

Guide to the use of the Erosion and Sediment Control Evaluation Tool

December 2017



Lake Simcoe Region
conservation authority

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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.

LSRCA Technical Guidelines for Stormwater Management Submissions

Approval Date: June 24, 2016

Effective Date: September 1, 2016

Erosion and Sediment Control Sections

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 185m³/ha. At a minimum, temporary sediment basins or traps are to be sized to provide a storage volume of 125 m³/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 m³/ha of permanent pool storage along with a minimum of 125m³/ha (in some cases 185 m³/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.

APPENDIX G from LSRCA Technical Guidelines
EROSION AND SEDIMENT CONTROL
MINIMUM REQUIREMENTS

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 m³ / ha of storage; and
 - The active storage component is to be sized to provide a minimum storage of 125 m³ / 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 m³ / 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:

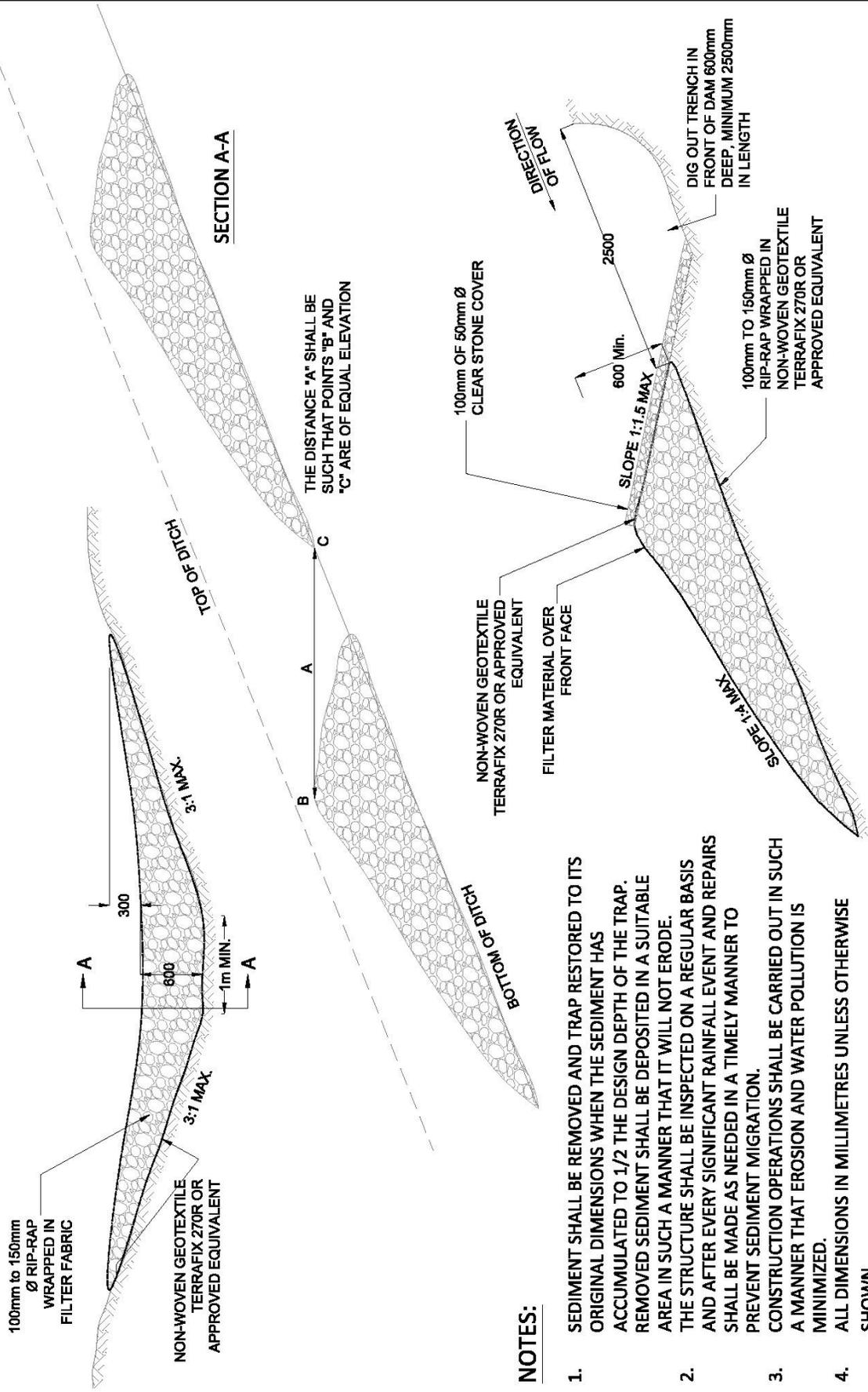
See following pages for the attached details.

