Appendix A-7
Stage One Report with Background
Environmental Report
One River Stage 1 Master Plan
Environmental Assessment Report

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Prepared for
City of London

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LURA

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Executive Summary

Introduction

The overall purpose of the One River Master Plan Environmental Assessment (EA) is to develop a comprehensive strategy, through engagement with First Nations and Métis, and in consultation with the public, and agency stakeholders, which identifies and describes various enhancement projects within the One River study area. These projects will represent both infrastructure needs and the community’s recreational and ecological vision for the Thames River in the City. As part of the EA process, findings from other studies, plans, and projects will be taken into consideration in selecting a preferred strategy based on their net natural, social/cultural, and technical/economic impacts.

This report presents the One River EA Stage 1 findings and recommendations with respect to assessing and selecting the preferred option for the Springbank Dam. Alternative strategies for river management in the study area will then be identified and evaluated in detail during Stage 2 of the EA process in order to select a preferred overall river management strategy.

One River EA Problem/Opportunity Statement

The Problem/Opportunity Statement for an EA is a clear, concise description of the issue(s) that need to be considered as part of an EA process. The ultimate goal of an EA is to deliver an outcome that addresses and resolves the problem/opportunity statement. Based on early stakeholder engagement and background information, a draft One River EA Problem/Opportunity Statement has been prepared, which recognizes the collective responsibility of all stakeholders in maintaining and enhancing these “shared natural, cultural, recreational and aesthetic resources”. Through the public consultative process carried out in Stage 1 and through endorsement by the study Steering Committee the EA Problem/Opportunity Statement (Phase 1 of the Class EA process) has been confirmed.

The detailed problem/opportunity statement that has been defined is as follows:

“The river that flows through London’s downtown has many names:

- Deshkan Ziibiing (known to the Anishnaabeg and Lenape of the Great Lakes);
- Kahwy’hatati (ONYOTA:KA); and,
- The Thames (John Graves Simcoe)

This river is both our inheritance and our living legacy. It is our collective responsibility to maintain and enhance this shared natural, cultural, recreational and aesthetic resource. The One River Master Plan Environmental Assessment will consider the area historically influenced by the Springbank Dam and will provide a plan that coordinates critical infrastructure projects in ways that improve the overall health of the river, identifies and creates an understanding of potential impacts these projects may have on downstream communities, species at risk and/or endangered species and where possible avoids them and respects the vision of Back to the River’s “The Ribbon of the Thames” concept plan. This study, in the context of many other ongoing initiatives, will preserve for future generations this valuable resource and allow people of all abilities to enjoy and access this designated Canadian Heritage River.”

The above statement was developed based on a review of the information provided during the various stakeholder engagement sessions held in 2016, as well as the background information available, the study objectives, and the input from the March 8, 2016 public meeting. This statement has also been endorsed by City Council.
Study Area

The Thames River, which flows through the City of London, is one of the largest river systems in Southern Ontario. The study area is shown in Figure ES-1. The North and South Branches of the Thames river converge near the City’s downtown area at a location commonly referred to as “the Forks”. The Thames River at the Forks drains an area of over 3,000 km². The Thames River was recognized as Canadian Heritage River in 2000, and is acknowledged to be a river of great natural, cultural, and recreational importance.

Natural Environment

The natural environment of the Thames River can be best described as a truly unique system known not only for its ability to sustain a great variety of aquatic species, but also for its biological diversity that attracts various terrestrial wildlife species. The Thames River is known as the only true Carolinian River in Canada, and is one of the main reasons that many species at risk and Special Concern species are potentially occurring upstream of the Springbank Dam and within the Thames River. Accordingly, this unique setting hosts species whose northern ranges are limited or non-existent in other parts of Ontario and Canada. The steep forested valleys and wide, shallow watercourse provides areas for many species to occupy, migrate and interact within the system.

Aquatic habitat upstream of the dam has historically been impacted by the operation of the Springbank dam which resulted in backwater upstream of the dam for several kilometers, creating a lentic (still water) ecosystem. This low energy environment limited sediment movement which, in turn, resulted in a more uniform habitat for aquatic life. Since the non-operation of the Dam, the river and riparian corridor has continued to diversify following the new flow and sediment regimes, trending toward a new dynamic equilibrium. The riparian corridor has been expanding and creating a larger functional habitat along the channel margins. Vegetation establishment along the banks have developed into dense shrub growths, creating a littoral zone in areas that were formerly submerged and bordered by retaining walls and dykes.

Although the Thames River flows through urban and rural agricultural lands and is largely a warm water, flow controlled system, its southerly location within the Carolinian zone provides habitat for Species at Risk (SAR) whose ranges are restricted and endemic to Southwestern Ontario. A review of existing information and background studies found over 30 species at risk listed as Endangered, Threatened, or Special Concern under SARA and/or the ESA in the area of Springbank Dam or upstream. Many of these species at risk have benefited from the free-flowing system that has occurred over the past 10 years and will continue to inhabit and migrate freely through the corridor.

Water quality parameters were also examined as part of the assessment of the natural environment. These parameters included total suspended solids (TSS) and total phosphorus (TP). TSS are made up of organic materials such as algae and inorganic particles such as sand and silt. TSS made up of sands and silt are normally the result of erosion and runoff of stormwater. TP is a nutrient that normally enters waterways through surface runoff during rainfall events and municipal wastewater discharges. The findings of the water quality analysis completed for the One River EA determined that TP and TSS levels were higher with the dam in place than during the period when the dam was not operational. The impacts of climate change are anticipated to increase the impacts of TSS and TP on the river.
Social/Cultural Environment

The City of London (the City) is currently one of Ontario’s largest urban centers with a variety of important cultural and environmental resources shaping the City’s history and identity. The Thames Valley Corridor is widely recognized as one of the City’s most important natural, cultural, recreational and aesthetic resources and, as a result, the Thames River was recognized as a Canadian Heritage River in 2000. The Thames River presence has shaped the City’s development and subsequently influenced the existing land use in, and adjacent to, the Thames Valley Corridor.

Within the Thames Valley Corridor itself, land use consists of nature-oriented parkland, valleyland open space, and a system of pathways and trails. These uses provide excellent opportunities to support healthy lifestyles and promote wellness, offer affordable and unstructured recreational pursuits, increase tourism, and facilitate cultural and natural heritage appreciation. The existing developed park area provides recreational facilities including playing fields and picnic areas which serve as community and neighbourhood social areas. Specifically, the valleyland along the Thames River and its tributaries provide primary open space resources including a continuous, linear open space network of trails and pathways connecting individuals and communities, with a distributed open space system consisting of natural areas, parks, activity areas and facilities. Currently, however, there are few locations along the Thames Valley Corridor for potential interaction with the Thames River. These locations include: Springbank Pumphouse area, Riverside boat launch, rowing club, canoeing club, and fishing docks as well as several locations where informal river access has been created.

Other initiatives have been undertaken to support a revitalization of the Thames River in London. Back to the River was an international design competition initiated by London Community Foundation in partnership with the City of London and Upper Thames River Conservation Authority to revitalize a five kilometer stretch of the river radiating from the Forks in three directions: north to the intersection of Oxford Street bridge and the Thames River, west to the Wharncliffe Road Bridge and south to the intersection of the London to Port Stanley railway bridge and Thames River. The Back to the River “Ribbon of the Thames” award-winning design incorporates a number of elements that support a River vision that has been called bold and exciting. It focuses on bringing people back to the River to enjoy a significant cultural and heritage resource and engage in activities that reflect the river’s beauty and cultural significance. Coordination with the Ribbon of the Thames Civitas/Stantec team has begun on how the design elements of Back to the River can be integrated into the EA evaluation and be adapted to potentially changing water levels. The design elements of the Ribbon of the Thames can be integrated into the range of water levels represented by the Springbank Dam options.

Agency Consultation and First Nations Engagement

Consultation with stakeholders and the public, including engagement with First Nations and Metis, as well as government agencies, is an important and necessary part of the EA process. Recognizing the importance of the Thames River to the London citizens, the City of London has developed an extensive consultation and engagement process, that goes well beyond the requirements of the Municipal Engineers Association (MEA) Master Plan EA process. The goal being to consult with all interested stakeholders and First Nations communities in meaningful ways with the focus of understanding and incorporating input into the decision-making process.

Government Agencies

As part of the Master Plan EA process, the relevant government agencies were provided a Notice of Study Commencement for the One River EA and asked to provide any comments in regard to requirements for the conduct of the EA.
In addition, specific government agencies were asked to participate in an Agency Advisory Committee. The main objective of the Agency Advisory Committee is to provide guidance and feedback to the project team on environmental, social/cultural, technical and regulatory issues and challenges that could impact the decision-making with respect to the evaluation of options for the One River EA project.

The Agency Advisory Committee is comprised of the Ministry of Environment and Climate Change (MOECC), Ministry of Natural Resources and Forestry (MNRF), Upper Thames River Conservation Authority (UTRCA), Lower Thames Valley Conservation Authority (LTVCA) and the Department of Fisheries and Oceans (DFO).

Three meetings were held with the Agency Advisory Committee at key milestones during Stage 1 to receive input, guidance, and feedback. The objective was to examine the issues and challenges associated with the evaluation of options for Springbank Dam. All input was considered in the EA Stage 1 decision-making process.

**First Nations/Metis Engagement**

First Nations community consultation is essential to the One River EA process. The perspectives and stories of First Nations with respect to their history, knowledge and identity through Aboriginal Traditional Knowledge, as it relates to the Thames River, are important contributions to the One River EA. First Nations peoples have a unique perspective and relationship with the lands and waters within the watershed that include assertions of Aboriginal title, Treaty rights and Aboriginal rights. First Nations have expressed concern about actions they perceive may influence title claims, as well as the health and economic well-being through impacts to drinking water, hunting, fishing, recreation and tourism. Oneida Nation of the Thames, Munsee-Delaware and Chippewas of the Thames First Nation rely on the Thames River as an indirect source of drinking water, sustenance in the way of fish, gathering and harvesting of ceremonial and medicinal plants and recreation. The watershed is an important hunting ground and is essential to archival and oral traditions, history, knowledge and identity.

Several First Nations communities have expressed interest in the One River EA, and engagement has continued throughout Stage 1 of the EA, with the project team contacting the London area First Nations and provincial Metis organizations through mail and email correspondence. One River pamphlets were sent to the D’amerind Friendship Centre (Indigenous Friendship Centre) in London to be placed visibly for visitors to see and a presentation was made at a community meeting with the Chippewa’s of the Thames First Nation (COTTFN) on December 7 to receive comment and feedback on the study.

**Public Consultation**

A variety of strategies and tools were used during Stage 1 to ensure widespread and accessible participation in the public engagement process. These are described below:

**Notice of Commencement**

A formal notice to announce the commencement of the EA process was published in a local newspaper, *The Londoner* on July 20 and July 27.

**Surveys**

A survey was developed to collect information about London Residents’ current use of the Thames River, and their ideas and wishes for the future of the river. The survey asked respondents both multiple choice and open-ended questions about how they use the river, how they would like to use the river, and what changes they would like to see, if any, in or around the river. The survey was available online at the webpage, GetInvolved.london.ca, and in paper format at Pop-up events.
Stakeholder Meetings

During the implementation of Stage 1, a number of meetings were held between the City and Stakeholder groups and their comments and issues incorporated into the feedback received on the One River EA. Meetings were held with the following groups:

2. Kensington Village Association – September 1, 2017
3. Thames River Keepers – September 1, 2017
4. Thames River Rally – September 19, 2017
5. Friends of the Coves – September 21, 2017
6. Thames River Anglers Association – August 25, 2017
7. Thames River Paddling Routes Project – August 25, 2017
8. London Canoe Club – August 29, 2017
9. London Rowing Club – August 29, 2017

Pop-ups

The City of London set up booths and provided background materials on the One River EA at many of the local events during the summer. These are referred to as Pop-ups. Pop-up engagement events took place six times over the course of Stage 1 of the One River EA.

1. July 23, 12:00 pm – 6:00 pm: Inspiration Fest, Wortley Village
2. August 3, 11:00 am – 6:00 pm: Rib Fest, Victoria Park
3. August 10, 3:30 pm – 7:30 pm: River Forks Park
4. August 11, 7:00 am – 3:00 pm: Springbank Park
5. August 12, 8:00 am – 3:00 pm: Farmers Market at Western Fair Grounds
6. August 19, 11:00 am – 3:00 pm: London Tree Fest, Harris Park

Public Information Centre #1

Public Information Centre #1 was hosted on October 18 and 19, 2017. Approximately 130 people attended each session (with 102 officially signing in for the first and 103 officially signing in for the second) for a total of 260 attendees. A number of stakeholders, including residents interest groups, and First Nations representatives provided feedback and input to the EA through correspondence and emails and is included in this stakeholder consultation summary. A total of 104 pieces of correspondence and/or emails were received about this phase of the EA.

Webpage

The project webpage included notice of Public Information Centre #1 as well as a survey that mirrored consultation activities at the PIC that was made available until October 27, 2017.

Getinvolved.london.ca/OneRiver:
https://getinvolved.london.ca/OneRiver/upcoming-events

London.ca Events Calendar:
https://www.london.ca/calendar/Pages/One-River-Public-Information-Centre.aspx
 london.ca/calendar/Pages/One-River-Public-Information-Centre-2.aspx

One River EA Page:
https://www.london.ca/residents/Environment/EAs/Pages/One-River-EA.aspx

Social Media

Social Media (Twitter and Facebook) was used to raise awareness of Public Information Centre #1.
Traditional Media

Local news media coverage was used to raise awareness of the One River Master Plan EA, advertise Public Information Centre #1, and direct the public to the getinvolved.london.ca webpage to learn more and complete the survey. Local coverage included CTV News London and AM980 News (CFPL AM).

Springbank Dam Options

Three distinct options for the Springbank Dam were examined and evaluated in detail to determine the most preferred option for the dam.

Do Nothing

The dam is kept in its current condition by completing a safety and operations review and on-going maintenance with no repurposing. Minor work would be completed to salvage appropriate dam components and obtain applicable permits.

Free-Flowing River

The dam is decommissioned and no longer provides a water retention function. Dam decommissioning may include options for repurposing the dam structure and various river enhancements, ecological enhancements and recreational enhancements upstream. These enhancements are to work within the hydrologic and hydraulic limitations associated with lower water levels during the summer months when, otherwise, the dam may have been operated to increase water depths upstream. Work to be completed in addition to salvaging dam components and obtaining applicable permits could include removing gates to provide a live bottom to the river and stabilizing the required components and shore structures.

Reinstating the Dam

The dam is reinstated so it provides a water retention function, operating at a similar capacity as it has previously. Dam repair or reconstruction allows for dam operation during months when higher water levels upstream would promote additional recreational opportunities associated with higher water levels. Reinstating the dam does not preclude adding options like those for repurposing the dam.

Evaluation of Springbank Dam Options

Evaluation Process

The evaluation process for the selection of the preferred option for the Springbank Dam follows the MEA process for Master Plan EAs. The essential nature of the process is that it captures a wide and inclusive range of criteria that provide the opportunity to examine the impact of each of the options on the issues identified through the Problem/Opportunity statement. The criteria for the examination of the three Springbank Dam options cover the range of potential impacts or changes from what is considered the “Baseline Condition”. This baseline condition is represented by the existing conditions in the river within the boundaries of the study area and the current condition of the Springbank Dam. This baseline condition has been defined through the examination of various databases on water quality and the ecological environment, consultation and engagement with the public, stakeholders and First Nations and Metis communities and recent field efforts to characterize the current condition of the river.

The various criteria that were developed for the evaluation represent aspects of the Natural Environment, Social/Cultural and Technical/Economic potential impacts. The anticipated impact of the each of the three Springbank Dam options on each of the criteria were evaluated based on a
Measure/Indicator defined under each criterion that assesses either a positive change from the existing conditions, no change from existing conditions, or a negative change from existing conditions.

**Recommended Option**

The detailed options evaluation of the relative impact for each criterion in relation to the “existing condition” which is defined as the state of the current Thames River without the Springbank Dam in operation is summarized in Table ES 1. As indicated in the table, the free-flowing river (Option 2) is ranked first in terms of natural environment; it will provide the most benefits to the natural environment, by improving water quality, aquatic and terrestrial habitats, and protect and enhance species at risk.

**Table ES-1. Score Summary by Category**

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<tr>
<th>Criteria Category</th>
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<td>Total</td>
<td>8.8</td>
<td>12.0</td>
<td>7.6</td>
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For the social/cultural environment Option 2 – free-flowing river and Option 3 – reinstating the dam, have similar ratings; 4.3 and 4.1 out of 5, respectively. This is expected as both have similar potential to maintain and enhance many of the social and cultural resources in the study area with the exception of recreational activities. The free-flowing river tends to provide more fishing recreational activities, while reinstating the dam favours more of the boating-relating and park shoreline recreational activities.

With respect to the technical and economic factors, the do nothing rates the best (3.7 out of 5) as it is the easiest to implement at the least cost. The free-flowing river (Option 2) rates second in terms of technical and economic criteria (3.1 out of 5), followed by reinstating the dam (Option 3). Reinstating the dam would be the most difficult and challenging to implement, primarily due to the difficulties in receiving permits and approvals.

Based on the overall assessment, Option 2 – Free-flowing River rates highest as it provides the most benefits and best meets the problem statement to:

- “maintain and enhance this shared natural, cultural, recreational and aesthetic resource; and
- “preserve for future generations this valuable resource and allow people of all abilities to enjoy and access this designated Canadian Heritage River.”

