:

- Limited understanding of Agency roles and responsibilities related to ESC.
- Lack of consistent standards between one jurisdiction and another (i.e. a level playing field).
- A need for improved knowledge of effective ESC measures and more CISEC trained staff on both the private and public side.
- Lack of financial resources for municipalities and the conservation authority for regular ESC inspections and follow-up.

2.4.3 ESC Site Evaluation Tool Limitations

The Tool limitations can be summarized as follows.

1) Lack of web connectivity: The tool is a MS Excel worksheet. Results cannot be immediately uploaded to a web site.
2) Not a database: As an Excel worksheet, the tool does not have the storage ability or functionality like database software such as MS Access or MS SQL server.
3) LSRCA focus: The tool was created for evaluations of ESC in the Lake Simcoe watershed and would have to be modified for use elsewhere.
4) Not a mobile app: The tool is not a mobile app and as such, the user cannot share plans, photos & tasks in real time.

3.0 CONCLUSIONS AND RECOMMENDATIONS

The approach taken in this project involved several components:

a) Development of an accountability and oversight framework for ESC activities on urban construction sites in the Lake Simcoe watershed
b) Design and implementation of an LSRCA ESC guideline awareness program through the completion of two workshops in the fall of 2017.
c) Development of an evaluation tool for assessing the level of adoption of the LSRCA’s ESC guidelines at urban construction sites.
d) Piloting this ESC evaluation tool in two priority subcatchments.

This project supports the LSPP goals of improving the Lake Simcoe watershed’s capacity to adapt to climate change as well as promoting environmentally sustainable development practices. It will provide insight into developing approaches to protect, improve and restore the elements that contribute to the ecological health of Lake Simcoe watershed. It could potentially be extrapolated to other watersheds in the province.

The recommendations resulting from this project are as follows:
1) Explore software alternatives to MS Excel ESC Tool such as a searchable database approach or a web connected smart phone or tablet app.

2) Expand the use of the ESC Tool to the remainder of the LSRCA watershed.

3) Explore opportunities for additional sources of funding to hire a LSRCA full time ESC inspector in partnership with interested watershed municipalities.

4) Continue with the ESC technology transfer program to improve the level of ESC knowledge for public and private sector staff involved with the inspections of developments in the LSRCA watershed.

5) Expand the availability of the Certified Inspector of Sediment and Erosion Control (CISEC) training program for public and private sector staff involved with the inspections of developments in the LSRCA watershed.

6) Explore the potential of establishing a requirement for the mandatory use of a CISEC inspector for all development sites in the Lake Simcoe watershed, in partnership with our municipalities.

7) Subject to available funding, LSRCA should consider hiring a full time CISEC Inspector for on-going monitoring of development sites in the watershed.

8) Subject to available funding, improve LSRCA technology for tracking, inspection, and enforcement using a web based monitoring and reporting application.

9) Look at the potential for the required use of real time precipitation and water quality monitoring systems in sensitive or priority catchments in the Lake Simcoe watershed.

10) Encourage / explore the use of drones after storm events to provide aerial photos and video to identify any erosion or sediment spills.
4.0 REFERENCES


APPENDIX A
EROSION AND SEDIMENT CONTROL WORKSHOPS
Please Join Us

Erosion and Sediment Control Standards in the Lake Simcoe Watershed

LSRCA has received funding from MOECC to promote the use of consistent Erosion and Sediment Control (ESC) standards and best management practices in the Lake Simcoe Watershed. The pressures of urban development have large-scale impacts to the natural environment and in particular aquatic resources and their natural corridors. It’s everyone’s responsibility to prevent construction related sediment from impacting aquatic resources and other natural features.

The goal of this project is to improve the Lake Simcoe watershed’s capacity to adapt to climate change as well as promoting environmentally sustainable development practices.

We are inviting you to this information session to update you on the latest LSRCA ESC standards and a site evaluation tool being developed for use in our watershed.

Where:  East Gwillimbury Sports Complex, Canada Hall A, 1914B Mt. Albert Rd, Sharon, ON L0G 1V0
When:  Monday, Oct 2, 2017

Agenda
8:30 am  Arrive (refreshments & snacks provided)
9:00 am  Agenda Begins
12:00 pm  Wrap up, lunch will be served

RSVP to Theresa Bos at t.bos@LSRCA.on.ca or 905-895-1281
# Erosion and Sediment Control Standards in the Lake Simcoe Watershed

East Gwillimbury Sports Complex - Canada Hall "A"
1914B Mount Albert Road, Sharon, ON

Monday, October 2, 2017
8:30 AM to 1:00 PM

## AGENDA

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 – 9:00</td>
<td>REFRESHMENTS</td>
<td></td>
</tr>
<tr>
<td>9:00 – 9:10</td>
<td>Welcome, Introductions, and Overview of Project</td>
<td>Rob Baldwin</td>
</tr>
<tr>
<td>9:10 – 9:45</td>
<td>The State of Erosion &amp; Sediment Control in the Lake Simcoe Watershed</td>
<td>Rob Baldwin, Steve Auger</td>
</tr>
<tr>
<td></td>
<td>(a) Legislation Updates – CA Act and Municipal Act</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) 2016 Erosion and Sediment Control Research Study</td>
<td></td>
</tr>
<tr>
<td>9:45 – 10:10</td>
<td>Current LSRCA Erosion &amp; Sediment Control Guidelines</td>
<td>Tom Hogenbirk</td>
</tr>
<tr>
<td>10:10 – 10:30</td>
<td>BREAK</td>
<td></td>
</tr>
<tr>
<td>10:30 – 11:00</td>
<td>The LSRCA Erosion &amp; Sediment Control Evaluation Tool</td>
<td>Tom Hogenbirk, Don Allan</td>
</tr>
<tr>
<td>11:00 – 11:30</td>
<td>BMP’s / Case Studies: Projects in and outside of the Lake Simcoe Watershed</td>
<td>Brook Piotrowski</td>
</tr>
<tr>
<td>11:30 – 12:00</td>
<td>Group Discussion – Next Steps</td>
<td>Rob Baldwin</td>
</tr>
<tr>
<td>12:00 – 1:00</td>
<td>LUNCH</td>
<td></td>
</tr>
</tbody>
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The goal of this project is to improve the Lake Simcoe watershed’s capacity to adapt to climate change as well as promoting environmentally sustainable development practices.

