X7 HAMLET OF GLEN WILLIAMS TERMS OF REFERENCE FOR ENVIRONMENTAL IMPLEMENTATION REPORTS

An Environmental Implementation Report (EIR) must be prepared according to the policies of the Glen Williams Secondary Plan, on a tributary basis. The complexity of the EIR will be dependent on the environmental sensitivity of the subject tributary and adjacent watercourses. It is suggested that the proponent consult with the Town of Halton Hills, Credit Valley Conservation (CVC) and the Region of Halton prior to beginning to prepare the EIR. The EIR can be prepared concurrently with any other studies that are required.

X7.1 PURPOSE

The purpose of the EIR is to:

- ensure the goals and objectives set out in the Scoped Subwatershed Plan for Glen Williams are met when land use changes are planned;
- develop an appropriate plan that will achieve the targets that have been set for individual environmental resources;
- streamline the review and approval processes; and,
- collect and provide sufficient detailed data so that the proposed implementation reports and stormwater management reports can be developed.

X7.2 PROCESS

The EIR consists of fourteen steps divided into three parts:

- Part A – Background Review;
- Part B – Detailed Studies/Impact Assessment; and,
- Part C – Implementation.

The EIR process is summarized on Table X7 and the steps in each of the three parts are detailed below.

Table X7: Environmental Implementation Report Process

Part	Description	Output	Step
X7.3	Background Review • Brief description of the proposed land use change • Describe and implement monitoring to collect	Background Report that includes: • General site map • Development schedule • Literature cited	1-5

Part	Description	Output	Step
	baseline conditions • Field work carried out to better define the environmental resources	• List of background data consulted • Constraint map that includes all environmental and water-related features, in and adjacent to the proposed area of land use change • List of detailed studies needed for Part B	
X7.4	Detailed Studies and Impact Assessment • Describe the purpose of the land use change • Describe the activities associated with the land use change • Describe possible alternatives to the proposal • If insufficient information exists to adequately assess the impact of the proposal, then detailed studies need to be completed • The hydrogeology study requirements are more detailed for extraction developments that plan to go below the water table • An impact assessment will be included in this phase – a statement that describes the	Impact Assessment Report that includes: • Detailed location map • Site plan • Surface water and groundwater resources study • Geomorphology study • Aquatic resources and water quality study • Terrestrial resources study • Hydrogeology study to assess areas of potentially higher recharge • Hydrogeology impact associated with aggregate extraction • Summary of alternative scenarios, the associated impacts, and a list of mitigative	6-9

Part	Description	Output	Step
	potential impacts that the land use change will have on environmental resources • Show how the proposed land use change has considered the environmental resources in planning/design proposal • Set environmental targets	measures • Revised constraint mapping • Forecasted changes in all environmental resources • Note: Acceptable mitigation must conform to the goals and objectives, and must meet targets.	
X7.5	Implementation • Will include a long-term monitoring plan to determine if and where change is occurring • Includes a recommended plan that shows how goals and objectives are achieved • Includes recommendations for implementation	Implementation Report that includes: • Stormwater Management Plan • Long-term monitoring plan • Conclusions • Recommendations • Mitigating measures • Executive Summary of Parts A, B and C • Note: Monitoring plan must be designed to evaluate if the targets set are being met.	5-6, 10-13

X7.3 PART A - BACKGROUND INFORMATION

X7.3.1 Step 1 Introduction to Proposed Land Use Changes

The purpose of this component is to focus on the tributary of concern and translate pertinent known information to establish initial constraints and baseline conditions. The end product is to be able to identify the needed detailed studies to be done in Part B.

This section should include:

- A brief description of the proposed land use change.
- A general map of the area.

X7.3.2 Step 2 Baseline Monitoring

Monitoring is completed to check the impact that the proposed land use change has on the environment. The purpose of the baseline monitoring is to establish the baseline conditions and existing environmental trends to which future monitoring results will be compared.

Information should be collected on (but not limited to):

- water quality;
- fisheries;
- hydrology;
- groundwater quality and quantity;
- stream morphology; and,
- terrestrial resources – woodlots, wetlands, wildlife habitat, Environmentally Sensitive Areas, Areas of Natural and Scientific Interest.

