CITY OF LONDON
SUBWATERSHED STUDIES

Implementation Plan

May 1995

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Paragon Engineering Limited
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To: Members of All London Subwatershed Technical Advisory Committees
   London Subwatershed Studies - Phase II to V

RE: Implementation Report

Please find attached a copy of the revised Implementation Report for the London Subwatershed Studies. The report has been prepared through the combined efforts of the three teams conducting the Subwatershed Studies and is applicable to each of the studies. Efforts have been made to address the comments received from the TAC and we believe the majority of issues have been resolved. Some issues remain outstanding however, because some of the comments received were in conflict. This report therefore represents the recommendations of the consulting teams. Further refinement of the implementation plan by the TAC (or its successor Implementation Committee) is expected.

On behalf of myself and the other consultants, I would like to thank the TAC members for their input throughout the course of the subwatershed studies. We all look forward to working with you again in future.

Yours Very Truly,

Marshall Macklin Monaghan Limited

Project Manager

for
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1.0 INTRODUCTION

In 1993 the Corporation of the City of London embarked upon a forward looking planning process which will establish priorities and plans for the City as it moves into the 21st Century. The need for this planning resulted from legislation approving London’s annexation of lands from adjacent municipalities in January 1993. Under the banner of Vision ’96, the City has been preparing a number of plans including, among others, a strategic plan, a social plan, an economic development plan and a new official plan. A study on subwatersheds was one of several programs needed to support the official plan.

The City of London, in partnership with the Upper Thames River Conservation Authority and where applicable, the Kettle Creek Conservation Authority, and London Township, initiated a series of subwatershed plans to identify important natural resources and develop strategies to protect and enhance them. The studies establish plans for the management of the subwatersheds and policy directions to assist the City’s official plan review.

Subwatershed Plans have been prepared for ten watersheds in the London area, namely:

- Medway Creek
- Stanton Drain
- Dingman Creek
- Kettle Creek
- Pottersburg Creek
- Mud Creek
- Sharon Creek
- Upper Dodd’s Creek
- Crumlin Drain
- Stoney Creek

In addition, three sections of the Thames River Valley have had Subwatershed Plans prepared for them.

The land area covered by these plans encompasses the entire City of London beyond its developed core and stretches across the annexation boundary to include large areas of the surrounding Townships.

The information provided in the subwatershed plans applies equally to the City of London and the surrounding townships. The details of application of the plans will differ however, depending on whether the lands are within the City of London or one of the surrounding Townships. The City of London is preparing a new official plan and the subwatershed plans are intended to provide information which is to be used preparing land use schedules and policies for the new plan. As such, Candidate ESAs have been designated and other elements of the Natural Heritage System have been placed into categories. This detailed designation of lands is not appropriate in the Townships at the present time. The Townships have not specified ESA criteria, nor have they reached any decision regarding the assignment of different types of natural areas into different categories. As a result, the Natural Heritage System outside the City of London should be considered advisory and all lands identified should be considered subject to more detailed assessment (prior to development) except where they are already protected by provincial policy or regulation (e.g. provincially significant wetlands, flood plains).

1.1 Intent of the Plan

The subwatershed plans are intended to provide broad direction to the City and its partners. The plans identify lands which should be protected or conserved as a Natural Heritage System; development criteria which should be used in the design of future urban development; conservation and management practices which address existing impacts from land use activities; and a series of projects and programs which seek to fix specific problems and increase awareness of needs of the environment.

The Natural Heritage System identifies a land base for the City and the Townships which includes the most important natural areas and functions. By retaining these areas, in broad terms, and allowing growth to occur primarily in other areas, the framework for a functioning and "green" City and a healthy aquatic ecosystem, will be preserved into the future. Combined with the development criteria
which will govern the environmental standards that future development should meet, the Natural Heritage System will promote growth that will be sustainable in environmental, as well as social and economic terms.

The conservation and management elements of the plans will, over the long term, introduce practices which reduce many of the impacts currently caused by agricultural, rural and urban land uses. By reducing stress on the systems in this manner, and by implementing specific projects and programs to strengthen the key environments, the subwatersheds will become more resilient and able to support a diversity of life. The value of this will increase over time, producing a healthy natural environment, integrated into the urban and rural landscapes.

1.1.2 Relationship to Subsequent Plans

The subwatershed plans are strategic in nature, as is an official plan. They deal with larger vegetation patches and broad landscapes in formulating the Natural Heritage System. They indicate development criteria and environmental targets on a tributary basis. They address needed conservation practices on a subwatershed basis.

The subwatershed plans do not get down to a "design" level of detail and it is expected that subsequent studies and initiatives will be undertaken to provide more specific information and data as growth proceeds. The required studies are documented in the appendices to the subwatershed plans, on a tributary basis. It is recommended that these additional studies be used to refine the details, while retaining the broader strategy and recommendations of the subwatershed plans.

In terms of the lands included in the Natural Heritage System, two categories of lands are specified. Category 1 lands are the core environmental lands and are to be considered "no development" lands¹. Developments occurring adjacent to these lands will be required to complete a scoped Environmental Impact Study (EIS). The EIS will address issues on Adjacent Lands (50-120 m outside the edge of the area, depending on the type of feature) and on any abutting Category 2 lands. The EIS will specify the buffer width to be provided for Category 1 lands (including designated waters courses), where applicable. It will be used to set the specific boundaries for the development.

Category 2 lands are to be considered to be protected pending the results of more detailed studies. For vegetation features, terrestrial corridors and associated anti-fragmentation zones, a full site or scoped site EIS will be required. For lands designated as significant recharge/discharge areas a detailed hydrogeological study will be required. This latter type of study would investigate the importance of the area to the aquatic ecosystems and local water supplies. The detailed studies may result in:

a) Upgrade of the Category 2 lands to Category 1.
b) Specification of site-specific development criteria which will maintain the function of the Category 2 lands.
c) Recommendation that development of the Category 2 lands be permitted provided there is acceptable replacement or compensation.
d) Recommendation that development be permitted without replacement or compensation.

¹It is not the intent that Category 1 be interpreted as being entirely consistent with the Comprehensive Set of Policy Statements (CSPS) associated with Bill 163 at this stage. Refinement to ensure appropriate consistency will occur as the Official Plan is formulated. At this time, the strict definition of development used by the CSPS, which includes grading and the placement of fill, is to be applied only in provincially significant wetlands, ANSIs, and Candidate ESAs (subject to City adoption as ESAs). Development within the regulatory floodline and outside of provincially significant areas, ANSIs and ESAs is regulated by the floodplain management policies. For other Category 1 areas within the fill lines, it is possible that new parks or other recreational open space uses may be appropriate. It is intended that these types of uses be permitted in such areas if an Environmental Impact Study (EIS) is completed and shows that there would be not be a significant loss of features or function.
e) Combinations of b) to d).

It is recommended that decisions governing Category 2 lands be based on:

- The findings of the detailed studies (Hydrogeology, EIS)
- The intent of the Subwatershed Plans (functioning as a Comprehensive EIS)
- Land Use/Parks & Recreation needs
- Economic/Social Factors

The amount of land remaining in natural vegetation on the London subwatersheds is quite low. Much of the existing vegetation is fragmented and disconnected. It should therefore be clearly understood that while some Category 2 lands may be eliminated in the future, the intent of the subwatershed plans, on a broad landscape scale, is to maintain and where possible increase the amount of vegetation on the subwatersheds. Opportunities to enlarge, cluster or connect vegetation units should be pursued wherever possible.

In addition to the detailed studies required for Category 1 and 2 lands, all development proposals will be required to provide an assessment of natural resources present (for smaller areas (< 4 hectares) not addressed in the subwatershed plans), stormwater management plans and plans for erosion and sediment control during construction. Geomorphological studies and extension of flood lines may be required in specific cases. Archeological assessments, as recommended in the City’s Archeological Master Plan, may be required prior to urban development or initiation of special projects (eg. stream rehabilitation or planting programs). The preferred means of completing all of these studies (including the EIS and hydrogeological) is through an Area Plan. Further discussion of Area Plans and other development planning studies is provided in Section 5.0.

1.1.3 Class Environmental Assessments

The subwatershed plans have been conducted in a manner consistent with the requirements of the Environmental Assessment process. The five key principles of successful planning under the EA Act have been addressed. Consultation with the public and agencies has exceeded the minimum requirements. It is therefore expected that the subwatershed plans will satisfy the first two phases of subsequent Class EAs conducted for projects implemented as a result of the subwatershed plans. Confirmation of this will have to be sought from the EA Branch at the time that specific projects proceed.
2.0 SUBWATERSHED PLAN ADMINISTRATION

The subwatershed plans provide direction which can be used in formulating Official Plan schedules and policies, as well as other City and agency policies. The subwatershed plans themselves however, provide the direction needed to manage the subwatersheds in an ecologically sound manner, both for existing land use activities and as urban land use changes. The implementation of the plans offers an opportunity to streamline the approvals process and improve the delivery of conservation programs while providing for ongoing monitoring and evaluation of the plans’ success.

Based on experience gained in other areas of the province and the current provincial planning direction to vest greater decision making power at the local level, it is recommended that a partnership be formed between the municipality and the applicable Conservation Authority. The municipality (City or County) would be the lead agency in the granting planning approvals and the Conservation Authority would be charged with leading the delivery of conservation programs in the rural areas and coordinating plan monitoring and review. Provincial agencies would continue to be involved in strategic planning (e.g. Area Plans) and review and updating of the subwatershed plans, but would transfer or delegate their day-to-day plan review function to the municipality, subject to such terms and timing as will be negotiated with the municipality. A Subwatershed Plans Implementation Committee (hereafter referred to as the Implementation Committee) would be formed, based on the membership of the subwatershed TACs, to oversee implementation, review monitoring results and make any necessary adjustments or modifications to the plans as time goes on.

2.1 Implementation Structure

The completion of the subwatershed plans was a cooperative effort involving the area municipalities, conservation authorities, provincial ministries and representatives from the public and special interests. With the completion of the plans it is recommended that the basic representation of this group be retained as an "Implementation Committee" to assist with and monitor plan implementation. It is expected that meetings of the full Committee would be on an annual or semi-annual basis and that smaller working subcommittees would be formed to deal with specific aspects of implementation.

Table 2.1 indicates the recommended membership of the overall Implementation Committee, together with the suggested membership of four subcommittees which would address Area Plans, rural programs, monitoring and public involvement. The table indicates the chair, core members and other members. The core members would be expected to always be involved in the committee functions. The "other members" would be drawn into the appropriate committee on an 'as needed' basis, where issues involving them were to be discussed.

Figure 2.1 indicates the general responsibilities for implementation of the major elements of the subwatershed plans, together with the anticipated involvement by the Implementation Committee and its subcommittees. Figure 2.2 shows the recommended approach and responsibilities for planning approvals. The approval process shown indicates that which is recommended once there has been delegation of authority to the municipality (to be completed within two years of adoption of the Official Plan). As discussed in Section 2.3, the current approvals process will continue until this delegation has been negotiated.

2.2 Planning Approvals

The subwatershed plans establish a comprehensive strategy for the protection of the key natural resources and functions of the subwatersheds. Once the plans have been approved by the Technical Advisory Committee (TAC) they should be recognized as providing preferred direction over other generic or internal guidelines with respect to drainage, stormwater management and environmental issues in the development planning process.
Table 2.1 - Recommended Committee Membership

<table>
<thead>
<tr>
<th>Committee</th>
<th>Membership</th>
<th>Chair(s)</th>
<th>Core Members</th>
<th>Other Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Committee</td>
<td></td>
<td>City of London</td>
<td>MOEE, MNR,</td>
<td>Public Representatives</td>
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<tr>
<td></td>
<td></td>
<td>UTRCA/KCCA</td>
<td>OMAFRA, MMA, Townships, EEPAC, AAC, LDI</td>
<td></td>
</tr>
<tr>
<td>Area Plan Subcommittee</td>
<td></td>
<td>City of London</td>
<td>MOEE, MNR, CA, EEPAC, LDI</td>
<td>OMAFRA, AAC</td>
</tr>
<tr>
<td>Rural Programs Subcommittee</td>
<td></td>
<td>UTRCA/KCCA</td>
<td>City of London, OMAFRA, AAC, MOEE, MNR</td>
<td>Townships, EEPAC</td>
</tr>
<tr>
<td>Monitoring Subcommittee</td>
<td></td>
<td>UTRCA/KCCA</td>
<td>City of London, OMAFRA, AAC, MOEE, MNR</td>
<td>EEPAC</td>
</tr>
<tr>
<td>Public Involvement</td>
<td></td>
<td>City of London</td>
<td>UTRCA/KCCA</td>
<td>EEPAC, AAC, LDI, MNR</td>
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</tbody>
</table>

Urban development can be allowed to proceed (utilizing the recommended subwatershed plan development criteria) so long as it conforms to the requirements of the plan. This can be ensured through the approval process for land development. Currently, the Ministries of Natural Resources and Environment and Energy, and the Upper Thames River and Kettle Creek Conservation Authorities all have input to the approval process through their review and commenting role. Each of these regulatory agencies has, through their participation on the TAC accepted that urban development may proceed in designated areas if the development plans meet the development criteria specified in the plan. As a result, the need for review and comments on land development proposals by these agencies is greatly reduced. It is therefore possible to streamline the approvals process by making one "lead agency" responsible for ensuring that a development proposal meets the requirements of the subwatershed plans.

It is recommended that the municipality ultimately be designated as the "lead agency" for approvals. In performing this role, the City or County would:

- Review development proposals submitted, to ensure they are in accord with the subwatershed plan and the criteria governing development.

- Notify the provincial ministries and the conservation authorities that they have reviewed the proposal and that it meets the requirements of the applicable subwatershed plan and that they intend to approve it, or;

  Deny approval of the proposal because it contravenes the intent or the requirements of the subwatershed plan; or

Refer proposals that are believed to be acceptable but which deviate from the subwatershed plans or which are not adequately addressed by the plans, to the regulatory agencies for review and comment.
Figure 2.1 - Subwatershed Plan Administration

Subwatershed Plans

- Planning Approvals (City)
- Official Plan Development Criteria (See Figure 2.2)
- Conservation and Management (Conservation Authority)
- Establish Potential Funding Initiatives and Incentives (Rural Programs Subcommittee)
- Projects and Programs (City, Conservation Authority)
- Monitoring (Conservation Authority)
- Establish Annual Monitoring Program (Monitoring Subcommittee)
- Public Involvement (City, Conservation Authority)
- Establish Annual Public Involvement Program (Public Involvement Subcommittee)

Implementation

Reporting (Conservation Authority)

Monitoring and Implementation Review (Implementation Committee)

State-of-the-Subwatersheds Report (Conservation Authority)

Subwatershed Plan Revisions (City, Conservation Authority)
Figure 2.2 Planning Approvals

Subwatershed Plans

- Constraint Areas
- Environmental Policies
- Development Criteria

Official Plan

Negotiate Delegation of Authority

Development Proposal

Choice based on minor or major:

- Status of Subject Lands Report (City)
- Area Plan Required
- Area Plan (Area Plan Subcommittee)
- Confirm, Refine Criteria

Official Plan Amendment (City)

Plan of Subdivision, Site Plan (City)

Notify & Approve (City)

Reject (City)

Non Compliance Applications (Area Plan Subcommittee)

Approval Denied (City)

Approval Granted (City)

Note: City option to notify and approve does not come into effect until delegation of authority is approved.
While designation of the municipality as the lead approvals agency for administration of all specific site development proposals is recommended, it is also recommended that the provincial Ministries and the Conservation Authorities continue to be involved in Area Plans. Area Plans, like subwatershed plans are strategic in nature, although they are conducted at a more detailed scale. This, combined with the fact that Area Plans may be expected to refine and modify the subwatershed plans argues for the continued involvement by the province. It is recommended that a subcommittee of the overall implementation Committee (Area Planning Subcommittee) participate in the review of Area Plans.

2.2.1 Delegation of Responsibility

With the designation of a lead approvals agency, delegation of authority to the municipality will be required. Such delegation must conform to existing legislation and may take the form of a Memo of Understanding between the agencies and the municipality. It is recommended that negotiations pursuant to the delegation of authority begin once the municipality's Official Plan is approved and that a target for completion of these negotiations be set at two years.

One of the key issues in delegating authority is the need to ensure that adequate expertise is available to ensure technically sound review of submissions. In order for the municipality to assume the role of lead agency for approvals, it will have to have qualified staff, or access to the expertise needed to review the submissions technically. In particular, expertise in terrestrial and aquatic biology and ecology, hydrogeology and geomorphology may be required. It is recommended in the case of the City of London, that they either hire staff in these areas or that they "pre-qualify" consultants who may be contracted to complete technical reviews. If the pre-qualification route is adopted, it is recommended that the Implementation Committee be asked to confirm the selection of qualified firms/individuals.

It is recommended that the issuance of provincial permits remain vested with the regulatory agencies unless there is a subsequent agreement to delegate this authority to the municipality. Where transfer or delegation of plan review functions has occurred, the regulatory agencies would consider notification by the municipality of adherence to the plan as meeting planning and policy requirements and would focus permit approval on the technical design aspects of the submission.

2.3 Rural Programs

Rural programs represent an important element of the subwatershed plans. While the Official Plan and Development Criteria address future urban growth (through planning approvals) a large portion of the subwatersheds will remain rural, with agriculture the primary land use, for many years to come. It is therefore important to pursue the various conservation and management actions which constitute the rural programs, in order to reduce the negative impacts and enhance positive aspects of the existing land uses.

It is recommended that the Conservation Authorities lead the implementation of the rural programs. The Conservation Authorities currently work closely with the local rural community and have coordinated the delivery of rural programs under various provincial initiatives (CURB, SWEET, etc.).

The rural programs are important to the improvement of the subwatershed ecosystems. Delivery of the programs has been historically limited by the need for long term educational efforts and funding. Chapter 7 of this report identifies a number of initiatives which would seek to increase the effectiveness of the programs. Unfortunately, funding for these initiatives is not currently available except in the existing limited amounts. It is therefore recommended that a subcommittee of the Implementation Committee (Rural Programs Subcommittee) investigate avenues for potential funding and improved delivery of the programs.
2.4 Plan Monitoring and Review

Monitoring of plan implementation, subwatershed response to management actions and improvements in ecosystem health are fundamental to the implementation of the subwatershed plans. Based on the results of monitoring, the subwatershed plans should be reviewed and updated periodically.

It is recommended that the Upper Thames River and Kettle Creek Conservation Authorities be given the responsibility for coordinating monitoring in their respective areas of jurisdiction. The Authorities would be responsible, initially, for collecting information on plan implementation and convening the Implementation Committee annually to discuss progress on the implementation of management options.

In addition to this annual reporting, the Authority would be ultimately be responsible for coordinating the environmental monitoring (see Section 10) and for analyzing the data collected and synthesizing the information so that trends can be established. The results, together with recommendations for any needed adjustments to the plan would be documented in an annual monitoring report which would be tabled with the Implementation Committee for review and subsequent action, as necessary. It is recommended that the analyses, annual reports, and reviews be consolidated into a "state-of-the-subwatersheds" report to be done at five year intervals.

Initiation and ongoing planning of the monitoring program will require the input of different agencies. It is therefore recommended that a subcommittee of the Implementation Committee (Monitoring Subcommittee) be established to assist the Conservation Authorities in establishing the needed monitoring schedules and budgets. Further discussion of the role of this subcommittee is provided in Section 10.1.2.

2.5 Community Participation in Implementation

Community participation in the implementation of the subwatershed plans and the development of a strong community awareness of the benefits of environmental initiatives is considered to be very important to the success of the plans (see Section 8.0). It is recommended that the coordination of community programs be delivered through a partnership between the conservation authorities and the municipalities. A partnership is recommended because of the respective strengths of the parties. This partnership is shown as the Public Involvement Subcommittee in Table 2.1. While not truly a subcommittee, since it involves just the City and the CA's in most cases, it is shown as such because there are likely to be opportunities to involve other members of the Implementation Committee (EEPAC, AAC, LDI) in specific undertakings.

The municipality would focus its efforts on developing and coordinating education and awareness programs, taking advantage of its school and library systems and its contacts with community organizations and corporations. The conservation authorities would focus on the more "hands on" aspects of community involvement acting as a coordinator for projects and community monitoring programs. In each case, efforts would be made to cooperate closely with existing community assets such as Grosvenor Lodge, the University and active organizations such as the McIlwraith Field Naturalists and Friends of Stoney Creek.
3.0 IMPLEMENTATION REQUIREMENTS AND RESPONSIBILITIES

The subwatershed plans contain plan components under the broad headings of Constraint Areas, Development Criteria, Conservation and Management Practices, and Projects and Programs. In order for the plans to achieve their full potential, progress must be made under each of these categories. To facilitate this, tables have been prepared for each group of subwatersheds (Appendix A) which specify the action to be taken, the lead implementing agency (and support agencies), the recommended means or mechanism for completing the action, the time frame for implementation, and the funding responsibility.

In many cases the time frame for the component action is "immediate and ongoing" or "ongoing". The actions needed under the subwatershed plans are not simply reactive "fix and forget" type solutions. Rather they require an ongoing commitment and perseverance if they are to be ultimately successful. The subwatershed plans must change the way we develop and use the land if sustainable growth is to be achieved.

The lead agency for implementation varies from component to component but is always either the City (or the Townships) or the Conservation Authority. In general, the City of London will coordinate the activities related to urban growth and the Conservation Authorities will coordinate the rural programs. It is recognized that Provincial agencies have mandated responsibilities in regard to many of the actions to be taken. They are not, however, within the context of the subwatershed plans, an "implementing" lead agency. In many cases however they are designated as supporting agencies and are assumed to be available for technical comment and support, as needed.

The responsibility of implementation may require modifications or additions to both the City and the Conservation Authority structures to allow for the most effective implementation. The greatest change will be needed within the City because the implementation of the subwatershed plans represents a new mandate. Just as the development of the subwatershed plans brought together divergent viewpoints from different agencies, it will be necessary for the City to form a structure which involves many of its departments (parks, planning, engineering) in the continuing implementation of the plans.

The Conservation Authorities are structured in a manner which is consistent with the responsibilities assigned to them under the subwatershed plans. There may however be a need to reorient some efforts or programs in order to increase liaison or delivery within the subwatersheds.

Funding responsibility is predominantly assigned to either the City or the proponent, although in some cases this responsibility rests with the Conservation Authority or the landowner. It is recommended that discussion continue within the Rural Programs Subcommittee to assess means of accessing provincial or federal sources of funding and reallocating resources to key areas such as agricultural programs.
4.0 SUPPORTING ENVIRONMENTAL POLICIES AND BY-LAWS

4.1 Basis For Official Plan Policy

Subwatershed planning provides supporting input to municipal planning. Through the identification of natural features, constraint areas are identified in the Official Plan. Subwatershed planning provides direction for protecting and enhancing the natural heritage system in both an urban and rural context.

Bill 163 introduces amendments to the Planning Act that more clearly define provincial planning interests. In so doing, all Ontario municipalities are now required to develop Official Plan policies that are consistent with provincial policy statements.

These policy statements include very clear direction for environmental protection, hazard lands and natural heritage. Natural heritage features and areas are defined in the policy statements as "natural landforms, ecosystems, species in the environment, and their environmental and social value as a legacy of natural or restored ecosystems on the landscape."

Policy Statement A1.2 states that "Natural heritage features and areas will be protected." This policy statement goes on to state that development is not permitted in most significant natural areas or features. These areas are in addition to the provincially significant wetlands that were protected by previous provincial policy and continue to be protected by Policy Statement A2.1.

It is also important to note Provincial Policy Statement A1.4:

"In decisions regarding development, every reasonable opportunity should be taken to: maintain the quality of air, land, water, and biota; maintain biodiversity compatible with indigenous natural systems; and protect natural links and corridors. The improvement and enhancement of these features and systems is encouraged."

Clearly, there is legislative authority for protection of environmental features. However, no such authority exists for enhancement and improvement beyond encouragement.

In addition, the London - Middlesex Act (Bill 75) and its associated regulations requires preparation of a new Official Plan that incorporates, among other things, environmental objectives that direct the City to protect woodlands, valleylands, wildlife and fish habitat, wetlands, land subject to flooding and other areas that are environmentally significant and sensitive. In addition, these objectives are to direct the City to preserve ground water and surface water resources. The subwatershed studies are the foundation for the environmental objectives and policies to be included in the new OP.

It should be noted that the Bill 75 regulations also require that the City promote the growth of the tourism industry in a manner compatible with the preservation of the natural and cultural environments. Appendix C provides recommendations for the Thames River corridors intended, in part, to address this section of the regulations. Given the unique approach used for the Thames corridors, these recommendations could not be included in the body of the Implementation Plan common to all the subwatershed studies.

It is important to note that the City already has approved environmental policies in its Official Plan. Recently, changes to those policies were approved by Council, some of which have been approved by the Ontario Municipal Board. In other words, the City is not working in a policy vacuum.

Early in the subwatershed planning process, a vision statement and set of environmental goals were prepared to guide the preparation of the studies. These continue to be a guide for preparation of recommendations for the Official Plan.
Chapter 4 is intended to provide recommendations for the Official Plan that will help guide land use change in a manner that implements the recommended subwatershed studies and ensures the Official Plan will be consistent with provincial planning policy.

4.2 NATURAL HERITAGE STRATEGY

4.2.1 Natural Heritage System

The Natural Heritage System is composed of several elements, including:

- water quality
- fish and wildlife habitat
- unique vegetation communities (woodlots and wetlands)
- links/corridors between vegetation communities for the migration of plant and animal species
- natural hydrologic cycle

The Natural Heritage Strategy is used as the basis for linking these elements of the natural environment in a manner that can be integrated into an overall strategy for managing land use change in London. It should become a key component of the City’s long range land use planning strategy and of the City’s Open Space and Recreation Master Plan.

RECOMMENDATIONS:

That Official Plan policies indicate that subwatershed planning is a requirement when considering land use change within London.

That the Official Plan establish the City’s Natural Heritage Strategy based on the findings of the various subwatershed studies.

That the Natural Heritage Strategy be included as an integral component of a new Open Space and Recreation Master Plan for the City of London. These policies could be the foundation for promoting the concept of the “Forest City”.

As part of the Strategy, Area Plans must be required to include an Environmental Management Strategy (EMS) that will set out how the land development strategy for the area will implement the relevant components of the Natural Heritage Strategy, including achieving environmental and water quality targets and protecting significant natural heritage features. More detailed recommendations are provided in Section 5.0.

That the Official Plan define an acquisition/stewardship strategy for the management of natural features, floodplains and corridors.

4.2.2 Top Soil Removal By-law

A top soil removal by-law will allow the municipality to enforce policies intended to reduce sediment loading in streams during construction or through inappropriate agricultural practices without resorting to the use of the federal Fisheries Act. The consultants understand that the City is using other practices to effectively manage top soil removal. However, this by-law should be given further consideration as a potential additional tool.

Section 223.1 of the Municipal Act allows municipalities to approve these by-laws. Reference should be made to this Section of the Municipal Act for more specific direction regarding the potential contents of such a by-law.
RECOMMENDATION:

That a Top Soil Removal By-law could be enacted, and permit approval procedures established. If the by-law is enacted, the City should be available to provide technical support, guidance and training to those who will be involved in submitting applications, reviewing applications, and fulfilling the conditions of approval.

4.2.3 Tree Cutting By-law

A Tree Cutting By-law is needed to ensure sound forest management practices can be enforced in London. Section 223.2 of the Municipal Act allows the City to pass such a by-law. This section and Section 34 of the Planning Act should be components of the City's strategy for protection of natural areas. Section 34 can be used to prohibit uses in defined environmentally significant areas.

A Tree Cutting By-law passed in accordance with the Municipal Act can be more restrictive than a similar by-law passed under the Trees Act.

RECOMMENDATION:

A Tree Cutting By-law should be prepared and approved by Council as soon as possible. Appropriate restrictive zoning by-laws should be drafted for environmentally significant areas and applied immediately wherever this is practical under current Official Plan policy.

4.2.4 Tree Preservation Policies

Currently, the City is managing two tree preservation policies. It is our understanding that this has been under review.

RECOMMENDATION:

Council should consolidate Tree Preservation Policies into one policy document that is managed/implemented by the Planning and Development Department through the development review process; this can be addressed consistently and effectively by one department.

4.2.5 Tree Planting Programs

The City has tree planting programs that should be expanded to include natural enhancement. Special funding should be considered to help implement natural enhancement objectives. Public support for such a program may be encouraged if the funds raised for natural enhancement are used solely to achieve natural enhancement objectives. Existing tree planting funds could be expanded and used to support the natural enhancement objectives of the subwatershed studies. A separate special fund could be developed for land acquisition or this could be an extension of the fund used for floodplain acquisition.

RECOMMENDATION:

Add a forest rehabilitation/enhancement program with specific funding for active intervention through planting programs to help achieve the enhancement objectives of the subwatershed studies. A separate fund for land acquisition should also be part of this program.

This program and its associated funds should be administered by the Parks and Recreation Department.
4.3 Significance

It is important to note that the subwatershed studies are but one component of the background material to be used by the City in developing Official Plan policy. The subwatershed studies assess "significance" from the perspective of the natural environment. In addition to the natural environment, the City must have regard to many matters of provincial interest, including social, recreational, and cultural values. All these factors will contribute to determining how best to reflect the subwatershed studies' recommendations in the Official Plan, including how best to resolve potential conflict between the natural "significance" of the river and stream corridors and their "significance" to residents as social, recreational and cultural resources. We are confident that after all these factors are considered, Official Plan policies will be consistent with the CSPS.

The subwatershed studies have identified significant environmental features based on criteria that would augment or modify those used in the Draft Terrestrial Resource Strategy. These new criteria and those used in the DTRS account for natural features (greater than 4 hectares) that warrant protection from development as determined by the subwatershed studies.

To ensure that significant natural features and areas are properly recognized in the Official Plan, the Provincial Policy Statements require that appropriate criteria and guidelines be established as a basis for determining significance. These criteria must be identified in the Official Plan or the foundation for identifying significant features in the OP schedules will be unclear and subject to challenge.

Development is not permitted within the boundaries of a Category 1 feature, although the precise limits of these features and areas will likely be defined at the Area Plan stage. It is appropriate for the Official Plan to recognize that the boundaries are somewhat flexible given the scale of the maps used in the Official Plan and the subwatershed studies.

The Area Plans will determine the final level of protection to be given to the Category 2 areas identified in the subwatershed studies. The extent to which development will be allowed within a Category 2 feature will be determined as part of an Environmental Impact Study (EIS) or as part of the Environmental Management Strategy (EMS) that is prepared as part of the Area Plan.

Chapter 1 of this Plan reviews in greater detail how Category 2 areas identified by the studies are to be evaluated until Area Plans are complete.

The subwatershed studies are to be the evaluations required by the Province's Policy Statements for determining how significant natural features will be identified in the Official Plan. Once an OP identifies an area that serves an important ecological function within the City's Natural Heritage System as "significant", the Province's policy statements provide very clear limits on what can occur within the defined significant area.

RECOMMENDATIONS:

That the City's Official Plan include the criteria used to identify Category 1 and Category 2 natural features identified in the City's subwatershed studies. These criteria were used to identify significant environmental areas and features, including wetlands, ravine and stream corridors, and woodlands.

The OP should distinguish between the criteria that will apply to the identification of Category 1 and 2 environmentally significant areas. Direction for the potential use and integration of anti-fragmentation areas (potential natural enhancement areas) in the natural heritage system should also be included.

Although the subwatershed studies intend Category 1 features to be subject to the same level of protection as contemplated by the Policy Statements, the Category 2 features should be treated with more flexibility until more detailed assessments are completed as part of the Area Plan process. For reference, the implications of the studies' distinctions are as follows:
Category 1: No development is permitted. If a proponent can do better for the natural environment, the proof will need to be very clear; if the proof is provided, an OPA must be approved before the designation can change. The first choice is full protection for Category 1 areas; they are to remain unaltered. Boundaries are approximate on the subwatershed maps, but they can be more accurately defined with the Area Plan or subdivision plan, along with the adjacent lands. Adjacent lands can not be altered unless an Environmental Impact Study (EIS) is completed and its findings and recommendations approved.

Category 2: If the significant functions can be maintained, these areas can be treated with some flexibility. However, they are protected from development until more detailed studies are completed (EIS). Reference should be made to Chapter 1 of this report for a more detailed explanation. Anti-fragmentation areas are included in this category to ensure that appropriate corridors and other enhancements have been considered for integration into the natural heritage system as part of the area plan process.

