



Instruction Manual for Erosion and Sediment Control Plan Applications **2017**

i. Introduction

An Erosion and Sediment Control (ESC) Plan outlines controls and practices that will be undertaken during all stages of construction, to prevent sediment loss from a parcel. Keeping sediment on site prevents it from causing damage to roadways, storm infrastructure, and rivers and creeks all while protecting human health and safety.

Being the registered owner of the public storm drainage system, The City assumes responsibility for protecting it from activities that could cause an adverse effect to the integrity of the system or the quality of storm drainage. During construction significant erosion and sedimentation may occur, putting the quality of storm drainage and the integrity of the storm drainage system at a higher risk. For this reason, all construction sites over 0.4 hectares must create and implement an ESC Plan which has been reviewed and approved by The City ESC Inspector.

The requirement for an ESC Plan will be communicated by one of the following three methods:

- 1) It was a Prior to Releases condition on a Development Permit that you applied for,
- 2) It is a condition of the Development Agreement, and/or
- 3) The project is a City of Calgary project over 0.4ha in size.

Regardless of what triggered the requirement for a plan, it is imperative that the ESC Plan is approved via an ESC Approval letter prior to the commencement of work that exposes soil.

An ESC Plan consists of an [Erosion and Sediment Control Plan Application Form](#), required documentation and drawing references, and the relevant *ESC Standard Specification (Specifications)* This instruction manual is designed to assist you when filling out the application. If you are unable to find the answer you are looking for in this manual, contact 3-1-1 and ask to be put in touch with a City ESC Inspector..

ii. Submitting an ESC Plan

Where to submit

Use the ESC Application section of this instruction manual to assist you with filling out the Erosion and Sediment Control Plan Application Form. Where you send your application is dependent on the type of application and if the application is a first submission or a resubmission.

Application Type	1st Submission	Resubmissions
Stripping & Grading Development Permits & Development Agreements	Calgary Municipal Building	Shipping and Receiving Water Centre 625 25 Ave S.E.
Development Permits City Projects Circulation Drawings	Shipping and Receiving Water Centre 625 25 Ave S.E.	Shipping and Receiving Water Centre 625 25 Ave S.E.

ESC Plan applications can be dropped off in person or sent by courier.

Water Centre	Calgary Municipal Building
<p>Mail:</p> <p>c/o Business Support Coordinator The City of Calgary, Water Resources Mail Code 413 P.O. Box 2100, Station M, T2P 2M5</p>	<p>Mail:</p> <p>Engineering Generalist The City of Calgary Development & Building Approvals, Mail Code 8032 P.O. Box 2100, Station M, T2P 2M5</p>
<p>Courier:</p> <p>c/o Business Support Coordinator The City of Calgary, Manchester Centre Stormwater Pollution Prevention Water Centre Shipping and Receiving 625 25 Avenue, SE.</p> <p>Note: The Water Centre Shipping and Receiving door is located on the east side of the building (the opposite side of main reception). A door buzzer is present to obtain entry.</p>	<p>Courier:</p> <p>Engineering Generalist The City of Calgary Development & Building Approvals 3rd Floor, Calgary Municipal Building 800 MacLeod Trail, SE Calgary, Alberta</p>

Submission Responses

The City attempts to review all ESC Plan applications within fourteen business days of receipt. Most applications require at least one resubmission, and some will even require additional resubmissions. In summary, the ESC Plan takes time for review, resubmission and approval. To prevent construction commencement delays, schedule your application timing accordingly.

There are three possible outcomes from the review of an ESC Plan:

- 1) An Approval,
- 2) A Further Information Requested (FIR) letter/comments, or
- 3) A notice of Rejection

Note: How much time should you plan for obtaining approval on an ESC Plan? Knowing City target review timelines allows you to estimate.

Example: If you submit an ESC Plan application on **Wednesday, April 18, 2018** The City ESC Inspector has till **Monday, May 7, 2018** to respond. If the response is an FIR letter, edits will need to be made prior to resubmission. If it takes one week to update the ESC Plan it would be returned to The City on **Tuesday, May 15, 2018**. The City ESC Inspector now has until **June 1, 2018** to respond to the resubmission. If all information requests have been satisfied, ESC Approval would be granted in **six and a half weeks (45 days)**.

Many applications receive approval on the second submission, but it is not uncommon for three or more submissions to be required. If your site is more intricate and another FIR letter is received on June 1, 2018, instead of an Approval letter, one could assume another week to update the ESC Plan. This would result in a resubmission of **June 11, 2018**. Now The City

ESC Inspector has till **June 28, 2018** to provide a response. If ESC Approval is granted at this point, it has taken **ten and a half weeks (73 days)**.

April 2018							May 2018							June 2018						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
25	26	27	28	29	30	31	29	30	1	2	3	4	5	27	28	29	30	31	1	2
1	2	3	4	5	6	7	6	7	8	9	10	11	12	3	4	5	6	7	8	9
8	9	10	11	12	13	14	13	14	15	16	17	18	19	10	11	12	13	14	15	16
15	16	17	18	19	20	21	20	21	22	23	24	25	26	17	18	19	20	21	22	23
22	23	24	25	26	27	28	27	28	29	30	31	1	2	24	25	26	27	28	29	30
29	30	1	2	3	4	5	3	4	5	6	7	8	9	1	2	3	4	5	6	7

Approval

When an Approval is granted, The City of Calgary will stamp the last page of the Erosion and Sediment Control Plan Application Form and all of the supplied drawings. The stamp will include the approval date and the City ESC Inspector’s signature. An Approval letter, with conditions, is supplied to the owner of the site. The Approval letter, application form, Specifications and all drawings and attachments collectively form the complete ESC Plan. The issuance of an Approval letter deems the ESC Plan a legally binding document under the Drainage Bylaw. As such, the plan must be implemented and followed to ensure the construction site remains in compliance. Should the construction site ownership change, the ESC Plan is tied to the land and must be adhered to by the new owner.

Note: An approved ESC plan consists of the Approval letter, Erosion and Sediment Control Plan Application form, Standard Specifications for Erosion and Sediment Control, all applicable drawings, and supplementary documents (including the nomograph, sieve analysis data, site photos and manufacturer’s specifications).