**Next Steps**

**Environmental Assessment Process**

Once the option for the Springbank dam is confirmed, alternative strategies for river management, which consist of various projects related to infrastructure and river improvements, will be developed and assessed using similar criteria as established during Stage 1. A preferred river management strategy will be selected in Stage 2 based on the benefits the projects have on the natural social/cultural, and technical and economic environment. Stakeholder consultation, including consultation and engagement with First Nations and Metis, government approval agencies, interest groups and the general public will continue in Stage 2.
Anticipated Schedule

It is anticipated that a decision on the future of Springbank Dam will be made early in 2018. After that decision is made, the One River EA will proceed with Stage 2. Stage 2 will be carried out in late winter, spring and summer of 2018 and it is anticipated to be concluded early in the fall of 2018. Stage 2 of the One River EA will include additional gathering of background data on the various projects being considered for the river management plan, additional consultation and engagement opportunities and the evaluation and selection of the preferred strategy.
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<th>Symbol</th>
<th>Description</th>
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<tbody>
<tr>
<td>µg/L</td>
<td>microgram per litre</td>
</tr>
<tr>
<td>CAA</td>
<td>Conservation Authorities Act</td>
</tr>
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<td>CCME</td>
<td>Canadian Council of Ministers of the Environment</td>
</tr>
<tr>
<td>CH2M</td>
<td>CH2M HILL Canada Limited</td>
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<td>CHRS</td>
<td>Canadian Heritage River System</td>
</tr>
<tr>
<td>cm</td>
<td>centimetre</td>
</tr>
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<td>DFO</td>
<td>Canada Department of Fisheries and Oceans</td>
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<td>EA</td>
<td>Environmental Assessment</td>
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<td>ECCC</td>
<td>Environment and Climate Change Canada</td>
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<td>ELC</td>
<td>ecological land classification</td>
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<td>END</td>
<td>Endangered</td>
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<td>ESA</td>
<td>Environmentally Significant Area</td>
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<tr>
<td>ha</td>
<td>hectare</td>
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<tr>
<td>km</td>
<td>kilometre</td>
</tr>
<tr>
<td>km²</td>
<td>square kilometre</td>
</tr>
<tr>
<td>LRIA</td>
<td>Lakes and Rivers Improvement Act</td>
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<tr>
<td>LTVCA</td>
<td>Lower Thames Valley Conservation Authority</td>
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<tr>
<td>m³/day</td>
<td>cubic metre per day</td>
</tr>
<tr>
<td>m³/s</td>
<td>cubic metre per second</td>
</tr>
<tr>
<td>m³/year</td>
<td>cubic metre per year</td>
</tr>
<tr>
<td>MEA</td>
<td>Municipal Engineers Association</td>
</tr>
<tr>
<td>mg/L</td>
<td>milligram per litre</td>
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<tr>
<td>MGCS</td>
<td>Ministry of Government and Consumer Services</td>
</tr>
<tr>
<td>MNDM</td>
<td>Ministry of Northern Development and Mines</td>
</tr>
<tr>
<td>MNRF</td>
<td>Ontario Ministry of Natural Resources and Forestry</td>
</tr>
<tr>
<td>MOE</td>
<td>Ministry of the Environment (now MOECC)</td>
</tr>
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<td>MOECC</td>
<td>Ontario Ministry of the Environment and Climate Change</td>
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<td>MTCS</td>
<td>Ministry of Tourism, Culture and Sport’s</td>
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<tr>
<td>NAR</td>
<td>Not at Risk</td>
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<td>NPA</td>
<td>Navigation Protection Act</td>
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<td>Ontario Water Resources Act</td>
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<td>Public Information Centre</td>
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<tr>
<td>PTTW</td>
<td>Permit To Take Water</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>SAR</td>
<td>Species At Risk</td>
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<td>SARA</td>
<td>Species At Risk Act</td>
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<tr>
<td>SC</td>
<td>Special Concern</td>
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<tr>
<td>SLSR</td>
<td>Subject Land Status report</td>
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<td>SRANK</td>
<td>Species Ranking</td>
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<td>TC</td>
<td>Transport Canada</td>
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<tr>
<td>THR</td>
<td>Threatened</td>
</tr>
<tr>
<td>TP</td>
<td>total phosphorus</td>
</tr>
<tr>
<td>TSS</td>
<td>total suspended solids</td>
</tr>
<tr>
<td>TVCP</td>
<td>Thames Valley Corridor Plan</td>
</tr>
<tr>
<td>USGS</td>
<td>U.S. Geological Survey</td>
</tr>
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<td>UTRCA</td>
<td>Upper Thames River Conservation Authority</td>
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<td>WSC</td>
<td>Water Survey of Canada</td>
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SECTION 1

Introduction

The overall purpose of the One River Master Plan Environmental Assessment (EA) is to develop a comprehensive strategy, through engagement with First Nations and Métis, and in consultation with the public, and agency stakeholders, which identifies and describes various enhancement projects within the One River study area. These projects will represent both infrastructure needs and the community’s recreational and ecological vision for the Thames River in the City. As part of the EA process, findings from other studies, plans, and projects will be taken into consideration in selecting a preferred strategy based on their net natural, social/cultural, and technical/economic impacts.

Key references amongst these other studies, plans, and projects to be incorporated into the evaluation process are The London Plan which has identified the City’s vision and directions for growth, the Thames Valley Corridor Plan (TVCP) recommendations that relate to the riverfront environment, accessibility and recreational use objectives, and the “Back to the River” design that provides an award-winning concept for the Forks of the Thames. This EA will be part of the implementation of the objectives and vision put forward in these plans and designs. The EA will recommend various projects forming a basis for future infrastructure improvements and river management that also incorporates the vision and objectives of The London Plan and the Thames Valley Corridor Plan.

This report presents the One River EA Stage 1 findings and recommendations with respect to assessing and selecting the preferred option for the Springbank Dam. Alternative strategies for river management in the study area will then be identified and evaluated in detail during Stage 2 of the EA process in order to select a preferred overall river management strategy.

1.1 One River Master Plan Process

The One River EA process is being carried out in two stages:

- Stage 1: The objective of Stage 1 is the selection of a preferred option for the future of the Springbank Dam. The selection of a preferred option for Springbank Dam will be an influential factor in the identification and evaluation of the overall river management plan. This plan will include various infrastructure projects as defined in the One River EA Terms of Reference and the design of the Back to the River elements. It is therefore necessary to determine the preferred option for the dam first so that the option selected can inform the decision-making process on the overall river management plan. A preferred option for Springbank Dam will be selected based on natural, social/cultural, and technical/economic criteria.

- Stage 2: Once the option for the Springbank dam is selected, alternative strategies for river management, which consist of different types of projects related to infrastructure and river improvements, will be developed and assessed. A master plan for the river will represent a preferred strategy selected based on environmental, social/cultural, technical and cost criteria.

Following the two-stage assessment process, the One River EA recommendations will be developed for each individual project, with estimated costs, schedule for implementation, and additional approval and assessment requirements. The One River EA process is further described in Appendix A.

1.2 One River EA Problem/Opportunity Statement

The Problem/Opportunity Statement for an EA is a clear, concise description of the issue(s) that need to be considered as part of an EA process. The ultimate goal of an EA is to deliver an outcome that addresses and resolves the problem/opportunity statement. Based on early stakeholder engagement
and background information, a draft One River EA Problem/Opportunity Statement has been prepared, which recognizes the collective responsibility of all stakeholders in maintaining and enhancing these “shared natural, cultural, recreational and aesthetic resources”. Through the public consultative process carried out in Stage 1 and through endorsement by the study Steering Committee the EA Problem/Opportunity Statement (Phase 1 of the Class EA process) has been confirmed.

The detailed problem/opportunity statement that has been defined is as follows:

“The river that flows through London’s downtown has many names:

- Deshkan Ziibiing (known to the Anishnaabeg and Lenape of the Great Lakes);
- Kahwy’hatati (ONYOTA:KA); and,
- The Thames (John Graves Simcoe)

This river is both our inheritance and our living legacy. It is our collective responsibility to maintain and enhance this shared natural, cultural, recreational and aesthetic resource. The One River Master Plan Environmental Assessment will consider the area historically influenced by the Springbank Dam and will provide a plan that coordinates critical infrastructure projects in ways that improve the overall health of the river, identifies and creates an understanding of potential impacts these projects may have on downstream communities, species at risk and/or endangered species and where possible avoids them and respects the vision of Back to the River’s “The Ribbon of the Thames” concept plan. This study, in the context of many other ongoing initiatives, will preserve for future generations this valuable resource and allow people of all abilities to enjoy and access this designated Canadian Heritage River.”

The above statement was developed based on a review of the information provided during the various stakeholder engagement sessions held in 2016, as well as the background information available, the study objectives, and the input from the March 8, 2016 public meeting. This statement has also been endorsed by City Council.

### 1.3 Study Team

The One River Master Plan study is being carried out by the City of London under the guidance of the City of London Steering Committee with the assistance of a consultant project team. The One River Study Team consists of:

**City of London Project Team**

- One River Project Manager – Ashley Rammeloo, Manager, Engineering
- One River Project Coordinator – Daniel Hsia, Water Demand Manager, Water Engineering

**One River City Steering Committee**

- Kelly Scherr – Managing Director of Environmental and Engineering Services and City Engineer
- Scott Mathers – Director of Water and Wastewater
- John Fleming – Managing Director of Planning – City Planner
- Scott Stafford – Managing Director of Parks and Recreation
- Andrew Macpherson – Manager, Planning – Environmental & Parks Planning

**Consultant Project Team**

- Tom Mahood – CH2M
- Laurie Boyce – CH2M
- Mitch Jewson – CH2M
- David Van Vliet – Matrix Solutions
- Amanda McKay – Matrix Solutions
• John Parish – Matrix Solutions
• John MacDonald – Matrix Solutions
• Arnie Fausto – Matrix Solutions
• Lisa Prime – Prime Planning
• Jim Faught – LURA
• Liz Nield – LURA
SECTION 2

Study Area Existing Conditions

2.1 Natural Environment

The Thames River, which flows through the City of London, is one of the largest river systems in Southern Ontario. The study area is shown in Figure 1. The North and South Branches of the Thames river converge near the City’s downtown area at a location commonly referred to as “the Forks”. The Thames River was recognized as Canadian Heritage River in 2000, and is acknowledged to be a river of great natural, cultural, and recreational importance. The river plays a significant role in the lives of people in the City of London (Dillon and D.R. Poulton & Associates Inc. 2011).

The Thames River watershed lies within in the Carolinian Zone (Eco Region 7E), which extends through southern Ontario from Toronto to Windsor. This ecozone is the most populated zone in Canada, containing 25% of the Canadian population in only 0.25% of the Canada’s land mass. The Carolinian Zone hosts more species than any other region in Canada (Carolinian Canada Coalition 2016) including many endangered and threatened species. Ongoing conservation measures, and expanding urban populations and development makes this zone unique for governance and regulatory agencies.

An overview and description of the natural environment conditions surrounding Springbank Dam is detailed in an Background Environmental Data Report (Matrix 2017a, Appendix B). Information for this report was gathered using previous environmental studies completed by the City, UTRCA and other consultants. To supplement existing data, localized environmental field programs were completed in 2017 at various locations upstream of Springbank Dam (Matrix 2017b, Appendix C). These field programs included fisheries sampling, aquatic habitat mapping and geomorphic assessments. Findings from these two documents describe the current state of the Thames River and riparian corridor.

2.1.1 Watershed Description

Appendix B includes mapping such as Official Plans and natural features for the study area. The maps outline land use, natural features, natural hazards, groundwater recharge, significant areas, and regulatory limits. Natural features mapping identifies the Thames River and the surrounding area as a significant wildlife corridor. Woodlands have been mapped through Harris Park (North Branch), the Thames Park (South Branch) and throughout various sections along the Middle Thames River. Some unevaluated vegetation patches are also shown near the north side of Springbank Dam and near the confluence with Mud Creek. The nearest designated Environmentally Significant Areas (ESAs) are the Coves and Sifton Bog.

2.1.2 Hydrology

The Thames River at the Forks drains an area of over 3,000 km\(^2\). The contributing watershed is dominated by fine grained soils and as a result, flows in the Thames River exhibit a quick hydrologic response, rapidly peaking and declining in response to rainfall and snow melt events. While there are isolated areas that receive significant amounts of groundwater discharge, the Thames River is generally characterized as an overland runoff dominated system with low baseflow during periods of dry weather.
The Water Survey of Canada (WSC) has maintained a hydrometric (streamflow) monitoring station on the Thames River at Byron (Station ID: 02GE002) downstream of Springbank Dam since 1922. To provide context on the historical flows upstream of the Springbank Dam, Figure 2 summarizes and illustrates daily flow data measured from 1970 to 2015. Typical to southern Ontario, the highest monthly flows occur in March and April during the spring. Flows then decline into the summer months, reaching the lowest average monthly flow in August and September, before increasing flows into the fall.

2.1.3 Flooding

The Thames River floodplain is extensive and historical floods have influenced the communities of people who have settled in these areas. The City constructed the first system of dykes after a large flood in 1883 to prevent water entering into low-land areas. Dyke construction has continued over time, and presently there are seven dykes with a total length of approximately 5 km (UTRCA, 2017c). The seven dykes are shown on Figure 3 and are located along the North Thames, South Thames, and Middle Thames Rivers. Flood control dykes that may be influenced by backwater from the Springbank Dam include the West London Dykes (North Branch), Riverview-Evergreen, Coves, and Byron dykes.

In addition to the dykes, three upstream reservoirs, The Fanshawe Dam (North Thames), Wildwood Dam (North Thames) and Pittock Dam (South Thames) are maintained by the UTRCA. These dams were constructed to provide flood protection as well as other objectives including low flow augmentation and recreation. The Fanshawe Dam was constructed in 1952, creating the 2.6 km² Fanshawe Reservoir and has reduced the risk from flooding. The Wildwood (built in 1965) and Pittock (built in 1967) dams provide flood control and are also used to augment summer low flow for aquatic habitat and wastewater assimilation.
2.1.4 Wastewater Assimilation

To ensure there is a reliable supply of baseflow during periods of dry weather, the Wildwood and Pittock reservoirs capture flood waters during the spring freshet, and slowly release that stored water through the summer and fall period to augmenting downstream dry weather flow. The primary objective for flow augmentation from Wildwood and Pittock is wastewater assimilation. The City operates six wastewater treatment plants; four of which discharge treated effluent to the Thames River. The Greenway, Adelaide, Oxford, and Vauxhall wastewater treatment plants, discharge approximately 55,700,000 m³/year (1.8 m³/s) to the Thames River. The largest treatment plant, Greenway, is located 4.5 km upstream of the Dam. The Greenway plant discharges approximately 39,400,000 m³/year (1.25 m³/s) and is a significant source of flow into the Thames River through London during low flow periods. For comparison, the August median flow in the Thames River below the Forks (not considering wastewater effluent discharges), is approximately 7 to 8 m³/s.

2.1.5 Surface Water Takings

There are a number of operations within the City that have been granted permission by the Ministry of the Environment and Climate Change (MOECC) to withdraw water from the Thames River. These takings are predominantly commercial golf courses that are withdrawing water to irrigate turfgrass. Upstream of the Springbank Dam, a City operated golf course is permitted to withdraw 2,200 m³/day. There are six permitted water withdrawals (all for golf course operations) downstream of the dam that are permitted to withdraw a total of 16,200 m³/day. When combined, the maximum permitted water takings are 18,400 m³/day or 0.2 m³/s from the river.
2.1.6 River Characterization

The Thames River consists of a wide, low gradient, fairly homogenous channel with a quasi-regular series of pools, riffles, runs, and several bar formations. Through the City, the River Valley is encroached by urban land use, and confined by several flood protection dykes and natural and constructed slopes (PARISH 2014). The level of encroachment varies as much of the floodplain remains natural or utilized as parkland.

Rivers are dynamic features that develop their geometry in response to streamflow and sediment characteristics, as well as influencing factors such as land use, climate, direct human intervention, geology, and vegetation. Over time, morphological adjustments, or changes in the river geometry, are common in response to changes from these variables.

2.1.7 Impacts of the Dam

Dams have a direct impact on water elevation, streamflow and sediment movement by modifying water flow, depth, and velocity. The Springbank Dam has impacted water levels to create extensive (~7 km) backwater effects to permit recreational boating mainly during the summer months (May to November). When operational, the dam raised water levels by more than three meters at the dam, expanding the wetted area within the valley, and reducing sediment movement in the downstream direction. In turn, the backwater promoted the deposition of particles of a wide range of sizes within the ponded area, reducing the variability of the channel shape which would naturally occur. The dam affected the channel’s ability to maintain the dynamic equilibrium that keeps a natural river healthy. Although the Thames River had free flowing periods in the off-season months, the winter and spring periods were too short to facilitate the natural recovery of the river before the beginning of the next recreational season. Recovery/response following a major change to a river system generally occurs over several years to decades (Knighton, 1998).

2.1.8 Impacts of Dam Removal

When a dam is removed, there is a typical response whereby the base water level lowers and a period of degradation and widening occurs creating a sediment wedge within the impounded side (Figure 4). As the channel adjusts to the new free-flowing regime, a bankfull channel establishes within the sediment wedge.

The term “bankfull” represents the condition where water levels in a river are at the top of the banks of the channel. Bankfull flow represents the maximum capacity for a channel to convey flow before inundating the floodplain. The prevailing flow that shapes the bankfull channel is often referred to as the “channel forming” discharge and is thought to have a recurrence interval of 1.5 to 2 years. The conceptual model detailed in Figure 4 may not be entirely applicable to the Springbank Dam as it was seasonally operated, and presumably, much of the fine sediment was transported downstream during the spring flows. However, Figure 4 does illustrate the trend that has been observed upstream of Springbank Dam, in terms of the development of a bankfull channel with lateral features, and stabilization of the new cross-section with vegetation.
2.1.9 Riparian and Bank Re-Vegetation

Air photo interpretation and a recent site visit has revealed that the Thames River through the study area has responded to free-flowing conditions by developing a new bankfull channel where material has accumulated along the margins and vegetated (Figure 5). This trend is consistent with the conceptual patterns suggested in Figure 4 where over the past decade, bankfull benches, lateral and mid-channel bars have vegetated, enhancing their permanency as grasses, shrubs, and small trees thrive. The riparian vegetation is a mix of native species and invasive species and adds root cohesion and roughness, enhancing the overall stability of the system, and provides a protective buffer to the valley slope.

Vegetated mid-channel bars and lateral floodplain features have become more permanent features diverting or concentrating flows, (providing variability) and accumulating sediment and nutrients, thereby enhancing water quality and the riparian zone through nutrient uptake. Prior to the current free-flowing situation, floodplain features (benches), and island bars were flooded seasonally during dam operation for extended periods. During these periods of flooding, the settlement of fines and nutrients would occur throughout the watercourse rather than sorted at select depositional features or on the floodplain. Riparian areas were submerged during the growing season, and during low flow months, exposed bars/benches lacked vegetation cover and stability through root cohesion.