We are inviting you to this information session to update you on the latest LSRCA ESC standards and a site evaluation tool being developed for use in our watershed.

Where:  Town of Innisfil Municipal Office (Rooms A, B and C) - 2101 Innisfil Beach Road, Innisfil, ON
When:  Wednesday, Oct 11, 2017

Agenda
8:30 am  Arrive (refreshments & snacks provided)
9:00 am  Agenda Begins
12:00 pm  Wrap up, lunch will be served

RSVP to Theresa Bos at t.bos@LSRCA.on.ca or 905-895-1281
# AGENDA

<table>
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<td></td>
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</tr>
<tr>
<td>12:00 – 1:00</td>
<td>LUNCH</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B
THE ESC
EVALUATION TOOL
Lake Simcoe Region Conservation Authority - Erosion and Sedimentation Control Evaluation Tool

**Part 1: Site Information**

<table>
<thead>
<tr>
<th>Site Identifier:</th>
<th>Inspection Date and Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Name:</td>
<td>Weather:</td>
</tr>
<tr>
<td>Inspector:</td>
<td>Date of Last Rainfall:</td>
</tr>
<tr>
<td>Municipality:</td>
<td>Amount of Precipitation:</td>
</tr>
<tr>
<td>Location (Closest Main Intersection):</td>
<td>APID:</td>
</tr>
<tr>
<td>Type of Construction (choose one or add specific type):</td>
<td>Description of Work (choose one / add specific type):</td>
</tr>
<tr>
<td>Developer:</td>
<td>Engineering Consultant:</td>
</tr>
<tr>
<td>Contractor:</td>
<td>Builder:</td>
</tr>
</tbody>
</table>

**Part 2: Erosion and Sedimentation Control Inspection Results**

**Scoring Breakdown List:**
- **n/a** = not applicable
- **0** = no issues identified
- **1** = monitoring required
- **2** = routine maintenance required
- **3** = immediate repair/restoration required
- **4** = immediate installation of ES controls required

### 1: Site Perimeter and Adjacent Lands

<table>
<thead>
<tr>
<th>(choose one from list)</th>
<th>(choose one from list)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encroachment into Natural Areas:</td>
<td>n/a</td>
</tr>
<tr>
<td>Encroachment into Other Property:</td>
<td>n/a</td>
</tr>
<tr>
<td>Construction Access Mat at Entrance:</td>
<td>n/a</td>
</tr>
<tr>
<td>Excess Erosion:</td>
<td>n/a</td>
</tr>
<tr>
<td>Deposition of Silt in Watercourse or on Land:</td>
<td>n/a</td>
</tr>
<tr>
<td>Perimeter Sediment Control Fence:</td>
<td>n/a</td>
</tr>
<tr>
<td>Mud Tracking on Roads</td>
<td>n/a</td>
</tr>
<tr>
<td>Cut-off Swales:</td>
<td>n/a</td>
</tr>
<tr>
<td>Coir Logs/Silt Sock:</td>
<td>n/a</td>
</tr>
<tr>
<td>Rock Check Dams c/w Sediment Pools:</td>
<td>n/a</td>
</tr>
<tr>
<td>Additional Comments:</td>
<td></td>
</tr>
</tbody>
</table>

### 2: Internal Controls - Sheet Flow:

<table>
<thead>
<tr>
<th>(choose one from list)</th>
<th>(choose one from list)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment Control Fence:</td>
<td>n/a</td>
</tr>
<tr>
<td>Natural Ground Cover:</td>
<td>n/a</td>
</tr>
<tr>
<td>Cross Slope Tilling:</td>
<td>n/a</td>
</tr>
<tr>
<td>Revegetation:</td>
<td>n/a</td>
</tr>
<tr>
<td>Erosion Mat:</td>
<td>n/a</td>
</tr>
<tr>
<td>Straw Mulch:</td>
<td>n/a</td>
</tr>
<tr>
<td>Coir Logs:</td>
<td>n/a</td>
</tr>
<tr>
<td>Silt Sock:</td>
<td>n/a</td>
</tr>
<tr>
<td>Additional Comments:</td>
<td></td>
</tr>
</tbody>
</table>

### 3: Internal Controls - Concentrated Flow

<table>
<thead>
<tr>
<th>(choose one from list)</th>
<th>(choose one from list)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock Check Dams c/w Sediment Pools:</td>
<td>n/a</td>
</tr>
<tr>
<td>Cut-off Swales:</td>
<td>n/a</td>
</tr>
<tr>
<td>Bypass Channel c/w Lining:</td>
<td>n/a</td>
</tr>
<tr>
<td>Haul Roads c/w Temporary Culverts:</td>
<td>n/a</td>
</tr>
<tr>
<td>Dewatering System:</td>
<td>n/a</td>
</tr>
<tr>
<td>Additional Comments:</td>
<td></td>
</tr>
</tbody>
</table>

### 4: Sediment Control Pond(s) - If the Site Contains Ponds Complete the Following Table(s) - (one per pond)

<table>
<thead>
<tr>
<th>(choose one from list)</th>
<th>(choose one from list)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4a - Temporary Sediment Pond Number:</td>
<td>Location Within Site:</td>
</tr>
<tr>
<td>Perforated Riser c/w Anti-vortex Intake:</td>
<td>Plunge Pool at Outlet:</td>
</tr>
<tr>
<td>Clear Stone Jacket c/w Filter Fabric:</td>
<td>Lined Overflow Spillway:</td>
</tr>
<tr>
<td>Barrier Fence (if specified):</td>
<td>Berm Construction and Stability:</td>
</tr>
<tr>
<td>Additional Comments:</td>
<td></td>
</tr>
</tbody>
</table>
**Overall Result of Site Inspection**

<table>
<thead>
<tr>
<th>Grade (choose one from list below):</th>
<th></th>
</tr>
</thead>
</table>

**The grade is based on the following criteria.**

**A:** Excellent. All applicable ESC measures have been installed and have been given a score of between 0 and 2. There is no evidence of sediment migration onto adjacent lands. General housekeeping on site is excellent. Records have been kept regarding previous inspections. Additional ESC controls stored on site.

