

CHAPTER 1.0
INTRODUCTION

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1.1 OVERVIEW

The Moffat Creek Watershed Plan process was initiated in 1989 in response to development pressures in the South East Galt area of Cambridge. At that time, the report took the form of a Master Drainage Plan and an accompanying Environmental Report. The report format has subsequently been modified to follow the progressive evolution of Watershed planning. This evolution is summarized in Section 1.2. This report also fulfills the requirements of a Comprehensive Environmental Impact Statement as required by the new Planning Act (Bill 163).

The study has been conducted under the direction of a Steering Committee with representatives from several agencies and municipal departments. The initial Terms of Reference for this study are provided in Appendix A. The Watershed study process was officially sanctioned by the Councils of the City of Cambridge and the Township of North Dumfries. A copy of the City of Cambridge resolution is included in Appendix B.

1.2 WATERSHED PLANNING

Watershed management practices in the past were primarily directed toward the mitigation of flooding and erosion problems, often through structural means. The philosophical approach of watershed planning is that systematic, holistic, and environmentally conscious approaches can prevent problems such as flooding and erosion from occurring.

The Watershed is the smallest scale ecological unit at which the planning and management of natural systems can logically occur because it is the basic hydraulic unit. Water is the principal linkage and source of dynamism for the ecosystem and the watershed is the scale at which inputs, linkages, outputs, and changes to the system can be sensibly measured and understood.

The idea of planning on the basis of ecological rather than political boundaries is one which has found common acceptance in recent years through media such as the Earth Summit, the Crombie Commission, the Sewell Commission and locally through initiatives of the Region of Waterloo Ecological and Environmental Advisory Committee (EEAC), the Cambridge Environmental Advisory Committee (CEAC), and the Grand River Conservation Authority (GRCA). These ideas are also reflected

in changes in policy direction and new guidelines from the Provincial Ministries of the Environment and Energy, Natural Resources, and Municipal Affairs.

The conditions that exist in a watershed are controlled by the fixed natural processes at work and the influences of human activity. An ecosystem approach is needed to understand the interrelationships that occur between the process and within this man/environment complex. At the most basic level, it is the objective of ecosystem planning that all elements of the system achieve a desirable and sustainable balance. Maintaining this balance requires an understanding of the elements, processes, and their interactions. Interference with the natural balance requires perpetual subsidy while maintaining/restoring/enhancing the system recognizes and utilizes natural process in a sustainable manner.

Watersheds often consist of swamps and marshes along meandering watercourses, upland and lowland woodlots, farms and urban development. Pollutants in runoff tend to get trapped and assimilate in the swamps and marshes. Vegetated stream banks resist the erosive forces of flowing water, and act to reduce flow velocities and trap sediments and pollutants. The woodlots intercept and hold precipitation, encourage infiltration into the ground water aquifer system, and release water to the atmosphere through transpiration.

Where adjacent land is used for agricultural purposes, the watershed characteristics change. Vegetation that previously trapped precipitation is removed, thereby increasing surface runoff and reducing infiltration. Peak flows in watercourses increase, as does the magnitude of runoff. Sediment loading to streams is increased from areas with bare soils. Nutrient loading and pollutants to streams increase through fertilizer and pesticide applications to the land. These changes in land use could result in a decline in water quality and water quantity, and consequently wildlife and fish habitat.

Historical observations indicate that urbanization has a further degrading impact on the watershed ecosystem. With the addition of paved surfaces and piped stormwater, surface runoff increases and infiltration decreases. Baseflow diminishes as peak flows increase. As a result, water quality in the watercourse becomes further degraded. Salts and hydrocarbons from streets and parking areas are carried to the watercourses in surface runoff. Toxic materials spilled onto streets or discharged from industrial areas may also be carried to watercourses. Increased runoff and shorter peaking times result in greater erosive forces and flood levels. As urbanization encroaches on a watercourse, the potential for flood damage increases. Further urban development alters the flow characteristics of the watershed and the watercourse, which leads to channelization as the most efficient means of water dispersion.

Some of the conditions controlling the watershed characteristics outlined above are shown in Figure 1.1. This Figure illustrates that conditions in a watershed are influenced by land use. The influence of agricultural and urban land uses on watershed characteristics are schematically represented in Figure 1.2.

The assessment of watershed conditions in Moffat Creek focuses primarily on natural factors and the influences of man and land use activities upon them. The following Watershed Plan will consider environmental characteristics, flood risk, erosion potential, water quality and water quantity, and proposed plans for future development. This report will assist planners in addressing the total system needs of Moffat Creek by evaluating Watershed management options and by selecting preferred generic approaches which will assist in the development of land use plans. Specific design details or in situ solutions will be outlined in Environmental Impact Studies (EIS) and Environmental Implementation Reports (EIR), which will be prepared prior to the approval of individual land use plans.