Figure 4. Conceptual Model of Channel Adjustment Following Dam Removal
(adapted from Doyle et al, 2005).
Figure 5. Aerial Photos of Springbank Dam to the Old Pump house (1.2 km) from 2003, 2006 and 2016
Note the vegetation establishment and channel narrowing subsequent to non-operation. The dam was operating in 2003, and recently stopped operating in the 2006 photo. The 2016 photo represents existing conditions after the dam was not operational for a decade.
2.1.10 Evolution of the River Channel

Recent field surveys were conducted with the intent to identify adjustments in the channel cross-section during the period of non-operation. Surveys completed in October of 2017 were compared to available topographic data from the UTRCA hydraulic model and previous surveys associated with studies of the Springbank Dam and Central Thames (Parish, 2009; Parish, 2012). Unfortunately, detailed surveys prior to 2006 are not currently available. Figure 6 provides an example of cross-section adjustment over the last 5 years. Although this does not compare directly with channel form prior to the free-flowing system, some trends in lateral bar growth are evident, along with bed degradation. The composition of the bankfull bench, or lateral bar (right side of Figure 4), was primarily cobble and gravel, with a layer of fines, well vegetated by tall and short grasses, willows and other young deciduous trees. Benches were observed throughout the study area, having similar cobble/gravel composition and vegetation types.

![Figure 6. Cross-section Comparison Between 2012, and Recent 2017 Surveys](image)

2.1.11 Sediment Characterization

As the channel narrows, flows concentrate, and velocities and shear stress increases. These changes increase the capacity for sediment transport and sorting, which, in-turn enhances the fluvial and aquatic systems. In general, a coarsening of bed substrates is expected as a result of flow concentration. Substrates were characterized at each cross-section in October of 2017. Pebble counts from 2009 and 2012 were available for cross-sections in the vicinity of the Dam, and downstream of Wonderland Road near the Rowing Club (Table 1).
Table 1. Grainsize Characterization Comparison

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentile</th>
<th>2009/12</th>
<th>2017</th>
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<tbody>
<tr>
<td></td>
<td>D10 (cm)</td>
<td>1.16</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>D50 (cm)</td>
<td>8.39</td>
<td>3.19</td>
</tr>
<tr>
<td></td>
<td>D90 (cm)</td>
<td>50.09</td>
<td>12.79</td>
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<tr>
<td>U/S Springbank</td>
<td>D10 (cm)</td>
<td>1.75</td>
<td>0.15</td>
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<tr>
<td>Dam</td>
<td>D50 (cm)</td>
<td>8.52</td>
<td>11.72</td>
</tr>
<tr>
<td></td>
<td>D90 (cm)</td>
<td>18.55</td>
<td>29.43</td>
</tr>
</tbody>
</table>

Based on these comparisons, there is no clear trend in adjustment of the grainsize distribution. Some coarsening is evident upstream of the Springbank Dam. However, only 25 particles were measured in 2009, as compared to 100 in 2017, therefore reducing confidence when interpreting observed changes. Roughly one-quarter of the channel bottom was rip rap, extending from the vegetated rip rap revetment along the south bank. Unfortunately, substrate characterizations are not available during a period of Dam operation to confirm the hypothesis that substrates coarsen as the sediment wedge is mobilized and flows concentrate during channel narrowing.

2.1.12 Water Quality

A statistical analysis was performed on available water quality data from three stations, identified as Byron, Springbank, and Wharncliffe. The objective was to determine if the concentrations of specific water quality parameters were significantly different with the dam, compared to without the dam.

2.1.12.1 Methods

Raw observed data, typically recorded at a weekly frequency, from the summer months (June through September) of 1987-2016 at Byron and Springbank, and from 1978-2016 at Wharncliffe, was analyzed using the R statistics software platform (R Core Team, 2017).

The parameters total phosphorus and suspended solids were chosen for the analysis because a) sufficient data was available for each parameter across the time periods where the dam was present and then absent; and b) these parameters are primary indicators of water quality that are more likely to be affected by the change in hydraulic characteristics associated with the transition from a dammed to free-flowing river.

The summer data was divided into dry weather and wet weather samples based on analysis of the cumulative distribution of discharge data at Byron. Close inspection of the plot (Figure 7) yielded an estimate that 22.0 cubic metres per second at Byron was a threshold above which the river was assumed to be flowing at a wet weather condition, and below which was assumed to be dry weather. Measurements from common dates at Springbank and Wharncliffe were then categorized as dry weather or wet weather, based on the discharge measured on that date at Byron. Dry weather samples are of particular interest, since the presence of a dam is more likely to influence water quality under dry weather rather than wet weather conditions.

To be conservative, the period with the dam in operation was identified as prior to July 9, 2000 when the dam was damaged. The period without a dam was identified, again, to be conservative, as July 2008 to present to account for the time period after the final failure of the new structure. Data from those intervals were binned accordingly for the statistical analysis.
Boxplots were generated for each of the datasets (Figures 8, 9, and 10). Due to the non-normal distributions of the datasets, the Wilcoxon rank sum test was applied in each case. This test is the non-parametric analog to the more well-known Student’s t-test. The test was performed to determine whether the parameter concentration was greater with the dam than without the dam. P-value results less than or equal to 0.05 indicate statistical significance at the 5% significance level. Average concentration values of each case were also calculated (Table 2).
Figure 9. Boxplots of Summer Wet Weather Total Phosphorus Concentrations

Figure 10. Boxplots of Summer Dry Weather Suspended Solids Concentrations
2.1.12.2 Results

Table 2 contains statistical analysis results for comparisons of the given parameter with and without the dam, at summer dry or wet weather conditions.

Table 2. Statistical Analysis Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Average Concentration with Dam (mg/L)</th>
<th>Average Concentration without Dam (mg/L)</th>
<th>Significantly Greater Concentration with Dam?</th>
<th>p-value</th>
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<tr>
<td>Total P_dry</td>
<td>Byron 0.3262</td>
<td>0.1436</td>
<td>Yes</td>
<td>&lt; 2.20E-16</td>
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<tr>
<td></td>
<td>Springbank 0.3246</td>
<td>0.1646</td>
<td>Yes</td>
<td>&lt; 2.20E-16</td>
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<td></td>
<td>Wharncliffe 0.2084</td>
<td>0.1066</td>
<td>Yes</td>
<td>6.41E-15</td>
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<td>Total P_wet</td>
<td>Byron 0.2807</td>
<td>0.1479</td>
<td>Yes</td>
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<td></td>
<td>Springbank 0.2689</td>
<td>0.1572</td>
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<td>0.0008681</td>
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<td></td>
<td>Wharncliffe 0.2078</td>
<td>0.1311</td>
<td>Yes</td>
<td>0.004358</td>
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<td>Suspended solids_dry</td>
<td>Byron 13.62</td>
<td>12.19</td>
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<td></td>
<td>Springbank 16.51</td>
<td>12.24</td>
<td>Yes</td>
<td>0.0103</td>
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<td></td>
<td>Wharncliffe 19.68</td>
<td>13.34</td>
<td>Yes</td>
<td>3.80E-07</td>
</tr>
</tbody>
</table>

The results indicate that total phosphorus concentrations in summer were significantly greater at each station with the dam, compared to without the dam, both at dry and wet weather conditions in summer. In particular, at dry weather, the average total phosphorus concentration was about twice as high with the dam than without the dam at each station. This represents a substantial reduction in phosphorus concentration during the critical summer period when eutrophication is a greater risk.

Average concentrations of dry weather total phosphorus increased downstream, and were approximately 50% greater at Byron and Springbank than at Wharncliffe, perhaps due to effluent from the wastewater treatment plant located between Wharncliffe and Springbank stations. Dry weather average concentrations of total phosphorus at each station were greater at each station than at wet weather, with the dam in operation. However, without the dam, slightly greater average total phosphorus concentrations were observed at Wharncliffe and Byron in wet weather. This shift may be due to a smaller degree of difference in river conditions between dry and wet weather when the dam was not operational.

Suspended solids concentrations were significantly greater at the two upstream stations, Springbank and Wharncliffe, with the dam, compared to without the dam, at dry weather in summer. The absence of a dam might have driven a greater degree of change in river depth and velocity at the upstream two stations, yielding a larger decrease in Suspended Solids there. For both the dammed and free-flowing conditions, suspended solids decreased downstream, perhaps due to dilution.

2.1.13 Natural Hazards and Erosion

Natural hazard mapping in the London Official Plan identifies the steep slopes, erosion hazard limits, and special policy areas in the area (The City 2006, maps updated in 2015). In addition to the natural hazards noted at many locations, the banks of the river have been artificially hardened in some locations.
through the application of bank armoring and gabion baskets. This hardening is most prevalent along
the South Thames branch, near the dykes, at the Forks, and around the vicinity of Springbank Dam.
Zones of active erosion in the study area have been previously documented in The Central Thames
Subwatershed Study (PARISH 2014). An update erosion inventory is currently being completed through
the One River area and will summarize and prioritize areas for any recommended remediation based on
potential risk. The updated inventory identifies gabion baskets, poured concrete, concrete slabs
(rubble), and rip rap revetments.
A survey of erosion hazards in October 2017 revealed that fluvial erosion (bank and bed scour) is
primarily limited to the area of the forks. Observations include failure of gabion baskets (Figure 11) as
well as failure along steep banks downstream of the confluence posing potential risk to the multi-use
trail (Figure 12). Toe-erosion was also observed along the south bank in the vicinity of the Greenway
Wastewater Plant and the Riverview-Evergreen Dyke. Permanent lowering of the water level as a result
of dam non-operation has resulted in the outflow channels from elevated stormwater outfalls becoming
less stable (Figure 13).

2.1.14 Vegetation
Vegetation characterization through the area has historically been documented through land use
mapping, aerial imagery, ecological land classification (ELC) and flora inventories. The most extensive
(spatial) study of vegetation is an ELC completed as part of the ENVision Thames River Valley Corridor
Plan (Dillon et al. 2009). The study examined 47 vegetation patches greater than 0.5 ha along the Thames corridor. Between Springbank Dam and the Forks, eight vegetation communities were mapped, including deciduous forest (most dominant), cultural woodland (second most dominant), cultural meadow, mixed forest, coniferous forest, meadow marsh, and open aquatic.

After the non-operation of Springbank Dam, a localized shoreline vegetation study was initiated by the UTRCA. The review was conducted in 2007, 2010, and 2014 and reported in 2015 (UTRCA 2015a), showing the chronology of vegetation establishment within several vegetation plots within the riparian corridor. The findings from the shoreline vegetation study are of interest as they were a direct observation of the vegetation changes along the river since the non-operation of the Springbank Dam. Vegetation plots were examined for diversity, Floristic Quality Index (an index of vegetation quality based on plant species composition and abundance), and other scoring parameters. Inventories found the number of native and non-native species within the plots to be relatively similar. The Floristic Quality Index increased throughout the plots over time due to the larger number of species found, and was considered in the moderate range for diversity. The study also provided recommendation with respect to vegetation management if the Springbank dam was recommissioned or decommissioned. If the Springbank Dam was decommissioned permanently, the recommendations in the UTRCA report suggest allowing the vegetation to continue to naturalize and monitor these changes. If the operation of the Springbank Dam was resumed, the recommendation states that the vegetation should be removed from the shorelines. Over time, the vegetation has since covered over 10 ha of land. This could lead to water quality and recreational issues if it were left in place when the area is backwatered. Bank erosion issues should also be monitored with the vegetation removal. The City’s river management strategy will ultimately determine an appropriate strategy for vegetation management based on environmental and recreational considerations.

### 2.1.15 Wildlife – Terrestrial

The Thames River and valley corridor is known as a unique area for biological diversity that attracts various terrestrial wildlife species. The combination of water, riparian areas, and woodlands promote an opportunity for species to occupy and migrate between a multitude of habitats. The forested valley slopes and wide river corridor separate the natural environment from the surrounding urban landscape. The width and longitudinal connectivity of the terrestrial corridor has increased since the lowering of water levels, allowing for vegetation to establish and more stable slopes to form.

#### 2.1.15.1 Terrestrial Wildlife Inventories

Terrestrial wildlife throughout the area includes birds, mammals, herpetofauna and insects. Terrestrial wildlife is separated from aquatic wildlife. Although terrestrial species may interact with the riverine environment or surrounding vegetation within the Thames corridor, they spend much of its life cycle outside of the aquatic environment. Inventory record reviews were completed through online database searches and atlases, and supplemented with observations from previous reports. A detailed inventory is outlined in Appendix B and includes 200 birds, 42 mammals, and 34 species of herpetofauna that have been observed or have the potential to occupy the area at and upstream of Springbank Dam.

Birds observed in the area from previous studies cover several different families including swallows, thrushes and woodpeckers. Geese, ducks, herons and kingfishes along with other aquatic birds and water fowl have also been observed utilizing the area upstream of the dam. Generally, birds will utilize the Thames River and adjacent corridor for foraging, nesting, and shelter, with overwintering occurring in areas of faster moving water that is not prone to freeze up.

As the Thames River is surrounded by interconnected parkland and interspersed by natural lands, mammals generally utilized the Thames River as interconnected habitat allowing opportunities to exploit the urban setting. Common wildlife tolerant of human disturbances is able to thrive within the Thames corridor and maintain a healthy population within the city. Sightings of several mammals have
been observed near the dam including rodents and larger mammals such as coyotes and white-tailed deer. Beavers, which largely utilized the riverine environment have also been noted recently (2016) near Springbank Dam and at the Forks.

Herpetofauna, collectively known as amphibians and reptiles, include snakes, turtles, lizards, frogs, toads, salamanders, and newts in Ontario (Ontario Nature 2017). Many of these species utilize river habitats for a wide range of functional habitat needs including foraging, breeding and nesting. The most common herpetofauna documented recently near Springbank include the Eastern Spiny Softshell turtle, Eastern Gartersnake and Northern Map turtle.

2.1.16 Wildlife – Aquatic

Aquatic habitat upstream of the dam, similar to channel morphology, has historically been impacted by the operation of the Springbank dam which resulted in backwater upstream of the dam for several kilometers, creating a lentic (still water) ecosystem. This low energy environment limited sediment movement which, in turn, has resulted to minimal variation in bed forms and a more uniform habitat for aquatic life. Since 2006 the riparian corridor has been expanding and creating a larger functional habitat along the channel margins (Figure 5). Vegetation establishment along the banks have developed into dense shrub growths, creating a littoral zone in areas that were formerly submerged and bordered by retaining walls and dykes.

Previous reports on the aquatic habitat within the area have been limited and generally subject to studies surrounding structural components such as a dyke or bridge. The Byron Dyke SLSR completed in 2015 concluded that the habitat within the subject lands (downstream of the dam) was in good condition with optimal scores for channel flow, riffle frequency and epifaunal cover. Suboptimal scores were given for bank stability. Similarly, the West London Dykes SLSR aquatic habitat assessment completed in 2014 concluded that the subject lands at the Forks was also in good condition with high scores for epifaunal cover and low amounts of sedimentation. Suboptimal scores were given for riffle frequency, banks stability, and riparian zone width.

Matrix Solutions is currently conducting general habitat mapping for the Thames River between Springbank Dam and the Forks as part of this EA. Select areas near the 2017 fish survey locations will be targeted for detailed habitat mapping. This information will provide an overall look at aquatic habitat through the reach that can be related to the historical and 2017 fish surveys. It will be used to help develop the preferred river management strategy as part of Stage 2 of the Master Plan EA.

2.1.16.1 Aquatic Wildlife Inventories

UTRCA identified over 150 aquatic fish, mussel and amphibian/reptile species that inhabit the Thames River and adjacent tributaries (UTRCA 2017d). Inventories of fish, mussels, herpetofauna and benthic macroinvertebrates are documented by agencies such as DFO, MNRF, and UTRCA since 1967. Matrix Solutions has also completed two seasonal fisheries surveys upstream of the Dam in June and September of 2017.

Fisheries

Background fisheries data has been compiled by fish sampling records from DFO, Royal Ontario Museum, MNRF, and UTRCA between 1967 and 2015. A historical fish inventory summary included 47 different species collected between 1967 and 2015 (Appendix B). The most common species found over the sampling period was Greenside Darter, Rock Bass, Smallmouth Bass, and Striped Shiner.

The 2017 fisheries surveys in Appendix C focused on four select areas: the old pump house upstream of Springbank Dam, Greenway Park upstream of Wonderland Road, the Fork and the South Thames Branch, just upstream of the Forks. During both visits, the most common species caught were members of the minnow family making up over 80% of the total species sampled. The most common individual
species sampled were Common Shiner, Rosyface Shiner, Emerald Shiner and, in the second round of sampling, Silver Shiner. The free-flowing river system has allowed for the development of vast areas of riffle, flats and coarse substrates that support large schools of these minnow species.

Since the spatial and temporal extents as well as the methods of collection for each of the fisheries programs varied, it is difficult to draw conclusions about population changes and trends. There is no direct connection between the presence of fish species within the area before and after the operation of Springbank Dam in 2006. However, it appears that the shiner species in particular have benefited from the newly available gravel substrate and fast flowing riffle environment upstream of the Springbank Dam.

Springbank Dam Fish Passage Study

A study completed by Biotactic in October 2010 monitored 3 years of fish movement at the Springbank Dam during open flow conditions. Fish passage data from three species with varying swimming abilities and migration timing windows — White Sucker (weak), Shorthead Redhorse (moderate), and Smallmouth Bass (strong) — were monitored each year for various components of fish passage (e.g., attraction, efficiency). The data was compared to the pre-construction data from 2006 during a period where the Springbank Dam was not in operation and the stop logs were not in place. The findings of the study summarized that although the dam does provide some interference to fish passage, it is not seen as a complete barrier.

Mussels

The Thames River hosts the second most diverse freshwater mussel population in Canada (UTRCA, 2017d). Freshwater mussels typical thrive in free flowing riverine environments where oxygen is plentiful, siltation is minimal and there is the presence of species specific host fish that each mussel requires to develop from larvae.

Historical mussel surveys were conducted by UTRCA, DFO and Environment Canada in 1998 and 2004 in the vicinity of the Springbank Dam and the North and South Thames tributary sections. Over 10 species including live and shell relics were identified upstream of the dam. Since 2004, no mussel surveys have been completed upstream of the Springbank Dam or in the main Thames branch. The lack of current sampling efforts within the river have limited the understanding of current assemblages, however it is anticipated that these species would likely still be present in the area or have migrated downstream from the North and South Thames branches, now that a free-flowing riverine state has been established.