**B:** Good. All applicable ESC measures have been installed and have been given a score of between 0 and 2 but there may be evidence of minor sediment migration to adjacent lands in one general location. General housekeeping on site is good. Records have been kept regarding previous inspections. Additional ESC controls stored on site.

**C:** Needs Improvement. The site is in okay shape. All applicable ESC measures have been installed and the important ESC measures have been given a score of between 0 and 2. A number of secondary ESC measures have received scores of 3. There may be evidence of moderate sediment migration to adjacent lands in one general location. General housekeeping on site needs improvement. Records have not been kept regarding previous inspections. Additional ESC controls not stored on site.

**D:** Marginal. The site is in poor shape. All applicable ESC measures have been installed, however, a number of important measures have received scores of 3 meaning that immediate repair/ restoration is needed. There may be evidence of significant sediment migration to adjacent lands at one or more location.

**F:** Fail. The site is in very poor shape. ESC measures have not been installed correctly or have been poorly maintained with many receiving scores of 3. There is at least one important ESC measure with a score of 4 meaning that it has not been installed at all. There may be evidence of significant sediment migration to adjacent lands at one or more location.

**Definitions**

- **Important ESC Measure** – ESC at critical low points in the site where a breach could result in significant sediment release into undisturbed or external lands.
- **Secondary ESC Measure** – Internal ESC where there is a downstream ESC also in place.
- **Minor** – Sediment deposit is close to the site boundary (<15 m) and can be easily cleaned up in a few hours.
- **Moderate** – Sediment deposit is close to the site boundary (<15 m) but will require at least one day to clean up.
- **Significant** – Sediment deposit extends further from the disturbed site (>15 m) and will require extensive cleanup work.
### Part 3: Assessment of Level of Adoption of LSRCA Erosion and Sediment Control Standards

#### Degree of Compliance:

<table>
<thead>
<tr>
<th>n/a: not applicable</th>
<th>0 - ES Control Meets LSRCA standard requirements.</th>
<th>1 - ES Control meets the LSRCA standard requirements but needs some maintenance.</th>
<th>2 – ES Control meets the LSRCA standard requirements but requires significant repair.</th>
<th>3 – ES Control installed but is of lesser quality or does not meet some or all key requirements of the LSRCA standard.</th>
<th>4 – Immediate installation of ES control needed.</th>
</tr>
</thead>
</table>

(choose one from list above)

<table>
<thead>
<tr>
<th>Rock Check Dams – ESC-2</th>
<th>n/a</th>
<th>Construction Access Mats – ESC-3</th>
<th>n/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sediment Control Fences – ESC-4</td>
<td>n/a</td>
<td>Double Sediment Control Fences – ESC-5</td>
<td>n/a</td>
</tr>
<tr>
<td>Stockpile Siltation Controls – ESC-6</td>
<td>n/a</td>
<td>Temporary Sediment pond and Outlets – ESC-7</td>
<td>n/a</td>
</tr>
<tr>
<td>Dewatering Methodologies</td>
<td>n/a</td>
<td>Stabilization of Areas disturbed for greater than 30 days</td>
<td>n/a</td>
</tr>
<tr>
<td>Maintenance of Buffer Areas</td>
<td>n/a</td>
<td>Other: ____________________________</td>
<td>n/a</td>
</tr>
</tbody>
</table>

#### Compliance Rating (choose from list below):

- High: 80% - 100% of the applicable erosion and sediment controls in the above table were given a compliance rating of 0 or 1.
- Medium: 60% - 79% of the applicable erosion and sediment controls in the above table were given a compliance rating of 0 or 1.
- Low: Less than 60% of the applicable erosion and sediment controls in the above table were given a compliance rating of 0 or 1.

#### General Comments:

Photos and Drawings or Sketches
APPENDIX C
SITE EVALUATION RESULTS – ESC TOOL
<table>
<thead>
<tr>
<th>Development Reference Number</th>
<th>Overall Result of Site Inspection;</th>
<th>Degree of Compliance with LSRCA ESC Standards / Guidelines;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A – Excellent</td>
<td>H - High, M - Medium, L - Low</td>
</tr>
<tr>
<td></td>
<td>B – Good</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C – Needs Improvement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D – Marginal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F – Fail</td>
<td></td>
</tr>
<tr>
<td>7-1</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>7-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14-1</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>15-1</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>19-1</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>19-2</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>20-1</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>25-1</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Development Reference Number: Number assigned to a specific development
Inspection Number: 1 = first inspection, 2 = second inspection etc.
<table>
<thead>
<tr>
<th>South Cook’s Bay Subwatershed – Development Reference Number and Inspection Number</th>
<th>Overall Result of Site Inspection;</th>
<th>Degree of Compliance with LSRCA ESC Standards / Guidelines;</th>
</tr>
</thead>
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<tr>
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<td></td>
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<tr>
<td></td>
<td>F – Fail</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Development Reference Number</th>
<th>Overall Result</th>
<th>Degree of Compliance / Inspection Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>A</td>
<td>H</td>
</tr>
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Inspection Number: 1 = first inspection, 2 = second inspection etc.
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<td>C – Needs Improvement</td>
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APPENDIX D
GUIDE TO THE USE OF THE EROSION AND SEDIMENT CONTROL EVALUATION TOOL
Guide to the use of the Erosion and Sediment Control Evaluation Tool
December 2017

If you require content in an alternate format please contact us at 905-895-1281 or by email at Accessibility@LSRCA.on.ca
**Introduction:**
Early in 2017 the Lake Simcoe Region Conservation Authority (LSRCA) implemented a pilot project to develop an erosion and sedimentation control (ESC) evaluation tool and inspection form to assist with the review of compliance with current LSRCA technical guidelines within the Lake Simcoe watershed. This tool guide has been developed to assist in identifying and managing ESC risks associated with urban construction sites.

The pressures of urban development have large-scale impacts on the natural environment and in particular aquatic resources and their natural corridors. Changes to land use can result in decreased permeability, increased fine sediment inputs, impact water quality and increased runoff. The changes create an imbalance in the natural processes and can lead to increased flood events, reduction in tributary baseflows, decreased natural habitat diversity and increase channel erosion. Sediment from construction activities is a major contributor to these impacts. Additional sediment from construction runoff contributes to the destabilization of watercourses that not only has extreme ecological costs, but can also result in loss of property, costly infrastructure repairs, and may require stabilization efforts which could take many years to complete. It is everyone’s responsibility to prevent construction related sediment from impacting aquatic resources and other natural features. The site evaluation tool has been developed to support construction site managers, municipal inspectors and contractors at residential, commercial and major transportation related construction sites within the Lake Simcoe watershed.

