

Appendix B – Summary of Submission Requirements

1.0 Subwatershed and Landscape Scale Analysis Requirements

This Appendix provides general requirements and objectives for CVC approval for subwatershed through to site plan. Please contact CVC for development specific requirements.

1.1 Objectives of the Subwatershed Planning Process

The objectives of the Subwatershed Planning process include:

- a) To integrate the information and analysis from CVC and municipal Monitoring Program(s), existing subwatershed studies, Landscape Scale Analysis and any other relevant environmental study within the subwatershed boundary (for example any EIRs)
- b) To develop specific subwatershed targets consistent with the CRWMSU to:
 - Identify key linkage points for conservation given the connected links identified in the Landscape Scale Analysis;
 - Establish the appropriate natural cover targets and distribution for the achievement of sustainable ecosystem maintenance (e.g. biodiversity conservation);
 - Develop a management strategy to address surface and groundwater quantity (including volume) and quality; and
 - Establish land use designations, form and best management practices;
- c) To provide delineation, on a reconnaissance scale, of:
 - Recharge areas for regional and local groundwater systems;
 - The groundwater resource potential for the area;
 - Generalized groundwater flow patterns; and
 - Water balance/budgets for each subwatershed and/or subcatchment;
- d) To integrate information from Municipal, Regional or County planning studies and provide direction to help inform these planning documents;
- e) To establish direction for future studies such as Environmental Implementation Reports (EIRs) and storm water management plans (SWM plans)
- f) To develop an implementation plan that includes specific implementation schemes (i.e., define areas for protection, conservation, restoration and remediation) and outlines roles and responsibilities to carry out all recommendations that result from this study.
- g) To provide a monitoring plan that includes:
 - A long-term plan of action and a description of the information required for assessing results of the ongoing CVC and municipal Monitoring Programs;
- h) To establish recommendations for stewardship of sensitive areas;
- i) To develop a Recommended Plan that includes recommendations for:
 - Planning and Policy;

- Rehabilitation and Retrofit;
- Stewardship;
- Monitoring; and
- Research and Development.

1.1.2 Landscape Scale Analysis

The landscape scale analysis will:

- identify natural features and habitat blocks that lie within the defined LSA study area;
- identify riparian and terrestrial linkages between natural features and habitat blocks;
- identify existing barriers (bridges, roads, railways) that affect the viability of corridors; and
- incorporate the multi-disciplinary information gathered from the subwatershed studies to refine corridor design attributes and habitat block protection, restoration or improvement requirements.

The Landscape Scale Analysis and Subwatershed Study are intended to be interactive and iterative. The data collected in the Subwatershed Study is fed back into the Landscape Scale Analysis to be refined through various land use scenarios in Phase 2 and 3 of the Subwatershed Study.

The LSA Report should summarise the detailed methodology and protocols used and should include Existing Features Maps (ELC), Policy areas, Analysis Maps, System LSA Maps and Finalized Natural Features and Functions. It should integrate the terrestrial and aquatic ecosystems within the LSA Study Area. More specifically, it should assemble information layers to be incorporated in the analysis. This includes the following features and information:

- All existing natural vegetation features to ELC Community Series (Lee et al., 1998), as appropriate (based on remote sensing and roadside verification):
 - o Woodlands;
 - o Wetlands and ponds and lakes (including extracted, rehabilitated pits and quarries);
 - o Meadows and prairie (natural and cultural);
 - o Treed areas, hedgerows, orchards, plantations, parks, cliffs crevices, bluffs or any other relevant features collected through subwatershed studies;
 - o Floodplain, riparian and valley floor communities; and
 - o Physiography (soils, geology, elevation, wetness index);
- Significant Species:
 - o Occurrence records of federal (COSEWIC, 2005) and provincial (OMNR, 2004) “Species At Risk” and provincial, regional or local species of conservation concern (OMNR, 2000 and COSSARO) such as CVC bird species of Conservation Concern, etc.;
- Significant Wildlife Habitat:
 - o Potential Significant Wildlife Habitat Units that are ecologically important in terms of features, functions, representation or amount of habitat, and which contribute to the quality and diversity of an identifiable geographic area or ecosystem;