When preparing a baseline monitoring plan, it is important to ensure that many different disciplines are being monitored at the same site when possible and appropriate. For example, fisheries and water quality monitoring should take place at the same site.

An explanation of how indicator parameters were established, for example, what criteria were used when deciding what to monitor, will be included in this section.

It is essential that baseline monitoring be included in the project work plan, and that associated costs are included in the project budget.

X7.3.3 Step 3 Background Information

Include literature cited, all background data, a listing of information sources contacted during the study, and a listing of the professionals on the study team.

X7.3.4 Step 4 Existing Conditions and Initial Constraint Mapping

Fieldwork should be carried out to better define the existing functions, linkages and limits of the natural environmental resources. Detailed constraint mapping at the tributary scale will be prepared that highlights the environmental resources detailed in the appropriate Tributary Fact Sheet in the Scoped Subwatershed Plan for Glen Williams, as well as agency and municipal setback requirements (i.e. the Environmental Protection Strategy, the Fisheries Act, valleyland setbacks). This part of the submission will show how the proposed land use change has been designed in conformity with the initial constraint mapping and will show how the EIR conforms to the general concepts of the Scoped Subwatershed Plan for Glen Williams. The mapping specifications are outlined under Item 14.

The mapping may include, but is not limited to:

- all hydrologic features including watercourses, swales, ponds, depression areas, springs, seepage areas and existing stormwater management facilities;
- Regulatory Floodplain as per the CVC Flood Plain Management Policies;
- present day land use;
- wetlands, woodlots and other terrestrial and riparian communities;
- terrestrial corridors (existing and potential);
- water quality;
- aquatic communities and habitat, and appropriate setbacks;
- fill lines, valley slopes, top of bank, ecological considerations and geotechnical hazard areas as per the CVC Watercourse and Valleyland Protection Policies;
- groundwater recharge and discharge areas, and the linkages between them;
- groundwatersheds (extending outside the study area – if applicable);
- stream morphology, channel sensitivity, and setbacks required to allow natural channel functions (migration, meander belt width, flooding); and,
- limit of extractable resource, and grade and type of extractable resource.

X7.3.5 Step 5 Report

Once the requirements of Steps 1 to 4 have been met, a Background Report will be prepared and submitted for review and approval prior to proceeding to the following steps.

X7.4 PART B - DETAILED STUDIES AND IMPACT ASSESSMENT

X7.4.1 Step 6 Detailed Studies

If found through completing Part A that insufficient information exists to complete the constraint mapping or develop protection, restoration and enhancement plans for the subject area, then detailed studies must be prepared. The need for, and scope of, the detailed studies should be

confirmed with the Town of Halton Hills, the CVC, and the Region of Halton at the conclusion of Part A. Detailed studies may include, but are not limited to:

- surface water and groundwater resources study;
- aquatic resources and water quality study;
- geomorphology study;
- terrestrial resources study;
- hydrogeological analyses, including field investigations, to assess identified areas of potentially higher recharge; and,
- hydrogeological impact associated with aggregate extraction.

X7.4.1.1 Surface Water and Groundwater Resources Study

Note: The groundwater detailed study is more extensive if the proposed land use change is an aggregate resource area – additional study components are required. If this is the case see the section on Hydrogeological Impacts Associated with Aggregate Extraction.

The constraint mapping will have identified hydrologic features within the study area, however, the overall hydrologic system must be described. The components of the system to be addressed by the detailed studies include:

a) identification of flow characteristics in on-site watercourses and swales, and a general description of the water balance on the site;

b) characterization of all hydrologic features (watercourse, swales, natural areas providing flood storage/attenuation, depression storage areas, recharge areas, seepage areas and springs);

c) determination of the volume and distribution patterns of the major discharge areas and a representative location used for monitoring; and,

d) description of the relationship and dependencies between these features and the surrounding terrestrial, wetland and aquatic resources.