That Schedule ‘A’ of the Official Plan include an ‘Environmental Protection’ designation. This designation should be applied to key features, including the following:

a) significant ravine, valley, river, and stream corridors;
b) significant portions of the habitat of endangered and threatened species;
c) ESA’s;
d) provincially significant wetlands; and
e) provincial ANSI’s.

That an Official Plan Schedule separate from Schedule ‘A’ be prepared that identifies environmental features and areas within the City. This schedule will illustrate the proposed natural heritage system for the City and should generally identify the various components of this system. It is anticipated that this Schedule would revise the current Schedule B. It may be appropriate to identify aggregate resources on another schedule.

All mapping will be based on features and functions known to exist as of March 28, 1995. It is the intent of these policy recommendations to ensure protection of all significant features. Category 2 areas are to be protected until an appropriate EIS is completed and identifies alternatives to protection that are acceptable to the City.

If significant features are destroyed or damaged, it is strongly recommended that the area affected remain protected as a Category 1 area to allow for rehabilitation to a natural state. If an EIS has not been prepared for a Category 2 area prior to its destruction, it should also be protected unless an appropriate replacement area can be found. The City should not be responsible for identifying replacement areas, unless the damaged area is on City property.

4.4 Water Quality

The subwatershed studies have identified sensitive groundwater recharge areas, headwaters, or aquifers that could be part of sensitive areas or sensitive water systems, except for those associated with vegetation patches. Where these recharge areas are identified with other environmental features, it is appropriate to require preparation of an EIS before development is approved. Other groundwater recharge areas in these sub-watersheds should influence the selection of BMP’s proposed for development within those areas.

RECOMMENDATIONS:

That the OP include policies that require evaluation of potential impacts on the quality and quantity of water and related resources, specifically with respect to well water supplies and aquatic resources, when land use changes are proposed.
That sensitive groundwater recharge areas and head-waters or those associated with sensitive water systems be afforded protection as Category 2 areas. Development that will negatively impact on sensitive water systems or areas, including sensitive aquifers, must not be permitted. Category 2 status will ensure that development can only proceed after an appropriate study is prepared. Where development is expected to be appropriate, the study must establish the conditions under which that development can occur.

It is intended that all groundwater recharge areas identified in the subwatershed studies will be subject to appropriate study before development will be permitted over these areas. Where vegetative patches are associated with groundwater recharge areas, an EIS is an appropriate level of assessment. Other recharge areas can be subject to less detailed study, provided it is shown that the hydrologic function of the area can be maintained.

4.5 Valley, River, Ravine, Stream and Terrestrial Corridors

Buffers and setbacks along stream corridors have been reviewed in the subwatershed studies. Specific requirements can be established at the Area Plan stage rather than in the Official Plan.

The CSPS appears to intend for "significant" ravine, valley, river, and stream corridors to be protected from all forms of development, including many recreation uses such as golf courses, sports fields, and even manicured parks and public gardens. Although generally consistent with the intent of the CSPS, the subwatershed studies did not intend to prevent the use of more detailed study (EIS) to determine whether such uses might be appropriate in some cases. This warrants further discussion with the Province as the City moves toward preparing Official Plan policy.

The subwatershed studies also recommend including vegetation patches that are contiguous to "significant" river and stream corridors as part of the criteria for Category 1 ESA's. These are important features adjacent to "other" river and stream corridors.

Although the subwatershed studies have, at a conceptual level, defined that the limits of significant valley and ravine corridors will be contained within registered fill lines, it is not the intent of these studies to limit the potential for more detailed study that will more accurately define the limits of these significant corridors. Existing developments located in significant corridors, including parks and golf courses, are not to become "naturalized", although this may, in some cases, be an appropriate transition to consider.

RECOMMENDATIONS:

That the OP identify stream setbacks and buffers, and terrestrial corridors as integral components of the Natural Heritage System in the City of London. That the OP require that minimum setbacks for significant stream corridors be established in the Area Plan.

It is recommended that an EIS be used as a basis for more accurately defining the limits of "significant" corridors and their adjacent lands. A minimum natural vegetated corridor width is required, subject to the specific requirements of the stream corridor, to maintain the ecological significance of the corridor (eg. wildlife corridor).

In significant valleys and corridors, public works or infrastructure that require location in these areas can be considered, although they should be discouraged. An appropriate environmental assessment process or EIS must be completed before infrastructure can be developed in these areas. New golf courses, sports fields and other similar uses are generally not appropriate within "significant" valley, river, ravine and stream corridors as these uses fall within the relevant definition of development.

However, it is not the intent of the subwatershed studies or the CSPS to limit all recreation opportunities such as trails and walkways. Paved bike paths will likely be considered "infrastructure"
and could then be approved through an EIS (or Class EA, if applicable). This is consistent with the intent of relevant provincial policies. However, most recreation facilities appear to fall within the relevant "development" definition and are not defined as "infrastructure".

In "other" valley and stream corridors, essential public works and those outdoor recreation activities that may be compatible with the natural character of the valleys and stream corridors, including golf courses, are permitted with fewer restrictions.

That any vegetation patch contiguous to a river or stream be considered a significant feature that is to be protected from development. These features should be given Category 1 protection if they are adjacent to a significant corridor. They are Category 2 features adjacent to other stream or river corridors (eg. most municipal drains).

4.6 Fisheries

Streams have been altered to improve drainage, by straightening and deepening the stream channels. Less than half of the area's streams have vegetated stream banks, and as a result, banks are unstable, stream temperatures are high and soil eroded from adjacent lands readily enters the streams. All these factors contribute to degrading fish habitat.

In the past 20 years, there has been little change in the diversity of species, but there is evidence that population declines in sensitive species has occurred. Although urban development is not the sole contributor to this decline, to be consistent with Policy Statement A1.3, new development must not harmfully alter, disrupt or destroy fish habitat. In addition, there must be no net loss of productive capacity of fish habitat, and a net gain of productive capacity, wherever possible. For improvements in the rural areas, the focus must be on developing improved agricultural practices and devising special programs and tax incentives that will lead to improved stream conditions.

RECOMMENDATIONS:

That the Official Plan clearly state that when land use change is proposed, no degradation of streams with an aquatic resource will be tolerated to ensure protection or enhancement of fish habitat. Alteration of streams or municipal drains may be considered as part of the Area Plan process, provided it is demonstrated that this will enhance fish habitat. This policy could be similar to provincial policy A1.3.

That stream bank revegetation be required where potential for an aquatic resource exists. This must be completed as a condition of development approval and/or through an active planting program by the City. Although revegetation can occur at the time of development, some form of cost recovery should be available to the developer if no other stream improvements are needed to mitigate the effects of development.

For revegetation initiatives that are not development related, a specific program with appropriate funding should be established and managed by the Parks and Recreation Department. This could be an extension of the naturalization and community tree planting program.

The use of development charges as a mechanism for funding river and stream corridor mitigation works associated with development should be considered. Further discussions with LDI and the London Home Builders are required to address this issue.

An Area Plan or EIS will address the specific requirements for buffering and corridor widths as part of the Area Plan process or as part of a specific development application review process. However, no compensation for land values is contemplated unless public acquisition is necessary. It is anticipated that portions of the buffer area will be contained within the floodplains of these streams. If wider buffers are needed, these can be contained within private property, provided there are controls over
fencing and tree cutting within these areas, subject to specific direction provided by the Area Plan or EIS (eg. recommendations for control of yard maintenance, including notification on title and/or zoning controls).

4.7 Potential Enhancement Areas (Anti-fragmentation)

These areas are proposed as a way to restore some of the former functions of the City's natural heritage system. Much of the historic habitat diversity has been lost. Habitats characteristic of forest interior, grassland, savanna, area sensitive species and forest predators are very rare. Without a strategy to restore some of the former functions of the current natural heritage system, future urban growth and continued agricultural and forest management practices will continue to degrade existing features.

It is important to note that the studies state that anti-fragmentation areas represent areas that can be naturalized as part of the strategy for enhancement of the Natural Heritage System. They are not mandatory limits for restoration of natural vegetation but should be subject to further review at the Area Plan stage. The studies give these areas Category 2 status to ensure completion of an appropriate assessment of these areas and their potential role in the Natural Heritage System.

As a general guide for the application of enhancement or anti-fragmentation areas, they can be used as potential replacement areas for other features. They should be viewed as a means of improving the natural heritage system within a development area without reducing the acreage available for development. Enhancement objectives often can best be achieved within fill regulated areas of streams, river and ravine corridors.

Storm water management ponds may be considered for use within an "anti-fragmentation area", provided it will improve the natural heritage system. It should be noted that historically SWM ponds have been better suited for integration into parks with active and passive recreation needs. Generally, agencies have not been satisfied that these ponds provide suitable natural habitat. However, the policies of the Official Plan should allow the potential for creative and effective multi-use of these areas.

Other options for protection and management of these areas include local land trusts (bequeathals and purchase), conservation easements (ownership remains private), private stewardship, and purchase by the Conservation Authorities, the City, County, Province or federal governments. Unless specific funding can be targeted to the purchase of these lands by these government agencies, it is likely that greater reliance must be placed on private land options such as conservation easements, stewardship and Land Trusts. Negotiation remains a reasonable option for lands under immediate development pressure.

Category 1 features form the "Core" of the Natural Heritage System. These are the areas that offer the greatest diversity of habitat and value to the hydrologic and natural heritage systems. If enhanced, they have the greatest potential to become stronger more viable natural areas. Strong linkages between these areas also become critical components of the Natural Heritage System. Given that the natural linkages and corridors between these Category 1 areas are generally not as strong as they should be in London, public purchase priority should be given to lands that will best fulfil a linkage or enhancement function for Category 1 areas.

It should be noted that to ensure consistency with the CSPS, in areas where there is little vegetation cover, it is appropriate to focus evaluations of corridors on opportunities to retain or restore linkages between isolated natural areas. This applies to London.
RECOMMENDATIONS:

That the Official Plan include implementation policies that clearly state Council’s commitment to the establishment of a special fund to be used for the purchase of lands needed for the enhancement or protection of natural areas. This fund would only be used when other forms of protection are not possible or practical.

Due to the important role of the core natural areas in the City’s Natural Heritage System, priority for acquisition should be on those areas that will enhance and/or link Category 1 features. Public acquisition will not always be necessary to ensure protection of the Category 1 features. However, the areas enhancing or linking these features may also be suited for other uses. If protection of Category 1 features is jeopardized, public acquisition of lands that contain these features should become a priority.

That the OP recognize that SWM ponds may be considered as potential enhancement or anti-fragmentation areas, provided these will enhance the natural heritage system.
5.0 DEVELOPMENT PLANNING STUDIES

This section is intended to identify the range of studies and their intended function within the context of implementing the natural heritage strategy for London. Area Plans and their Environmental Management Strategies (EMS) are proposed as the key link between the City's Natural Heritage Strategy and a streamlined development approvals process. An EIS is a detailed study of environmental features or areas that can be completed comprehensively as part of the Area Plan or at a site specific stage.

5.1 Area Plans

It is anticipated that Area Plans will be the preferred approach for managing land use changes in urbanizing areas of London. These plans will provide the direction for implementing broader Official Plan policies. Within that framework, there is a need to establish more specific direction for addressing the objectives and policies associated with the Natural Heritage Strategy.

Generally, it is recommended that an Area Plan be carried out prior to proceeding with development within a tributary. This approach will help to ensure that the subwatershed goals, objectives and targets are met. There may, however, be situations where individual developments which are relatively small and are not located within, or adjacent to sensitive areas, may proceed prior to an Area Plan being undertaken. Typically these proposed developments would be small (less than 5 ha) and should cumulatively not exceed ten percent of the subwatershed.

In such cases the proponent would be required to prepare a "Subject Lands Status" report. This report would outline the natural resources on site (eg. features covering less than 4 ha) and would indicate plans (if any) to integrate these into the development proposal. If the results of this report indicated no significant features or habitats, then the proposal would be allowed to proceed, completing only the normal mandatory studies (eg. Stormwater Management Plan, Erosion and Sediment Control Plan). If significant features were identified in the status report, a decision would have to be made as to whether the proposed protection and integration plans were adequate, or whether their was a need to defer development pending a full assessment under an Area Plan.

The ongoing revisions of the City of London Official Plan will identify an Urban Growth Area of sufficient extent to meet the City's land requirements for community growth and economic development to the year 2016. Most of the lands within the Urban Growth Area will be placed in an Urban Reserve designation pending the completion of more detailed planning studies at a community scale. Areas not designated as Urban Reserve will be appropriately designated for their existing use (residential, commercial, industrial, etc.) or as Open Space if they are deemed to be significant for environmental protection and/or public or private open space purposes.

All of the Urban Reserve lands within the Urban Growth Area will fall within the limits of proposed community planning areas that are likely to be in the 400 ha to 800 ha size range. The boundaries of these areas would be determined on the basis of criteria relating to physical features (major roads, rail lines, etc.), subwatershed boundaries, and servicing areas. The Official Plan will establish some broad strategies, priorities or targets to be met within these planning areas and already contains policies that set out locational criteria for various types of land use.

The area planning process includes a detailed analysis of physical site characteristics, requirements for community facilities, collector road patterns, land use relationships, pedestrian circulation, open space and pedestrian networks, and the co-ordination of servicing and the phasing of community development. The resulting Area Plan integrates the pattern of development across multiple land ownerships and with adjacent planning areas and seeks to promote community interaction and identity.
The Area Plan is implemented in two ways. Components of the Plan that are appropriate for inclusion in the Official Plan (collector road patterns, specific land use designations, etc.) are adopted as an amendment to the Official Plan. The Area Plan itself is adopted by resolution of City Council and serves as a guideline document that will direct the planning efforts of City departments, local agencies and utilities, and individual developers. While the Area Plan does not have Official Plan status, any proposed changes to it are subject to public notification and meeting requirements prior to adoption by City Council.

Area planning studies have normally been undertaken by planning staff in consultation with landowners, agencies, City departments and the general public. Following adoption of the new Official Plan, it is likely that some of the required studies will be undertaken by consultants in accordance with guidelines to be established by the City. The cost of area studies will be shared by benefitting landowners through a development charge components or through up-front cost-sharing arrangements.

**RECOMMENDATIONS:**

That the Official Plan indicate that storm water management and erosion/sedimentation management is a requirement in urbanizing areas.

To ensure implementation of the Natural Heritage Strategy, each Area Plan should include an Environmental Management Strategy (EMS) that addresses how the land development strategy will implement the Natural Heritage Strategy described within the Official Plan.

The Area Plan will establish the link between the general environmental policies of the Official Plan and the specific requirements of a development area. The EMS should contain the detailed environmental data, analysis and mitigation and enhancement recommendations needed to ensure a streamlined approvals process for subdivisions and other site specific development applications within the area. The Area Plan could contain a comprehensive EIS, although this would not be mandatory.

The Area Plan will identify specific corridor and buffer widths and address how non-designated vegetation patches have been considered. Although many of these areas may not be "significant", protecting existing patches, where practical, is more cost effective than planting new patches. Incorporation into school blocks, park blocks or high density apartment blocks all are possible, provided that the site plan approval and development process addresses protection and replacement. Some patches might also be integrated into the rear yards of low density housing.

If there is a significant land base required to implement the selected approach within a subwatershed or catchment area, there must be cooperation among all public agencies, including the School Boards, to ensure public land is used as efficiently as possible.

When Area Plans are not appropriate or practical to address development issues, the need for an EMS should be addressed upon submission of a subdivision or site plan application. It is not anticipated that an EMS would be required solely for small and isolated development proposals.

### 5.1.1 Environmental Management Strategy (EMS)

The objective of the subwatershed plans was to protect, enhance or restore the environment under present conditions, or as land use changes occur. The recommended plan as presented in each study, summarizes the measures which must be undertaken in order to meet this objective.

The subwatershed plan, which was completed using an ecosystem approach, provides the foundation for long term protection, enhancement or restoration. It must be remembered, however, that the study areas (up to ± 200 km²) are considerable. As such, detailed assessment of each vegetal patch, local tributary, or potential recharge area was not undertaken. This section will define the general requirements of an Environmental Management Strategy (EMS).
The EMS will typically be part of the Area Plan. Ultimately the findings with the environmental component (EMS) of the area plan will be integrated into findings from the Recreational (Master Open Space), Servicing and Transportation plan.

The EMS will commonly be undertaken at a subcatchment, or tributary level. The primary objectives of an EMS are to:

- complete the necessary field/technical analyses to define the environmental conditions at a tributary level; and
- confirm that the recommendations of the area plan are consistent with the overall intent of the subwatershed plan.

As the subwatershed plan provides the foundation for an EMS, the EMS provides the basis for Draft or site plans. Key deliverables from an EMS will include:

- location, sizing and preliminary design of all stormwater management facilities;
- field assessments (EIS’s) to verify natural heritage features including composition, age, and ecologic functions;
- stream requirements, including areas to be restored, conveyance (and thus land) requirements and preliminary design;
- development of an aquatic resources strategy;
- definition of appropriate setbacks and buffers;
- confirmation of the local groundwater flow patterns for moderate/high recharge areas; and
- development of a local natural heritage strategy consistent with the subwatershed natural heritage strategy.

Table 5.1 illustrates an example fact sheet taken from the Dingman Creek Subwatershed study. The fact sheet, which was developed for each tributary, forms the basis for carrying out the EMS. The key headings are:

- Resources;
- Key Best Management practices;
- Proposed Studies; and
- Environmental Targets.

Outlined below is a further description of each heading, as well as the general requirements of the EMS.

**Resources**

The environmental resources will be defined in the subwatershed plan. Four general headings; water resources (including groundwater, surface water and water quality), aquatic resources, stream morphology and terrestrial resources have been used. The resources as summarized represent the key resources within the tributary and thus provide direction as to what type of studies are to be undertaken.

**Key Best Management Practices**

The key Best Management Practices are also defined in the subwatershed plan. The listing of BMPs provides direction with respect to the types of measures to be undertaken within the tributary area. Details of the proposed measures will be confirmed at the EMS.
Table 5.1

DINGMAN
TRIBUTARY NO. 16

Resources

Water Resources

- 667 ha drainage area
- permanent streamflow
- 100 rural wells
- confluence with Zone 1

Aquatic Resources

- tolerant warmwater fishery (Type III)
- unstable-tolerant benthic invertebrate community (Type III)

Stream Morphology

- 500 m of natural watercourses
- 1,650 m of altered watercourses
- remainder are surface drainage features

Terrestrial Resources

- Category 1:
  - ESA - 10088 - upland hardwood (interior forest birds) 15 ha
  - vegetation contiguous with fill line 3 ha

- Category 2:
  - 1 upland hardwood woodland 18 ha
  - 3 other vegetation features 10 ha

Key Best Management Practices
(refer to Table 8.1 for details)

Stormwater Management Facilities

- 29 ha of stormwater management facilities required for flood control, protection of stream morphology, water quality protection and baseflow augmentation
- distributed runoff control techniques for protection of stream morphology
- 1,600 m of stream requiring revegetation
- 500 m of stream restoration to natural morphology

Proposed Studies

General

- Subject Land Status
Table 5.1 (Cont’d)

Proposed Studies (Cont’d)

**Water Resources**
- stormwater management study to confirm size and location of facilities, peak flow rates, water budget and channel conveyance requirements
- fill lines to be re-defined
- streambank soil types to be field checked to define parameters for protection of stream morphology
- Two-Zone approach to floodplain management to be considered where applicable

**Aquatic Resources/Stream Morphology**
- stream habitat restoration plan for target fish species
- fluvial geomorphological study to define natural channel characteristics and sediment budget

**Natural Heritage Features**
- scoped EIS areas within 50 - 100 m of Category 1 Areas and for all Category 2 Areas
- confirmation of terrestrial resources within patches less than 4 ha in area

**Environmental Targets**

**Flows**
- 100 year peak flow \( \leq 3.8 \, \text{m}^3/\text{s} \)
- increase baseflows (10 - 30 l/s)

**Water Quality**
- TP \( \leq 0.06 \, \text{mg/l} \)
- SS \( \leq 40 \, \text{mg/l} \) (annual average)
- D.O. 6 mg/l

**Aquatic Community**
- 50% of streambanks vegetated
- 30% of stream with natural characteristics
- minimum riffle and pool area 4% and 30%
- HSI (green sunfish, creek chub) = 0.6 minimum
- IBI typical of fair good conditions
- WQI = 8 - 10 EPT >5

**Terrestrial**
- protect all Category 1 Areas
- retain function of Category 2 Areas by protection, enhancement, replacement
- revegetate non-vegetated areas in Category 1 (e.g., within fill lines)
- use indigenous species
Proposed Field/Technical Analyses

A listing of the proposed field/technical analyses to be undertaken at the area plan stage is provided. A brief overview of each type of analysis is provided below.

Water Resources

The following field programs may be required (see comments in brackets) for an EMS:

- monitoring of streamflows (in areas where low flows are important, streams are subject to erosion, or where flood protection is an issue); and
- monitoring of groundwater flow patterns in areas of high/moderate recharge/discharge (in order to define localized flow patterns and potential impact on rural wells and/or low flows within the streams).

Technical analyses will include:

- hydrologic/hydraulic analyses to confirm flows for a series of conditions: to define stream conveyance requirements and to size stormwater management facilities (see accompanying example);
- updating of fill lines, as appropriate, to incorporate more recent applications (e.g., Bill 163) or other environmental considerations (e.g., aquatic or terrestrial corridor widths). Ultimately this information will be used to define setbacks and/or buffers.
- hydraulic assessment to define appropriateness of applying Two Zone Concept in areas subject to flooding for storms up to and including the Regulatory Storm (1:250 year).

Aquatic Resources/Stream Morphology

The aquatic resources and stream morphologic studies should be carried out simultaneously. The subwatershed plan will have defined general stream characteristics including:

- target fishery and benthic invertebrate community; and
- general habitat considerations.

Field programs, at the EMS stage will generally include:

- stream morphologic assessments (e.g., soils type, stream classification, bankfull width, and depth, sinuosity); and
- habitat assessment (e.g., substrate material, pool/riffle structure, percent riparian cover).

Furthermore, all watercourses less than 125 ha should be field walked to confirm their environmental significance. In cases where the watercourses provide habitat for aquatic or terrestrial resources or are part of a well/moderately defined valley they should be protected, and an appropriate buffer width applied.

Collectively, the assessments as carried out as part of the water resources and aquatic/stream morphologic studies should define protection/restoration/enhancement requirements from a conveyance and habitat perspective. Preliminary designs including land requirements, buffer and setback widths and illustrating typical cross sections and plans should be prepared (see accompanying example).

Terrestrial Resources

The subwatershed plans identified the key components of the natural heritage system, emphasizing several key core areas, a number of linking corridors primarily along stream corridors and several supporting natural areas of sufficient size and quality to sustain remnants of former terrestrial
communities such as upland hardwood forests and forest-interior plant/animal communities. The plans also identified remaining natural vegetation features 4 ha or greater which exist around these key areas that also contribute to the natural heritage system. Finally, the plans identified a number of areas where habitat creation/ restoration in compensation for lost features should be further investigated. These antifragmentation study areas were selected based on several criteria:

- habitat creation adjacent to large, diverse natural features;
- habitat creation that increases the amount of interior forest habitat in mature forests; and
- habitat creation that unites several closely associated natural vegetation features.

At the area plan level, additional studies are required through an EMS to provide the following:

- confirm the boundaries of the key components of the natural heritage system including the adjacent land area which may be subject to additional development constraints;
- field evaluations for all remaining natural vegetation features (including those less than 4 ha in size) based on the feature's intrinsic value (rare species habitat, lack of disturbance, age and composition of vegetation) and the contribution of the feature to the identified natural heritage system or "landscape value" (representativeness, high biodiversity, key ecological or hydrologic function); and
- identify mitigation and compensation measures including recommendations on the type and extent of habitat creation required for features which will deteriorate in terms of their condition and ecological function as development proceeds. This will include identifying appropriate locations for habitat creation generally with antifragmentation study areas.

Inventories will typically cover three field seasons and characterize biological communities within each vegetation feature in terms of vegetation, birds and animals (amphibians, reptiles, mammals). The emphasis of the inventory should be on identifying the ecological functions provided by the feature not only on rare species.

The value of individual features, should be assessed based on the direction provided in the natural heritage strategy, i.e., that there is a predominance of features characteristics of edge habitat, high disturbance levels (non-native species, grazing, cutting), and immature, early successional vegetation; and a scarcity of interior forest habitat, wetlands, savannas, grasslands and large natural vegetation blocks.
PRELIMINARY DESIGN

Mean Slope = 0.33%
Q, (bankfull) = 5.5 cms

Rugger C, Channel
n=0.022
bankfull width = 10 m
bankfull depth = 0.6 m
D_h = 20 mm
Avg bank side slope 3:1 (H:V)
W/D = 17

Flood Prone Width = 22m
(Riparian flow)
(1:100) =

Riffle/Pool spacing = 60 m
full wave length = 120 m
max belt width ratio = 9
max valley width = 90 m

Channel length < 1540 m
(i.e. almost < 14)

Radius of Curvature = 24 m
The social and recreational value of these features should also be identified at the area plan level so that features may still be protected on a best effort basis although their regional ecological function is limited.

Environmental Targets

Environmental Targets for each tributary are provided via the subwatershed plan. The targets which are based on a long term (50 year) planning horizon are based on technical assessments carried out on a subwatershed wide basis. The environmental targets, as provided, should be compared to the values as generated via the area plans to confirm that the overall integrity of the subwatershed plan is maintained. Over the long term, environmental monitoring will be carried to confirm that key targets are met.

5.1.2 Environmental Impact Studies (EIS)

An environmental impact study is the tool by which individual natural resource areas are considered prior to approval of development. Provincial policy G6.1 describes when an EIS is required. These studies can be used to better define the limits of an environmental feature and its adjacent lands. This information can then be used to refine the limits of new development prior to rezoning property. An EIS may be conducted as part of the Area Plan’s EMS, or may be undertaken for specific proposals where an Area Plan did not complete the EIS requirements or an Area Plan was not prepared.

RECOMMENDATION:

That the Official Plan confirm that the approach proposed for Environmental Impact Studies in London is comparable to that contemplated by provincial policy statements G6.1-3 and the relevant implementation guidelines. Where an EIS is required, it must be reviewed by the City before options for managing land use change can be considered.

5.1.3 Rehabilitation and Enhancement

There are many opportunities for enhancement throughout London, as confirmed in the various subwatershed studies. The key is determining where to focus attention to achieve the greatest environmental and social benefit or how to get the biggest bang for the buck.

Aggregate extractive operations offer some immediate opportunities for natural enhancement and recreation if the Province will support changes to rehabilitation plans. Other more limited opportunities exist within City owned land, mostly on parkland.

RECOMMENDATIONS:

That the Official Plan require that Area Plans address rehabilitation and enhancement issues. These alternatives would be assessed based on their ability to help achieve the enhancement objectives of the subwatershed studies. Social and economic factors could be other considerations that influence the selection of an alternative.

That the Official Plan acknowledge that the City’s highest priority for rehabilitation are those Category 1 features that have been damaged by nature or human activities. Section 4.7 has recommended that priority for enhancement would be those areas linking or adjacent to Category 1 features and areas. These areas are found mostly within the river, stream, valley and ravine corridors in London.

That native species shall be planted on City property and, where possible, these plantings shall be used to create habitat rather than scattered planting. The Parks and Recreation Department has already established “naturalization” zones within its recent parks planning initiatives. This practice should be continued and expanded, where possible.
5.1.4 Natural Corridors and Linkages

Where significant natural features exist, the long term protection of these areas is best assured if natural corridor functions can be maintained. It is the intent of these corridors to facilitate movement between significant features. They allow for increased potential for species movement and reproduction, thus ensuring genetic diversity and they prevent overcrowding. These corridors will function as conduits for seeds carried by animals and birds that will ensure the long term viability of these natural areas. It is not the goal to reintroduce certain species into an area, but it is the goal to recreate the habitat/community type and ensure that these areas can sustain themselves.

RECOMMENDATIONS:

That the OP require Area Plans to identify opportunities for providing natural corridors and linkages, with particular emphasis on linkages between Category 1 ESA’s.

Where these corridors or linkages can not be established through an integration with private lands, parks, floodplain corridors, or storm water management facilities, public purchase may have to be considered.

5.2 Development

Development is now defined in four different ways by the Province. Use of the term will vary depending on which provincial policy is to be applied. When more than one is relevant, the most restrictive must apply. For example, use of the term when applied to floodways would allow most forms of recreation. However, when applied to significant environmental features, “development” does not appear to include any form of site grading unless it is associated with approved infrastructure projects.

5.2.1 Lot Creation

To ensure consistency with Provincial Policy Statements, new lots and development that increases the number of permitted units on a lot can not be permitted on lands that are environmentally significant. In some instances, two levels or categories of significance are recognized.

Given that existing conditions reflect the minimum level acceptable for environmental conditions in London, no further degradation of environmental features can be permitted without a thorough assessment of potentially affected features and a strategy for replacement that will lead to enhancement or maintenance of existing conditions. However, the subwatershed studies have found that many features cannot be replaced.

Until significant areas and features have been properly assessed, no alteration should be permitted. This must apply whether the feature is in an area contemplated for urban growth or likely to remain in agricultural production for another 50 years.

Although exceptions are not recommended, should they be granted, it is strongly recommended that the exception only be granted as part of an Official Plan amendment.

In addition to the implementation measures proposed for new urban development, new rural lots proposed in a consent application, could be subject to appropriate conditions of consent approval that can help implement the subwatershed studies’ recommendations. To ensure implementation of the rural subwatershed recommendations, there may be appropriate mandatory conditions for consent approval that could be identified in the Official Plan.
RECOMMENDATIONS:

That the OP clearly state that new lots, for any purpose, shall not be created within significant ravine, valley, river and stream corridors, significant portions of the habitat of endangered species and threatened species, provincially significant wetlands, and Category 1 significant natural corridors, woodlands, areas of natural and scientific interest, portions of the habitat of vulnerable species, shorelines of rivers and streams, and wildlife habitat. This policy would apply to all land use designations.

The Official Plan should allow "significant" features and areas to be separated from those portions of lots or blocks that do not require protection from development. This separation would not be mandatory. If any "significant" feature is severely damaged or destroyed before completion of an EIS or Area Plan, the extent of that feature as mapped should be designated for protection in the Official Plan.

New rural lots proposed in consent applications should be subject to conditions of approval that help implement the rural area recommendations of the subwatershed studies. Mandatory conditions could be identified in the Official Plan and might include requirements for vegetated stream buffers (where applicable) or "Environmental Farm Plans".

5.3 DEVELOPMENT STANDARDS AND CONTROLS

5.3.1 Zoning

Traditional open space and hazard zoning that applies to much of the recently annexed areas of London, is generally no longer appropriate for the protection of significant natural features and areas. In the City’s Z-1 zoning by-law, there appears to be a sufficient range of appropriate open space zones to accommodate the recommendations of this Implementation Plan.

RECOMMENDATIONS:

That Category 1 environmental features and areas, such as provincially significant wetlands, be zoned specifically for no development, based on the relevant provincial definitions. The OS5 zone from the City’s Z-1 zoning by-law may be the most appropriate zone to apply. However, "recreational uses and facilities..." should be defined to clarify the limited range of recreation facilities that can be associated with "conservation lands" or category 1 features and areas.

That multiple zones (as applied in the City’s Z-1 zoning by-law) may be applied to properties that contain environmentally significant features, provided suitable control mechanisms are available to limit potential negative impacts of developed portions of the lot on the feature or area.

5.3.2 Environmental Guidelines and Standards for Development

Those proposing development in London should have an opportunity to assess how best to achieve the environmental objectives of this community before submitting development applications. It would be useful to have a set of relevant policies, standards and guidelines available in one manual for distribution to the public. Although there should be one set of these for environmental issues, the contents of this document should also be used to amend existing City manuals and development guideline documents. These should be developed in consultation with relevant local organizations, including LDI, and address local, provincial and federal standards.

The manual would be a by-product of the various environmental, subwatershed and servicing studies ongoing in the City and would be available from the Engineering, and Planning and Development departments.
RECOMMENDATIONS:

That an "Environmental Guidelines and Standards for Development" manual be prepared for London. This manual should include direction for the contents of Environmental Management Strategies and Environmental Impact Studies.

That existing practices, policies, and guidelines associated with site plan control, density bonus provisions, parkland dedication, and acquisition of lands be reviewed to ensure they are consistent with the CSPS and the recommendations of the subwatershed studies. Environmental Impact Study (EIS) requirements, and options for protecting privately owned significant features, including conservation easements and stewardship programs, should also be addressed in the new Official Plan.