The following is a link to LSRCA SWM Guidelines (specific erosion and sediment control sections have been appended at the end of this document):

http://www.lsrca.on.ca/Shared%20Documents/permits/swm_guidelines.pdf

Erosion and sedimentation control is a vital component of all construction projects including land development, building and infrastructure construction, installation of utilities or any other projects which involve the disruption of the existing or natural environments. With proper design and implementation of specific ESC measures, most impacts can be mitigated and managed to ensure downstream environments are protected from the potential damages caused by the release of sediments off site.

Each construction project has its own unique issues with respect to ESC measures and typically, the designer/engineer will utilize various forms of data collection to identify topographic and natural heritage features which require protection from erosion and sedimentation. Data collection can include topographic mapping using aerial orthographic photography, in-field topographic surveys, existing mapping such as Ontario Base Mapping (OBM) or various other local information sources within the watershed.

Once significant features have been identified, the designer develops detailed ESC plans in accordance with LSRCA and local area municipality guidelines to establish which specific controls and staging requirements are required to ensure that downstream natural environmental features are not impacted by any construction operations within the project.
limits. Typically, the designer will prepare a series of plans identifying various stages of construction and how ESC measures are to be implemented throughout the entire project. As an example, on a typical land development project, topsoil stripping and earthworks may require specific ESC measures in advance of servicing operations. Once servicing is completed, different, and usually permanent, measures are constructed.

**Site Inspection and Evaluation Tool:**
Prior to any site evaluation the inspector should be completely familiar with the approved ESC engineering drawings and all LSRCA permit requirements. All significant natural heritage features should be identified including downstream watercourses, areas where runoff is most likely to be discharged and the location of sediment traps, temporary sediment ponds and future permanent stormwater management facilities where applicable.

It is imperative that all sedimentation and erosion controls are in place and operational prior to the contractor removing any existing vegetative cover on site. Sediment control fencing or other approved boundary controls act as the final line of defense against sediment discharge but will not provide full protection in isolation. Properly constructed cut-off swales, rock check dams and sediment ponds or traps are critical components in any ESC plan and these must be constructed as construction is staged.

The ESC evaluation tool has been created in a standard spreadsheet format and has been designed to identify various components of a typical construction project. These components are broken down into subsections to assist the inspector in clearly identifying the level of compliance with the approved ESC plans for various areas of the site. The inspector should take as many photographs of site conditions as possible during the inspection; these can be incorporated into the inspection report in a separate section (to be discussed further below).

It should be noted that as with any typical site inspection report these evaluations represent a single moment in the overall progress of construction on site and may not necessarily be representative of how well or poorly a specific contractor complies with the approved drawings and permit requirements.

**Part 1: Site Information**
This section is used to provide details of the site location, LSRCA permit number (site identifier), date of inspection, specific assessment parcel identification number (APID), date of last rainfall event and amount of precipitation, etc. There are specific sections to identify the type of construction project and description of work currently underway on site; these sections have dropdown menus with various options to select from or the inspector can input others as required. There are also sections for identifying the property owner, engineering consultant, contractor and builder for the project.

**Part 2: Erosion and Sediment Control Inspection Results**
There is a scoring breakdown list included at the beginning of this section which identifies various scores for each specific component of the inspection report. Scores range from least to most critical: “0” (no issues identified), “1” (monitoring required), “2” (routine maintenance
required), “3” (immediate repair/restoration required) and “4” (immediate installation of ES controls required). Within each subsection of the inspection report, there are dropdown menus for specific components which incorporate the above scoring protocol; each result is colour-coded from green to red depending on the severity of the value and to visually display inspection results. Each section also has a separate area to provide additional comments; this area should be utilized by the inspector to provide specific details with respect to any subsection on the evaluation sheet. It is recommended that where details are being included, the specific cell(s) be highlighted for ease of review.

Subsection 1 – Site Perimeter and Adjacent lands
This section is used to identify various components of the ESC requirements used to protect the site perimeter and identify any issues associated with movement of sediment off site. Obviously, this is the most critical area of the inspection report since any deficiencies are likely to cause significant downstream impacts. Where possible the inspector should traverse the entire perimeter of the site to evaluate encroachments into natural areas or adjacent lands, proper installation of perimeter sediment control fencing (single or double as specified), proper installation of construction access controls, mud tracking off site and all other specific ESC requirements identified on the approved plans. Each applicable component has a corresponding section with dropdown menu to identify the level of compliance and current condition (0 to 4) for the specific control measure.

Specific attention should be placed on the condition of sediment fencing particularly in the lower areas of the site where runoff will collect before being discharged off site. Perimeter fencing (double where specified) should be stable and well constructed with no breaches. The inspector should note any areas where residue of sediment is visible on the fabric especially if the residue is evident to more than half the height of the fence; this would denote the potential for possible future failure of the fence during a significant rain event. Regardless of the current condition of any section of perimeter fencing, the inspector should always complete a visual inspection of all downstream watercourses and natural features to assess if there is any evidence of previous discharge of sediment from the site. Photographic record of any sediment discharge or other areas of concern should be taken and attached to the inspection report.

Subsection 2 – Internal Controls – Sheet Flow
Typically, on large scale projects such as subdivisions or site plans there will be significant sheet drainage patterns within the site which contribute runoff which will ultimately be directed towards the perimeter. As such, various ESC measures are employed to control the flow. Some measures include intermediate sediment fencing, maintaining existing ground cover in certain areas, use of erosion mats, straw mulch and other vegetative cover techniques designed to remove sediment, slow flow and/or protect from potential surface soil erosion. The inspector should review the existing topography of the site where sheet flow is expected to occur and evaluate all measures put in place to protect the site. One very important control is re-vegetation of exposed areas after topsoil stripping and earthworks operations have been completed. Within large-scale developments where lands may be left vacant for extended
periods of time (such as industrial/commercial developments) it is imperative that disturbed areas be re-vegetated as soon as possible to avoid possible erosion of surface soils.