The above analyses should be carried out using technical methods and procedures that are in conformity with the protocols and requirements of the Town of Halton Hills, the CVC, and the Region of Halton. These agencies should be consulted prior to initiating the studies to confirm computer modelling techniques and watershed parameters to be employed (e.g. rainfall distribution, recession constants, curve numbers, etc.) as well as the scope and format of the supporting documentation.

X7.4.1.2 Aquatic Resources and Water Quality Study

The constraint mapping will have identified fish habitat and water quality classification for the tributaries. The detailed study is to provide the following information in support of the habitat classifications and planned land use change conditions:

a) The direct and indirect physical impacts on water bodies and water quality from the activity;

b) The fish species present, and the direct and indirect biological impacts of the physical impacts in (a); and,

c) An assessment of whether the impacted habitat represents a limiting factor for the proposed land use change.

X7.4.1.3 Stream Morphology Study

The study will describe the physical form of the watercourse. The following information will be included:

a) Characterization of geomorphic features including sensitive reaches, areas of erosion and aggravation, meander belt width, and channel migration; and,

b) Description of the relationship between the geomorphologic and hydrologic characteristics of the system.

X7.4.1.4 Terrestrial Resources Study

The study will describe the physical form and function of the ecological features of the area, any functional relationships to adjacent areas, define what additional issues must be examined (e.g. buffers) and demonstrate how the proposed land use change will maintain or compensate for the areas existing ecological and hydrological functions. Reference to Section 5 of the Natural Heritage Reference Manual (MNR, 1999) will be of some assistance.

The terrestrial resources study will contain, but not be limited to:

a) maps illustrating land ownership, and land use zoning;

b) maps illustrating any of the following features that occur in or within 120 metres of the proposed land use change:

i) significant wetlands;

ii) significant portions of the habitat of threatened or endangered species;

iii) significant woodlands or valleylands;

iv) significant wildlife habitat;

v) areas of Natural and Scientific Interest (ANSIs); and,

vi) Environmentally Sensitive Areas (ESAs); and,

c) a biological description of the natural environment that might reasonably be expected to be affected by the proposal for land use change.

X7.4.1.5 Hydrogeology Analyses - Recharge Considerations

The Scoped Subwatershed Plan for Glen Williams identified several areas within the Glen Williams Planning Area that represent potential areas with higher infiltration characteristics. This conclusion was reached primarily from available information produced as part of the Regional-based groundwater studies prepared by the Region of Halton.

Detailed hydrogeology investigations should be conducted on a tributary or site-specific basis to determine and quantify the following:

- The nature and composition of the native soils;
- The infiltration capacity of the native materials;
- An estimate of the groundwater recharge volume that is being achieved, and its significance to the receiving watercourse; and,
- If warranted, identify appropriate Best Management Practices that are in accordance with the direction provided by the Scoped Subwatershed Plan for Glen Williams, and which should be employed to maintain current levels and/or minimize potential impacts.

X7.4.1.6 Hydrogeology Impact Associated with Aggregate Extraction

If required, the proponent is expected to follow the Provincial standards set out in the document Aggregate Resources for Ontario and the following more detailed requirements:

If extracting above the water table:

a) establish the water table elevation before extraction occurs; and,

b) determine how hydrology and hydrogeology will change, and the effect of the change on fisheries, terrestrial resources, geomorphology, surface water, water quality, etc.

If extracting below the water table, the study should, but not be limited to:

a) the general groundwater setting and linkages between the local and surrounding groundwater system;

b) approximate high water table location;

c) groundwater flow and direction, and the general geologic setting;

d) potential recharge and discharge areas on, and adjacent to, the site;

e) local groundwater resource usage;

f) location and usage of water wells within 1 km of the site;

g) detailed description of the local geologic conditions and the function of the geologic units from a hydrogeologic perspective;

h) detailed assessment of the groundwater flow system, local flow direction, linkages to surface water and the regional groundwater flow system;

i) detailed local and Regional water budget related to the groundwater system. The emphasis should be on estimating recharge to the site, groundwater flux off-site to the local system, regional system and local and regional discharge. The water budget should be evaluated from a sensitivity perspective to potential change in groundwater movement on a subcatchment and subwatershed scale;

j) delineate major and local aquifers in the area and interpret the connection to the site;

k) studies on springs, surface watercourses or discharge to surface water that focus on groundwater/surface water interaction, determining linkages to recharge and discharge areas through baseflow assessment, vertical gradients and water table location. This information should be incorporated into the water balance; and,

l) proposed water diversions or storage and drainage facility studies should focus on the linkage of the surface water to the groundwater.