5.3.3 Servicing Component of Area Plans

The information contained in the EMS is used to develop the land use plan which can then be used to guide the servicing scheme for any planned development area.

RECOMMENDATION:

That Area Plans be used to coordinate servicing schemes with environmental management strategies. The land use plan and possibly some or all of the EIS’s for an area should be completed before a servicing scheme is approved.

5.3.4 Other Potential Municipal Implementation Tools

RECOMMENDATION:

That the Official Plan allow the City’s environmental objectives and policies to be achieved through such measures as:

- environmental warnings to landowners and occupants
- restrictive covenants
- site plan agreements
- subdivision agreements
- conditions for municipal approval
- design and performance guidelines
- public acquisition of rights to lands with significant features through purchase, easement, and dedication or bequeathal

5.4 Monitoring

To ensure that Council understands that monitoring programs are a key part of a successful implementation strategy and of managing land use change in London, the Official Plan should include general policies that recognize this and provide direction for such a program.

RECOMMENDATION:

That the Official Plan include policies that recognize the key role of monitoring programs in relation to the City’s land use and environmental management objectives. These policies should provide specific direction for establishing these programs.
6.0 NATURAL AREAS OWNERSHIP AND MANAGEMENT

6.1 Overview

The City of London’s Subwatershed Planning initiatives have brought together a number of disciplines in inter-disciplinary studies to identify important natural areas and features, and develop strategies to protect and enhance them as land use changes. One of the strategies involves the use of innovative approaches to Open Space ownership and management that will ensure long-term preservation of natural areas that are currently privately owned, which could have limited or no public access, or could be used for other (development) purposes.

This section identifies a number of alternative approaches to natural areas land ownership and/or management which provide “win-win” opportunities for private land owners/developers and the preservation of natural areas. Recommendations are made with respect to Open Space areas which should become publicly owned and alternative land ownership and management arrangements which could be considered in everyone’s interest. The discussion in this section is largely based on The Trend Towards Open Space: A Discussion Paper on Options for Ownership and Management (Regional Municipality of Waterloo and Grand River Conservation Authority Watershed Planning Committee, November 1994).

6.2 Options for Natural Areas Ownership and Management

Important natural resource areas which have been identified in the subwatershed planning process generally include lands which:

i) Present a physical risk to development;

ii) Lands that are considered to be sensitive plant or wildlife habitat;

iii) Lands containing unique natural landscapes and include significant geologic features, or provide valuable geologic functions; and

iv) Areas and corridors which can act as linkages between the above.

Besides the above features being deserving candidates for Open Space designation, some man-made features such as utility and transportation corridors and abandoned rail lines have been considered for Open Space designation.

Overall, the lands being considered for Open Space designation fall into one of the following categories:

- Watercourses and their associated flood plains
- Wetlands and buffers
- Valley slopes (and setback areas)
- Scheduled fill areas
- ANSIs
- Carolinian Canada Areas
- ESAs
- Fish habitat
- Park, transportation and utility corridors
- Groundwater resources
- Heritage resources
- Open Space linkages

Obviously, some conflicts will arise with the designation of Open Space that results from this subwatershed planning process. With the intent of promoting a healthy community, greater amounts of Open Space have been identified than historically would have been designated. Securing natural
areas as Open Space has both benefits and costs (refer to Tables 6.1 and 6.2). When lands are designated as Open Space, it means less land is available to the developer, and development which may necessarily become disjointed and less efficient in terms of servicing. There is usually a cost to be borne with the designation of Open Space. Those home owners who buy in newer developments, for example, pay indirectly for the cost of the Open Space lands that will benefit an entire community, not just the development associated with the current lands being developed. In addition, the City of London may face higher servicing costs where Open Space is protected more extensively.

The costs associated with owning and managing Open Space/natural areas of land can be minimized by employing alternative ownership and management arrangements. The alternative arrangements may involve partnerships, cost-sharing and/or arrangements providing tax breaks, while maximizing the use and preservation of the natural/Open Space areas. Obviously, when assessing costs of securing Open Space, consideration should also be given to the costs of not protecting natural areas through Open Space designation. These costs could include degradation of resources and the related direct and indirect reduction in revenue and economic activity; reduced access to Open Space and natural areas which may increase social, psychological and health costs, in urban areas with limited natural recreational opportunities. The following is a summary of various Open Space ownership and management alternatives.

6.2.1 Public Agency Ownership and Management

Public ownership and management of Open Space/natural areas provides the greatest opportunity for their preservation and management, while providing access to the public. In addition, the public (users) have an opportunity to provide input to the use and management of the area.

i) Municipal Ownership

This option presents flexibility for management purposes by having control vested in one agency. Long-term security of the use of the Open Space area is ensured. With one management group involved, where necessary or desired, cooperative agreements between agencies can be easily administered. Such cooperative agreements however mean there is no longer one agency assuming management, maintenance and operating costs. Uncertainty or fluctuations in funding arrangements for public agencies may affect the success of this option. Inconsistencies in acquisition programs, or the cancellation of programs altogether may result.

The municipality has the ability over the long-term to establish a park plan and linkage system for their community, however where significant hazards or unique geomorphologic or hydrologic features exist, they may not have the expertise available to manage the resource to its potential. At the outset of the designation, property and income tax benefits to the donor may facilitate the program, however in the absence of donation, there is the potential for public sector acquisition costs to be very high. The municipality may be in a better position than another agency to recoup some of the initial costs in acquiring the property.

ii) Conservation Authority

The benefits of one agency control can be demonstrated in this option also. Management of the Open Space area is facilitated where the environmentally sensitive and hazardous areas are involved. Capital for acquisition is limited especially since such an agency has fewer options for return on a property. A Conservation Authority often has staff with expertise in terrestrial and aquatic, biology and ecology, to manage resources in sensitive areas and can enforce regulations where resources are being negatively impacted.
Combinations in Public Agency Ownership

Combining available financial and management tools may be the preferred option in many cases. The work invested in a parcel of land becomes a partnership in achieving resource goals with cost and maintenance being shared.

6.2.2 Individual Ownership

When Natural Areas remain in private ownership, lot lines would extend to include an area of Open Space as part of an individual’s property.

Individuals acting as custodians benefit from this option in that they secure a lot of high aesthetic value, and can become a guardian of their own piece of ‘green.’ This pride of ownership may ensure some degree of protection for the resource. Owners may be eligible for property tax rebate on a portion of their lands. Owners would be responsible for the maintenance and the liability on the Open Space lands.

Costs with this option affect primarily the resource itself and the agencies with the mandate to protect it. While this option may be suited to smaller tracts of Open Space, fragmentation of the resource results. Public access is prohibited, the owner tends to ‘fence and defend.’ Large scale benefits of the Open Space area may be lost.

Limitations on encroachment and environmental damage cannot be easily enforced and equal standards of protection for the entire tract cannot be guaranteed. Long-term flexibility is reduced to zero. The municipality may be hesitant to split zone small parcels. If this is the case, there would not be a mechanism in place for future owners that would flag a resource or hazard concern. Education of the owner would be of prime importance with this option.

6.2.3 Individual Ownership, Restricted Land Use/Conservation Easement

This option also involves the transfer of Open Space to the individual landowners. Lots extend into the Open Space areas, and conservation easements in favour of a public agency are registered on title as a measure of protection for the resource and to show intent for its use.

This option harbours the same advantages to the individual as the previous option, but can be more beneficial to the resource base because of established continuity between original and subsequent landowners. Awareness of the resource is enhanced, land stewardship is promoted. This scheme is useful for larger natural areas, particularly in advance of development, and can be implemented for the protection of vistas and corridors. Greater buffers and setbacks from protected areas can be effected.
TABLE 6.1

Benefits of Securing Open Space

**Protection of Life and Property**

With significant and sensitive natural areas designated as Open Space, areas that present a physical risk to life and property become unavailable for development. A "risk avoidance" concept results. Costs incurred due to natural disaster can be very great to the individual, and knowing their investments have little or no potential for loss is a comfort. Developers, the municipality and other public agencies involved in the planning process can also limit their liability.

**Environmental Conservation**

The greatest of the benefits of Open Space is Environmental Conservation. Existing habitat can be preserved or indeed enhanced. Significant species or features unique on any scale are protected. Any threat to these areas comes, for the most part, from human intervention. Curtailing the intervention increases potential for long-term viability of natural processes.

**Recreation and Tourism**

The profile of active and passive recreation activities has increased greatly over time and municipalities are emphasizing these activities for members of, and visitors to, their community. Open Space Linkage systems provide an opportunity for a vast array of activity, from quiet walks to camping trips. These opportunities are maximized when all sensitive areas are included in the system and proper management and maintenance practices are implemented.

**Corridor Preservation**

Along watercourses and utility/transportation corridors, Open Space designations can preserve natural areas in a linear system. Trails for passive and some active uses become available and wildlife movement between sensitive areas is facilitated. Utility corridors, although on their own are not so aesthetically pleasing, can be a vital link between passive areas such as river valleys or wetlands and active parks. Abandoned railway lines can provide isolated links between towns.

**Environmental Enhancement**

Uses that, out of necessity, might be situated adjacent to or within areas ideally placed in Open Space, provide additional opportunities for the enhancement of a significant feature. Storm water management facilities, water treatment plants and municipal well sources can be designed to be compatible with some types of natural area resources, or in some cases in a manner in which the natural resources features be enhanced.

**Protection of Water Quality, Quantity**

Sustaining wetlands, headwater areas and other sensitive areas can ensure that water quality is maintained or improved. Open Space designations along watercourses, implemented preferably through subwatershed studies, protect against extremes in flow regimes and avoid adverse impacts on fishery resources.

**Energy Conservation**

Retaining tree lines, woodlots and slopes can provide windbreaks to development and can represent energy savings.

**Noise Reduction**

Open Space areas, particularly when vegetated, can provide visual screening and noise barriers between adjacent land uses.

**Public Education/Awareness**

The securing of Open Space provides opportunities for access to areas characterized by features not otherwise readily experienced by many. In Open Space areas, interpretive uses for education provide a benefit by extending environmental awareness to future generations.

**Streamlining of Planning Process**

When all sensitive and significant areas that are of issue are identified and assessed, the developer can then be aware of the extent of lands available for development. When revisions to plans and the need for extensive negotiation of development limits can be avoided, the planning process is streamlined for all those involved. This concept is furthered when the area assessed for natural features is large and several properties are included, as is the case with the scale of planning at the subwatershed level.
TABLE 6.2
Costs for Securing Open Space

Acquisition Costs

Whereas areas of Open Space are being set aside from development, some individual, group or agency will attain ownership. Costs for acquiring the lands can be high with little or no opportunity for return on the property. Taxes for the property, maintenance and if necessary, liability insurance can add significantly to the costs.

Liability

In an Open Space area, where public activity is expected to be high, liability becomes of concern to the owner.

Maintenance

Maintenance of lands secured as Open Space can become very significant. Time and funding is required to manage woodlots and sensitive habitats, to create and maintain trails along linkages, monitor physical risk factors on steep slopes and in flood plains and to complete rehabilitative work where damage has occurred. Where access is to be restricted, fencing and sign placement would be required. Some areas may require water quality and quantity monitoring. The degree to which maintenance is required depends largely on the physical character of the Open Space area, its location and its proposed use.

Management Decisions

Once ownership of an Open Space area is determined, the means by which management decisions will be made must be defined. Whether the owner is a neighbourhood association, an individual or a public agency, the owners must be educated in proper stewardship of the resource in order to manage it effectively. There may not be an opportunity to ensure this education in all cases, and overtime the original intent of the Open Space area may not be reflected. Maintaining continuity over time between owners and management plans may be difficult without legal mechanisms such as agreements or conservation easements. Such mechanisms may be regarded as infringing on property rights. Effecting change in certain areas and at certain times may be difficult.

Policing and Enforcement

In areas that become heavily used, the potential exists for damage to the resource and vandalism to occur. Some means of enforcing the intent of the area, the protection of the resource and nuisance control may be difficult to establish and maintain. It must be decided who will be responsible for these issues and action plans should be prepared ahead of time to ensure a timely response if problems arise. Where damage does occur, costs associated with rehabilitation may not be foreseen.

Land Use Issues

Some conflicts arise with the delineation and dispensation of Open Space in several areas. Protecting Open Space areas will be at the expense of areas that are otherwise sensitive, such as farmland. Those who buy into newer developments will be responsible for the cost of the Open Space lands that will indeed benefit an entire community, not just the development associated with the current lands being developed. The municipality may suffer higher servicing costs in order to develop the same amount of revenue generating uses in this case compared to areas where Open Space is not protected as extensively.

Greater amounts of Open Space means less land available to the developer, developments may become disjointed and less efficient in terms of servicing layout. Long-term pro-active planning over broad areas will be required. Open Space areas may become fragmented where long-term planning does not occur.

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With Conservation Easements and hence some assurance of resource protection, larger lots with high aesthetic value can be a selling point for the developer and undevelopable land can be easily disposed of. This provides some simplicity in the subdivision planning process. Where the developer donates the easement to a governing agency, the donation may be considered for tax credit. With this option there are limitations placed on the lot configuration of a development.

Some public agencies could exercise this easement option in the initial stages of Open Space linkage design to offset capital acquisition costs, and in doing so would not be burdened with property taxes and would still have the opportunity for management. Although the individual may now not be responsible for the maintenance of the natural areas, they may not be willing to accept enforcement and security aspects associated with public access. Enforcement in non-visible areas can be a problem and a good working relationship with the owner becomes paramount.

This option may provide a viable means for an individual wishing to sever a lot in an area that has been partially delineated as Open Space. The Conservation Easement may allow the applicant to balance the policy standards between agencies such as Conservation Authority and the Ministry of Agriculture, Food and Rural Affairs.

Administratively, conflicts may arise with ascertaining the sensitive areas on established properties and the placement of land use restrictions on individual title may not be acceptable to all registry offices. Municipalities may be hesitant to split zone small parcels.

### 6.2.4 Neighbourhood Association Ownership and Management

Open Space transfer to a neighbourhood association would involve buffers, setbacks and natural areas being managed but not modified by the Association. Advantages to the implementation of this option are that it provides some degree of protection for natural areas, greater buffers may be afforded to the natural resource areas than on an individual lot basis, and a sense of community is fostered with local groups owning the areas and adjacent landowners managing them cooperatively.

The long-term viability of a community association is not ensured at the outset of such a scheme however, and measures must be taken to provide education and guidelines for proper management. The degree of accountability accepted by the group would also have to be defined. Guidelines would be needed to be set out to allow the association to monitor the resource and make the correct management decisions. An agency that would act as the overseer in this regard must be determined as well. Perhaps a group representative could meet twice yearly with an agency acting as a steward for the parcel. This would provide further assurance that the resource is protected, the owners are being educated, and that efforts are being made to solve any problems with the system before they escalate.

In addition to continuity problems, Associations may not have the means to acquire sufficient funds to carry out management programs. Without careful guidelines for this option, there is the potential for the municipality to inherit by default fragmented blocks that have become unwanted and misused. At this point, mitigative measures may be required.

### 6.2.5 Other Group Ownership

Local naturalist groups may lobby to acquire a parcel of Open Space to manage, or Land Trust Foundations may be formed to hold properties in trust. There are benefits in that the public or adjacent individual owners are not burdened with taxes and costs of maintenance result, however long-term continuity is questionable. The objective of the group may not protect all of the features of an area. Other agencies and the public have no management control. Ownership by groups may protect the area as it stands now, but in some instances may not provide flexibility for future management and related use by the community.
6.3 Recommended Plan for Natural Areas Ownership and Management

In both rural and urban areas of the subwatersheds there are areas that are sensitive to development, contain significant features or may present physical risk if developed upon. Lands of this type should be designated as Open Space. Once designated, options must be explored as to how the lands will be owned, managed and maintained. One can certainly not stop the change in land use that will occur over time but we can endeavour to manage it as best we can.

The municipality and other agencies that may be involved with acquisition and management of Open Space areas should develop criteria under which they will assume ownership and/or manage such areas. Using such criteria and the consideration of other factors such as availability of funds, decisions can be made about the best agency/group/individual or combination thereof to be utilized to ensure proper management of the resource. Where acquisition by a public agency is not feasible, other options for ownership/management which may be appropriate given the size, significance and regulatory status of the feature should be explored with an emphasis on partnerships.

Some recommendations are provided in Table 6-3 regarding the agencies most suited to own various Open Space areas based on resource type.

Because of the various feature types and development situations, there will be situations that won’t quite fit the proposed criteria. The timing of development in relation to opportunities for major Open Space dispensation will not always be to the municipality’s benefit. The ideal assumes, of course, that funds will be available, municipalities and developers will be consistent in their approach to development with respect to resource features and that individuals will be interested in the stewardship of natural areas.

In summary, preferred natural areas ownership and management arrangements fall into the following two categories:

1. **Public Ownership**
   
i) Municipality - natural areas in urbanizing area where the public is extensively using the feature, which may be locally significant or include high hazard potential.
   
   ii) Provincial Agency - natural areas that are of provincial significance.
   
   iii) Conservation Authority - natural areas that transcend municipal boundaries and are in an isolated undeveloped area; or natural areas that are Provincially Significant, are located where their management is more easily accessible to, and provided by Conservation Authorities, have high hazard potential and/or transcend municipal boundaries and/or are extensively used by the Public.

2. **Other Ownership Arrangements**
   
   iv) Citizen’s Group - natural areas is in urbanizing area that are limited in size; or natural areas that are Provincially Significant and are extensively used by the public.
   
   v) Privately Owned - natural areas that have local significance and/or are in an isolated, undeveloped area and/or are limited in area.

It is recommended that the City of London use the above ownership and management arrangement guidelines for conservation of natural areas in its area of jurisdiction, and that the area Townships consider the above arrangements for conservation of natural areas in their jurisdiction.
<table>
<thead>
<tr>
<th>Owner</th>
<th>Watercourses and Associated Flood Plains</th>
<th>Wetland and Associated Buffers</th>
<th>Valley Slopes and Associated Setbacks</th>
<th>Carolinian Canada Sites</th>
<th>Areas of Natural and Scientific Interest</th>
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<td>• Feature has local Significance; and</td>
<td>• Feature in urbanizing area; and</td>
<td>• Feature in urbanizing area; and</td>
<td>• Feature has local significance; or</td>
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<td></td>
<td>• Feature extensively used by public; and</td>
<td>• Feature extensively used by public; and</td>
<td>• Feature extensively used by public; and/or</td>
<td>• Feature is limited in area; and</td>
<td>In most instances.</td>
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<td></td>
<td>• Feature has high hazard potential.</td>
<td>• Feature in urbanizing area.</td>
<td>• Feature has high hazard potential.</td>
<td>• Feature has local significance.</td>
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<tr>
<td>Provincial Agency</td>
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<tr>
<td>Conservation Authority</td>
<td>• Feature has high hazard potential.</td>
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<td></td>
<td>• Feature has Provincial Significance; and</td>
<td>• Feature has Provincial Significance; and</td>
<td>• Feature transcends Municipal Boundary; and</td>
<td>• Feature has high hazard potential; and</td>
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<td></td>
<td>• Feature transcends Municipal Boundary; and</td>
<td>• Feature has high hazard potential; and</td>
<td>• Feature has Provincial Significance.</td>
<td>• Feature has Provincial Significance.</td>
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<td>• Feature extensively used by public; or</td>
<td>• Feature transcends Municipal Boundary.</td>
<td>• Feature in isolated, undeveloped area; and</td>
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<td></td>
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<td>• Feature in isolated, undeveloped area.</td>
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<td>• Feature has Provincial Significance.</td>
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<tr>
<td>Citizen’s Group</td>
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<td>• Feature in urbanizing area; and</td>
<td>• Feature is limited in area.</td>
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<td>• Feature extensively used by public.</td>
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<tr>
<td>Individual</td>
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<td>• Feature has local significance; and</td>
<td>• Feature in isolated, undeveloped area; and</td>
<td>• Feature is limited in area.</td>
<td>• Feature has local significance; and</td>
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7.0 RURAL PROGRAMS

Approximately 85% of the lands added to the City in the 1993 Annexation are in some form of agricultural use (the remaining 15% include valleylands, residential, light industrial and recreational uses). In the next 20 years only about 3100 hectares these lands will change to urban uses. If a healthy ecosystem and restoration of a natural heritage system (requiring an increase in the proportion of the land base in natural vegetation) are to be achieved, substantial effort is required in the rural areas.

Agricultural land uses have gradually intensified as narrow economic margins have pushed farmers to utilize as much land as possible and increase production per hectare by increasing herd size, intensifying cultivation and fertilizer/pesticide use, and by growing crops with greater nutrient requirements. While this land use change is more subtle than a rural to urban change, environmental impacts are significant. Some impacts, such as tile drainage and municipal drainage practices have caused widespread stream instability and aquatic habitat deterioration over several decades, while others such as soil erosion and nutrient loading are more recent activities affecting stream habitat conditions. Non farm uses in the rural areas have had similar impacts. These degrading effects have been subtle, yet cumulative, resulting in streams which are capable of supporting only the hardiest fish and invertebrates. Likewise, extensive drainage practices, clearing of marginal lands, removal of fence rows and stream side vegetation, and depletion of woodland reserves has left few areas of natural vegetation on the landscape.

Correcting these problems and restoring natural stream functions and natural vegetation features should be viewed as a long term, but critical goal, which should proceed on a priority basis.

Conservation Authorities, in partnership with OMAFRA, MOEE, MNR and Agriculture Canada have provided incentives (grants, rebates, tax exemptions, low interest loans) combined with technical assistance to the agricultural community for many years to improve natural systems in agricultural landscapes. While these programs have resulted in significant improvements in farm management practices to address environmental concerns, they have often fallen short of achieving long term, regional-scale environmental improvements for the following reasons:

- the economic benefit to the farmer was often too long term to result in a permanent change in agricultural practices
- incentives which focused on correcting problem land uses may have failed to reward farmers that, through good land stewardship, prevented environmental degradation from occurring.
- incentives were not offered for a long enough period to allow economic benefits to be realized and to build sufficient support within the community for widespread changes in practices
- programs were not sufficiently targeted on priority management areas, often because of lack of information
- there was often insufficient flexibility in incentives programs to support a range of implementation alternatives or combine incentives from several different programs
- policies, guidelines and legislation addressing agricultural lands and land use practices are often in conflict, and often fail to act as deterrents to new occurrences of poor land use practices

Special efforts are required to effectively implement a program of rural measures. The following sections therefore outline the existing conditions and a series of implementation actions which are needed for effective implementation beyond the status quo. The implementation actions listed at the end of Section 7.2 provide supplementary detail to the tables contained in Appendix A.

7.1 Summary of Existing Conditions/Programs

Farming practices over the past 40 years have led to a deterioration in the environmental quality of aquatic and terrestrial features. Drainage practices, forest clearing and cutting and livestock grazing have reduced natural vegetation to scattered woodlots and the lower valleys of watercourses. While
municipal drainage practices may have extended the defined channel of some streams by deepening swales and concentrating flows via tile drainage, they have also eliminated natural channel characteristics and reduced the former extent of natural floodplains. More efficient drainage has caused streams to dry up more quickly and the concentration of flood flows within drainage channels combined with sedimentation from soil erosion has increased streambank erosion throughout the river systems. Nutrient enrichment and bacteria loading from field runoff and point sources such as livestock access, manure storage and feedlot runoff and faulty septic systems has caused algal blooms in streams which creates intolerable conditions for other aquatic life. Together these practices have degraded streams to the point where only the most tolerant fish and aquatic invertebrates survive.

Recently, however, this long term trend has changed. Use of conservation tillage practices and correction of some point source problems has begun to reduce loading of sediment and nutrients to streams. The use of herbicides, pesticides and fertilizers has been decreasing. Reforestation and retirement of marginal lands combined with recognition of the value of woodlots has resulted in an increase in the quality and quantity of natural vegetation cover. Municipal drainage practices, including maintenance activities, remain a difficult issue to overcome if stream enhancement is to be achieved as maintaining the drains is very important to the agricultural industry.

The current trends in agricultural land use is toward larger, more productive farms resulting in fewer farmers and an increase in lands farmed under lease agreements. In some cases, this threatens the continued enhancement of natural areas, since the renters interest in the land is short term and most conservation initiatives require a long term view. On farmlands closer to the city, this concern is intensified since more lands are held by non-farming owners and individual farm sizes have tended to remain smaller. Another current trend is an increase in the number of farmer operators who do custom work, i.e. provide planting and harvesting services to other farmers on a fee for service basis. These custom operators, some of which utilize conservation tillage equipment, represent an important opportunity for implementing some rural best management practices because of the large land areas that they work.

Both LTRCA, UTRCA and KCCA have actively promoted a range of programs within the rural portions of the subwatersheds. Over the years, these have served as the implementation mechanism for a variety of incentives provided by all levels of government. Currently the Authorities have a limited capital works budget provided through the Conservation Services/Sediment Control Program and staff resources. Capital works funds are allocated on a priority basis, with a 50% contribution from landowners, to correct major sources of stream bank erosion which contribute to sedimentation of watercourses and reservoirs. Funding support is also available for tree planting on marginal lands and for the purposes of providing windbreaks, shelterbelts and streamside vegetation. In some cases, Authorities may also complete the plantings.

The Authorities enforce regulations under Section 28 of the Conservation Authorities Act (Fill Regulations). While these regulations are limited in their application to agricultural land use practices, they are applicable to land use changes including land severances, construction activities and building construction. They have also been used to protect wetlands and to help prioritize lands for revegetation / conservation land use practices.

The Authorities also provide technical assistance in the following areas for rural landowners:
- soil conservation practices
- livestock access control
- structural controls for manure storage, feedlot runoff and milhouse wastes
- wetland protection

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The Authorities have also entered into agreements with the MOEE to administer the following programs:

Permit to Take Water (Ontario Water Resources Act)
Certificate of Approval - Private Sewage Systems (Part VIII, Environmental Protection Act)

While these programs do not provide funding support, they do provide opportunities for Authority staff to interact with landowners and some legislative authority to facilitate implementation of some measures such as repair of faulty septic systems and maintenance of stream base flows.

Other programs which offer funding incentives include the CURB program (MOEE) and the Environmental Farm Plan (Ontario Farm Environmental Coalition, OMAFRA, AgCan). These are described below.

CURB or Clean Up Rural Beaches is an MOEE funded program, which offers grants in targeted watersheds to fund the implementation of rural BMP's to eliminate sources of bacterial contamination to swimming beaches impacted by rural land uses. The program provides 50% grants (with a ceiling) for the following projects: livestock access control, manure/feedlot runoff storage, milhouse waste control and faulty septic system replacement. The program is available only in Sharon, Kettle and Dodd Subwatersheds.

The Environmental Farm Plan is a voluntary program, encouraging farmers to review existing practices on their lands and develop a long range course of action aimed at improving farm productivity, improving management of activities associated with farm building and addressing problems associated with soil erosion, water conservation and environmental protection. A grant of $500 is available to initiate this action plan.

Several other programs deserve special mention. The Soil and Water Environmental Enhancement Program (SWEEP) is an Ag Can program which evaluated the environmental benefits of conservation tillage practices in a portion of the Kettle Creek Subwatershed. Although the program is essentially complete, many landowners were convinced of the merits of conservation tillage and the practice is expanding in the London area. In addition a similar, federally sponsored program is continuing in the Kintore area investigating the environmental performance of conservation tillage. The discontinued Conservation Land Tax Credit program which provided tax rebates for lands which were managed for conservation or retired from farm uses, was considered to be a successful program.

In summary, the Authorities have a strong presence in rural communities and have fostered a number of partnership arrangements with conservation clubs, soil and crop improvement associations, woodlot improvement associations, etc. As a result, they are well positioned to implement rural programs. Incentives, combined with education/awareness and technical assistance programs are clearly effective in rural implementation, however, incentive programs have traditionally been under-funded or too inflexible to address the broad range of rural issues.

OMAFRA also has a long history in working with the rural community and can play an important role in implementation as well.

7.2 Implementation Actions

Participants of the subwatershed TACs representing the agricultural community have indicated that the short term effects of restoring a natural heritage system within agricultural lands were not perceived to be sufficiently positive to be economically beneficial to farmers. An ongoing program of incentives is therefore necessary to offset initial negative impacts, combined with an overhaul of provincial policies and legislation to provide clear direction on provincial priorities for environment and agriculture in the rural landscape. Fundamental to the success of rural programs is provision of the necessary staff and resources to continue education/awareness programs, provide technical assistance and monitor the effectiveness of agricultural programs in terms of usage by client groups and in terms of
environmental improvement. Active participation (in terms of staff and financial support) by the City is also viewed as fundamental to the success of rural program implementation. TAC members have noted that the City needs to acknowledge that agricultural land uses are a permanent land use within the City and a vital part of the local economy. Finally, a continued effort to establish partnerships between rural and urban constituents is needed to foster better understanding and joint participation in addressing environmental issues common to both groups.

In the long term, goals for self sustaining natural systems and healthy streams will be achieved by changing landowner attitudes toward these areas from liabilities to assets. The continuation of the following initiatives are vital to championing this long term attitudinal shift:

- education/awareness programs
- technical assistance/demonstration projects
- fostering stewardship through community groups/organizations
- monitoring program effectiveness

The implementation of rural programs should focus on the following:

- correcting existing problems on a priority basis
- preventing future problems from occurring by strengthening and clarifying policies and legislation and providing services that are customer driven

The priority for addressing existing problems was established through the subwatershed studies and is generally consistent from subwatershed to subwatershed as follows:

1. prevent overland soil erosion
   1.1 conservation tillage
   1.2 other soil conservation practices
   1.3 vegetative buffer strips (see 2.2)

2. stabilize stream banks
   2.1 control livestock stream access
   2.2 revegetate stream banks

3. restore stream morphology
   3.1 stream restoration
   3.2 modify municipal drainage practices
   3.3 outlet controls

4. increase proportion of naturally vegetated lands
   4.1 woodlot management
   4.2 retirement of fragile lands
   4.3 wetland creation

5. reduce nutrient and bacteria loading to streams
   5.1 manure management
   5.2 manure storage and feedlot runoff control
   5.3 milkhouse waste management
   5.4 faulty septic system correction

At the same time, in addition to the above incentive based programs, the following implementation mechanisms should be utilized to ensure that future problems do not occur:
1. education/awareness programs
2. partnerships with local community groups
3. legislative change
4. municipal land use policies
5. technical assistance - site planning
   - environmental farm plans
   - fragile land management
   - woodland management

Staff resources, particularly in extension services areas in CA's, OMAFRA, and municipalities need to be maintained or expanded to ensure that effective promotion of incentive programs and ongoing technical/monitoring support is ensured. Without this level of effort, simple incentive programs will fail.

The following section outlines proposed initiatives.

IMPLEMENTATION ACTION: Conservation Tillage

TIMEFRAME: 10 years
COST: $0.11-0.22 million @ $8k - 16k/600 ha of high priority management area
IMPLEMENTING AGENCY(IES): AgCan., OMAFRA, MOEE, CA's, Equipment Manufacturers, Landowners

KEY PROGRAM COMPONENTS:

Area of lands in high priority management areas is as follows:
   Dingman, Kettle/Dodd, Sharon: 4000 ha
   Medway, Stanton, Mud: 1600 ha
   Stoney, Pottersburg: 1300 ha

There are about 6900 ha of agricultural lands in high priority sediment management areas which is in the order of 10% of the total area of these subwatersheds. Based on Dingman Creek GAMES modelling, these lands generate about 31% of the total sediment delivered to streams annually. Implementing conservation tillage practices in these areas would reduce the total sediment delivery by 25% or about 1.5 T/ha and the total phosphorus loading by 0.5 - 1.0 kg./ha or 25 - 40%.

This program would require funding support from AgCan and OMAFRA for a long term rental agreement for about 14 sets of conservation tillage equipment with a combined cost of about $220,000. It is proposed that funding in the order of $25,000/year for 10 years would meet rental requirements. Equipment would be shared and maintained by several farmers for use on high sediment generation areas. CA’s would be responsible for coordinating the program and monitoring results with analytical support from MOEE.

The program would be similar to SWEEP, in that it would provide a demonstration of the practice and allow farmers adequate time to evaluate impacts on farm productivity. OMAFRA and CA’s would also promote the use of this equipment to other farmers to encourage more widespread use, particularly on medium priority management areas.