Benthic Macroinvertebrates

Benthic macroinvertebrates (benthics) are organisms that live on the bottom of a water body (or in the sediment) and have no backbone. Benthics are typically sampled at riffles/run habitats in the spring or fall season, and their taxonomy is classified by family and/or genus levels. The number of benthics in each family/genus level is then related to various biotic indices. These indices are used to determine the health of the river based on the sensitivity and tolerance to pollution at a given location within the river.

Both water quality and benthic monitoring on the Thames River has been ongoing since by the City since 2006. The City’s BioMap monitoring program uses a number of indices to determine the spatial and temporal trends in water quality of the Thames River. The program has not found any significant improvement trends in the biotic indices upstream of the Springbank Dam (Matrix 2016). The best benthic and water quality sites continue to be found in the North and South Thames River. These sites had scores that indicate fair to good water quality conditions. The poorest quality conditions continue to be found in the main Thames River, with biotic index scores indicating fair to fairly poor water quality. The decrease in water quality downstream of the North and South branch confluence is attributed to the number of combined sewer overflows and Greenway Pollution Control Plant effluent nutrient loading contributions.
**Species at Risk and Species of Concern**

The Thames River is known as the only true Carolinian River in Canada, and is one of the main reasons that many species at risk and Special Concern species are potentially occurring upstream of the Springbank Dam and within the Thames River. Accordingly, this unique setting hosts species whose northern ranges are limited or non-existent in other parts of Ontario and Canada.

A review of existing information and background studies (Appendix B) indicated that 74 species at risk listed as Endangered, Threatened, or Special Concern under SARA and/or the ESA have the potential to occur in the area of Springbank Dam or upstream. While some of the species only have the potential to occupy the River based on habitat preferences and historical information, many species at risk have been observed to utilize the area for migration as well as residence. A list of 31 observed species at risk species are outlined in Table 3, with discussion on each grouping detailed below.

<table>
<thead>
<tr>
<th>Table 3. Observed Species at Risk and Species of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Name</td>
</tr>
<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td><strong>Flora (5)</strong></td>
</tr>
<tr>
<td>Butternut</td>
</tr>
<tr>
<td>Cucumber Tree</td>
</tr>
<tr>
<td>Green Dragon</td>
</tr>
<tr>
<td>Kentucky Coffee Tree</td>
</tr>
<tr>
<td>Red Mulberry</td>
</tr>
<tr>
<td><strong>Birds (8)</strong></td>
</tr>
<tr>
<td>Bank Swallow</td>
</tr>
<tr>
<td>Barn Swallow</td>
</tr>
<tr>
<td>Chimney Swift</td>
</tr>
<tr>
<td>Common Nighthawk</td>
</tr>
<tr>
<td>Eastern Meadowlark</td>
</tr>
<tr>
<td>Eastern Wood-pewee</td>
</tr>
<tr>
<td>Olive-sided Flycatcher</td>
</tr>
<tr>
<td>Wood Thrush</td>
</tr>
<tr>
<td><strong>Herpetofauna (5)</strong></td>
</tr>
<tr>
<td>Eastern Spiny Softshell</td>
</tr>
<tr>
<td>Northern Map Turtle</td>
</tr>
<tr>
<td>Snapping turtle</td>
</tr>
<tr>
<td>Eastern Milksnake</td>
</tr>
<tr>
<td>Queensnake</td>
</tr>
<tr>
<td><strong>Mammals (1)</strong></td>
</tr>
<tr>
<td>Eastern Small-footed Bat</td>
</tr>
<tr>
<td><strong>Insects (1)</strong></td>
</tr>
<tr>
<td>Monarch</td>
</tr>
<tr>
<td><strong>Fish (5)</strong></td>
</tr>
<tr>
<td>Silver shiner</td>
</tr>
<tr>
<td>Black Redhorse</td>
</tr>
<tr>
<td>Northern Brook Lamprey²</td>
</tr>
</tbody>
</table>
### Flora

Previous flora inventories listed 5 species at risk that have been observed in the area including, Green Dragon, Cucumber Tree, Butternut, Kentucky Coffee Tree, and Red Mulberry (may be a hybrid). Green Dragon was the only species confirmed for the area in the 2016 MNRF species at risk letter (Appendix B). The remaining species at risk flora were all inferred in previous studies based on the presence of other vegetation communities. Several of the floral species at risk prefer wet, riverine/floodplain environments including the Green Dragon, Butternut and Kentucky Coffee Tree, which could now potentially inhabit the largest riparian environment. However, no plant species at risk were found by UTRCA during the three-year vegetation succession study.

### Birds

Of the 26 potentially occurring bird species at risk in the area, eight have been observed including: Bank Swallow, Barn Swallow, Chimney Swift, Common Nighthawk, Eastern Meadowlark, Eastern Wood-pewee, Olive-side Flycatcher, and Wood Thrush. Many of these species were found along the South Thames and the Coves, where more meadow environment exists adjacent to the Thames River Valley. Some species such as the Olive-sided Flycatcher will use forests adjacent to rivers and wetlands for breeding where other such as the Chimney Swift will use the river for foraging.

### Mammals

Five species at risk mammals were listed as having potential to occur in the area. The Small-footed Bat was the only species at risk mammal observed during the previous studies along the North Thames. Bats typically used the riverine environment for foraging insects. Two species of insects were also identified as species at risk. The Rusty-patched Bumble Bee (END) was listed as potentially occurring within the area but was never observed. The Monarch Butterfly (SC) was listed and sighted during several of the previous studies. Monarchs feed on milkweed which prefers wet soils such as riverbanks and other riparian areas.

### Herpetofauna

The majority (75%) of Ontario’s reptile species are listed as species at risk. The major cause of listing is due to habitat loss and fragmentation, as these species tend to occupy more sensitive habitats (e.g., wetlands and shorelines). Five herpetofauna species at risk have been observed in the area upstream of Springbank Dam. The most commonly recognized species is the Spiny Softshell Turtle which in other
Ontario environments continues to decline from poaching and habitat loss. The Spiny Softshell turtle, unlike other turtle species, uses the riverine environmental for all critical life-cycle requirements including breeding and foraging. It is the most documented and well-known species at risk to inhabit this area of the Thames River since the non-operation of the Dam. Additional herpetofauna species at risk found in the area include Snapping Turtle and the Northern Map Turtle, two species that also utilize the river for critical habitat needs (e.g. hibernating). The Eastern Milksnake is more likely to be found in a terrestrial environment such as a meadow, however the Queensnake is an aquatic reptile that prefers to live near river banks and largely forages for crayfish.

**Fish**

Three species at risk fish have been caught in or directly adjacent to the area, including Black Redhorse, Silver Shiner, and Spotted Sucker. Moreover, during the Springbank Dam EA, two additional species at risk, Northern Brook Lamprey and Pugnose Minnow, were reported approximately 3 km downstream of the Springbank Dam at Riverside Bend. Since the nonoperation of Spring Dam, and the findings from the fish passage study conducted in 2010, it is possible that these species have now migrated further upstream.

The Distribution of Fish Species at Risk (DFO 2016) Maps are provided in Appendix B. The maps indicate that the Special Concern species and species under consideration for listing (Endangered or Threatened) have critical habitats throughout in the area. The species noted include Pugnose Minnow, Silver Shiner, Northern Brook Lamprey, and Spotted Sucker. This corresponds with the findings from the 2017 fisheries surveys which found Silver Shiner, a species that prefers a habitat of large free-flowing rivers, at all sampling locations upstream of the dam.

**Mussels**

Based on observations of both live and relic shells, species at risk mussels have been documented near and upstream of Springbank Dam including Mapleleaf, Mudpuppy, and Wavy-rayed Lampmussel. Rainbow, Rayed Bean, and Round Pigtoe mussels were found in sections upstream of the Forks in the South and North Thames. Hickorynut and Kidneyshell were listed as potentially occurring, but were never found during previous studies. During the 2017 fisheries sampling, host fish were found for Kidneyshell (e.g. Blackside Darter), Rainbow Mussel (e.g. Small-mouthed Bass), Rayed bean (e.g. Greenside Darter), Round Pigtoe (Bluntnose minnow), and Wavy-Rayed Lampmussel (Small-mouthed bass). Presence of a host-fish is one of the key features in determining if an environment can support a mussel population.

The DFO map of the Distributions of Mussel Species at Risk (UTRCA 2015b) is provided in Appendix B. Mapping shows that several species protected under SARA for critical habitat are found upstream and downstream of the Springbank Dam. Critical habitat has been outlined for Kidneyshell, Mapleleaf, Rainbow, Rayed Bean, Round Pigtoe, and Salamander (Mudpuppy) Mussel.

**2.1.17 Summary**

The natural environment of the Thames River can be best described as a truly unique system known not only for its ability to sustain a great variety of aquatic species, but also for its biological diversity that attracts various terrestrial wildlife species. The steep forested valleys and wide, shallow watercourse provides areas for many species occupy, migrate and interact within the system. Since the non-operation of the Dam, the river and riparian corridor has continued to diversify following the new flow and sediment regimes, trending toward a new dynamic equilibrium.

Although the Thames River flows through urban and rural agricultural lands and is largely a warm water, flow controlled system, its southerly location within the Carolinian zone provides habitat for Species at Risk (SAR) whose ranges are restricted and endemic to Southwestern Ontario. A review of existing information and background studies found over 30 species at risk listed as Endangered, Threatened, or Special Concern under SARA and/or the ESA in the area of Springbank Dam or upstream. Many of these
species at risk have benefited from the free-flowing system that has occurred over the past 10 years and will continue to inhabit and migrate freely through the corridor. Future management of the river environment will need to consider the river’s function as habitat of both species at risk and other indigenous wildlife, as well as its unique attributes in terms of cultural and recreational importance.

2.2 Social/Cultural Environment

The social/cultural environment is the environment that has been developed by humans. It includes how humans use and interact with the land now, in the past, and in the future. Important aspects of the social/cultural environment are existing land uses, cultural and archaeological heritage resources, recreational uses, First Nations history, use and knowledge of the Thames River Corridor, and planned land use and infrastructure.

2.2.1 Existing Land Uses

The City of London (the City) is currently one of Ontario’s largest urban centers with a variety of important cultural and environmental resources shaping the City’s history and identity. The Thames Valley Corridor is widely recognized as one of the City’s most important natural, cultural, recreational and aesthetic resources and, as a result, the Thames River was recognized as a Canadian Heritage River in 2000 (City of London, 2011). The Thames River presence has shaped the City’s development and subsequently influenced the existing land use in, and adjacent to, the Thames Valley Corridor.

The Thames Valley Corridor currently provides a wide range of land uses including park open space, pathways, and trails. Adjacent lands include organized recreation and institutional use (for example, Thames Valley Golf Course and University of Western Ontario, respectively) as well as several vacant or underutilized commercial and industrial uses.

Within the Thames Valley Corridor itself, land use consists of nature-oriented parkland, valleyland open space, and a system of pathways and trails (City of London, 2011). These uses provide excellent opportunities to support healthy lifestyles and promote wellness, offer affordable and unstructured recreational pursuits, increase tourism, and facilitate cultural and natural heritage appreciation. The existing developed park area provides recreational facilities including playing fields and picnic areas which serve as community and neighbourhood social areas. Specifically, the valleyland along the Thames River and its tributaries provide primary open space resources including a continuous, linear open space network of trails and pathways connecting individuals and communities, with a distributed open space system consisting of natural areas, parks, activity areas and facilities.

Currently, there are few locations along the Thames Valley Corridor for potential interaction with the Thames River. These locations include: Springbank Pumphouse area, Riverside boat launch, rowing club, canoeing club, and fishing docks as well as several locations where informal river access has been created.

2.2.2 Archaeological and Built Heritage

The scope of the One River EA cultural heritage overview involved identifying cultural heritage resources within the Study Area, reviewing previous research and reporting, and recommending measures to ensure cultural heritage resources are considered in the preferred options. All analysis and recommendations followed guidance outlined in the Ministry of Tourism, Culture and Sport’s (MTCS) Ontario Heritage Tool Kit series, municipal documents such as the City’s Official Plan, Cultural Prosperity Plan, and 2015-2019 Strategic Plan, as well as recognized conservation manuals such as Canada’s Historic Places Standards and Guidelines for the Conservation of Historic Places in Canada.
The cultural heritage overview resulted in the identification of the following cultural heritage resources within the Study Area:

- Two (2) properties designated as a National Historic Site of Canada under the *Historic Sites and Monuments Act* (R.S.C., 1985, c. H-4), with plaques also erected on the property;
- Fourteen (14) properties designated under Part IV of the *Ontario Heritage Act*;
  - Nine (9) of these are included on the Canadian Register of Historic Places.
  - Two (2) of these have an Ontario Heritage Trust easement.
- Fifty (50) properties designated under Part V of the *Ontario Heritage Act*, as part of either the Blackfriars-Petersville Heritage Conservation District, the Downtown Heritage Conservation District, or the Wortley Village-Old South Heritage Conservation District;
- Forty-four (44) properties inventoried on the Inventory of Heritage Resources 2006 and/or the City’s Heritage Parcels GIS layer;
- Three (3) properties identified by the City Heritage Planner as ‘properties of interest’;
- Three (3) plaques listed on the Ontario Heritage Foundation Online Plaque Guide; and
- One (1) cemetery listed on the MGCS’s Database of Registered Cemeteries.

Desktop research also determined that the entire Study Area is within the floodplain of the Thames River, which is designated under the Canadian Heritage River System (CHRS). Each identified resource and associated recommendation for further action is summarized in Appendix D.

### 2.2.3 Recreational Uses and Activities

Existing recreational areas within the Thames Valley Corridor have been developed to offer a variety of active and passive recreational uses. There are many recreationalists and interest groups using and supporting the enhancement of the Thames Rivers, including Anglers’ Associations and the London Canoe Club. Passive recreational opportunities include activities such as bird watching, walking, canoeing, and the enjoyment of natural features. Active recreational opportunities within the Thames Valley Corridor include activities such as organized sports, playground activities, use of motorized equipment, and fishing. Walking and cycling on the Thames Valley Parkway is also a known favoured activity for users of all ages (City of London, 2009).

Activity areas are existing developed park spaces offering recreational amenities that may also serve as neighbourhood or community social gathering areas. These activity areas for recreational use within the study area include Ivey Park, Springbank Park, Labatt Park, Thames Park, and Greenway Park. These recreational amenities include the following:

- Sports fields
- Tennis courts
- Swimming pools
- Washrooms
- Water fountains
- Picnic areas
- Dog parks
- Splash pads
- Fishing docks
- Rowing club house
- Cultural sites
- Children’s play areas
- Playgrounds

The City’s oldest golf course also lies within the study area and directly fronts the river. These activity areas and subsequent recreational uses are anticipated to evolve over time which will provide an opportunity for additional recreational activities to support strong neighbourhoods, healthy lifestyles and a sustainable environment (City of London, 2009).
Historically, the reservoir upstream of Springbank Dam was used for pleasure boating and a ferry service. More recently the London Rowing Club and the London Canoe Club have offered training and programs on the reservoir, although they have since moved to other local water bodies with the non-operation of the dam.

### 2.2.4 First Nation and Metis Concerns

First Nations community consultation is essential to the One River EA process. The perspectives and stories of First Nations with respect to their history, knowledge and identity through Aboriginal Traditional Knowledge, as it relates to the Thames River, are important contributions to the One River EA. First Nations peoples have a unique perspective and relationship with the lands and waters within the watershed that include assertions of Aboriginal title, Treaty rights and Aboriginal rights. First Nations have expressed concern about actions they perceive may influence title claims, as well as the health and economic well-being through impacts to drinking water, hunting, fishing, recreation and tourism. Oneida Nation of the Thames, Munsee-Delaware and Chippewas of the Thames First Nation rely on the Thames River as an indirect source of drinking water, sustenance in the way of fish, gathering and harvesting of ceremonial and medicinal plants and recreation. The watershed is an important hunting ground and is essential to archival and oral traditions, history, knowledge and identity.

First Nations Communities with an interest in the One River Master Plan EA, who have been consulted with include:

- Aamjiwnaang First Nation
- Delaware Nation (Moravian of the Thames)
- Chippewas of the Thames
- Munsee-Delaware Nation
- Oneida Nation of the Thames
- Bkejwanong Territory (Walpole Island)
- Caldwell First Nation
- Chippewas of Kettle and Stony Point First Nation
- Southern First Nations Secretariat
- Ministry of Aboriginal Affairs-Consultation Unit
- Metis Nation of Ontario

### 2.2.5 Planned Land Use and Infrastructure

The City is experiencing an increase in population density with an approximate 4.8% increase in population growth from 2011 to 2016 (Statistics Canada, 2017). The City anticipated that demographic growth will continue with approximately 77,000 new residents by 2035 (City of London, 2016). Therefore, planned land use and future development will consider the current and future needs of the growing population while managing the available park and recreational resources.

In the past, most urban uses within and adjacent to the Thames Valley Corridor have purposely derived minimal benefit from a ‘Thames River address’ by developing infrastructure with minimal focus on the corridor (City of London, 2011). Redevelopment presents an opportunity to reverse this and facilitate land uses that are more compatible with the Thames River Valley context to improve the aesthetic value of the urban structure. Planned land use and infrastructure associated with the Thames Valley corridor will align with desired land uses described in the City’s Official Plan (City of London, 2016) including principles to protect and preserve natural features for their integration into the land use design, maintain open views of natural features and landmarks, and the creation of gateways at strategic locations. The public has expressed a strong interest in managing new development adjacent to the Thames Valley Corridor toward these objectives (City of London, 2011).
Strategic restoration of open space lands to buffer and enhance existing remnant natural areas is an important management strategy for the Thames Valley Corridor (City of London, 2011). Providing access to the Thames River’s edge for activities such as viewing, fishing, or exploring nature is anticipated to support river users who have expressed concern regarding the Thames River’s stewardship and restoration efforts. Creating strategic access points along the Thames River is important to limiting unplanned trail development by the public as well as preventing the destruction of existing riverbank vegetation.

More recently, the City plans to develop programming along the Thames Valley Corridor to allow for festivals, events and activities that will facilitate social connections, physical health, mental well-being and intellectual development (City of London, 2016).