X7.4.2 Step 7 Description of Proposed Land Use Change

Section 7.0 should include, but not be limited to:

a) the purpose of the proposed land use change;

b) a detailed location map and site plan;

c) activities associated with the proposed land use change both during the construction phase and the post-development phase that may have an impact on the natural environment;

d) a schedule of the proposed land use change, including any phasing for the development;

e) a discussion of the “do nothing” alternative and other alternatives to the proposal; and

f) an explanation of how the proposed land use change has incorporated the environmental resources into planning/ designing the proposed land use change.

X7.4.3 Step 8 Impact Assessment

A concise description of potential impacts for each study completed will be included. This will include how linkages between environmental resources and the functions of the resources, will be affected. Predicted changes in all natural features will be included.

A revised or updated Constraint Map will be required to reflect the results of the Impact Assessment.

X7.4.4 Step 9 Report

Once the requirements of Steps 6 to 8 have been fulfilled, a report on Part B (Impact Assessment Report) will be prepared and submitted to the Town of Halton Hills, the Region of Halton and the CVC for review and approval prior to proceeding to the following steps. The report will include environmental targets for the area should the land use change be approved.

X7.5 PART C - IMPLEMENTATION

The implementation section should focus on how the recommendations and findings will be addressed. There may be several recommendations related to various aspects of the natural environment. Stormwater management is a consistent requirement, and as such is outlined here.

X7.5.1 Step 10 Stormwater Management Plan

Stormwater management facilities and enhancement techniques will be required to ensure that hydrologic characteristics of the subwatershed will be maintained and ecological resources will be protected.

A fundamental goal of the stormwater management plan will be to determine the most appropriate type of control and enhancement measures and facilities that should be incorporated into the development proposal. Particular attention will be required in dealing with Tributary E, as identified in the Scoped Subwatershed Study for Glen Williams, which is a sensitive cold water watercourse. Accordingly, consideration must be given to incorporating management measures that will avoid the creation of potential thermal impacts that would be harmful to the environment.

Accordingly, the stormwater management study will define and provide the following:

a) Description of existing and proposed runoff conditions by subcatchment;

b) Identification of significant watercourses;

c) Identification of management practices and design considerations necessary to ensure that the stormwater management plan conforms to the Scoped Subwatershed Plan for Glen Williams and the Credit River Water Quality Strategy;

d) Identification of downstream problems and methods to mitigate or eliminate them;

e) Identification, screening and design of alternative management practices based on guidelines provided in the Scoped Subwatershed Plan for Glen Williams, the Stormwater Management Practices Planning and Design Manual (MOEE, 1994) and the CVC Stormwater Management Guidelines (CVC, 1996);

f) Where basins are proposed, confirmation of location, catchment area, functional considerations, outlet characteristics and preliminary design elements;

g) Documentation and adherence to criteria related to water quality, water quantity and base flow protection;

h) Location, size, type and design of all stormwater management facilities. Details to be provided include: determination of whether an on-line or off-line facility should be used; selection of wet pond or wetland; forebay dimensions; operating characteristics; targets that will be achieved; integration with existing natural features, etc. Reference should be made to the Scoped Subwatershed Plan for Glen Williams for guidance in regard to the screening and selection of the stormwater management measures, and the initial listing of the preferred alternatives;

i) Detailed implementation steps and programs; and,

j) A summary of the technical findings and recommendations.

X7.5.2 Step 11 Long-term Monitoring Plan

Monitoring should continue after baseline conditions are established. The monitoring plan should be designed in order that impacts can be distinguished from natural trends at an early stage.