1.3 PURPOSE OF THE WATERSHED PLAN AND COMPREHENSIVE ENVIRONMENTAL IMPACT STATEMENT

The purpose of this Watershed Plan and Comprehensive Environmental Statement is to:

- Promote an ecosystem approach to environmental planning in the Watershed;
- Foster early integration of environmental and ecosystem considerations in the preparation of land use plans;
- Assist municipal and government agencies, consultants, and the development industry in understanding the needs of the Watershed; and
- Enhance the efficiency and effectiveness of land use plan preparation and the review process.

1.4 GOALS OF THE WATERSHED PLAN AND COMPREHENSIVE ENVIRONMENTAL IMPACT STATEMENT

This Watershed Plan will provide a framework within which management, mitigation and rehabilitation decisions can be made with regard to human impacts on the natural environment. In the upper Watershed, agricultural practices and the creation of estate residential lots will be guided by the management recommendations contained in this plan.

Urbanization pressures are beginning to affect the middle reach of Moffat Creek. In this area, the Watershed Plan will act as a guide directing development toward appropriate lands and will incorporate measures by which the environment may be protected from adverse development impacts.

In the lower reaches of the Moffat Creek Watershed, this Plan will provide recommendations for rehabilitation and enhancement of the Watershed, where appropriate.

The goals of the Moffat Creek Watershed Plan are as follows:

Flooding

To minimize the threat to life and the destruction of property and natural resources from flooding and to preserve or reestablish natural flood plain hydrologic functions.

Erosion

To minimize the destruction of property and natural resources from erosion and to preserve or reestablish natural flood plain hydrologic functions.

Surface Water Quality

To restore, enhance and protect the surface water quality and associated aquatic resources and water supplies so that the Watershed objectives for fish and wildlife, recreation, and aesthetics can be met. To restore, protect and enhance the fisheries potential of Moffat Creek.

Groundwater

To protect, restore and enhance groundwater quantity and quality and to identify and maintain the function of groundwater recharge and discharge areas.

Natural Area Resources

To conserve, restore, protect and enhance the natural area resources of the Watershed and to enhance the potential for wildlife and birds.

Recreation and Aesthetics

To restore, protect, develop, and enhance the cultural, natural, recreational and visual amenities of rural and urban stream corridors.

Cost

To minimize long-term public operating and maintenance costs.

1.5 STUDY PARTICIPANTS

Since this Watershed Plan was initially development driven, funding for the study has been provided by the developer landowners of South East Galt. The multi-disciplinary consulting team responsible for the study content was chosen by these landowners and consisted of the following members:

- Cambridge Engineering and Planning Consultants Limited;
- Rand Engineering Limited;
- Cosburn Patterson Wardman Limited;
- J. Dougan and Associates; and
- Lotowater Ltd.

The Watershed Plan has been prepared under the direction of a Steering Committee led by the Grand River Conservation Authority and consisting of members from the City of Cambridge, the Ministry of the Environment and Energy, the Ministry of Natural Resources, the Township of North Dumfries, and the Regional Municipality of Waterloo. The Terms of Reference were agreed upon by the Steering Committee and the consulting team on April 8, 1990. The initial Terms of Reference are provided in Appendix A along with a List of Steering Committee Members.

1.6 PUBLIC PARTICIPATION

Two public meetings and two field tours were held during the study to provide information to the public with regard to the study purpose, findings and recommendations. Comments and observations were obtained from the public about the information presented and their vision of the Watershed. Public meetings were advertised in local newspapers and direct mailings were sent to a list of interested citizens and organizations provided by the City of Cambridge. Materials related to the public meetings are contained in Appendix C.

The following is a listing of public participation events/activities held as part of this study:

1. Public meeting June 25, 1992 to review environmental reports.
2. Field Tours with Cambridge Environmentalists September 24, 1992 and November 10, 1992.
3. Field tour and workshop for City of Cambridge Environmental Advisory Committee January 21, 1993.
4. Public Meeting February 21, 1996 for comments on the final draft Report which was released January 24, 1996.

The June 25, 1992 public meeting was attended by approximately 20 people. Attendees were asked to fill out a questionnaire regarding their experience with the Watershed, their particular concerns and suggestions for further public input. The responses which were returned to the study team indicated that the residents were primarily concerned with the wetlands and wooded areas of the Watershed and the form of future development.

Some members of the public asked questions pertaining to the establishment of wetland buffers and indicated their support for the protection of wetland areas. A number of residents suggested establishing active parkland and recreational trails along the watercourse and there was general support for reestablishing a natural setting with wetlands and trees. Other questions at the meeting related to the form of urban development expected in the South East Galt area. Suggestions included setting development well back from the wetlands, the creation of pedestrian-oriented development, the adoption of a neotraditional planning approach and instituting an intensified development pattern to relieve development pressures on North Dumfries Township.