Some smaller sites or linear projects such as road reconstruction will not have significant or identifiable sheet drainage patterns and therefore most components in the section can be marked as not applicable (n/a).

Photographs showing overall site drainage conditions should be taken for record purposes.

**Subsection 3 – Internal Controls – Concentrated flows**

This section deals with various ESC measures used on almost all construction projects where surface flows are being directed to temporary sediment ponds and / or traps to be treated prior to release off site. Specific control measures include cut-off swales, rock check dams (with sediment traps upstream), internal haul roads with temporary culverts, lined by-pass channels, etc. The inspector should review the measures in place to assess their effectiveness in controlling flows and removing sediments. Rock check dams should be properly constructed as per the approved standard detail with sufficient capacity in the sediment trap on the upstream side. In longer and / or steeper grade swales, a sufficient number of check dams should be installed to slow flows and allow for maximum sediment removal. The inspector should note any areas where flows appear to be overflowing or bypassing check dams where evident by bank erosion. Lined by-pass channels should be stable and show no signs of stream bank erosion which may denote insufficient capacity of the channel.

Photographs should be taken to identify any areas of concern or in the case of well-constructed and properly functioning ESC measure, to show that systems are currently in place at the time of the inspection.

**Subsection 4 (a to d) – Sediment Control Ponds**

The evaluation tool includes multiple sections for sediment control ponds because typically most construction sites will include more than one sediment pond or trap. The inspector can add or delete sections as required using cut-and-paste applications within the spreadsheet based on the number of sediment ponds located on a specific site. Each pond should be identified with a corresponding number and approximate location within the site for clarification.

Each sediment control pond section includes various components typically found in a standard sediment pond or trap. The inspector should review the approved plans for each pond design to establish which components are incorporated into each. Where perforated risers and clear stone jackets are utilized, an assessment of the amount of sediment buildup on the clear stone should be made; excess buildup could be the result of inlet blockage or plugged filter fabric. Overflow spillways should be inspected to confirm stability and capacity. The berm enclosing the pond should also be inspected to ensure stability and that there is no evidence of significant erosion on the embankments which could eventually compromise the berm or reduce the overall storage capacity of the pond.
Overall Result of Site Inspection
At the end of Part 2 there is a separate section for the inspector to provide an overall rating of the site based on the overall result of the inspection. The ratings vary from “A” – Excellent, [wherein all applicable erosion controls are in place (given rating between zero and two), operating as designed and there is no evidence of sediment discharge offsite] to “F” – Fail, [wherein the site is in poor condition, ESC measures are poorly installed/maintained and there is or may be evidence of sediment discharge from the site]. To assist the inspector with completing the site evaluation report specific criteria are identified on the evaluation sheet for each rating (grade).

Part 3 – Assessment of Level of Adoption of LSRCA - ESC Standards
This section of the evaluation sheet includes a list of ratings for degree of compliance in the use of the most current LSRCA erosion and sedimentation control standards (copies of the specific standards and details are included at the end of this document). Compliance rating ranges from “0” – ESC meet LSRCA standard to “4” – Immediate installation of ESC measures required. Each standard component includes a dropdown menu for individual ratings which are also colour-coded (green to red) for visual clarification. The inspector should review all components and establish an overall rating for the site based on the worst case for each individual component.

Example: if there are two temporary sediment ponds on a specific site and one of the two have significant issues associated with any component of those ponds, the rating should be reflective of the poorer constructed/maintained pond. Although this may not be totally objective it will bring attention to any issues with overall compliance.

General Comments Section
This section is provided for the inspector to include any specific comments, critique or any other notes regarding the overall assessment of the site.

Photos and Drawings or Sketches
This section has been included for the inspector to include copies or a link to any photographs taken during the inspection. Hyperlink to a separate folder is an efficient method for including multiple photos files. Copies of engineering plans, sketches, field notes or permit files can be linked in this section as well.
It is suggested that any spreadsheet cells which include links be highlighted to assist the reader with visual clarification.

The following pages are excerpts from the LSRCA’s Technical Guidelines relating to ESC.
2.6 Erosion and Sediment Control

2.6.1 Soil Erosion

Soil erosion is a naturally occurring process where water picks up and transports soil particles. The degree of naturally occurring erosion will depend on a number of factors such as vegetative cover, slopes and soil type.

When a site is disturbed and soil is exposed, the potential for soil erosion is greatly increased. This increase in erosion results in sediment-laden runoff, which should be considered a pollutant. This sediment-laden runoff is damaging to natural downstream systems such as wetlands, creeks, rivers and wooded-areas. As such, measures should be implemented on sites with exposed soil with the intent of:

1. Minimizing soil erosion at the source;
2. Containing sediment on site;
3. Treating sediment-laden runoff; and
4. Being proactive, not reactive.

Additional benefits such as construction phase phosphorus reduction may be realized from a well-designed and well-implemented erosion and sediment control plan.

2.6.2 Erosion Control Requirements

Erosion and sediment control for site alteration works must be in accordance with the Erosion and Sediment Control Guidelines for Urban Construction, 2006 and the LSRCA requirements in
Appendix G. Local Municipalities may have specific additional requirements above and beyond those outlined in the above documents, which would need to be applied to erosion and sediment control plans.

As noted above in Section 2.0, Site alteration should be performed in such a manner that release of sediment into receiving waters is kept to an absolute minimum with a goal of no sediment migration offsite. In certain circumstances, this may require that the release in sediment be controlled such that natural background rates / loads are not exceeded.

