



**HESPELER WEST SUBWATERSHEDS STUDY
SUMMARY REPORT 2004**

September 2004

PREPARED BY: Hespeler West Subwatersheds Study Working Committee

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LIST OF ACRONYMS

ARA	Aggregate Resources Act
CEAC	Cambridge Environmental Advisory Committee
CNAI	Cambridge Natural Areas Inventory
COP	Cambridge Official Plan
DEM	Digital Elevation Model
EA	Environmental Assessment
EIS	Environmental Impact Statement (Study)
EPA	Environmental Preservation Area
ESPA	Environmentally Sensitive Policy Area
GAWSER	Guelph All Weather Sequential Events Runoff
GIS	Geographic Information System
GRCA	Grand River Conservation Authority
GWRA	Groundwater Recharge Area
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HRU	Hydrologic Response Units
HWSS	Hespeler West Subwatersheds Study
LSNA	Locally Significant Natural Area
LSW	Locally Significant Wetland
MGWA	Maple Grove Wetlands Association
MOE	Ministry of the Environment
MNR	Ministry of Natural Resources
OMB	Ontario Municipal Board
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
ORC	Ontario Realty Corporation
PEIL	Planning and Engineering Initiatives Limited
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
ROPP	Regional Official Policies Plan
RMOW	Regional Municipality of Waterloo
SNHF	Significant Natural Heritage Feature
SWM	Stormwater Management
UTM	Universal Transverse Mercator
WRED	Waterloo Regional Ecological Database

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A. HWSS – STUDY/REVIEW PROCESS

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- A.6.5 Guideline for the Preparation of Environmental Impact Statements in the Regional Municipality of Waterloo, June 2002
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- A.7.2 Letter Re: Correspondence from Ian Thornton, MNR, Guelph District Office titled “Clarification of Provincially Significant Wetland on Arriscraft Lands” (dated February 25, 2003) to April Souwand, City of Cambridge from Ian Seddon, Ian Seddon Planning Services dated February 27, 2003
- A.7.3 Letter Re: Clarification of Provincially Significant Wetland on Arriscraft Lands to April Souwand, City of Cambridge from Ian Thornton, MNR, Guelph District Office dated March 21, 2003
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B. HWSS – TECHNICAL BACKGROUND

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HESPELER WEST SUBWATERSHEDS STUDY SUMMARY REPORT 2004

1. INTRODUCTION

1.1 INTRODUCTION TO PROCESS

The City of Cambridge commenced the process for completing the Hespeler West (East, Middle and West Creeks) Subwatersheds Study (HWSS) in July 2001. This was done because the Hespeler West area (through which East, Middle and West Creeks run) had been identified in the annual City's Staging of Development Report as the next significant area of new development to proceed through the planning process. A Community Plan is required by the City of Cambridge Official Plan for large designated areas of future residential development. Additionally, under the Official Plan and the Regional Official Policies Plan, a subwatershed study must precede community plan approval so that comprehensive input of environmental considerations into the land use planning process is accomplished at an early stage. Through the Cambridge Development Charges By-law, the responsibility to prepare both Subwatershed Plans and Community Plans is vested in the City of Cambridge. The goal of the Hespeler West Subwatersheds Study as set out in the terms of reference for the Hespeler West Subwatersheds Study (Appendix A.1) is to "protect, maintain and enhance the ecological processes and functions and significant natural features of the subwatersheds in a way which is environmentally sound and socially and economically sustainable."

The consulting firm, Planning and Engineering Initiatives Limited (PEIL) was contracted by the City of Cambridge in October 2001 to conduct the study. They assembled a group of associates, which comprised the study team as follows: C. Portt and Associates, Dougan and Associates, Naylor Engineering Associates, Schroeter and Associates and Ag Plan. They completed the study with direction from the Hespeler West Subwatersheds Study Steering Committee. A list of members is shown in Section 5.2.

The study was completed by PEIL in October 2002 (final draft dated October 31, 2002) and received for information by Cambridge Council on November 11, 2002. At that time, the study was released for public review and comment for 90 days. During that time period, comments were received from landowners and agencies. The report was revised and finalized and dated March 2003. At the General Committee meeting on April 28, 2003, some landowners appeared and expressed concern with the recommendations in the study. Council resolved that the report be deferred and that staff bring forward a further report to address the issues raised by the delegations. On August 11, 2003, Council directed Planning Services staff to organize a community meeting with residents and following the community meeting to meet with individual property owners to discuss specific concerns. The community meeting was held on September 25, 2003. The following recommendation was adopted by Council on September 29, 2003:

THAT Cambridge Council approve the formation of a Working Committee comprised of representatives of the Maple Grove Wetland Association, property owners, along with a representative from each of the MNR, GRCA, the Region of Waterloo, City Planning staff and others as suggested by the Commissioner of

Planning to review the specific areas of community concerns and report to Cambridge City Council;

AND THAT the Working Committee be chaired by the Ward 1 Councillor.

In preparation for the first meeting of the Working Committee on October 30, 2003, City staff identified that there were two different versions of the mapping in the final reports for October 2002 and March 2003. The consultants, PEIL and Dougan and Associates explained the computer problems they experienced producing the maps in the March 2003 report and other mapping errors that occurred. They apologized for the errors and the inconvenience it had caused (Appendix A.2) and corrected the maps and produced a revised copy of the final report (Revised November 2003). The Working Committee review of issues was based on the HWSS (PEIL) Report (November 2003).

The Hespeler West Subwatersheds Study Working Committee (HWSSWC) met over the course of the next year to review the community concerns (Appendix A.5) with the study. A list of members and the Terms of Reference are found in Section 5.1 and Appendix A.2.3 respectively. Information on the progress of the review of issues by the Working Committee was provided to the members of the MGWA through two newsletters in April 2004 (Appendix A.5.11) and July 2004 (Appendix A.5.14). Working Committee members (Erich Ritzmann (MGWA), John Vasiga (MGWA), Wendy Wright (City) and April Souwand, (City, Senior Environmental Planner)) met with the seven property owners requesting site visits at the community meeting on September 25, 2003. Property owners were provided with a site map showing how the results of the Hespeler West Subwatersheds Study affected their property. This was followed up with a letter confirming the results of the site discussions (Appendix A.9.2).

The Hespeler West Subwatersheds Study Working Committee hosted a Public Meeting on September 16, 2004 at the Wanner Mennonite Church, 1725 Beaverdale Road (Appendix A.9.3). Sixty-four people signed the sign-in sheet. Maps and displays were available for viewing between 6:00 p.m. and 7:00 p.m. Following the Open House, a presentation on the Summary Report 2004 was made by Wendy Wright (City). John Vasiga and Ron McKitrick presented, on behalf of the MGWA, "How a Flawed Subwatershed Study Gets Corrected" (Appendix A.9.4). The formal presentations were followed by a question and answer session. Brian Cunningham (MGWA) chaired the meeting. Questions and discussion largely focused on the outstanding issue of buffer widths to protect the significant natural features after serviced urban development occurs. Notes of the meeting are included as Appendix A.9.3.5.

Seventeen comment sheets and two letters were submitted. The original sheets and a Summary Table are included in Appendix A.9.3.6. Of the seventeen (17) comments received, three (3) were supportive of the study results, eleven (11) were concerned with the proposed buffers, two (2) of the nine (9) also had a concern with the extent of the enhancement land use area, one (1) was concerned with the extent of the Greenspace Management Strategy shown on their lands and one (1) wanted more information. Two of the comment sheets attached a letter of opinion from Dr. Daryl Howes-Jones, Howes-

Jones & Associates Inc. on the properties located at 2315 Speedsville Road and 2045 Speedsville Road assessing the implications of the HWSS dated September 15, 2004 and September 16, 2003 respectively.

This report, the Hespeler West Subwatersheds Study Summary Report 2004 provides a summary of the review and is recommended for adoption as the Hespeler West Subwatersheds Study. The HWSS Summary Report 2004 relies on the updated HWSS (PEIL) Report (September 2004) for background details¹ but where there are differences, the HWSS Summary Report 2004 supercedes the HWSS (PEIL) Report.

1.2 COMMUNITY CONCERNS (MGWA)

When citizens became aware of the content and ramifications of the subwatershed study, a steering committee and Association was formed with one of its objectives being to correct and address the issues being raised in the community. The Maple Grove Wetlands Association (MGWA), together with landowners, residents, and interested parties, reviewed the Hespeler West Subwatershed Study (HWSS) in some detail in the winter and spring of 2003. It became apparent that not only did it contain obvious data errors, but the recommendations seemed quite “onerous” to some who commented on them. The following section lists the key concerns, which had been communicated to City Council and staff. For the complete record of which issues received discussion and/or resolution, please refer to Appendix A.8 – HWSS Working Committee Minutes and Section 2.0 – Key Changes.

- Wetland areas misclassified: Several areas/polygons included in wetland classification are plainly mistakes.
- Polygon boundary errors: Without sufficient ground truthing, these products of air photo interpretation are often inaccurate. Boundary issues impacting existing residential properties needed to be addressed before any secondary planning commences.
- Drainage basin boundaries must be based on an acceptable geographic definition: Watershed boundaries must accurately reflect topographic, baseflow and low flow runoff factors. In the HWSS it clearly did not.
- Inconsistencies: Some are typographical and editorial in nature, others are non-trivial.
- Natural vs Human Heritage: Anthropogenic and cultural features are by definition human features, yet are in some cases in the HWSS classified as “significant natural heritage features”. Should cultural features be 'protected' from development as such a classification would imply?

¹ The HWSSWC has not reviewed the HWSS (PEIL) Report (September 2004) to ensure that all the errata have been thoroughly addressed.

- Ditches are of human heritage: Ditches, are by definition, anthropogenic features. The most prominent example in the area is the Hunsperger Municipal Drain system, which outlets into Middle Creek south of Maple Grove Road. By contrast, creeks are natural features. There seems much confusion in the HWSS in this regard, where every watercourse is referred to as a creek. The discussions and conclusions subsequently drawn border on absurd.
- Plantations are cultural features. Plantations need human encroachment – they need desperately to be thinned out in the interests of a healthy future forest. Plantations that are enhanced in this way should include a one meter buffer to offer protection for the roots.
- Pastures are cultural features. In the HWSS, pastures are sometimes meadows, sometimes thickets. It should not be assumed that these features are natural heritage unless the owners dedicate them to this cause. Pastures that are enhanced and naturalized, are by definition buffers – they should not again be buffered with yet another buffer strip. In many cases, pastures may be developable land.
- Wetland buffer applied to non-wetlands: Thirty meter buffers, would be used for sensitive wetland where overland runoff into the wetland occurs. However, the HWSS also applies the 30 m buffer to the upland forests. A credible environmental justification for these inappropriate buffers on non-wetlands is not found in the Study. These must be removed and replaced with normal dripline buffers of three to five meters as are typically used to protect the most valuable upland forests.
- Genuine, naturally occurring wetlands should be buffered: Wetlands which are proven to be genuinely provincially significant should be buffered. These buffers fall onto residential backyards and onto agricultural fields – areas that are heavily disturbed. The area is also fairly flat tablelands, with very permeable soils, with little or no interflow. In this context, wetland buffers of 15 m should be used, rather than the HWSS 30 m.
- Recommendation for removal of online ponds fails to consider existing ecosystem impact: Recognition of vital role pond habitat plays to the local ecology, and its contribution to valuable ground water recharge needs to be made. It should be stressed that elsewhere in the HWSS it recommends creation of small pond habitats. Existing pond ecosystems need to be preserved and enhanced with no consideration for removal.
- Linkages: The intended purpose of “enhancement areas” is to preserve linkages between core natural feature ecosystems. Many enhancement area recommendations made by the Study do not reflect the research and are unjustified. Other enhancements were placed across busy roads and near major intersections, luring the animals to their deaths.

- Enhancement recommendations need to be removed/reduced in cases where core feature already meets the width criteria. Enhancement recommendations for areas adjoining or crossing anthropogenic units and major impediments such as roadways must be re-evaluated.
- Natural features that abut major roads should really be enhanced not with an “area” so much as with an overpass/underpass, designed not only to accommodate stream hydraulics, but to allow dry passage of animals the size of fully grown deer. The recommendation of the HWSS for enlarged culverts is unacceptable.
- Stewardships: The enhancement recommendation when traversing an existing residential area, allowed for a special case called “stewardship area”. Concerns were expressed that noxious weeds contribute to a wide variety of significant human health issues.
- Missing Factors: The October '02 revision of the HWSS, didn't even identify the aggregate extraction areas. The March '03 HWSS is also incomplete – the affects of licensed pits and quarries extractions aren't considered. We expect that the natural areas within 120 meters of the extractions will be affected. Yet, no data or analysis is ever provided.
- Contradictions: How is an active, licensed pit operation, simultaneously a provincially significant wetland? Is it a pit? Or is it a PSW?
- Floodplain mapping: Floodplains need to be reassessed following corrections in watershed boundary definitions, and other noted issues.
- Rewriting the recommendations: Once known issues, errors, omissions, and inconsistencies are corrected, new recommendations need to be made – recommendations which reflect a solid scientific basis and consider the social and economic fabric existent in the subwatersheds area.
- Working Closely With Property Owners: More than just a fine sounding statement in the HWSS Terms of Reference, we need to define what this means for the future. Perhaps, by working together we can avoid repeating negative aspects of history.
- Independent review: This is being sought for HWSS rankings of cultural features as high constraint and for HWSS buffer recommendations.
- Socially and Economically Sustainable Recommendations: Social and economic impacts on the current residents and landowners really need to be considered. In fact, it is demanded by the HWSS Terms of Reference.

- Summary report to contain corrected data. Consistent application of science. HWSS corrections that are recorded in the errata must also be flagged on any maps and pages of text that are implicated, if the error is permitted to persist.
- The fact clearly admitted, stated publicly and in the summary report, that numerous and serious errors were identified necessitating the WC and the additional report.
- Everyone needs to be treated equally, and in every way: Buffers recommended by the subwatershed study should be commensurate with what is being accepted by other environmental impact studies.
- Removal of open space designation, OS1 zoning in inappropriate areas.
- Removal of GRCA scheduling in inappropriate areas.
- Landowner compensation for expropriation: Principles for this are set forth in federal legislation.

1.3 REVISIONS TO THE HWSS (PEIL) REPORTS - FROM MARCH 2003 TO NOVEMBER 2003 VERSIONS

The Hespeler West Subwatersheds Study (PEIL) Report (March 2003), which was presented to Cambridge Council for approval in May 2003, contained several mapping errors. Planning and Engineering Initiatives Limited produced a revised version of the report which corrected some of these errors (November 2003).

2. KEY CHANGES

The work of the Hespeler West Subwatersheds Study Working Committee resulted in some changes to the HWSS (PEIL) Report (November 2003) due to further errors detected in the report. PEIL produced a further revision to their report dated September, 2004. Appendix A.3 details these corrections.

Other changes the committee has made have resulted from a more detailed look at some of the natural heritage features and their protection, as well as physical changes that have occurred in the subwatersheds since PEIL completed their work in March 2003. The changes are detailed below. The other issues identified by the MGWA in Section 1.2 have been discussed by the Working Committee and those discussions are contained in the meeting Minutes (Appendix A.8). The Committee has reached a consensus on most issues. The key outstanding issue is the extent of the buffer requirements to protect the significant natural features after serviced urban development occurs.

2.1 WETLAND EVALUATIONS

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) presented the results of the wetland evaluations and concluded that the Maple Grove Wetland Complex was Provincially Significant and the West Creek Wetland Complex was Locally Significant. The Maple Grove Wetlands Association (MGWA) questioned the classification of some vegetation community polygons as wetland and the boundaries of some polygons. Ministry of Natural Resources (MNR) staff conducted a detailed review of the polygon mapping in 2004, with field checks where required. MNR staff were assisted by Erich Ritzmann (MGWA Chairperson). This work resulted in some polygons being removed from the Provincially Significant Wetland (PSW) classification in the Maple Grove Wetland Complex, namely: 2.13, 2.29E, 6.17B, 6.19C, and 6.26A. Polygon 2.11 had been removed by PEIL in the HWSS (PEIL) November 2003 Report because MNR identified that it was not part of a PSW during their review. Boundary adjustments were made to the following polygons: 2.17A, 2.35A, 2.37, 2.43, 4.01A, 4.01C, 4.13A, 4.13B, 4.13C, 5.25, 6.00A, 6.04A, 6.12B, and 6.13. Part of Polygons 6.04C and 6.22A were added to the PSW.

There were no changes to the Locally Significant West Creek Wetland Complex.

The Speed River Wetland Complex was not evaluated as part of the Hespeler West Subwatersheds Study as it is a large wetland and only a small part of it is found in the extreme southerly part of the study area. However, despite text to the contrary (Page B-94, HWSS (PEIL) Report (November 2003), some polygons were adjusted in the mapping. This was not apparent to MNR in the agency review of the subwatersheds study, but became apparent through the detailed review done in the Working Committee timeframe. MNR staff reviewed this with Dougan and Associates and Polygons 8.01 and 8.02 were removed from the Speed River PSW because they were too small for inclusion (less than 0.5 ha). In addition, one of them was a low quality ditched watercourse. The following Speed River Wetland Complex polygons were adjusted: 6.37A, 6.37B, 6.37D, 6.38, 6.39A, 6.40, 6.41A, 6.46A, 6.48B and 7.04.