The existing parks and open space system should continue to support areas where people and nature can co-exist in the same ecosystem. For example, additional benches, rest areas, shade trees, washrooms and drinking fountains should be developed at strategic locations for ongoing enjoyment. The creation of secondary pathways and/or trail connections should focus on neighbourhoods with socio-demographic indicators the suggest access to no/low-cost or unstructured outdoor recreation opportunities would be most beneficial. Limitations on development and land use activities within the Thames Valley Corridor are imposed by the natural flood plain, slope and erosion hazard areas; however, restoring, rehabilitating and enhancing natural heritage areas subject to flooding or erosion hazards (such as, the Thames Valley Corridor) is one of the City’s highest priorities (City of London, 2016). Additionally, the Thames Valley Corridor Plan (City of London, 2011) is a progressive step to ensure London’s natural heritage assets are protected and preserved, while enhancing recreational opportunities.

2.3 Technical Environment

2.3.1 Springbank Dam – History, Description, Condition

The original Springbank Dam was built in the 1870s as a water reservoir at a different location than the current dam. The dam failed at various time over the few decades and there was no dam in operation from 1917 to 1929.

The current location was the site of construction for the next Springbank Dam structure in 1929. This dam was again built to provide a water reservoir and to support recreational opportunities along the river. The dam, when operational, raised water levels in the Thames upstream of the dam to the forks of the Thames area in downtown London and provided deeper water for recreation and access to the river. Typical operation of the dam was from late May and then opened again in early November. The dam is owned by the City of London and was operated by the UTRCA to manage fisheries (UTRCA, 2015).

In 2000, a debris field during a rainfall damaged the dam. A review of the dam condition resulted in recommendations to rehabilitate the dam to meet current safety standards. In 2008 during the testing of the new dam a failure occurred and the dam has not operated since that time. The dam was not designed to provide any flood attenuation.

2.3.2 Back to the River Design Integration

The Back to the River “Ribbon of the Thames” award-winning design incorporates a number of elements that support a River vision that has been called bold and exciting. It focuses on bringing people back to the River to enjoy a significant cultural and heritage resource and engage in activities that reflect the river’s beauty and cultural significance. Coordination with the Ribbon of the Thames Civitas/Stantec team has begun on how the design elements of Back to the River can be integrated into the EA evaluation and be adapted to potentially changing water levels. The design elements of the Ribbon of the Thames can be integrated into the range of water levels represented by the Springbank Dam options.
2.3.3 Other Infrastructure
The Thames River in the study area impacted by the dam there are a number of other infrastructure components maintained by the City of London. Over the last 50 years, the river has been altered and impacted as the City has grown. Flood protection dikes were constructed to alleviate flooding at the Forks, infrastructure and weirs were constructed to service the City’s core, and water-takings were permitted to supply water for a variety of industrial, commercial, and agricultural uses.

2.3.4 Permits and Approvals
The permits and approvals required for retaining the dam in some form or reinstating it were reviewed with the Agency Review Committee and presented in the Agency Advisory Committee report in Appendix E for a description of the Agency Review Committee and input received. The Committee confirmed that the permits and approvals necessary, the level of mitigation and compensation requirements, and the timeframe required to receive varied with the option under consideration. The key agencies and permits that may be required are as followed:

- Permit under Section 28 of the Conservation Authorities Act (CAA) from the Upper Thames River Conservation Authority (UTRCA).
- A permit-to-take water under the Lakes and Rivers Improvement Act (LRIA) from the MOECC.
- Dam Construction Regulation Permit under the Lakes and Rivers Improvement Act (LRIA) from the Ontario Ministry of Natural Resources and Forestry (MNRF).
- An overall benefit permit is Environmental Sensitive Areas (ESA) are impacted form the MNRF.
- A permit under the Species At Risk Act (SARA) from Canada Department of Fisheries and Oceans (DFO), as critical habitat, as defined by DFO exists within the area that would be affected by potential flooding. The presence of multiple species at risk and the significance of water quality and habitat to those species also affects the subject area.
- Navigable Waters Permit under the Navigable Waters Act administered by Transportation Canada.

If was confirmed that no permit would be required under Ministry of Northern Development and Mines (MNDM) in this region.
SECTION 3

Springbank Dam Options

3.1 Do Nothing

The dam is kept in its current condition by completing a safety and operations review and on-going maintenance with no repurposing. Minor work would be completed to salvage appropriate dam components and obtain applicable permits.

3.2 Free-Flowing River

The dam is decommissioned and no longer provides a water retention function. Dam decommissioning may include options for repurposing the dam structure and various river enhancements, ecological enhancements and recreational enhancements upstream. These enhancements are to work within the hydrologic and hydraulic limitations associated with lower water levels during the summer months when, otherwise, the dam may have been operated to increase water depths upstream. Work to be completed in addition to salvaging dam components and obtaining applicable permits could include removing gates to provide a live bottom to the river and stabilizing the required components and shore structures.

3.3 Reinstating the Dam

The dam is reinstated so it provides a water retention function, operating at a similar capacity as it has previously. Dam repair or reconstruction allows for dam operation during months when higher water levels upstream would promote additional recreational opportunities associated with higher water levels. Reinstating the dam does not preclude adding options like those for repurposing the dam.
Approach for Evaluation of Springbank Options

4.1 Evaluation Process

The evaluation process for the selection of the preferred option for the Springbank Dam follows the Municipal Engineers Association (MEA) process for Master Plan EAs. The essential nature of the process is that it captures a wide and inclusive range of criteria that provide the opportunity to examine the impact of each of the options on the issues identified through the Problem/Opportunity statement. The criteria for the examination of the three Springbank Dam options have been developed through consultation with the City, project stakeholders, the general public and engagement with First Nations and Metis communities. The criteria cover the range of potential impacts or changes from what is considered the “Baseline Condition”. This baseline condition is represented by the existing conditions in the river within the boundaries of the study area and the current condition of the Springbank Dam. This baseline condition has been defined through the examination of various databases on water quality and the ecological environment, consultation and engagement with the public, stakeholders and First Nations and Metis communities and recent field efforts to characterize the current condition of the river.

4.2 Evaluation Criteria

The criteria used to evaluate options are presented in Table 4, along with descriptions of the rating scales for measuring impacts. The criteria represent Natural Environment, Social/Cultural and Technical/Economic aspects of potential impacts. The anticipated impact of each of the three Springbank Dam options on each of the criteria are evaluated based on the Measure/Indicator defined under each criterion. The rating scales ranges from 1 to 5, with 5 indicating the positive change from the existing conditions, 3 indicating no change from existing conditions (neutral effect), and 1 representing a negative change from existing conditions.

<table>
<thead>
<tr>
<th>Category &amp; Criterion</th>
<th>Description</th>
<th>Measure/Indicator</th>
<th>Rating Scale for Measuring Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural Environment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>The potential of the option to maintain or improve water quality.</td>
<td>Potential change in water quality compared to the existing conditions for total suspended solids and total phosphorus.</td>
<td>5 Improvement to water quality from existing conditions (positive effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No change in water quality from existing conditions (neutral effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Decrease/degradation in water quality from existing conditions (negative effect)</td>
</tr>
<tr>
<td>Geomorphology</td>
<td>The potential of the option to result in a stable river system (i.e. stable streambanks and stream bottom conditions) to optimize sediment transport to support a healthy aquatic environment.</td>
<td>Potential change in the extent and risk of streambank erosion and stream bottom scour compared to the existing conditions.</td>
<td>5 Improvement in the stability of the river system from existing conditions (positive effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No change in the stability of the river system from existing conditions (neutral effect)</td>
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<tr>
<td></td>
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<td></td>
<td>1 Decrease in the stability of the river system from existing conditions (negative effect)</td>
</tr>
<tr>
<td>Category &amp; Criterion</td>
<td>Description</td>
<td>Measure/Indicator</td>
<td>Rating Scale for Measuring Impacts</td>
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<tr>
<td><strong>Species at Risk</strong></td>
<td>The potential of the option to protect and enhance the habitat of sensitive species and species at risk (both aquatic and terrestrial).</td>
<td>Potential change in the extent and quality of significant habitats for sensitive species and species at risk compared to the existing conditions.</td>
<td>5 Improvement in the extent and quality of significant habitats for sensitive species and species at risk from existing conditions (positive effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No change in the extent and quality of significant habitats for sensitive species and species at risk from existing conditions (neutral effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Decrease in the extent and quality of significant habitats for sensitive species and species at risk from existing conditions (negative effect)</td>
</tr>
<tr>
<td><strong>Terrestrial Habitat</strong></td>
<td>The potential for the option to maintain or enhance terrestrial and riparian habitat for both plants and animals.</td>
<td>Potential change in the terrestrial habitat function and production capacity compared to existing conditions</td>
<td>5 Improvement in the terrestrial habitat function and production capacity from existing conditions (positive effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No change in the terrestrial habitat function and production capacity from existing conditions (neutral effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Decrease in the terrestrial habitat function and production capacity from existing conditions (negative effect)</td>
</tr>
<tr>
<td><strong>Aquatic Habitat</strong></td>
<td>The potential for the option to maintain or enhance habitat for aquatic dependent species.</td>
<td>Potential change in the aquatic habitat function and production capacity compared to existing conditions.</td>
<td>5 Improvement in the aquatic habitat function and production capacity from existing conditions (positive effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No change in the aquatic habitat function and production capacity from existing conditions (neutral effect)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1 Decrease in the aquatic habitat function and production capacity from existing conditions (negative effect)</td>
</tr>
<tr>
<td><strong>Groundwater and Surface Water interactions</strong></td>
<td>The potential of the option to protect or improve groundwater and surface water interactions to maintain or improve water quality and quantity.</td>
<td>Potential changes in the groundwater and surface water interactions compared to existing conditions.</td>
<td>5 Improvement in groundwater and surface water interactions from existing conditions resulting in improvements to water quality and quantity (positive effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No change in groundwater and surface water interactions from existing conditions resulting in no changes to water quality and quantity (neutral effect)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Decrease in groundwater and surface water interactions from existing conditions resulting in degradation to water quality or decrease in water quantity (negative effect)</td>
</tr>
<tr>
<td><strong>Social/Cultural</strong></td>
<td>The potential of the option to protect cultural/heritage resources.</td>
<td>Potential of the construction and related changes to the river regime to impact cultural heritage resources.</td>
<td>5 Potential to improve cultural/heritage resources due to construction and related changes to the river regime</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 No potential to degrade cultural/heritage resources due to construction and related changes to the river regime</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 Potential to degrade cultural/heritage resources due to construction and related changes to the river regime</td>
</tr>
</tbody>
</table>
## SECTION 4 – APPROACH FOR EVALUATION OF SPRINGBANK OPTIONS

<table>
<thead>
<tr>
<th>Category &amp; Criterion</th>
<th>Description</th>
<th>Measure/Indicator</th>
<th>Rating Scale for Measuring Impacts</th>
</tr>
</thead>
</table>
| **Public Health & Safety** | The potential of the option to minimize risk or liability to community health and safety. | Potential change in risk or liability to community health and safety from existing conditions. | 5 Potential to improve potential risk or liability to community health and safety  
3 No change in potential risk or liability to community health and safety  
1 Potential to degrade potential risk or liability to community health and safety |
| **Boating Recreation** | The potential of the option to provide or enhance boating recreational activities. | Potential change in boating (canoeing, kayaking, etc.) recreational activities and areas from existing conditions. | 5 Improvement in boating recreational activities and areas from existing conditions (positive effect)  
3 No change in boating recreational activities and areas from existing conditions (neutral effect)  
1 Decrease in boating recreational activities and areas from existing conditions (negative effect) |
| **Fishing Recreation** | The potential of the option to provide or enhance fishing recreational activities. | Potential change in fishing recreational activities and areas from existing conditions. | 5 Improvement in fishing recreational activities and areas from existing conditions (positive effect)  
3 No change in fishing recreational activities and areas from existing conditions (neutral effect)  
1 Decrease in fishing recreational activities and areas from existing conditions (negative effect) |
| **Land-Based Recreation** | The potential of the option to provide or enhance land-based recreational activities such as walking, biking and bird watching. | Potential change in land-based recreational activities and areas from existing conditions. | 5 Improvement in land-based recreational activities and areas from existing conditions (positive effect)  
3 No change in land-based recreational activities or areas from existing conditions (neutral effect)  
1 Decrease in land-based recreational activities or areas from existing conditions (negative effect) |
| **Shoreline Accessibility** | The potential of the option to enhance public accessibility to the river. | Potential change in sites and areas for shoreline access from existing conditions. | 5 Improvement in sites and areas for shoreline access from existing conditions (positive effect)  
3 No change in sites and areas for shoreline access from existing conditions (neutral effect)  
1 Decrease in sites and areas for shoreline access from existing conditions (negative effect) |
| **Aesthetics** | The potential of the option to maintain or enhance the visual character of the river corridor. | Potential change in the visual character of the river corridor from existing conditions. | 5 Improvement in the visual character of the river corridor from existing conditions (positive effect)  
3 No change in visual character of the river corridor from existing conditions (neutral effect)  
1 Decrease in the visual character of the river corridor from existing conditions (negative effect) |
| **First Nations Interest** | The potential of the option to address First Nations and Métis concerns. | Ability to address First Nations and Métis concerns. | 5 Fully addresses First Nations and Métis interest  
3 Partially addresses First Nations and Métis concerns  
1 Does not address First Nations and Métis concerns |
| **Urban Revitalization** | The potential of the option to encourage investing in London’s downtown as the heart of the City to support urban regeneration and revitalization. | Potential to encourage investing in London’s downtown. | 5 High potential for encouraging investing in London’s downtown in support of urban regeneration and revitalization  
3 Moderate potential for encouraging investing in London’s downtown in support of urban regeneration and revitalization  
1 Low or negative potential for encouraging investing in London’s downtown in support of urban regeneration and revitalization |
### Technical and Economic

<table>
<thead>
<tr>
<th>Category &amp; Criterion</th>
<th>Description</th>
<th>Measure/Indicator</th>
<th>Rating Scale for Measuring Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Hazard</td>
<td>The ability of the option to mitigate flood hazards.</td>
<td>Potential change in risk of flood and erosion damage to public infrastructure and private property.</td>
<td>5 Decrease in potential risk of flooding&lt;br&gt;3 No change in potential risk of flooding&lt;br&gt;1 Increase in potential risk of flooding</td>
</tr>
<tr>
<td>Carbon Footprint</td>
<td>The ability of the option to minimize carbon footprint.</td>
<td>Potential change in carbon footprint from existing conditions, including the change in energy requirements during construction and operations.</td>
<td>5 Potential to reduce carbon footprint or energy requirements compared to existing system&lt;br&gt;3 No change carbon footprint or energy requirements compared to existing system&lt;br&gt;1 Potential to increase carbon footprint or energy requirements compared to existing system</td>
</tr>
<tr>
<td>Constructability</td>
<td>The ease of the option to be constructed and implemented on a technical basis.</td>
<td>Ease of constructing the option, considering land requirements for works and staging areas, construction equipment, timeframe for construction</td>
<td>5 Easy to implement; no or very little construction requirements&lt;br&gt;3 Moderately easy to implement; some challenges with construction such as land and equipment requirements, and timeframe for construction&lt;br&gt;1 Very difficult to implement; major construction challenges such as land and equipment availability/requirements, and long timeframe for construction</td>
</tr>
<tr>
<td>Approvability</td>
<td>The ease of the option to obtain required permits and approvals from regulating agencies (e.g. UTRCA, MNR, MOECC, DFO).</td>
<td>Ease of obtaining approvals and permits, including timeframe for receiving</td>
<td>5 No or very little approval requirements&lt;br&gt;3 Moderately easy to obtain permits and approvals; some challenges relating to timelines and number of approvals necessary but conditions are minor&lt;br&gt;1 Very difficult to receive permits and approvals; timeframe is long and conditions are major</td>
</tr>
<tr>
<td>Operations &amp; Maintenance</td>
<td>The ease of the option to be operated and maintained.</td>
<td>Degree of change in operations and maintenance requirements from existing conditions</td>
<td>5 Lowest degree of change operations and maintenance requirements from existing conditions&lt;br&gt;3 Moderate degree of change in operation and maintenance requirements from existing conditions&lt;br&gt;1 Highest degree of change in operation and maintenance requirements from existing conditions</td>
</tr>
<tr>
<td>Compatibility with existing and planned infrastructure projects</td>
<td>The compatibility of the option with existing and planned public infrastructure projects.</td>
<td>Ability of an option to be integrated with or complement existing and planned infrastructure projects</td>
<td>5 Very compatible with existing and planned infrastructure&lt;br&gt;3 Moderately compatible with existing and planned infrastructure&lt;br&gt;1 Very low compatibility with existing and planned infrastructure</td>
</tr>
<tr>
<td>Capital Cost</td>
<td>Relative capital costs.</td>
<td>Capital costs of an option relative to other options</td>
<td>5 Lowest capital costs&lt;br&gt;3 Moderate capital costs&lt;br&gt;1 High capital costs</td>
</tr>
</tbody>
</table>
Table 4 provided a summary of the evaluation criteria, measures and potential ratings. As illustrated the impacts are rated on a scale of 1 to 5 (with 5 being the most beneficial and 1 being the least beneficial), and scores are normalized for each criteria category – natural, social/cultural and technical/economic – so that each category can be considered of equal importance. Scores by category are then summed to provide a score out of 15 for each option. The option with the highest score is ranked as preferred.

Details on the impact assessment on natural, social/cultural and technical/economic criteria are described in the following sections and in the detailed options evaluation matrix provided in Appendix F.

5.1 Natural Environment

The natural environment criteria provide the framework for examining the potential ecological changes that can be anticipated for each of the three Springbank Dam options. Each of the criteria addresses an aspect of the natural environment and, in combination, provide a thorough review of potential changes from the baseline condition.

5.1.1 Water Quality

Water quality parameters examined in detail for this criteria evaluation included total suspended solids (TSS) and total phosphorus (TP).

TSS are made up of organic materials such as algae and inorganic particles such as sand and silt. TSS made up of sands and silt are normally the result of erosion and runoff of stormwater. Organic particles such as algae are more abundant in surface water that provides better growth conditions such as warmer water with high TP nutrient conditions. TSS is a good indicator of water quality deterioration (Biloka, G. S., R. E. Brazier, 2008). The findings of the water quality analysis completed for the One River EA determined that TSS levels were higher with the dam in place than during the period when the dam was not operational.