If impacts are detected:

a) A more aggressive type of monitoring should take place that determines where, why and how fast the change is occurring;

b) cause-effect relationships between environmental resources and land use change should be determined;

c) appropriate mitigative measures should be proposed to deal with change; and,

d) a focus should be placed on evaluating ongoing or proposed management practices.

Areas that should be monitored over the longer-term include, but are not limited to:

a) water quality;

b) fisheries;

c) hydrology;

d) groundwater quality and quantity;

e) stream morphology; and,

f) terrestrial resources – woodlots, wetlands, wildlife habitat.

It is essential that long-term monitoring is included in the project work plan, and that monitoring costs are included in the project budget.

X7.5.3 Step 12 Implementation

This section will include, but not be limited to:

a) a comparative evaluation of alternative management options leading to the selection of the preferred option;

b) conclusions and recommendations – including the advisability of proceeding; and,

c) mitigation measures – if impacts are expected, what plans are in place to maintain functions within the natural system.

X7.5.4 Step 13 Executive Summary

Include a summary at the front of the report that contains a description of the land use change, the effects on the environment, and all recommendations. The summary should include information from Parts A, B and C.

X7.5.5 Step 14 Reporting Format

A complete description of all the work and conclusions involved in the EIR (Parts A, B and C) needs to be included here.

Reports should be submitted in hard copy along with an electronic copy in Microsoft Word on a labeled 3.5 inch floppy disk, CD or via e-mail. Diskettes should be scanned for viruses and corruption prior to delivery. Three copies of the report, each containing a full set of maps must be prepared, and one copy submitted to the Town of Halton Hills, Credit Valley Conservation, and the Region of Halton.

X7.5.5.1 Graphics

All graphics will be submitted in Microsoft PowerPoint format. The graphic should be delivered on disk separately from the main document, although it should also be incorporated into the main document file.

X7.5.5.2 Artwork

All artwork should be provided in Corel Draw format and should be delivered on 3.5 inch floppy disk separately from the main document, and also incorporated into the main document. If the artwork has to be scanned, it may be delivered in GIF or TIF bitmap format.

X7.5.5.3 Mapping

Mapping should be at a scale of 1:5000 or less. It should be noted that ArcView 3.0 and PC ArcInfo comprise the software currently in use at the Town of Halton Hills and CVC. As such, ArcInfo format coverages are considered to be standard for the organization. In general, digital graphic data:

- must be georeferenced in either UTM (preferred, using NAD 83) or latitude-longitude coordinates;
- must be clean (i.e. polygons are closed, dangles eliminated, polygons with common borders should not overlap, etc.);
- should be packaged/organized into logical layers (e.g. soils layer, wetlands layer, etc.);
- must be in vector format, unless otherwise specified; and,
- should be either uncompressed ASCII ArcInfo Export (.E00) format, ArcView Shapefile or AutoCAD exchange DXF format.

If provided in DXF format, the elements necessary to produce correct topology in ArcInfo should be included, such as feature codes and attributes. Peripheral graphics such as page borders and title boxes should be included only if they are stored in layers distinct and separate from the actual map graphic. All features should be in separate named layers, and layers should be

colour-coded. A single unique numeric label feature ID should be placed inside of polygons. Attributes may be provided in separate tables, although it should be ensured that a common variable exists between the attribute table and the map features, such as feature ID, to allow their association and/or joining.

X7.5.5.4 Tabular Attribute Data

Attribute data should be provided in Microsoft Access 97 format files (preferred), dBase IV format files, or in formatted (i.e. with defined columns) ASCII files.

X7.5.5.5 Textual Data for Graphics

Text should be provided in Microsoft Word or ASCII format. Please be aware that any tabular data to be referenced to actual map features should not be provided as tables in a Word document.

X7.5.5.6 Digital Photos

Digital photos, whether they are scanned photographs or computer-generated artwork, should be provided in Corel Draw 5.0 (i.e. for vector graphics), encapsulated postscript (EPS), or bitmap (either TIF or PCX) format for scanned graphics.

For more information on delivering digital data, refer to the document Specifications for the Delivery of Digital Data to Credit Valley Conservation.