Further Information Requested

After a submission, you may receive a letter or email containing FIR comments. These comments must be resolved via a resubmission. When resubmitting ensure that you have:

- 1) Provided a numbered response letter that matches the format of the FIR letter which outlines how each of the FIR questions has been resolved and that indicates all the locations where changes have been made. Clearly state the applicable sections, pages, drawings and/or note numbers of all changes (not supplying a complete and detailed response letter could result in a resubmission being rejected).
- 2) Resubmitted a complete package of information. Our office stamps the submission that is approved. Ensure the resubmission contains all pages of the application form, all attachments and all drawings. Partial resubmissions are only acceptable if prior approval for such has been granted.

Rejection

When information is missing from the application, the incorrect application form is used, or when documents are difficult to read the ESC Plan application will be rejected. Providing feedback on applications with limited information result in confusion and additional work for all parties involved.

Amendments

Once an ESC Plan is approved it is legally binding and must be followed on the construction site. If, for any reason, an approved ESC Plan cannot be followed, an amendment must be submitted. An amendment request must contain the:

- a) Project name;
- b) Project reference number (Development Permit, Development Agreement, Development Liaison, Circulation Drawing number);
- c) Municipal site address;
- d) Notification that it is an amendment for a previous ESC Approval;
- e) A detailed description of what is being amended;
- f) Applicable amended drawing and details portions of the ESC Plan.

Amendments must be submitted to the City ESC Inspector following the process outlined at the following link calgary.ca/esc.

iii. ESC Applications

ESC Applications must comply with the *ESC Standard Specifications (Specifications)* located in the ***Erosion and Sediment Control Guidelines for use in Calgary***. While creating an ESC Plan you will need to refer to these Specifications frequently.

The following instructions are to be used while completing the [Erosion and Sediment Control Plan Application Form](#).

1.0 Project Information

General project information provides basic details about when and where the project is taking place. Some of this information will be used to populate the *Inspection Sheet* in section 12 of the application.

1.1 Project Name

The name of the project as it is identified on applications.

1.2 Estimated Project Start-up Date

This timeline can be expressed as a month and a year if the exact start-up date is not known. Attempt to be as accurate as possible as this information may be used to schedule the ESC preconstruction meeting.

1.3 Legal Land Location:

This information must be expressed in section-township-range-meridian format, for example, 27-25-02-W5.

1.4 Site Address

List the site address for the property at the commencement of construction. If there are multiple addresses, list them all. If the project is a linear project, provide the closest intersection.

1.5 Community Name

Provide the community name for the area.

1.6 Overall Site Size (ha)

Provide the overall site size in hectares. If only part of the site is being exposed to erosion, this information will be outlined in later calculations.

1.7 Stormwater Movement

This information clearly shows where water that leaves the construction site will discharge to. In the event of a sediment release from a construction site, this information is very useful for field staff to determine the extent and impacts of the release. If a storm pond is present, provide the name or number of the pond, indicate the receiving water body and the outfall (e.g. Sundance Storm Pond, Nose Creek, N30).

[Storm Utility Section Maps](#) are available online to assist in locating this information.

2.0 Application Type

The application type will define what information should be present in the ESC Plan. For example, a stripping and grading project would not have a landscape plan included, while a development permit for a multi-family project would.

First choose which of the four application types best describes your project:

- 1) Stripping and Grading (Development Permit or Development Agreement)
- 2) Industrial, Commercial, Institutional, Multi-family (Development Permit, Development Liaisons, Airport Developments)
- 3) Subdivision Development including Offsites and fee simple row houses (Construction Drawing)
- 4) City of Calgary Project (Development Permit, Development Agreements Development Liaison, Construction Drawing)

Check the box that aligns with your project. Only fill out the one section next to the box that you have checked. If your project requires multiple boxes to be checked, you are likely trying to create an ESC Plan that is associated with multiple development applications. Call 3-1-1 and request to be put in contact with a City ESC Inspector to discuss.

2.1 Stripping and Grading

Supply the Development Permit (DP) or Development Agreement (DA) number for the project that is being undertaken. If you have not yet received this number you may check the TBA box on your preliminary submission and provide it once available. This number is typically required prior to the issuance of the ESC Approval letter.

2.2 Industrial, Commercial, Institutional, Multi-family

Provide the Development Permit number. If you have not yet received this number you may check the TBA box on your preliminary submission. This number is typically required prior to the issuance of the ESC Approval letter.

If the site is already stripped and graded, provide the parent stripping and grading number. If the site is not tied to a stripping and grading ESC Plan, check the N/A box. Generally, as all construction sites greater than 0.4ha in size require an ESC Plan, there would have been one approved for the site prior to soil being exposed to erosion. If you have purchased a piece of stripped and graded property, you as the owner are now responsible for following the Approved ESC Plan for the stripping and grading phase, as this document is tied to the land. Be sure to obtain a copy during your land purchase. The site will most likely be at the final conditions phase of the stripping and grading plan. Familiarize yourself with the approved ESC Plan and ensure that it is implemented.

2.3 Subdivision Development

Subdivision developments, offsites (sanitary, storm, water, roadways) and fee simple row houses are related to construction drawings.

All fee simple lot ESC drawings are prepared and submitted during the larger subdivision approval process by the Developer and are governed by the associated subdivision development agreement. Copies of these ESC drawings should be supplied by the Developer to each individual builder who is constructing in the subdivision. No additional ESC drawings for fee simple housing (row, semi-detached or detached) developments are needed and none are required during the Development Permit process. If the builder wants to amend the original ESC plans for their specific lots, they will be required to submit an amendment to the approved site ESC Plan.

Provide the Construction Drawing number as well as the Development Agreement number for the project. If stripping and grading on the construction site was conducted under a Development Permit, provide that number as well. If the stripping and grading was undertaken under the Development Agreement, check the N/A box next to the parent stripping and grading number.

2.4 City of Calgary Projects

City of Calgary projects may be conducted under a Development Permit, Development Agreement, Development Liaison (DL), Construction Drawings (CD) an ECO Plan or a

combination of several submissions. If there is a DP, DL or CD associated with the project, provide the number in this section.

3.0 Contact Information

To ensure effective communication throughout a development, it is important that accurate information is provided as part of the application. The contact information must be complete prior to Approval of the ESC Plan being granted.

3.1 Owner

The owner is the person or entity who appears on land titles.

The owner is ultimately responsible for ESC on their land and for confirming compliance with approvals and regulations.