IMPLEMENTATION ACTION: Other Soil Conservation Practices

TIMEFRAME: Ongoing
COST: Existing Staff Resources
IMPLEMENTING AGENCY(IES): OMAFRA, CA's
KEY PROGRAM COMPONENTS:

An education/awareness program aimed at farmers with medium to high sediment management priority areas on their lands would focus on promoting other methods of soil conservation, including:
- contour farming
- contour strip cropping
- delayed or spring tillage
- winter crop covers
- crop rotation
- grassed swales

On farm consultation could be provided using the Environmental Farm Plan as an aid.

IMPLEMENTATION ACTION: Revegetate Streambanks

TIMEFRAME: 10 years
COST: $400,000 - Dingman, Kettle/Dodd, Sharon
      $0 (natural succession) - Medway, Mud, Stanton
      $400,000 - Pottersburg, Stoney
IMPLEMENTING AGENCY(IES): CA’s, MNR, City, municipalities, volunteer organizations, community groups, landowners

KEY PROGRAM COMPONENTS:

MNR, CA’s, City and municipalities would provide "seed" funding of $30,000/year for 10 years toward purchase of trees and shrubs for revegetating streambanks including some municipal drains. Landowners and local groups with technical direction from CA staff would complete planting. Targeted areas would include streams with Type II,III fish/benthic invertebrate communities, then type IV communities. Landowners would agree to maintain a setback from the stream in an undisturbed condition to prevent impacts on planted vegetation for a period of 10 years. This would require preventing access by livestock.

CA and MNR would monitor streams to evaluate effectiveness. City and municipalities would provide a tax rebate for lands taken out of production through these efforts.

IMPLEMENTATION ACTION: Control Livestock Stream Access

TIMEFRAME: 10 years
COST: $900,000 - Dingman, Kettle/Dodd, Sharon
      $140,000 - Medway, Stanton, Mud
      $40,000 - Pottersburg, Stoney
IMPLEMENTING AGENCY(IES): MOEE, OMAFRA, CA’s, City, municipalities, Landowner

KEY PROGRAM COMPONENTS:

Expand CURB program to all subwatersheds and augment with CA erosion/sediment control project funding. MOEE, OMAFRA and CA’s would provide 50% grant or $50,000 annually for 10 years. Landowners, with technical assistance from CA’s would undertake work. City and municipalities would provide a tax rebate for lands taken out of production. Concepts of natural channel design and streambank revegetation would be part of project.

CA’s would monitor effectiveness of program.
IMPLEMENTATION ACTION: Modify Municipal Drainage Practices

TIMEFRAME: 5 years
COST: $250,000 for pilot projects
IMPLEMENTING AGENCY(IES): AgCan, CA's, OMAFRA, MNR, City, municipalities, Landowner

KEY PROGRAM COMPONENTS:

Agencies would provide necessary funding (in part through federal Green Plan) above landowner contribution for typical drain maintenance activities. Several demonstration projects would be undertaken as part of a routine drain maintenance project to redesign the drain and its floodplain to improve instream habitat for aquatic life and to improve sediment transport capacity in the stream to promote self-maintaining drainage. Projects may also include wetland creation, outlet controls on tile drains.

A partnership arrangement with a research institution/university could facilitate monitoring requirements.

CA’s and OMAFRA would promote concepts within subwatersheds on an ongoing basis to encourage better management of municipal drainage practices.

IMPLEMENTATION ACTION: Tile Drain Outlet Controls

TIMEFRAME: Ongoing
COST: $25,000/yr
IMPLEMENTING AGENCY(IES): CA’s, OMAFRA, MNR, MOEE, City, municipalities

KEY PROGRAM COMPONENTS:

Provision of funding to CA’s to continue existing program of providing 50% grant to support provision of outlet controls to prevent erosion. Greater emphasis would be placed on use of sediment control ponds and wetland creation as a means of controlling outlet flows and impacts on watercourses. CA staff would provide technical assistance and promotion.

IMPLEMENTATION ACTION: Stream Restoration

TIMEFRAME: 20 years
COST: $12 M - Dingman, Kettle/Dodd, Sharon
      $7 M - Medway, Stanton, Mud (stream works and stream restoration)
      $3 M - Pottersburg, Stoney
IMPLEMENTING AGENCY(IES): CA’s, City, municipalities, MNR, landowners

KEY PROGRAM COMPONENTS:

Based on the assumption that a large proportion of subwatershed area will remain agricultural, agencies should expect to support about 75% of the total cost of works. This is equivalent to an annual cost of $750,000 annually. The focus of stream restoration is on restoring natural morphological characteristics and achieving a dynamically stable condition and also on aquatic habitat restoration (includes major restorative projects on Group 1 subwatersheds). Priority for works would be similar to priority for streambank revegetation. Lands adjacent to works would be deeded to the City/municipality/CA as part of the landowner contribution to the projects.

Funding for this work would be considered as a replacement for existing CA program of erosion control. All agencies would participate in funding.
IMPLEMENTATION ACTION: Woodlot Management

TIMEFRAME: 20 years
COST: $30,000/year
IMPLEMENTING AGENCY(IES): MNR, CA’s, City, municipalities, AgCan, EnvCan, Woodlot Associations, Landowners

KEY PROGRAM COMPONENTS:

Woodlands in the study subwatersheds cover less than 8% of the total subwatershed area. In the long term, the strategies advocate a substantial increase in the area occupied by woodlands and an overall improvement in the quality of existing woodlands to support terrestrial and hydrologic functions. MNR and CA’s already provide technical guidance on woodlot management to increase habitat value and economic return to the farmer. MNR is currently developing a Private Forest Sustainability Program that may offer some "seed" funding to promote better forest management practices. With some additional assistance and cooperation of landowners, stewardship initiatives could be created to begin rehabilitating London area forests.

IMPLEMENTATION ACTION: Retirement of Fragile Lands

TIMEFRAME: Ongoing
COST: Municipal Tax Rebate
IMPLEMENTING AGENCY(IES): CA’s, MNR, OMAFRA, City, municipalities, Landowner

KEY PROGRAM COMPONENTS:

CA staff currently provide technical assistance to landowners regarding fragile land management. This program should be continued with the added incentive of a tax rebate for taking these lands out of crop production. In the long term, it may be possible to have these lands placed in conservation easements or to deed them over to the City, municipality or CA.

IMPLEMENTATION ACTION: Wetland Creation Pilot Project

TIMEFRAME: 5 years
COST: (included with municipal drain pilot project)
IMPLEMENTING AGENCY(IES): MNR, CA’s, AgCan, EnvCan, City, municipalities, Landowner

KEY PROGRAM COMPONENTS:

This project would be part of the municipal drain pilot project and would evaluate the potential to re-establish wetlands along and adjacent to streams to provide hydrologic and sediment control benefits and restore terrestrial functions. This may require using portions of fragile lands, floodplain areas, tile drain outlet points and stream reaches to create wetlands.

IMPLEMENTATION ACTION: Rural Point Source Controls

TIMEFRAME: 20 years
COST: $8.4 M - Dingman, Kettle/Dodd, Sharon
      $0.6 M - Medway, Mud, Stanton
      $0.5 M - Pottersburg, Stoney
IMPLEMENTING AGENCY(IES): MOEE, OMAFRA, CA’s, City, municipalities
KEY PROGRAM COMPONENTS:

This would be an expansion of the existing CURB program into the remaining subwatersheds augmented by municipal funding. CURB provides 50% funding for manure and feedlot runoff storage, and milkhouse waste storage. Funding in the order of $330,000/year is required to support this program. CA’s would be responsible for promoting the program and monitoring effectiveness with analytical support from MOEE.

IMPLEMENTATION ACTION: Repair Faulty Septic Systems

TIMEFRAME: ongoing
COST: $5.5 M - Dingman, Kettle/Dodd, Sharon
      $2.9 M - Medway, Mud, Stanton
      $ - Pottersburg, Stoney
IMPLEMENTING AGENCY(IES): MOEE, CA’s, City, municipalities

KEY PROGRAM COMPONENTS:

This would be an expansion of the existing CURB program into the remaining subwatersheds augmented by municipal funding. CURB provides 50% funding to a limit of $2000 for faulty septic system repair. Funding in the order of $50,000/year is required to support this program. CA’s would be responsible for promoting the program and monitoring effectiveness with analytical support from MOEE.

IMPLEMENTATION ACTION: Municipal Land Use Policies

TIMEFRAME: 5 Years
COST: ongoing Official Plan review process
IMPLEMENTING AGENCY(IES): City, municipalities in consultation with provincial agencies, CA’s, rural community representatives

KEY PROGRAM COMPONENTS:

Strong municipal policies and guidelines for rural land uses, both agricultural and non-agricultural, are necessary to reinforce provincial legislation. It is important that each municipality clearly recognize the role of agriculture in the local economy and incorporate appropriate direction in its Official Plan. A number of measures are currently under consideration by the City of London or have been implemented in other municipalities as follows:

- top soil preservation bylaw
- tree cutting bylaw
- maximum permissible animal unit densities
- identification of fill lines and existing natural features such as wetlands and woodlands in O.P. schedules with appropriate protection designation
- guidelines governing municipal drainage and tile drainage practices
- policies and bylaws regarding consents, severances and dwelling unit densities that protect agricultural lands
- guidelines governing private septic systems
- guidelines concerning lease agreements to ensure that natural features and conservation practices are maintained/protected
- amendments to "urban reserve" designation to better recognize agricultural land protection
- guidelines encouraging the use of the Environmental Farm Plan to improve on farm practices with possible application for rural site plan control
- specific policies governing non farm uses of rural lands that afford greater protection to the rural community

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• update current policies to incorporate Agricultural Code of Practice and Comprehensive Policy Statements (Bill 163)
• policies governing farm diversification and home occupations

IMPLEMENTATION ACTION: Legislative Change

TIMEFRAME: 5 years
COST: Ongoing provincial policy development
IMPLEMENTING AGENCY(IES): Provincial ministries, DFO, AgCan, EnvCan, City, municipalities, agricultural community representatives, non-government organizations

KEY PROGRAM COMPONENTS:

There is an urgent need to develop a strategic plan to promote sustainable agriculture that will preserve agricultural lands, the agricultural economy and protect the natural environment. The province needs to develop new policies and legislation that provide clear direction to the agricultural community is support of sustainable agriculture and eliminate inconsistencies in current legislation and incentives programs. Preservation of agricultural lands, and supporting natural areas, as a significant natural resource needs to be addressed in a more holistic way.

IMPLEMENTATION ACTION: Protection/Management of natural heritage features

TIMEFRAME: 20 years
IMPLEMENTING AGENCY(IES): MNR, CA’s, AgCan, EnvCan, City, Municipalities, landowners

KEY PROGRAM COMPONENTS:

A program is needed to develop management plans and a protection strategy to ensure that features within the natural heritage system are maintained and enhanced on agricultural lands. Incentives are required to encourage farmers to protect this areas form livestock access, over-cutting, draining, etc.
8.0 PUBLIC INVOLVEMENT

Public involvement in the implementation of the subwatershed plans is recommended by the subwatershed teams. The involvement of community groups will increase awareness of environmental issues, build ongoing support for environmental initiatives and potentially allow access to additional sources of funding. The London area already has substantial participation and interest by many community groups through programs sponsored by the City, Conservation Authorities and private corporations.

8.1 Public Views on Participation

Due to the importance attached to community involvement in implementation, the subwatershed teams conducted discussions and included specific comment sheets on implementation, during the round of subwatershed public meetings held in April 1995. The discussions centred on how best to coordinate activities, the support for different funding sources and the desirability of different types and levels of community involvement. The results of the discussions (summarized across the various public meetings) are provided below.

8.1.1 Organization Structure and Committees

There is a large array of possible community involvement activities and many sponsoring groups and organizations. Examples of groups actively involved at present include:

Special Interest:   Friends of Stoney Creek  
                   McIlwraith Field Naturalists  
                   Anglers Clubs  
Community Groups:   Ratepayers Associations  
                   Service Clubs  
School Groups       
Guides/Scouts       
Corporate Sponsorship  
Agricultural Community

These various groups are currently involved in a variety of activities, although tree planting and fish habitat improvements are the most common.

While not wishing to stifle community enthusiasm, there is a need to coordinate the activities of these groups so that efforts are directed towards the most important areas, they are consistent with the subwatershed strategies and proper approvals (eg. archeological assessment, etc.) are received prior to implementation. Discussion at the public meetings addressed three types or structures for coordination:

1. Agency or City coordinators
2. Subwatershed-based Implementation Committees
3. Rural Area Team Coordinators

The public response was in favour of a strong central coordination using an Agency or City coordinator. This was seen as being important to ensuring that public implementation activities were actively pursued on an "across-the-board" basis rather than depending on the enthusiasm generated in a particular area. Involvement by the community groups and local landowners was also seen as being important however, in the long term. A suggestion was made that the coordinating body hold semi-annual meetings with interested community groups and landowners, to review progress and discuss opportunities of specific projects or programs.
8.1.2 Funding Alternatives

A second area of discussion at the subwatershed meetings was the acceptability of various funding sources, as a means of implementing the actions contained in the plans. It was recognized the provincially funded programs and development charges, while often most acceptable in the public's view, are limited by budgets (which cannot be controlled at the local level) and by what can legitimately be considered the responsibility of a development proponent. Those attending were therefore asked to consider the following potential funding sources:

- Municipal Tax-Based Funding
- Existing Environmental Funds (e.g. Canada Trust Friends of the Environment)
- Heritage Trust Funds
- Service Club Funding
- Public Donations
- Corporate Donation Programs

Those attending the public meeting indicated high to moderate support for all of these options. Environmental Funds and Heritage Trust funds were the most acceptable, while tax-based funding was the least popular. It was noted by several participants however, that availability of many of these potential sources may be quite limited and that tax-based funding may therefore be needed.

Other suggestions made regarding funding included rural tax incentives, the City of London's Capital Works Fund (Reserve Fund), for large projects and lotteries. There were also conflicting suggestions for a development surcharge and elimination of development charges.

8.1.3 Community Implementation Programs

The final area of discussion at the public meetings involved the types of programs that might be pursued by different groups and agencies. A fairly exhaustive list was presented which included:

**Community "Ownership"**
- Neighbourhood Programs (e.g. Friends of Stoney) (2)
- Adopt a Stream (5)

**Community Awareness**
- Stream/Natural Area Clean-up Days (3)
- Storm Drain Marking (outlet awareness) (12)

**Special Projects**
- Fish Habitat Improvement Projects (8)
- Tree Planting by Youth Groups and Others (4)
- Streambank and Channel Restoration Programs (7)
- Storm Water Management Area Naturalization (6)

**Rural Awareness**
- Rural Practices (manure handling, conservation tillage, restricted livestock stream access) (1)

**Public Education/Awareness**
- Public Awareness Seminars (10)
- Guest Speakers to Address Technical Topics (15)
- Regular Public Notices (newsletters, advertisements) (10)
Community Monitoring
Monitoring by Citizens, Interest Groups, Conservation Clubs (9)
Involvement of Interest Groups in Data Interpretation (14)
Watershed Ecosystem Health Report Cards (12)
Bracketed numbers indicate relative rank based on public meeting polls.

The results of discussions showed predominantly strong to moderate support for all of these types of activities, with some exceptions. Rural programs received the strongest support, although it is believed that this was an expression of concern rather than interest in participation, because the majority of those attending were not rural residents. Other than the rural programs, the most strongly supported programs included neighbourhood and "adopt-a-stream" programs, clean-up days and tree planting. The weakest support was for the "dryer" education-type initiatives including guest speakers, citizen data interpretation, and the watershed report card. A suggestion was made that public education activities be tied into field activities (e.g. walking workshops) in order to generate enthusiasm. Other suggestions included signage to indicate the importance of a natural area (with a phone number to call to report vandalism) and the setting up of a hot-line.

8.2 Recommended Approach for Public Involvement

Community involvement in the subwatershed implementation process will be important in building a strong sense of public "ownership" and ongoing support for initiatives undertaken as part of the subwatershed plans. Based on the public response and experience in other subwatersheds, it is recommended that the coordination of public involvement activities be a joint effort or partnership between the City and the Conservation Authorities. Provincial agencies should be drawn upon as necessary for advice in specific projects.

The municipality should take the lead on educational programs through the school and library systems, and through liaison with groups such as McIvor Field Naturalists. Newsletters should be prepared (perhaps with community group input) and distributed quarterly or semi-annually. The City should also be involved in high profile events such as the clean-up days or tree planting projects. These latter projects would probably also involve the Conservation Authority and corporate sponsors.

The Conservation Authority should take the lead in the more "hands-on" types of projects and in community monitoring and reporting. Liaison with community groups such as "Friends of Stoney Creek", angler associations and the sponsorship of subwatershed-based conservation clubs is recommended.

Continuing efforts should be made to involve the most active community groups in the coordination process. It is therefore recommended that the City and the Conservation Authority jointly sponsor a semi-annual workshop or meeting at which ideas from different groups can be discussed and where appropriate, actively pursued. One of the functions of both coordinating agencies should be to assist with getting necessary approvals for worthwhile projects.

In the Townships, the coordination should be provided by the Township and the Conservation Authority, assisted by OMAFRA. The Authority mandate should include efforts to form a "peer" organization of environmentally active farmers, to assist with discussion and implementation of pilot or demonstration projects.

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9.0 ENVIRONMENTAL TARGETS

Environmental targets have been established in each of the subwatershed plans, on a tributary basis. The applicable targets are listed in the fact sheets contained in the Technical Appendices for each group of plans.

The purpose of the targets is to allow assessments to be made as to how the efforts under the subwatershed plans are progressing over time. They represent measures of certain parameters that are indicative of ecosystem function or health, modified to reflect the existing conditions and characteristics of the subwatersheds, the management actions planned, and the resulting potential for improvement over the medium to long term. It is recognized, that ultimately, the goal is to achieve a healthy and diverse ecosystem.

The assessment of monitoring data in relation to the targets, should be based on the trends observed over time because of the effects of variations in individual samples (up and down) which may be expected to occur due to natural influences (eg. climate, etc.).

The parameters used as environmental targets for a particular tributary may include all or some of the following:

**Flow Regime:**
- 100 year peak flow
- minimum base flow
- erosion index

**Water Quality:**
- Suspended Solids
- Total Phosphorus
- Nitrate
- Temperature
- Dissolved Oxygen

**Aquatic Community:**
- Water Quality Index (WQI)
- Index of Biotic Integrity (IBI)
- Habitat Suitability Index (HSI)
- % streambank vegetation
- % riffle/pool area

**Terrestrial:**
- Protect Category 1 lands
- Maintain or increase vegetated amount of Category 2 lands
- Area revegetated

It should be noted that all targets may not be used on a specific tributary (due to a lack of information at this time). Targets should be modified where necessary to reflect more detailed information whenever this becomes available (eg. subsequent to an Area Plan, EIS etc.).
10.0 MONITORING, COMPLIANCE AND MAINTENANCE

10.1 Monitoring

10.1.1 Purpose

The purpose of the Monitoring Program in the short-term is to establish or add to the current baseline of data available for subwatershed features and functions. This data would subsequently be used to:

i) Compare against environmental targets as a measure of subwatershed health; and

ii) Provide data for use by agencies and the development industry in the planning and design of environmental and development projects.

In the long-term the Monitoring Program should be continued such that:

i) The effect of development can be measured with respect to current subwatershed conditions and environmental targets;

ii) Programs and projects aimed at maintaining or enhancing environmental conditions in the subwatershed can be planned and designed in an appropriate manner; and

iii) The subwatershed’s health can be gauged and appropriate programs and management measures set in-place if conditions are deviating from the environmental targets.

10.1.2 Monitoring Implementation Plan

As noted above, the monitoring program must serve both short-term and long-term purposes. It will be necessary to plan monitoring program activities on an annual basis to respond to proposed development activity, special project undertakings, and financial constraints. It is recommended that the Implementation Committee establish a subcommittee that would oversee the monitoring programs throughout the City of London and neighbouring Townships. It would be the responsibility of the Monitoring Subcommittee to:

i) Prioritize components of the annual monitoring programs in each subwatershed based on forecasted development and plans for special projects;

ii) Prepare annual budget estimates and pursue funding sources to undertake monitoring programs;

iii) Work with the City and neighbouring Townships and Conservation Authorities in establishing training programs to instruct volunteers, schools etc. on completing monitoring program activities and to establish a methodology and reporting format for the monitoring data;

iv) Prepare a reporting plan/mechanism to respond to acute-type problems that are detected during the monitoring programs;

v) Prepare an annual monitoring report summarizing the results of the monitoring programs that are focused on environmental targets. The report should provide rationale as necessary for failure to meet targets; and

vi) Coordinate monitoring program activities with other Federal, Provincial and local monitoring programs and initiatives.
The focus of monitoring programs in the short-term should be on maintaining programs established during the subwatershed planning process that were found to best represent conditions in the subwatersheds, and on establishing efficient and cost-effective data collection systems at additional locations, as necessary, based on proposed development and special projects.

It is recommended that monitoring efforts in the short-term involve the use of high quality/advanced data collection systems at points along the main drainage systems, and at the more significant terrestrial, wetland and Open Space features. The data collection efforts should involve to the greatest extent possible the use of current municipal and Conservation Authority staff and resources. While fulfilling short-term monitoring program requirements, these agencies should be planning for the long-term monitoring program that may require expanding monitoring efforts to tributaries and to other terrestrial, wetland and Open Space features. This will likely require the use of less sophisticated monitoring techniques, possibly to be completed by personnel other than employees of the municipality or Conservation Authorities, and may include volunteers.

The monitoring program consists of the following four components:

i) Flow Regime and Water Balance;

ii) Water Quality, Benthic Invertebrates and Fisheries;

iii) Natural Heritage System; and

iv) SWM Facilities.

The following subsections summarize the main objectives and activities of short-term and long-term monitoring programs for the above four monitoring program components.

10.1.3 Flow Regime and Water Balance

Objective

To collect and maintain a database of climatologic, hydrogeologic, hydrometric and fluvial geomorphological data for use in noting changes or trends in the infiltration, runoff, evapotranspiration and baseflow components of the water balance.

Short-Term Monitoring Program

i) Climatology

Assemble a database of historical climatologic data and Thornthwaite Water Balance data available from Environment Canada’s Atmospheric Environment Services (AES) climatologic station at London Airport and/or St. Thomas, to be updated annually. The database would be used to establish monthly and annual average and extreme values for rainfall, snowfall temperature and evapotranspiration. Hourly and daily extreme precipitation records should be monitored for use in defining design conditions.

ii) Hydrogeology

Monitoring and hydrogeologic conditions at a watershed or subwatershed scale would likely be prohibitive and hence the monitoring program should focus on collection of specific information. The monitoring program in the short-term should focus on measuring the performance of infiltration facilities to determine their practicality; and to note changes or trends using qualitative methods that include: monitoring locations
of groundwater recharge and groundwater discharge, and deducing the groundwater component of the water balance from analysis of climatologic and hydrometric data.

iii) **Hydrometric (Streamflow) Data**

Continuous streamflow monitoring data should be collected from each subwatershed from at least the following two locations: at the current rural/urban fringe, and at the subwatershed’s outlet to the Thames River or its branches, or to Kettle Creek. This data will be assembled in a database that will be used to determine long-term averages and extremes from which flow conditions can be compared as development in the subwatersheds proceeds.

iv) **Fluvial Geomorphology**

Permanent erosion monitoring stations should be installed that would be used to assess changes in sediment characteristics, meander geometry and hydraulic geometry. The stations would consist of bars installed in each bank and a pin noting the bed elevation. The stations would preferably be located near the hydrometric gauges. The erosion monitoring stations are recommended to be installed in the short-term because they act as benchmarks and are an effective means of identifying long-term changes in channel hydraulics, and their installation and monitoring are not onerous if combined with the hydrometric monitoring program.

v) **Water Balance**

Monitoring the water balance of the subwatersheds involves combining information collected during the climatologic, hydrogeologic and hydrometric monitoring programs to note changes or trends in factors influencing streamflow characteristics. Water balance calculations need only to be carried out once annually, with analysis for changes or trends occurring once every 3-5 years. The water balance monitoring will provide information with respect to the effectiveness of subwatershed plan activities, such as infiltration facilities, to maintain (or enhance) the current flow regime and related features such as aquatic habitat and fisheries.

**Long-Term Monitoring Program**

The long-term monitoring program should expand monitoring activities to locations along tributaries of each of the subwatersheds, as necessary, to coincide with development activity and/or specific environmental projects. Hence, the long-term monitoring programs could involve expanding the monitoring programs outlined in the short-term monitoring program above, or using other, less sophisticated techniques, to describe or quantify flow regime and water balance characteristics.

It is recommended that as development occurs in each subwatershed, the Monitoring Subcommittee consider options for monitoring that are summarized in Appendix B.

**10.1.4 Water Quality, Benthic Invertebrates and Fisheries**

**Objective**

The objective of this monitoring program is to prepare a database which can be used to comment on the health of the subwatersheds, in particular, with respect to the subwatershed environmental targets.
Short-Term Monitoring Program

i) Water Quality

One water quality monitoring station should be located near the outlet of each subwatershed to be sampled monthly (i.e. dry weather flow) for the full array of MOEE nutrient, metal and organic parameters. The results of the monitoring program should be assessed annually to determine whether modifications to the monitoring program should be made (i.e. reducing or expanding monitoring program). The monitoring programs should be expanded to a second monitoring location in each subwatershed at the current rural/urban fringe as development in the subwatershed proceeds. The monitoring program should include, as a minimum, seasonal wet-weather water quality monitoring, to coincide with development proposed in Area Plans. Monitoring results should be summarized in an annual report for comparison against the environmental targets.

Where rural programs and projects are proposed, monitoring at the rural/urban fringe should be considered to monitor the impact of these measures/programs on water quality.

ii) Benthic Invertebrates

Ideally, monitoring would continue on an annual basis at all of BEAK’s benthic and fisheries sampling stations that were monitored during the subwatershed studies. This, however, is likely prohibitive, and a reduced benthic invertebrate and fisheries monitoring program would be more practical. At this time, it is recommended that the monitoring program be carried out annually downstream of areas which are undergoing development, and every 2 or 3 years at the outlet of each subwatershed. The results of the monitoring program are to be used in combination with the water quality monitoring program to assess the performance of management measures with respect to environmental targets. The results should provide a basis on which to gauge the “health” of the subwatersheds, as development in the subwatersheds proceeds.

Long-Term Monitoring Program

Monitoring of water quality and benthic invertebrates and fisheries should be extended to include tributaries of the main creek systems in the long-term. This may require use of more qualitative and conventional monitoring techniques that are summarized in Appendix B.

10.1.5 Natural Heritage System

Objective

The objective of the Natural Heritage System monitoring program is to enhance the present level of inventory data available for its wetlands, terrestrial and trail and corridor features, to note areas of encroachment, and impacts of development and recreational use on the National Heritage System.

Short-Term Monitoring Program

i) Wetlands

Inventorizing of wetland features is encouraged to the extent that funding will permit. However, it is likely that inventorizing of wetland features in the short-term at least, will be limited to areas which are subject to EIS investigations as part of development applications. Consequently, as a condition of Draft Plan Approval, monitoring
requirements should be specified for pre and post-development inventorying and inspection. The main purpose of the monitoring program is to note wetland features or functions which could be directly or indirectly affected by proposed development.

Monitoring of locations of encroachment on wetlands should be carried out by City/Township and Conservation Authority crews, and through records of complaints received at municipal offices regarding encroachment.

**ii) Terrestrial Features**

Like wetland features, inventorying of terrestrial features is encouraged, but is likely to be limited to EIS investigations, at least in the short-term. As in the case for wetlands, Draft Plan Approval conditions should include the requirement of both pre and post-development monitoring and inspection. The main purpose of the monitoring program is to note terrestrial features or functions which could directly or indirectly be affected by proposed development.

Encroachment on terrestrial features should be monitored by City/Township and Conservation Authority work crews, and through records of complaints received at municipal offices regarding encroachment.

**iii) Trails and Corridors**

Monitoring of lands within the municipality’s managed Open Space lands should be undertaken by municipal and Conservation Authority staff and should include noting the following specific areas:

- Destruction of understorey vegetation and slopes as a result of off-trail use (e.g. mounting biking, trail breaking, and ‘hang-outs’);
- Encroachment of adjacent land uses into natural areas (e.g. construction of gardens, sheds, and outbuildings, dumping—even backyard grass clippings can create problems), clearing of vegetation, and invasion of natural vegetation by non-native species; and
- Creekbank erosion, degradation of wetlands, and destruction of riparian vegetation as a result of public access to water’s edge.

The purpose of the monitoring program is to identify problem areas and to prepare management plans to address ways of overcoming impacts to natural areas that are resulting from recreational use.

**Long-Term Monitoring Program**

Monitoring of the Natural Heritage System in the long-term should involve coordinating inventories of all wetlands, terrestrial, trail and corridor systems (i.e. not just those located near proposed development) to be carried out jointly by the City and Conservation Authority with assistance provided by local naturalist organizations and volunteers. Some optional monitoring components are presented in Appendix B for long-term monitoring.
10.1.6 Storm Water Management Facilities

Objectives

To monitor the performance of SWM facilities and the quantity and quality of water in the receiving tributaries to determine if subwatershed targets are being met.

Short-Term Monitoring Program

The specific monitoring requirements of each development should be defined on a case-by-case basis, considering the nature and size of development, the benefits and costs of collecting the data and whether alternative monitoring techniques could/should be applied. In general, monitoring of the quantity and quality of storm runoff should be undertaken along the main tributaries where development is occurring and be based on the water quality monitoring program discussed in Section 10.1.4. Where possible (in conjunction with Area Plans for example), development proponents should share costs for quantity and quality monitoring of flow in the tributaries.

Assuming that the storm water management facilities have been designed using accepted guidelines (i.e., the MOEE SWMP Manual), monitoring of the SWM facilities could be limited to monitoring the performance of the sediment forebays and extended detention facilities to determine the frequency in which treatment storage volumes are exceeded. This could be accomplished by installation of a crest gauge to monitor peak storage levels in the pond. This information would be used to determine if sufficient settling capacity is available to remove pollutants, or if it is necessary, to increase the treatment volume capacity.

The requirement for and details of SWM monitoring and cost sharing for monitoring the quantity and quality of flow in the receiving tributaries should form part of the subdivision agreement. The monitoring results should be submitted to the City semi-annually for use in assessing pond performance and recommending remedial action, if necessary. Obviously, qualitative monitoring of SWM facilities should be carried out continuously by development proponents, and appropriate reporting be made in the event of apparent non-compliance.

Long-Term Monitoring Program

Long-term monitoring of SWM facilities will be required after ownership of the facilities has been transferred to the City. Qualitative monitoring techniques involving noting the frequency of exceeding sediment forebay and extended detention facility storage volumes should continue, as in the short-term monitoring program.

10.2 Compliance and Contingency Planning

10.2.1 Overview

The Subwatershed Plan identifies a number of management actions that are recommended to maintain and/or enhance the health of the subwatershed. The management actions fall into four main components, namely:

i) Recognition and Protection of Constraint Areas;

ii) Development Criteria;

iii) Management Practices; and

iv) Completion of Specific Projects and Programs
The monitoring program detailed in Section 10.1 has been designed to collect information such that the health of the subwatershed can be measured with respect to basic ecological, aesthetic and public health and safety criteria.

This part of the Implementation Plan addresses how the results of the monitoring program should be considered with respect to assessing compliance with ecological, aesthetic and public health and safety criteria and how contingency measures involving changes to the management actions should be initiated.

10.2.2 Compliance

The Technical Appendix includes fact sheets for each of the Subwatershed Plans, summarizing environmental targets from which monitoring data will be compared. To facilitate the evaluation of the effectiveness of the management actions of the Subwatershed Plans, it is important that reporting of monitoring results be organized with respect to the subwatersheds environmental targets.

The assessment of monitoring reports and data to determine whether the implementation of management actions are resulting in environmental targets being achieved is often complicated by natural fluctuations in climate, a certain set of circumstances contributing to non-compliance etc. Consequently, the determination of compliance with environmental targets should be carried out from three perspectives:

1) Day-to-day perspective;

2) Year-to-year perspective; and

3) Long-term perspective.

1) Day-to-Day Perspective

The day-to-day perspective involves reacting to monitoring results (often qualitative) which are observed and reported, often the result of a spill, or exceedance of design criteria that results in an apparent impact to the environment. In these cases it is mainly the responsibility of the municipality and agencies to have response plans in place to assess the seriousness of the situation and to implement contingency measures as required. It is also in the interest of and the responsibility of private citizens, developers and contractors to respond to non-compliance situations as they arise, not only from the perspective of "good corporate-citizens", but also for liability reasons.