The MGWA questioned the inclusion of Polygon 2.01, west of Fountain Street, with the Maple Grove Wetland Complex, once it was determined that Polygons 2.11 and 2.13 were not part of the complex. This left Polygon 2.01 relatively isolated in the landscape. MNR staff determined that Polygon 2.01 remains as part of the wetland complex because it is functionally connected through a 90 cm (900 mm) storm sewer and may receive some water from Polygon 2.01 as well as other areas in significant storms. It must be noted that .089 m³/sec from this polygon flows to Freeport Creek through a 30 cm (300 mm) storm sewer. It also meets the criteria for inclusion (i.e. within 750 m of the next closest portion of the Maple Grove Wetland Complex).

MNR staff explained during the Working Committee's deliberations that the MNR considers wetland evaluation files as "open files" and revisions and adjustments are made over time as new information becomes available. It was also explained that at the development review stage, wetland boundaries are staked in the field and surveyed at a

very detailed level of accuracy. The evaluated wetland mapping as of the completion of the Working Committee's review is presented in Figure B8.3.2 (2004) - Evaluated Wetlands.

The changes to the vegetation polygons resulting from the review of the wetland evaluations necessitated revisions to Map 2 - Existing Natural Heritage System, Table B8.3.1 - ELC Community Series Present in the Hespeler West Subwatersheds and Appendix J6 - Vegetation Community Attributes and Constraint Rankings. The boundaries of some polygons were changed and some polygons had to be re-classified. Dougan and Associates were re-hired to conduct this work, as they had done the original mapping, using the Ecological Land Classification System (Lee et al., 1998).

2.2 POTENTIAL ENVIRONMENTALLY SENSITIVE POLICY AREAS

The Hespeler West Subwatersheds Study (PEIL) Report (September, 2004) concluded that there are, "adequate grounds to consider ESPA designation of at least some of the habitat features in the East and Middle Creek subwatersheds. In particular, the headwater areas north of Maple Grove Road are relatively large and extensive, meeting several primary and likely two or more secondary ESPA criteria" (Page C-2, HWSS (PEIL) Report (November 2003)). Through review of data presented by the consultants and discussed with the Working Committee, the Manager of Environmental Planning from the Region of Waterloo (RMOW staff) has identified natural areas, which will have to be further investigated in the appropriate field seasons to determine whether they fulfill sufficient criteria to become candidates for designation (Appendix A4.9 and Table 5). This work will have to be done and approved by the Region prior to the adoption of Cambridge Official Plan Amendments or implementation plans such as the community plan that implements the recommendations of the HWSS Summary Report 2004.

2.3 HYDROLOGY AND HYDRAULICS (FLOODLINE REPORT)

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) included a hydrologic and hydraulic analysis that was used to produce floodline mapping. The MGWA identified errors in the documentation of culverts, which are data inputs to the hydraulic model (HEC-RAS) and questioned the boundaries of subcatchment areas in the headwaters of Middle Creek, which were used in the hydrologic model (GAWSER). The MGWA felt that some of the information had been available to PEIL but was neglected. Any changes to these subcatchment areas (2115, 2120 and 2125) would affect the Subwatersheds boundary. They also questioned the apparent discrepancies between floodline mapping produced by Delcan Corporation for the City of Cambridge as part of the Maple Grove Industrial Subdivision (Phase II) and the mapping produced by PEIL.

Planning and Engineering Initiatives Limited completed revisions to the HEC-RAS model, using some corrected culvert data. They also revised Appendix E (Hydraulic Structure Data sheets and HEC-RAS output) and produced revised floodline mapping in April 2004. This work is included in the Hespeler West Subwatersheds Study (PEIL) Report (September, 2004).

The City of Cambridge hired the firm Totten, Sims, Hubicki Associates (TSH) to conduct a peer review of the corrected work produced by PEIL and to develop updated floodline mapping, based on a detailed review of subcatchments in the headwaters of Middle Creek. There was new information available to TSH on these subcatchments that was not available to PEIL at the time they produced the original floodline mapping and some subcatchments had been physically altered since the time of the original study. For subcatchment area 2115, some fill had been placed by property owners and MTE had completed a more detailed survey. For subcatchment 2120, the Regional drain to the north and east had been reopened. For subcatchment 2125, there was more complete information and a better understanding of the functioning of the private catchbasin and its 300 mm storm sewer connection to Freeport Creek. TSH's work also sorted out the apparent discrepancy between the Delcan floodline mapping and that produced by PEIL.

The TSH report is included as Appendix B.3. They conducted a field survey of the northeast quadrant of Maple Grove Road and Speedsville Road where the MGWA had pointed out apparent mapping discrepancies between the Delcan floodline mapping and that produced by PEIL. They concluded that the field survey was more consistent with the contours in the Delcan report than with the City's digital 0.5 m contours that had been used by PEIL in their floodline mapping. These inaccuracies in the City's 0.5 m contours may occur due to the way in which the data was collected remotely as part of a larger Regional project²

The general peer review of the PEIL HEC-RAS model provided some suggestions to "fine tune" the model so that it is more accurate and easily interpreted by others. The conclusion of TSH was that changes made to the HEC-RAS model, for the most part, have only a minor impact on water levels, both minor increases and decreases in water level, depending on location. The most significant suggestion was that the spacing of culvert end cross-sections should be placed closer to the culverts. They suggested that the impact of doing this would be minor, but should be reviewed in greater detail if future works are proposed near culverts (e.g. development, road improvements, culvert upgrades, etc.).

The production of updated floodline mapping began with a technical review of the previous GAWSER model. Then, several scenarios were run, based on more detailed information on three subcatchments (2115, 2120 and 2125). This resulted in a revised subwatershed boundary for Middle Creek shown on Figure B2.3.1 (2004) and revised floodline mapping shown on Figure B3.2.1 (2004) – Regulatory Floodlines and Scheduled Areas and Map 1 – Floodline Mapping (1:8000) and in Appendix B.3 – Floodplain Report.

² 0.5 m Contours are based on the Digital Elevation Model created in the summer of 2000 using visual stereoscopic equipment. Individual points were created on a 12 m-grid pattern as well as at 1 m intervals along breaklines. The contours were generated by Northway-Photomap in 2001 and are uncorrected. The DEM was collected photogrammetrically during the spring of 2000 – 1:8000, and 1:15,000 scale black and white aerial photography. In most cases, the 1:8000 scale aerial photography was used to collect the urban area information. The point placement was collected at 2 mm at plate scale and breakline information collected at 2-3 times this density for breakline features where required to support the orthophoto image.

2.4 PROTECTION OF NATURAL HERITAGE FEATURES USING BUFFERS AND ENHANCEMENT AREAS

Having identified the core features of the Natural Heritage System, (Provincially Significant Wetlands, potential Environmentally Sensitive Policy Areas, Locally Significant Wetlands, Floodplains and Other High Constraint Areas), it is necessary to develop a Greenspace Management Strategy in order to maintain the ecological features and functions of these environmentally significant areas after serviced urban development occurs. The requirement to do this is set out in the Provincial Policy Statement, the Grand River Conservation Authority Wetland Policy, the Regional Official Policies Plan, and the Cambridge Official Plan. The “tools” for protecting the Natural Heritage System include Buffers, Enhancement Areas and Stewardship Areas. The “process” of establishing the extent of the protection required for the Natural Heritage System includes the preparation of an Environmental Impact Study, the strategic location of compatible land uses, and compatible natural plantings.

The Hespeler West Subwatershed Study prepared by PEIL and revised through work of the Hespeler West Subwatersheds Study Working Committee fulfils the requirements to be a ‘comprehensive’ Environmental Impact Study as part of developing the Greenspace Management Strategy. In order to protect the features of the East, Middle and West Creek Subwatersheds, the following buffers, enhancement corridors and stewardship areas were originally proposed in the HWSS (PEIL) Report (November 2003):

- 15 m Aquatic (creek) Buffers (measured from the “top of bank”);
- 30 m Buffers around other natural features;
- Enhancement Corridors of at least 50 m for East Creek, 200 m for Middle Creek and 50 m for West Creek;
- Stewardship Areas for plantings of appropriate native species.

Since the Subwatershed Study is carried out at a broad scale, it also provides for the preparation of a more detailed Environmental Impact Study to refine the requirements for the protection of the natural heritage features during preparation of the Community Plan and/or the review of specific development proposals should a developer wish to develop within the buffers. During the preparation of the Community Plan, compatible land uses and plantings of appropriate native species are key to the implementation of the Enhancement Corridors and Stewardship Areas.

The Maple Grove Wetlands Association on April 30, 2004, (Appendices A.5.7, A.5.8 and A.5.9) expressed its concerns with the extent of the area proposed to protect the core features of the natural heritage system and proposed the following:

- Context sensitive buffering which considers the quality of features being protected and which acknowledge the advanced state of human disturbance existent;
- Wetland buffers that don’t exceed the 15 m;
- Upland forest buffers that don’t exceed 3 m;

- Plantations buffered by 1 m;
- No buffering of other cultural features;
- Enhancement recommendations need to be removed/reduced in cases where core feature already meets the 50 m (local) or 200 m (primary) width criteria; and
- Enhancement recommendations for areas adjoining or crossing anthropogenic units and major impediments such as roadways must be re-evaluated.

They also expressed concern with singling out individual properties with a Stewardship Area designation in order to maintain or enhance the natural heritage features.

The HWSSWC spent several meetings reviewing how to adequately protect the Natural Heritage System and explored several options. There is consensus that the features do need to be protected so that they can maintain their ecological features and functions after serviced urban development occurs. Table 3 – Width of Study Area to Establish or Change Buffers summarizes the review showing the requirements if there is no subwatershed study and the proposals in the Summary Report 2004 and by the MGWA.

2.5 AGGREGATES/ARRISCRAFT SUBDIVISION

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) recognized the existence of two licenced pit extraction areas in the lower end of the Middle Creek subwatershed. The Terms of Reference for the Hespeler West Subwatersheds Study (Appendix A.1) did not identify extraction of sand and gravel as an issue to be addressed in the Study. It indicated that the Greenspace Management Strategy may not be fully implemented in the licenced areas, due to undetermined future changes to the natural features covered by the pit licenses. The southerly licenced area is also covered by an approved draft plan of subdivision (30T-85005). The MGWA contended that a more comprehensive analysis of the future impacts of pit extraction on hydrology and the Maple Grove Wetland Complex status as a PSW should have been conducted as part of the Subwatersheds Study. It was determined that these impacts are difficult to quantify, without knowing the extent to which the pit is to be excavated. MNR staff has indicated that they have no compliance issues with these pits and there is nothing compelling the Ministry to collect baseline data to monitor change. Ministry staff did determine that the Maple Grove Wetland Complex would remain provincially significant, both by virtue of total score and individual component score, even if all of the wetland area covered by the pit licenses were removed.

2.6 COUNTRYSIDE LINE

The Council of the Regional Municipality of Waterloo (RMOW) has recently approved a Growth Management Strategy and an associated Countryside Line. The Growth Management Strategy looks forward to the next 40 years of growth in Waterloo Region. The Countryside Line is the firm boundary between urban and rural areas of the community to be used throughout the Region. It was approved in June 2003, with four areas in the Region where a definitive line was unable to be drawn. In Cambridge, there is one of these areas between Speedsville and Hespeler Roads. The uncertainty is the

result of a decision by Regional Council to include the Hiff and Snyder lands which lie to the east of the Hespeler West Subwatersheds Study. Regional staff had found that those lands were not needed for urban development uses, but City and Regional Councils wanted to add them in. However, it is not clear exactly where the boundary will be located or the extent of lands to be added in. Staff will be looking for physical features or visual lines distinguishing between urban and rural areas to help draw the line. In this area, several studies (Hespeler West Subwatersheds Study, Chilligo Creek Subwatershed Study, Regional Wastewater Master Plan and Regional Transportation Master Plan) must be completed or updated to help determine the appropriate boundary.

A Regional Official Policies Plan amendment and a Cambridge Official Plan amendment will be needed to add any land to the urban areas. The approved Countryside Line (Figure C2.1.1 (2004) – Countryside Line) encompasses most of the Hespeler West Subwatersheds Study area, except a small area north of Mohawk Road and east of Speedsville Road. This is in the area requiring further studies to determine the precise location of the Countryside Line. The remainder of the Hespeler West Subwatersheds Study area which is beyond the City’s current Urban Area is within the Potential Future Greenfield Development Area of the Region’s Growth Management Strategy. As stated previously, Regional and City Official Plan amendments would be needed to bring this area into the City’s Urban Area to establish the principle of serviced urban growth beyond the current Urban Area.

2.7 SCHEDULED AREAS

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) did not identify “Scheduled Areas” that lie within the study area. These are areas regulated by the Grand River Conservation Authority for fill placement. The types of area mapped include: flood plain, wetlands, areas susceptible to pollution, steep slopes, ponds, lakes, watercourses and areas for the conservation of lands which have inherent limitations to use. The areas are mapped by the GRCA, endorsed by the City, and approved by the Province as regulation “schedules” under the Conservation Authorities Act. The Grand River/Speed River Schedule 17 that was approved in 1993 covers the Hespeler West Subwatersheds Study area (Figure B3.2.1 (2004) – Regulatory Floodlines and Scheduled Areas). In 1998, there were changes to the Conservation Authorities Act which set out the framework for a “generic” regulation. The generic regulation, which defines regulated areas, was approved in May 2004. The GRCA will be working in the next two years to create new regulated area mapping, using the Hespeler West Subwatersheds Study as one piece of background information (Appendix A.4.8).

2.8 PONDS AND DAMS

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) recommended an Aquatic Rehabilitation Strategy that identified several system-wide and creek-specific activities that could be undertaken to manage the streams. The management option of removing on-line ponds (both system-wide and creek-based) was discussed by the Working Committee. The Area Biologist from Guelph District MNR (MNR staff) presented information about the benefits to streams of removing on-line ponds (Appendix

A4.7) and the MGWA presented information about the aquatic and terrestrial habitat benefits of ponds (Appendix A4.12). It was decided to change the wording of this recommendation on Figure C3.1.3 (2004) – Aquatic Rehabilitation Strategy to more clearly reflect the goal of removing the undesirable attributes of on-line ponds and highlighting the benefits of creating pond habitat. One way to do this is to take on-line ponds off-line and develop better pond habitat through the planting of appropriate native species. It should be noted, however, that this can be achieved without the total removal of the pond.

2.9 CONCEPTUAL TRAIL STRATEGY

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) presented a Conceptual Trail Strategy (Section C3.4 and Figure C3.4.1). The HWSS Working Committee members of the MGWA expressed concerns that the Report allowed for an extensive system of community trails to be “built” in the buffers, based on the recommendations made at the Subwatersheds Study stage without assessing the impacts at a subsequent stage. The Report was not clear that trails would not be built until urban development occurs, nor built on lands already developed with estate residential uses without landowner permission. It also was not clear that, depending on the location of a trail or its design features, an Environmental Impact Statement could be required. The MGWA was also concerned that the development of trails within the 30 m buffers was being used to justify the width of the buffer. They were advised that the 30 m buffer width was identified independent of the trail considerations.

It was agreed by the Working Committee that it is premature to identify a conceptual trail strategy in the subwatersheds study because it will not be implemented until after the Community Plan is approved and “urban development” occurs. This will become a component of the Community Plans to be developed in the future. Background information on the natural heritage system will be used in the development of a conceptual trail strategy at that time.

2.10 PUBLIC CONSULTATION

The following concerns were expressed with the public consultation process used for the preparation of the Hespeler West Subwatersheds Study:

- the public did not receive notice of the Steering Committee meetings
- some property owners did not receive notice of the Open Houses and Council meetings
- notice of these meetings was not given in a timely fashion
- the open house format did not allow for a good exchange of information either in terms of communicating the complex information in an understandable way and formalizing the residents’ expression of concerns through minutes or study revisions
- landowner permissions for access on all properties was not in place
- access to the final report was too limited

The consensus of the HWSSWC is that in future Subwatershed and Community Plan Studies, public consultation should include the following:

1. Keep as up to date a list as possible of property owners from the assessment roll. Update the list where a study is undertaken over an extended period of time.
2. In addition to individual and newspaper notice, make better use of the City's web site for providing notice of Steering Committee meetings, for notice of public meetings, for posting agendas and minutes of Steering Committee meetings and for posting the final report.
3. Make more and better provision for individual landowner contact and information exchange in the Terms of Reference of future studies.
4. Ensure that property owner permissions are in place before entering a property by requiring consultants to provide a list of permissions received to the City.
5. Provide individual property owners with more and clearer information about the study findings on their property.