3.2 ESC Consultant

The ESC consultant is the professional with experience in the design and implementation of erosion and sediment controls who signed and stamped the drawings and holds a designation as a Certified Professional in Erosion and Sediment Control (CPESC), a Professional Engineer (P.Eng.), Professional Licensee (P.L.(Eng.)), or a Professional Agrologist (P.Ag). They are responsible for developing the initial ESC Plan and for submitting amendments.

3.3 ESC Inspector

The ESC Inspector is the person hired to conduct regular inspections on the construction site. They are trained in ESC, understand how to read ESC Plans and have experience in construction, inspection and maintenance of ESC practices. The ESC Inspector understands the importance of documentation and records information accordingly. They have the authority to direct work and to mitigate or stop erosion, sedimentation and stormwater pollution in accordance with the approved ESC Plan. If the ESC Plan cannot be met, the ESC Inspector can advise that an amendment is required.

4.0 Project Details

4.1 Project Description

Provide a brief description of the nature and extent of the construction project. This information will clarify what will be present on the site after the construction project is complete. For example, if a multi-family project is being installed, this section would outline how many buildings are being constructed, if they are apartment style or townhomes, and if there is underground parking present.

4.2 Site Visit Date

This is the date the site was visited to obtain information to support the ESC Plan application. The date of the site visit should be as close as possible to the development of the ESC Plan. If

there has been a delay between when the site was visited and when the application was submitted or if The City ESC Inspector has reason to believe that the present conditions drawing no longer matches the site, updated site photos may be requested as part of a FIR letter.

4.3 Visit Limitations

State any limitations of the field investigation such as snow cover, restricted access, on-going construction and/or safety concerns.

4.4 Cover and Practice Information

Provide a description of the cover and practices that are present on the site at the commencement of this project. For sites such as stripping and grading developments, this description will reflect what the site looks like at the time of the site visit. For sites such as subdivisions the property may be actively undergoing stripping and grading and the cover description should instead be reflective of the last drawing in the stripping and grading set. Most pieces of land under development will require two separate ESC Plans to move from a stabilized preconstruction state to a stabilized post construction state.

In this section indicate the areas that are vegetated and the areas that are stripped. If applicable, provide information on the type(s) and density of the vegetation present. Include any information on existing stockpiles, berms, and existing ESC practices.

4.5 Low Impact Developments (LIDs)

Low Impact Developments are on-site stormwater management systems that are easily impacted by sediment. Some examples include bioswales, infiltration galleries and rain gardens. Due to their sensitive nature the preference for installation of LIDs, in order, is as follows:

- 1) Install LIDs last after all other construction is complete
- 2) Protect LIDs using sacrificial measures
- 3) 100% isolation from construction area

In this section provide details on what low impact developments are to be installed on or near the site and explain, in detail, how they will be protected during the construction period.

4.6 Onsite Critical Areas

Discuss any critical areas located within or adjacent to the proposed development site that could be adversely impacted by erosion, sediment-laden run-off or sedimentation. Examples of critical areas include steep slopes, highly erodible soils, water bodies, contamination and environmental reserves.

4.7 Critical Run-on and Run-off Locations

a) Identify critical run-on pathways (e.g. bridge abutment slopes) where water will enter your construction site either by sheet flow or concentrated flow. Additional practices and controls may be required to manage run-on.

b) Identify critical run-off pathways, which are the low areas on your site where water will leave the property during a rain event. Sediment discharges can result in adverse effects to the environment, infrastructure and property. By identifying your critical run-off locations you are able to propose and install controls and practices that prevent these adverse effects.

c) Identify emergency overland flow locations. This is where water will travel during high flow events. The emergency overland flow location may form part of the final stormwater management design or, it may be a temporary structure to only be used during construction (e.g. where water will overflow from a sediment containment system).

4.8 Referenced Documents

List any other documents that were referenced for the development of the ESC Plan (e.g. environmental site assessment, geotechnical report).

4.9 Project Specific Information

This section is provided so that you may include any project specific information related to erosion and sediment control that you feel is relevant.

5.0 Attachments/Supporting Documentation

5.1 Photos

Provide photos of the site and a map that shows the location and direction that the photo was taken from.

5.2 Manufacturers Information

When a C or P value is not provided in the Specifications, provide the manufacturer's specification sheets that support the C or P-value used in the Revised Universal Soil Loss Equation (RUSLE). Include any details, not already present in the Specifications, to ensure the product is properly installed. Examples typically include product size, spacing, application rates and staple patterns.

5.3 Geotechnical Information and Nomograph

Provide data on soil structure and texture for the soils that will be disturbed during construction, including existing soils on site and those that are being imported as fill.

Submit the most recent site geotechnical report and any soil survey information available at the time of the report development, including representative soil texture data (sieve and hydrometer analysis) and nomographs. If organic matter information is not available, 0% should be used

when determining the K-value. For more information on determining your site K-value refer to the *Erosion and Sediment Control Guidelines*.

If there is no soil data for the construction site a default K-value of 0.079, the highest known value for Calgary, will be accepted. If you are going to use this value, identify this decision in the in Section 5.3 in the Supplemental Information area.

5.4 Permission Letters

Attach any relevant permissions and approval letters for work that is being conducted on land outside of the construction boundary. This could include adjacent properties, water bodies such as wetlands, transportation utility corridors or public property such as a park.

5.5 Haul Route Map

If soil is being hauled off site, include a map that shows the haul route. If a haul route is not available at the time of the application, indicate this in the supplemental information section. In this case, the ESC Plan would be granted Approval, but in order for the site to remain in compliance, a haul route map would need to be submitted as an amendment prior to earth being taken off site.

5.6 Other(s)

Indicate any other attachments or supporting documents that have been supplied as part of the application. For example, if terracing is being used on the construction project, a letter from a qualified geotechnical engineer should be attached to the ESC Plan application. Another example of what should be included in this section is RUSLE exceedances. If there are slopes that result in a soil loss values higher than 2 tonnes/ha/yr, but you feel they will not cause a release, you may provide a professional opinion on why these higher values should be approved.

6.0 Winterization Plan

Calgary has a unique winter climate with a significant number of reoccurring freeze-thaw cycles. The benefit is that it allows for the installation of controls and practices during warmer winter weather conditions. The drawback is that the frozen ground impedes infiltration, increasing runoff and erosion. A particular concern is when a precipitation event or rapid melt occurs prior to the ground thawing. For Calgary, winter is defined as the period between November 15 – May 15.