TP is a nutrient that normally enters waterways through surface runoff during rainfall events and municipal wastewater discharges. Elevated levels of TP in surface waters can result in the excessive growth of algae which can lead to other impacts such as anoxic conditions (low oxygen levels), (CCME, 2004). The findings of the water quality analysis completed for the One River EA determined that TP levels were higher with the dam in place than during the period when the dam was not operational. TP levels in the Thames River within the study area are above the MOECC guideline level of 30 µg/L to avoid Excessive plant growth in rivers and streams (MOE, 1994). The impacts of climate change are anticipated to increase the impacts of TSS and TP on the river.

5.1.2 Geomorphology

The assessment made of the Thames River in the study area under the existing condition indicates areas of erosion and instability in the banks of the river and the river bottom. There are areas of bank erosion and both deposition and scour in the bottom of the river. The river is, however, becoming more stable its banks through the growth of additional vegetation. The seasonal operation of the Springbank Dam can impact the stability of the river because of the wide fluctuations in seasonal water levels creating areas of erosion at various bank levels and the high-water levels would eliminate any vegetation that has returned in the existing condition that has stabilized parts of the river banks. Erosion protection measures are required for either a free-flowing river or a river with an operational dam in place. The
extent of erosion protection would be substantially greater with the dam in place given the wider range of fluctuations in water elevations.

5.1.3 Species at Risk (SAR)

SAR and their habitats in the study area have been identified through a variety of studies (UTRCA 2015b), (DFO 2016). Many of the SAR are adapted to the existing conditions in the river and would be negatively impacted by the operation of the Springbank Dam. Many of the species are adapted to a free-flowing stream environment in their required habitat areas for various life cycle stages.

There are a number of SAR that have been identified in the Thames River like the Silver Shiner fish, the Mudpuppy mussel, Spiny Softshell turtle, the Queensnake, that are negatively impacted by dams and impoundments (B. Cudmore, C.A. MacKinnon, and S.E. Madzia, 2004).

Perhaps the most discussed SAR in the study area is the Spiny Softshell turtle. The reinstatement of the dam would result in a negative impact on the turtle habitat and survival. Recent turtle surveys in 2015 showed a dramatic and unparalleled increase in at-risk turtles since the dam has been out of commission, (UTRCA, 2015).

Additional discussion on SAR in the study area that would be negatively impacted by reinstatement of the Springbank Dam is provided in Appendix B of this report.

5.1.4 Terrestrial Habitat

The terrestrial habitat areas most impacted by the Springbank Dam options are in the riparian zones along the river banks in the study area upstream of the dam structure. The riparian areas along the river have re-established in the existing river condition and although many invasive species have repopulated the riparian areas, the overall impact has been an increase in the density and diversity of plant growth, (Upper Thames River Conservation Authority, 2015). Healthy riparian areas support an increase in wildlife from amphibians to bird species, help to improve water quality by reducing erosion and reducing direct runoff to rivers that can carry excess pollutants. Healthy riparian areas also lower the temperature of surface water by shading rivers and streams and provide organic nutrients to support aquatic life.

The reinstatement of the Springbank dam would eliminate the vegetation in the riparian areas upstream of the dam by flooding these areas during months of dam operation and leave these riverbank areas devoid of vegetation for much of the year when the dam was not operational.

5.1.5 Aquatic Habitat

The aquatic habitat in the Thames river upstream of the Springbank dam has been altered considerably since the dam became inoperable in 2008. The river has been flowing freely as a natural flowing system and that annual stability has resulted in the positive growth of river and floodplain habitats that are important to many species, (UTRCA, 2015).

Although there is not a definitive study completed to-date on the change in extent of aquatic habitat health and diversity since the dam became inoperable, Appendix B discusses the reported increase in the diversity of various aquatic species that utilize aquatic habitats in the study area.

5.1.6 Groundwater and Surface Water Interactions

The important interaction between groundwater and surface water in any stream environment is the addition of baseflow to the system from groundwater resources. There are limited studies on the relative impact of the dam removal on the contribution of groundwater to river baseflow in the study area, however, in an analysis of the impact of reservoir levels on the interaction between surface water and groundwater by the U.S. Geological Survey, (USGS, 1998) it was determined that increased water
elevations resulted in a net discharge to groundwater and lowering water levels resulted in increased surface water recharge. It is anticipated that reinstatement of the Springbank Dam and increasing the water levels in the Thames upstream of the dam would result in a net negative impact on stream baseflow.

5.2 Social/Cultural Environment

Through the consultation activities it was apparent that stakeholders found the ability to enjoy the many recreational activities the Thames River corridor offers of key importance. Criteria were therefore developed to consider the different types of activities and different interest groups involved in using, protecting and enhancing the Thames River corridor (i.e., fishing, boating and land-based recreational activities). In addition, First Nations and Metis concerns are of key importance to the City and community. Consequently, a separate criterion was therefore developed under the social/cultural environment to represent their concerns. Other criteria identified as important in the evaluation of social/cultural impacts include cultural heritage, public health and safety, shoreline accessibility, aesthetics, and urban revitalization. The following sections provide a review of the impacts of the Springbank dam options considering the identified social/cultural environment criteria.

5.2.1 Cultural Heritage

The cultural heritage review presented in Appendix D indicated that there are several cultural heritage resources within the Study Area that must be protected. In addition, the entire floodplain of the Thames River is designated under the Canadian Heritage River System (CHRS). Under the do nothing option, the risk of impacting some of the cultural resources along the River corridor will increase as no river management projects will be implemented. Option 2 – free-flowing river and Option 3 – reinstating the dam both provide equal opportunities to protect and enhance cultural resources.

5.2.2 Community Health and Safety

Community health and safety is a core component of the London Plan:

“Through the London Plan our community is planning for vibrant, healthy, safe and fulfilling neighbourhoods, attractive and viable mobility alternatives and affordable housing that is accessible to those who need it.”

Under the do nothing option, the existing dam structures will receive minimal maintenance and no strategy will be implemented to manage the river. Consequently, risks to community health and safety may increase. Under both Option 2 – free-flowing river and Option 3 – reinstating the dam river, the river will continue to be managed to protect human health and safety. For example, river management strategies will consider measures to mitigate risks of erosion and flooding, and provide safe, secure opportunities for individuals to access the river. The risks to human health and safety will therefore be reduced by implementing either option. Given that reinstating the dam provides more control of the river than a free-flowing river, risks to human health and safety may be slightly less if the dam is reinstated and operated properly (i.e., potential for flooding may be reduced).

5.2.3 Recreation

Recreation is an important consideration as indicated in the problem statement for this Master Plan EA which states “It is our collective responsibility to maintain and enhance the Thames River as a shared natural, cultural, recreational and aesthetic resource”. Recognizing the different types of activities and different interest groups involved in using the river and its corridor for recreational activities, three
separate criteria have been developed to differentiate the impacts each option will have on the varying types of recreational activities:

- **Boating Recreational Activities**: These activities include such water sports as canoeing, rowing and kayaking. It is recognized that reinstating the dam will provide deeper, more calm waters that allow for different types of boating. Boating recreational activities will increase the most by reinstating the dam (Option 3).

- **Fishing Recreational Activities**: With a free-flowing river the number of native fish species will increase, and the invasive fish species will be reduced. Fishing will therefore be improved the most under a free-flowing river (Option 2).

- **Land-based Recreational Activities**: These activities include walking, biking, bird-watching and other sports along the river corridor. Both Option 2 (free-flowing river) and Option 3 (reinstating the dam) offer opportunities to improve land-based recreational activities through proper river management. Reinstating the dam (with controlled water levels) may offer slightly greater opportunities for land-based recreational activities, such as more extensive trails and access along the river front.

### 5.2.4 Accessibility to the River

If no River management strategies are implement the river will continue to naturalize with no controls; and accessibility to the river will be reduced as a result. A free-flowing river (Option 2) and reinstating the dam (Option 3), with continued river management will both provide more opportunities to improve sites and areas for shoreline access. Option 3 may provide slightly more opportunities with water levels in the river being controlled.

### 5.2.5 First Nations and Métis Concerns

First Nations and Métis are interested in maintaining and enhancing the Thames River as a shared natural and cultural resource. The do nothing option partially addresses First Nations and Métis concerns by letting the river return to its natural state over time. However, without the river being managed the river corridor will eventually be degraded. A free-flowing, properly managed river represented by Option 2 will address some of the First Nations and Métis concerns. Option 3 to reinstate the dam did not address the concerns of the COTTFN. At the COTTFN community meeting, participants were asked which of the options they are in favour of for the future of the Springbank Dam. Results collected through comment forms provided show that Option 2 was the most preferred.

### 5.2.6 Investing in London’s Downtown

“At the root of The London Plan is the goal of building a city that will be attractive as a place to live and invest in a highly competitive world and one that will offer the opportunity of prosperity to everyone – one their own terms and in their own way”. Therefore, the potential of the One River Master Plan to provide a strategy that encourages investing in London’s downtown as the heart of the City to support urban regeneration and revitalization is very important to the City and its citizens. Do nothing will not support this goal.

A free-flowing, managed river has the potential to encourage more investment in London’s downtown by bring more people to the river corridor. A controlled river with a higher consistent water level, offers perhaps more potential for investments in London’s downtown as it may offer more recreational activities bringing even more people to enjoy the river and London’s downtown.
5.3 Technical and Cost Considerations

The technical and cost impacts associated with an option are considered equally as important in this assessment as the impacts on the natural and social/cultural environment. The following technical and cost criteria were identified for assessing options in this Master Plan EA:

- Flood Protection
- Minimizing carbon footprint and energy use
- Ease of Implementation (construction)
- Ease of Implementation (permits and approvals)
- Operation and Maintenance Requirements
- Compatibility with Existing and Planned Infrastructure
- Relative Capital Costs

A summary of the impacts of the options on each of the above criteria is presented below.

5.3.1 Flood Protection

The ability of the option to mitigate flood hazards is an important consideration in selecting options. The goal is to reduce the risks of flood and erosion damage to public infrastructure and private property. The do nothing option will provide no change in the ability to protect the Thames River corridor from flooding. Management of the river, whether it is free-flowing (Option 2) or the dam is reinstated (Option 3), however, will help protect the sensitive areas thereby reducing the risk of flood or erosion damage. Reinstating the dam will control water levels on a season basis, which may serve to reduce the risk of flood or erosion damage more so than if the river is free-flowing.

5.3.2 Minimize Carbon Footprint

The Ministry of Environment and Climate Change (MOECC) is particularly concerned with the ability of infrastructure projects to minimize carbon footprint; works that minimize carbon footprint and associated greenhouse gas emissions are preferred. The options related to the Springbank dam do not significantly impact carbon footprint; all are comparable. There may be slight reductions in greenhouse gas emissions the river corridor becomes more vegetated under Option 2 – free-flowing river, and increase slightly with the construction and operation of the dam under Option 3; However, these changes are minimal and do not reflect a significant variation among the options.

5.3.3 Ease of Implementation

Two criteria related to ease of implementation have been identified, and considered separately in this evaluation:

- Construction: This criterion considers the ease at which an option may be implemented from a technical basis. The option which would take the least amount of effort to implement is the do nothing as it requires no additional works. Implementing a free-flowing river (Option 2) or reinstating the dam (Option 3), including associated river management works, are both feasible and include a number of works requiring construction activity. Given more construction works are necessary to reinstate the dam, this option is considered more difficult to implement from a construction standpoint.

- Permits and Approvals: Table 5 identifies the anticipated approvals for each option based on review of the appropriate Acts and consultation with the Agencies Review Committee. As indicated in Table 5, Option 3 reinstating the dam, will be the most difficult and time to receive required permits and approvals. It is expected that it will be difficult to approve without significant rehabilitation and compensation to maintain and enhance environmental sensitive species and habitats that would be threatened if the dam is reinstated and water levels rise.
### Table 5. Complexity of Approvals Anticipated

<table>
<thead>
<tr>
<th>Act</th>
<th>Administrative Body</th>
<th>Permit Required</th>
<th>Do Nothing</th>
<th>Free-Flowing River</th>
<th>Reinstall the Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Cost</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td><strong>Time</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td><strong>Tech</strong>&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>CAA</td>
<td>UTRCA</td>
<td>Permit under section 28</td>
<td>$</td>
<td>Short</td>
<td>Medium</td>
</tr>
<tr>
<td>OWRA</td>
<td>MOECC</td>
<td>Permit To Take Water</td>
<td>N/A</td>
<td>N/A</td>
<td>$</td>
</tr>
<tr>
<td>LRIA</td>
<td>MNRF</td>
<td>MNRF Dam Construction Regulation Permit</td>
<td>$</td>
<td>Long</td>
<td>Low</td>
</tr>
<tr>
<td>ESA</td>
<td>MNRF</td>
<td>Overall Benefit Permit</td>
<td>$</td>
<td>Short</td>
<td>Medium</td>
</tr>
<tr>
<td>SARA</td>
<td>DFO</td>
<td>Permit</td>
<td>$</td>
<td>Long</td>
<td>Low</td>
</tr>
<tr>
<td>NPA</td>
<td>TC</td>
<td>Navigable Waters Permit</td>
<td>N/A</td>
<td>Long</td>
<td>Low</td>
</tr>
</tbody>
</table>

Notes:

- <sup>a</sup> Cost to implement solutions to meet permit requirements - based on $$$ scale ($- Low Cost, $$- Medium Cost, $$$- High Cost)
- <sup>b</sup> Time Considerations for permitting (Short or Long)
- <sup>c</sup> Technical Consideration Level (Low, Medium, High, Extreme)
- <sup>d</sup> Total Complexity based on cost, time and technical considerations (Low, Medium, High, Extreme)
5.3.4 Operation and Maintenance

The ease at which an option can be operated and maintained was also considered. Reinstating the dam will have the highest degree of operational and maintenance requirements compared to the existing situation, and is therefore rated the lowest.

5.3.5 Compatibility with Existing and Planned Infrastructure

There are a number of planned infrastructure projects in the Thames River corridor, including those identified in the Thames River Corridor Plan, London Plan and Back to the River Plan. The do nothing option does not allow the planned infrastructure projects to be incorporated into the One River Strategy. However, both the options of a free-flowing river (Option 2) and reinstating the dam (Option 3) can be planned and developed to incorporate the future infrastructure projects.

5.3.6 Relative Capital Costs

Capital costs have not been estimated for these options. However, capital costs of each option have been compare on a relative basis. As the do nothing option requires the least capital works it is the least expensive option. Reinstating the dam requires re-construction of the dam, along with associated river management works, and is therefore the most expensive. Implementing a free-flowing river would require some minor modifications to the dam as well as associated river management works.

5.4 Recommended Option

The detailed options evaluation matrix and descriptions of the relative impact for each criterion is provided in Appendix F. Each anticipated impact for the options has been described in relation to the “existing condition” which is defined as the state of the current Thames River without the Springbank Dam in operation. Comparison to the existing condition provides the required baseline for the comparative analysis. Each anticipated impact is given a rating score based on the anticipated change in the Thames River from the existing condition. As indicated in the evaluation table, scores are normalized for each criteria category – natural, social/cultural and technical/economic – so that each category can be considered of equal importance (scores for each category are out of 5 with 5 being the most preferred and 1 being the least. Scores by category are then summed to provide a score out of 15 for each option. The option with the highest score is ranked as preferred.

Table 6 below presents a summary of the normalized score by criteria category. By normalizing the data it weights each criteria category the same, regardless of how many individual criteria make up that criteria category. This normalizing process ensures that each criteria category is considered of equal importance in the evaluation. As indicated, the free-flowing river (Option 2) is ranked first in terms of natural environment; it will provide the most benefits to the natural environment, by improving water quality, aquatic and terrestrial habitats, and protect and enhance species at risk.

<table>
<thead>
<tr>
<th>Criteria Category</th>
<th>Option 1: Do Nothing</th>
<th>Option 2: Free-flowing River</th>
<th>Option 3: Reinstate the Dam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Environment</td>
<td>3.0</td>
<td>4.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Social/Cultural Environment</td>
<td>2.1</td>
<td>4.3</td>
<td>4.1</td>
</tr>
<tr>
<td>Technical and Economic</td>
<td>3.7</td>
<td>3.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>8.8</td>
<td>12.0</td>
<td>7.6</td>
</tr>
</tbody>
</table>
For the social/cultural environment Option 2 – free-flowing river and Option 3 – reinstating the dam, have similar ratings; 4.3 and 4.1 out of 5, respectively. This is expected as both have similar potential to maintain and enhance many of the social and cultural resources in the study area with the exception of recreational activities. The free-flowing river tends to provide more fishing recreational activities, while reinstating the dam favours more of the boating-relating and park shoreline recreational activities.

With respect to the technical and economic factors, the do nothing rates the best (3.7 out of 5) as it is the easiest to implement at the least cost. The free-flowing river (Option 2) rates second in terms of technical and economic criteria (3.1 out of 5), followed by reinstating the dam (Option 3). Reinstating the dam would be the most difficult and challenging to implement, primarily due to the difficulties in receiving permits and approvals.

Based on the overall assessment, Option 2 – Free-flowing River rates highest as it provides the most benefits and best meets the problem statement to:

- “maintain and enhance this shared natural, cultural, recreational and aesthetic resource; and
- “preserve for future generations this valuable resource and allow people of all abilities to enjoy and access this designated Canadian Heritage River.”
SECTION 6

Agency Consultation and First Nations Engagement

Consultation with stakeholders and the public, including engagement with First Nations and Metis, as well as government agencies, is an important and necessary part of the EA process. Recognizing the importance of the Thames River to the London citizens, the City of London has developed an extensive consultation and engagement process, that goes well beyond the requirements of the MEA Master Plan EA process. The goal being to consult with all interested stakeholders and First Nations communities in meaningful ways with the focus of understanding and incorporating input into the decision-making process.

An overview of the consultation and engagement activities, input received and responses to comments are provided in the following sections.

6.1 Government Agencies

As part of the Master Plan EA process, the relevant government agencies were provided a Notice of Study Commencement for the One River EA and asked to provide any comments in regard to requirements for the conduct of the EA. The list of agencies and the notice are provided in Appendix H.

6.1.1 Agency Advisory Committee

In addition, specific government agencies were asked to participate in an Agency Advisory Committee. The main objective of the Agency Advisory Committee is to provide guidance and feedback to the project team on environmental, social/cultural, technical and regulatory issues and challenges that could impact the decision-making with respect to the evaluation of options for the One River EA project.