3. KEY RESULTS OF SUBWATERSHEDS STUDY

The Key Results of the Hespeler West Subwatersheds Study outlined in the Summary Report, 2004 are:

- 1) The Greenspace Management Strategy that:
 - Identifies significant natural features including Provincially Significant Wetlands, potential Regional Environmentally Sensitive Policy Areas, Locally Significant Wetlands, Other High Constraint Areas and Floodlines; and
 - Protects the significant natural features after serviced urban development through the use of buffers, enhancement land uses, stewardship programs and an aquatic remediation strategy.
- 2) A Management Strategy for Groundwater and Surface Water During Urban Development and Post Urban Development
- 3) Potential Aggregate Resources Extraction Impacts
- 4) Implementation of Key Results During Development

3.1 GREENSPACE MANAGEMENT STRATEGY

3.1.1 Identification of Significant Natural Features

Environmental Policy Areas are existing planning designations assigned to areas of the Greenspace Management Strategy. They are natural heritage features that have already been identified as significant either at the provincial, regional or local (City) levels. The Hespeler West Subwatersheds Study Summary Report 2004 provides information that should be used to update and refine many of these designations.

3.1.1.1 Fisheries Habitat

The City of Cambridge Official Plan (Map 13) shows Selected Fisheries Resources. It shows that West Creek and Middle Creek are Type 4 Warmwater Baitfish Streams and East Creek is a Type 1 Existing Coldwater Stream. The HWSS found that the fish communities consist of warmwater and coolwater non-game species, with more species present in the reaches that are close to, and accessible from, the Speed River. This information will be used to make the necessary changes to the City of Cambridge Official Plan during the next Official Plan Review.

The Provincial Policy Statement mandates protection for all fish habitat, consistent with the federal Fisheries Act.

3.1.1.2 Provincially and Locally Significant Wetlands

The City of Cambridge Official Plan (Map 8) shows Provincially and Locally Significant Wetlands, as well as Unevaluated Wetlands. This map reflects the former MNR system of Class 1, 2 and 3 being Provincially Significant and Class 4, 5, 6, and 7 being Locally Significant Wetlands. The MNR is responsible for determining which wetlands and wetland complexes (groups of individual wetland units which are functionally related in some important manner) are provincially significant, on the basis of provincial evaluation measures (Southern Ontario Wetland Evaluation Manual March 1993, revised May 1994). Through the HWSS, MNR has determined that the Maple Grove Wetland Complex is a Provincially Significant Wetland (PSW). It had previously been identified as “Locally Significant” and “Unevaluated” and is shown that way on Map 8 of the Cambridge Official Plan. MNR has determined that the West Creek Wetland Complex is a Locally Significant Wetland (LSW). It had previously been identified as “Unevaluated” on Map 8 of the Cambridge Official Plan. The Regional Official Policies Plan also shows Provincially Significant Wetlands on Map No. 2, which does not currently include the Maple Grove Wetland Complex. This information will be used to update the City and Regional Official Plans.

It should be recognized that wetlands are dynamic ecosystems. They change over time, due to factors such as natural succession and changing water levels. Boundary changes may occur, which may need to be verified by the MNR, which keeps “open” files on wetland evaluations.

The Provincial Policy Statement mandates “no development” of Provincially Significant Wetlands in southern Ontario and environmental impact assessments for development proposals on adjacent lands (within 120 metres) which may recommend mitigation measures such as the establishment of vegetated buffers. The Grand River Conservation Authority Wetlands Policy (2003) (Appendix A.6.4) requires an environmental impact statement for development proposed within 120 metres of a PSW or unevaluated wetland and within 30 metres of a Locally Significant Wetland (Policy 6.2.11). The HWSS has performed a comprehensive Environmental Impact Study which has determined that vegetated buffers of 30 metres around the PSW and LSW would protect the wetland complexes from the impacts of development. Development proposed outside of the 30

metres is relieved from the requirement for an EIS, while development proposed within the 30 metres generally requires an EIS.

The Grand River Conservation Authority's Wetlands Policy (2003) protects all wetlands, subject to very specific exclusion criteria (Policy 6.2.6 and 6.2.7). Based on a preliminary screening, three small wetlands could be considered for removal, based on the GRCA Wetland Policies exclusions (Polygon 2.25, 5.11A and 6.20c).

3.1.1.3 Environmentally Sensitive Policy Areas

The City of Cambridge Official Plan (Map 9) shows Environmentally Sensitive Policy Areas (ESPAs) and Locally Significant Natural Areas (LSNAs). ESPAs are designated by the Regional Municipality of Waterloo. Prior to the commencement of the HWSS, none of the natural heritage features in the Hespeler West Subwatersheds were designated as ESPAs. The HWSS Summary Report 2004 indicates that several of the natural heritage features, particularly those north of Maple Grove Road appear to meet at least some of the Regional Official Policies Plan (ROPP) criteria to qualify as an ESPA. Regional staff will carry out further field investigations of these areas (Table 5 and Figure B8.3.3A (2004)) in 2005 to determine if they warrant designations as ESPAs prior to taking the completed subwatershed study forward for approval by Regional Council.

The ROPP directs that Area Municipalities must protect ESPAs in their local Official Plans. The City's Official Plan does not allow development within Regionally Significant ESPAs. The ROPP and the City's Official Plan both require an Environmental Impact Statement for development or site alteration proposed for lands "contiguous" to an ESPA. The ROPP defines "contiguous" to in a very site-specific fashion based on topography, hydrology, and habitat and does not rely on a set distance³.

3.1.1.4 Locally Significant Natural Areas

The City of Cambridge Official Plan (Map 9) shows Environmentally Sensitive Policy Areas (ESPAs) and Locally Significant Natural Areas (LSNAs). LSNAs are designated by the City of Cambridge. There are two LSNAs shown on Map 9 of the Cambridge Official Plan. The one in the north end of the Middle Creek subwatershed has now been identified as part of the Provincially Significant Maple Grove Wetland Complex, a designation that will supercede the LSNAs policies. The other, in the downstream end of the Middle Creek subwatershed was deferred from the City of Cambridge Official Plan approval (Deferral #20). This deferral is based on a disagreement as to the environmental significance of this wooded area. However, the area of the deferral is also now identified

³ Contiguous – Defined in the Regional Official Policies Plan as "lands adjoining an Environmental Preservation Area or Environmentally Sensitive Policy Area which are situated in sufficiently close proximity that development could reasonably be expected to produce one or more of the following impacts: alterations to existing hydrological or hydrogeological regimes; clearing of existing vegetation; erosion and sedimentation into the Environmental Preservation Area or Environmentally Sensitive Policy Area; or producing a substantial disruption of existing natural linkages or the habitat of a significant species known to inhabit the Environmental Preservation Area or Environmentally Sensitive Policy Area."

as part of the Maple Grove Wetland Complex. It is also covered by a pit licence (No. 5537) and a draft approved plan of subdivision (30T-85008).

The Cambridge Official Plan directs that any permitted development within or contiguous to an LSNA must have regard for the preservation and enhancement of the LSNA. It also requires an Environmental Impact Statement for development which may impact upon a LSNA.

3.1.1.5 Regulatory Flood Plain

The City of Cambridge Official Plan (Map 10) shows the Regulatory Storm Flood Plain, where it has been calculated and subsequently mapped by the GRCA. Flood Plains⁴, shown on Figure B.3.2.1 (2004) – Regulatory Floodlines and Scheduled Areas and Map 1 – Floodline Mapping 1:8000, are assessed using the latest data and GRCA approved modeling techniques, and the flood plain is defined by the outer limit of the Regional Storm on the landscape. The Regulatory Storm is based on the flood resulting from a storm equivalent to the Hurricane Hazel storm. The known factors associated with this observed event are transposed over the drainage area under investigation to determine the flood plain through hydraulic analysis. The HWSS produced flood plain mapping for East, Middle and West Creeks, using a modeling technique reviewed and approved by the GRCA.

Pursuant to Provincial Policy, within the City of Cambridge new areas of urban development are not permitted in the Regulatory Storm Flood Plain.

3.1.1.6 Environmental Constraint Areas

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) identified sensitive and/or significant biological and physical resources based on a terrestrial (i.e. vegetation and wildlife) constraint ranking system. The constraints are an amalgamation of the environmental constraints related to steep slopes, vegetation communities and wildlife inventories completed as part of the HWSS. Watercourse systems and related fish habitats are contained within the terrestrial constraint areas. Groundwater constraints exist within some of these features and their buffers, however, for areas outside these features, groundwater is not considered a limiting factor to development provided that the storm water management (stormwater quantity, quality) and infiltration recommendations are followed.

Each vegetation polygon has been assigned a terrestrial constraint (high or medium) based on an assessment of vegetation and wildlife resources within it that are considered constraints to future development. The vegetation and wildlife constraint assessment methodologies are found in Appendix J5 and J7. The revised breakdown of scores for each vegetation unit is found in Appendix B.1 (Revised Appendix J6 (2004) – Vegetation Community Attributes and Constraint Rankings). Figure B8.3.3 (2004) – Natural

⁴ Flood plain is the limit of flooding hazard from the Hurricane Hazel Storm (based on the amount of precipitation which fell during this event - Appendix A.4.6).

Heritage Constraints shows the constraint ranking of each polygon. Areas outside the high and medium constraint features are primarily agricultural fields and cultural landscape features.

High constraint terrestrial features are predominately associated with wetlands in the Maple Grove, Speed River and West Creek Wetland Complexes. They are of high quality and sensitivity, containing significant species, high species diversity and seasonally wet soils. Other high constraint features include those which: contribute to forest interior habitat; perform a linkage function; are associated with steep slopes or with poor drainage; or are subject to groundwater discharge conditions.

High constraint areas are core areas of the Greenspace Management Strategy. Most of these are areas where development, encroachment and stormwater management ponds are not permitted based on the Provincial Policy Statement, the Regional and City Official Plan Policies, and the GRCA Wetlands Policy. These areas are:

- Watercourses and associated fish habitat;
- Regulatory Storm Flood Plain of the Speed River and East, Middle and West Creeks;
- Provincially and Locally Significant Wetlands;
- Environmentally Sensitive Policy Areas (if designated by the Region);
- Areas with steep slopes or seepage/drainage conditions.

Medium constraint areas consist of terrestrial or aquatic features that are often located close to high constraint areas. They are areas of imperfect drainage, moderate slopes, successional vegetation or areas containing lesser concentrations of significant species. While they are not as sensitive to development as high constraint lands, their features and functions frequently support those of the high constraint features. In most cases, they have been integrated as part of the Greenspace Management Strategy as Buffers, or supporting Enhancement Land Uses.

Generally, hedgerows have been left out of the high and medium constraint areas. Integration of hedgerows into the Greenspace Management Strategy may be difficult due to grading or other considerations, unless particular features are taken into account in the layout of land uses. Compensation for hedgerow loss or fragmentation should take the form of replacement plantings in strategic areas in order to maintain and enhance existing functions. Other areas outside the high and medium constraint areas such as agricultural fields currently provide for extensive movement of small to large mammals, amphibians and reptiles which will not occur under urban conditions. The implementation of the Greenspace Management Strategy with its core areas, buffers and enhancement land uses as well as stewardship initiatives is necessary to offset the loss of ecological functions associated with the urbanization of the agricultural land use matrix.

3.1.2 Protection of Significant Features

3.1.2.1 Buffers

Buffers are the spatial distance between the natural heritage feature and an area of serviced urban development. They are put in place, during the development approval process, so that the ecological features and functions of these natural areas are maintained after serviced urban development occurs. The widths of buffers can vary depending on the nature of the natural feature (sensitivity), the depth to the water table, the hydrologic and hydraulic characteristics of the subwatershed, slope, topography, the nature of the soils, the type and density of development, and the extent of regrading and change that occurs during the actual servicing and development of an area. The ‘comprehensive’ Environmental Impact Study carried out through the Subwatershed Study considered the above noted factors. However, until the Community Plan and development applications are considered, only the fact that urban development will occur is known. The type of use, density of development, servicing plans and location of compatible land uses is not yet available. As a result, buffers in the Hespeler West Subwatersheds Study were recommended to protect the natural heritage features in the absence of more detailed information relating to the specific development that will occur.

The Hespeler West Subwatersheds Study (PEIL) Report (November 2003) recommended that 30 m buffers with Enhancement Areas would generally protect the natural heritage system. The Study provided for the preparation of an Environmental Impact Statement should development be proposed within 30 m of the natural heritage feature and specifically suggested that buffers adjacent to upland woodlots could be reduced to 15 m with the completion of an Environmental Impact Statement. The Study also recommended 15 m aquatic buffers on either side of streams.

One of the main issues related to establishing buffers in a Subwatershed Study is the width of the buffers needed to protect the Natural Heritage System. The Subwatershed Study takes a broad look at the natural features of the subwatershed and the potential impacts of urban development on those natural features. Because the Subwatershed Study is the first step in implementing the development approval process for serviced urban development, it generally sets the parameters of where urban development can and cannot occur. As a result, the buffers established in the Subwatershed Study may be considered more generous than the buffers that will ultimately be required when the details of the development are known. The development process anticipates that as more details are known about a development, a more detailed Environmental Impact Statement will be able to refine the buffer widths in conjunction with consideration of the density of development, grading and servicing information. At both the Community Plan stage and subdivision stage, it is contemplated that the buffer widths will be refined through the preparation of an Environmental Impact Statement. Where there is a change to a buffer width, it is usually smaller. On occasion, however, greater buffers widths are required to accommodate complex topography or particularly sensitive habitats.

The results of the Hespeler West Subwatershed Study (PEIL) Report (November 2003) were accepted by MNR and GRCA in terms of the extent of protection required for the Natural Heritage System after serviced urban development occurs. Without the ‘comprehensive’ Environmental Impact Study of the HWSS, MNR, GRCA and the Region would have required an Environmental Impact Statement for development as set out in Table 3 and summarized as follows:

Buffer Widths – No Subwatershed Study

<u>Feature</u>	<u>Buffer Default Width</u>	<u>EIS Approval Authority</u>
Provincially Significant Wetland	120 m on Adjacent Lands	Region; GRCA
Environmentally Sensitive Policy Area	Contiguous Lands as determined by Regional EEAC	Region
Locally Significant Wetland	30 m	GRCA
Other High Constraint Areas	Negotiate with Region*, GRCA*, City*	GRCA*; Region*; City*

***Depending on nature of constraint.**

Subwatershed Studies completed in the early to mid 1990s often did not include a specific buffer width or identify an enhancement area but more recent subwatershed studies have done so. All of the studies have relied on a requirement for the preparation of an Environmental Impact Statement to either establish a buffer and enhancement area as part of a subwatershed study and/ or to refine the extent of a buffer as part of the review and approval of urban development.

Four subwatershed studies have been completed in Cambridge since 1995. (Table 1 – Buffer Recommendations – Subwatershed Studies in Cambridge). Where buffers were not specified as part of the Subwatershed Study, an EIS was required within 120 m of the significant natural features. In two of the studies buffers were identified. In the case of the Forbes Creek Subwatershed Study, buffers of 50 m were recommended with the opportunity to reduce them to 30 m subject to completion of an Environmental Impact Statement⁵. In the case of the Moffat Creek Subwatershed Study buffers ranging from 120 m to 10 m were recommended, based on the amount of information and type of feature being protected.

⁵ The Forbes Creek Subwatershed Study (August 12, 2002) indicates that the wetlands located downstream of Blackbridge Road are reliant on a shallow water table which is perched on finer textured soils, and fed by shallow groundwater flows (interflow) from the surrounding agricultural lands and by seasonal flows originating from upstream. Based on averaged soil condition, a 50 m buffer “threshold” would accommodate the majority of shallow groundwater functions (i.e. storage, water quality buffering and shallow flows) that sustain key habitat in the wetland south of Blackbridge Road. This threshold is based on the assumption that urban uses will predominate in the vicinity. The buffer could potentially be reduced (minimum of 30 m recommended) in some areas subject to site-specific studies of shallow groundwater and affected biological resources.” (p. C-31)

Cambridge Council has approved all of the above Subwatershed Studies and implemented the results of these studies through development applications. Most developers have prepared an Environmental Impact Statement to establish and/or reduce the buffers. The approved subwatershed studies cover only a small part of the City, so Council also deals with development applications in the absence of a subwatershed study. In these cases, an Environmental Impact Statement is required. Examples of recent development approvals where buffers have been established through the submission of an EIS are contained in Table 2 – Buffers Established Through Approval of Development Proposals.

Development has already taken place in some areas of the Hespeler West Subwatersheds. The Idylwild Subdivision was developed by ‘Arriscraft’ in the 1980s/1990s as an estate residential development. As these developments were draft approved before the Provincial Wetland Policy Statement came into effect in May, 1992, no formal buffers were required and the changes, if any, to the wetlands were not recorded. Current conditions indicate that areas in the Middle Creek Subwatershed and along the Speed River adjacent to the estate residential lots are still Provincially Significant Wetlands. The same situation exists adjacent to other estate residential lots developed in the former Township of Waterloo. If there is no “significant intensification” of these areas, no buffers will be required as it has been demonstrated that one is not needed by virtue of the fact that the significant natural features and the estate residential development coexist. Severance of a single property on private services would not require a buffer but multiple severances made possible by City services would be considered “significant intensification”.