To manage these sensitive times it is important to ensure that a construction site is protected from erosion prior to the ground freezing. Construction in Calgary is increasingly occurring during winter months. A challenge associated with this practice is that not all erosion and sediment controls can be installed successfully during frozen ground conditions. For instance, mulch can only be sprayed onto a construction site when it is above freezing, berms cannot be properly compacted when using frozen soils, and stapling down blankets can be challenging.

Complete the winterization plan section of the application. Include all controls that will be used on the construction site and identify if the control is to be removed for winter. If the control will

be removed before winter, there is no additional information to provide. If the control will remain over winter, confirm that the product must be installed before the winter or identify an alternate control that can be installed if frozen ground conditions are present. For example, a common control that must be removed during the winter is inlet control devices as they can result in ice formation around catch basins.

7.0 Stockpile Control Plan

Stockpile types can be categorized in three types:

- 1) Trench backfill stockpiles,
- 2) Short term stockpiles, and
- 3) Long term stockpiles

Trench Backfill Stockpiles

It is assumed that all construction sites with an underground component will have trench backfill stockpiles present at different stages during construction. As open trenches pose little concern from an ESC perspective, details on how these will be managed for the short period they are present are not required. The main concern with underground installation is the presence of trench backfill stockpiles.

To manage trench backfill stockpiles, follow the Stockpile Section of the ESC Standard Specifications. To summarize, the stockpiles must be placed on the up-gradient side of trenches whenever possible, may not be placed on paved surfaces without barrier protection and should not be in place for more than a few days.

As these Specifications manage the risks associated with the placement of trench backfill stockpiles, detailed related information automatically forms part of your ESC Plan.

Short Term Stockpiles

Short term stockpiles are those that are in place for a period of less than 30 days. Although under normal circumstances they do not require cover, they must have functional sediment control practices on the down-gradient side of the pile. Some examples of this could include silt fence, fibre rolls and compost socks.

Long Term Stockpiles

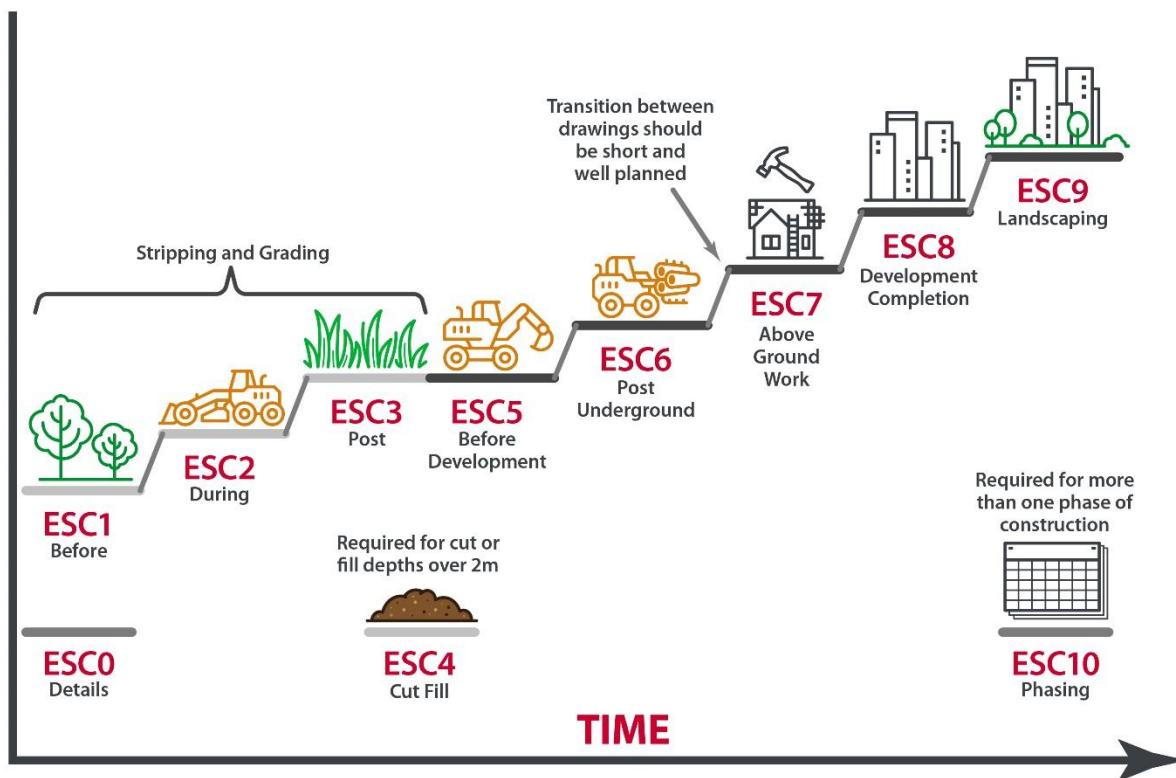
Long term stockpiles are those that are in place for 30 days or more. These stockpiles require functional sediment control practices on the down-gradient side as well as some form of cover such as mulch and tackifier, vegetation or other suitable erosion control measure.

8.0 Construction Drawings

Drawing numbers must align with the drawing codes provided in this section. This numbering system allows for consistent submission practices between applicants and reduces the need for clarifications or resubmissions. Alignment with this numbering is required to avoid delays or resubmissions. The one exception is ESC9, the landscape drawing, when it has been created by a third party and may have a different drawing code.

If there are additional drawings required, for example when there are two separate drawings that represent different time periods during above ground work, number them ESC7a and ESC7b.

Check the boxes on the left in the Check Relevant Drawings section. Use the Development Type Required Drawings below to assist you in determining what drawings are required for your project type.



Below is a table that outlines the drawings that are typically required by project type. Find your project type and ensure that you are submitting the drawings that are always part of your application, and if relevant, drawings that may be part of your application.