Key points from the LSRCA requirements for erosion and sediment control submission found in Appendix G are highlighted here:

- A separate erosion and sediment control plan must be included with submissions;
- The phasing or stages must be clear from the plans (clearing and grubbing, earthworks, restoration) and need to be itemized and shown on all ESC plans;
- Temporary sediment control basins or traps to be installed at low points accepting less than 2 hectares (ha) of overland drainage. The preferred sizing for temporary sediment control basin or trap is to provide a storage volume of 185m$^3$/ha. At a minimum, temporary sediment basins or traps are to be sized to provide a storage volume of 125 m$^3$/ha. All temporary sediment control basins or traps are to provide appropriate outlet protection;
- In general, temporary sediment ponds should have a contributing drainage area of no more than 10 ha. In some site-specific instances, there may be restrictions that need to be accommodated such as site outlet constraints, grading constraints and phasing. In cases where restrictions are present, intermediate controls (i.e. sediment traps used upstream of the temporary sediment pond) should be used to provide at source controls for contributing drainage areas greater than 10 ha and the temporary sediment pond would be sized for the full contributing drainage area.
- Temporary sediment ponds are to be sized to provide 185 m$^3$/ha of permanent pool storage along with a minimum of 125m$^3$/ha (in some cases 185 m$^3$/ha) of active storage. Refer to Appendix G, note 4 for additional information;
- Swales and ditches at a minimum must be designed to convey the flow from a 5-year design storm. Municipalities may have additional requirements for swale sizing and capacity. The LSRCA may also require sizing for the flows resulting from 100 year storm as Site specific conditions dictate;
- Topsoil/spoil piles shall not exceed 8m in height and shall be located in such a manner as to respect the setbacks as outlined in Appendix G; and
- Given the importance of LIDs as part of a holistic approach to stormwater management within the LSRCA watershed, it is imperative that LIDs are not to be used for sediment control.
1.0 Erosion and Sediment Control Plans, Drawings and Details

This section includes the minimum requirements for erosion and sediment control plans, drawings, details, reports and supporting calculations. If there is a discrepancy between these minimum requirements and local Municipal requirements, then the more conservative requirements will apply. Typical Erosion and Sediment Control (ESC) Details sheets are included at the end of this section.

1. Identify approved development and regulatory limits on submitted plan:
   - development limits for Site. i.e. to clarify that all works are within the development limit;
   - floodplain elevations and floodplain limit for the 1:100 year and the regulatory event as applicable, within the area of interest. Include a reference for the modelling and mapping source;
   - identify the meanderbelt limit and source; and
   - any other regulatory limit as applicable, within the area of interest.
2. Separate Phase and / or Stage drawings including notes and details sheets.
3. Drawings should clearly identify the following ESC information and details as applicable:
   a. Contours and / or DTM points for existing and proposed elevations at each phase of construction;
   b. A note indicating that all sediment control measures must be installed prior to the commencement of site works;
   c. Notes on the inspection and maintenance of sediment controls are to be included in the ESC drawing set. Sediment controls should be inspected on a regular basis and after every significant rainfall event. Repairs to ESC measures must be completed in a timely manner to prevent sediment migration;
   d. Notes requiring that additional materials such as clear stone, filter fabric, pumps, hoses and siltsoxx to be kept onsite at all times for conducting repairs to sediment control measures;
   e. A statement is to be provided in the ESC drawing notes requiring “all disturbed areas left inactive for more than thirty days are to be stabilized”. Identify seed mix and / or stabilization measures within note and / or detail;
   f. A note must be included on the ESC drawing that engineered changes to the ESC measures may be required as Site conditions change;
   g. Construction access mats are to be installed at all construction entrances and exits;
   h. A sediment control fence detail that is consistent with the Authority standard is to be used. Heavy duty sediment control fences are to be installed downslope of all disturbed areas, see detail LSRCA ESC-4. Double row sediment control fence will be required upstream of natural heritage features and as Site conditions require, see detail LSRCA ESC-5;
i. Cut-off swales and ditches are to be shown as directing overland flow to the appropriate sediment trap or temporary sediment pond;

j. Check dams are to be shown in all swales and ditches. Swales and ditches at a minimum must be designed to convey the flow from a 5-year design storm. Municipalities may have additional requirements for swale sizing and capacity. The LSRCA may also require sizing for the flows resulting from 100 year storm as Site specific conditions dictate;

k. Temporary sediment control traps are to be shown at low points accepting less than 2 hectares (ha) of overland drainage. The preferred sizing for temporary sediment control trap is to provide a storage volume of 185m$^3$/ha. At a minimum, temporary sediment traps are to be sized to provide a storage volume of 125 m$^3$/ha. All temporary sediment control traps are to provide appropriate outlet protection;

l. In general, temporary sediment ponds should have a contributing drainage area of no more than 10 ha. In some site-specific instances, there may be restrictions that need to be accommodated such as site outlet constraints, grading constraints and phasing. In cases where restrictions are present, intermediate controls (i.e. sediment traps used upstream of the temporary sediment pond) should be used to provide at source controls for contributing drainage areas greater than 10 ha and the temporary sediment pond would be sized for the full contributing drainage area. Refer to Note 4 below for additional clarification on temporary ESC Pond required components. Additional reference information can be found on details sheet LSRCA ESC-7;

m. A general overall Site plan showing areas of cut and fill is to be provided. i.e. the typical green / red mass balance drawing is an example of this information;

n. For fill within regulated areas, the volume and source of the fill are to be shown on a drawing(s). The supporting calculations are to be provided for the cut and fill analysis;

o. Stockpile locations are to be shown on the drawing(s) in accordance with the following criteria:
   i. The height of the stockpile material shall not exceed 8.0 metres;
   ii. The side-slope of the stockpile shall not exceed 2:1;
   iii. The bottom of the stockpile shall be located a minimum distance of 15.0 metres from a municipal road, provincial road, waterway and/or a waterbody;
   iv. The bottom of the stockpile shall be located a minimum distance of 8.0 metres from the property-line or alteration limit, whichever is most conservative;
   v. Erosion control shall be provided at the base of the stockpile to intercept sediment;
   vi. Stockpiles are to be located outside of the regulatory floodplain limit;
   vii. Stockpiles left in place more than 30 days shall be stabilized with a tarp, mulch, vegetated cover, other acceptable means or as directed by the engineer; and
   viii. Construction operations are to be carried out in a manner that erosion and sediment migration of sediment is minimized;

p. Dewatering notes and details must be identified in the ESC drawing set at the appropriate ESC stage / phase, and as needed due to changing Site conditions;

q. A drawing note is required identifying that “the Site trailer location, equipment storage, refueling area and hydrocarbon storage are to be located outside of the regulated area limit”. If the entire site falls within a regulated area, the LSRCA and municipality should
be consulted to determine a suitable refuelling and storage locations. This location is to be clearly shown on the drawings;

r. A note is required identifying MOECC spills action centre contact and number on ESC drawings;

s. A note indicating that the contractor will be responsible for clean-up and restoration, including all costs, due to the release of sediment from the Site;

t. Include proposed storm sewer alignments on appropriate phase or stage drawing;

u. A sample site plan showing sediment controls to be installed during home building on individual lots (applicable to large estate residential lots only);