- Policy and zoned areas:
 - o Policy areas (including wetlands, ESAs/ANSIs and Greenlands);
 - o Public and Private open space (e.g., schools, golf courses, etc.);
 - o Cultural or natural features (e.g., roads, dams, bridges, rail lines, hydro and gas corridors, stormwater management ponds and other infrastructure);
 - o Agricultural lands (intensive and non-intensive);
 - o Urban lands (development barriers for wildlife); and
 - o Licensed Aggregate properties;

- Water resources information:
 - o Infiltration (recharge and discharge);
 - o Floodplain, meander belts, defined crest of slope (valley lands);
 - o Stream classification, both watercourses and drainage features;
 - o Water quality (including benthics);
 - o Geomorphology; and
 - o Classified fish habitat contributing areas and erosion sites.

Using the information gathered above, the LSA will also:

- Provide an assessment of the current habitat composition and configuration on the landscape in its entirety (including natural features, agricultural and existing urban/rural development);

- Identify potential future habitat conditions, impacts and mitigative measures to minimize impacts on ecosystem function given potential future development scenarios within the subwatershed area; and

- Conduct a Corridor Analysis at the Landscape Scale study area that assesses barriers and potential corridors for movement of species across the landscape connecting the subwatershed to other natural heritage areas.

2.0: Environmental Implementation Report (EIR)

The following table provides a general list of requirements for EIR approval. Please consult CVC for specific requirements for your development.

Table 2.1 Submission Requirements Environmental Implementation Report

Number	Required Components
1	Referenced Drainage Studies: <ul style="list-style-type: none"> • Approved watershed, subwatershed and/or master drainage studies
2	Background Component: <ul style="list-style-type: none"> • Define applicable planning policies – provincial, municipal, agency • Define requirements for compliance with subwatershed study • Study area boundaries • Define supporting reports to be integrated through Environmental Implementation Report (EIR)
3	Environmental Impact Study: <ul style="list-style-type: none"> • Vegetation (ELC) and wetland (OWES) evaluations, as appropriate; wildlife and fisheries studies • Evaluation, classification and management of headwater drainage features • Identification of downstream problems
4	Existing Ecological Functions: <ul style="list-style-type: none"> • Linkages • Vegetation Communities • Wetlands • Flora and fauna inventories (including fisheries) • Constraints and opportunities map
5	Constraints Analysis (Limits of Development): <ul style="list-style-type: none"> • Geotechnical • Slope stability analysis • Erosion hazard analysis • Soils analysis • Fluvial Geomorphology • Watercourse characterization • Erosion thresholds • Meander belt/erosion hazards • Drainage density • Post-development floodplain analysis • Ecological • Significant valleylands and woodlands • Fish habitat • Species at Risk/Conservation Concern, Significant Wildlife, interior habitat, etc. • Preliminary grading analysis
6	Stormwater Management: <ul style="list-style-type: none"> • Hydrologic analysis • Hydraulics analysis • Fluvial geomorphology recommendations • Best Management Practices/Stormwater Management recommendations