2) Year-to Year Perspective

The year-to-year perspective involves the Implementation Committee and/or municipal departments and agencies reviewing annual monitoring reports, with respect to environmental targets, where available. The primary purpose of this review is to assess whether management and/or maintenance measures are adequate or require refinement in order to achieve environmental targets. For example, trampling of vegetation or litter or other damage to Open Space areas could be avoided if appropriate measures are put in-place based on observations in the previous year.

3) Long-Term Perspective

The long-term perspective would involve an examination of environmental targets to determine whether the Subwatershed Plan and its management actions are still "on-course" and achieving its intended objectives. This analysis should be undertaken every five years or so. The Implementation Committee should assess the performance of the Subwatershed Plan's Management Actions and their implementation, and perhaps establish priorities for management actions to be implemented over the next five years.
10.2.3 Contingency Measures

Contingency measures which could include improving erosion and sedimentation control measures, or retrofitting SWM facilities for example, should be undertaken in a coordinated manner, and after an examination of the nature of the factors contributing to the compliance problem has been undertaken, as necessary, to determine if the problem is acute (i.e. the result of a design failure, that with adjustments can be fixed) or chronic (i.e. an on-going problem that will require fundamental changes to management practices, retrofitting etc.).

When non-compliance problems are assessed as acute, the contingency measures should be implemented in a manner consistent with overall subwatershed objectives, and include consideration for additional monitoring.

Where non-compliance problems are assessed as chronic, a re-examination of the Subwatershed Plan’s management actions should be undertaken, as well as consideration for undertaking additional monitoring to further characterize the problem.

10.2.4 Re-Examination of Subwatershed Targets and Management Actions

During the implementation of the Subwatershed Plan over the coming years, situations are likely to arise in which the appropriateness of subwatershed targets and management actions may be questioned. This should be anticipated because more information will be available in the future on which decisions can be made, changes in climate could occur, technological advances may make present approaches obsolete, funding availability and sources may change, etc.

Consequently, the Implementation Committee should re-examine the subwatershed targets and management actions at least every five years to ensure that the targets are reasonable and/or appropriate given the results of the monitoring program, and required changes to the management actions.

10.3 Maintenance

10.3.1 Overview and Philosophy

The management actions identified in the Subwatershed Plan list a number of specific projects, management practices and constraint areas which may result in a long-term maintenance requirements - a cost or responsibility that must be borne to sustain a healthy subwatershed community. Since one of the goals of the Subwatershed Planning Studies is to arrive at a plan that maximizes benefits for all stakeholders, the cost of and responsibility for maintenance needs to be shared.

The philosophy for long-term maintenance involves the following three components:

i) Leadership;

ii) Education; and

iii) Regulation.

The Public Involvement Subcommittee needs to solicit leaders in the community that are committed to maintenance of features that affect the health of the subwatershed. The leaders should include Departments of the City of London, the Conservation Authorities, School Boards, Utility Companies, Downtown BIA, representatives from industry and commerce.

The Subcommittee needs to educate the public with respect to the role that they must play in the maintenance of their "own backyards" and how they can participate through voluntarism.
Agencies must identify and regulate mandatory maintenance requirements for private/public interests in the watershed that could not and should not be anticipated to be carried out through leadership or education initiatives.

It is recommended that the City, Conservation Authorities and other agencies initiate a community environmental initiative which would identify maintenance requirements, match-up organizations and volunteers with specific maintenance projects and provide technical support and facilitation services to assist with the maintenance projects as necessary through their completion.

The following sections describe general maintenance requirements which should be regulated in Open Space areas and storm water management facilities.

10.3.2 Natural Areas

As development takes place, the transfer of natural areas into public ownership through park dedication, purchase etc., will represent a significant opportunity for the protection and enhancement of ecosystem functions, if environmentally sound maintenance and development practices are applied. A stringent set of guidelines for valley lands, hazard lands and woodlots that are maintained within the municipal Open Space System should be established to ensure that environmental management objectives are met, in conjunction with any development for recreation uses. The following recommendations are intended to establish the direction for development guidelines and maintenance practices within existing and proposed municipal greenways and corridors.

- Permitted uses should be restricted to low intensity recreation, such as bikeways and walking trails, passive Open Space areas, picnic areas, wildlife and nature observation;

- The development of facilities such as trails, boardwalks or observation decks should be contingent on the environmental sensitivity of the area, as determined through the EIS process (e.g. soft surface walking trails or no trails may be appropriate through some highly sensitive areas);

- Where trails are permitted within environmentally sensitive areas, off-trail use outside of designated areas should be restricted through posting of signs, interpretive information, public awareness and education, planting of ‘unfriendly’ barriers (e.g. thorny species), or possibly fencing;

- Access points should be carefully controlled to ensure minimal disturbance to side slopes, existing vegetation etc.;

- Adequate setbacks from watercourses (e.g. 15 metres) should be maintained for all recreation areas including trails and picnic areas;

- Development of any facilities involving minimal clearing of existing vegetation and disturbed areas should be restored immediately with plant species that will quickly re-establish vegetative cover;

- Construction should be undertaken during the season when the stream is least sensitive (generally summer);

- All plant species planted should be indigenous species, based on local conditions. (EEPAC has developed guidelines for native species and MNR is currently preparing fact sheets on vegetation types, that will assist in landscape restoration - Ecological Land Classification for Southern Ontario);
• Vegetated buffer strips should be established adjacent to all watercourses, to assist in sedimentation control, erosion protection, and to enhance aquatic habitats. Public access to the watercourse should be carefully controlled in appropriate locations;

• Riparian buffer strips should include plant species that have a high tolerance to flood conditions, and have deep or wide spreading root systems to bind soil and reduce erosion;

• Enhancement of aquatic habitats should be considered through planting of species that will shade and overhang the stream;

• The use of having manicured turf areas within natural corridors should be restricted. Turf should be encouraged to return to natural grass species, with regular mowing restricted to specific areas designated for recreation and a mowing strip of 1-2 metres in width on either side of frequently used trails (e.g. bicycle/pedestrian routes);

• The routine use of pesticides, fertilizers and herbicides should be discontinued, in particular within 15 metres of the watercourse;

• Pedestrian bridges should be designed and constructed to create the least possible disturbance to the natural creek banks, and to aquatic habitats (e.g. the use of longer span bridges, no wing walls, no gabions or amourstone within the channel). Creekbank restoration should consider enhancement of aquatic habitats; and

• Landscaping on lands adjacent to natural areas should avoid invasive non-native species such as norway maples, black locusts etc.

10.3.3 Storm Water Management Facilities

The transition of lands from rural to urban land uses usually requires the implementation of storm water management measures to address potential impacts that could arise due to changes to storm water quantity and quality. The present state-of-the-art of storm water management involves a combination of at-source measures and end-of-pipe control measures. Most at-source measures are located on private land and may include:

• Rear-yard drainage from roof leaders;
• Lot grading;
• Infiltration galleries;
• Cisterns; and
• Roof-top storage.

Where at-source storm water management measures are a component of overall management of storm water runoff, public education may play an important role in the long-term maintenance and success of the Storm Water Management Plan.

End-of-pipe control measures such as storm water management (SWM) facilities are usually constructed on private property that is eventually transferred to public ownership in the long-term. The performance of SWM facilities is dependent on appropriate and timely maintenance. Maintenance requirements of end-of-pipe facilities should be considered with respect to the following time periods:

i) During construction of road and utilities infrastructure (private ownership);

ii) During the residential/commercial/industrial building development, prior to substantial completion (private ownership); and
Following substantial completion (public ownership).

**During Construction of Road and Utilities Infrastructure**

During this period, vegetation in most SWM facilities will not have taken hold and the facility will be vulnerable to embankment erosion and erosion near its inlets and outlet. The performance of the SWM facility is also stressed due to the disturbed condition of the areas tributary to it, and its performance is unknown (because the construction period usually is only a few months in duration).

Regular inspection and maintenance of the SWM facility by the contractor is important in order to minimize impacts to the environment. This could include:

- Repairing embankments;
- Repairing areas at the SWM facility's inlets and outlet;
- Watering vegetation as needed;
- Removing accumulated sediments; and
- Maintaining and/or installing other controls as necessary, including silt fencing and check dams.

Due to the vulnerability of the SWM facility and disturbed soils in its catchment, maintenance should be anticipated to be required during and/or immediately following rainfall events, and during drought periods (when vegetation may require watering to take hold).

**During Building Development - Prior to Substantial Completion**

During this period the contractor should continue a similar maintenance program as the one initiated during the infrastructure construction phase, except the regularity of maintenance could be scaled back. The maintenance program, should continue to be proactive, to maintain the facility to ensure it performs as designed, not to react to a situation of non-compliance.

Prior to the SWM facility’s ownership and maintenance responsibilities being transferred to the City, certain maintenance and monitoring conditions must be met (usually outlined in the subdivision agreement) and would be the subject of inspection by the City.

**Long-Term Maintenance**

The long-term maintenance of SWM facilities generally involves a combination of semi-annual, and as-needed maintenance. Semi-annual (spring and fall) maintenance would be required for the following:

- Removal of trash and debris;
- Clearing blockages at the inlet and outlet structures;
- Grass cutting and weed control, if desired; and
- Vegetation planting, if necessary.

As-needed maintenance would be required for the following:

- Removal of accumulated sediments;
- Adjustment of inlet/outlet configurations, if needed; and
- Repairing erosion problems on embankments and at inlet and outlet, as necessary.
10.4 Responsibilities

10.4.1 Monitoring

The Conservation Authorities should be responsible for the implementation and coordination of the monitoring program detailed in Section 10.1. The Conservation Authorities should be assisted by the Monitoring Subcommittee to address inter-agency responsibilities.

The Conservation Authorities should be the custodians of the overall monitoring database, which should be accessible by all subwatershed stakeholders. The Conservation Authorities should coordinate the review and approval of any monitoring programs prepared by development proponents.

10.4.2 Contingency Measures

The City of London should be responsible for coordinating contingency measures. The City should be assisted by the Implementation Committee to address issues with respect to the timing of contingency measure implementation and cost sharing arrangements.

10.4.3 Maintenance

The recommended allocation of ownership and maintenance responsibilities of natural areas is summarized in Table 6-1. Generally speaking, the City should be responsible for maintaining natural areas in the urban and urbanizing section of the City, the Conservation Authorities should be responsible for maintaining natural areas that transcend the municipal boundaries and the Provincial agencies should be responsible for maintenance of Provincially Significant features, unless arrangements are made with the Conservation Authorities.

Maintenance agreements should be prepared between land developers and the City addressing SWM facility maintenance requirements as part of the subdivision agreement.

The Public Involvement Subcommittee should consider establishing a community environmental committee which would assist in identifying, prioritizing, coordinating and undertaking voluntary maintenance activities.
11.0 REPORTING

It is recommended that reporting under the implementation plan be coordinated by the Conservation Authorities, acting in their role as custodians of the subwatershed plans. Two types of reporting are recommended, implementation progress and monitoring results. Both implementation progress reports and environmental monitoring reports would be generated annually, for use by the Implementation Committee. At five year intervals a comprehensive "State-of-the-Subwatersheds" report would be generated. This latter report would include updates and revisions to the subwatershed plans.

11.1 Implementation Progress Reporting

Implementation Progress (IP) reporting will be the most important initially because it will indicate how well the individual management actions are being implemented. IP reporting should be conducted under the broad headings of Constraint Areas (Natural Heritage), Development Criteria, Conservation and Management and Projects and Programs. In each case, although the Conservation Authorities will be responsible for coordinating and synthesizing the reports, the implementing lead agency designated for the particular management action will be responsible for assembling the data and information needed to gauge the progress under the individual action. IP reporting should be on a subwatershed basis (for community information purposes) but should also be summarized across the City as a whole to provide an overview of progress.

Constraint Areas (Natural Heritage)

For Category 1 lands, the reporting will indicate:

- status of action (eg. Candidate ESAs approved; Category 1 lands designated in OP schedules)
- loss or gain of Category 1 lands (eg. lands gained as a result of upgrade after more detailed studies; lands lost as a result detailed boundary delineations; approved Class EAs affecting Category 1 lands)
- stewardship and acquisition (eg. stewardship agreements concluded, bequests, purchases)
- plans or problems (plans to integrate recreation; problems with public use, etc.)

For Category 2 lands, the reporting will indicate:

- status (area plans or other detailed studies completed or under way)
- growth/loss of Category 2 lands (additional areas (eg. smaller than 4 ha) identified for protection in areas plans, patches reduced in area or eliminated after detailed studies, land revegetated as compensation for loss, etc.)
- stewardship and acquisition (eg. stewardship agreements concluded, bequests, purchases)
- plans or problems (plans to integrate recreation; problems with public use, etc.)
Development Criteria

The reporting will indicate:

- status (progress under the various actions)
- number/area of draft plan approvals issued; conditions of approval (ponds, volumes, stream rehabilitation, infiltration, etc.)
- problems/non compliance

Conservation and Management

The reporting will indicate:

- status (contacts made with farmers, agreements reached, projects initiated/equipment purchased, septic problems identified/fixed)
- initiatives (funding sources sought, by-laws passed)
- problems

Projects and Programs

- status of specific projects identified in the subwatershed plans
- status of generic projects (watercourses stabilized, aquatic habitat improvements made, revegetation undertaken)
- status of community involvement (community projects, City/CA education efforts etc.)

The reporting under these categories should be completed on an annual basis, with subsequent review and discussion by the Implementation Committee at a meeting convened by the Conservation Authority. Subsequent to the review, a "Subwatersheds Report Card" should be prepared and distributed to the public.

11.2 Monitoring Results

As discussed in Section 10, environmental monitoring will be conducted on an ongoing basis in order to collect the data necessary to gauge improvements in subwatershed health and the effectiveness of plan implementation. It is recommended that this data be compiled and reported by the Conservation Authority annually (to identify unusual problems). Care should be taken in the annual review of data because of the variability inherent in a limited number of samples. Special actions may need to be taken if the monitoring reveals a problem, but the existence of the problem should be confirmed through cross-correlation of data at other sites and possibly field reconnaissance.

The environmental monitoring report should be reviewed by the Implementation Committee at a meeting convened by the Conservation Authority. Necessary changes to management actions (which have become evident as a result of the review) should be made. The monitoring results should be combined with the IP report in the "Subwatersheds Report Card" which would be distributed to the public. The report card should indicate the successes and the failures, and should outline actions to be taken to correct problems.

11.3 State-of-the-Subwatershed Report

At 5 year intervals, implementation progress data and the environmental monitoring data should be compiled and evaluated. The emphasis should be on trends in relation to the environmental targets.
Utilizing the data and analyses, a "State-of-the-Subwatersheds" should be prepared. The purpose of this report would be to document the success or lack of success of the subwatershed plans and to modify or re-focus the plans. The report should identify problems and recommend actions in areas which are deficient. After discussion and commitment to any needed actions by the Implementation Committee, the report should be made available for public review. Summaries of the report should be included in any newsletters or other information sources that have been established under the community involvement programs.
Appendix A

Subwatershed Plan Implementation Responsibilities
Group 1 Subwatersheds
Medway, Stanton, Mud
<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
<th>Lead Agency</th>
<th>Mechanism</th>
<th>Time frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constraint Areas - Category 1</strong></td>
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<tr>
<td>Provincially Significant Areas (wetlands, ANSIs, rare species habitat)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>None identified within the Medway, Mud or Stanton subwatersheds</td>
</tr>
<tr>
<td>Environmentally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 (no development) type lands</td>
<td>City of London</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>See section 6 (ownership)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>ESAs are not delineated in London Township</td>
</tr>
<tr>
<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as Category 1 (no development) type lands</td>
<td>City of London London Township (UTRCA)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwaterhed plans as Category 1 lands</td>
<td>City of London London Township</td>
<td>Designate water courses to be protected as Category 1 Land in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>City (where necessary)</td>
<td>See section 6 (ownership)</td>
</tr>
<tr>
<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Lands.</td>
<td>City of London London Township</td>
<td>Designate riparian patches to be protected as Category 1 Land in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>City (where necessary)</td>
<td>See section 6 (ownership)</td>
</tr>
</tbody>
</table>

* All lands within London Township are considered Category 2, with the exception of floodplain.
### Implementation Requirements and Responsibilities - Group 1 Subwatersheds

<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
<th>Lead Agency (support agency)</th>
<th>Mechanism</th>
<th>Time frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>All remaining vegetative patches greater than 4 hectares</td>
<td>Protect as Category 2 lands subject to more detailed studies</td>
<td>City of London London Township</td>
<td>Designate lands in OP as requiring detailed studies (eg. Areas Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>See section 6 (ownership)</td>
</tr>
<tr>
<td>Anti Fragmentation Areas</td>
<td>Protect as Category 2 lands subject to more detailed studies</td>
<td>City of London London Township</td>
<td>Designate lands in OP as requiring detailed studies (eg. Areas Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>See section 6 (ownership)</td>
</tr>
<tr>
<td>Terrestrial Corridors</td>
<td>Protect as Category 2 lands subject to more detailed studies</td>
<td>City of London London Township</td>
<td>Designate lands in OP as requiring detailed studies (eg. Areas Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>See section 6 (ownership)</td>
</tr>
<tr>
<td>All significant recharge/discharge areas</td>
<td>Protect as Category 2 lands subject to more detailed studies</td>
<td>City of London London Township</td>
<td>Designate lands in OP as requiring detailed studies (eg. hydrogeologic) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>See section 6 (ownership)</td>
</tr>
<tr>
<td>Plan Component</td>
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<tr>
<td>Development Criteria</td>
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<tr>
<td>Peak Flow Attenuation</td>
<td>Provide quantity control storage to prevent increased flood damage as specified in the subwatershed plans</td>
<td>City of London</td>
<td>Submission of Stage 1 stormwater management report to include pre-design of facility in conformance with Plan. Final design submission in parallel with submissions for subdivision approvals.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Not applicable on Medway or Mud Creek. On Stanton plans should be interfaced with reconstruction of main channels</td>
</tr>
<tr>
<td>Water Quality</td>
<td>Provide quality storage as specified in the subwatershed plans</td>
<td>City of London</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Design based on SWMP Manual and City standards</td>
</tr>
<tr>
<td>Erosion/Stream Morphology</td>
<td>Provide quantity storage to prevent increased erosion potential or construct/restore dynamically stable water course.</td>
<td>City of London</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Combined Facilities permitted where practical</td>
</tr>
<tr>
<td>Baseflow Augmentation</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Not recommended on Group 1 subwatersheds</td>
</tr>
<tr>
<td>Infiltration</td>
<td>Provide lot level infiltration (20 mm of roof runoff) on suitable soils (high recharge/discharge areas) if development is approved</td>
<td>City of London</td>
<td>Require detailed hydrogeologic studies of high recharge/discharge areas in Area Plans. Storm water management report to include infiltration techniques to be employed.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Design based on SWMP Manual and City standards</td>
</tr>
<tr>
<td>Erosion control during construction</td>
<td>Require preparation of Sediment and Erosion Control Plans for all new developments</td>
<td>City of London</td>
<td>Preparation of the Erosion and Sediment Control Plan to be included in the conditions of draft plan approval.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Two Zone Flood Policy</td>
<td>Evaluate use of Two Zone Flood Policy on portions of Kelly Drain and Mud Creek</td>
<td>UTRCA</td>
<td>Consider application of policy as part of Area Plans.</td>
<td>When Area Plans are initiated</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Plan Component</td>
<td>Action</td>
<td>Lead Agency (support agency)</td>
<td>Mechanism</td>
<td>Time frame</td>
<td>Funding Responsibility</td>
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<tr>
<td>Develop flood and fill lines</td>
<td>Prepare flood/fill line maps for all watercourses designated on OP land use schedules</td>
<td>UTRCA (City of London)</td>
<td>Require preparation of flood/fill line mapping by proponent as condition of draft plan approval. UTRCA to register fill lines. City to amend OP schedules</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Construction Inspection</td>
<td>Require regular inspection by a qualified environmental inspector during construction</td>
<td>City of London</td>
<td>Agreement to provide an environmental inspector to be included in the conditions of draft plan approval.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Erosion Monitoring</td>
<td>Require regular inspection of receiving watercourse by a qualified environmental inspector during construction and for a period of two years after completion of construction</td>
<td>City of London</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Encourage environmentally sensitive site planning techniques</td>
<td>Promote the use of good site planning which seeks to limit grading and retain smaller natural areas and watercourses</td>
<td>City of London</td>
<td>City to develop guidelines and encourage their use in subdivision design.</td>
<td>Immediate and ongoing</td>
<td>City/Proponent</td>
<td></td>
</tr>
<tr>
<td>Plan Component</td>
<td>Conservation and Management Practices</td>
<td>Action</td>
<td>Mechanism</td>
<td>Lead Agency (support agency)</td>
<td>Funding Responsibility</td>
<td>Time Frame</td>
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</tr>
<tr>
<td>Conservation Tillage</td>
<td>Encourage conservation tillage in very high to medium erosion potential areas as delineated in the subwatershed plans</td>
<td>Staff to work with farmers to encourage use of conservation tillage</td>
<td>UTRCA (OMAFRA)</td>
<td>Landowner</td>
<td>Ongoing (long term)</td>
<td></td>
</tr>
<tr>
<td>Septic System Effluent</td>
<td>Trace and remediate faulty septic systems</td>
<td>Institute a tracing program to identify priority areas for septic system inspections and remediation</td>
<td>UTRCA (MOE)</td>
<td>Landowner</td>
<td>Ongoing (long term)</td>
<td></td>
</tr>
<tr>
<td>Vegetated Buffer Strips</td>
<td>Encourage the adoption of buffer strips along designated watercourses to minimize the conveyance of eroded soils and nutrients to the watercourse. Where feasible encourage riparian planting within the buffer strip.</td>
<td>Staff to work with farmers to encourage adoption of buffers in specific areas within the division plan or draft plan of subdivision</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Landowner</td>
<td>Ongoing (long term)</td>
<td></td>
</tr>
<tr>
<td>Control livestock access</td>
<td>Continue existing programs to minimize the impacts of livestock access to watercourses.</td>
<td>Staff to work with farmers to encourage fencing of watercourses.</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Landowner</td>
<td>Ongoing (long term)</td>
<td></td>
</tr>
<tr>
<td>Milkbouse Waste Control</td>
<td>Continue existing programs to minimize the impacts of milkhouse waste handling systems</td>
<td>Staff to work with farmers to encourage collection of milkhouse waste systems</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Landowner</td>
<td>Ongoing (long term)</td>
<td></td>
</tr>
<tr>
<td>Plan Component</td>
<td>Action</td>
<td>Lead Agency (support agency)</td>
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<tr>
<td><strong>Conservation and Management Practices - Continued</strong></td>
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<tr>
<td>Manure management</td>
<td>Continue existing programs</td>
<td>UTRCA (OMAFRA, MNR, MOEE)</td>
<td>Staff to work with farmers to encourage good handling practices.</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority. See Section 7.0</td>
</tr>
<tr>
<td>Feedlot runoff control</td>
<td>Continue existing programs</td>
<td>UTRCA (OMAFRA, MNR, MOEE)</td>
<td>Staff to work with farmers to encourage runoff capture and treatment</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority. See Section 7.0</td>
</tr>
<tr>
<td>Natural Channel Succession</td>
<td>Allow natural succession to occur in all Category 1 lands and Category 2 lands which are not in active agricultural use</td>
<td>City of London, London Township, UTRCA</td>
<td>No direct action required. Preference is to allow natural regeneration, unless specific need for rapid growth of woody vegetation is specified (e.g., in Area Plan; riparian zones)</td>
<td>Ongoing (long term)</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Top Soil Preservation</td>
<td>Investigate implementation of a top-soil by-law and fee structure which would fund a municipal inspection program to ensure implementation and regular inspection of construction controls</td>
<td>City of London</td>
<td>City to investigate the use and success in other municipalities and to prepare a draft by-law for discussion and future implementation.</td>
<td>Discussion Paper/Draft By-Law within two years</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Municipal De-icing Programs</td>
<td>Continue programs to minimize the use of de-icing chemicals</td>
<td>City of London</td>
<td>Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
<td></td>
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<tr>
<td>Plan Component</td>
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<td>Lead Agency</td>
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<tr>
<td>Vegetation</td>
<td>Plant native species in unvegetated riparian zones</td>
<td>Ongoing (long term)</td>
<td>Planning Plan to be prepared for unvegetated riparian areas, community involvement to be encouraged</td>
<td>UTRCA, City of London, landowners</td>
<td>UTRCA</td>
<td>See Section 8.0</td>
</tr>
<tr>
<td>Restorations</td>
<td>Encourage stream restoration and improvement of watercourses</td>
<td>Ongoing (long term)</td>
<td>Focus on first and second development phases, working closely with partners</td>
<td>Proprietary developer</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Aquatic/Stream Restoration (General)</td>
<td>Rebuild or restore Fox Hollow channel</td>
<td>Within 5 years</td>
<td>Tie to development approval</td>
<td>Proprietary developer</td>
<td>City of London</td>
<td>Ongoing (long term)</td>
</tr>
<tr>
<td></td>
<td>Rebuild or restore Fox Hollow channel</td>
<td>Within 5 years</td>
<td></td>
<td>City of London</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Restore a geomorphologically stable channel</td>
<td>Within 5 years</td>
<td></td>
<td>City of London</td>
<td>City of London</td>
<td>Ongoing (long term)</td>
</tr>
<tr>
<td></td>
<td>Restore a geomorphologically stable channel</td>
<td></td>
<td></td>
<td>City of London</td>
<td>City of London</td>
<td>See Section 8.0</td>
</tr>
<tr>
<td></td>
<td>Rebuild or restore Gainsborough Ravine channel</td>
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<td>City of London</td>
<td>City of London</td>
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<tr>
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<td>Rebuild or restore Gainsborough Ravine channel</td>
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<td></td>
<td>Rebuild or restore Gainsborough Ravine channel</td>
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<td>City of London</td>
<td>City of London</td>
<td>See Section 8.0</td>
</tr>
<tr>
<td></td>
<td>Rebuild the Stanton Drain and the Kelly Drain (above the railway tracks) to provide flood storage and improved aquatic habitat</td>
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<td>City of London</td>
<td>City of London</td>
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<td></td>
<td>Eliminate Barriers to Fish Passage</td>
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<td>City of London</td>
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<td></td>
<td>Evaluate feasibility as part of infrastructure renewal</td>
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<td>City of London</td>
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<tr>
<td></td>
<td>Evaluate feasibility as part of infrastructure renewal</td>
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<td></td>
<td>City of London</td>
<td>City of London</td>
<td>Ongoing (long term)</td>
</tr>
<tr>
<td></td>
<td>Coordinate education initiatives for community involvement programs</td>
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<td>City of London</td>
<td>City of London</td>
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<tr>
<td></td>
<td>Implement public awareness programs and community involvement programs</td>
<td></td>
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<td>City of London</td>
<td>City of London</td>
<td>See Section 8.0</td>
</tr>
</tbody>
</table>
Group 2 Subwatersheds

Thames - Downstream
Thames - South
Thames - North
<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
<th>Lead Agency (support agency)</th>
<th>Mechanism</th>
<th>Time frame</th>
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<th>Other Comments</th>
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<tbody>
<tr>
<td>Constraint Areas - Category 1</td>
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</tr>
<tr>
<td>Provincially Significant Areas (wetlands, ANSIs, rare species habitat)</td>
<td>Protect PSAs as category 1 Natural Heritage Lands (no development)</td>
<td>MNR (CA, City, Municipality)</td>
<td>PSAs are protected by provincial statues and within OP land use schedules</td>
<td>Complete by January 1, 1996</td>
<td>MNR (CA) (where necessary)</td>
<td>MNR to confirm, some newly designated PSAs (wetlands).  See Note 2</td>
</tr>
<tr>
<td>Environmentally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 Natural Heritage Lands (no development)</td>
<td>City of London (CA)</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules. CA endorsement of ESAs.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>Seek support for ESA designation in other municipalities.  See Note 2</td>
</tr>
<tr>
<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as category 1 Natural Heritage Lands (no development)</td>
<td>CA (City, Municipality)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>CA (where necessary)</td>
<td>CA to pursue strengthening of fill regulations to provide for protection of vegetation.  See Note 2</td>
</tr>
<tr>
<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwatershed plans as Category 1 Natural Heritage Lands</td>
<td>City of London (Municipality (CA, MNR)</td>
<td>Designate water courses to be protected as Category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Municipality)</td>
<td>City (where necessary)</td>
<td>CA and MNR to develop criteria to guide determination of setback width  See Note 2</td>
</tr>
<tr>
<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Natural Heritage Lands</td>
<td>City of London, Municipality (CA)</td>
<td>Designate riparian patches to be protected as category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>City (where necessary)</td>
<td>See Note 2</td>
</tr>
<tr>
<td>Plan Component</td>
<td>Action</td>
<td>Lead Agency (support agency)</td>
<td>Mechanism</td>
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<td>Municipal De-icing Programs</td>
<td>Continue programs to minimize the use of de-icing chemicals</td>
<td>City of London</td>
<td>Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
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| Plant Riparian Vegetation  | Plant native species in unvegetated riparian zones                     | CA, City                    | Planting Plan to be prepared for unvegetated riparian areas Community involvement to be encouraged.  
• public education/ awareness  
• technical assistance  
• priority driven  
• incentives                              | Ongoing (long term) | CA, City, MNR (supply) landowner | See Section 8.0 Plant materials in accordance with EEPAC native species lists |
| Aquatic/Stream Restoration (General) | Encourage stream restoration and habitat improvement of watercourses | City of London CA Municipality | Encourage projects sponsored by public interest groups  
• public education/ awareness  
• technical assistance  
• priority driven  
• incentives                                                              | Ongoing (long term) | Proponent, landowner, community group, City, CA | Funding through CA, City Capital works programs, in part |
| Eliminate Barriers to Fish Passage | NA                                                                     | NA                           | NA                                                                        | NA               | NA                                      |                                                                                |
| Floodproofing/Local Flood Protection | Provide local flood protection for structures in Kilworth            | City of London               | Evaluate feasibility as part of infrastructure renewal                        | Ongoing (long term) | City of London                         |                                                                                |
| Public Awareness Program    | Implement public awareness and community involvement programs         | City of London, UTRCA        | Coordinate education initiatives and community involvement programs        | City of London  | City of London, UTRCA                  | See Section 8.0                                                                    |
| Proposed Bike/Fitness Trail | Design and construct additional trails to link into city-wide system  
EIS adjacent to significant features required.                               | City (CA, MNR)               | Developed through City's Recreation Plan Support provided through adjacent development | Ongoing          | City (proponent) | City to pursue corporate funding support in return for "official home" for portion of trail  
Opportunity for public contributions |
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<td>Proposed Hiking Trail</td>
<td>Design and construct additional trails to link into city-wide system</td>
<td>City (CA, MNR)</td>
<td>Developed through City’s Recreation Plan</td>
<td>Ongoing</td>
<td>City</td>
<td>City to pursue corporate funding support in return for &quot;official home&quot; for portion of trail</td>
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<td>EIS adjacent to significant features required.</td>
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<td>Support provided through adjacent development</td>
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<td></td>
<td>Opportunity for public contributions</td>
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<td>Proposed On-Road Bike Route</td>
<td>Provide signage and other safety measures for on road bike route.</td>
<td>City</td>
<td>Developed through City’s Recreation Plan</td>
<td>Ongoing</td>
<td>City</td>
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<tr>
<td>Environmental Awareness/ Education Program</td>
<td>Development of materials, guided tours, partnerships with local groups, staff resources to provide service</td>
<td>City (CA, MNR)</td>
<td>City Recreation Plan</td>
<td>Ongoing</td>
<td>City (CA, MNR)</td>
<td>City to pursue partnerships with local community groups, environmental groups</td>
</tr>
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<td>Urban Fishing Access Trails and facilities</td>
<td>Control river access and limited facilities such as parking, piers, information board EIS may be required</td>
<td>City (CA, MNR)</td>
<td>City Recreation Plan</td>
<td>Ongoing</td>
<td>City (MNR)</td>
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<td></td>
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<td></td>
<td>MNR community program (CFIP)</td>
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<td>Small Boat Launching Facilities</td>
<td>Launching facilities for small non motorized boats</td>
<td>City (CA)</td>
<td>City Recreational Plan</td>
<td>Ongoing</td>
<td>City</td>
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<td></td>
<td>Support from volunteer organizations</td>
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<tr>
<td>Specific Policy Area</td>
<td>Develop special architectural standard, site plan controls, landscaping requirements to preserve areas unique features</td>
<td>City</td>
<td>LACAC Committee to recommend standards</td>
<td>Ongoing</td>
<td>NA</td>
<td></td>
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<tr>
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<td></td>
<td>Incorporate specific policy designation in OP and schedules</td>
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<td></td>
<td>Preparation of Bylaws and development criteria</td>
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<td>Comprehensive River Corridor Plan</td>
<td>Extend concept of river corridor planning to Thames River through London to restore valued river connections</td>
<td>City (CA)</td>
<td>Undertake a comprehensive study to develop river corridor plan with broad public consultation</td>
<td>5 years</td>
<td>City</td>
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<td>Valleyland Vegetation Management Program</td>
<td>Revegetate valleylands to reconnect fragmented natural features</td>
<td>City (CA, MNR)</td>
<td>Use EEPAC guidelines for species selection Prioritize areas based on need to buffer ESAs Encourage volunteer participation</td>
<td>Ongoing</td>
<td>City</td>
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<tr>
<td>Kilworth Heritage Conservation District</td>
<td>Develop policies for preservation of historical structures Develop architectural standards for new development</td>
<td>City</td>
<td>LACAC Committee and local historical society to provide guidelines Specific policy designation in OP and schedules Site plan controls</td>
<td>Ongoing</td>
<td>Proponent (City)</td>
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<tr>
<td>London Gateway Image Route</td>
<td>Develop architectural controls, development standards, landscaping requirements</td>
<td>City</td>
<td>LACAC Committee and local historical society to provide guidelines Specific policy designation in OP and schedules Site plan controls</td>
<td>Ongoing</td>
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Note 2: A number of alternative ownership and management arrangements could be explored for natural areas designated as open space. Refer to Section 6.
## Implementation Requirements and Responsibilities - Group 2 Subwatersheds - South Thames Area