Development of the City’s industrial lands north of Maple Grove Road and east of Fountain Street included a 15 m aquatic buffer along Middle Creek. The cut and fill operation in the floodplain, approved by the GRCA in September 2001, resulted in the removal of a section of natural vegetation (formerly a LSW) subsequently identified as PSW.

Development of the Toyota lands at Maple Grove Road and Fountain Street during the mid 1980s saw the relocation of a portion of West Creek and approval for rerouting of the flows from the area west of Fountain Street to Freeport Creek. In 2000, during development of Phase I of the Loblaws site, north of Maple Grove Road, further flows (for storms less than Regional Storm) were diverted to Freeport Creek. The current requirements for the preparation of Subwatershed Studies and the protection of significant natural features were not in place at that time so specific buffers were not required.

The other significant ‘development’ approved in the Middle Creek subwatershed is the aggregate extraction license on the Arriscraft lands, north and south of Briardean Road. The older license (License 5537) was first issued in the early 1970s with no requirement for natural area buffers as it predated the 1992 Provincial Wetland Policy Statement. The more recent license (46162) does include natural areas buffers. The approved pit license shows a paige wire fence located 1 m minimum outside the dripline of the wooded area in

the north east corner of the licensed area (only the interior portion of the wooded area is part of the Maple Grove PSW). There is also a requirement for a paige wire fence (with no location direction on the plan) for the wooded areas in the south and west portions of the licensed areas. These are now both part of the Maple Grove PSW identified during the HWSS.

The process that has been generally used to establish buffers has been the preparation of an Environmental Impact Study. It is a process that is familiar to Council, the environmental agencies (MNR, GRCA, Region) and the development industry. The current policy of the Province, GRCA, the Region or the City requires the preparation of an Environmental Impact Statement if development is proposed within 120 m of a Provincially Significant Wetland, within 30 m of all other wetlands, or “contiguous to” an ESPA (Table 3 – Width of Study Area to Establish or Change Buffers). If the Hespeler West Subwatersheds Study had been approved with the recommended 30 m buffer as proposed in the Hespeler West Subwatersheds Study (PEIL) Report (November 2003), development would have been permitted up to the 30 m limit and an EIS would have been required if development was proposed within 30 m of a significant natural feature.

Where the process of establishing or refining buffers through the use of an Environmental Impact Statement has been proposed, it is important that the scope of an EIS can be readily determined. Where necessary, some subwatershed studies have included the requirements for the preparation of an EIS. In the case of the Hespeler West Subwatersheds Study, the GRCA has an adopted wetland policy for all wetlands in the Grand River watershed and they are developing guidelines for the preparation of an implementing EIS. The Region of Waterloo does have guidelines for the preparation of an EIS adjacent to an Environmentally Sensitive Policy Area (Appendix A.6.5) and has over 25 years of experience in reviewing and approving them. The City has been following the Region’s guidelines for the preparation of an EIS for the consideration of development adjacent to Locally Significant Natural Areas. Table D2.5.1 (2004) – Scoped and Full Site EIS Requirements (2004) also identifies the scope for an Environmental Impact Study.

It seems appropriate to relate the buffer policies in the West, Middle and East Creeks to existing Provincial, Regional and City policies and processes currently in place for processing development applications because the purpose of the buffer policies is to protect the natural heritage features after development occurs, develop appropriate context sensitive buffers and give more certainty to the known amount of developable land.

Responsibility for the protection of the significant natural heritage features lies with several agencies. The MNR ensure that Provincially Significant Wetlands are protected at the “plan input” level (Official Plan, Subwatershed Study) and in Environmental Assessments conducted pursuant to the Environmental Assessment Act. In 1996, the Province delegated responsibility for protecting Provincially Significant Wetlands and woodlands at the “plan review” level to the Region. The Region subsequently contracted

with the GRCA to take responsibility for Provincially Significant Wetlands outside ESPAs, while retaining responsibility for Provincially Significant Wetlands within ESPAs and for woodlands. The GRCA Wetland Policy requires review of all wetlands over 0.5 ha. The GRCA also regulates alterations to watercourses and is contracted by the Federal Department of Fisheries and Oceans to protect aquatic habitat. Generally there is a shared responsibility with the City of Cambridge for the protection of the other significant natural features (upland woodlots, plantations, steep slopes, seepage areas) through the development approval process including the preparation of the Community Plan.

The MGWA prefers and has presented a case for recommending that specific buffers be established now. The Association supports context sensitive buffers which consider the quality of the features being protected and which acknowledge the advanced state of human disturbance existent:

- Wetland buffers that do not exceed 15 m.
- Upland forest buffers that do not exceed 3 m.
- Plantations buffered by 1 m.
- No buffering of other cultural features.

The buffer sizes that the MGWA is recommending may be consistent with the results of an Environmental Impact Statement when the buffer width can be related to specific planned developments (including, density, servicing and grading). The MGWA advocates orthogonal environmental protection in which all buffer sizes are based on actual science and accurately documented environmental factors. If there is any erring on the side of caution, the MGWA prefers that the balancing economic and social factors be documented and considered in any recommendation.

Having reviewed the Hespeler West Subwatersheds (PEIL) Report (November 2003), the policies of the MNR, GRCA, Region and City, background material on buffers from environmental specialists, and submissions from the MGWA, the following was proposed:

- (1) Aquatic buffers of 15 m (measured from the “top of bank”) for East, Middle and West Creeks.
- (2) No buffers where the natural heritage feature/buffer and proposed development are separated by an existing public roadway, regardless of the width.
- (3) No buffers for significant natural heritage features adjacent to existing estate residential development where no significant intensification is proposed as a result of the community plan.
- (4) No buffers (established in the HWSS) for the Other High Constraint Areas (upland woodlots, plantations, steep slopes, seepage areas) listed on Table 7, and shown on Map 4 - Detailed Buffers, until a more detailed EIS is completed as part of the preparation of the Community Plan. Most of these areas are south of Maple Grove Road along the creek corridors and in the existing Cambridge

- Urban Area. Context sensitive buffers would be developed as more detailed information on the density and type of urban development is known.
- (5) 30 m buffers adjacent to the boundary of a Provincially Significant Wetland or Locally Significant Wetland. If a developer proposes development within the 30 m, they would be required to complete an Environmental Impact Statement requiring approval of the GRCA.
 - (6) 30 m buffers adjacent to the boundary of a Regional Environmentally Sensitive Policy Area. If a developer proposed development within 30 m, they would be required to complete an Environmental Impact Statement requiring approval of the Region.

At the Working Committee meeting of September 28, 2004, Chris Gosselin, Manager, Environmental Planning, Region of Waterloo, reported on the results of the environmental monitoring regarding the adequacy of buffer widths and the impacts of development on the natural features that was recently carried out on the west side of Waterloo. As a result, he is now suggesting that the proposed buffer policy for areas contiguous to Regional ESPAs take a more cautious approach and the Default Buffer width apply. Therefore, buffer widths adjacent to an ESPA would be determined through a site-specific EIS at the time of development.

Clause (6) of the proposed buffer policy would need to be revised as follows:

- (6) Buffers on lands contiguous to a Regional Environmentally Sensitive Policy Area to be determined through an Environmental Impact Statement at the time development is proposed.

The proposed buffers, shown on Map 4 – Detailed Buffer Map, have the following advantages over that originally recommended in the Hespeler West Subwatersheds Study:

- Clearly provides for more detailed analysis and adjustment of buffer sizes during the development approval process (community plan or subdivision).
- Identifies agencies that have jurisdiction for the approval of buffers related to high constraint natural areas including GRCA and the Region of Waterloo.
- Requires further study as part of the development of the Community Plan for determining buffers in areas where the City has more flexibility to establish buffer widths, no clear policy currently exists and/or impacts of development may be more readily mitigated.

The proposed buffer policy would provide developers with the option of accepting the 30 m buffer for protecting a Provincially Significant Wetland or a Locally Significant Wetland. The developer has the option of undertaking an EIS when development is proposed within 30 m of such a feature. If development is proposed on lands contiguous to an ESPA, an Environmental Impact Statement will be required to establish the buffer regardless of distance. Context sensitive buffers would be established as part of the preparation of the Community Plan for the other high constraint areas including upland forests and plantations.

Table 3 – Width of Study Area to Establish or Change Buffers compares the requirements if there is no Subwatershed Study, the Summary Report 2004 proposal and the MGWA proposal. It should be noted that the buffer widths proposed by the MGWA are not acceptable to outside approval Agencies (MNR, GRCA and Region) without the preparation of an EIS. In the interim, the agencies could use the default adjacent/contiguous buffer values for the study area for an EIS as if no Subwatershed Study had been done or use the buffer width proposed in the HWSSWC Summary Report 2004. Many of the landowners do not support the above noted buffers but do support the buffers proposed by the MGWA.

3.1.2.2 Enhancement Land Uses and Stewardship Program

The next set of ‘tools’ for the protection of the significant environmental features and function are Enhancement Corridors (Land Uses) and a Stewardship Program. In order to implement the requirements of the Provincial Policy Statement, Regional Official Policies Plan and the Cambridge Official Plan, the Hespeler West Subwatersheds Study needs to not only protect the significant environmental features and functions but also use a system wide approach in order to sustain the whole natural system after serviced urban development occurs not just individual features.

The Provincial Policy Statement requires that the diversity of natural features in an area, and the natural connections between them, be maintained, and improved where possible. Along the same lines, the Regional Official Policies Plan requires that interconnections among significant natural areas be recognized, maintained and enhanced to prevent further fragmentation and degradation of the ecological integrity of the landscape. The Regional Official Policies Plan also requires that development should be viewed as an opportunity for enhancement of the natural features and functions of the Natural Habitat Network.

The Cambridge Official Plan contains a more general policy to maintain and improve the City’s natural environment, including the linked open space system, in the interests of overall ecosystem integrity.

Buffers alone are inadequate to maintain existing levels of wildlife movement or the presence of significant wildlife species. An agricultural land use constrains wildlife movements less than urban land uses. Therefore, there is a need to maintain habitat corridors and linkages after urban development.

The intent of Corridors/Linkages is to provide an area of unimpeded space in order to:

- create connectedness among habitat patches;
- allow plants and animals to sporadically or regularly intermingle to reduce isolation and inbreeding;
- allow populations to recolonize should extinction occur;

- consolidate forest interior habitat (minimum 100 m from any edge) and successional meadows for breeding bird species; and
- reduce heat island effects of urban development.

Recommended Enhancement Land Uses include:

- active/passive recreation;
- stormwater management facilities; and
- complementary land uses. These could include schoolyards or large landscaped features associated with industrial/commercial development (e.g. campus style) or higher density cluster residential development.

A Stewardship Program will help to maintain/enhance the system connectedness by:

- 1) encouraging property owners to plant native species and avoid invasive species;
- 2) making property owners aware of the significance and sensitivity of the Natural Heritage Features to avoid inadvertent impacts; and
- 3) creating a community partnership to maintain and enhance the natural heritage features.

The recommended Enhancement Land Use Areas are shown on Figure C3.3.1 (2004) – Greenspace Management Strategy. Generally the Hespeler West Subwatersheds Study Greenspace Management Strategy is working to achieve a 50 m enhancement corridor along West and East Creeks and a 200 m corridor along Middle Creek as shown on Figure C1.2.1 (2004) – Conceptual Watershed Linkage and Enhancement Areas. The width of Enhancement Corridors/Linkages includes the width of any core natural features, watercourses, flood plains and buffers.

The corridor/linkage area along West Creek is currently of sufficient width (over 50 m) and of an incised nature such that the local linkage function can be maintained by the 30 m LSW buffer. Enhancement Land Uses located east of Boxwood Drive would assist in linking isolated features.

The Middle Creek corridor provides a weak link between the Speed and the Grand Rivers. Chilligo Creek is also considered to be a primary/corridor link. Given the proposed urban development in north Cambridge, it may be more realistic to look to Chilligo Creek to perform that function. The connection function of the Middle Creek corridor could be strengthened through maintaining and enhancing its connection to Chilligo Creek. Currently, the connection to Chilligo Creek is not strong – just the grass areas adjacent to the fence rows. No detailed study of annual corridor movement has been included in the HWSS. Therefore, maintaining the linkages north of Maple Grove Road becomes very important. When considering development north of Maple Grove Road on current agricultural lands, habitat cover in the corridor could be enhanced through enhancement land uses and floodplain revegetation. South of Maple Grove Road where there has been moderate urban development (particularly estate residential), a corridor could be enhanced through a stewardship program. On agricultural lands, the

corridor/linkage can be achieved through Enhancement Land Uses and flood plain revegetation. This will need to be considered in more detail when preparing the Community Plan.

Together the Enhancement Land Uses and Stewardship Program, after urban development occurs, will minimize:

- impacts to core vegetation communities
- fragmentation of natural habitats
- impacts to wildlife
- impacts to ecological functions
- impacts to future urban land uses

3.1.2.3 Aquatic Remediation Strategy

The HWSS (PEIL) Report (September 2004) found that the degree of existing alteration to West, Middle and East Creeks coupled with the increased development occurring in the area might put these watercourses into a rapid state of decline if no management strategies are put in place in the near future. Rehabilitation scenarios for the three creeks within the Hespeler West subwatersheds were identified in Section C of the HWSS (PEIL) Report (September 2004). Several options were discussed for these highly altered fluvial systems⁶. The advantages and disadvantages of these suggested approaches were discussed and recommendations made regarding the system-wide options. The preferred system-wide management alternatives were ranked as follows:

System-Wide Aquatic Management Options

1. Protect and enhance existing riparian⁷ buffers.
2. Establish naturally vegetated⁸ riparian buffers in areas where none currently exist in undeveloped areas and conduct site-specific remediation strategies for immediate problem areas. For estate residential properties, riparian buffers may include appropriate landscaping practices.
3. Remove or modify culverts that are barriers to upstream fish migration.

⁶ Large sections of West, Middle and East Creeks have been ditched or channelized, including all of Middle Creek north of Maple Grove Road; West Creek south of Highway 401, East Creek north of Maple Grove Road and East Creek immediately west of Hespeler Road. Under current conditions, portions of the watercourses tend to dry up in the late summer.

⁷ Riparian buffer – “A riparian zone has no definite boundaries but is the larger transitional area between water surface and uplands. Immediately adjacent to water bodies, it includes streambanks, plant and animal communities and the flood plain. Under natural conditions, riparian vegetation is usually quite diverse and water-loving plants are more abundant than in upland areas.” Taken from – Best Management Practices: Buffer Strips. Gov’t of Canada and Ontario, Ontario Cattleman’s Association.

⁸ Naturalization is the process of stabilizing and maintaining the riparian zone so as to be in a state which resembles the equilibrium of a system with minimal human disturbance. It may include the planting of native species and progressive reduction or elimination of non-essential pesticide use. Naturalization will allow the area to regenerate through natural means. Naturalization relies entirely on the free will and volunteerism of the immediate property owners through the auspices of the stewardship program. Existing and preferred practices will be respected in most cases.

4. Address negative impacts of on-line ponds such as impediments to fish passage and water quality impacts.

The preferred creek-based management alternatives were ranked as follows:

Creek-Based Aquatic Management Options

1. East 1 – Rehabilitate the lower sections (previously channelized) of the creek from the start of the Regional Road #24 alteration to the Speed River.
2. East 2 – Rehabilitate the entire lower section downstream of Beaverdale Road (including establishing a formal riparian buffer downstream of Beaverdale Road within the residential property. For existing residential properties, the riparian buffer may include appropriate landscaping practices.)
3. West 3 – Develop and implement a monitoring program for the reaches upstream of Royal Oak Drive to assess ongoing channel adjustments due to loss of upstream catchments area.
4. Middle 3 – Conduct site-specific treatments upstream of the on-line pond in the straight section between the path and Briardean Road (including removal of the culvert beneath the path and reestablishing a meandering pattern to the creek upstream).
5. East 3 – Modify stream so that the waterfall is no longer a migration barrier.
6. East 4 – Rehabilitate the section downstream of Maple Grove Road.
7. Middle 1 – Rehabilitate the section of creek upstream of Hunt Club Road to the on-line pond (previously gabion-lined).
8. West 1 – Rehabilitate the lower portion of the creek in Riverside Park
9. East 5 – Protect water quality and quantity of the headwater wetlands upstream of Maple Grove Road from development.
10. Middle 5 – Rehabilitate, using natural channel design principles, Maple Grove Road to the headwaters area.
11. Middle 4 – Reestablish a natural pattern to the creek along the Maple Grove Road channelization.
12. West 2 – Remove the dam and drop structure at Royal Oak Drive.
13. Middle 2 - Address negative impacts of on-line ponds such as impediments to fish passage and water quality impacts. The remediation strategy is to respect the positive contribution of ponds to the habitat.

The location of the above aquatic management options are shown on Figure C3.1.3 (2004) - Aquatic Rehabilitation Strategy.