The February 21, 1996 public meeting was attended by approximately twenty people. Only two members of the general public attended. The rest of the attendees were staff from agencies as well as the Mayor for the City of Cambridge and the Ward Councillor. The meeting included informal review/discussion of mapping and the report, presentation of the findings and a question period. Questions by the members of the general public related to timing of development in South East Galt.

Appendix C contains the newspaper ads and direct mail information pertaining to this public meeting.

1.7 STUDY APPROACH

The comprehensive nature of this study required a detailed review of a broad range of background information. Data was collected and reviewed in the areas of soils, hydrology, hydrogeology, vegetation, wildlife, fisheries and water quality. The primary focus of the information review was to develop an understanding of the existing Watershed conditions, the interrelationship between the various ecological processes, and the environmental potential of the Watershed. To accomplish this and to satisfy the study goals, the following study phases were completed:

- A detailed assessment of existing environmental characteristics and land use patterns in the Watershed;
- An assessment of flood and erosion potential resulting from land use change in the Watershed;
- Consideration and evaluation of various options for controlling storm water runoff and maintaining or enhancing existing resources;
- Development of a Watershed Plan with attainable targets for storm water management, erosion control, water quality enhancement, environmental enhancement, etc; and
- Implementation of public participation and consultation at key steps in the process to ensure that public concerns are adequately addressed.

Once the factual data regarding existing Watershed conditions had been accumulated by the Steering Committee, the next step was to evaluate the data and to design a feasible method to foster early integration of environmental and ecosystem considerations in the preparation of plans. To accomplish this task, Steering Sub-Committees were formed and given a mandate to report on methods of implementation for their particular areas of interest.

Various areas of the Watershed were walked by the Sub-Committee members to familiarize the members with existing Watershed conditions, and to identify potential opportunities for enhancement which could potentially be incorporated into the Watershed planning process. This process resulted in the following four Sub-Committee reports:

1. Natural Resources Sub-Committee Report
2. Public Participation Sub-Committee Report
3. Aquatic Assessment - Erosion/Sedimentation Field Inspection Reports
4. Moffat Creek Hydrology Update

These reports were submitted to and reviewed by all Steering Committee members. The observations and recommendations contained in these reports were integrated into this Watershed Study.

Work completed for the Watershed study included the following:

- Collection of existing information;
- Field studies;
- Modelling and analyses;
- An impact assessment;
- Provision of recommendations for mitigation and monitoring; and
- An implementation strategy.

As a result of varying levels of existing information and the nature of the Watershed, there were some differences in how the study was conducted across the Moffat Creek Watershed. These differences related specifically to existing information and field studies, and they affected the recommendations for mitigation and monitoring. For example, floodline mapping has been completed for the area downstream of Regional Road 97. However, floodline mapping is not available above Regional Road 97 because adequate topographic mapping is not available.

Field studies varied across the Watershed as a result of the nature of the areas and for reasons of access. The Watershed consists of the following three general areas:

- The existing built area which extends from the Grand River to Highway 8;
- The area proposed for development which includes South East Galt and additional lands between Regional Road 97 and the Municipal boundary; and
- The rural/agricultural area in North Dumfries which includes all the Watershed lands above the Municipal boundary.

In the existing built area, much of the land is privately owned and occupied by structures and roads. The natural environmental features and areas have previously been reduced in number and area. The remaining environmental features and areas have been observed in the field and recommendations for enhancement have been made. In South East Galt, where there are more natural features and areas and where the study team had access, detailed field studies were conducted. This level of information enabled the study team to make specific decisions regarding issues such as buffer size. Although there are large areas of natural environment in North Dumfries, much of the land is privately held. As a result, access to the interior of these areas was limited. Available information was not sufficient to address all issues. Future detailed studies, in the form of Environment Impact Statements, will be

required prior to development within 120 m of these natural environment areas. Therefore, although the specific nature and details of this study varied across the Watershed, the Watershed Plan and Comprehensive EIS Report addresses the entire Watershed.

1.8 REPORT STRUCTURE

The structure of the Watershed Study is as follows:

- Description of Watershed and Key Issues (Chapter 2);
- Moffat Creek Policy Framework (Chapter 3);
- Existing Watershed Conditions (Chapter 4);
- Future Land Use Scenarios and Impact Assessment (Chapter 5);
- Mitigation, Monitoring, Management Plan and Implementation (Chapter 6);
and
- Conclusions and Recommendations (Chapter 7).

Where possible, maps, figures and tables have been used to illustrate points and concepts. While the information in this report is often technical in nature, it is the hope of the Steering Committee that this report will convey its information with sufficient clarity that future readers will be able to understand the considerations affecting choices in the Moffat Creek Watershed.