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<tr>
<td>Provincially Significant Areas (wetlands, ANSIs, rare species habitat)</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>None identified</td>
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<tr>
<td>Environmentally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 Natural Heritage Lands (no development)</td>
<td>City of London (CA)</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules. CA endorsement of ESAs.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>Seek support for ESA designation in other municipalities. See Note 2</td>
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<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as category 1 Natural Heritage Lands (no development)</td>
<td>CA (City, Municipality)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>CA (where necessary)</td>
<td>CA to pursue strengthening of fill regulations to provide for protection of vegetation. See Note 2</td>
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<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwatershed plans as Category 1 Natural Heritage Lands</td>
<td>City of London (Municipality (CA, MNR)</td>
<td>Designate water courses to be protected as Category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Municipality)</td>
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<td>CA and MNR to develop criteria to guide determination of setback width See Note 2</td>
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<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Natural Heritage Lands</td>
<td>City of London, Municipality (CA)</td>
<td>Designate riparian patches to be protected as category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
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<td>Public Awareness Program</td>
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<td>Valleyland Vegetation Management Program</td>
<td>Revegetate valleylands to reconnect fragmented natural features</td>
<td>City (CA, MNR)</td>
<td>Use EEPAC guidelines for species selection Prioritize areas based on need to buffer ESAs Encourage volunteer participation</td>
<td>Ongoing</td>
<td>City</td>
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<td>Interpretative Centre</td>
<td>Enhance facilities at Park farm to provide nature interpretative EIS may be required</td>
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<td>Recreation Plan</td>
<td>Ongoing</td>
<td>City</td>
<td>City to seek corporate sponsorship</td>
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<td>Improve bridge to provide pedestrian, bicycle linkage across river</td>
<td>City</td>
<td>Recreation Plan</td>
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Note 2: A number of alternative ownership and management arrangements could be explored for natural areas designated as open space. Refer to Section 6.
## Implementation Requirements and Responsibilities - Group 2 Subwatersheds - North Thames Area

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<tr>
<td>Provinceally Significant Areas (wetlands, ANSIs, rare species habitat)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>None identified</td>
</tr>
<tr>
<td>Environmentally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 Natural Heritage Lands (no development)</td>
<td>City of London (CA)</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules. CA endorsement of ESAs.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>Seek support for ESA designation in other municipalities. See Note 2</td>
</tr>
<tr>
<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as Category 1 Natural Heritage Lands (no development)</td>
<td>CA (City, Municipality)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996</td>
<td>CA (where necessary)</td>
<td>CA to pursue strengthening of fill regulations to provide for protection of vegetation. See Note 2</td>
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<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwatershed plans as Category 1 Natural Heritage Lands</td>
<td>City of London (Municipality (CA, MNR))</td>
<td>Designate water courses to be protected as Category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>CA and MNR to develop criteria to guide determination of setback width See Note 2</td>
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<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Natural Heritage Lands</td>
<td>City of London, Municipality (CA)</td>
<td>Designate riparian patches to be protected as category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>See Note 2</td>
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<td>Constraint Areas - Category 2</td>
<td>All remaining vegetative patches greater than 4 hectares</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>Anti Fragmentation Areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
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<tr>
<td>Terrestrial Corridors</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
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<tr>
<td>All significant recharge/discharge areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. hydrogeologic) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
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<td><strong>Development Criteria</strong></td>
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<tr>
<td>Peak Flow Attenuation</td>
<td>Provide quantity control storage to prevent increased flood damage as specified in the subwatershed plan</td>
<td>City of London</td>
<td>Submission of Stage I stormwater management report to include pre-design of facility in conformance with Plan. Final design submission in parallel with submissions for subdivision approvals.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Only required in Kilworth Tributary</td>
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<tr>
<td>Water Quality</td>
<td>Provide quality storage as specified in the subwatershed plans</td>
<td>City of London</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Design based on SWMP Manual and City standards</td>
</tr>
<tr>
<td>Erosion/Stream Morphology</td>
<td>Provide quantity storage to prevent increased erosion potential or construct/restore dynamically stable water course.</td>
<td>City of London</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Combined Facilities permitted where practical</td>
</tr>
<tr>
<td>Baseflow Augmentation</td>
<td>Provide baseflows from the recommended stormwater management facilities to help support aquatic life</td>
<td>City of London</td>
<td>As Above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Only required on Kilworth Tributary</td>
</tr>
<tr>
<td>Infiltration</td>
<td>Provide lot level infiltration (20 mm of roof runoff) on suitable soils (high recharge/discharge areas) if development is approved</td>
<td>City of London</td>
<td>Require detailed hydrogeologic studies of high recharge/discharge areas in Area Plans. Storm water management report to include infiltration techniques to be employed.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td>Design based on SWMP Manual and City standards</td>
</tr>
<tr>
<td>Erosion control during construction</td>
<td>Require preparation of Sediment and Erosion Control Plans for all new developments</td>
<td>City of London</td>
<td>Preparation of the Erosion and Sediment Control Plan to be included in the conditions of draft plan approval.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
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<tr>
<td>Two Zone Flood Policy</td>
<td>NA</td>
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<td>Update/Extend flood and fill lines</td>
<td>Prepare flood/fill line maps for all watercourses designated on OP land use schedules</td>
<td>UTRCA (City of London)</td>
<td>Require preparation of flood/fill line mapping by proponent as condition of draft plan approval. UTRCA to register fill lines. City to amend OP schedules</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
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<tr>
<td>Construction Inspection</td>
<td>Require regular inspection by a qualified environmental inspector during construction</td>
<td>City of London</td>
<td>Agreement to provide an environmental inspector to be included in the conditions of draft plan approval.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
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<tr>
<td>Erosion Monitoring</td>
<td>Require regular inspection of receiving watercourse by a qualified environmental inspector during construction and for a period of two years after completion of construction</td>
<td>City of London</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
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<tr>
<td>Encourage environmentally sensitive site planning techniques</td>
<td>Promote the use of good site planning which seeks to limit grading and retain smaller natural areas and watercourses</td>
<td>City of London</td>
<td>City to develop guidelines and encourage their use in subdivision design.</td>
<td>Immediate and ongoing</td>
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| Plant Riparian Vegetation            | Plant native species in unvegetated riparian zones                    | CA, City                     | Planting Plan to be prepared for unvegetated riparian areas Community involvement to be encouraged.  
• public education/awareness  
• technical assistance  
• priority driven  
• incentives                                                    | Ongoing (long term)         | CA, City, MNR (supply) landowner                                                   | See Section 8.0 Plant materials in accordance with EEPAC native species lists |
| Aquatic/Stream Restoration (General) | Encourage stream restoration and habitat improvement of watercourses  | City of London               | Encourage projects sponsored by public interest groups  
• public education/awareness  
• technical assistance  
• priority driven  
• incentives                                                    | Ongoing (long term)         | Proponent, landowner, community group, City, CA                                     | Funding through CA, City Capital works programs, in part |
| Eliminate Barriers to Fish Passage   | NA                                                                     | NA                           | NA                                                                                                                                         | NA             | NA                                                          |                                                                                                             |
| Floodproofing/Local Flood Protection | Provide local flood protection for structures in Kilworth             | City of London               | Evaluate feasibility as part of infrastructure renewal                                                                                     | Ongoing (long term) | City of London                                              |                                                                                                             |
| Public Awareness Program             | Implement public awareness and community involvement programs         | City of London, UTRCA        | Coordinate education initiatives and community involvement programs                                                                      | City of London | City of London, UTRCA                                       | See Section 8.0                                                                                                |
| Proposed Bike/Fitness Trail          | Design and construct additional trails to link into city-wide system  | City (CA, MNR)               | Developed through City’s Recreation Plan  
Support provided through adjacent development                                                                                           | Ongoing        | City (proponent)                                            | City to pursue corporate funding support in return for "official home" for portion of trail  
Opportunity for public contributions                                                                         |
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<td>5 years</td>
<td>City</td>
<td></td>
</tr>
<tr>
<td>Valleyland Vegetation Management Program</td>
<td>Revegetate valleylands to reconnect fragmented natural features</td>
<td>City (CA, MNR)</td>
<td>Use EEPAC guidelines for species selection</td>
<td>Ongoing</td>
<td>City</td>
<td></td>
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<td></td>
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<td></td>
<td>Prioritize areas based on need to buffer ESAs</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Encourage volunteer participation</td>
<td></td>
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</tr>
<tr>
<td>Coordinated Aggregate Extraction and</td>
<td>Review existing rehabilitation plans and remaining resources and develop a coordinated approach with appropriate rehabilitative end uses defined</td>
<td>City, MNR (Aggregate Association, Landowners)</td>
<td>Use provisions available under Aggregate Resources Act</td>
<td>Ongoing</td>
<td>City (landowners)</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation Plan</td>
<td></td>
<td></td>
<td>Strengthen OP policies, guidelines</td>
<td></td>
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</tr>
</tbody>
</table>

Note 2: A number of alternative ownership and management arrangements could be explored for natural areas designated as open space. Refer to Section 6.
Group 3 Subwatersheds
Upper Kettle, Dodds
<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
<th>Lead Agency</th>
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<th>Time frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constraint Areas - Category 1</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Provincially Significant Areas (wetlands, ANSIs,</td>
<td>Protect PSAs as category 1 Natural Heritage Lands (no development)</td>
<td>MNR (CA, City, Municipality)</td>
<td>PSAs are protected by provincial statutes and within OP land use schedules</td>
<td>Compete by January 1, 1996</td>
<td>MNR (CA) (where necessary)</td>
<td>MNR to confirm, some newly designated PSAs (wetlands).  See Note 2</td>
</tr>
<tr>
<td>rare species habitat)</td>
<td></td>
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</tr>
<tr>
<td>Environmentally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 Natural Heritage Lands (no development)</td>
<td>City of London (CA)</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules. CA endorsement of ESAs.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>Seek support for ESA designation in other municipalities. See Note 2</td>
</tr>
<tr>
<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as category 1 Natural Heritage Lands (no development)</td>
<td>CA (City, Municipality)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>CA (where necessary)</td>
<td>CA to pursue strengthening of fill regulations to provide for protection of vegetation. See Note 2</td>
</tr>
<tr>
<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwatershed plans as Category 1 Natural Heritage Lands</td>
<td>City of London (Municipality (CA, MNR)</td>
<td>Designate water courses to be protected as Category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Municipality)</td>
<td>City (where necessary)</td>
<td>CA and MNR to develop criteria to guide determination of setback width See Note 2</td>
</tr>
<tr>
<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Natural Heritage Lands</td>
<td>City of London, Municipality (CA)</td>
<td>Designate riparian patches to be protected as category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>City (where necessary)</td>
<td>See Note 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plan Component</th>
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<th>Lead Agency (support agency)</th>
<th>Mechanism</th>
<th>Time frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
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<tbody>
<tr>
<td><strong>Constraint Areas - Category 2</strong></td>
<td></td>
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</tr>
<tr>
<td>All remaining vegetative patches greater than 4 hectares</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>Anti Fragmentation Areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>Terrestrial Corridors</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>All significant recharge/discharge areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (eg. hydrogeologic) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
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<tr>
<td>Development Criteria</td>
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<tr>
<td>Peak Flow Attenuation</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>Water Quality</td>
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<tr>
<td>Erosion/Stream Morphology</td>
<td>NA</td>
<td>NA</td>
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<td>Baseflow Augmentation</td>
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<td>NA</td>
<td>NA</td>
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<td>Infiltration</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Erosion control during construction</td>
<td>Require preparation of Sediment and Erosion Control Plans for all construction activities</td>
<td>City of London</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
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<tr>
<td>Two Zone Flood Policy</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td><strong>Development Criteria - Continued</strong></td>
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<tr>
<td>Extend flood and fill lines</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Construction Inspection</td>
<td>Require regular inspection by a qualified environmental inspector during construction</td>
<td>City of London, Municipality</td>
<td></td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Erosion Monitoring</td>
<td>Require regular inspection of receiving watercourse by a qualified environmental inspector during construction and for a period of two years after completion of construction</td>
<td>City of London, Municipality</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Encourage environmentally sensitive site planning techniques</td>
<td>Promote the use of good site planning which seeks to limit grading and retain smaller natural areas and watercourses</td>
<td>City of London, Municipality</td>
<td>City to develop guidelines and encourage their use in subdivision design.</td>
<td>Immediate and ongoing</td>
<td>City/Proponent</td>
<td></td>
</tr>
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</tbody>
</table>
| Conservation and Management Practices | Conservation Tillage | Encourage conservation tillage in very high to medium erosion potential areas as delineated in the subwatershed plans | CA (OMAFRA) | • education/awareness program  
• technical assistance  
• priority driven  
• incentives | Ongoing (long term) | Landowner (CA, OMAFRA, Ag Can).  
High Priority in Identified High Loading Areas | See Section 7.0 |
| Septic System Effluent | Trace and remediate faulty septic systems. | CA (MOEE, OMAFRA) | • Tracing and inspection  
• education/awareness program  
• technical assistance  
• priority driven  
• incentives | Identification of problem systems within three years.  
Ongoing (long term) | CA (MOEE) (tracing & inspection)  
Landowner (remediation) | See Section 7.0  
CA, City to initiate partnership with research agency to develop cost effective solutions |
| Vegetated Buffer Strips | Encourage the adoption of buffer strips along designated watercourses to minimize the conveyance of eroded soils and nutrients to the watercourse. Where feasible encourage riparian planting within the buffer strip. | CA, City, Municipality (OMAFRA, MNR) City | Staff to work with farmers to encourage adoption of buffers  
Buffer dimension to be specified in Area Plan or Draft Plan of Subdivision  
• education/awareness  
• technical assistance  
• priority driven  
• incentives | Ongoing (long term) | Landowner  
Proponent (City, CA, Municipality) | See Section 7.0  
Agencies to pursue partnerships with volunteers to provide labour |
| Control livestock access | Continue/refocus existing programs to minimize the impacts of livestock access to watercourses. | CA (OMAFRA, MOEE) | Staff to work with farmers to encourage fencing of watercourses  
• education/awareness  
• technical assistance  
• priority driven  
• incentives | Ongoing (long term) | Landowner, CA, MOEE | Requires expansion of CURB program  
See Section 7.0 |
| Milkhouse Waste Control | Continue/refocus existing programs to minimize the impacts of milk house operations | CA (OMAFRA, MNR) | Staff to work with farmers to encourage construction of milkhouse waste handling systems  
• education/awareness  
• technical assistance  
• priority driven  
• incentives | Ongoing (long term) | Landowner, CA, MOEE | Requires expansion of CURB program  
See Section 7.0 |
<table>
<thead>
<tr>
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<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation and Management Practices - Continued</td>
<td>Manure management: Continue/refocus existing programs</td>
<td>CA (OMAFRA, MNR, MOEE)</td>
<td>Staff to work with farmers to encourage good handling practices. • education/awareness • technical assistance • priority driven</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority requires expansion of CURB program See Section 7.0</td>
</tr>
<tr>
<td></td>
<td>Feedlot runoff control: Continue/refocus existing programs</td>
<td>CA (OMAFRA, MNR, MOEE)</td>
<td>Staff to work with farmers to encourage runoff capture and treatment • education/awareness • technical assistance • priority driven</td>
<td>Ongoing (long term)</td>
<td>Landowner, MOEE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural Channel Succession: Allow natural succession to occur in all Category 1 lands and Category 2 lands which are not in active agricultural use</td>
<td>City of London, CA, Municipality</td>
<td>No direct action required. Preference is to allow natural regeneration, unless specific need for rapid growth of woody vegetation is specified (eg. in Area Plan; riparian zones)</td>
<td>Ongoing (long term)</td>
<td>None</td>
<td>Not recommended</td>
</tr>
<tr>
<td></td>
<td>Top Soil Preservation: Investigate implementation of a top-soil by-law and fee structure which would fund a municipal inspection program to ensure implementation and regular inspection of construction controls</td>
<td>City of London, Municipality</td>
<td>City to investigate the use and success in other municipalities and to prepare a draft by-law for discussion and future implementation.</td>
<td>Discussion Paper/Draft By-Law within two years</td>
<td>City of London, Municipality</td>
<td></td>
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<tr>
<td></td>
<td>Municipal De-icing Programs: Continue programs to minimize the use of de-icing chemicals</td>
<td>City of London</td>
<td>Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Plan Component</td>
<td>Action</td>
<td>Lead Agency</td>
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</tr>
<tr>
<td>Plant Riparian Vegetation</td>
<td>Plant native species in unvegetated riparian zones</td>
<td>CA, City</td>
<td>Planting Plan to be prepared for unvegetated riparian areas. Community involvement to be encouraged. • public education/ • awareness • technical assistance • priority driven • incentives</td>
<td>Ongoing (long term)</td>
<td>CA, City, MNR (supply) landowner</td>
<td>See Section 8.0 Plant materials in accordance with EEPAC native species lists</td>
</tr>
<tr>
<td>Aquatic/Stream Restoration (General)</td>
<td>Encourage stream restoration and habitat improvement of watercourses</td>
<td>City of London, CA Municipality</td>
<td>Encourage projects sponsored by public interest groups. • public education/ • awareness • technical assistance • priority driven • incentives</td>
<td>Ongoing (long term)</td>
<td>Proponent, landowner, community group, City, CA</td>
<td>Funding through CA, City Capital works programs, in part</td>
</tr>
<tr>
<td>Eliminate Barriers to Fish Passage</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Floodproofing/Local Flood Protection</td>
<td></td>
<td>City of London</td>
<td>Evaluate feasibility as part of infrastructure renewal</td>
<td>Ongoing (long term)</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Public Awareness Program</td>
<td>Implement public awareness and community involvement programs</td>
<td>City of London, CA</td>
<td>Coordinate education initiatives and community involvement programs</td>
<td>City of London</td>
<td>City of London, CA</td>
<td>See Section 8.0</td>
</tr>
</tbody>
</table>
| Municipal Agricultural Policies        | Develop a range of policies, bylaws, guidelines, site plan controls to encourage environmentally sustainable agricultural practices and protect agricultural lands | City, Municipality (CA, OMAFRA) | Implement changes in new OP policies and land use schedules
Implement when OP revision required   | January 1, 1996 (City)                                               | Ongoing                      |                                                      |
| Coordinated Provincial Policy for Environmentally Sustainable Agriculture | Review existing provincial policies, guidelines, standards and incentives to eliminate contradictions and provide clear direction to farmers | OMAFRA, MNR, MOEE, MMA, CA | Prepare a discussion paper on policy reform by March 1996
Target initiative to revise policy in 1996 Throne Speech | March, 1996           | Ongoing                     |                                                      |
<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
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<th>Time frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal Drain Modification Pilot Study</td>
<td>Undertake a demonstration project to evaluate feasibility of providing habitat rehabilitation while maintaining farm productivity</td>
<td>CA, City, Municipality, (MNR, OMAFRA)</td>
<td>Demonstration project</td>
<td>5-Year Pilot Study</td>
<td>Ag Can, MNR, OMAFRA, City</td>
<td></td>
</tr>
</tbody>
</table>

Note 2: A number of alternative ownership and management arrangements could be explored for natural areas designated as open space. Refer to Section 6.
Group 4 Subwatersheds
Potterburg, Crumlin
<table>
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<tr>
<th>Plan Component</th>
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<th>Other Comments</th>
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<tr>
<td><strong>Constraint Areas - Category 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Provincially Significant Areas (wetlands, ANSLs, rare species habitat)</td>
<td>• N/A</td>
<td>• N/A</td>
<td>• N/A</td>
<td>• N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Environmentally Significant Areas</td>
<td>• No candidate ESAs are proposed</td>
<td>• N/A</td>
<td>• N/A</td>
<td>• N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Areas within flood or fill lines</td>
<td>• Protect lands within flood and fill lines as Category 1 (no development) type lands</td>
<td>• City of London, West Nissouri Township, (UTRCA)</td>
<td>• Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules</td>
<td>• Complete by January 1, 1996 (City)</td>
<td>• None</td>
<td></td>
</tr>
<tr>
<td>• Areas within a setback from designated streams (1)</td>
<td>• Protect water courses as indicated in the subwatershed plans as Category 1 constraint lands</td>
<td>• City of London, West Nissouri Township</td>
<td>• Designate water courses to be protected as Category 1 Land in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level</td>
<td>• Complete by January 1, 1996 (City)</td>
<td>• City (where necessary)</td>
<td>• See Note 2</td>
</tr>
<tr>
<td>• Vegetative patches contiguous to designated streams</td>
<td>• Protect designated riparian patches as Category 1 constraint lands</td>
<td>• City of London, West Nissouri Township</td>
<td>• Designate riparian patches to be protected as Category 1 land in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level</td>
<td>• Complete by January 1, 1996 (City)</td>
<td>• City (where necessary)</td>
<td>• See Note 2</td>
</tr>
</tbody>
</table>

NOTES:

1) All lands within West Nissouri Township are considered Constraint Area - Category 2, with the exception of floodplain.
2) A number of alternative ownership and management arrangements could be explored for natural areas designated as Open Space. Refer to Section 6.0.
## Implementation Requirements and Responsibilities

**Group 4 Subwatershed - Pottersburg Creek and Crumlin Drain**

<table>
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<tr>
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<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constraint Areas - Category 2</strong></td>
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<td></td>
</tr>
<tr>
<td>- All remaining vegetative patches greater than 4 hectares</td>
<td>- Protect as Category 2 lands subject to more detailed studies</td>
<td>- City of London</td>
<td>- Designate lands in OP as requiring detailed studies (e.g. Area Plans, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>- Complete by January 1, 1996 (City)</td>
<td>- None</td>
<td>- See Note 2)</td>
</tr>
<tr>
<td>- Anti-fragmentation Areas</td>
<td>- Protect as Category 2 lands subject to more detailed studies</td>
<td>- City of London</td>
<td>- Designate lands in OP as requiring detailed studies (e.g. Area Plans, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>- Complete by January 1, 1996 (City)</td>
<td>- None</td>
<td>- See Note 2)</td>
</tr>
<tr>
<td>- Terrestrial Corridors</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- N/A</td>
</tr>
<tr>
<td>- All significant recharge/discharge areas</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- N/A</td>
<td>- None</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**

2) A number of alternative ownership and management arrangements could be explored for natural areas designated as Open Space. Refer to Section 6.0.
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<td>• Water Quality</td>
<td>• Provide quality storage as specified in the subwatershed plans</td>
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<td>• Two Zone Flood Policy</td>
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<td>None</td>
<td>• Subject to further study - See projects and programs.</td>
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<td>• Require preparation of flood/fill line mapping by proponent as condition of draft plan approval.</td>
<td>• Immediate and ongoing</td>
<td>• Proponent</td>
<td>• See Note 2)</td>
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<td>• Extend flood and fill lines</td>
<td>• Prepare flood/fill line maps for all watercourses designated on OP land use schedules</td>
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<td>• Immediate and ongoing</td>
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NOTE:

2) A number of alternative ownership and management arrangements could be explored for natural areas designated as Open Space. Refer to Section 6.0.
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<tr>
<td>Conservation Tillage</td>
<td>Encourage conservation tillage in very high to medium erosion potential areas as delineated in the subwatershed plans</td>
<td>UTRCA (OMAFRA)</td>
<td>Staff to work with farmers to indicate target areas and encourage use of conservation tillage</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Septic System Effluent</td>
<td>Trace and remediate faulty septic systems</td>
<td>UTRCA (MOEE)</td>
<td>Institute a tracing program to identify priority areas for septic system inspections and remediation. Require inspection and remediation as required</td>
<td>Identification of problem systems in Pottersburg Creek and Crumlin Drain within three years. Remediation within two years of identification Ongoing (long term)</td>
<td>UTRCA (tracing &amp; inspection) Landowner (remediation)</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Vegetated Buffer Strips</td>
<td>Encourage the adoption of buffer strips along designated watercourses to minimize the conveyance of eroded soils and nutrients to the watercourse. Where feasible encourage riparian planting within the buffer strip</td>
<td>UTRCA (OMAFRA, MNR, City)</td>
<td>Staff to work with farmers to encourage adoption of buffers Buffer dimension to be specified in Area Plan or Draft Plan of Subdivision</td>
<td>Ongoing (long term)</td>
<td>Landowner Proponent</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Grasped Waterways</td>
<td>Encourage establishment of grassed waterways where swales cross cultivated land</td>
<td>UTRCA OMAFRA</td>
<td>Staff to work with farmers to identify suitable swales.</td>
<td>Ongoing (long term)</td>
<td>Landowner Proponent</td>
<td>See Section 7.0</td>
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<tr>
<td>Control livestock access</td>
<td>Continue existing programs to minimize the impacts of livestock access to watercourses</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Staff to work with farmers to encourage fencing of water courses</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Milkhouse Waste Control</td>
<td>Continue existing programs to minimize the impacts of milk house operations</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Staff to work with farmers to encourage construction of milkhouse waste handling systems</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>See Section 7.0</td>
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### Implementation Requirements and Responsibilities

**Group 4 Subwatershed - Pottersburg Creek and Crumlin Drain**

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<tr>
<td><strong>Conservation and Management Practices - Continued</strong></td>
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</tr>
<tr>
<td>Manure management</td>
<td>Continue existing programs</td>
<td>UTRCA, OMAFRA, MNR, MOEE</td>
<td>Staff to work with farmers to encourage good handling practices.</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority, See Section 7.0</td>
</tr>
<tr>
<td>Feedlot runoff control</td>
<td>Continue existing programs</td>
<td>UTRCA, OMAFRA, MNR, MOEE</td>
<td>Staff to work with farmers to encourage runoff capture and treatment</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority, See Section 7.0</td>
</tr>
<tr>
<td>Natural Channel Succession</td>
<td>Allow natural succession to occur in all Category 1 lands and Category 2 lands which are not in active agricultural use</td>
<td>City of London, West Nissouri Township, UTRCA</td>
<td>No direct action required. Preference is to allow natural regeneration, unless specific need for rapid growth of woody vegetation is specified (e.g. in Area Plan; riparian zones)</td>
<td>Ongoing (long term)</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Top Soil Preservation</td>
<td>Investigate implementation of a top-soil by-law and fee structure which would fund a municipal inspection program to ensure implementation and regular inspection of construction controls</td>
<td>City of London</td>
<td>City to investigate the use and success in other municipalities and to prepare a draft by-law for discussion and future implementation.</td>
<td>Discussion Paper/Draft By-Law within two years</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Municipal De-icing Programs</td>
<td>Continue programs to minimize the use of de-icing chemicals</td>
<td>City of London</td>
<td>Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Plan Component</td>
<td>Projects and Programs</td>
<td>Funding Responsibility</td>
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<tr>
<td>Plant native species in un-vegetated riparian zones</td>
<td>Plant Riparian Vegetation</td>
<td>- Encourage stream channelization and habitat restoration of riparian areas including recreation of ponds and riffles</td>
<td>UTRCA, City of London, landowners</td>
<td>Ongoing (long term)</td>
<td>City of London</td>
<td>Erosion of banks could lead to failure of culvert/road</td>
</tr>
<tr>
<td>Focus on first and second order tributaries in City as development progresses</td>
<td>- Provide riparian education to community</td>
<td>- City of London</td>
<td>Next 5 years</td>
<td>City of London</td>
<td>UTRCA</td>
<td></td>
</tr>
<tr>
<td>Encourage real-time drainage projects and/or roof leaders</td>
<td>- Initiate program to connect roof leaders from storm sewers</td>
<td>- City of London</td>
<td>UTRCA</td>
<td>Next 5 years</td>
<td>UTRCA</td>
<td></td>
</tr>
<tr>
<td>Encourage real-time drainage projects and/or roof leaders</td>
<td>- Encourage residents to introduce controls through education</td>
<td>- City of London</td>
<td>UTRCA</td>
<td>Next 5 years</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Regrade and protect banks along Petersburg Creek</td>
<td>RemEDIATE Significant Erosion Areas</td>
<td>- Regrade and protect banks along Petersburg Creek</td>
<td>UTRCA</td>
<td>Next 5 years</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Remove mid-channel bar along Petersburg Creek</td>
<td>- Regrade and protect banks along Cumulin Drain north of Gore Road</td>
<td>UTRCA</td>
<td>City of London</td>
<td>Next 5 years</td>
<td>UTRCA</td>
<td></td>
</tr>
<tr>
<td>Disregard and protect banks along Cumulin Drain south of Gore Road</td>
<td>- Stabilization of banks for downstream of Gore Road</td>
<td>UTRCA</td>
<td>City of London</td>
<td>Next 5 years</td>
<td>UTRCA</td>
<td></td>
</tr>
<tr>
<td>Erosion of banks</td>
<td>RemEDIATE Minor Erosion Area</td>
<td>- Erosion of banks</td>
<td>UTRCA</td>
<td>Next 5 years</td>
<td>City of London</td>
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<tr>
<td>Projects and Programs, continued</td>
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<tr>
<td>* Floodplain Management/Stream Corridor Rehabilitation</td>
<td>* Further study of proposed use of floodplain lands along Pottersburg Creek at Oxford Street and Highway 100</td>
<td>* UTRCA</td>
<td>* Require assessment of impacts of lost floodplain storage and potential for stream corridor rehabilitation</td>
<td>* Tie to development approvals</td>
<td>* Proponent</td>
<td>* Would lead to definition of hydraulic floodway</td>
</tr>
<tr>
<td>* Public Awareness Program</td>
<td>* Implement public awareness and community involvement programs</td>
<td>* City of London, UTRCA</td>
<td>* Coordinate education initiatives and community involvement programs</td>
<td>* City of London</td>
<td>* City of London, UTRCA</td>
<td>* See Section 8.0</td>
</tr>
</tbody>
</table>
Group 5 Subwatershed
Stoney
## Implementation Requirements and Responsibilities