	<ul style="list-style-type: none"> • Outfall Locations • Preliminary grading plans/facility design elements • Pre and Post Drainage boundaries • Low impact development techniques
7	<p>Hydrogeology:</p> <p><i>Setting</i></p> <ul style="list-style-type: none"> • Description of the physiographic, geologic, and hydrogeologic conditions • Identification of major groundwater resources and groundwater users in the area <p><i>Site Characterization</i></p> <ul style="list-style-type: none"> • Description of site topography, geology, and hydrogeology • Description of groundwater levels, groundwater flow direction and gradients • Characterization of groundwater quality where potential exists for development to alter conditions (e.g., individual septic systems) • Characterization of groundwater recharge across the site with consideration of topography, land use, soils, etc. • Characterization of groundwater discharge through collection of field data <p><i>Impact of Ground Water Takings</i></p> <ul style="list-style-type: none"> • If the site development is likely to include new or increased water takings then the potential impacts of the water takings must be thoroughly analyzed through the characterization of the site and additional field work (e.g., pumping test) as necessary, with particular emphasis on characterizing long term impacts to sensitive features (e.g., aquatic habitat) <p><i>Preliminary Water Balance</i></p> <ul style="list-style-type: none"> • The preliminary water balance should calculate pre-development recharge at the site (e.g., MOE 1995 method) and also calculate a preliminary post-development water balance, including identification of potential methods for maintaining pre-development recharge rates (e.g. infiltration facilities). • Recommendations regarding Future site development to ensure groundwater functions and linkages will be maintained. Additional monitoring, including monitoring to evaluate the impacts of development (e.g., impacts of water takings or servicing).
8	<p>Surface Water Quality:</p> <ul style="list-style-type: none"> • Background characterization of surface water and sediment chemistry • Detailed monitoring program designed to illustrate storm water management facilities will meet water quality criteria
9	<p>Impact Analysis of Development Proposal:</p> <ul style="list-style-type: none"> • Proposed elimination/impacts to ecological features drainage feature realignments • Natural community vegetation loss/encroachment • Changes to hydrology/hydrogeology affecting fish and wildlife habitat, and vegetation • Loss/impact to corridors/linkages • Loss of cultural features including hedgerows, orchards, etc. • Buffer and/or setback delineation • Mitigation and/or compensation for issues • Restoration, remediation and/or enhancement measures

10	Natural Channel Design: <ul style="list-style-type: none"> • Location • Preliminary hydraulics analysis • Design concepts (fish, wetland, corridor, etc.) • Preliminary corridor sizing (bottom width, side slopes, depths) • Fish Habitat Impacts
11	Water Quality: <ul style="list-style-type: none"> • Background Assessment • Groundwater characterization (groundwater flow system; recharge/discharge assessment; identification of groundwater receptors, etc.) • Preliminary Water Balance analysis • Infiltration studies to identify recharge potential for nitrate mass balance calculation • Existing Nutrient Loading • Septic Loading Impact Analysis • Mass Balance of Nitrate Loadings • Monitoring and Mitigation Measures
12	Impact of Development on Surface Water Quality: <ul style="list-style-type: none"> • Background characterization of surface water and sediment chemistry • Detailed monitoring program designed to illustrate storm water management facilities will meet water quality criteria • Impact of Ground Water Takings • Impact on Development on Water Balance • Stormwater infiltration must be accommodated on site to ensure adequate infiltration for septic dilution
13	Monitoring: <ul style="list-style-type: none"> • Terrestrial and aquatic issues • Fish and wildlife habitat • Geotechnical/fluvial geomorphic issues • Hydrogeotechnical issues • Stormwater Management/water quality • Sediment and erosion management
14	Summary and Conclusions
15	Future study requirements
16	List As-Built plans to be submitted

3.0 *Functional Servicing Report (FSR)*

The following is a general list of requirements for FSR approval. Please consult CVC staff for specific requirements.

Table 3.1: Submission Requirements Functional Servicing Report

Number	Required Components
1	<p>Referenced Drainage Studies:</p> <ul style="list-style-type: none"> • Approved watershed, subwatershed, master drainage studies and Environmental Implementation Report as appropriate
2	<p>Requirements:</p> <ul style="list-style-type: none"> • Water Quality Analysis – Background review of existing water quality data to determine background conditions in receiving water courses – if no data this will trigger the need for background monitoring. Outline water quality guidelines and criteria that must be met. • Water Quantity • Downstream Erosion Control/Monitoring • Meander Belt • Slope Stability • Pre and post-development drainage boundaries • Identified limits of development
3	<p>Site Hydrology and Hydraulics (Pre and Post-Development):</p> <ul style="list-style-type: none"> • Assumptions and site parameters • Sub-basins within, or flowing through, the site • Land use, acreage, hydrologic soil group and land use to be modeled for each sub-basin • Output summary (hydrologic/hydraulic Analysis) • Detailed hydraulic analysis and hydrologic calculations (Appendix) • Topographic map showing the following for predevelopment and post development conditions: <ul style="list-style-type: none"> ○ Sub-basin boundaries ○ Off-site contributing areas ○ Development Area ○ Preliminary major and minor drainage patterns ○ Land use ○ Natural streams and drainage features ○ Points of discharge from the site ○ Existing on and off-site drainage facilities, including overland swales ○ Pre and post-development floodlines ○ Constraints mapping ○ Preliminary grading plans
4	<p>Hydrogeology:</p> <ul style="list-style-type: none"> • Detailed water balance • Including identification of any infiltration methods and locations • Preliminary stormwater management pond design is appropriate for existing groundwater conditions (e.g., depth to water table; disruption of shallow groundwater flow to areas of groundwater discharge, etc.)