3.2 A MANAGEMENT STRATEGY FOR GROUNDWATER AND SURFACE WATER DURING AND POST URBAN DEVELOPMENT

3.2.1 Groundwater Recharge

The groundwater aquifer underlying the Hespeler West Subwatersheds provides base flow to both Hespeler West creeks (West, Middle and East) and likely Chilligo Creek, a coldwater stream lying to the northeast. Base flow is the amount of water that sustains

the creek system and is critical during periods of no rainfall. It is delivered from groundwater discharge and is representative of groundwater conditions. Maintaining current infiltration rates (which recharges the aquifer) after development is an important consideration for lands outside the greenspace system.

Lands generally south of Middle Creek and Maple Grove Road are undergoing urban development, with future development form and servicing of this area to be determined through completion of a community plan and servicing studies. Lands to the north are generally within the Region's Countryside Line and considered part of the potential Greenfield Development Area in the Regional Growth Management Strategy (Figure C2.1.1 (2004) – Countryside Line). Generally, the density and degree of lot coverage may impact surface water infiltration properties of the area. Buffer requirements outlined in the Greenspace Management Strategy will provide some protection for core natural areas (especially wetlands) from groundwater disruption related to adjacent development activities. Planning for compatible land uses in the Enhancement Areas of the Greenspace Management Strategy will also aid in maintaining groundwater recharge.

3.2.2 Stormwater Management

One of the driving issues of the Hespeler West Subwatershed Study is the future urban development of the area.

Key findings and considerations of the hydrologic analysis include:

- Highly permeable soils in the watershed result in relatively low runoff and contribute to groundwater recharge. This provides base flow to watercourses within and adjacent to the watersheds and sustains wetland features.
- The watersheds are naturally buffered from extreme runoff events because of natural storage areas, wetlands, and depressions in the headwaters areas.
- Development with uncontrolled stormwater runoff will cause increases in peak flows and flooding in downstream areas, loss of recharge, and stream erosion.

Analysis through the HWSS and conventional practice dictate that implementation of Stormwater Management (SWM) practices will be required to mitigate hydrologic impacts of development. All facilities will be required to meet stormwater management targets set out in the plan and designed in accordance with the standard practices at the time of the submission (i.e. Current version of MOE Stormwater Management Planning and Design Manual, March 2003).

The overall strategy has three main goals:

- To maximize infiltration across the subwatershed,
- To protect the quality of the surface and groundwater,
- To minimize impact of post development conditions on downstream areas (i.e. stormwater quantity).

Implementation of stormwater management will require that designs be implemented with the full treatment train approach considering at-source, conveyance, and end of pipe controls. The water management strategy has screened primary facilities to include lot-level infiltration, soak away pits, and extended detention wetlands. Secondary facilities may also be implemented including: oil/grit separators, filter strips, grassed swales, rooftop and parking lot controls, and reduced lot grading outside building envelopes. Stormwater criteria and targets are further outlined in the following sections.

- **Infiltration**

Infiltration targets for the HWSS area are to maintain or enhance existing infiltration rates. Subcatchment based infiltration targets to be met through development are presented in Tables B1.5.5 to B.1.5.8 of the HWSS (PEIL) Report (September 2004). Subcatchment infiltration is to be maintained as distributed throughout the development. Maintaining density requirements and lot sizes that maximize infiltration is a consideration of the plan and community planning process. Infiltration of road runoff will require pre-treatment.

- **Stormwater Quality**

Sizing and design of SWM facilities are to meet MOE “Enhanced” water quality control. This level of control is required based on habitat issues related to the HWSS watercourses, Speed River, and PSW areas. It is anticipated that a combination of control measures outlined in section C3.2 of the HWSS (PEIL) Report (September 2004) will be required to meet water quality targets.

- **Stormwater Quantity**

SWM will be required to address stream erosion potential and peak flow rates on a subcatchment basis. Extended detention of the 25 mm runoff volume using a 48-hour draw down rate will be required to address stream erosion potential. Allowable peak flow rates for return period events by subcatchment are summarized in Table 5.4.3.1 “Unit Flow Rates” of the TSH Final Report (Oct. 2004) attached as Appendix B.3. Allowable outflow rates for developments will be the applicable subcatchment outflow prorated by area. Additional considerations include ensuring that the subcatchment hydrograph peak is not advanced and should be maintained within 75% or greater of the existing time to peak of the calibrated hydrograph.

3.3 POTENTIAL AGGREGATE RESOURCE EXTRACTION IMPACTS

The Ontario Geological Survey identifies and evaluates sand, gravel and bedrock resources in the province. For the Hespeler West Subwatersheds Study area, the Aggregate Resources Inventory of the Regional Municipality of Waterloo, Paper 161 dated 1998, by the Ontario Geological Survey is the most recent report. A sand resource of primary significance (identified in the report as Number 26) generally underlies an area north of Highway 401 and south of Maple Grove Road. A sand resource of tertiary significance is found in the northeast quadrant of the study area (Figure B7.4.1 (2004) – Licenced Aggregate Areas).

Deposits of primary significance are areas in which a major resource is known to exist and may be reserved wholly or partially for extractive development and/or resource protection. The area of primary significance in the Hespeler West Subwatersheds Study area has been identified in the past in the Regional Official Policies Plan and the Cambridge Official Plan. However, subsequent to the Toyota development occurring over the westerly third of the deposit, it was removed from the mapping in those plans.

Deposits of tertiary significance are not considered to be important resource areas by the Province because of their low available resources and/or because of possible extraction difficulties. These areas are unlikely to support large-scale extraction operations and are not identified in the Regional or the City Official Plans.

There are two licenced pits in the Hespeler West Subwatersheds Study area. Both are found in the sand resource of primary significance. On the easterly portion of the deposit, east of Speedsville Road, north of the Speed River Wetland Complex is a Category 3 Class A aggregate operation licenced under the Aggregate Resources Act (Licence #5537). This area was first licenced under the old Pits and Quarries Act in 1971-72, and revised in 1996. North of Briardean Road, just east of Speedsville Road, is another Category 3 Class A licenced aggregate operation (Licence #46162), approved and licenced in 2000. These licenses are both issued to Arriscraft International Inc. and both pits supply sand for the manufacture of stone at the plant on Speedsville Road. Under the Aggregate Resources Act, all activities within these licenced areas are governed by the terms of the licenses, the site plans and the operating standards prescribed by the regulations under the Act. The areas of the licenses are shown on Figure B7.4.1 (2004) – Licenced Aggregate Areas.

The older licence (#5537) contains within it a portion of the provincially significant Maple Grove Wetland Complex. The licence allows extraction to the water table that would eliminate the wetland feature within the pit area. However, an analysis conducted by MNR staff has indicated that even if this feature were removed, the remainder of the wetland complex would still score as provincially significant. Newer licences approved by the Ministry of Natural Resources do not generally allow extraction within PSWs and seek to mitigate impacts of extraction on any which are nearby. The newer licence (#46162) allows extraction to within 1.5 metres of the water table. The surrounding wooded areas which are part of the Maple Grove Wetland Complex (although they were not evaluated as such when the pit licence was granted) are excluded from the licenced areas, and some buffering was applied. The approved pit licence shows a paige wire fence located 1 m minimum from the outside dripline of the wooded area. Only the interior portion of the wooded area is part of the Maple Grove PSW. There is also a requirement for a paige wire fence (with no location shown on the plan) for the wooded areas in the south and west portions of the licenced areas. They are now both part of the Maple Grove Wetlands Complex PSW identified during the HWSS.

Both sites are to be rehabilitated with grassy vegetation. The older licence (#5537) has a draft approved plan of residential subdivision (File No. 30T-85005) on it. The draft approval was for large lots on municipal water and private septic systems. The developer

does not plan to pursue the draft plan as it is approved, and is awaiting the completion of the subwatersheds study and the community plan/servicing studies to determine final land use. Future urban development of the pit area will require consideration of SWM targets identified through the Hespeler West Subwatersheds Study and summarized in Section 3.2.2 of this report.

The nature and extent of aggregate extraction impacts on environmental processes is not well documented. Impacts may be of a positive or a negative nature. Impacts of aggregate extraction on the natural environment are most severe when extraction is permitted below the water table. As indicated above, neither of the pit licences in the HWSS area allows extraction below the water table. There are well protection agreements with nearby residents that oblige Arriscraft to address any impacts to drinking water wells within 120m of the newer licence (as a precaution). These agreements were signed if a property owner wished to enter into such an agreement. There are no agreements for the southerly licence because of its age.

The following are some of the potential environmental impacts of the Arriscraft aggregate extraction above or to the water table, adapted from the Blair, Bechtel and Bauman Creeks Subwatersheds Plan (CH2M Gore and Storrie Limited, 1997):

1. Potential water quantity impacts from above-water table aggregate extraction:
 - Changes to groundwater levels from:
 - Seepage at perched water tables
 - Increased local recharge in exposed areas
 - Changes in surface water volumes from:
 - Reduction of runoff to watercourses

2. Potential water quality impacts from above-water table aggregate extraction:
 - Increased temperatures from:
 - Decreased vegetation cover
 - Decreased attenuation of seasonal fluctuations through groundwater flow
 - Increased sedimentation from:
 - Increased erosion from stripped and excavated areas
 - Material washing and processing activities
 - Introduction of contaminants from:
 - Fuel and other material spills during operations
 - Waste disposal
 - Dust suppressants
 - Secondary processing sites

3. Potential terrestrial features (especially wetlands) impacts from above-water table aggregate extraction:
 - Decreased vegetative cover either through direct removal or indirectly through edge loss
 - Decreased surface runoff to wetlands due to local increases in recharge

The Ministry of Natural Resources has indicated that they have no compliance issues with either licence, so there is nothing compelling the Ministry to collect baseline data to assess impacts (Appendix A.8.15). The most obvious impact of the older licence (#5537) will be the direct loss of wetland area within the central portion of the pit. The Hespeler West Subwatersheds Study Greenspace Management Strategy may not be fully implemented within the licenced pit areas due to future changes to the natural features resulting from extraction.

3.4 IMPLEMENTATION OF KEY RESULTS DURING DEVELOPMENT

3.4.1 What is Development?

The policies for the protection of significant natural features in the Provincial Policy Statement, Regional Official Policies Plan and the City of Cambridge Official Plan apply when ‘development’ occurs. Development is defined by the Provincial Policy Statement as follows:

“Development means the creation of a new lot, a change in land use, or the construction of buildings and structures, requiring approval under the Planning Act; but does not include activities that create or maintain infrastructure authorized under an environmental assessment.”

New lots are created by plan of subdivision, plan of condominium or severance. Usually lots created by severance already front on an existing road and are few in number. Subdivisions create new streets and new lots. Condominiums create new ‘lots’ within a multiple unit development.

Land use policy is established in an Official Plan. Land use is regulated by the Zoning By-law. Land use is changed by an amendment to the Zoning By-law and/or the Official Plan. If the change to the Zoning By-law is minor, it may be done by obtaining a variance rather than a rezoning.

Construction of buildings is only considered to be development for the purposes of the Provincial Policy Statement if it also requires an approval under the Planning Act. Building Permit applications must conform to the Zoning By-law for the use and for the regulations (setbacks, parking, etc). If they do not conform, they require an approval under the Planning Act and would be considered ‘development’ in this context.

The Provincial Policy Statement (Section 2 – Resources and Section 3 – Public Health and Safety) sets out the following protection requirements for natural features when considering ‘development’:

- Ensure that there will be no negative impacts on the natural features or on the ecological functions because of urban development
- The diversity of natural features in an area, and the natural connections between them be maintained, and improved where possible
- Ensure that the quality and quantity of groundwater and surface water and the function of groundwater recharge/discharge area, aquifers and headwaters will be protected and enhanced
- Direct development to areas outside of hazardous lands due to flooding, erosion or steep slope

The protection requirements for new ‘development’ in the Regional Official Policies Plan require that interconnections among significant natural areas should be recognized, maintained and enhanced to prevent further fragmentation and degradation of the ecological integrity of the landscape.

The Cambridge Official Plan policy is to maintain and improve the City’s natural environment, including the linked open space system of the Grand and Speed Rivers and their tributaries, fish habitat, wetlands, woodlands, groundwater and atmospheric resources in the interests of overall ecosystem integrity.

3.4.2 Interim Land Use Management Strategy

The Hespeler West Subwatersheds Study Summary Report 2004 identifies the significant natural features in the West, Middle and East Creek subwatersheds including Provincially Significant Wetlands, Locally Significant Wetlands, potential Environmentally Sensitive Policy Areas, Other Constraint Areas (Woodlands, Groundwater Discharge, Steep Slopes) and Flood Plains (including fisheries habitat). It also recommends ways to protect these significant natural features following serviced urban development.

a) South of Maple Grove Road

Cambridge Council, through its annual Staging of Development Report, has identified the area south of Maple Grove Road to Highway 401 between Fountain Street and Hespeler Road as the next new development area within the City of Cambridge. Following completion of the Subwatersheds Study, the City will prepare a Community Plan to provide the framework for processing development applications for new serviced urban development.

This area is currently designated ‘urban’ in both the Regional Official Policies Plan and the City of Cambridge Official Plan. Through the preparation of the Community Plan, specific land uses (Residential, Industrial, Institutional, Commercial and Open Space) will be identified. Under the Cambridge Official Plan, Provincially Significant Wetlands, Locally Significant Wetlands, potential Environmentally Sensitive Policy Areas and

Flood Plains are usually considered as no development areas and would be identified as Open Space. Other areas identified as High Constraint in the Subwatersheds Study will be studied further during the preparation of the Community Plan and may be identified as Open Space in the Community Plan. During the preparation of the Community Plan, further environmental analysis is required to confirm buffer widths and enhancement land uses. Some of these areas will be identified as Open Space; others will be identified as Residential, Commercial, Industrial or Institutional.

Until the Community Plan is completed, implementation of the Subwatersheds Study will rely on the current Federal, Provincial, Regional and City policies such as the Provincial Policy Statement, GRCA Wetlands Policy, Regional Official Policies Plan, City of Cambridge Official Plan and others. The current Official Plan designations and zoning will remain in place. Following the completion of the Community Plan, the Regional and Cambridge Official Plans will be amended to recognize the results of both the Subwatersheds Study and the Community Plan. Based on Policy 9.3.1 of the Cambridge Official Plan, amendments may designate lands for a specific land use, identify major roads and pedestrian/trail linkages and identify major natural features, parks and open spaces.

b) North of Maple Grove Road

The area within the West, Middle and East Creeks subwatersheds north of Maple Grove Road, is being considered for longer-term future urban serviced development under the Region's Growth Management Strategy (see Figure C2.1.1 (2004)). The lands are currently designated 'rural' in both the Regional Official Policies Plan and Cambridge Official Plan. Over the next few years, the Region is undertaking a series of studies to implement the Regional Growth Management Strategy and to identify and refine the Countryside Line that defines the limit of the serviced urban development area to 2041. The results of these studies, together with the Hespeler West Subwatersheds Study will be implemented through future amendments to the Regional Official Policies Plan and the Cambridge Official Plan.

In the interim, new serviced urban development will not be permitted in this area. Further 'development' proposals in this area would continue to be guided by the Provincial Policy Statement, GRCA Wetland Policy, GRCA approved Floodlines, Regional Official Policies Plan, City of Cambridge Official Plan and City of Cambridge Zoning By-law.

c) Specific Properties

During the preparation of the Subwatersheds Study and its subsequent review by the HWSSWC, some land use changes are appropriate for consideration now:

i) McCrae Property – 1755 Speedsville Road

Mr. Murray McCrae has requested that the zoning on his property be changed from OS1 to recognize the existing single family dwelling on the property. The detailed correspondence on the McCrae property is found in Appendix A.9.2.7. The property is zoned OS1 under the provisions of the City of Cambridge Zoning By-law. The south half of the property is within the Regulatory Floodline of Middle Creek and a portion of the north half of the property is being reviewed by the Region as a potential ESPA. The house and shed are outside both of these features. More detailed survey information is needed to determine whether the garage is outside the flood plain. Based on a site visit, it does appear that a portion of the property could be rezoned to recognize the existing residential use. This could be undertaken as part of the next Omnibus Zoning By-law early next year.

ii) Immaculate Heart of Mary School – 1370 Maple Grove Road

Mr. Domenic Posella, on behalf of Immaculate Heart of Mary School, has requested that the Official Plan be amended to remove the Open Space designation on the School property. The detailed correspondence is contained in Appendix A.9.2.6.

3.4.3 Greenspace Management Strategy

The Greenspace Management Strategy identifies the Significant Natural Heritage Features (Provincially Significant Wetlands, potential Environmentally Sensitive Policy Areas, Locally Significant Wetlands and Other High Constraint Areas) and provides the framework for the protection, enhancement and use of these areas after serviced urban development occurs.

The first step in implementation of the Greenspace Management Strategy will be the preparation of a Community Plan for the area generally bounded by Maple Grove Road, Hespeler Road, Highway 401 and Fountain Street. As part of the implementation of the Greenspace Management Strategy through the Community Plan, an Environmental Impact Study will be completed to establish buffer widths for the Other High Constraint Areas shown on Map 04 (2004) Detailed Buffers. The Community Plan will also identify long-term land ownership of the significant natural heritage features and the protective measures.