Project Type	Always Part of Application	May Be Part of Application
Stripping and Grading	ESC1, ESC3	ESC2, ESC4, ESC10
Subdivision Development	ESC5-ESC7	ESC4, ESC10

Multi-family, Industrial, Commercial, Institutional, Bareland Condo, Park	ESC5-ESC9	ESC1-ESC4, ESC10
Linear Projects (e.g. mains, roads)	ESC5-ESC9	ESC1-ESC4, ESC10

Add details on the estimated duration of the implementation. This is the length of time the site is expected to follow this drawing and should be estimated in months. Make sure that the controls you specify align with the period of time they should be in place.

9.0 Drawing Requirements

When creating your drawings, confirm they comply with the requirements outlined below. These requirements serve the following purposes:

- 1) Ensure that all information is present
- 2) Create consistency between applications
- 3) Decrease review time required with consistent format

Requirements

Drawings represent plateaus of stabilization and show the site at a factual period in time. Each drawing should include details of what is present at that stage, no more, no less. For example, do not show onsite undergrounds storm infrastructure on ESC5 – Before Development, because these would not be present at this phase in time. Below are the requirements that must be included in your ESC drawings.

- a) A1 drawings are **folded** to letter size (approximately 8" X 11") – submissions of rolled drawings are not accepted
- b) Drawings are folded so the Project Information is visible for all drawings (with the exception of the Landscape drawing)
 - Project Information:
 - i. Permit – Seal (CPESC, P.Eng., P.L.Eng or P.Ag)
 - ii. City of Calgary Office Use (space required is 5x8cm)
 - iii. Project Name
 - iv. Owner
 - v. City Project Number (e.g. DA, DP, CD)
 - vi. Drawing Title
 - vii. Scale
 - viii. Date
 - ix. Drawing Code
- c) Drawings are labeled to match ESC Drawing Code's identified in the Construction Drawings section of the Erosion and Sediment Control Plan Application Form
- d) All the dates in the Project Information section must match (with the exception of the landscape drawing)
- e) Drawings must be scaled for readability (generally, a scale of greater than 1:1000 will not be accepted)
- f) Where more than one drawing is required to show a single stage in time, match lines must be shown on the drawings
- g) Font size must be legible
- h) All drawings include a revisions table
- i) Include a north arrow
- j) The construction boundary is delineated (must match the land use application)
- k) Indicate what cover is present on the drawings (e.g. asphalt, exposed soil, gravel, grass, trees)

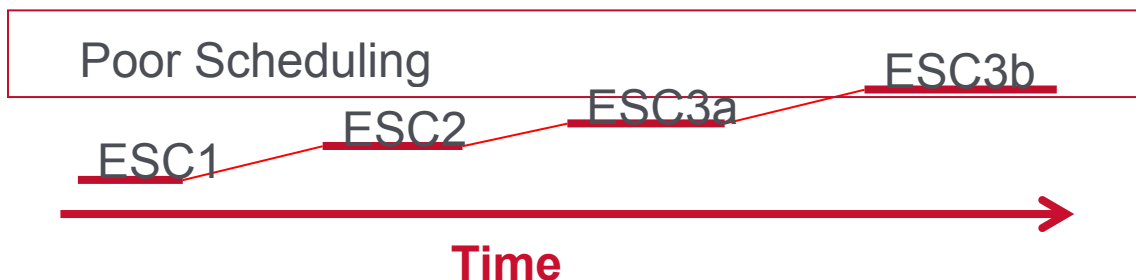
- l) Delineate all vegetated areas. For those that are to be protected/retained, clearly indicate what barriers, controls and practices are being installed
- m) Show the adjacent properties (e.g. rivers, residential, commercial area, environmental/municipal reserves, and roadways)
- n) Include contours at 0.5m
- o) Show the height and location of retaining walls
- p) Using an arrows, indicate the slopes, show length and direction with all slope lengths and LS values marked (25m@6% = LS 0.72); attach a unique LS identifier to each LS value (e.g. LS21)
- q) Indicate the patterns on overland drainage including the run-on and run-off locations and any emergency overland flow routes
- r) Show the drainage divides to define drainage areas and indicate the drainage area sizes in ha. Provide each drainage area a unique drainage area identifier (e.g. Area #1)
- s) Include the location of existing and proposed permanent storm drain inlets, pipes, outlets and other permanent facilities onsite and for the surrounding area that are present at the stage of time the drawing represents
- t) Identify the location of critical areas within or near the development. Critical areas may include, but are not limited to, areas that are environmentally sensitive such as environmental reserves, water bodies and natural areas
- u) Show the location of the footprint where the construction project is being built. Only show this if the building is occurring at the time that the drawing represents (e.g. building footprints would not show up on stripping and grading drawings). Examples of footprints include building footprints, overpasses, storm mains or single family lots
- v) Show the locations, types, dimensions and details for all erosion and sediment controls present at the stage of construction the drawing represents (e.g. for sediment containment systems include the length, width and depth, for storage ditches show the locations of cross check structures, for silt fence show the locations where J-hooks will be installed)
- w) Provide the locations of stockpile staging area, both on and off site. Indicate what type of stockpile is in place and the estimated volume of the pile. If soil is being hauled off site, provide a separate map showing the haul routes
- x) Provide a copy of the phasing plan if the area is to be constructed in phases. Phases represent how different areas on the construction project will be worked on at different phases in time (e.g. Phase 1 will be constructed in 2018, Phase 2 in 2019 and Phase 3 in 2020). This drawing may be created by others and does not need to be A1 in size
- y) Provide a separate cut and fill plan. No cut and fill plan is required if no cuts or fills on the site exceed 2m. If your site does not have cut and fills over 2m, check the box next to Cut and Fill Doesn't Exceed 2 Meters
- z) Provide a separate landscaping plan that includes details on seed, sod, plants and garden areas. Landscaping plans are not required for stripping and grading applications. As many landscape drawings are created by others, they are exempt from having a permit – seal [requirement 9.0(b)(i)]
- aa) Include a legend on the right side of the page for drawings ESC1, ESC2, ESC3 and ESC5, ESC6, ESC7 and ESC8.

Legend Item:	Examples:
Storm Infrastructure	catch basins, grated top manholes, storm pipes, low impact developments, concrete drainage swales, ditches, culverts, trap lows, storm ponds, outfalls
Erosion Controls	blankets, mulch and tackifier, aggregate cover
Sediment Controls	silt fence with J-hook locations, sediment ponds, wattles, sediment ditches with cross check structure location
Cover Types	asphalt, exposed soil, gravel, grass
Drainage Patterns	drainage divides, flow direction arrows, run-on and run-off locations, emergency overland flow route arrows
Stockpiles	topsoil, common stockpiles

10.0 Transition Planning

Construction sites are naturally in a constant state of change making it impossible to have ESC drawings that match each moment of development. The ESC Plan lays out a set of drawings that show plateaus of stabilization.