The Agency Advisory Committee is comprised of the following representatives from a variety of agencies, including the Ministry of Environment and Climate Change (MOECC), Ministry of Natural Resources and Forestry (MNRF), Upper Thames River Conservation Authority (UTRCA), Lower Thames Valley Conservation Authority (LTVCA) and the Department of Fisheries and Oceans (DFO):

- Scott Abernethy – Surface Water Group Leader MOECC
- Emmilia Kuisma – Issues Project Coordinator, MOECC
- Craig Newton – Regional Environmental Planner, MOECC
- Jason Lehouiller – Acting District Manager, MOECC
- Mary Alikakos – Senior Advisor, Outreach and Program Support, MOECC (Formerly with Chippewas of the Thames First Nations for initial meeting)
- Claire Paller – Aylmer District Planner, MNRF
- Chris Tasker – Manager, Water and Information Management UTRCA
- Mark Snowsell – Land Use Regulations Officer, UTRCA
- Don Pearson – General Manager, LTVCA
- Jennie Ryman – Fisheries Protection Biologist, DFO

Three meetings were held with the Agency Advisory Committee at key milestones during Stage 1 to receive input, guidance, and feedback. The objective was to examine the issues and challenges associated with the evaluation of options for Springbank Dam. All input was considered in the EA Stage 1 decision-making process, and a summary report for the initial three Agency Advisory Committee meetings was completed and is included in Appendix E.
The discussions that took place at the initial three Agency Advisory Meetings was facilitated through the presentation of information from a number of subject matter experts including members of the consultant team, City of London Environmental and Parks Planning Division, and UTRCA staff. The comments that have been provided as part of the Agency Advisory Committee report (Appendix E) are summarized below:

- **Subject Matter Expert Comments**
  - There has been more habitat available and an increase in populations of numerous important native species of fish, mussels and reptiles since the failure of the dam.
  - Repair of the Springbank Dam would lead to habitat loss for a number of endangered and threatened species at risk.
  - Reinstating the dam would negatively impact turtle population recovery due to direct loss of habitat. Also, acting as a barrier, the dam would limit movement between interconnected habitat for the turtles (nesting, laying, and feeding areas).
  - There is more information available for Spiny Softshell turtles relative to other species, so it’s the best indicator species we have in terms of the success of other species.
  - A reinstated operational dam would create additional habitat for zebra mussels and other invasive species.
  - Based on the available data, not reinstating the dam and allowing the river to return to a more natural state would benefit most native species.
  - Other dams like the Fanshawe Dam offer flood control essential for life and property protection, while the Springbank Dam only provides a recreational benefit.
  - Social (e.g. canoeing and rowing) factors are important considerations for dam decision.
  - The Recovery Strategies created under SARA identifies critical habitat, such as the 8 km stretch of the river in the study area.
  - An overall net benefit permit would be required to reinstate the dam.
  - Current critical habitat mapping for the stretch of the Thames in much of the study area from just below the dam to the upstream sections of the river at the forks are not based on an assessment of critical habitat that has developed since the dam failed.
  - Many areas within the study area would now qualify as critical habitat for a number of species.
  - The Silver Shiner, an endangered species of minnow, has been identified in the Thames river study area through the current One River field program, and has been identified previously when the dam was operational. Creating artificial reservoirs along the river is contradictory to natural processes, which can result in significant disturbance and mortality to aquatic and semi-aquatic species that depend on the river for survival.
  - Barriers are not appropriate for river-adapted wildlife, especially species at risk within the watershed. Thus, it is important to limit the number of such barriers to only those that are deemed essential.
  - Given the number of listed species at risk that occupy the study area, the extent the species at risk utilize the corridor and the mosaic of habitat needed to maintain their life cycle needs, replication of this habitat on another suitable location is in a practical sense not feasible. As such it would be extremely difficult to impossible to justify a net benefit for the Springbank Dam repair option.
It will be a tremendous challenge to provide the opportunity for habitat compensation in one of the largest and most southern Ontario Rivers in a growing urbanized landscape that is shown to be improving since the non-operation of the Springbank Dam.

Permit requirements for the option of reinstating the Springbank Dam are considered substantially more complex and significantly more difficult to obtain or unlikely to be approved when compared with the option of a Free-Flowing River.

**Specific Agency Comments**

- To reinstate the dam, a net benefit permit would be required to be signed off by the Minister of the MNRF. That process would be a considerable undertaking and could be very difficult to show the required net benefit for approvals. While the Springbank dam is not for flood control, it still impacts flooding through operation if it was reinstated. Repurposing the Dam would, therefore, also have an impact on flooding.

- It is important to look at the critical habitat, water quality, and species in the area in question as holistically as possible.

- If dam is reinstated fish passage must be provided.

- A Permit to Take Water (PTTW) would be required if dam is reinstated. PTTW was issued when dam was constructed; current status unknown.

- While the Spiny Softshell turtle is a terrestrial animal overseen by Environment Canada, its residence is in the water and destruction of residence is prohibited.

- The MNRF issues permits to authorize an activity that will result in a significant social or economic benefit to Ontario, under section 17(2)(d) of the ESA, also known as D permits.
  - To date, only two D permits have been issued in the province – both are associated with the Rt. Hon. Herb Gray Parkway project in the Windsor-Essex region.

- Requirements and conditions to receive a social or economic benefit to Ontario permit:
  - the activity must result in a significant social or economic benefit to Ontario
  - the Ministry must consult with an expert on the possible effects of the activity on the species. The expert must submit a written report to the Minister, including his or her opinion on whether the activity will jeopardize the survival or recovery of the species in Ontario.

- In approving an undertaking (or project), the Minister of the Environment and Climate Change must be of the opinion that:
  - the activity will not jeopardize the survival or recovery of the species in Ontario
  - reasonable alternatives have been considered, including those that wouldn’t adversely affect the species, and the best alternative has been adopted
  - reasonable steps to minimize adverse effects on individual members of the species are required by conditions of the permit

- Environment and Climate Change Canada (ECCC) clarifications regarding the Spiny Softshell Turtle:
  - Spiny Softshell Turtles fall under Federal Minister of the ECCC.
  - SARA protections for Spiny Softshell only automatically apply on federal lands.
  - Springbank Dam does not appear to be on or in vicinity of federal lands.
  - Federal Government generally looks first to Province to protect species at risk; hence MNRF should be consulted regarding permit under ESA.
DFO specific comments were as follows:

- DFO works with all proponents to review their projects and, through mitigation and offsetting, minimize the serious harm to fish while still allowing progress and development.
- Reinstating the dam would require a consideration of mitigation measures, and also a large monitoring project.
- DFO is mainly concerned about fish passage; if the current status of the Dam impacting the waterway doesn’t change (i.e. only repurpose the surface/walkway), then DFO has no concerns.
- If the Dam is to be removed, DFO sees it as a good thing for fish passage, but still needs to be given the opportunity to provide oversight on the removal process.
- DFO & MNRF generally work concurrently; but permits applications will be required for both since they are separate processes. There will be some overlap in requirements.

The input received from the government agencies was considered in the assessment of options; specifically, with respect to the ease of receiving permits and approvals, and the impacts on the natural environment.

6.2 First Nations/Metis Engagement

Several First Nations communities have expressed interest in the One River EA, and through early pre-consultation provided input for the project Terms of Reference and the problem/opportunity statement. Specifically,

*The river that flows through London’s downtown has many names:*

- Deshkan Ziibiing (known to the Anishnaabeg and Lenape of the Great Lakes);
- Kahwy’hatati (ONYOTA:KA); and,
- The Thames (John Graves Simcoe)

*This river is both our inheritance and our living legacy. It is our collective responsibility to maintain and enhance this shared natural, cultural, recreational and aesthetic resource.*

Consultation has continued through Stage 1, with the project team contacting the London area First Nations and provincial Metis organizations through mail and email correspondence as listed in Table 7, below. One River pamphlets were sent to the D’amerind Friendship Centre (Indigenous Friendship Centre) in London to be placed visibly for visitors to see.

**Table 7. Contact Information**

<table>
<thead>
<tr>
<th>First Nations Community Name</th>
<th>Chief or Mailing Contact</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aamjiwnaang First Nation</td>
<td>Chief Joanne Rogers</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18SEP2017 - Updated Chief Name (can be reached at x236)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19SEP2017 - Notice of PICs mailed to Chiefs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>notified of upcoming recommendation for Dam to Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>online and Survey is available - Reiterated invitation to meet</td>
</tr>
<tr>
<td>Delaware Nation (Moravian of</td>
<td>Chief Denise Stonefish</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent</td>
</tr>
<tr>
<td>the Thames)</td>
<td></td>
<td>18SEP2017 - Updated Chief Name from Greg Peters to Denis Stonefish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19SEP2017 - Notice of PICs mailed to Chiefs</td>
</tr>
<tr>
<td>First Nations Community Name</td>
<td>Chief or Mailing Contact</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td></td>
</tr>
<tr>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td></td>
</tr>
<tr>
<td>Chippewas of the Thames</td>
<td>Chief Myeengun Henry</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent</td>
</tr>
<tr>
<td>22SEP2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td>22SEP2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td></td>
</tr>
<tr>
<td>Munsee-Delaware Nation</td>
<td>Chief Roger Thomas</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent</td>
</tr>
<tr>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td></td>
</tr>
<tr>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td></td>
</tr>
<tr>
<td>Oneida Nation of the Thames</td>
<td>Chief Randall Phillips</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent; chief works out of different office. 519-652-6161</td>
</tr>
<tr>
<td>19SEP2017 - Notice of PICs mailed to Chiefs</td>
<td>21SEP2017 - Contacted office directly to inquire about status of Chief and email</td>
<td></td>
</tr>
<tr>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td></td>
</tr>
<tr>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td>23OCT2017 - Emailed Chief Directly with notice that PIC material is online and Survey is available - Reiterated invitation to meet</td>
<td></td>
</tr>
<tr>
<td>Bkejwanong Territory (Walpole Island)</td>
<td>Chief Daniel Miskokomon</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent</td>
</tr>
<tr>
<td>19SEP2017 - Notice of PICs mailed to Chiefs</td>
<td>22SEP2017 - Emailed Chief Directly with Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td></td>
</tr>
<tr>
<td>Caldwell First Nation</td>
<td>Chief Louise Hillier</td>
<td>09AUG2017 - Notice of Commencement &amp; Invitation to Meet Sent</td>
</tr>
<tr>
<td>15AUG2017 - Chief Hillier emailed Ashley R. Requesting Meeting</td>
<td>18AUG2017 - Called Caldwell First Nations. Offices; No Answer, Left Message</td>
<td></td>
</tr>
<tr>
<td>22SEP2017 - Emailed Tammy/Office again for Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td>22SEP2017 - Emailed Tammy/Office again for Invitation to Meet and notified of upcoming recommendation for Dam to Council</td>
<td></td>
</tr>
</tbody>
</table>
6.2.1 Chippewas of the Thames First Nation Community Meeting

A community meeting took place at the Chippewas of the Thames First Nation (COTTFN), Antler River Senior Centre, 20723 Muncey Road, Muncey, Ontario on December 7, 2017. Sixteen members of the COTTFN attended and a member of the Oneida Nation of the Thames River First Nation attended this PIC. Presentation boards provided information on various aspects of the Environmental Assessment (EA), including the problem/opportunity statement, the history and current conditions of the study area, evaluation criteria for the EA, and a description of three alternative options for the future of the Springbank Dam. The project team, including staff from CH2M, Lura Consulting and the City of London, were available to answer any questions participants had about the EA. Participants were asked to provide their feedback by filling in comment forms.

The following information provides a summary of comment form responses received at the PIC. In total, 12 comment forms were returned to the project team.

Question 1: Is the presentation of the One River EA process clear? Is there any part of the process that is not clear?

Participants stated that the following part of the process was not clear:

- Impacts of the project on plant species.
- Presentation Format; First Nations protocols dictate that the presentation should have been available verbally for elders.

The project’s focus on the dam, instead of the whole river.

Question 2: The Problem/Opportunity Statement presented in the display material was developed to clearly define the objectives of the One River EA. Do you feel anything important has been missed in the statement?

Participants stated that the following was missed in the Problem/Opportunity Statement:

- Addressing the health of the river, including:
  - Pollutants in the water
  - Water quality testing
  - The quality of the riverbed
  - Toxic hotspots
  - Phosphorus levels and loading at the base of the dam
- London’s long-term, overall impact on the river.
• The option for study area expansion, including additional focus locations within the study area, and a broader look at a larger portion of the river (not just the portion in London’s boundaries).

• Addressing Moravian/Delaware Nation, as they reside along the river.

• Additional Factors that affect the people who live on and drink from the river (none specifically provided).

Question 3: Please review the display panels describing the history and the current conditions and let us know what important aspects might have been missed?

Participants stated that the following was missed in the history of existing conditions summary:

• Indigenous histories:
  – The historical uses of the river by Indigenous people.
  – The City of London’s impact on Indigenous uses of the river.
  – Indigenous perspectives on the river.

• Species histories:
  – The presence of species at risk before and after the dam’s construction.
  – The presence of Invasive species (e.g. carp).
  – The presence of Native species protected for First Nations use.

• Water quality:
  – Drinking water quality, including the down-stream water quality.
  – Existing waste water releases.

• Archeological Potential:
  – The archeological potential of the river.

Question 4: Please review the explanation of the EA evaluation criteria used to evaluate the three alternatives for Springbank Dam. Do you feel anything important has been missed?

Participants stated that the following was missed in the evaluation criteria:

• Holistic evaluation:
  – The total environmental impact of the City of London on the overall health of the river, both current impacts and historical impacts.
  – Long term impacts of a “do nothing” approach.

• Specific impacts on:
  – Downstream communities.
  – Mercury deposits.
  – Fish species.
  – Heritage.
  – Ground and surface water interactions.
  – Flooding.
  – Terrestrial habitat.

• An Indigenous lens/additional input from Indigenous people
Question 5: Based on the information provided in the Public Information Centre, do you think the consultation and engagement steps taken to-date have been sufficient?

Participants stated that the following consultation and engagement steps would improve the EA:

- Greater inclusion of Indigenous people in the process, including:
  - Earlier inclusion of Indigenous communities;
    - One participant noted that the Chippewa of the Thames have been involved in the project for two years.
  - More meetings with Indigenous peoples;
  - Ensuring Chief and Council of the community are present at meetings;
  - Holding meetings in partnership with Indigenous councils;
  - More collaborative efforts to manage traditional Indigenous lands;
  - Inclusion of Indigenous peoples as part of Ministry of Indigenous Relations and Reconciliation and the Truth and Reconciliation; and

- Recognition that this is the sole drinking water source for Oneida.

- Greater municipal support for the Nations upon which cities currently reside.

- Meetings that are consultative, rather than informational.
  - A participant viewed this session as informational, not consultative.

Question 6A: There are three alternatives for the future of the Springbank Dam:

**Option 1) Do nothing**: The Springbank Dam will remain in its current condition with no upgrades or repairs.

**Option 2) Free Flowing River**: Part or all of the dam will be removed so that it can no longer provide a water retention function. May include options for repurposing, such as using structure for viewing platform or walkway.

**Option 3) Reinstate the Springbank Dam**: Reinstate the Dam Repair or reconstruct dam so that it can provide a water retention function. Operate at a similar capacity as it did previously. May include options for repurposing, such as using structure for viewing platform or walkway.

After reading through the display panels with details of each of the three alternatives, participants were asked which of the options they are in favour of for the future of the Springbank Dam. Results provided show that Option 2 was the most popular.
Several methods of consultation were used during Stage 1 to engage the stakeholders in meaningful ways and to receive input. The objectives of the Phase 1 public engagement program were to:

- Introduce the One River Master Plan EA to the community
- Direct residents to the GetInvolved.london.ca website to learn more about the EA and participation in the One River Public Survey
- Engage community members in meaningful conversations about the One River Master Plan EA to gather constructive, solutions-based input
- Inform the ultimate selection of an option for the Springbank Dam
- To continuously monitor the success of the Public Engagement Program in reaching its audiences, and to adjust the program, as required

### 7.1 Overview of Consultation Activities

A variety of strategies and tools were used during Stage 1 to ensure widespread and accessible participation in the public engagement process. These are described below.

#### 7.1.1 Surveys

A survey was developed to collect information during the pop-up events about London Residents’ current use of the Thames River, and their ideas and wishes for the future of the river. The survey asked respondents both multiple choice and open-ended questions about how they use the river, how they would like to use the river, and what changes they would like to see, if any, in or around the river. The survey also asked for postal codes of respondents. The survey was available online at the webpage, GetInvolved.london.ca, and in paper format at Pop-up events. A copy of the survey can be found in Appendix G.

#### 7.1.2 Stakeholder Meetings

During the implementation of Stage 1, a number of meetings were held between the City and Stakeholder groups and their comments and issues incorporated into the feedback received on the One River EA. Meetings were held with the following groups:

11. Kensington Village Association – September 1, 2017
12. Thames River Keepers – September 1, 2017
13. Thames River Rally – September 19, 2017
14. Friends of the Coves – September 21, 2017
15. Thames River Anglers Association – August 25, 2017
17. London Canoe Club – August 29, 2017
18. London Rowing Club – August 29, 2017
7.1.3 Pop-ups

The City of London set up booths and provided background materials on the One River EA at many of the local events during the summer. These are referred to as Pop-ups. Pop-up engagement events took place six times over the course of Stage 1 of the One River EA.

1. July 23, 12:00 pm – 6:00 pm: Inspiration Fest, Wortley Village
2. August 3, 11:00 am – 6:00 pm: Rib Fest, Victoria Park
3. August 10, 3:30 pm – 7:30 pm: River Forks Park
4. August 11, 7:00 am – 3:00 pm: Springbank Park
5. August 12, 8:00 am – 3:00 pm: Farmers Market at Western Fair Grounds
6. August 19, 11:00 am – 3:00 pm: London Tree Fest, Harris Park

At each Pop-up event, the project team (which included staff from Lura Consulting and/or the City of London) set up a booth that included:

- Surveys
- Informational handouts (attached in Appendix G)
- A large map of the study area
- A project banner and signage
- Thames River buttons and One River stickers (as handouts)
- Some pop-ups included a small fishing activity for children to play as their parents/guardians filled out surveys

Pop-up goals included raising overall awareness for the One River Master Plan EA and directing members of the public to getinvolved.london.ca to learn more about the project and fill out a survey. At pop-ups, staff would engage participants in conversations about the One River EA and either have them fill out a paper survey, or give them an informational handout and encourage them to fill out the survey online at a later time.

7.1.4 Notice of Commencement

A formal notice to announce the commencement of the EA process was published in local newspaper, *The Londoner* on July 20 and July 27.