5	Stormwater Management Design: <ul style="list-style-type: none"> • Proposed methods • Alternate methods • Justification for choice of proposed methods • Preliminary calculations • Preliminary design plans
6	Channel Design or Alteration (if required): <ul style="list-style-type: none"> • Location • Justification for crossing • Preliminary Sizing calculations (flow, velocity, etc.) • Preliminary design plans (plan/profile) • Fluvial geomorphology components (corridor width and slope to ensure stability)
7	Erosion and Sediment Control Plans <ul style="list-style-type: none"> • Details • Location plan • Calculations • Outfall locations • Monitoring plan • Contingency plans • Construction sequencing
8	Channel Crossing Plans (if required) <ul style="list-style-type: none"> • Requirements • Meander belt analysis/review • Hydrologic and hydraulic calculations • Preliminary drawings (plan, profile, x-sections) • Fish habitat impacts
9	Summary and Conclusions
10	Future Study Requirements
Note: All reports and engineering plans MUST be signed and stamped by a professional engineer or a qualified professional.	

4.0 Stormwater Management Design and Implementation Report

The following is a general list of requirements for SWM Design and Implemented Report approval. Please contact CVC for specific requirements.

Table 4.1: Submission Requirements SWM Design and Implementation Report

Number	Required Components
1	<p>Referenced Drainage Studies:</p> <ul style="list-style-type: none"> • Watershed, subwatershed or master drainage studies • Approved Environmental Implementation Report and Functional Servicing Report • Approved Stormwater management reports for same site and near by developments (for peak flow analysis) • Approved detailed stormwater management reports for same site
2	<p>Site Hydrology and Hydraulics (Pre and Post Development):</p> <ul style="list-style-type: none"> • Assumptions and site parameters • Sub-basins within, or flowing through, the site • Land use, acreage, hydrologic soil group and land use to be modeled for each sub-basin • Output summary (hydrologic/hydraulic Analysis) • Detailed hydraulic analysis and hydrologic calculations (Appendix) • Topographic map showing the following for predevelopment and post development conditions: <ul style="list-style-type: none"> o Sub-basin boundaries o Off-site contributing areas o Development Area o Preliminary major and minor drainage patterns o Land use o Natural streams and drainage features o Points of discharge from the site o Existing on and off-site drainage facilities, including overland swales o Pre and post-development floodlines o Constraints mapping o Preliminary grading plans
3	<p>Stormwater Management Design:</p> <ul style="list-style-type: none"> • Proposed methods • Alternate methods • Justification for choice of proposed methods • Detailed calculations • Calculations/Detailed Description of methods to meet Water Quality Criteria • Topsoil requirements • Detailed design plans • Operations and Maintenance plan/report

	<ul style="list-style-type: none"> • Permanent water level • Monitoring Program to assist in future design, maintenance or retrofits
4	Hydrogeologic: <ul style="list-style-type: none"> • Final design of any infiltration facilities required to maintain pre-development water balance • Confirmation that SWM and infiltration facilities are designed appropriately for hydrogeologic conditions (e.g. soil types and depth to water table)
5	Channel Design or Alteration: <ul style="list-style-type: none"> • Location • Sizing calculations (flow, velocity, etc.) • Vertical and lateral erosion rates • Detailed design plans (plan/profile) • Fluvial geomorphology components (low flow/bankfull/floodplain width, inverts and slopes, tractive force/erosion analysis, etc.)
6	Erosion and Sediment Control Plans <ul style="list-style-type: none"> • Details • Location plan • Calculations • Outfall locations • Monitoring plan • Contingency plans • Construction sequencing
7	Revegetation/Landscape Plans <ul style="list-style-type: none"> • Requirements – refer to Credit Valley Conservation Stormwater Management Facility Planting Guidelines • Locations • Species list • Quantity calculations
8	Channel Crossing Plans (if required) <ul style="list-style-type: none"> • Requirements • Justification • Geomorphic Analysis of channel setting, meander/amplitudes, alignment, slopes, etc. • Hydrologic and hydraulic calculations • Detail drawings (plan, profile, x-sections) • Fisheries timing window • Sufficient allowance for services and utilities crossing without resulting in negative disturbances or impacts to the watercourse
9	Monitoring Plan – generally to address municipal issues
10	Summary and Conclusions
<p>Note: All reports and engineering plans MUST be signed and stamped by a professional engineer or a qualified professional</p>	