4. Temporary ESC Pond components identified as applicable:

a. Temporary ESC ponds are to be individually sized for both the permanent pool component and active storage component based on the following requirements:
   - For the permanent pool component, temporary ESC ponds are to be sized to provide 185 m$^3$/ha of storage; and
   - The active storage component is to be sized to provide a minimum storage of 125 m$^3$/ha with a minimum 48 hour drawdown time and a minimum 4:1 length to width ratio. If the minimum 48 hour drawdown time and/or the minimum 4:1 length to width ratio cannot be met, then an active storage volume of 185 m$^3$/ha will be required;

b. Temporary ESC pond sized as outlined above and supported with calculations and appropriate ESC measures. i.e. as applicable outlet with orifice, emergency overflow weir, low flow outlet dispersion dam, animal protection grate, all components in details, freeboard, spot elevations, sections provided through outlet and across pond, etc.;

c. Temporary ESC ponds are to have filter fabric / clear stone wrapped Hickenbottom riser outfalls (with anti-seepage collars) and rip rap (or equivalent erosion protection) overflow weirs. Reference Detail Sheet LSRCA ESC-7. The outlet must have an animal protection grate and a flow dispersion dam or suitably designed flow spreader, unless outletting directly to a storm sewer. The emergency overflow weir must be sized at a minimum to convey the 100 year event;

d. Notes on the construction of the pond berms to be included on the appropriate ESC drawing (i.e. acceptable soils with low permeability to be used, 95% SPMDD compaction, inspection to be completed by a geo-technical engineer);

e. Stage / storage table with supporting calculations for the temporary ESC pond is to be included in the design submission; and

f. Emergency overflow weir and orifice included on drawing detail. Drawdown calculations are to be provided in the submission.
5. ESC details must be provided to support the ESC plan. Erosion and sediment control measures used on Site must be equal or better than the attached details. Sample details are attached and identified in the Erosion and Sediment Control Drawing Index below.

### 2.0 Erosion and Sediment Control Drawing Index:

See following pages for the attached details.

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<tr>
<td>Temporary Sediment Pond and Outlet Details</td>
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EROSION AND SEDIMENT CONTROL NOTES:

1. ALL SEDIMENT CONTROL MEASURES SUCH AS SEDIMENT CONTROL FENCE, TEMPORARY PONDS, CONSTRUCTION ACCESS MATS, SEDIMENT TRAPS, SWALES AND CHECK DAMS MUST BE INSTALLED PRIOR TO THE COMMENCEMENT OF SITE WORKS.
2. SEDIMENT CONTROLS SHOULD BE INSPECTED ON A REGULAR BASIS AND AFTER EVERY SIGNIFICANT RAINFALL EVENT. REPAIRS TO ESC MEASURES MUST BE COMPLETED IN A TIMELY MANNER TO PREVENT SEDIMENT MIGRATION.
3. ADDITIONAL MATERIALS SUCH AS CLEAR STONE, FILTER FABRIC, PUMPS, HOSES AND SILTSOXX TO BE KEPT ONSITE AT ALL TIMES FOR CONDUCTING REPAIRS TO SEDIMENT CONTROL MEASURES.
4. ALL DISTURBED AREAS LEFT INACTIVE FOR MORE THAN THIRTY DAYS ARE TO BE STABILIZED.
5. THE STABILIZATION SEED MIXTURE IS TO BE AS SPECIFIED ON THE EROSION AND SEDIMENT CONTROL PLAN.
6. THE STABILIZATION SEED MIXTURE IS TO BE APPLIED AT A MINIMUM RATE OF 25 kg/ha.
7. ENGINEERED CHANGES TO THE ESC MEASURES MAY BE NEEDED AS SITE CONDITIONS CHANGE THROUGHOUT THE CONSTRUCTION PROCESS. THESE UPDATES MUST REFLECT BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT AND EROSION ONSITE AND SHOULD BE COMPLETED BASED ON DIRECTION FROM THE SITE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED AS DIRECTED BY AN ENGINEER THROUGHOUT THE CONSTRUCTION PROCESS.
8. THE CONSTRUCTION ENTRANCE MAT IS TO BE INSTALLED AS THE FIRST STEP IN THE SITE ALTERATION PROCESS.
9. SEDIMENT CONTROL FENCE IS TO BE INSTALLED DOWNSLOPE OF ALL DISTURBED AREAS. A DOUBLE ROW OF SEDIMENT CONTROL FENCE IS TO BE INSTALLED SURROUNDING ALL NATURAL HERITAGE FEATURES AND AS DIRECTED BY THE SITE ENGINEER. SEDIMENT CONTROL FENCE IS TO BE AS PER LSRCA STANDARD ESC-4 OR ESC-5 AS A MINIMUM. LIGHT DUTY SEDIMENT CONTROL FENCE IS NOT ACCEPTABLE.
10. CUT-OFF SWALES OR DITCHES ARE TO BE INSTALLED AS SHOWN ON THE ESC PLANS AND AS NECESSARY BASED ON CHANGING SITE CONDITIONS TO DIRECT OVERLAND FLOW TO THE APPROPRIATE SEDIMENT TRAP OR TEMPORARY SEDIMENT POND.
11. CHECK DAMS ARE TO BE INSTALLED IN ALL SWALES AND DITCHES IN ACCORDANCE WITH DRAWING LSRCA ESC-2, AS A MINIMUM.
12. TEMPORARY SEDIMENT TRAP(S) ARE TO BE CONSTRUCTED AT THE BEGINNING OF SITE GRADING AND IF THE SITE DRAINAGE CHANGES DURING CONSTRUCTION. IT MAY BE NECESSARY FOR TEMPORARY SWALES TO BE CONSTRUCTED TO DIRECT SITE FLOWS TO THE TEMPORARY SEDIMENT TRAP(S) DURING ROUGH GRADING AND AS CONSTRUCTION PROGRESSES.
13. TEMPORARY SEDIMENT POND(S) ARE TO BE CONSTRUCTED AT THE BEGINNING OF SITE GRADING AND IF THE SITE DRAINAGE CHANGES DURING CONSTRUCTION. IT MAY BE NECESSARY FOR TEMPORARY SWALES TO BE CONSTRUCTED TO DIRECT SITE FLOWS TO THE TEMPORARY SEDIMENT POND(S) DURING ROUGH GRADING AND AS CONSTRUCTION PROGRESSES.
14. FILTREXX SILTSOXX OR APPROVED EQUIVALENT TO BE INSTALLED DOWNSTREAM FROM SEDIMENT TRAP AND TEMPORARY SEDIMENT POND OUTLETS TO A MINIMUM HEIGHT OF 300mm.
15. STOCKPILES ARE USED ON-SITE FOR THE STORAGE OF EXCESS MATERIAL, THEY ARE TO BE IN ACCORDANCE WITH DETAIL DRAWING LSRCA ESC-6 OR BETTER.
16. ANY DEWATERING OCCURRING ONSITE MUST BE IN ACCORDANCE WITH AN APPROVED DEWATERING PLAN. ADDITIONAL DEWATERING REQUIREMENTS MAY BE DEEMED NECESSARY AND SHALL BE IMPLEMENTED AS DIRECTED BY THE ENGINEER, CONTRACT ADMINISTRATOR OR LOCAL MUNICIPALITY.
17. THE SITE TRAILER IS TO BE LOCATED ONLY AT THE DESIGNATED LOCATION SHOWN ON THE PLANS.
18. EQUIPMENT AND HYDROCARBON STORAGE IS TO OCCUR ONLY WITHIN THE DESIGNATED AREA SHOWN ON THE PLANS.
19. REFUELING IS TO TAKE PLACE ONLY WITHIN THE DESIGNATED AREA SHOWN ON THE PLANS AND SHALL BE A MINIMUM OF THIRTY METRES FROM ANY WATERCOURSE OR ENVIRONMENTALLY SENSITIVE AREA.
20. AN APPROVED SPILLS MANAGEMENT PLAN IS TO BE KEPT ONSITE.
21. SPILL CLEANUP EQUIPMENT SUCH AS ABSORPTIVE MEDIA IS TO BE MAINTAINED ONSITE FOR IMMEDIATE USE IN THE EVENT OF A SPILL.
22. SPILLS ARE TO BE REPORTED IMMEDIATELY TO THE MOECC SPILLS ACTION CENTRE AT 1-800-268-6060.
23. THE CONTRACTOR WILL BE RESPONSIBLE FOR CLEAN-UP AND RESTORATION, INCLUDING ALL COSTS, DUE TO THE RELEASE OF SEDIMENT FROM THE SITE.
24. LOW IMPACT DEVELOPMENT (LID) MEASURES ARE NOT TO BE USED AS SEDIMENT CONTROL DEVICES.
25. ADDITIONAL SEDIMENT CONTROL DEVICES MAY BE DEEMED NECESSARY AND AS SITE CONDITIONS CHANGE AND SHALL BE INSTALLED AS DIRECTED BY THE SITE ENGINEER, CONTRACT ADMINISTRATOR OR LOCAL MUNICIPALITY.