Drawing Title	Drawing Number
Erosion and Sediment Control Plan Notes	LSRCA ESC-1
Swale and Rock Check Dam	LSRCA ESC-2
Construction Access Mat	LSRCA ESC-3
Sediment Control Fence	LSRCA ESC-4
Double Row Sediment Control Fence	LSRCA ESC-5
Stockpile Siltation Control	LSRCA ESC-6
Temporary Sediment Pond and Outlet Details	LSRCA ESC-7

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 SILT/SOXX 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 AS PER LSRCA STANDARD ESC-4 or ESC-5 AS A MINIMUM. LIGHT 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 SILT/SOXX OR APPROVED EQUIVALENT TO BE INSTALLED DOWNSTREAM FROM SEDIMENT TRAP AND TEMPORARY SEDIMENT POND OUTLETS TO A MINIMUM HEIGHT OF 300mm.
15. IF 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.

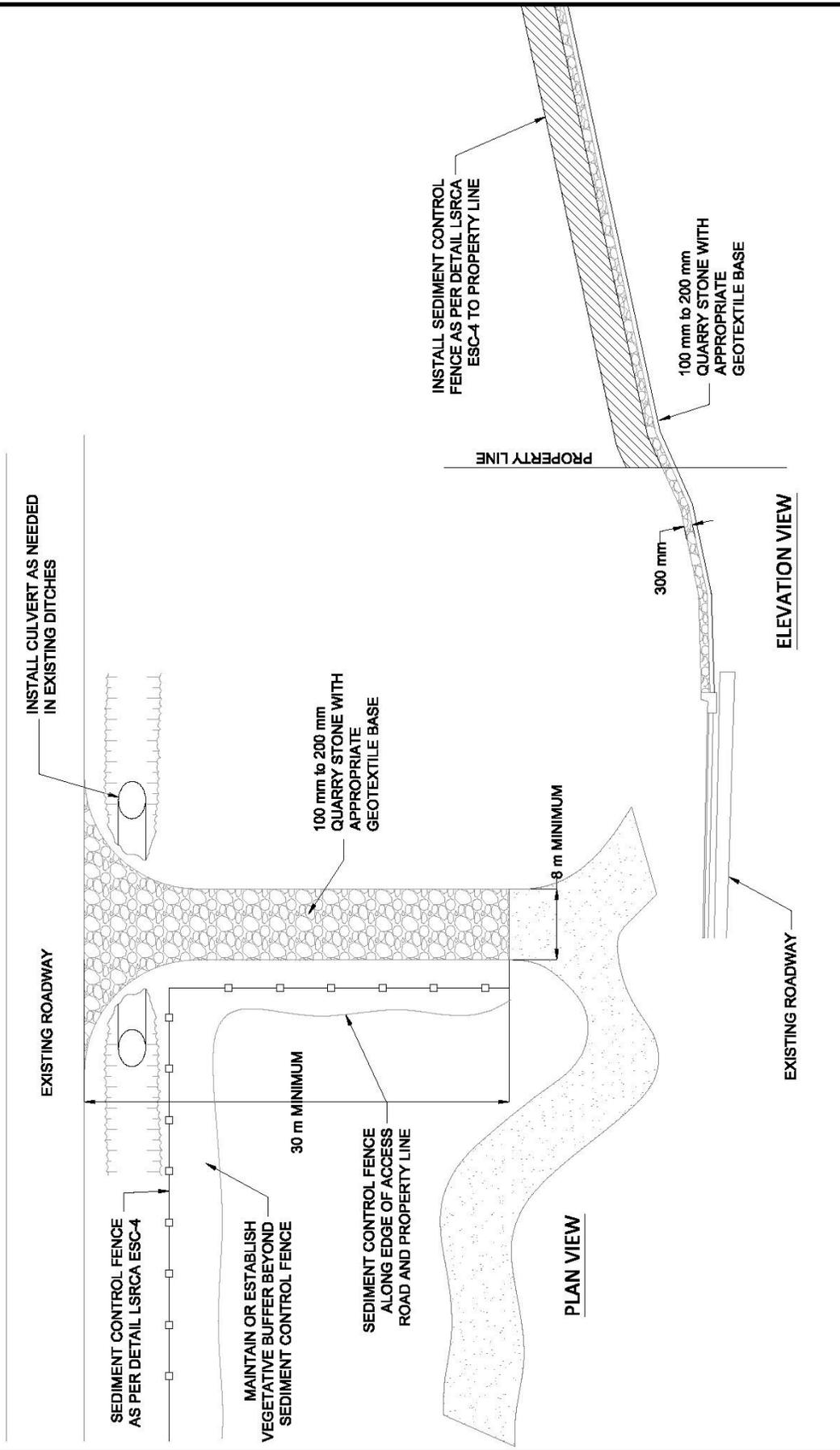
1	SWM GUIDELINES UPDATE	06.2016	DATE: 06.2016
			SCALE: NTS
EROSION AND SEDIMENT CONTROL PLAN NOTES			LSRCA ESC-1
NO.	REVISION	DATE	