5.0 *Site Plan Requirements*

The following is a general list of requirements for Site Plan approval. Please contact CVC for specific requirements.

Table 5.1: Submission Requirements for Site Plan Proposals

Number	Required Components
1	<p>Referenced Drainage Studies:</p> <ul style="list-style-type: none"> • Watershed, subwatershed or master drainage studies • Approved Environmental Implementation Report and Functional Servicing Report • Approved Stormwater management reports for same site and near by developments (for peak flow analysis) • Approved detailed stormwater management reports for same site
2	<p>Site Hydrology and Hydraulics (Pre and Post-Development) (if required):</p> <ul style="list-style-type: none"> • Assumptions and site parameters • Land use, acreage, hydrologic soil group and land use • Output summary (hydrologic/hydraulic Analysis) • Detailed hydraulic analysis and hydrologic calculations (Appendix) • Topographic map showing the following for predevelopment and post development conditions: <ul style="list-style-type: none"> o Off-site contributing areas o Development Area o Preliminary major and minor drainage patterns o Land use o Natural streams and drainage features o Points of discharge from the site o Existing on and off-site drainage facilities, including overland swales o Pre and post-development floodlines o Constraints mapping o Preliminary grading plans o Storm sewer calculations, including indication of hydraulic grade line
3	<p>Stormwater Management Design:</p> <ul style="list-style-type: none"> • Proposed methods • Justification for choice of proposed methods • Detailed calculations • Calculations/Detailed Description of methods to meet Water Quality Criteria • Topsoil requirements • Detailed design plans • Operations and Maintenance plan/report (if required) • Monitoring Program to assist in future design, maintenance or retrofits
4	<p>Hydrogeologic:</p> <ul style="list-style-type: none"> • Final design of any infiltration facilities required to maintain pre-development water balance • Confirmation that SWM and infiltration facilities are designed appropriately for hydrogeologic conditions (e.g. soil types and depth to water table)

	<ul style="list-style-type: none"> •
5	Channel Design or Alteration: <ul style="list-style-type: none"> • Location • Sizing calculations (flow, velocity, etc.) • Vertical and lateral erosion rates • Detailed design plans (plan/profile) • Fluvial geomorphology components (low flow/bankfull/floodplain width, inverts and slopes, tractive force/erosion analysis, etc.)
6	Erosion and Sediment Control Plans <ul style="list-style-type: none"> • Details • Location plan • Calculations • Outfall locations • Monitoring plan • Contingency plans • Construction sequencing
7	Revegetation/Landscape Plans <ul style="list-style-type: none"> • Requirements – refer to Credit Valley Conservation Stormwater Management Facility Planting Guidelines • Locations • Species list • Quantity calculations
8	Channel Crossing Plans (if required) <ul style="list-style-type: none"> • Requirements • Justification • Geomorphic Analysis of channel setting, meander/amplitudes, alignment, slopes, etc. • Hydrologic and hydraulic calculations • Detail drawings (plan, profile, x-sections) • Fisheries timing window • Sufficient allowance for services and utilities crossing without resulting in negative disturbances or impacts to the watercourse
9	Monitoring Plan – generally to address municipal issues
10	Summary and Conclusions
<p>Note: All reports and engineering plans MUST be signed and stamped by a professional engineer or a qualified professional</p>	