Transition planning is the transfer from one set of drawings to the next. These transfer periods should be short and well timed. On the Good Scheduling picture below the transfer periods, indicated by the thin red lines, are short in duration and timed to take into account seasonality and weather. On the Poor Scheduling picture below, transfer periods are longer in duration and increase the amount of time that the site would be exposed to erosion.



To prevent poor scheduling and reduce the risk of sediment loss during construction, the ESC Plan should take into account these transition periods. Use the drawing codes from the Construction Drawings section, including sub drawings (e.g. ESC2a, ESC2b), to populate the Transition Planning section. For instance, if you have the following drawings for a multi-family

project with ESC5, ESC6, ESC7a, ESC7b, and ESC8, you would require the following four transition plans:

- a) ESC5 -> ESC6
- b) ESC6 -> ESC7a
- c) ESC7a -> ESC7b
- d) ESC7b -> ESC8

Identify the expected duration of the transition plan. If the plan is expected to exceed 14 days, the extent of foresight available for weather forecasts, an additional drawing is required. For example, if the transition period between above ground work ESC7 and Development Completion ESC8 is expected to exceed 14 days, an additional drawing is required. The update would result in an ESC7a and ESC7b drawing to describe site planning during the previously uncaptured period of time.

Next, determine what erosion and sediment controls are being transitioned. In the following example, silt fence, a gravel pad, surface tracking and sediment ponds are present on ESC5, while on ESC6 a gravel pad, mulch, seed and tackifier, and aggregate cover are present.

The first step is to identify which controls and practices will be kept. In this example, the silt fence, gravel pad, surface tracking, and aggregate cover will remain. Next, the rest of the controls are placed in the order that they will be installed or removed during the construction transfer.

Start Drawing Code	ESC5	Next Drawing Code	ESC6		
Order of Actions for Erosion and Sediment Controls		Action			
		Keep	Remove	Install	
1)	Silt fence, gravel pad, surface tracking, wattles, aggregate cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2)	Sediment ponds, wattles	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3)	Mulch, seed and tackifier	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4)	Silt fence	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Provide any details to help ensure the transition plan may be properly implemented. Also provide a contingency plan if the plan cannot be implemented in the timelines specified.

Start Drawing Code	ESC5	Next Drawing Code	ESC6		
Transition Details					
The mulch, seed and tackifier cannot be installed in below freezing conditions.					

Dewater the sediment ponds prior to their removal and follow the <u>Code of Practice for Drainage Activities</u> . Commence dewatering five days prior to the sediment pond removal to allow areas to dry .
Contingency Plan if transition cannot be conducted in the duration specified
Warm weather contingency plan – install mulch, tackifier X at 3,000kg/ha and seed B at 300kg/ha.
Winter conditions – Sediment ponds and wattles cannot be removed during winter conditions unless arrangements can be made during warm weather to install mulch and tackifier first.

11.0 Erosion and Sediment Controls

The *Specifications* include the installation, inspection, maintenance and removal requirements for standard controls and practices. When using these standard practices simply check the Check if Used box and provide the specific details for the practice or control you chose. This information would include details on drawings the control is used on, where the control is used and any additional information relevant to your plan.

The Drawing When Used and Description Where Used responses will automatically be used to populate the ESC site inspection sheet. This information allows staff on site to know exactly what controls should be on the construction site and where they should be located.

Standard C-values and P-values will auto populate. If you have chosen a control or practice with a variable C or P-value, you will be given instructions on what supporting information to attach to your application. For example, if you are using a mulch/tack product, you will be asked to provide the manufacturer’s information on application rates and the associated C-values.

If a control or practice that you wish to use is not located in the *Specifications* then refer to the *Nonstandard Specifications* section below.

12.0 Nonstandard Specifications

The world of erosion and sediment control is continuously evolving. In support of this evolution, The City encourages innovation and new practices. If you wish to use an alternate control or practice not listed in the *Specifications*, check the Nonstandard Specification box (the last box in Section 10.0 Erosion and Sediment Controls) and indicate the number of nonstandard specifications that will be used on site. The application will then be auto populated with the correct number of Nonstandard Erosion and Sediment Control forms.

Type/Name of Control

Indicate the type and, if applicable, the name of the control. If the manufacturer uses a specific name for the item, include it here.

Detailed Description of Control

Identify what the control is and how it will be used. Be sure to include:

- 1) What the control looks like;
- 2) What the product is made of, including relevant Chemical Abstracts Service (CAS) numbers and toxicity testing; and
- 3) A description of how the product works.

C or P-Value

Indicate the C or P-value that represents the control or practice. To support this value, you will need to attach the manufacturer's testing information. This is particularly important when the C and P-values differ depending on spacing, thickness, size, etc.

Drawing When Used and Description Where Used

Like the information provided on standard specifications, details on Drawing When Used and Description Where Used responses will automatically be used to populate the ESC site inspection sheet. This information allows staff on site to know exactly what controls should be on the construction site and where they should be located.

Additional Information

This section of the application allows an opportunity to provide any relevant additional information that the ESC Plan reviewer and/or staff on site need to be aware of.

Design Requirements

Design requirements outline what performance a control or practice is capable of and what requirements must be followed to operate as designed. **For examples, refer to the Design Requirements sections of the standard specifications in the *Erosion and Sediment Control Guideline*.**

Specification Detail Drawing

The specification detail drawing is the actual descriptive drawing that shows how the product should be installed. **For examples, refer to the drawings provided for the eleven standard specifications in the *Erosion and Sediment Control Guideline*.** If the drawing does not fit in the specification box provided in the application, indicate that supplemental information is attached and provide the documentation.

Installation Method

In this section include details on exactly how the product will be installed. These details typically include timing, depths, sizes, application rates, site preparation and methods. When creating this section, write it as if you are giving instructions to someone who is not familiar with the product and who has only your instructions to follow.