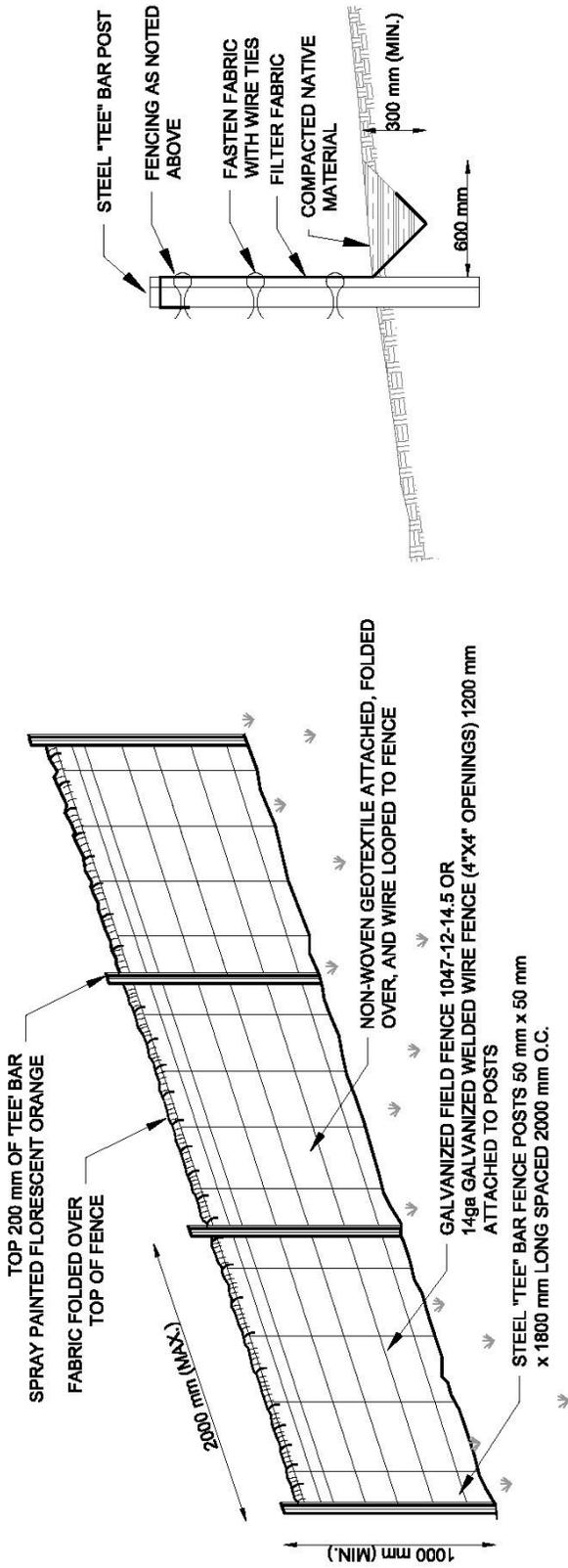
NOTES:

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
NO.		REVISION	DATE
SWALE AND ROCK CHECK DAM			
		DATE: 06.2016	SCALE: NTS
LSRCA ESC-2			