3.4.4 Aquatic Rehabilitation Strategy

The preferred management option for the watercourses within the study area includes retaining some sections while rehabilitating other portions of the channels. These actions will assist in rehabilitating the entire watercourse system to an improved state that better reflects a stable and well-functioning natural system. These actions could be encouraged through the Stewardship Program for the private landowners in the subwatersheds.

Funding assistance may be available from various environmental programs. Aquatic rehabilitation could also be required as part of the development approvals through the Community Plan and servicing studies. It could also be implemented through Class Environmental Assessments done for municipal infrastructure projects. See Figure C3.1.3 (2004) for details of the Aquatic Rehabilitation Strategy.

Portions of Middle Creek are subject to the Drainage Act (Hunsperger Municipal Drain – Figure A3.3.1, HWSS (PEIL) Report (September 2004). Any future work in the area must consider this status. All recommendations of the HWSS that pertain to the Hunsperger Drain are to be considered in any future Drainage Report. If future works do impact the Drain, the City will be required to modify the catchment area and update the assessment. Abandonment will require a Drainage Report as prepared by a Professional Engineer. However, there is no priority placed on abandonment as a result of this study.

3.4.5 Environmental Impact Studies

Current Provincial, GRCA, Regional and City policies do not allow development within the following areas:

- Provincially Significant Wetlands
- Locally Significant Wetlands
- Regulatory Floodplains
- Environmentally Sensitive Policy Areas

The Hespeler West Subwatersheds Study has been conducted to the level of a ‘Comprehensive’ Environmental Impact Study, which generally defines the limits of development and recommends Management Strategies under future development conditions. The type of development and its servicing requirements are determined during the preparation of the Community Plan. As part of the preparation of the Community Plan, servicing Environmental Assessments will be completed as well as an Environmental Impact Study for the preparation of context sensitive buffers adjacent to ‘Other High Constraint Areas’ shown on Map 04 (2004) – Detailed Buffers.

Should developers wish to develop within 30 m of a Provincially Significant Wetland, Regional Environmentally Sensitive Policy Area or Locally Significant Wetland, submission of an Environmental Impact Statement would be required.

Should Council wish to not approve the 30 m buffer and rely on the current policy of the MNR, GRCA, Region and City, developers would be required to submit an Environmental Impact Statement on any lands “adjacent to” or “contiguous to” the significant natural feature (Table 3 – Width of Study Area to Establish or Change Buffers). If it was “adjacent to” a Provincially Significant Wetland, the study area would be 120 m. If it is “contiguous to” a Regional Environmentally Sensitive Policy Area, the study area would be determined with Regional staff and the Ecological and Environmental Advisory Committee. If it was “adjacent to” a Locally Significant

Wetland, the study area would be negotiated with GRCA under their Wetland Policy (Appendix A.6.4).

In every case, however, it is the preparation and review of an Environmental Impact Study that determines where development can (or cannot) occur and under what conditions. It can be either a ‘Comprehensive’ Environmental Impact Study under the subwatershed study or a development specific Environmental Impact Statement.

3.4.6 Community Plans

Community Plans are a requirement of the City of Cambridge. They are described in Section 3.2.1.2 of the Official Plan as a document to:

“...provide guidance and a framework within which approvals for amendment to the Official Plan or for plans of subdivision, zoning, site plans and other applications can be considered, building on other policies of the Official Plan and recommendations of watershed plans and other special studies, to provide a greater level of detail on how an area will develop. They implement such matters as the design and layout of trunk infrastructure, the protection of natural systems and built heritage resources over broad areas, the identification of hazard lands, and the planned function and coordination of individual developments for diverse and compatible land uses.”

Issues that will be more precisely defined in the Community Plans will relate to road and servicing environmental assessments, density and type of development, identification of land uses to accomplish the enhancement area functions under future development, environmental studies to determine buffer widths adjacent to the Other High Constraint Areas, and site-specific criteria for the preparation of scoped Environmental Impact Statements. In addition, the Plan should address the issue of sand and gravel deposits currently being extracted, future extraction plans and rehabilitation options.

Community Plan recommendations must achieve the following management measures:

- identify steps to implement buffers and their policies explaining the criteria for establishing the width, use and location;
- identify the ownership options for the buffers;
- identify steps to implement the aquatic rehabilitation procedures that provide for the improvement of the watercourse systems from an environmental perspective;
- identify steps to implement Community Trails and methods of creating them as part of Community Planning and/or the development approval process;
- provide direction on the implementation of the Water Management Strategy concerning stormwater and infiltration opportunities; and
- implement an adaptive environmental monitoring strategy that provides for the continuous assessment of the health of the Hespeler West subwatershed ecosystems.

3.4.7 Best Management Practices

Property owners can implement best management practices that lessen the negative environmental impact of their operations. This can be applied to agricultural, institutional, industrial and estate residential landowners in the subwatersheds. The Stewardship Program proposed through the Hespeler West Subwatersheds Study, to be coordinated by the City of Cambridge can be a source of information for landowners wishing to implement best management practices on a voluntary basis. The following is a brief description of how best management practices can be used by the various types of landowner:

Agricultural best management practices are directly related to the protection and management of surface water quality and the reduction of non-point pollution sources. Such practices include conservation tillage, crop rotation and contour cropping which assist in the prevention of soil erosion and nutrient loading to the watercourses.

Residential best management practices can also aid in the protection of surface water quality as well as the integrity and health of natural heritage features. Such practices include alternatives to non-essential pesticide use, plantings of appropriate native species, and proper disposal of waste such as lawn clippings and brush trimmings.

Industrial and institutional best management practices are aimed at preventing accidental spills to the environment as well as minimizing the impact of their facilities and operations on the environment. An example is the ISO 14000 Series of Environmental Management Practices that ensure environmental safeguards are in place to assist industries and institutions by having contingency plans and emergency measures in place that will safeguard the environment, in addition to workplace safety. With an internationally recognized environmental risk management and auditing system in place, corporations will also lower the risk of environmental accidents and improve pollution and hazardous waste control.

3.4.8 Tree Protection

The Regional Municipality of Waterloo has a Tree By-law (By-law No. 99-045) that restricts and regulates the destruction of trees. It applies, generally, to any area of woodland (as defined in the by-law) that is 0.8 hectares (2 acres) or more in size. The by-law requires landowners to notify the Regional Municipality of Waterloo and complete a notice of the intent to cut trees at a commercial scale (30 logs or more). The by-law promotes good forestry practice and is another way the goals and objectives of the subwatershed plan can be carried out. The Regional Tree By-law does not apply to lands approved for development under draft plan of subdivision approval or an approved aggregate license. In these cases, the City of Cambridge has Tree Management Policies and Guidelines for New Development that provides a mechanism to preserve, manage and replace treed areas being converted to urban uses within the City of Cambridge.

3.4.9 Monitoring and Adaptive Management Strategy

An important component of any subwatershed study that makes recommendations aimed at maintaining and improving the environmental features and functions of an area is monitoring. Monitoring is needed to assess whether or not the recommendations of the study are being implemented over time and if these are having the desired effect. The adaptive management aspect of a monitoring program provides for responses if it is discovered that they are not working as planned. In order for a monitoring and adaptive management strategy to work, it must be coordinated by one agency, although it can be undertaken by many groups or even individuals.

The HWSS Summary Report 2004 recommends implementation of a monitoring program including stream gauging within the watersheds (Table D2.9.1 (2004)). Results of the flow monitoring should be incorporated into the hydrologic modeling of the watershed to verify and if required adjust subcatchment flow targets. The GAWSER model of the watershed should be maintained to account for the development of the watershed as it proceeds. Any required adjustments to the targets should be evaluated through this adaptive management approach prior to future community plan work.

4. CONCLUSIONS/SUMMARY/RECOMMENDATIONS

The Hespeler West Subwatersheds Study Working Committee has reviewed all of the issues identified by the MGWA and prepared the Summary Report 2004 and two Appendices for approval by Cambridge Council. The Committee has generally reached a consensus on the issues, except for the recommendation on appropriate buffers for serviced urban development at the Subwatershed Study stage in the development approval process. The Working Committee is recommending that the Summary Report 2004 be accepted as the Hespeler West Subwatersheds Study and that Council make a decision on the proposed buffer widths.

The Key Results of the Hespeler West Subwatersheds Study include the preparation of the Greenspace Management Strategy, a Management Strategy for Groundwater and Surface Water During Urban Development and Post Urban Development, and an outline of how the key results will be implemented during the approval of future urban development.

The **Greenspace Management Strategy** (Figure C3.3.1(2004)) identifies the Significant Natural Heritage Features (Provincially Significant Wetlands, potential Environmentally Sensitive Policy Areas, Locally Significant Wetlands and Other High Constraint Areas) in the West, Middle and East Creek Subwatersheds and provides the framework for the protection, enhancement and use of these areas after serviced urban development occurs. The revised Greenspace Management identifies four types of buffers – adjacent to wetlands (PSW/LSW), contiguous to potential ESPAs, in the Flood Plain, and adjacent to Other High Constraint Areas (upland forests, plantations, steep slopes, seepage areas).

The recommendations of the MGWA and the environmental agencies (MNR, GRCA, and the Region) regarding buffers are summarized in Table 3 – Width of Study Area to Establish or Change Buffers. The differences between the two groups are that the MGWA wants to establish smaller minimum buffers now (15m wetlands, 3m upland forests, 1m plantations), with no requirement for preparation of an Environmental Impact Statement when the details of development are known. They argue that their proposed buffers are similar to the buffers that have been accepted following the completion of an Environmental Impact Statement for site-specific developments. Table 2 – Buffers Established Through Approval of Development Proposals reports on some recent buffers established in Cambridge through the development approval process. Review of the table shows that while some may be consistent with what the MGWA are proposing, others continue to be more in line with the recommendations of the environmental agencies. The final buffer requirements shown in Table 2 are the results of site-specific environmental impact statements and based on a specific proposed development.

Provincial and Regional policy establishes default buffers where urban development is proposed and a Subwatershed study has not been done. The buffer widths are 120 m from a PSW and 30 m from a LSW . If development is proposed closer to the wetland than specified in the policy, an Environmental Impact Statement is required. For development contiguous to an ESPA, an Environmental Impact Study is required to establish the buffer width at the time development is proposed.

Responsibility for the protection of the significant natural heritage features through the use of buffers lies with several agencies. The MNR ensures that Provincially Significant Wetlands are protected at the “plan input” level (Official Plan, Subwatershed Study) and in Environmental Assessments. In 1996, the Province delegated responsibility for protecting Provincially Significant Wetlands and woodlands at the “plan review” level to the Region of Waterloo. The Region has subsequently contracted with the GRCA to take responsibility for Provincially Significant Wetlands outside ESPAs while retaining responsibility for Provincially Significant Wetlands within ESPAs and for woodlands. The GRCA Wetland Policy requires review of all wetlands over 0.5 ha. GRCA also regulates alterations to aquatic habitat. Generally there is a shared responsibility with the City of Cambridge for other significant natural features (upland woodlots, plantations, steep slopes, seepage areas) through the development approval process including the preparation of the Community Plan.

For development bordering a PSW, LSW or ESPA, the environmental agencies are supportive of the proposal that if development is proposed closer than 30 m to a PSW or LSW an Environmental Impact Statement is required to demonstrate that there will be no adverse impact on the natural feature at the time development is proposed. If development is proposed on lands contiguous to an ESPA, an Environmental Impact Statement will be required to establish the buffer regardless of the distance. It is also proposed that buffer widths be studied further adjacent to the Other High Constraint Areas (upland forests, plantations, steep slopes, seepage areas) at the time of the preparation of the Community Plan to establish appropriate buffers when more information is known about the type and density of development. These proposed buffers

are shown on the Greenspace Management Strategy (Figure C3.3.1) and recommended to Council for approval as part of Report P-91-04. This approach is not inconsistent with the comments that Dr. Daryl Howes-Jones prepared on the Schiedel and Ritzmann properties (Appendices A.9.3.7.1 and A.9.3.7.2 of the Summary Report 2004).

The results of the Hespeler West Subwatersheds Study will be used in the preparation of the Hespeler West Community Plan for the area generally south of Maple Grove Road to Highway 401 between Fountain Street and Hespeler Road. This area is designated for urban development in both the City and the Regional Official Plans. The balance of the area will be further studied by the Region for future urban development through the Regional Growth Management Strategy.

5. ATTACHMENTS

5.1 WORKING COMMITTEE MEMBERS

Councillor Rick Cowsill (Chair), City of Cambridge

Erich Ritzmann, Maple Grove Wetlands Association

John Vasiga, Maple Grove Wetlands Association

Cathy Murphy, Maple Grove Wetlands Association

Charlene Schiedel, Maple Grove Wetlands Association

Ian Rawlings, Representing Large Property Owners

Brian Cunningham, Representing Small Property Owners

Chris Gosselin, Manager, Environmental Planning, Regional Municipality of Waterloo

Nancy Davy, Senior Resources Planner, Grand River Conservation Authority

Ken Cornelisse, Area Biologist, Ministry of Natural Resources

April Souwand, Senior Environmental Planner, City of Cambridge

Wendy Wright, Commissioner of Planning Services, City of Cambridge

Working Committee - Alternates

Ron McKittrick, Maple Grove Wetlands Association

Brenda Khes, Representing Large Property Owners

Matt Pugliese, Representing Small Property Owners

Shilling Yip, Principal Planner, Regional Municipality of Waterloo

District Planner, Ministry of Natural Resources

5.2 STEERING COMMITTEE MEMBERS

Albert Hovingh, Environmental and Stewardship Planner, Planning, Housing & Community Services, Regional Municipality of Waterloo

Gus Rungis, Senior Water Resources Engineer, Grand River Conservation Authority

Carol Neumann, Ministry of Agriculture and Food

Ken Cornelisse, Area Biologist, Ministry of Natural Resources

Ian Thornton, District Planner, Ministry of Natural Resources

April Souwand, Senior Environmental Planner, City of Cambridge

Yvette Rybensky, Planner, City of Cambridge

Giancarlo Radicioni, Senior Development Engineer, City of Cambridge

Alex Koch, Co-ordinator of Design & Development, City of Cambridge

Hans Madan, Director of Planning Operations, City of Cambridge

5.3 LIST OF TABLES

Table 1 – Buffer Recommendations – Subwatershed Studies within Cambridge

Table 2 – Buffers Established Through Approval of Development Proposals

Table 3 – Width of Study Area to Establish or Change Buffers

Table 4 – Vegetation Community Attributes and Constraint Rankings for Provincially Significant Wetlands (PSW)

Table 5 – Vegetation Community Attributes and Constraint Rankings for Locally Significant Wetlands (LSW)

Table 6 – Vegetation Community Attributes and Constraint Rankings for High Constraint Areas Not PSW or LSW That Are Potential ESPA

Table 7 – Vegetation Community Attributes and Constraint Rankings For High Constraint Areas Not PSW or LSW or Potential ESPA

Table B8.3.1 (2004) - ELC Community Series Present in the Hespeler West Subwatersheds

Table D2.5.1 (2004) - Scoped and Full Site EIS Requirements

Table D2.9.1 (2004) - Monitoring Programs Part A: Creek Systems and Part B: Natural Heritage System (AS)

**TABLE 1
BUFFER RECOMMENDATIONS - SUBWATERSHEDS STUDIES WITHIN CAMBRIDGE**

Study Name	Prepared For	Prepared By	Date	Buffer Recommendations	Enhancement Areas?
Mill Creek Subwatershed Plan	GRCA	CH2M Gore and Storrie Limited	June, 1996	Undefined buffers – require EIS within 120 m of Core Greenspace for development to set buffer widths	Yes – “Greenspace Opportunity Areas”
Moffat Creek Watershed Plan and Comprehensive Environmental Impact Study	City of Cambridge	Cambridge Engineering and Planning Consultants Limited	November, 1996	4 levels of buffer, depending on amount of information available and field work – 120 m from classified wetland and 50 m from significant woodland needing more information – 30 m from classified wetlands where information is available (generally turns out to be PSWs) and 10 to 15 m from classified wetlands and adjoining forested features where wetland units or woodlots have limited dependency on adjoining surface runoff and interflow	Yes – “Potential Enhancement Zone”
Blair, Bechtel, and Bauman Creeks Subwatershed Plan	GRCA	CH2M Gore and Storrie Limited	January, 1997	Undefined buffers – require EIS within 120 m of Core Greenspace for development to set buffer widths	Yes – “Greenspace Opportunity Areas

**TABLE 1
BUFFER RECOMMENDATIONS - SUBWATERSHEDS STUDIES WITHIN CAMBRIDGE**

Study Name	Prepared For	Prepared By	Date	Buffer Recommendations	Enhancement Areas?
Forbes Creek Subwatershed Study	City of Cambridge	Planning and Engineering Initiatives Limited	August 2002	S. of Blackbridge Road, 50 m buffers with provision to reduce to 30 m with a site-specific study of shallow groundwater and affected biological resources N. of Blackbridge Road, 30 m (assumes low intensity rural development) – EIS requirements are detailed similar to HWSS	Yes – Enhancement Areas