### Group 5 Subwatershed - Stoney Creek

<table>
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<tr>
<th>Constraint Areas - Category 1</th>
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<tr>
<td><strong>Provincially Significant Areas</strong> (wetlands, ANSIs, rare species habitat)</td>
<td>• Protect lands that include the Fanshawe wetlands complex (no development) • Require EIS for development adjacent to wetland complex</td>
<td>• City of London • (MNR)</td>
<td>• Delineate Fanshawe wetland complex within OP land use schedules</td>
<td>• Complete by January 1, 1996</td>
<td>• None</td>
<td></td>
</tr>
<tr>
<td><strong>Environmentally Significant Areas</strong></td>
<td>• Protect candidate ESA as Category 1 (no development) type lands</td>
<td>• City of London</td>
<td>• Have candidate ESA recommended by EEPAC and adopted by Council. Delineate approved ESA within OP land use schedules</td>
<td>• Complete by January 1, 1996</td>
<td>• City (where necessary)</td>
<td>• See Note 1)</td>
</tr>
<tr>
<td><strong>Areas within flood or fill lines</strong></td>
<td>• Protect lands within flood and fill lines as Category 1 constraint (no development) type lands</td>
<td>• (UTRCA) • City of London • London Township</td>
<td>• Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules</td>
<td>• Complete by January 1, 1996 (City) • Complete when OP is revised (Township)</td>
<td>• None</td>
<td>• See Note 1)</td>
</tr>
<tr>
<td><strong>Areas within a setback from designated streams</strong></td>
<td>• Protect water courses as indicated in the subwatershed plans as Category 1 constraint lands</td>
<td>• City of London • London Township</td>
<td>• Designate water courses to be protected as Category 1 Land in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level</td>
<td>• Complete by January 1, 1996 (City) • Complete when OP is revised (Township)</td>
<td>• City (where necessary)</td>
<td>• See Note 1)</td>
</tr>
<tr>
<td><strong>Vegetative patches contiguous to designated streams, flood and fill lines</strong></td>
<td>• Protect designated riparian patches as Category 1 Lands.</td>
<td>• City of London • London Township</td>
<td>• Designate riparian patches to be protected as Category 1 Land in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level</td>
<td>• Complete by January 1, 1996 (City) • Complete when OP is revised (Township)</td>
<td>• City (where necessary)</td>
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### NOTES:

1) A number of alternative ownership and management arrangements could be explored for natural areas designated as Open Space. Refer to Section 6.0.
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<td><strong>Constraint Areas - Category 2</strong></td>
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<tr>
<td>- All remaining vegetative patches greater than 4 hectares</td>
<td>• Protect as Category 2 lands subject to more detailed studies</td>
<td>• City of London • London Township</td>
<td>• Designate lands in OP as requiring detailed studies (e.g. Area Plans, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>• Complete by January 1, 1996 (City) • Complete when OP is revised (Township)</td>
<td>• None</td>
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<td>- Anti-fragmentation Areas</td>
<td>• Protect as Category 2 lands subject to more detailed studies</td>
<td>• City of London • London Township</td>
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<tr>
<td>- Terrestrial Corridors</td>
<td>• Protect as Category 2 lands subject to more detailed studies</td>
<td>• City of London • London Township</td>
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<td>- All significant recharge/discharge areas</td>
<td>• Protect as Category 2 lands subject to more detailed studies</td>
<td>• City of London • London Township</td>
<td>• Designate lands in OP as requiring detailed studies (e.g. hydrogeologic) prior to consideration of development applications</td>
<td>• Complete by January 1, 1996 (City) • Complete when OP is revised (Township)</td>
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</tbody>
</table>

**NOTE:**

1) A number of alternative ownership and management arrangements could be explored for natural areas designated as Open Space. Refer to Section 6.0.
## Implementation Requirements and Responsibilities

### Group 5 Subwatershed - Stoney Creek

<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
<th>Lead Agency (support agency)</th>
<th>Mechanism</th>
<th>Time Frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
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<tbody>
<tr>
<td>Conservation Tillage</td>
<td>Encourage conservation tillage in very high to medium erosion potential areas as delineated in the subwatershed plans</td>
<td>UTRCA</td>
<td>Staff to work with farmers to indicate target areas and encourage use of conservation tillage</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Septic System Effluent</td>
<td>Trace and remediate faulty septic systems</td>
<td>UTRCA</td>
<td>Institute a tracing program to identify priority areas for septic system inspections and remediation. Require inspection and remediation as required</td>
<td>Identification of problem systems within three years. Remediation within two years of identification Ongoing (long term)</td>
<td>UTRCA (tracing &amp; inspection) Landowner (remediation)</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Vegetated Buffer Strips</td>
<td>Encourage the adoption of buffer strips along designated watercourses to minimize the conveyance of eroded soils and nutrients to the watercourse. Where feasible encourage riparian planting within the buffer strip</td>
<td>UTRCA (OMAFRA, MNR), City</td>
<td>Staff to work with farmers to encourage adoption of buffers Buffer dimension to be specified in Area Plan or Draft Plan of Subdivision</td>
<td>Ongoing (long term)</td>
<td>Landowner Proponent</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Grassed Waterways</td>
<td>Encourage establishment of grassed waterways where swales cross cultivated land</td>
<td>UTRCA</td>
<td>Staff to work with farmers to identify suitable swales.</td>
<td>Ongoing (long term)</td>
<td>Landowner Proponent</td>
<td></td>
</tr>
<tr>
<td>Control livestock access</td>
<td>Continue existing programs to minimize the impacts of livestock access to watercourses</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Staff to work with farmers to encourage fencing of water courses</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>See Section 7.0</td>
</tr>
<tr>
<td>Milkhouse Waste Control</td>
<td>Continue existing programs to minimize the impacts of milk house operations</td>
<td>UTRCA (OMAFRA, MNR)</td>
<td>Staff to work with farmers to encourage construction of milkhouse waste handling systems</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>See Section 7.0</td>
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<td>Plan Component</td>
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<tr>
<td>Conservation and Management Practices - Continued</td>
<td>· Manure management · Continue existing programs</td>
<td>· UTRCA (OMAFRA, MNR, MOEE)</td>
<td>· Staff to work with farmers to encourage good handling practices.</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority · See Section 7.0</td>
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<td></td>
<td>· Feedlot runoff control · Continue existing programs</td>
<td>· UTRCA (OMAFRA, MNR, MOEE)</td>
<td>· Staff to work with farmers to encourage runoff capture and treatment</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
<td>Lower priority · See Section 7.0</td>
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<td>· Natural Channel Succession · Allow natural succession to occur in all Category 1 lands and Category 2 lands which are not in active agricultural use</td>
<td>· City of London · London Township · UTRCA</td>
<td>· No direct action required. Preference is to allow natural regeneration, unless specific need for rapid growth of woody vegetation is specified (e.g. in Area Plan; riparian zones)</td>
<td>Ongoing (long term)</td>
<td>None</td>
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<td>· Top Soil Preservation · Investigate implementation of a top-soil by-law and fee structure which would fund a municipal inspection program to ensure implementation and regular inspection of construction controls</td>
<td>· City of London</td>
<td>· City to investigate the use and success in other municipalities and to prepare a draft by-law for discussion and future implementation.</td>
<td>Discussion Paper/Draft By-Law within two years</td>
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<td>· Municipal De-icing Programs · Continue programs to minimize the use of de-icing chemicals</td>
<td>· City of London</td>
<td>· Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
<td></td>
</tr>
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<tr>
<td>Projects and Programs</td>
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<tr>
<td>• Plant Riparian Vegetation</td>
<td>• Plant native species in un-vegetated riparian zones</td>
<td>• UTRCA</td>
<td>• Planting Plan to be prepared for un-vegetated riparian areas</td>
<td>Ongoing (long term)</td>
<td>• UTRCA, City, MNR (supply)</td>
<td>• See Section 8.0</td>
</tr>
<tr>
<td>• Aquatic/Stream Restoration (General)</td>
<td>• Encourage stream restoration and habitat improvement of watercourses (including creation of ponds and riffles)</td>
<td>• City of London</td>
<td>• Focus on first and second order tributaries in City as development proceeds</td>
<td>Ongoing (long term)</td>
<td>• Proponent, landowner, community group</td>
<td></td>
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<tr>
<td>• Control/Reduce Runoff in Existing Urban Areas</td>
<td>• Initiate program to disconnect roof leaders from storm sewers; Encourage rear-loot drainage and/or roof leaders discharge to pervious areas</td>
<td>• City of London</td>
<td>• Disconnect roof leaders during reconstruction projects; Encourage residents to introduce controls, through education</td>
<td>Ongoing (long-term)</td>
<td>• City of London; Landowner</td>
<td></td>
</tr>
<tr>
<td>• RemEDIATE Significant Erosion Areas</td>
<td>• Widen watercourse and regard and protect banks along Stoney Creek, west of Highbury Avenue, north of Fanshawe Park Road</td>
<td>• City of London (UTRCA)</td>
<td>• Place on priority list and monitor erosion condition</td>
<td>Next 5 years</td>
<td>• City of London; UTRCA</td>
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<td></td>
<td>• Channel rehabilitation along to areas of Stoney Creek near Windermere Road</td>
<td>• City of London (UTRCA)</td>
<td>• Place on priority list and monitor erosion condition</td>
<td>Next 5 years</td>
<td>• City of London; UTRCA</td>
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<tr>
<td>• RemEDIATE Minor Erosion Area</td>
<td>• Improve erosion protection at drop structures along channelized reach north of Fanshawe Park Road, east of Adelaide</td>
<td>• City of London (UTRCA)</td>
<td>• Place on priority list and monitor erosion condition</td>
<td>Next 5 years</td>
<td>• City of London; UTRCA</td>
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<tr>
<td>• Public Awareness Program</td>
<td>• Implement public awareness and community involvement programs</td>
<td>• City of London (UTRCA)</td>
<td>• Coordinate education initiatives and community involvement programs</td>
<td>City of London</td>
<td>• City of London; UTRCA</td>
<td>• See Section 8.0</td>
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</table>
Dingman Creek
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<tr>
<td>Constraint Areas - Category 1</td>
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<tr>
<td>Provincially Significant Areas (wetlands, ANSIs, rare species habitat)</td>
<td>Protect PSAs as category 1 Natural Heritage Lands (no development)</td>
<td>MNR (CA, City, Municipality)</td>
<td>PSAs are protected by provincial statues and within OP land use schedules</td>
<td>Complete by January 1, 1996</td>
<td>MNR (CA) (where necessary)</td>
<td>MNR to confirm, some newly designated PSAs (wetlands). See Note 2</td>
</tr>
<tr>
<td>Environmentally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 Natural Heritage Lands (no development)</td>
<td>City of London (CA)</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules. CA endorsement of ESAs.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>Seek support for ESA designation in other municipalities. See Note 2</td>
</tr>
<tr>
<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as category 1 Natural Heritage Lands (no development)</td>
<td>CA (City, Municipality)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>CA (where necessary)</td>
<td>CA to pursue strengthening of fill regulations to provide for protection of vegetation. See Note 2</td>
</tr>
<tr>
<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwatershed plans as Category 1 Natural Heritage Lands</td>
<td>City of London (Municipality (CA, MNR)</td>
<td>Designate water courses to be protected as Category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Municipality)</td>
<td>City (where necessary)</td>
<td>CA and MNR to develop criteria to guide determination of setback width. See Note 2</td>
</tr>
<tr>
<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Natural Heritage Lands</td>
<td>City of London, Municipality (CA)</td>
<td>Designate riparian patches to be protected as category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>City (where necessary)</td>
<td>See Note 2</td>
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<tr>
<td>All remaining vegetative patches greater than 4 hectares</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>Designate lands in OP as requiring detailed studies (e.g., Area Plan, ES, Farm Management Plan) prior to consideration of development applications</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
<td>Complete by January 1, 1996 (City)</td>
<td>Complete when OP is revised (Township)</td>
<td></td>
</tr>
<tr>
<td>Anti Fragmentation Areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>Designate lands in OP as requiring detailed studies (e.g., Area Plan, ES, Farm Management Plan) prior to consideration of development applications</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
<td>Complete by January 1, 1996 (City)</td>
<td>Complete when OP is revised (Township)</td>
<td></td>
</tr>
<tr>
<td>Terrestrial Corridors</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>Designate lands in OP as requiring detailed studies (e.g., Area Plan, ES, Farm Management Plan) prior to consideration of development applications</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
<td>Complete by January 1, 1996 (City)</td>
<td>Complete when OP is revised (Township)</td>
<td></td>
</tr>
<tr>
<td>All significant recharge/discharge areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>Designate lands in OP as requiring detailed studies (e.g., hydrogeologic) prior to consideration of development applications</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
<td>Complete by January 1, 1996 (City)</td>
<td>Complete when OP is revised (Township)</td>
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</tbody>
</table>
### Implementation Requirements and Responsibilities - Dingman Creek

<p>| Plan Component                  | Action                                                                 | Lead Agency (support agency) | Mechanism                                                                 | Time frame       | Funding Responsibility | Other Comments                                      |
|--------------------------------|                                                                       |                              |                                                                          |                  |                        |                                                      |
| <strong>Development Criteria</strong>       |                                                                       |                                |                                                                          |                  |                        |                                                      |
| Peak Flow Attenuation          | Provide quantity control storage to prevent increased flood damage as specified in the subwatershed plans | City of London, Municipality  | Submission of Stage I stormwater management report to include pre-design of facility in conformance with Plan. Final design submission in parallel with submissions for subdivision approvals. | Immediate and ongoing | Proponent               |                                                      |
| Water Quality                  | Provide quality storage as specified in the subwatershed plans        | City of London, Municipality  | As above                                                                 | Immediate and ongoing | Proponent               | Design based on SWMP Manual and City standards    |
| Erosion/Stream Morphology      | Provide quantity storage to prevent increased erosion potential or construct/restore dynamically stable water course. | City of London, Municipality  | As above                                                                 | Immediate and ongoing | Proponent               | Combined Facilities permitted where practical     |
| Baseflow Augmentation          | Provide baseflow from the recommended stormwater management facility to help support aquatic life. | City of London, Municipality  | As above                                                                 | Immediate and ongoing | Proponent               | Target of 10 l/s/facility Minimum drainage area to pond of approximately 100 ha required before feasible |
| Infiltration                   | Provide lot level infiltration (20 mm of roof runoff) on suitable soils (high recharge/discharge areas) if development is approved | City of London, Municipality  | Require detailed hydrogeologic studies of high recharge/discharge areas in Area Plans. Storm water management report to include infiltration techniques to be employed. | Immediate and ongoing | Proponent               | Design based on SWMP Manual and City standards    |
| Erosion control during construction | Require preparation of Sediment and Erosion Control Plans for all new developments | City of London, Municipality  | Preparation of the Erosion and Sediment Control Plan to be included in the conditions of draft plan approval. | Immediate and ongoing | Proponent               |                                                      |
| Two Zone Flood Policy          | Evaluate use of Two Zone Flood Policy on identified areas             | CA (City, Municipality)       | Consider application of policy as part of Area Plans.                    | When Area Plans are initiated. | City, Municipality (where necessary) | Cost sharing by proponents may be considered.     |</p>
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<td>Development Criteria - Continued</td>
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<tr>
<td>Extend flood and fill lines</td>
<td>Prepare flood/fill line maps for all watercourses designated on OP land use schedules</td>
<td>CA (City of London, Municipality)</td>
<td>Require preparation of flood/fill line mapping by proponent as condition of draft plan approval. UTRCA to register fill lines. City to amend OP schedules</td>
<td>Immediate and ongoing</td>
<td>Proponent (City, Municipality, CA)</td>
<td></td>
</tr>
<tr>
<td>Construction Inspection</td>
<td>Require regular inspection by a qualified environmental inspector during construction</td>
<td>City of London, Municipality</td>
<td>Agreement to provide an environmental inspector to be included in the conditions of draft plan approval.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Erosion Monitoring</td>
<td>Require regular inspection of receiving watercourse by a qualified environmental inspector during construction and for a period of two years after completion of construction</td>
<td>City of London, Municipality</td>
<td>As above</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Encourage environmentally sensitive site planning techniques</td>
<td>Promote the use of good site planning which seeks to limit grading and retain smaller natural areas and watercourses</td>
<td>City of London, Municipality</td>
<td>City to develop guidelines and encourage their use in subdivision design.</td>
<td>Immediate and ongoing</td>
<td>City/Proponent</td>
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<td>Conservation and Management Practices</td>
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<tr>
<td>Conservation Tillage</td>
<td>Encourage conservation tillage in very high to medium erosion potential areas as delineated in the subwatershed plans</td>
<td>CA (OMAFRA)</td>
<td>• education/awareness program</td>
<td>Ongoing (long term)</td>
<td>Landowner (CA, OMAFRA, Ag Can).</td>
<td>High Priority in Identified High Loading Areas</td>
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<tr>
<td></td>
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<td>• technical assistance</td>
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<td>See Section 7.0</td>
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<td>• priority driven</td>
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<td>• incentives</td>
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<td>Septic System Effluent</td>
<td>Trace and remediate faulty septic systems.</td>
<td>CA (MOEE, OMAFRA)</td>
<td>• Tracing and inspection</td>
<td>Identification of problem systems within three years.</td>
<td>CA (MOEE) (tracing &amp; inspection)</td>
<td>See Section 7.0</td>
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<td></td>
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<td>Vegetated Buffer Strips</td>
<td>Encourage the adoption of buffer strips along designated watercourses to minimize the conveyance of eroded soils and nutrients to the watercourse. Where feasible encourage riparian planting within the buffer strip.</td>
<td>CA, City, Municipality (OMAFRA, MNR) City</td>
<td>Staff to work with farmers to encourage adoption of buffers Buffer dimension to be specified in Area Plan or Draft Plan of Subdivision • education/awareness • technical assistance • priority driven • incentives</td>
<td>Ongoing (long term)</td>
<td>Landowner Proponent (City, CA, Municipality)</td>
<td>See Section 7.0 Agencies to pursue partnerships with volunteers to provide labour</td>
</tr>
<tr>
<td>Control livestock access</td>
<td>Continue/refocus existing programs to minimize the impacts of livestock access to watercourses.</td>
<td>CA (OMAFRA, MOEE)</td>
<td>Staff to work with farmers to encourage fencing of water courses • education/awareness • technical assistance • priority driven • incentives</td>
<td>Ongoing (long term)</td>
<td>Landowner, CA, MOEE</td>
<td>Requires expansion of CURB program See Section 7.0</td>
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<td>Plan Component</td>
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</table>
| Conservation and Management Practices - Continued | Milkhouse Waste Control Continue/refocus existing programs to minimize the impacts of milk house operations | CA (OMAFRA, MNR)                                                                              | Staff to work with farmers to encourage construction of milkhouse waste handling systems:  
  - education/awareness  
  - technical assistance  
  - priority driven  
  - incentives                                                                                      | Ongoing (long term) | Landowner, CA, MOEE | Requires expansion of CURB program  
  See Section 7.0 |
| Manure management              | Continue/refocus existing programs                                      | CA (OMAFRA, MNR, MOEE)                                                                          | Staff to work with farmers to encourage good handling practices:  
  - education/awareness  
  - technical assistance  
  - priority driven                                                                                     | Ongoing (long term) | Landowner | Lower priority requires expansion of CURB program  
  See Section 7.0 | |
| Feedlot runoff control         | Continue/refocus existing programs                                       | CA (OMAFRA, MNR, MOEE)                                                                          | Staff to work with farmers to encourage runoff capture and treatment:  
  - education/awareness  
  - technical assistance  
  - priority driven                                                                                     | Ongoing (long term) | Landowner, MOEE | |
| Natural Channel Succession     | Allow natural succession to occur in all Category 1 lands and Category 2 lands which are not in active agricultural use | City of London, CA, Municipality                                                                   | No direct action required. Preference is to allow natural regeneration, unless specific need for rapid growth of woody vegetation is specified (eg. in Area Plan; riparian zones) | Ongoing (long term) | None | Not recommended |
| Top Soil Preservation          | Investigate implementation of a top-soil by-law and fee structure which would fund a municipal inspection program to ensure implementation and regular inspection of construction controls | City of London, Municipality                                                                    | City to investigate the use and success in other municipalities and to prepare a draft by-law for discussion and future implementation. | Discussion Paper/Draft By-Law within two years | City of London, Municipality | |


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<td>Conservation and Management Practices - Continued</td>
<td></td>
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</tr>
<tr>
<td>Municipal De-icing Programs</td>
<td>Continue programs to minimize the use of de-icing chemicals</td>
<td>City of London</td>
<td>Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Projects and Programs</td>
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</tr>
<tr>
<td>Plant Riparian Vegetation</td>
<td>Plant native species in unvegetated riparian zones</td>
<td>CA, City</td>
<td>Planting Plan to be prepared for unvegetated riparian areas Community involvement to be encouraged. • public education/ awareness • technical assistance • priority driven • incentives</td>
<td>Ongoing (long term)</td>
<td>CA, City, MNR (supply) landowner</td>
<td>See Section 8.0 Plant materials in accordance withEEPAC native species lists</td>
</tr>
<tr>
<td>Aquatic/Stream Restoration (General)</td>
<td>Encourage stream restoration and habitat improvement of watercourses</td>
<td>City of London CA Municipality</td>
<td>Encourage projects sponsored by public interest groups • public education/ awareness • technical assistance • priority driven • incentives</td>
<td>Ongoing (long term)</td>
<td>Proponent, landowner, community group, City, CA</td>
<td>Funding through CA, City Capital works programs, in part</td>
</tr>
<tr>
<td>Eliminate Barriers to Fish Passage</td>
<td>Encourage removal of barriers</td>
<td>City of London</td>
<td>Evaluate feasibility as part of infrastructure renewal</td>
<td>Ongoing (long term)</td>
<td>City of London, CA</td>
<td></td>
</tr>
<tr>
<td>Floodproofing/Local Flood Protection</td>
<td></td>
<td>City of London</td>
<td>Evaluate feasibility as part of infrastructure renewal</td>
<td>Ongoing (long term)</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td>Public Awareness Program</td>
<td>Implement public awareness and community involvement programs</td>
<td>City of London, CA</td>
<td>Coordinate education initiatives and community involvement programs</td>
<td>City of London</td>
<td>City of London, CA</td>
<td>See Section 8.0</td>
</tr>
<tr>
<td>Reduce Sewage Overflows at Dingman Creek Pumping Station</td>
<td>Re-route Flows to Proposed Dingman Interceptor/ Southside PCP</td>
<td>City of London</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>Details provided in City of London Sanitary Sewerage Study</td>
</tr>
</tbody>
</table>
### Implementation Requirements and Responsibilities - Dingman Creek

<table>
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<tr>
<th>Plan Component</th>
<th>Action</th>
<th>Lead Agency (support agency)</th>
<th>Mechanism</th>
<th>Time frame</th>
<th>Funding Responsibility</th>
<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects and Programs - Continued</td>
<td>Reduce Total Phosphorus Discharges from Southland and Westminster PCP</td>
<td>Re-route sewage flows to proposed Dingman Interceptor Southside PCP</td>
<td>City of London</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Note 2:** A number of alternative ownership and management arrangements could be explored for natural areas designated as open space. Refer to Section 6.
Sharon Creek
## Implementation Requirements and Responsibilities - Sharon Creek

<table>
<thead>
<tr>
<th>Plan Component</th>
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<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constraint Areas - Category 1</strong></td>
<td></td>
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</tr>
<tr>
<td>Provincially Significant Areas (wetlands, ANSIs, rare species habitat)</td>
<td>Protect PSAs as category 1 Natural Heritage Lands (no development)</td>
<td>MNR (CA, City, Municipality)</td>
<td>PSAs are protected by provincial statutes and within OP land use schedules</td>
<td>Complete by January 1, 1996</td>
<td>MNR (CA) (where necessary)</td>
<td>MNR to confirm, some newly designated PSAs (wetlands). See Note 2</td>
</tr>
<tr>
<td>Environmetally Significant Areas</td>
<td>Protect candidate ESAs as Category 1 Natural Heritage Lands (no development)</td>
<td>City of London (CA)</td>
<td>Have candidate ESAs recommended by EEPAC and adopted by Council. Delineate approved ESAs within OP land use schedules. CA endorsement of ESAs.</td>
<td>Complete by January 1, 1996</td>
<td>City (where necessary)</td>
<td>Seek support for ESA designation in other municipalities. See Note 2</td>
</tr>
<tr>
<td>Areas within flood or fill lines</td>
<td>Protect lands within flood and fill lines as category 1 Natural Heritage Lands (no development)</td>
<td>CA (City, Municipality)</td>
<td>Update and register flood and fill lines within City. Delineate flood and fill lines within OP land use schedules.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>CA (where necessary)</td>
<td>CA to pursue strengthening of fill regulations to provide for protection of vegetation. See Note 2</td>
</tr>
<tr>
<td>Areas within a setback from designated streams*</td>
<td>Protect water courses as indicated in the subwatershed plans as Category 1 Natural Heritage Lands</td>
<td>City of London (Municipality (CA, MNR)</td>
<td>Designate water courses to be protected as Category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that a stream buffer dimension is to be demarcated at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Municipality)</td>
<td>City (where necessary)</td>
<td>CA and MNR to develop criteria to guide determination of setback width. See Note 2</td>
</tr>
<tr>
<td>Vegetative patches contiguous to designated streams, flood and fill lines*</td>
<td>Protect designated riparian patches as Category 1 Natural Heritage Lands</td>
<td>City of London, Municipality (CA)</td>
<td>Designate riparian patches to be protected as category 1 Natural Heritage Lands in OP land use schedules. Specify in policy that boundary of riparian patch is to be assessed in detail at Area Plan or Plan of Subdivision level.</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>City (where necessary)</td>
<td>See Note 2</td>
</tr>
</tbody>
</table>
### Implementation Requirements and Responsibilities - Sharon Creek

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<tr>
<th>Plan Component</th>
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<th>Lead Agency (support agency)</th>
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<th>Other Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constraint Areas - Category 2</strong></td>
<td></td>
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</tr>
<tr>
<td>All remaining vegetative patches greater than 4 hectares</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (e.g. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>Anti Fragmentation Areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (e.g. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>Terrestrial Corridors</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (e.g. Area Plan, EIS, Farm Management Plan) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>All significant recharge/discharge areas</td>
<td>Protect as Category 2 Natural Heritage Lands subject to more detailed studies</td>
<td>City of London, Municipality (CA)</td>
<td>Designate lands in OP as requiring detailed studies (e.g. hydrogeologic) prior to consideration of development applications</td>
<td>Complete by January 1, 1996 (City) Complete when OP is revised (Township)</td>
<td>None</td>
<td>City, municipalities, CA, to develop generic terms of reference for detailed studies See Note 2</td>
</tr>
<tr>
<td>Plan Component</td>
<td>Action</td>
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<td>Development Criteria</td>
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<tr>
<td>Peak Flow Attenuation</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Water Quality</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Erosion/Stream Morphology</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Baseflow Augmentation</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Infiltration</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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</tr>
<tr>
<td>Erosion control during construction</td>
<td>Require preparation of Sediment and Erosion Control Plans for all proposed construction</td>
<td>City of London</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
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<tr>
<td>Two Zone Flood Policy</td>
<td>NA</td>
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<tr>
<td>Extend flood and fill lines</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Construction Inspection</td>
<td>Require regular inspection by a qualified environmental inspector during construction</td>
<td>City of London</td>
<td>Agreement to provide an environmental inspector to be included in the conditions of draft plan approval.</td>
<td>Immediate and ongoing</td>
<td>Proponent</td>
<td></td>
</tr>
<tr>
<td>Erosion Monitoring</td>
<td>NA</td>
<td>NA</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Encourage environmentally sensitive site planning techniques</td>
<td>Promote the use of good site planning which seeks to limit grading and retain smaller natural areas and watercourses</td>
<td>City of London</td>
<td>City to develop guidelines and encourage their use in subdivision design.</td>
<td>Immediate and ongoing</td>
<td>City/Proponent</td>
<td></td>
</tr>
<tr>
<td>Plan Component</td>
<td>Action</td>
<td>Lead Agency (support agency)</td>
<td>Mechanism</td>
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<tr>
<td>Conservation and Management Practices</td>
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</tr>
</tbody>
</table>
| Conservation Tillage           | Encourage conservation tillage in very high to medium erosion potential areas as delineated in the subwatershed plans | CA (OMAFRA)                  | • education/awareness program  
• technical assistance  
• priority driven  
• incentives                      | Ongoing (long term)       | Landowner (CA, OMAFRA, Ag Can).                                            | High Priority in Identified High Loading Areas  
See Section 7.0                                                              |
| Septic System Effluent         | Trace and remediate faulty septic systems.                             | CA (MOEE, OMAFRA)            | • Tracing and inspection  
• education/awareness program  
• technical assistance  
• priority driven  
• incentives                      | Identification of problem systems within three years. | Landowner (tracing & inspection)  
Landowner (remediation)         | See Section 7.0                                                                 |
| Vegetated Buffer Strips        | Encourage the adoption of buffer strips along designated watercourses to minimize the conveyance of eroded soils and nutrients to the watercourse. Where feasible encourage riparian planting within the buffer strip. | CA, City, Municipality (OMAFRA, MNR)  
City                          | Staff to work with farmers to encourage adoption of buffers  
Buffer dimension to be specified in Area Plan or Draft Plan of Subdivision  
• education/awareness  
• technical assistance  
• priority driven  
• incentives                      | Ongoing (long term)       | Landowner  
Proponent (City, CA, Municipality)                                        | See Section 7.0  
Agencies to pursue partnerships with volunteers to provide labour               |
| Control livestock access       | Continue/refocus existing programs to minimize the impacts of livestock access to watercourses. | CA (OMAFRA, MOEE)            | Staff to work with farmers to encourage fencing of water courses  
• education/awareness  
• technical assistance  
• priority driven  
• incentives                      | Ongoing (long term)       | Landowner, CA, MOEE                                                      | Requires expansion of CURB program  
See Section 7.0                                                              |
<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Action</th>
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<th>Time frame</th>
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</tr>
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<tbody>
<tr>
<td>Conservation and Management Practices - Continued</td>
<td>Milkhouse Waste Control</td>
<td>Continue refocus existing programs to minimize the impacts of milkhouse operations</td>
<td>CA (OMAFRA, MNR)</td>
<td>Staff to work with farmers to encourage construction of milkhouse waste handling systems - education/awareness - technical assistance - priority driven</td>
<td>Ongoing (long term)</td>
<td>Landowner, CA, MOEE</td>
</tr>
<tr>
<td></td>
<td>Manure management</td>
<td>Continue refocus existing programs</td>
<td>CA (OMAFRA, MNR, MOEE)</td>
<td>Staff to work with farmers to encourage good handling practices. - education/awareness - technical assistance - priority driven</td>
<td>Ongoing (long term)</td>
<td>Landowner</td>
</tr>
<tr>
<td></td>
<td>Feedlot runoff control</td>
<td>Continue refocus existing programs</td>
<td>CA (OMAFRA, MNR, MOEE)</td>
<td>Staff to work with farmers to encourage runoff capture and treatment - education/awareness - technical assistance - priority driven</td>
<td>Ongoing (long term)</td>
<td>Landowner, MOEE</td>
</tr>
<tr>
<td></td>
<td>Natural Channel Succession</td>
<td>Allow natural succession to occur in all Category 1 lands and Category 2 lands which are not in active agricultural use</td>
<td>City of London, CA, Municipality</td>
<td>No direct action required. Preference is to allow natural regeneration, unless specific need for rapid growth of woody vegetation is specified (eg. in Area Plan; riparian zones)</td>
<td>Ongoing (long term)</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Top Soil Preservation</td>
<td>Investigate implementation of a top-soil by-law and fee structure which would fund a municipal inspection program to ensure implementation and regular inspection of construction controls</td>
<td>City of London, Municipality</td>
<td>City to investigate the use and success in other municipalities and to prepare a draft by-law for discussion and future implementation.</td>
<td>Discussion Paper/Draft By-Law within two years</td>
<td>City of London, Municipality</td>
</tr>
</tbody>
</table>
### Implementation Requirements and Responsibilities - Sharon Creek

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<tr>
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<td></td>
</tr>
<tr>
<td>Municipal De-icing Programs</td>
<td>Continue programs to minimize the use of de-icing chemicals</td>
<td>City of London</td>
<td>Review municipal practices regarding the use of de-icing compounds and seek to minimize the introduction of chlorides to watercourses.</td>
<td>Immediate, annual review ongoing</td>
<td>City of London</td>
<td></td>
</tr>
<tr>
<td><strong>Projects and Programs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Plant Riparian Vegetation         | Plant native species in unvegetated riparian zones                     | CA, City                     | Planting Plan to be prepared for unvegetated riparian areas Community involvement to be encouraged.  
• public education/awareness  
• technical assistance  
• priority driven  
• incentives | Ongoing (long term)                                                    | CA, City, MNR  
(supply) landowner | See Section 8.0  
Plant materials in accordance with EEPROM native species lists |
| Aquatic/Stream Restoration  
(General)                           | Encourage stream restoration and habitat improvement of watercourses   | City of London  
CA Municipality | Encourage projects sponsored by public interest groups  
• public education/awareness  
• technical assistance  
• priority driven  
• incentives | Ongoing (long term)                                                    | Proponent,  
landowner,  
community group,  
City, CA | Funding through CA, City Capital works programs, in part |
| Eliminate Barriers to Fish Passage | NA                                                                     | NA                           | NA                                                                        | NA                                | NA                               |                                                                                  |
| Floodproofing/Local Flood Protection | NA                                                                     | NA                           | NA                                                                        | NA                                | NA                               |                                                                                  |
| Public Awareness Program           | Implement public awareness and community involvement programs         | City of London, CA           | Coordinate education initiatives and community involvement programs       | City of London                     | City of London, CA                | See Section 8.0                                                                 |

**Note 2:** A number of alternative ownership and management arrangements could be explored for natural areas designated as open space. Refer to Section 6.
Appendix B

Optional Monitoring Techniques
APPENDIX B

Optional Monitoring Techniques

Section 10.1 describes components of the monitoring program which are recommended to be implemented in the short-term. This Appendix summarizes a number of alternative approaches for environmental monitoring that includes qualitative, conventional and advanced monitoring techniques which could be considered for long-term monitoring in the London subwatersheds. A summary of these techniques is provided in Table B.1.