1	SWM GUIDELINES UPDATE	06.2016	DATE: 06.2016
			SCALE: NTS
			LSRCA ESC-3
CONSTRUCTION ACCESS MAT			
NO.	REVISION	DATE	



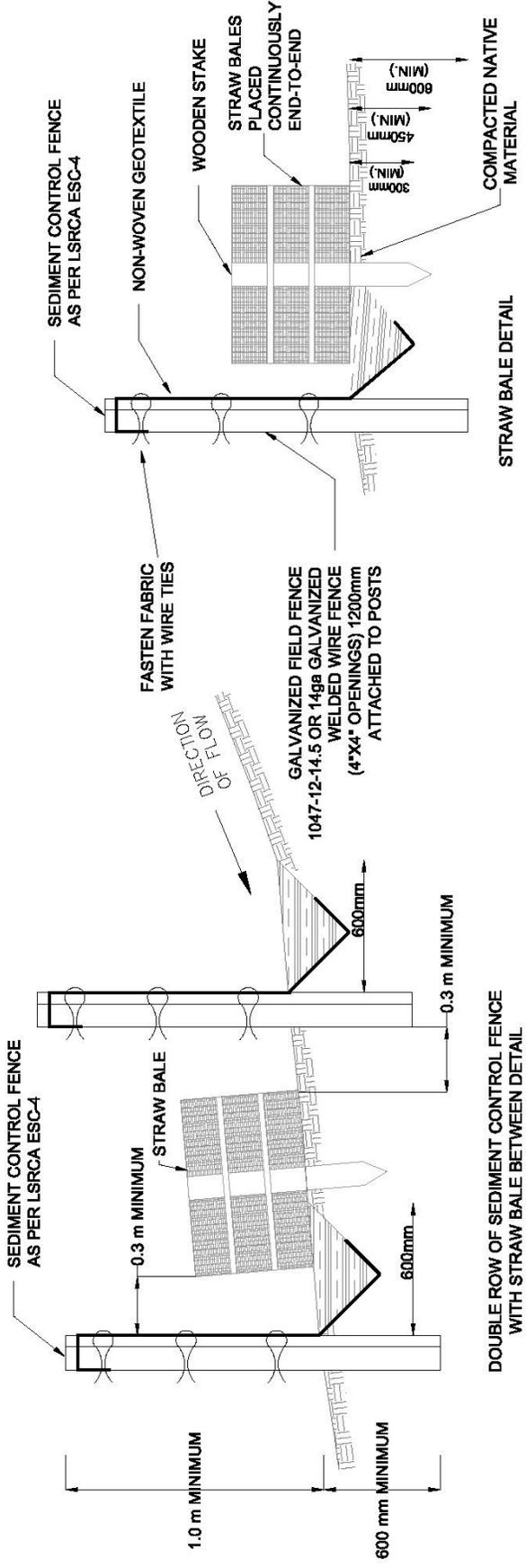
NOTES:

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 LS 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 DENSITY.
4. STEEL 'T' BAR POSTS ARE TO BE SPACED A MAXIMUM DISTANCE OF 2000 mm ON CENTER.
5. FROZEN GROUND CONDITIONS REQUIRE FILTER FABRIC TO BE BACKFILLED IN TRENCH WITH CLEAR STONE.
6. GEOTEXTILE FABRIC TO BE COMPRISED OF NON-WOVEN U.V. STABILIZED MATERIAL FABRIC TO BE FOLDED OVER TOP OF FENCE A MINIMUM OF 300 mm AND WIRE FASTENED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
8. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