Inspection Requirements

Outline what a person would look for when determining if the control or practice is functioning as it is designed to. Inspection requirements are very dependent on the type of control or practice used. Ask yourself the following three questions when determining what to include in this section for inspection requirements:

- 1) What are you looking for to determine if a control or practice is properly installed?
- 2) What are signs that the control or practice has been damaged, or is no longer functioning? , and
- 3) How do you know when to clean or replace the control or practice?

Maintenance Requirements

Maintenance requirements outline what must be done to keep a control or practice functioning as proposed. While inspection requirements may identify when a control or practice needs service, it is the maintenance requirements that indicate *how* to service it. For example, an inspection requirement for a sediment trap determines if the trap is 1/3 full of sediment, and this triggers maintenance of the trap. The maintenance of the sediment trap would include the removal of sediment to regain capacity along with a description of what to do with the sediment from the cleanup.

Removal Requirements

Some controls and practices are intended to remain in place after completion of the project while others must be removed. For example, a mulch, seed and tackifier would remain in place while a silt fence would be removed. In this section of the form, identify if the control or practice is to be removed and if so, outline how it will be removed.

13.0 Inspection Sheet

The inspection sheet for your project will auto populate from other areas of your application. This is the inspection sheet that is being approved for use on your construction site. This sheet is similar to the one used by The City ESC Inspector and is designed to allow for seamless data tracking on your project.

Below is an example of how information should be tracked on the second page of the inspection sheet. When a City ESC Inspector visits your construction site, they will request to see the inspection sheets. The City ESC Inspector is looking to confirm the inspection sheets are being filled out, that the information reflects what is happening on the construction site and that concerns noted from week to week are being addressed.

Control	Location	Observations (effectiveness of the measure used) Include Deficiencies or Noted Concerns Optional Photo	Maintenance Requirements or Changes Required for the ESC Report and/or Drawings	Performed Actions When and What Repairs/Maintenance were done and by Whom	Performance		
					Concerns	Meets	Exceeds
EXAMPLE Silt Fence	Drainage Area #4, 5 & 8 on ESC5 Drainage Area #5 & 8 on ESC6 & ESC7 Stockpile protection on Drainage Area #2 on ESC5	Silt fence in Drainage Area #5 was damaged by vehicular movement. Silt fence around stockpile has build up of sediment exceeding 50% of the height of the fence. All other areas, silt fence OK.	Repair silt fence in Area #5. Clean silt fence by stockpile. Stockpile has been in place for 28 days and must be covered with mulch.	May 7, 2016 silt fence cleaned out. May 9, 2016 mulch sprayed on stockpile.	✓		

14.0 RUSLE Calculations

The City of Calgary uses the Revised Universal Soil Loss Equation to determine the effectiveness of controls and practices on construction sites. In order to justify that ESC Plans are adequate, The City has adopted a threshold of 2 tonnes/ha/yr for all slopes.

This threshold should not be interpreted to mean that The City is approving a sediment loss of 2 tonnes/ha/yr, but rather acknowledgment that these controls and practices reduce sediment releases. The City deems any slope that is calculated to release 2 tonnes/ha/yr or more of sediment, a slope of concern. All slopes of concern must have either controls, practices or a combination thereof installed to reduce estimated sediment losses to at or below 2 tonnes/ha/yr. If a slope exceeds this limit and you feel there is no risk of offsite releases, you are entitled to provide professional justification for review in the Supplemental Information section at the bottom of your RUSLE calculations.

Use the RUSLE Calculations section of the application to provide data for all drawings where LS values are required. The number of RUSLE tables in your application will be predetermined by which drawings you have checked from Section 8.0 Construction Drawing Requirements (sub drawings e.g. ESC2a, ESC2b, require separate RUSLE tables).

The RUSLE calculations in the application serve two main purposes. First they confirm that each slope meets The City threshold of 2 tonnes/ha/yr and second they provide Project Mass Estimates for the construction site during all stages. A Project Mass Estimate is the total

predicted amount of soil loss that would occur over a one year period 1) when controls and practices are present and 2) when controls and practices are not present.

Project Mass Estimates clearly show which projects are of higher risk based on size, soil type, slope length and steepness. They also demonstrate the positive impacts that your practices and controls can have on soil loss.

To fill out your RUSLE Calculation tables, first identify the Drawing Code that has auto populated at the top of the calculation page. Using information from that drawing, populate the calculation table.

Drainage Area and LS Information

All construction site drawings are broken up into drainage areas, shown by drainage divides (Drawing Requirements section q). If rain were to fall on the construction site, the water in each drainage area would collect together and be separate from the water that had fallen in another drainage area.

The LS values take into account the topography of the site by accounting for the length and steepness of overland flow paths. For more information on how to calculate LS values **refer to the RUSLE-FAC section of the *Erosion and Sediment Control Guidelines***.

When filling out your table, start by entering the lowest numbered Drainage Area Identifier in column 1. Next, enter all the LS Identifiers in column 2 and the respective LS Area Size in column 3. Once you have completely populated the table, the LS Area Sizes should add up to the Overall Site Size.

Next include the Slope and Slope Length in column 4 for the LS Identifier.

1	2	3	4	5	6	7	8	9	10
Drainage Area Identifier	LS Identifier	LS Area Size (in Ha)	Slope and Slope Length (LS)	Description of Controls and Practices	R – Value	K – Value	LS – Value	C – Value(s)	P – Value(s)
Area #1	LS1	0.5	20% @ 50m		320				
1	LS2	0.3	1.3% @ 3m		320				
1	LS3	0.15	2% @ 6m		320				
Area #2	LS4	0.7	6% @ 3m		320				
2	LS5	1.2	4.5% @ 7m		320				

Description of Controls and Practices

Populate the Description of Controls and Practices column 5. Only controls that hold sediment in place along the LS line area or practices that impact the sediment after it becomes displaced along the LS line area should be included in the table. For example, if there is silt fence

upstream of the LS line area, it would not be included as a control since water would not flow in that direction during a storm event.

Controls are objects that cover the soil and prevent erosion. They are represented in RUSLE by a C-value. Examples of controls include blankets, mulch and vegetation. Practices, on the other hand, are methods that collect/contain sediment or filter sediment laden water. They are represented in RUSLE by a P-value. Examples of practices include silt fence, wattles and vegetative buffers.