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EROSION AND SEDIMENT CONTROL PLAN NOTES

LSRCA ESC-1

DATE: 06.2016
SCALE: NTS
NOTES:

1. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA IN SUCH A MANNER THAT IT WILL NOT ERODE.

2. THE STRUCTURE SHALL BE INSPECTED ON A REGULAR BASIS AND AFTER EVERY SIGNIFICANT RAINFALL EVENT AND REPAIRS SHALL BE MADE AS NEEDED IN A TIMELY MANNER TO PREVENT SEDIMENT MIGRATION.

3. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.

4. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

1  SWM GUIDELINES UPDATE  06.2016

DATE: 06.2016
SCALE: NTS

SWALE AND ROCK CHECK DAM

LSRCA ESC-2
NOTES:

1. SEDIMENT CONTROL FENCE SHOULD BE ALIGNED WITH CONTOURS FOR SHEET OVERLAND FLOW.
2. SEDIMENT CONTROL FENCE IS TO BE LOCATED IN AREAS OF LOW SEDIMENT YIELD ON SLOPES THAT CONFORM TO MTO DRAINAGE MANUAL VOLUME 2 CHART F4-3C TOPOGRAPHIC FACTOR IS BASED ON SLOPE LENGTH AND GRADIENT.
3. SEDIMENT CONTROL FENCE SHALL BE INSTALLED WITH FILTER MEDIA FABRIC TIED INTO THE SOIL A MINIMUM OF 300 mm BY EITHER STATIC SLICING OR TRENCH METHODS WITH COMPACTION OF TRENCH MATERIAL MEETING 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
4. STEEL "T" BAR POSTS ARE TO BE SPACED A MAXIMUM DISTANCE OF 2000 mm ON CENTER.
5. STRAW BALES TO BE PLACED END-TO-END CONTINUOUSLY BETWEEN SEDIMENT CONTROL FENCES.
6. FROZEN GROUND CONDITIONS REQUIRE FILTER FABRIC TO BE BACKFITTED IN TRENCH WITH CLEAR STONE.
7. GEOTEEXTILE FABRIC TO BE COMPRISSED OF NON-WOVEN U.V. STABILIZED MATERIAL FABRIC TO BE FOLDED OVER TOP OF FENCE A MINIMUM OF 300 mm AND WIRE FASTENED.
8. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
9. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.
NOTES:

1. POND IS TO BE CONSTRUCTED PRIOR TO SITE WORKS.
2. POND BERMS TO BE CONSTRUCTED USING IMPERVIOUS MATERIAL, COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY, AND INSPECTED BY A GEOTECHNICAL ENGINEER.
3. A 1,500mm HIGH BARRIER FENCE SHALL BE ERECTED ALONG THE PERIMETER OF THE SEDIMENT BASIN. WARNING SIGNS SHALL BE ATTACHED TO THE FENCING STATING THE AREA IS OFF LIMITS TO THE GENERAL PUBLIC, AND ADVISING THAT THE BASIN IS USED FOR SEDIMENT CONTROL PURPOSES AND THAT THE AREA IS SUBJECT TO FLASH FLOODING.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
5. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

TEMPORARY SEDIMENT POND AND OUTLET DETAILS

1

SWM GUIDELINES UPDATE 06.2016

DATE: 06.2016

SCALE: NTS

LSRCA ESC-7