B.1 Flow Regime and Water Balance

i) Climatology

Monitoring Program

The monitoring program will use and support the current climatologic monitoring programs provided by Environment Canada at its AES gauges at London Airport and St. Thomas. The monitoring program will utilize climatologic data collected by the Conservation Authorities and other agencies, and through the Implementation Committee, encourage local schools, organizations and citizens to participate in the collection of climatologic data.

Conventional Monitoring

Watershed-wide, less frequent (daily/event/monthly) precipitation, rainfall, snowfall, snowpack and temperature data (max/min).

Advanced Monitoring

Site specific, continuous precipitation, rainfall, snowfall, and temperature data.

ii) Hydrometric

The monitoring program will use hydrometric data available from the continuous streamflow gauges currently operated by the Water Survey of Canada, the UTRCA and the Kettle Creek Conservation Authority. Through the Implementation Committee, local schools, organizations and citizens will be encouraged to participate in the collection of hydrometric data.

Conventional

Watershed-wide spot observations of flow depths and/or maximum flow depths could be recorded using random tape-measurements, or installed water level gauges or crest gauges. Flow velocities could be recorded using current meters, or flotation devices and stop-watches. Flow rates could be measured in some cases using buckets and stop-watches.

Advanced

Site specific locations including continuing monitoring at sites established under the Subwatershed Planning Studies, the existing WSC and Conservation Authority continuous recording gauges identified in Map 10.1 should have continuous level recording devices installed and/or maintained and monitored.
<table>
<thead>
<tr>
<th>Monitoring Component</th>
<th>Objectives</th>
<th>Qualitative</th>
<th>Conventional</th>
<th>Advanced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Balance and Flow Regime</strong></td>
<td></td>
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</tr>
<tr>
<td>i) Climatology</td>
<td>• assemble information on climatologic extremes-flood and drought conditions, etc. • identify short-term and long-term trends.</td>
<td></td>
<td>• watershed-wide daily/event/monthly precipitation, snowfall, rainfall, snow pack and temperature data.</td>
<td>• continuous precipitation, rainfall, snowfall, temperature.</td>
<td>• conventional data collected by agencies, volunteers and schools. • advanced data collected at existing AES London and St. Thomas gauges.</td>
</tr>
<tr>
<td>ii) Hydrometric Data</td>
<td>• assemble information on streamflow characteristics including peak flows and low flows. • identify short-term and long-term trends.</td>
<td>• peak flow levels. • low flow levels. • frequency of bankfull flow conditions.</td>
<td>• watershed-wide spot measurements of peak flows and velocities.</td>
<td>• continuous monitoring of streamflow.</td>
<td>• qualitative data collected by agencies and volunteers. • conventional data collected by agencies and organizations or schools. • advanced data collected at WSC and UTRCA gauges, plus at sites established during the Subwatershed Planning Studies.</td>
</tr>
<tr>
<td>iii) Hydrogeology</td>
<td>• to determine if current subwatershed recharge and discharge features and functions are being sustained. • to determine if SWM recharge facilities are working as designed.</td>
<td>• note if erosion or sedimentation characteristics are changing in recharge areas. • note if changes in vegetation or the locations of seeps are changing in known discharge areas. • note if ponding is evident, or its duration or frequency is increasing at recharge facilities.</td>
<td>• monitoring water levels in recharge facilities during a 20 mm rainfall event or greater.</td>
<td></td>
<td>• monitoring of recharge facilities should be completed by qualified technologists or engineers. • monitoring of natural recharge or discharge locations could be completed by agencies, volunteers or schools.</td>
</tr>
<tr>
<td>Monitoring Component</td>
<td>Objectives</td>
<td>Qualitative</td>
<td>Conventional</td>
<td>Advanced</td>
<td>Comments</td>
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<tr>
<td>iv) Stream Morphology</td>
<td>• to monitor the stability of watercourses as land use changes in the subwatersheds.</td>
<td>• watershed-wide observations of erosion using landmarks as reference points; the presence, size and shape of mid-channel bars; the size and distribution of bed material.</td>
<td>• monitoring of 2 or 3 cross-sections in the lower, middle and upper areas of a watershed.</td>
<td>• permanent erosion monitoring stations involving the installation of bars into the banks and creek bed for subsequent surveying to be carried out seasonally.</td>
<td>• qualitative and conventional monitoring can be carried out by volunteers and schools. • advanced monitoring stations should be located near locations where hydrometric data is being collected, if possible.</td>
</tr>
<tr>
<td>v) Water Balance</td>
<td>• to note changes or trends in the infiltration, runoff, evapotranspiration and baseflow components of the water balance.</td>
<td></td>
<td></td>
<td>• synthesize results of the climatology, hydrometric, hydrogeology and SWM facility monitoring programs to note changes or trends in water balance components.</td>
<td>• monitoring of the water balance requires an understanding of the physical processes involved and should be completed by agency staff and/or by local schools.</td>
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**Natural Heritage System**

| i) Wetlands | • to maintain and enhance the level of inventory data on wetland features and functions, and to note changes as development in watershed occurs. | • monitor encroachment or areas of disturbance. • monitor the presence and/or distribution of invasive plant species. | • inspect and/or inventory flora and fauna. • particular attention should focus on wildlife presence including birds and amphibians. | • advanced monitoring involving detailed inventories should be completed as part of an EIS for adjacent development applications. | • local naturalists should be encouraged to continue and/or initiate qualitative and/or conventional monitoring. |

B.3
<table>
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<tr>
<th>Monitoring Component</th>
<th>Objectives</th>
<th>Qualitative</th>
<th>Conventional</th>
<th>Advanced</th>
<th>Comments</th>
</tr>
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</table>
| ii) Terrrestrial Features | • to maintain and enhance the level of inventory data on vegetation and wildlife communities. | • monitor encroachment or areas of disturbance.  
• note distribution of invasive plant species. | • inventory woodlots and patches for wildlife and vegetation species. | • detailed inventories of patches where there is no detailed terrestrial data.  
• priority areas should include: coniferous and mixed woodlots; woodlots that contain forest-interior habitat; and grasslands and old fields. | • local naturalists should be encouraged to continue and/or initiate qualitative and/or conventional monitoring.  
• advanced inventorying may be required to continue the City’s use of its ESA program. |
| iii) Trails and Corridors | • to determine the compatibility of integrating recreational activities within or adjacent to natural areas. | • check for areas where understory vegetation is destroyed.  
• check for encroachment in natural areas and for destruction of riparian vegetation, particularly adjacent to watercourses.  
• note locations of non-native/invasive plant species. | | | • local trail organizations and volunteers should be encouraged to participate in monitoring activities. |

**Water Quality and Benthic Invertebrates**

| i) Water Quality | • to use water quality data as a means of evaluating the performance of management measures with respect to environmental targets | • watershed-wide biophysical indicators-temperature, water clarity/turbidity, algae growth, aquatic macrophytes, aesthetics including oil films, debris etc.  
• observations could be collected after events or on a monthly/seasonal basis. | • watershed-wide monitoring using conventional equipment for temperature, dissolved oxygen, conductivity and pH measurements. | • one or two water quality stations to be sampled regularly (monthly/seasonally) for full array of MOEE nutrient, metal and organic parameters. | • qualitative monitoring could be completed by volunteers or schools. |
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<tr>
<th>Monitoring Component</th>
<th>Objectives</th>
<th>Qualitative</th>
<th>Conventional</th>
<th>Advanced</th>
<th>Comments</th>
</tr>
</thead>
</table>
| ii) Benthic and Fisheries | • to use the abundance of fish and benthic invertebrate as measures of watershed health and the effect of urban development on the food chain. | • macrobenthos analysis of substrate for the presence or absence of indicator groups of invertebrates.  
• inspect creeks for presence of fish species and spawning. | • scientific analysis of macrobenthos substrate using index method.  
• inventory fish species using dipnets or seines. | • detailed analysis of benthos at selected stations in the watershed. | • qualitative and conventional monitoring could be carried out by volunteers and schools.  
• the advanced monitoring stations should be located in areas where management initiatives are established, and in areas downstream of development. |

**Storm Water Management Facilities**

<table>
<thead>
<tr>
<th>i) Storm Water Management Facilities</th>
<th>Objectives</th>
<th>Qualitative</th>
<th>Conventional</th>
<th>Advanced</th>
<th>Comments</th>
</tr>
</thead>
</table>
|                                    | • to determine if SWM facilities are performing as designed, and that water quantity and quality targets can or are being met. | • inspection of embankments and inlets and outlets for erosion. | • quantity and quality analysis of rainfall/runoff events in receiving watercourse. |                                                                                              | • short-term (privately owned) monitoring program to be completed by developer.  
• long-term (publicly owned) qualitative monitoring to be completed by the City and/or volunteers. |

B.5
iii) Hydrometric

Monitoring Program

The monitoring program will use hydrometric data available from the continuous streamflow gauges currently operated by the Water Survey of Canada, the UTRCA and the Kettle Creek Conservation Authority. Through the Implementation Committee, local schools, organizations and citizens will be encouraged to participate in the collection of hydrometric data.

Conventional

Watershed-wide spot observations of flow depths and/or maximum flow depths could be recorded using random tape-measurements, or installed water level gauges or crest gauges. Flow velocities could be recorded using current meters, or flotation devices and stop-watches. Flow rates could be measured in some cases using buckets and stop-watches.

Advanced

Site specific locations including continuing monitoring at sites established under the Subwatershed Planning Studies and the existing WSC and Conservation Authority continuous recording gauges should have continuous level recording devices installed and/or maintained and monitored.

iii) Hydrogeology

Monitoring Program

The long-term hydrogeologic monitoring program has been designed using an affordable approach that involves checking for symptoms of recharge and discharge problems as opposed to regular diagnosis and testing of recharge and discharge characteristics.

Conventional

Prior to substantial completion of subdivisions, which include infiltration facilities, the performance of these facilities needs to be guaranteed. This will involve monitoring water levels in the infiltration facilities during a 20 mm or greater rainfall event.

iv) Stream Morphology

Monitoring Program

The monitoring of stream morphology can be carried out using a combination of qualitative, conventional and advanced techniques, preferably by personnel that have completed training in geomorphology and natural channel design.

Conventional

Repeated measurements could be performed along a cross-section at two or three locations within each subwatershed, representing lower, middle and upper areas. Parameters which should be measured include channel width, depth and substrate size. The timing or frequency should be in the spring (March to May) and fall (September to November) each year. Observations should be made at this time on bank conditions and discrepancies in pool-riffle patterns. This provides basic information on channel morphology, which can be linked with hydrometric data and will allow identification of channel changes or adjustments and evaluation of watershed goals or targets.
Advanced

Permanent erosion monitoring stations could be created. The stations would include the installation of bars into both banks and a pin into the bed, all of which would be tied into a benchmark on top of the bank. The erosion station will enable the evaluation and assessment of erosion control works and other related preventative measures. The monitoring frequency should be quarterly.

Permanent fluvial geomorphology stations could be created in conjunction with permanent stream gauges. The fluvial geomorphology station would represent at least 500 metres of a watercourse and assess the sediment characteristics, meander geometry and hydraulic geometry. Measurements would be repeated annually and could be incorporated into a provincial initiative on a fluvial geomorphology database.

v) Water Balance

Monitoring Program

The monitoring program of the water balance is an academic-type exercise which could be completed by the Conservation Authority (budget permitting), or it could be recommended to be completed by either the local high schools, colleges or university.

Advanced

The monitoring of the water balance requires an advanced understanding of the physical processes which are affecting its components. Long-term normals for the main water balance components can be derived from historical data from the Thornthwaite Water Balance available from the AES London Airport climatologic station; from historical hydrometric data collected by WSC; and from the streamflow, soils and hydrogeologic data and assessment in the subwatershed studies.

The annual monitoring data can be examined to: compare precipitation conditions against normals; determine surface runoff and baseflow components for the hydrometric data for comparison against normals; review anecdotal information on recharge and discharge conditions. Differences between water balance components and long-term normals could be explained by changes in climatic conditions, or possibly by changes in land use/land cover which may have occurred.

B.2 Water Quality, Benthic Invertebrates and Fisheries

i) Water Quality

Monitoring Program

The monitoring program is designed to provide general water quality profiles along the main tributaries and detailed water quality data on the main drainage system.

Conventional

Valuable water quality data can be collected by volunteers or school students provided they have access to conventional monitoring equipment. For example, measurements could be taken for temperature, dissolved oxygen, conductivity, and pH. The measurement of dissolved oxygen for example, will help indicate the presence and effectiveness of riffles within the creek. The riffles perform an oxygenation function, thus their presence (within a pool-riffle pattern) should result in high D.O. values. These measurements should be part of a regular water quality analysis, taken seasonally from lower, middle and upper sections of the watershed. Notes on biophysical conditions should be made, and observations should be identified as wet or dry events.
Advanced

As a minimum, one water quality station should be located near the mouth of each subwatershed and sampled regularly (monthly?) for the full array of MOEE nutrient, metal and organic parameters. Water quality stations should also be located on the main tributaries for analysis, but sampled and analyzed less frequently (seasonally or semi-annually).

ii) Benthic Invertebrates and Fisheries

Monitoring Program

The focus of monitoring will be on enhancing and/or updating information available on benthic and fisheries using qualitative and conventional techniques. The advanced benthic and fisheries monitoring carried out during the Subwatershed Planning Study should be continued in the future, but scaled back as necessary due to funding limitations. The Water Quality Index (WQI) will be one of the principal indicators used to assess ecosystem health over time.

Conventional

For macrobenthos, the Hilsenhoff Biotic Index (or some other index) could be applied at the family level. This requires greater identification skills, but not so great that it couldn’t be done by volunteers or agency personnel with no previous experience in this field. A substrate sample is collected from a riffle and the first 100 invertebrates are randomly selected and identified to the family level. Each family has been assigned a score based on its pollution tolerance and a weighted average use calculated to obtain an indication of water quality.

For fisheries, fish species present could be determined with dipnets or small seines. However, this level of activity will require a permit from MNR.

Advanced

BEAK recommended the location of stations where more benthos monitoring should be continued over the long-term. Ideally, all of BEAK’s fisheries stations would be sampled in the long-term, but this may not be practical over the entire City in the long-term. If sampling effort has to be decreased, it should focus on high-quality stations, those where management initiatives are expected to improve fisheries, and areas that may be affected by new development. Alternatively, the sampling frequency at each station could be decreased to once every two or three years.

B.3 Natural Heritage

i) Wetlands

Conventional

Conventional monitoring of wetlands would involve annual inspection and/or inventory of plant and wildlife communities, including amphibians and birds. These activities should be encouraged to be completed by local naturalists who have appropriate technical backgrounds and field experience. There are three volunteer monitoring programs coordinated by Environment Canada that are useful for detecting changes in wildlife populations in wetlands. These include the Amphibian Monitoring Program, the Forest Breeding Bird Program (suitable for swamps) and the Marsh Bird Monitoring Program. The amphibian monitoring is done three times annually (but only takes a few minutes). The bird monitoring program takes a little longer, but is only conducted twice a year. A backyard amphibian monitoring program is also in place where participants record calling frogs and toads evenings in April through to August. Volunteers living adjacent to wetlands could greatly improve knowledge of amphibian species distribution and abundance in the City.
Naturalists and interested individuals could also build on the inventory completed by Dr. Bowles. Further information would be of assistance if wetlands are re-evaluated.

Advanced

This would involve more detailed inventories, plus evaluation of any wetlands that have not been evaluated in the City. For wetlands adjacent to new developments or gravel extraction areas, hydrogeological investigations should be included in the monitoring program. These site-specific studies should be conducted as part of the requirements of an EIS.

ii) Terrestrial Features

Monitoring Programs

The monitoring of terrestrial features can be carried out using a combination of volunteers/citizens, naturalists and agency technologists. The program is directed towards the use of conventional and advanced techniques for establishing a database of terrestrial features, which would be maintained in the long-term using qualitative monitoring.

Conventional

Volunteers could use the Forest Bird Monitoring Program to document breeding bird populations over time. Naturalists could also build on the inventory completed by Dr. Bowles and provide information on patches that have not been studied in the field.

Advanced

This could involve more detailed inventories in patches that have already been field checked, but emphasis should be placed on patches for which there is no detailed terrestrial inventory. Priority sites should include coniferous and mixed woodlots, which are scarce in the City; woodlots that contain forest-interior habitat; and grasslands and old field, which were omitted during the original inventory.

If the City wishes to maintain its ESA program, it should identify which plant and animal species are rare within its boundary. Using the present criteria of significant species, the City can only protect habitat for species that are significant at the scales of southwestern Ontario or the entire province. A sound ESA program would protect habitat for rare species within the City, even if they are common in the adjacent rural areas. To maintain the ESA program, the City needs more information on the distribution and abundance of plant and wildlife species within the area under its jurisdiction.

iii) Trails and Corridors

Monitoring Program

Within the municipality managed Open Space lands, monitoring of the urban trail areas for environmental damage should occur twice yearly. Outside of the developed areas, where a hiking trail may be the only facility, a yearly inspection of trail conditions and adjacent areas should be undertaken, either by the managing agency or by trail associations. Input from general parks and trail users could also be solicited through signage placed at trailheads and park entrances.
Appendix C

Thames Implementation
APPENDIX C

THAMES IMPLEMENTATION

C.1 Basis For The Approach Proposed In The Thames Corridors

Bill 163 requires Council to have regard to matters of provincial interest. These are identified in the Bill in a series of statements (17), including:

1) "(a) the protection of ecological systems, including natural areas, features and functions;" and

2) "(h) the orderly development of safe and healthy communities;".

These matters of provincial interest must be considered on balance, with no one factor taking precedence over another. The Comprehensive Set of Policy Statements represent a more detailed presentation of these matters, expressing the general conditions under which land use planning can proceed in Ontario.

In addition to requiring protection of provincially significant areas, these policy statements allow municipalities to determine "significance based on criteria and guidelines established through municipal evaluations". In regard to matters other than natural features and functions, significant means important in terms of amount, content, representation, or effect.

It is "representation" and "effect" that we are proposing to maintain or enhance in many of the approaches recommended in the alternatives for Cultural/Recreation Resources. Relevant Provincial policy statements include:

1) (B.12) "Reasonable public access to public land and water bodies should be maintained or provided."

2) (B.13) "Policies and decisions regarding development, and infrastructure should conserve significant landscapes, vistas and ridge-lines."

3) (B.14) "Policies and decisions regarding development and infrastructure should conserve significant cultural heritage landscapes and built heritage resources.

4) (B.16) "The continuous linear characteristics of significant transportation and infrastructure corridors and rights-of-way, including abandoned railway corridors, should be protected."
It is in this context that we can present the alternatives for "Corridor Management" for the three Thames Valley areas. We are presenting approaches that balance the need for establishing a framework for urban design in these areas with the need to protect or enhance the natural features and resources of these Corridor areas.

C.2 Cooperation

Referring to the policy statements identified above for Cultural / Recreation Resources, these should be applied more flexibly than those that apply to environmentally significant areas.

It is in that context that we recommend implementation measures that ensure cooperation between the City and landowners when devising land use strategies for these areas. For example, local developers should be encouraged to consider the marketing advantages associated with incorporating this study’s recommendations into their development plans.

If there is a significant land base required to implement the selected approach, there must also be cooperation between all public agencies, including the School Boards. This is essential to ensure efficient use of land. For example, stronger coordination between the School Boards and the Parks Department would ensure more school property is used for active recreational facilities to reduce the land required by the Parks Department. This would allow more parkland or cash-in-lieu funding to be used to acquire key terrestrial features located on tableland, that may not be adequately protected in any other way or to achieve enhancement objectives. It should be noted that Category 1 areas are protected from development; private ownership remains an option with other controls and policies available to ensure proper management of those resources.

For successful implementation of this Plan, it must be recognized that enhancement options can only be achieved if there is recognition of the financial costs associated with enhancement, that taxpayers accept that cost, and that landowners have property rights that must be respected. To that end, the City must rely on coordination and cooperation with those landowners.

C.3 Recreation

Category 1 environmental features or areas are to be protected from development. Active recreation facilities, such as sports fields, arenas, and playgrounds are defined as development. Even flower beds and manicured park areas would constitute development as defined by the recent changes to the Planning Act when applied to a significant area or feature. Each of these examples involve site grading, excavation, and the placing and dumping of fill, if not the construction of structures or buildings.
When considering implementation of a recreation strategy for the Thames River corridors, this can be very limiting. For those river corridor areas that are not part of a significant feature, there may be more flexibility for the introduction of recreational activities. In those areas, it may be that development is only limited by a potential flooding hazard. The development definition to be applied is less restrictive when the area is not considered "significant".

RECOMMENDATIONS:

Active recreation opportunities contemplated by this Plan are to be directed away from ESA’s by the OP and used as a means of enhancing the Natural Heritage System while providing opportunities for people to have access to the river and enjoy a wider range of recreational experiences than might otherwise be available in the ESA’s. If the areas available outside the ESA’s are not suitable for these recreation activities, under no circumstances should the OP allow more intensive recreational use of a "significant" river corridor area than walking/hiking trails and associated maintenance that ensures safe use of a marked trail system.

The Official Plan should clarify that some recreation facilities may be permitted within those portions of the river corridors that need enhancement.

The implementation policies should be flexible enough to allow portions of the ESA to be more accurately defined upon completion of a Master Plan or Area Plan for the river corridors. These policies must be clear that the ESA is not to be compromised in any way. Where possible, the Official Plan schedules should distinguish between those areas of the river corridor that are part of the ESA from those "hazard" areas proposed for enhancement and/or recreation.

Accessibility

It is important to recognize that protection of ESA’s will limit the accessibility of the river, although access will not be prohibited on publicly owned land. However, the type of access will be controlled due to the limits placed on development. In most instances, it will be possible to ensure adequate protection and management of ESA’s without requiring public ownership. Those wanting to donate such lands should be accommodated either by the City or other public agency. Where private lands must be acquired by the City to implement its recreation strategy along the Thames, appropriate compensation will have to be provided. This could include dedication as parkland as contemplated by the Planning Act.

The recommended plan would promote fishing and non-motorized boating opportunities through the provision of urban fishing facilities and small boat launching areas.
RECOMMENDATIONS:

That the Official Plan include policies that state the City intends to accept land, when offered at no cost to the City, that is found to be of some environmental significance.

Where land must be acquired by the City to ensure implementation of its recreation strategy, some form of compensation should be offered to the landowner.

That land from these three river corridors acquired or accepted by the City, whether it is part of an ESA or to be used for recreation purposes, will be incorporated into one of three City or regional park complexes and function as satellites to the City’s existing central park system. Each of these areas will accommodate urban fishing and non-motorized boat launching facilities. An overall Thames River Corridor Master Plan would provide more detailed guidance for the City when considering how best to connect these park complexes with the rest of the Thames River parks’ system.

Fanshawe Conservation Area could play a very key role as part of a regional park complex at the northeastern terminus of the City’s river corridor system. Further discussions with the UTRCA are recommended to determine what options exist for the City and the Conservation Authority.

Komoka Park could play a similar role at the downstream terminus of this river corridor system. The Park Farm Estate and the City’s sports complex are likely to be the foundation for the regional park complex in the south-east.

Downstream

The primary strategy for this area proposes to consolidate and connect existing park features.komoka Park and Warbler Woods are proposed as destinations for the city trails system, extending west from Springbank Park.

A terrestrial and recreation corridor connection to the Dingman watershed is supported in the recommended plan.

RECOMMENDATIONS:

That a new Open Space and Recreation Master Plan require connections for the City’s trails system to be made to Komoka Park, Warbler Woods, and Springbank Park. This Plan should also conceptually recognize that it would be appropriate to allow at least one future neighbourhood park to become part of this system and serve as a potential "short cut" trail connection for a portion of the Thames corridor trail.
That construction of the Oxford St. extension allow for trail connections from the river to the tablelands.

That the Official Plan recognize in its enhancement policies, that a terrestrial and recreation corridor to the Dingman watershed is an important part of the Natural Heritage Strategy.

North Thames

The recommended plan identifies several opportunities to combine terrestrial and recreational corridors. These are unique enhancement opportunities in the City of London that should be recognized and acted upon. There are several aggregate extractive operations that should be approached by the City, with support from the MNR and OMAFRA, with a proposal to coordinate a comprehensive revision to rehabilitation plans. These revisions would implement the subwatershed plan and could serve as a pilot project for natural enhancement in London.

A key component of this enhancement strategy would see a combined recreation and terrestrial corridor connection to the Stoney Creek subwatershed. The detailed design of such a corridor would be developed as part of the comprehensive revisions to the aggregate rehabilitation plans.

Of the three Thames corridor areas in London, this area would benefit most from rehabilitation/enhancement. The recreation components of this enhancement would likely benefit from the recreation "critical mass" already in the area, including the Conservation Area and the proposed private sports complex. The Ted Earley Sports Complex should not be ignored when considering recreation enhancement in this area.

Portions of the Killaly Woods area will need enhancement if it is to be an urban forest area comparable to the Kains and Meadowlilly Woods forests. However, the areas close to the river and needing less protection may also be suited for river oriented public recreation uses. In those areas, facilities for urban fishing and non-motorized boat launching should be accommodated. The bike trail system could also be appropriate closer to the river at key locations within the area. Other more active recreation facilities could also be considered, although many of these would be best located on private lands proposed for rehabilitation.

RECOMMENDATIONS:

In addition to protection of the existing features of the Killaly Woods ESA, the Official Plan should support changes to the aggregate rehabilitation plans from agriculture to recreation and natural enhancement. The Official Plan should be clear that these changes must incorporate both recreation and terrestrial corridor enhancements.
The OP should recognize the potential of this area to be used as a pilot project for natural enhancement. In providing direction for public investment, this area should be considered a priority for enhancement funding.

The UTRCA should be approached to review if Fanshawe Conservation Area could be integrated with the City’s park system.

South Thames

The recommended plan proposes that the South Thames area become the "eastern natural environment park terminus for the 'Forest City'". This park complex will include Meadowlilly Woods, the sports complex and the Park Farm estate. Although the Plan has recommended restoration of the estate to a tea house and garden estates, there are other appropriate options that should be considered in greater detail when a Master Plan is prepared for the area. For example, a nature interpretive centre could be considered with some of these other uses. This area may also provide some opportunities for public/private partnerships if there is an interest in developing the tourism potential of the area.

Combined with a cultural heritage theme that would be enhanced by the development of a Heritage Estate subdivision east of Jackson Rd., this could become an attractive area for visitors.

The Waubuno Creek/Crumlin Drain corridor could serve as a key recreation linkage to the South Thames for east London residents on the north side of the river. The potentially high costs involved with using Pottersburg Creek as a recreational access to the Thames means that future recreation planning in east London should attempt to identify other potential links with the Thames for residential areas. Major pedestrian and bicycle linkages to this area along Gore Road and Crumlin Road should be part of an overall recreation strategy that would improve access to the Thames.

The Gore Road linkages could provide a link with Pottersburg Creek. Hamilton Road has some potential appeal for looping the route.

RECOMMENDATIONS:

That the Official Plan direct that a Master Plan (this could be required as part of an Area Plan) be prepared for the Meadowlilly Woods area that establishes a Cultural/Natural Heritage theme for the area north of Commissioners Rd. and explores opportunities for public/private partnerships that will help implement that theme.

That the Province support inclusion of special housing development policies in the OP that allow for unique subdivision developments in this area, provided they recreate a cultural heritage theme that also contributes to protecting the natural heritage of the area. This
special approach may need specific endorsement from the Province as it could require large single family housing lots either on public or private services.

That a new Open Space and Recreation Master Plan identify suitable recreation trail connections to the Thames from existing and proposed residential areas.

**Bike Trail System**

The bike trail system is an important component of the recreation strategy of this Plan. Although this type of trail system is considered development when it moves through an ESA, these paths can be defined as infrastructure and approved through an appropriate Class EA. This may be more limiting than what appears conceptually on the subwatershed maps. However, marked hiking/walking (not formal or paved paths) trails would not be limited by these definitions.

**RECOMMENDATIONS:**

That the City conduct a comprehensive EIS for the three river corridors to confirm the limits of the ESA's identified for each of these areas. The findings of this EIS will be used to identify the opportunities for river corridor enhancement and recreation, including the extension of the City's bike/fitness trail system. To ensure consistency with provincial policy statements, the Official Plan must be clear that development, even for active recreation, is not permitted within significant portions of the river corridor.

**C.4 Historic and Cultural Resources Strategy**

**Development Permits**

Design guidelines will be needed to implement the special planning areas contemplated for each of the corridors. The "image route" or scenic corridor proposed for Commissioners Rd. W. is an approach recommended for protecting many of the existing views of the landscape available in this area. It can develop a theme based on the heritage of Kilworth. This route would simply be an extension of that heritage area. Implementation of this approach is expected to require a development permit system.

A similar approach will be required for the Heritage Estate subdivision proposed in the South Thames area. This would attempt to replicate the perception of the historic single front system of land tenure and some of the architectural interest associated with the pre- and post-confederation homesteads associated with this area.
Special policy treatment is proposed for the Killaly Rd. area east of Clarke Rd. Development permits could be used in this area but that may not be critical to implementing the study's objectives.

RECOMMENDATIONS:

Thames Downstream: That the Official Plan direct that a Heritage Conservation District be established for Kilworth. As an extension to this, it is proposed that special Urban Design Guidelines be established for development along Commissioners Rd. W. between Kilworth and Byron. The natural and cultural heritage of the area, including the unique views and vistas, warrants special consideration in the Official Plan. The area has potential to become a significant "gateway" into London that will influence the image of the "new" London.

South Thames: A cultural heritage enhancement strategy is proposed as part of a Master Plan for the Meadowlilly Woods area. Refer to the recommendations for the South Thames recreation strategy.

North Thames: The area may warrant some special policy treatment for its unique views, but there are limited opportunities for historic and cultural resources. It is expected that Fanshawe Pioneer Village will continue to provide its unique heritage function.

C.5 Significant Landscapes, Vistas and Ridgelines

Some of the most significant views within the City can be found along the Thames River corridors. This is partly due to the elevation of these areas relative to other parts of the City and also due to the significant natural features that have been maintained along these corridors. In terms of the City's Natural Heritage Strategy, these areas are the key components of the "Core" natural areas to be maintained or enhanced within this City.

Although these core areas will generally be protected from development through their identification as ESA's (significant river corridors), maintaining opportunities for the public to view these significant landscapes from key view points or vistas should be given similar consideration to ensure that the public will continue to have an opportunity to enjoy some of the best views of the most significant environmental features in the community.

The recommended plan proposed consideration be given to establishing a regional lookout point/vista area just west of the existing Warbler Woods in the "Downstream" study area.

RECOMMENDATIONS:

That the Official Plan recognize the need to identify and conserve its significant landscapes, vistas and ridge-lines (Policy B.13). It is recommended that the City develop criteria for the selection of these features and that these criteria be identified in the Official Plan. The
Official Plan should also provide direction for recognizing these features at the Area Plan stage and require that the Area Plan identify how the criteria have been considered and will be implemented either in conjunction with development or prior to development. The traits of the area just west of Warbler Woods could serve as a basis for these criteria as could the "unique and dramatic views" in the Killaly Road area.

That the Official Plan recognize that the City’s most significant landscapes and vistas occur along the Thames corridors. As part of the City’s Master Open Space Plan, the City may wish to identify key opportunities that are already available to the public and should remain so and those that should be made available to the public either upon development of an area or prior to development (ie prepare an inventory). The City should also consider developing standards for the conservation of these resources. This will provide a framework from which the Area Plans can devise implementation strategies.

NOTE: No provincial standards exist that address conservation measures for these resources.