TABLE 2
BUFFERS ESTABLISHED THROUGH APPROVAL OF DEVELOPMENT PROPOSALS

Development Application	Subwatershed Study	EIS	Recommended Buffer	Type of Development
30T-88026 BLI Development Inc. Council Approved June 29, 2004	Yes – Blair Bechtel Bauman SWS	Yes	15 m to 30 m buffer adjacent to PSW	22 lot estate residential development on 42.21 ha (104 ac) site
Challenger Council Approved March, 2004	No – Freeport Creek Subwatershed	Yes	<ul style="list-style-type: none"> • 15 m aquatic buffer from Freeport Creek • 3 m buffer from a dripline of upland woodlot. Woodlot and buffer rezoned from Industrial to Open Space 	Large industrial lot 20.8 ha (51.5 ac)
Queenston Estates Council Approved January 11, 1993 and July 9, 2001	No – Master Drainage Study & Implementation Report for Hespeler East	Yes	10 m buffer from a natural storm water management pond/wetland with added mitigation measures (i.e. removal of invasive species)	424 to 462 residential lots 32.02 ha (79.12 ac)
30T-03102 Greengate – Proposed Plan	Yes – Moffat Creek Subwatershed Study	No	30 m buffer	624 residential units on 42.08 ha (104 ac)
30T-02101 Lotco II – South of Myers Road Council Approved September 16, 2002	Yes – Moffat Creek Subwatershed Study	No	<ul style="list-style-type: none"> • 30 m as per consultant’s planning report, no dimensions on plan • near PSW 	76 lots for one family detached dwellings, 3 future development blocks and 2 storm water management blocks including an existing wetland on the west side of the property. The property is a portion of 6.819 ha (16.85 ac)

**TABLE 2
BUFFERS ESTABLISHED THROUGH APPROVAL OF DEVELOPMENT PROPOSALS**

Development Application	Subwatershed Study	EIS	Recommended Buffer	Type of Development
R11/98 Arriscraft Pit Council Approved March 9, 2000	No	Yes	No recommended buffer in EIS. However, mitigative measures included protective fencing (the current standard of post and paige wire) with attached filter cloth fabric be installed 1-5 m from the dripline of the trees along the western and southern edges of the Class 1 Open Space.	The addition of the “(E)” prefix to the zone symbols applying to the lands to permit a mineral extraction operation to a 9.5 ha (23.5 ac) of land located northwest of Briardean Road
30T-88052 Mattamy Council Approved August 29, 2002	No – Portuguese Swamp ESPA/ PSW	Yes	5 m – 10 m buffer along wetland boundaries and 2 m along ESPA and transitional slopes – mostly 30 m+.	784-1,149 units at various densities on 77.07 ha (190.43 ac) of land
Camrock Council Approved February 26, 2001/ April 17, 2001	No	Yes	A 15 m wetland (unclassified) buffer that provides for a 20 – 40 m setback from Freeport Creek – SWM facility abuts the wetland buffer.	Industrial subdivision 26.53 ha (65.56 ac) 5 industrial lots, 1 commercial & 1 open space

**TABLE 3
WIDTH OF STUDY AREA TO ESTABLISH OR CHANGE BUFFERS**

Type of Environmental Feature	No Subwatershed Study (Default Value)	Proposed HWSS Summary Report 2004	Proposal by MGWA	EIS Approval Agency
	Maximum Buffer	Maximum Buffer	Maximum Buffer	
Provincially Significant Wetland	120 m * Adjacent Lands	30 m *	15 m **	MNR GRCA Region
Environmentally Sensitive Policy Area	“Contiguous” Lands determined by Regional Ecological and Environmental Advisory Committee	“Contiguous” Lands	15 m – Wetlands ** 3 m – Forest Dripline** 1 m – Plantation Dripline**	Region
Locally Significant Wetland	30m *	30 m *	15 m **	GRCA
Other High Constraint Areas	Negotiate with Region/GRCA/City	Establish buffers in Community Plan	15 m – Wetlands ** 3 m – Forest Dripline** 1 m – Plantation Dripline**	Region GRCA City
Creeks	15 m	15 m	15 m	GRCA

* No development (change in legal use of land or site alteration) will be permitted within the study area (buffer) unless an Environmental Impact Study (EIS) demonstrates to the satisfaction of the relevant agency(ies) that the Environmental Feature will not be negatively impacted. The EIS relies on information about the type of land use, density of development, grading and servicing plans, and the sensitivity of environmental features and functions in order to determine the permitted proximity of development to the Environmental Feature without adverse environmental impacts (as defined in the R.O.P.P.). This information is not available at the Subwatershed Study stage.

** Not acceptable to outside approval Agencies as a Maximum Buffer without the preparation of an EIS. In the interim, agencies could use the default adjacent/contiguous values for the study area for an EIS as if no Subwatershed Study had been done or use the area proposed in the HWSS Summary Report 2004.

**TABLE 4
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR PROVINCIALY SIGNIFICANT WETLANDS (PSW)**

Map. No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
1.01	SWT	Thicket Swamp	SWT	Thicket Swamp	5	3	1		High		Polygon unit is entirely outside of subwatershed boundary.
1.04	MAM	Meadow Marsh	MAM3	Organic Meadow Marsh	4	3	1		High	Yes	Polygon unit is partially outside of subwatershed boundary.
1.05a	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1	Yes	High	Yes	Supports forest interior habitat when combined with 1.05c,d,e,f,h. Polygon unit is partially outside of subwatershed boundary.
1.05c	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1		High	Yes	High wildlife constraint ranking based on availability of suitable habitat for significant wildlife species found in 1.05a. Supports forest interior habitat when combined with 1.05a,d,e,f,h.
1.05d	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1		High	Yes	High wildlife constraint ranking based on availability of suitable habitat for significant wildlife species found in 1.05a. Supports forest interior habitat when combined with 1.05a,c,e,f,h.
1.05f	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	6	3	1	Yes	High	Yes	High wildlife constraint ranking based on availability of suitable habitat for significant wildlife species found in 1.05a. Supports forest interior habitat when combined with 1.05a,c,d,e,h.
1.05g	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	6	3	1		High	Yes	
1.11a	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1	Yes	High	Yes	
1.11b	SWM	Mixed Swamp	SWM4	White Cedar Organic Mixed Swamp	8	3	1		High	Yes	
1.15	OAO	Open Aquatic			3	3	1		High	Yes	

**TABLE 4
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR PROVINCIALLY SIGNIFICANT WETLANDS (PSW)**

Map. No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
2.01	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1		High		
2.15	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High	Part	
2.17a	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1	Yes	High	Part	
2.20	MAM	Meadow Marsh	MAM	Meadow Marsh	4	3	1		High		
2.21	MAM	Meadow Marsh	MAM	Meadow Marsh	4	3	1		High		
2.29a	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1		High	Part	Supports forest interior habitat when combined with 2.29b,c & 2.31.
2.29d	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1		High		
2.30	SWM	Mixed Swamp	SWM1	White Cedar Mineral Mixed Swamp	7	3	1		High		
2.31	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	6	3	1		High	Part	Supports forest interior habitat when combined with 2.29a,b,c.
2.35a	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1		High		
2.37	SWT	Thicket Swamp	SWT2	Mineral Thicket Swamp	5	3	1	Yes	High		
2.38	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	8	3	1		High		
2.43a	SWM	Mixed Swamp	SWM4	White Cedar Organic Mixed Swamp	8	3	1		High	Yes	
2.44	OAO	Open Aquatic			3	3	1		High	Yes	
3.01	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1		High		
3.04	SWT	Thicket Swamp	SWT	Thicket Swamp	6	3	1		High	Yes	
3.06	SWD	Deciduous Swamp	SWD2-2	Ash Mineral Deciduous Swamp	8	3	1		High	Yes	Supports forest interior habitat when combined with 3.07, 3.08 & 3.09.

**TABLE 4
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR PROVINCIALY SIGNIFICANT WETLANDS (PSW)**

Map. No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
3.07	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1		High	Yes	Supports forest interior habitat when combined with 3.06, 3.08 & 3.09.
4.01a	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1	Yes	High	Yes	
4.01b	SWM	Mixed Swamp	SWM2	Maple Mineral Mixed Swamp	7	3	1	Yes	High	Part	Supports forest interior habitat when combined with 4.01e & 4.16a.
4.01e	SWT	Swamp Thicket	SWT2	Mineral Thicket Swamp	7	3	1		High	Yes	
4.09	OAO	Open Aquatic			3	3	1		High	Yes	Foraging location for Green Heron.
4.11	MAM	Meadow Marsh	MAM	Meadow Marsh	4	3	1		High		
4.13a	SWM	Mixed Swamp	SWM4	White Cedar Organic Mixed Swamp	7	3	1	Yes	High	Part	
4.13c	SWD	Deciduous Swamp	SWD	Deciduous Swamp	7	3	1	Yes	High	Part	
4.16c	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	9	3	1	Yes	High	Yes	
5.25a	MAM	Meadow Marsh	MAM3	Organic Meadow Marsh	4	3	1		High	Yes	
6.00a	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	4	3	1		High		
6.01b	MAM	Meadow Marsh	MAM3	Organic Meadow Marsh	6	3	1		High	Yes	
6.01c	SWD	Deciduous Swamp	SWD7	Birch-Poplar Organic Deciduous Swamp	6	3	1		High	Yes	
6.04b	SWD	Deciduous Swamp	SWD4	Mineral Deciduous Swamp	7	3	1	Yes	High	Yes	
6.04g	SWD	Deciduous Swamp	SWD4	Mineral Deciduous Swamp	7	3	1		High	Yes	
6.12b	SWD	Deciduous Swamp	SWD4	Mineral Deciduous Swamp	9	3	1	Yes	High	Part	
6.13	SWT	Thicket Swamp	SWT2	Mineral Thicket Swamp	7	3	1		High	Yes	

**TABLE 4
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR PROVINCIALY SIGNIFICANT WETLANDS (PSW)**

Map. No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
6.17a	SWD	Deciduous Swamp	SWD	Deciduous Swamp	7	3	1		High	Yes	Supports forest interior habitat when combined with 6.18a,b.
6.23b	SWM	Mixed Swamp	SWM4	White Cedar Organic Mixed Swamp	7	3	1	Yes	High		
6.26a	SWM	Mixed Swamp	SWM	Mixed Swamp	8	3	1	Yes	High		
6.26b	SWD	Deciduous Swamp	SWD6	Maple Organic Deciduous Swamp	7	3	1		High		
6.27	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	5	3	1		High		A second regionally significant wildlife species was reported in 1995.
6.28b	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High		
6.30a	SWC	Coniferous Swamp	SWC3	White Cedar Organic Coniferous Swamp	7	3	1	Yes	High		Supports forest interior habitat when combined with 6.30b,c and 6.35d and 6.54a.
6.30b	MAM	Meadow Marsh	MAM3	Organic Meadow Marsh	8	3	1		High		
6.30c	SWM	Mixed Swamp	SWM1	White Cedar Mineral Mixed Swamp	7	3	2	Yes	High		Supports forest interior when combined with 6.30a,b and 6.25d.
6.32a	OAO	Open Aquatic			3	3	1		High	Yes	
6.32c	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	6	3	1		High	Yes	
6.35b	MAM	Meadow Marsh	MAM3	Organic Meadow Marsh Ecosite	5	3	1	Yes	High		Significant wildlife observation does not merit constraint rating.
6.37a	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High	Yes	
6.37b	SWC	Coniferous Swamp	SWC1	White Cedar Mineral Coniferous Swamp	6	3	1		High	Yes	
6.37c	SWD	Deciduous Swamp	SWD4	Mineral Deciduous Swamp	6	3	1		High	Yes	
6.37d	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	5	3	1		High	Yes	

**TABLE 4
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR PROVINCIALY SIGNIFICANT WETLANDS (PSW)**

Map No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
6.38a	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High	Yes	
6.39a	SWT	Thicket Swamp	SWT2	Mineral Thicket Swamp	4	3	1	Yes	High	Yes	
6.39b	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	6	3	1		High	Yes	
6.40	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	6	3	1		High	Yes	
6.41a	SWC	Coniferous Swamp	SWC	Coniferous Swamp	8	3	1	Yes	High	Yes	
6.41b	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High	Yes	
6.44a	SWC	Coniferous Swamp	SWC	Coniferous Swamp	7	3	1		High	Yes	
6.45	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	4	3	1		High	Yes	
6.46a	SWT	Thicket Swamp	SWT2	Mineral Thicket Swamp	4	3	1		High	Part	
6.46b	FOC	Coniferous Forest	FOC4	Fresh-Moist White Cedar Coniferous Forest	7	2	1		Medium	Part	
6.46c	SWT	Thicket Swamp	SWT2	Mineral Thicket Swamp	4	3	1		High	Yes	
6.48b	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	5	3	1		High	Yes	
6.48e	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High	Yes	
6.49b	MAM	Meadow Marsh	MAM1	Bedrock Meadow Marsh	3	2	1	Yes	High (Medium)		Shallow soils over bedrock, drainage imperfect to poor; obligate wetland species present.
6.54a	SWT	Thicket Swamp	SWT3	Organic Thicket Swamp	8	3	1	Yes	High		
6.54b	MAM	Meadow Marsh	MAM	Meadow Marsh	3	3	1		High		

**TABLE 4
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR PROVINCIALLY SIGNIFICANT WETLANDS (PSW)**

Map. No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
6.56a	SWD	Deciduous Swamp	SWD6	Maple Organic Deciduous Swamp	8	3	1		High		
7.04	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High		

**TABLE 5
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR LOCALLY SIGNIFICANT WETLANDS (LSW)**

Map. No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
5.02	SWD	Deciduous Swamp	SWD6	Maple Organic Deciduous Swamp Ecosite	8	3	1		High		Supports forest interior habitat when combined with 5.03.
5.13a	OAO	Open Aquatic			3	3	1		High	Yes	
5.14b	SWM	Mixed Swamp	SWM1	White Cedar Mineral Mixed Swamp	7	3	1		High	Part	
5.14d	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1	Yes	High	Yes	

**TABLE 6
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR HIGH CONSTRAINT AREAS
NOT PSW OR LSW THAT ARE POTENTIAL ESPA**

Map No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
1.05e	CUW	Cultural Woodland	CUW1	Mineral Cultural Woodland	4	1	1		Low	Yes	Supports forest interior habitat when combined with 1.05a,c,d,f,h.
1.05h	FOD	Deciduous Forest	FOD7	Fresh-Moist Lowland Deciduous Forest	8	2	1		Medium	Yes	High wildlife constraint ranking based on availability of suitable habitat for significant wildlife species found in 1.05a. Supports forest interior habitat when combined with 1.05a,c,d,e,f.
1.05i	FOD	Deciduous Forest	FOD7	Fresh-Moist Lowland Deciduous Forest	9	1	1		High	Yes	Forest – 9 constraint ranking.
2.00	FOD	Deciduous Forest	FOD5	Dry-Fresh Sugar Maple Deciduous Forest	8	2	1		Medium		High wildlife constraint ranking based on availability of suitable habitat for significant wildlife species found in 2.01. Also supports forest interior habitat when combined with 2.01.
2.09a	FOD	Deciduous Forest	FOD6	Fresh-Moist Sugar Maple Deciduous Forest	9	2	1	Yes	High		Forest – 9 constraint ranking.
2.09c	FOD	Deciduous Forest	FOD6	Fresh-Moist Sugar Maple Deciduous Forest	9	2	1	Yes	High		Forest – 9 constraint ranking. Polygon is outside of subwatershed boundary.
2.29b	FOD	Deciduous Forest	FOD7	Fresh-Moist Lowland Deciduous Forest	7	2	1		High (Medium)	Part	Supports forest interior habitat when combined with 2.29a,c & 2.31.
2.29c	FOM	Mixed Forest	FOM6	Fresh-Moist Hemlock Mixed Forest	9	1	1		High		Supports forest interior habitat when combined with 2.29a,b & 2.31. Forest – 9 constraint ranking.
3.08	CUP	Plantation	CUP3	Coniferous Plantation	8	1	1		Medium	Yes	Supports forest interior habitat when combined with 3.06, 3.07 & 3.09.
3.09	CUP	Cultural Plantation	CUP3	Coniferous Plantation	8	1	1		Medium	Part	Supports forest interior habitat when combined with 3.06, 3.07 & 3.09. Forest – 9 constraint ranking.

**TABLE 6
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR HIGH CONSTRAINT AREAS
NOT PSW OR LSW THAT ARE POTENTIAL ESPA**

Map No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
4.01c	FOM	Mixed Forest	FOM7	Fresh-Moist Cedar-Hardwood Mixed Forest	7	3	1		High		Supports forest interior habitat.
4.01d	CUW	Cultural Woodland	CUW1	Mineral Cultural Woodland	6	1	1		Medium		Supports forest interior habitat when combined with 4.01b & 4.16a.
4.13b	CUP	Cultural Plantation	CUP3	Coniferous Plantation	8	2	1		High (Medium)		Mature conifer unit with significant functions.
4.16a	FOD	Deciduous Forest	FOD5	Dry-Fresh Sugar Maple Deciduous Forest	9	1	2		High		Supports forest interior habitat when combined with 4.01b,e & 4.16b,c. Forest – 9 constraint ranking.
6.30d	FOD	Deciduous Forest	FOD	Deciduous Forest	9	2	3	Yes	High		Forest – 9 constraint ranking.
6.36a	FOC	Coniferous Forest	FOC4	Fresh-Moist White Cedar Coniferous Forest	6	2	3		High		Slope.
6.36b	FOM	Mixed Forest	FOM7	Fresh-Moist White Cedar-Hardwood Mixed Forest	7	2	3		High		Slope.
6.42	FOD	Deciduous Forest	FOD6	Fresh-Moist Sugar Maple Deciduous Forest Ecosite	9	2	2	Yes	High	Yes	Forest – 9 constraint ranking.
6.44b	FOC	Coniferous Forest	FOC4	Fresh-Moist White Cedar Coniferous Forest	9	2	1		High	Yes	Forest – 9 constraint ranking.