1	SWM GUIDELINES UPDATE	06.2016
NO.	REVISION	DATE

SEDIMENT CONTROL FENCE

DATE: 06.2016
SCALE: NTS
LSRCA ESC-4



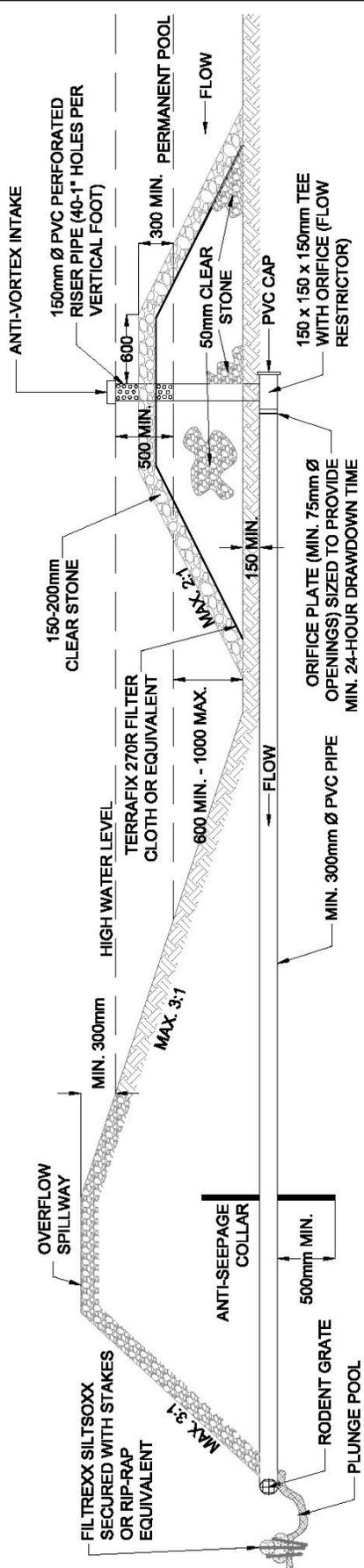
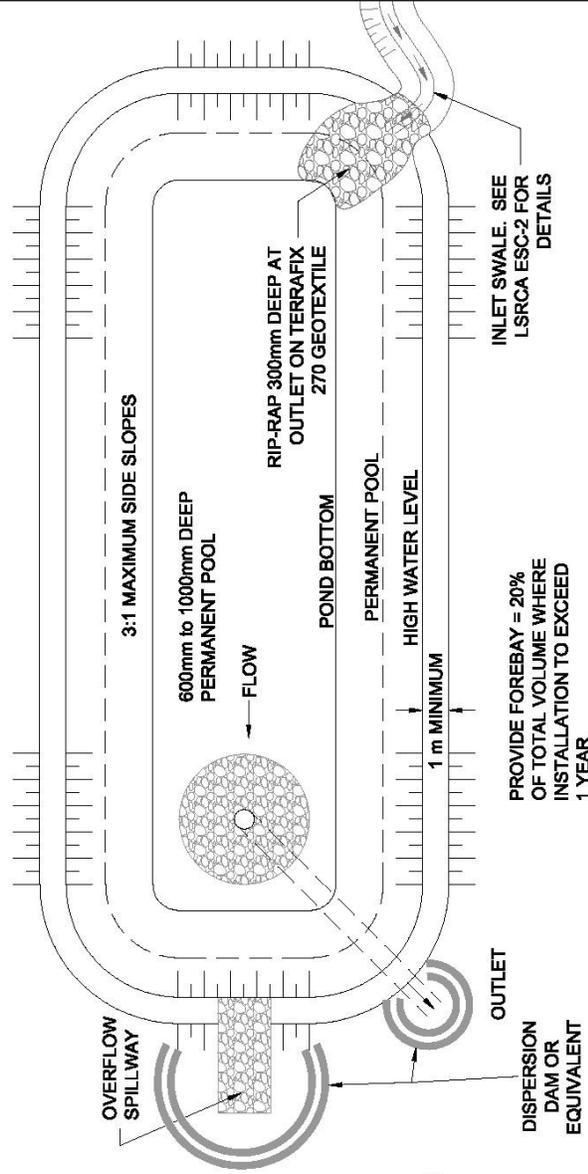
NOTES:

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 LS 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 T¹ 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 BACKFILLED IN TRENCH WITH CLEAR STONE.
7. GEOTEXTILE FABRIC TO BE COMPRISED 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.

1		SWM GUIDELINES UPDATE	06.2016	DATE: 06.2016
				SCALE: NTS
		DOUBLE ROW SEDIMENT CONTROL FENCE		LSRCA ESC-5
NO.		REVISION	DATE	

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 1500mm 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.



1	SWM GUIDELINES UPDATE	06.2016
NO.	REVISION	DATE

TEMPORARY SEDIMENT POND AND OUTLET DETAILS		DATE: 06.2016
		SCALE: NTS
		LSRCA ESC-7