Some P-values and C-values for standard controls are located in the *Specifications*, but often these values are product specific and must be obtained from the supplier. When you populate the Description of Controls and Practices also populate the C-value, column 9 and P-value column 10. For sediment containment systems, P-values can be obtained from Section 15.0 of the ESC Application - Sediment Containment Systems Data.

1	2	3	4	5	6	7	8	9	10
Drainage Area Identifier	LS Identifier	LS Area Size (in Ha)	Slope and Slope Length (LS)	Description of Controls and Practices	R – Value	K – Value	LS – Value	C – Value(s)	P – Value(s)
Area #1	LS1	0.5	20% @ 50m	mulch, tackifier, seed	320			0.1	1
1	LS2	0.3	1.3% @ 3m	sediment pond , tracking	320			1	0.3, 0.9
1	LS3	0.15	2% @ 6m	mulch, tackifier, seed	320			0.01	1
Area #2	LS4	0.7	6% @ 3m	mulch, tackifier, seed	320			0.01	1
2	LS5	1.2	4.5% @ 7m	mulch, tackifier, seed	320			0.01	1

R-Value

The R-value in column 6 represents the erosivity index as it relates to precipitation. Locally, The City of Calgary accepts an R-value of 320.

K-Value

The K-value represents how susceptible soil is to erosion. Populate the K-value(s) in column 7 that have been supported with information submitted under 5.3 Geotechnical Information and Nomograph. If the K-value for the construction site is not know, you may use 0.079 (a higher, conservative value for Calgary).

1	2	3	4	5	6	7	8	9	10
Drainage Area Identifier	LS Identifier	LS Area Size (in Ha)	Slope and Slope Length (LS)	Description of Controls and Practices	R – Value	K – Value	LS – Value	C – Value(s)	P – Value(s)
Area #1	LS1	0.5	20% @ 50m	mulch, tackifier, seed	320	0.042		0.1	1
1	LS2	0.3	1.3% @ 3m	sediment pond , tracking	320	0.042		1	0.3, 0.9
1	LS3	0.15	2% @ 6m	mulch, tackifier, seed	320	0.042		0.01	1
Area #2	LS4	0.7	6% @ 3m	mulch, tackifier, seed	320	0.042		0.01	1
2	LS5	1.2	4.5% @ 7m	mulch, tackifier, seed	320	0.042		0.01	1

When using an aggregate K-value adjustment, as outlined in Specification 200.7.6, insert the adjusted K-value in column 7 and provide an explanation on the adjustment in the Supplemental Information section.

LS-Value

The LS value that correlates with the slope and slope length is dependent on the site. Most LS values used in ESC Plans are represented by topographic factors when there is a high level of erosion or where little or no cover is present. The table that represents this phase of construction can be found in the **RUSLE-FAC section of the *Erosion and Sediment Control Guidelines***.

Populate the LS-value portion of the table, column 8, with the correct values that correlate to all LS Identifiers.

1	2	3	4	5	6	7	8	9	10
Drainage Area Identifier	LS Identifier	LS Area Size (in Ha)	Slope and Slope Length (LS)	Description of Controls and Practices	R – Value	K – Value	LS – Value	C – Value(s)	P – Value(s)
Area #1	LS1	0.5	20% @ 50m	mulch, tackifier, seed mulch/seed and tackifier	320	0.042	5.2	0.1	1
1	LS2	0.3	1.3% @ 3m	sediment pond , tracking	320	0.042	0.1	1	0.3, 0.9

1	LS3	0.15	2%@6m	mulch, tackifier, seed	320	0.042	0.15	0.01	1
Area #2	LS4	0.7	6%@3m	mulch, tackifier, seed	320	0.042	0.26	0.01	1
2	LS5	1.2	4.5%@7m	mulch, tackifier, seed	320	0.042	0.27	0.01	1

A-Value

The A-value represents the annual soil loss due to erosion in tonnes/ha/yr. The table will auto populate column 11. All values in column 11 must be at or below 2 tonnes/ha/yr. If you feel that it is acceptable for one or more of the flow paths on the construction site to exceed this value, include details on this in the Supplemental Information section.

Site Erosion Potential

The Site Erosion Potential is represented by two different numbers. The first number, column 12, shows the erosion potential of the site when controls and practices are installed, while column 13 demonstrates the soil loss from the site when no controls or practices are in place.

The total potential soil loss of a site when no controls or practices are installed is a good indicator of the level of risk a site represents. For example, a site that has a soil loss of 4 tonnes/yr poses a significantly lower environmental and infrastructure risk than a site that is estimated to lose 500 tonnes/yr.

15.0 Sediment Containment Systems Data

This section of your application will only appear if you have checked the Sediment Containment System box in Section 11.0 Erosion & Sediment Controls. Sediment containment systems are a popular method for sediment control as they are easy to install with equipment already present on the construction site. These practices are efficiency rated for the Calgary area based on historical local rainfall data.

When filling out the Sediment Containment System Data, column A allows you to indicate what Drawing the practice is located on. Next, provide a Location reference in column B. An easy way to do this is to label the drainage divides and then reference the drainage divide identifier. Since a single drainage divide may have multiple sediment containment systems, each system should also have a unique Sediment Containment Systems Identifier that can be noted in column C.

Next, identify the Volume in Cubic Metres of the containment system in column D. On the drawings, be sure to show the length, width and depth of the sediment containment systems so it is easier for staff on site to ensure they are properly installed.

Lastly, supply the Area Served in Hectares in column E. The more water a sediment containment system can accommodate per hectare, the lower the P-value associated with it.

A	B	C	D	E	F	G
Drawing	Location (referenced on Drawings)	Sediment Containment System Identifier	Volume in Cubic Metres	Area Served in Hectares	Design Volume	P – Value
ESC5	Drainage Area #4	Sediment Pond B	500 cubic metres	1.5 ha	333	0.5

Both column F and G will auto populate for you. Column F calculates the Design Volume, which is the volume of the sediment containment system divided by the number of hectares that it serves. Column G calculates the P-value that is associated with the sediment containment system. This value can be copied into the relevant location of your RUSLE Calculations.

16.0 ESC Certification

Provide confirmation that the application complies with the Specifications and that it was created by a Qualified Individual (CPESC, P.Eng., P.L.Eng. or P.A.g.).

Include the Permit to Practice Stamp or Number and Professional Stamp.

When your ESC Plan is approved, The City ESC Inspector will stamp the ESC Application and all the associated drawings.