**TABLE 7
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR HIGH CONSTRAINT AREAS
NOT PSW OR LSW OR POTENTIAL ESPA**

Map No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
2.13	MAM	Meadow Marsh	MAM2	Mineral Meadow Marsh	3	3	1		High	Yes	Non PSW now/drainage feature.
2.25	SWD	Deciduous Swamp	SWD3	Maple Mineral Deciduous Swamp	7	3	1		High		Isolated wetland.
2.41	CUM	Cultural Meadow	CUM1	Mineral Cultural Meadow	3	2	1		High (Medium)	Yes	Middle Creek Corridor linkage function.
5.03	FOD	Deciduous Forest	FOD6	Fresh-Moist Sugar Maple Deciduous Forest	8	2	1	Yes	Medium		City-owned 2.73 ha Boxwood Woodlot. Supports forest interior habitat
5.09	FOD	Deciduous Forest	FOD6	Fresh-Moist Sugar Maple Deciduous Forest	6	1	3		High		City-owned 0.2 ha isolated/slope.
5.11a	SWT	Swamp Thicket	SWT2	Mineral Thicket Swamp	7	3	1		High		City-owned 0.23 ha isolated wetland.
5.13b	CUT	Cultural Thicket	CUT1	Mineral Cultural Thicket	7	2	3		High		City-owned - West Creek Corridor/slope.
5.14c	FOD	Deciduous Forest	FOD6	Fresh-Moist Maple Deciduous Forest	9	1	2		High	Part	City-owned - West Creek Corridor. Forest – 9 constraint ranking.
5.14f	FOD	Deciduous Forest	FOD	Deciduous Forest	7	1	3		High		City-owned – West Creek Corridor/slope.
5.21	FOD	Deciduous Forest	FOD7	Fresh-Moist Lowland Deciduous Forest	8	2	3	Yes	High	Part	West Creek Corridor/slope.
6.01a	FOD	Deciduous Forest	FOD8	Fresh-Moist Poplar Deciduous Forest	7	2-3	1		High	Yes	Reszetrnik/seepage/drainage.
6.12c	CUW	Cultural Woodland	CUW1	Mineral Cultural Woodland	7	3	2		High	Part	East Creek Corridor/drainage feature.
6.20c	MAS	Shallow Marsh	MAS2	Mineral Shallow Marsh	4	3	1	Yes	High		Arriscraft/seepage/drainage.
6.20g	MAM	Meadow Marsh	MAM1	Mineral Meadow Marsh	5	3	1		High	Yes	Middle Creek Corridor/drainage feature.
6.29a	FOM	Mixed Forest	FOM2	Dry-Fresh Maple-Oak Mixed Forest	8	1	3		High	Part	Middle Creek Corridor/slope.

**TABLE 7
VEGETATION COMMUNITY ATTRIBUTES AND CONSTRAINT RANKINGS FOR HIGH CONSTRAINT AREAS
NOT PSW OR LSW OR POTENTIAL ESPA**

Map No.	Community Series Code	Community Series	ELC Code	ELC Ecosite	Constraint Score	Seepage/Drainage Conditions	Slope	Significant Plants	Constraint Ranking	Floodplain	Comments
6.29b	FOD	Deciduous Forest	FOD5	Dry-Fresh Sugar Maple Deciduous Forest	9	1	2		High	Part	Middle Creek Corridor/Forest – 9 constraint ranking.
6.29c	CUP	Cultural Plantation	CUP3	Coniferous Plantation	6	1	3		High		Arriscraft/slope.
6.31a	CUP	Cultural Plantation	CUP3	Coniferous Plantation	6	1	3		High		Middle Creek Corridor/slope.
6.31b	FOD	Deciduous Forest	FOD5	Dry-Fresh Sugar Maple Deciduous Forest	8	1	3		High		Middle Creek Corridor/slope.
6.32b	CUW	Cultural Woodland	CUW1	Mineral Cultural Woodland	6	3	1		High	Part	Middle Creek Corridor/seepage/drainage.
6.32d	CUW	Cultural Woodland	CUW1	Mineral Cultural Woodland	7	3	2		High	Yes	Seepage/drainage.
6.37e	SWD	Deciduous Swamp	SWD4	Mineral Deciduous Swamp	6	3	1		High	Yes	Speed River/slope.
6.47	FOC	Coniferous Forest	FOC4	Fresh-Moist White Cedar Coniferous Forest	9	2	1		High	Yes	Speed River/Forest – 9 constraint ranking.
7.03a	CUW	Cultural Woodland	CUW1	Mineral Cultural Woodland	7	3	3		High	Part	East Creek Corridor/slope & seepage/drainage.

TABLE B8.3.1 ELC COMMUNITY SERIES' PRESENT IN THE HESPELER WEST SUBWATERSHEDS

ELC Community Series	Area (Hectares)	Percentage of Subwatersheds
Agriculture	371	38.5
Anthropogenic	220	22.8
Cultural Meadow	79	8.2
Cultural Plantation	14	1.5
Cultural Savannah	1	0.1
Cultural Thicket	24	2.5
Cultural Woodland	8	0.8
Coniferous Forest	9	0.9
Deciduous Forest	23	2.4
Mixed Forest	4	0.4
Hedgerow	10	1.0
Meadow Marsh	30	3.1
Shallow Marsh	0.3	0.03
Open Aquatic	9	0.9
Coniferous Swamp	10	1.0
Deciduous Swamp	88	9.1
Mixed Swamp	25	2.6
Thicket Swamp	11	1.1
TOTAL	936	97*

Revised October 20, 2004

* Roadways and other built features comprise the remaining 3% (28 ha). Total area of the subwatersheds is 964 ha.

TABLE D2.5.1 (2004) SCOPED AND FULL SITE E.I.S. REQUIREMENTS IN THE HESPELER WEST SUBWATERSHEDS

SUBWATERSHED AREA TYPE AND LOCATION OF DEVELOPMENT		New Urban Uses East, Middle & West Creek Subwatersheds*			
		Within 120 m of an Identified Groundwater Discharge Zone General*	Within 30 m of PSW, LSW, ESPA General*	Full Service Trails**	Stormwater Management Facilities***
Documentation Required/EIS Level of Detail		Scoped	Full Site	Scoped	Scoped***
Biological Inventory	Terrestrial Resources				
	Document natural features within 30m buffer area to be affected		X	X	
	Updated seasonal surveys of vegetation		(X)	(X)	
	Updated seasonal wildlife surveys (mammals/amphibians/reptiles/breeding birds)		(X)	(X)	
	Identify critical habitat areas & features to be avoided		X	X	
	Document existing disturbance levels in buffers, habitat areas and corridors		X	X	
	Document critical dependencies of nearby significant species/habitats (i.e. minimum habitat requirements, habitat age & structure, hydrology, connectivity to other habitats)		X	X	
	Indicate location of existing tree cover		X	X	
	Aquatic Resources				
	Verify location of known fish habitats and species		(X)	(X)	
Document dependencies of identified fish habitat/species		(X)	(X)		
Biological Impact Assessment	Terrestrial and Aquatic Resources				
	Describe direct effects on significant species, habitats and functions (short & long term)	X	X	X	(X)
	Describe indirect effects on significant species, habitats and functions (short & long term)	X	X	X	X
	Document mitigation or enhancement required to maintain & improve terrestrial & aquatic species and habitats	X	X	X	X
Summarize cumulative effects	X	X	X	X	
Groundwater	Confirm hydrostratigraphy and local groundwater depth	X	X		(X)
	Confirm groundwater recharge/discharge conditions and rates	X	X		(X)
	Confirm site-specific connection between groundwater and wetlands	X	X		(X)
	Confirm site-specific connection between groundwater and affected creek	X	X		(X)
	Document existing site-specific groundwater quality	X	X		(X)
	Evaluate risk of impacts to site-specific and downstream groundwater quantity & quality based on development proposal	X	X		X
	Identify mitigation measures	X	X		X

TABLE D2.5.1 (2004) SCOPED AND FULL SITE E.I.S. REQUIREMENTS IN THE HESPELER WEST SUBWATERSHEDS

SUBWATERSHED AREA TYPE AND LOCATION OF DEVELOPMENT		New Urban Uses East, Middle & West Creek Subwatersheds*			
		Within 120 m of an Identified Groundwater Discharge Zone General*	Within 30 m of PSW, LSW, ESPA General*	Full Service Trails**	Stormwater Management Facilities***
Documentation Required/EIS Level of Detail		Scoped	Full Site	Scoped	Scoped***
Surface Water	Complete Stormwater Management Plan in accordance with guidelines in Subwatersheds Study	X	X		X
	Identify areas prone to sediment damage or quality impacts	X	X		X
	Identify potential impacts to buffer performance & downstream wetlands based on proposed runoff quantity changes (including event related seasonal hydroperiod changes)	X	X		X
	Identify potential impacts to buffer performance & downstream wetlands based on proposed runoff quality changes*	X	X		X
	Identify mitigation measures	X			X
Monitoring	Base on recommended monitoring in Subwatersheds Study/Comprehensive E.I.S.	X	X	X	X

General* - includes residential, commercial, industrial or parkland development (stormwater management facilities will require “General” Full Site EIS if they occur within 30m of PSW, LSW or an ESPA, in addition to Scoped requirements listed under Stormwater Management Facilities***).

Trails** - assumes full service, asphalt surface all-season trails; soft-surfaced seasonal trails do not require EIS.

Stormwater Management Facilities*** - facilities located outside the 30m minimum buffer will require Scoped EIS; those proposed within 30m of PSW, LSW or an ESPA will require Full Site EIS (under General*). Where stormwater facilities are proposed within 120m of identified groundwater discharge features, the Scoped EIS for development in those areas should include consideration of potential impacts of such facilities on the discharge regime.

(X) – discretionary; may be requested by City, Region or GRCA if existing information is considered out of date (> 5 years old) or otherwise inadequate, given proposed development.

TABLE D.2.9.1 (2004) MONITORING PROGRAM – PART A: CREEK SYSTEMS

Monitoring Stage	Phase	Proponent	Items to be Monitored	Time Frame
System Monitoring		Municipality or Public Agencies with Jurisdiction and/or Local Citizen Groups	Streamflow levels, groundwater levels, water temperature, erosion, vegetation, wildlife, water quality (surface water and groundwater), benthics and fisheries (if required).	Ongoing
During Development Monitoring	Pre-Development Phase	Developer	Surface water and groundwater (monitor levels and analyze samples), buffers, fisheries and benthics (if required).	To be proposed and approved at Draft Plan submission stage. Program must be conducted for at least two seasons prior to construction and will continue until the end of the guarantee period. A summary report is to be submitted at the detailed design stage.
	During Construction Phase	Developer	Erosion and sediment control measures, buffers.	To be proposed with the detailed design submission (erosion, sediment control plan and landscape plan). Weekly reports are to be submitted to the City during active construction (checklist style) from start of grading until completion of base asphalt.)
	Guarantee Period Phase	Developer	Performance of at-source and conveyance infiltration facilities, end-of-pipe facilities, buffers.	To be proposed with the detailed design submission. Annual reports are to be submitted to the City. Continues from the end of the during construction phase to the end of the guarantee period (2 years from substantial completion of areas tributary to the pond), provided that performance is satisfactory.
Post Development Monitoring		Municipality and Region	Performance of stormwater management facilities. Wildlife, vegetation, benthics, fisheries.	To be submitted with the final Guarantee Period report and will recommend exactly what monitoring activities will be required. Ongoing.

TABLE D.2.9.1 (2004) MONITORING PROGRAM – PART B: NATURAL HERITAGE SYSTEM MONITORING

Category	Feature/System	Parameters	Locations	Monitoring Evidence	Adaptive Management Response	Responsibilities & Resources
Natural Heritage System – Terrestrial Component	PSWs	<ul style="list-style-type: none"> Boundary integrity & revisions. Buffer and setback condition. Based on air photo review and field reconnaissance. <p>Frequency: Every 5 years or as part of Official Plan Reviews; opportunistically as part of development-related studies.</p>	All PSW, ESPA, LSNA boundaries	<ul style="list-style-type: none"> Encroachments into boundaries. Inappropriate buffer uses. 	<ul style="list-style-type: none"> Review Zoning requirements. Inform landowner(s) of boundary and buffer requirements. Initiate restorative actions. 	<p>Lead Agency: City</p> <p>Other Partners: GRCA, Region of Waterloo Affected landowners; Development proponents.</p>
		<ul style="list-style-type: none"> Ecological integrity including known physical and biological attributes Problem species Overall diversity of species and habitats. Based on field studies in growing season. Permanent monitoring plots would greatly facilitate. <p>Frequency: Every 5 years or as part of Regional Official Plan Reviews; opportunistically as part of development – related studies.</p>	All PSW, ESPA, LSNA areas	<ul style="list-style-type: none"> Loss of quality species/habitat diversity. Invasion of problem species. Degradation of physical environment (e.g. erosion, sedimentation, soil compaction, alteration of hydrology). 	<ul style="list-style-type: none"> Initiate management study to determine causes and appropriate actions/options to deal with identified problems Identify and correct sources of physical degradation. 	<p>Lead Agency: City</p> <p>Other Partners: City; Region, affected landowners; Development proponents; naturalist groups community stewards; CWIP Program.</p>
		<p>Urban Area</p> <ul style="list-style-type: none"> Review of forest integrity, buffer effectiveness, and human activity impacts. Field assessment in growing season. Permanent monitoring plots would greatly facilitate. <p>Frequency: annual “walk-throughs”; detailed review every 5 years or as part of Official Plan Reviews; opportunistically as part of development-related studies.</p>	Urban woodlots	<p>Urban Area</p> <ul style="list-style-type: none"> Encroachments into boundaries. Inappropriate buffer uses. Loss of species/habitat diversity. Invasion of problem species. Degradation of physical environment (e.g. erosion, sedimentation, soil compaction, alteration of hydrology) 	<ul style="list-style-type: none"> Initiate management study to determine causes and appropriate actions/options to deal with identified problems Identify and correct sources of physical degradation. 	<p>Lead Agency: City</p> <p>Other Partners: affected landowners; Development proponents; naturalist groups and community stewards; CWIP program.</p>
		<p>Urban Corridors & Linkages</p> <ul style="list-style-type: none"> Review of urban corridors and linkages. Field assessment in growing season. Permanent monitoring plots would greatly facilitate. <p>Frequency: Annually; integrated review during Official Plan Reviews; opportunistically as part of development-related studies.</p>	All SWS Plan identified corridors & conceptual linkages.	<p>Urban Corridors & Linkages</p> <ul style="list-style-type: none"> Loss of connectivity. Disease or damage to linkage elements. Degradation of physical environment along stream corridors. 	<ul style="list-style-type: none"> Initiate re-planting and disease management strategies. Consult with local resident/users. Identify and correct sources of physical degradation. 	<p>Lead Agency: City</p> <p>Other Partners: GRCA, residents and users; Development proponents; stewardship groups.</p>

5.4 LIST OF FIGURES

B2.3.1 (2004)	-	Subcatchment Boundaries
B3.2.1 (2004)	-	Regulatory Floodlines and Scheduled Areas
B7.4.1 (2004)	-	Licensed Aggregate Areas
B8.3.2 (2004)	-	Evaluated Wetlands
B8.3.3 (2004)	-	Natural Heritage Constraints
B8.3.3A (2004)	-	Potential Environmentally Sensitive Policy Areas (ESPAs)
C1.2.1 (2004)	-	Conceptual Watershed Linkage and Enhancement Areas
C2.1.1 (2004)	-	Regional Growth Management Strategy Countryside Line
C3.1.3 (2004)	-	Aquatic Rehabilitation Strategy
C3.3.1 (2004)	-	Greenspace Management Strategy

Note: Figures which have been produced as part of the HWSS Summary Report 2004 use the year 2003 digital ortho-rectified air photography base. Those in the HWSS (PEIL) Report use the year 2000 base.

5.5 LIST OF MAPS

Map 01 (2004)	Floodline Mapping (1:8000)
Map 02 (2004)	Existing Natural Heritage System
Map 03 (2004)	Greenspace Management Strategy
Map 04 (2004)	Detailed Buffers

Note: Maps which have been produced as part of the HWSS Summary Report 2004 use the year 2003 digital ortho-rectified air photography base. Those in the HWSS (PEIL) Report use the year 2000 base.