7.1.5 Public Information Centre Notice

A formal notice to announce the dates of Public Information Centre #1 was distributed to and published in The Londoner. The notice of the Public Information Centre is available in Appendix G.

7.1.6 Public Information Centre #1

Public Information Centre #1 was hosted on October 18 and 19, 2017. Approximately 130 people attended each session (with 102 officially signing in for the first and 103 officially signing in for the second) for a total of 260 attendees. PIC Display Boards are available in Appendix H. A number of stakeholders, including residents interest groups, and First Nations representatives provided feedback and input to the EA through correspondence and emails and is included in this stakeholder consultation summary. A total of 104 pieces of correspondence and/or emails were received about this phase of the EA.

7.1.7 Webpage

The project webpage included notice of Public Information Centre #1 as well as a survey that mirrored consultation activities at the PIC that was made available until October 27, 2017.
SECTION 7 – PUBLIC CONSULTATION

Getinvolved.london.ca/OneRiver:
https://getinvolved.london.ca/OneRiver/upcoming-events

London.ca Events Calendar:
https://www.london.ca/calendar/Pages/One-River-Public-Information-Centre.aspx
london.ca/calendar/Pages/One-River-Public-Information-Centre-2.aspx

One River EA Page:
https://www.london.ca/residents/Environment/EAs/Pages/One-River-EA.aspx

7.1.8 Social Media
Social Media (Twitter and Facebook) was used to raise awareness of Public Information Centre #1.

7.1.9 Traditional Media
Local news media coverage was used to raise awareness of the One River Master Plan EA, advertise Public Information Centre #1, and direct the public to the getinvolved.london.ca webpage to learn more and complete the survey. Local coverage included CTV News London and AM980 News (CFPL AM).

7.2 Summary of Feedback – PIC #1

Attendees at the PIC were provided with a comment form with eight questions to provide their feedback. A total 164 feedback forms were received at the PIC, which are available in Appendix I. The questions were as follows:

1. Is the presentation of One River EA process clear?

2. Is there any part of the process that is not clear? Do you feel anything important has been missed in the statement?

3. Please review the display panels describing the history and the current conditions and let us know what important aspects might have been missed?

4. Do you feel anything important has been missed with respect to the evaluation criteria?

5. Do you think the consultation and engagement steps taken to date have been sufficient?

6. What option are you in favour of for the future of the Springbank Dam?

7. Please share any additional comment you have regarding the future of the One River study area.

8. PIC/Information Summary
   a. Was the information provided helpful?
   b. Where all their questions answered?
   c. Was the information presented in sufficient detail?

The general comments and responses for the first 7 questions, along with the Project Team’s responses to the comments are summarized in Table 8. All input received has been considered in the assessment of options for the Springbank Dam. Stakeholder consultation and engagement will continue through Stage 2 of the Master Plan EA to identify the preferred river management strategy that best meets the problem/opportunity statement – **maintain and enhance the Thames River as a shared natural, cultural, recreational and aesthetic resource.**
Table 8. Responses to Public Comments

<table>
<thead>
<tr>
<th>Comments</th>
<th>Responses</th>
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<tbody>
<tr>
<td><strong>Question 1. Is the presentation of One River EA process clear? Is there any part of the process that is not clear?</strong></td>
<td>More specifics on the Class EA process is provided in Appendix A, Stage 1 Methodology. During Stage 2 of the EA process, a thorough review of strategies for managing the river, including how other projects and plans will be integrated will be conducted. Prior to conducting this evaluation, however, the future of the Springbank Dam must be decided.</td>
</tr>
<tr>
<td><strong>The EA Process</strong></td>
<td>Respondents expressed interest in more clarity on the overall EA process. They requested to better understand the project objectives and what the decision points and milestones were in the process, and how public input feeds into this. People were also curious to know how other projects and plans will be integrated, and which will take priority. There was a concern voiced that the preferred alternative for the dam would be complete before the One River alternatives come forward. It was also suggested that the process diagram itself could be clearer.</td>
</tr>
<tr>
<td><strong>Environmental Factors</strong></td>
<td>Details on the net effects of the options are detailed in this Stage 1 report.</td>
</tr>
<tr>
<td><strong>Recreational/Social Factors</strong></td>
<td>The Thames River will continue to maintain its Heritage River designation. The preferred river management strategy identified during this Master Plan process will ensure that the River maintains its Heritage River designation. Protecting and enhancing the cultural resources of the River is an important criterion identified for evaluation. Further impacts on recreational uses of the river under each option are presented in this report.</td>
</tr>
<tr>
<td><strong>Alternatives</strong></td>
<td>The first stage in the evaluation of alternatives is to decide on the future of the Springbank Dam – 1. Do Nothing; 2. Decommission the Dam to ensure a free-flowing river 3. Reinstate the Dam. Options 2 and 3 would also involve the implementation of various river enhancements, ecological enhancements and recreational enhancements upstream. Since the nature of the enhancements depends on whether the dam is decommissioned or reinstated, it is important to first decide on the preferred option for the dam. Stage 2 of the evaluation will consider the river management strategies that will best meet the problem/opportunity statement - maintain and enhance this shared natural, cultural, recreational and aesthetic resource. Input from the Ministry of Natural Resources and Forestry and Upper Thames River Conservation Authority (as well as other agencies) is being sought through the process. Three meetings with the Agency Advisory Committee have been held to provide input on Stage 1, and more are planned during Stage 2 of the evaluation. The input is documented in Appendix E.</td>
</tr>
</tbody>
</table>
### Question 2. Do you feel anything important has been missed in the statement?

The majority of respondents (55%) indicated that nothing had been missed in the problem/opportunity statement. Those that felt something had been missed in the statement, suggested the following:

#### Environmental Considerations

Some respondents felt that environmental considerations had been overlooked in the problem/opportunity statement. Water quality and overall ecosystem health were frequently noted. People also noted considerations such as invasive species, biodiversity, ecosystem services, and current water flow and how this impacts wildlife and vegetation. Respondents also questioned how it would be known whether or not the selected alternative would improve the overall health of the river.

The problem statement was developed as part of the pre-consultation process for the One River Master Plan EA, and is meant to ensure that a prefer strategy is selected that will *maintain and enhance this shared natural, cultural, recreational and aesthetic resource*.

The evaluation criteria, presented herein, were developed in consultation with stakeholders to further identify the aspects of the natural, social/cultural and technical/cost environment that were important in selecting a preferred strategy for the One River. Each category of criteria was considered equally in the evaluation. The criteria are consistent with the requirements of the Master Plan Class EA process as defined in the Municipal Class Environmental Assessment (Municipal Engineers Association, 2015).

#### Recreational/Social Considerations

On the other hand, some respondents felt that recreational/social consideration had been overlooked in the problem/opportunity statement in favour of environmental considerations. These respondents emphasized the importance of considering the recreational users of the river and the impact that decisions would have on recreational opportunities.

The problem statement was developed as part of the pre-consultation process for the One River Master Plan EA, and is meant to ensure that a prefer strategy is selected that will *maintain and enhance this shared natural, cultural, recreational and aesthetic resource*.

The evaluation criteria, presented herein, were developed in consultation with stakeholders to further identify the aspects of the natural, social/cultural and technical/cost environment that were important in selecting a preferred strategy for the One River. Each category of criteria was considered equally in the evaluation. The criteria are consistent with the requirements of the Master Plan Class EA process as defined in the Municipal Class Environmental Assessment (Municipal Engineers Association, 2015).

#### Alternatives

Some other respondents felt that the statement could have included more on the alternatives. Suggestions included trade-offs between each alternative, a comprehensive understanding of the implications of fixing the dam or not, costs (and cost/benefit) of each option), and other possibilities such as installing a weir.

The trade-offs of the options are presented in this Stage 1 report. This information will be present to stakeholders through subsequent planned consultation activities (e.g. Agency Advisory Committee Meetings, First Nations Meetings, PIC #2, and the project website.)
### Question 3) Please review the display panels describing the history and the current conditions and let us know what important aspects might have been missed?

45% of respondents felt that nothing had been missed, while 37% indicated they felt something had been missed (with 18% not responding). The following were suggested as having been missed in the history and current conditions:

#### Indigenous History

Some respondents noted that it past Indigenous settlements along the river should have been included, as well as Indigenous uses of the river.

First Nations and Metis concerns were considered in defining the problem opportunity statement through pre-consultation activities, and as part of the evaluation of options. For example, a key social/cultural criterion is the ability of the option to address First Nations and Metis interest. In addition, a cultural heritage assessment was undertaken as part of Stage 2 (See Appendix D). During Stage 2 further information on indigenous uses of the river will be sought and incorporated into the development of the river management strategies.

#### Origins of the Dam

Some respondents felt there could have been more about the original reason for dam construction (and eventual closure), information on past flooding, costs associated with dam maintenance, and the importance of the Springbank Reservoir in summer months.

The function of the dam and its importance to the natural and social/cultural activities associated with the Thames River have been further documented in this report.

#### Environmental Conditions

Respondents also noted that environmental considerations may have been missed in the history and current conditions. They cited the state of the river prior to the dam (including any changes in the water level), past issues associated with the dam, environmental and wildlife impacts (e.g., invasive species, species at risk, etc.), and water quality.

The environmental components associated with the dam and its impacts on the Thames River have been further documented in this report and in Appendix B.

#### Recreational/Social Conditions

Some respondents felt that the past and current recreational/social uses of the river could have been better acknowledged.

The impacts on social/cultural uses and resources are include in the assessment of options for the Springbank Dam in this Report. During Stage 2 impacts of the alternative river management strategies on social/cultural uses and resources, including recreation will be considered.

### Question 4) Do you feel anything important has been missed with respect to the evaluation criteria?

55% of respondents felt that nothing had been missed, while 27% indicated they felt something had been missed (with 17% not responding). The following were suggested as having been missed in the evaluation criteria:

#### Environmental Considerations

Respondents noted that some environmental considerations had been overlooked with respect to the evaluation criteria. They cited considerations such as water quality and quantity, source water protection, wildlife passage/corridors, enhancement of biodiversity, and bacteria/algal blooms associated with dams. It was also suggested to acknowledge any benefits associated with ecosystem services obtained from a more natural river.

Environmental considerations associated with damming the Thames River have been further documented in this report and in Appendix B.

#### Recreational/Social Considerations

Some respondents felt that the evaluation criteria should include the recreational and social uses of the river, and should also include safety considerations.

The impacts on social/cultural uses and resources (including recreational uses and public health and safety) are include in the assessment of options for the Springbank Dam in this Report. During Stage 2 impacts of the alternative river management strategies on social/cultural uses and resources, including recreation and public health and safety will be considered.
**Comments**  
With respect to the alternatives, respondents indicated that they thought the benefits, impacts, and trade-offs between the three should be a part of the evaluation criteria. Respondents also suggested that legal implications should be part of the evaluation criteria. Additionally, costs and timelines of the alternatives were noted.

**Responses**  
The benefits and impacts relative to each alternative have been documented in this report as part of the evaluation.

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<th>Alternatives</th>
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**Consultation**

Some respondents felt that input received from Indigenous communities and the general public should be part of the evaluation criteria.

**Responses**

Input received from indigenous communities and the general public through the Stage 1 consultation and engagement program has been included in this evaluation.

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<th>Consultation</th>
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**General Feedback**

A number of respondents questioned the relative weighting of the criteria, if any. Another commented that the measurements and indicators as written are vague.

**Responses**

The three criteria categories – natural environment, social/cultural environment and technical/economic environment – were considered equally in the evaluation. This was considered the most appropriate weighting given the importance of each category.

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<tr>
<th>General Feedback</th>
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**Question 5) Do you think the consultation and engagement steps taken to date have been sufficient?**

50% of respondents felt that consultation has been sufficient, while 27% indicated they felt something had been missed (with 23% not responding). The following were suggested as potential improvements to the consultation:

**Indigenous Engagement**

Respondents recognized the importance of Indigenous engagement to the project and suggested that the project team speak with Indigenous communities and share the same information with them as shown in the public information centre.

**Responses**

Indigenous engagement will continue through Stage 2 of the Master Plan EA, and input will continue to be an important consideration in the assessment of alternatives, and the development of the overall preferred river management strategy.

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<tr>
<th>Indigenous Engagement</th>
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</table>

**Public Engagement**

Some respondents indicated there could have been more public consultation opportunities such as in community centres, senior centres, at existing events and meetings of groups, etc. It was also recommended to continue consulting with affected user groups throughout the EA. Additionally, some want more opportunities to speak directly with Council.

**Responses**

A comprehensive public consultation process was carried out that included a number of meetings with Stakeholder groups and opportunities to discuss the project through different venues and events. Further description and the outcomes of these opportunities are provided in this report.

<table>
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<tr>
<th>Public Engagement</th>
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**Communications**

It was suggested that public meetings could be better communicated to the public. With respect to online/digital engagement and communications, there was a suggestion for a stronger online presence as well as a suggestion for a project video. One respondent suggested to share a summary of consultation findings in local news media.

**Responses**

Communications in regard to the consultation process included a number of various media. The details of these are provided in this report.

<table>
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<th>Communications</th>
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**Question 6) What option are you in favour of for the future of the Springbank Dam?**

In total, 15% of respondents to the PIC survey and from correspondence/emails were in favour of Alternative 1 (Do Nothing), 55% were in favour of Alternative 2 (Decommission the Springbank Dam), and 24% were in favour of Alternative 3 (Repair/Replace the Springbank Dam), with the remaining 5% either being in favour of a combination of alternatives or not having provided a response.

**Alternative 1 – Do Nothing**

Those in favour of Alternative 1 cited reasons such as improved health of the river and associated habitat for plants and animals (including species at risk). Respondents also looked favourably on the minimal cost of Alternative 1 compared to the other two options.

**Responses**

A complete discussion of the evaluation of these criteria with regard to the Options is provided in this report.

| Alternative 1 – Do Nothing |  |
## Alternative 2 – Decommission the Springbank Dam

Alternative 2 was the most popular option among respondents at the Public Information Centre. Respondents commonly cited environmental reasons for their decision to support this alternative, including that it would allow for the river to return to a free-flowing and natural state. One respondent cited the fact that a free-flowing river is preferred by Indigenous communities, while another said that a free-flowing river meets the most evaluation criteria. Many felt it would improve the health of the river and its water quality (no stagnant or foul water, less suspended solids and sediment), and improve conditions for flora and fauna (including species at risk). Some respondents felt that a free-flowing river provides recreational opportunities and a dam is not necessary, or that recreational facilities are available elsewhere in London. Some saw the cost associated with fixing the dam to be prohibitive, or felt Alternative 1 was a short-term solution. The viewing platform/walkway was seen as desirable.

A complete discussion of the evaluation of these criteria with regard to the Options is provided in this report.

## Alternative 3 – Repair/Replace the Springbank Dam

Those in favour of Alternative 3 cited a return to previous recreational and social uses such as canoeing, boating and fishing. Some supporters of this alternative felt a balance could be reached in terms of recreational uses and environmental concerns, and offered suggestions such as retaining water in the area of the Forks, but leaving the river as free-flowing elsewhere, or installing a weir to retain water in times of drought only. Some felt that a fully functional dam would have no impact on the listed species at risk. With respect to the dam structure itself, some respondents noted that a repaired or replaced dam would provide flood mitigation in times of high water levels, or even allow for renewable energy generation opportunities.

A complete discussion of the evaluation of these criteria with regard to the Options is provided in this report.

## Question 7) Please share any additional comment you have regarding the future of the One River study area.

Many respondents used this opportunity to echo their previous comments and reasons for their support for their preferred alternative.

There were several comments and suggestions to do with the EA process itself. Some hoped for a decision to be reached soon, though another voiced concern over the ability to conclude this process and start any physical work on a reasonable timeline. It was felt that this issue has been polarizing. Communication to the public could be improved, and there was a suggestion to have another public meeting to review the results of the EA before it goes to Council. Any economic analysis of the alternatives should also include future maintenance costs. It was cautioned that if the dam is decommissioned, the Forks of the Thames project would not be able to proceed as planned.

## Environmental Considerations

- Leave it natural and it will attract eco-tourists
- Restore a wide riparian buffer on the river
- Feel that the river is much improved when it is free-flowing and natural
- Have been kayaking and fishing a lot with the dam not functional – water quality/smell appears improved
- Need to better control invasive plant species along the river
## Recreational/Social Considerations

<table>
<thead>
<tr>
<th>Comments</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would like to see a walkway on either side of the river</td>
<td></td>
</tr>
<tr>
<td>Turn the dam into a walkway</td>
<td></td>
</tr>
<tr>
<td>Creating an attractive space for the people of London</td>
<td></td>
</tr>
<tr>
<td>Fixing the dam would provide outdoor recreation opportunities</td>
<td></td>
</tr>
<tr>
<td>There is a need for continuous hiking/walking paths</td>
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</tr>
<tr>
<td>Concerned that Heritage River designation may be lost</td>
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### Compromise

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<tbody>
<tr>
<td>Leaving the dam operational for part of the year as a compromise</td>
<td></td>
</tr>
<tr>
<td>Has the project look at restoring the weir at the Pumphouse as a lower cost way of restoring water</td>
<td></td>
</tr>
<tr>
<td>Levels to allow for recreational use? A fish ladder could be incorporated.</td>
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</tr>
</tbody>
</table>
With respect to Question 8, the usefulness of the PIC Information, responses were as follows:

- 90% of the respondents indicated the information provided was helpful to them, as illustrated below:

- 84% indicated all or some of their questions had been answered, as illustrated below:

- 60% indicated the level of detail was about right, while 5% thought it was too technical and 23% felt it was not technical enough, as illustrated below:

Based on the above, it is concluded that the PIC format was useful, but that many respondents felt that more detail should be provided. This input will be taken into consideration when implementing Stage 2 consultation and engagement activities.
SECTION 8

Next Steps

8.1  Environmental Assessment Process

Once the option for the Springbank dam is confirmed, alternative strategies for river management, which consist of various projects related to infrastructure and river improvements, will be developed and assessed using similar criteria as established during Stage 1. A preferred river management strategy will be selected in Stage 2 based on the benefits the projects have on the natural social/cultural, and technical and economic environment. Stakeholder consultation, including consultation and engagement with First Nations and Metis, government approval agencies, interest groups and the general public will continue in Stage 2.

8.2  Anticipated Schedule

It is anticipated that a decision on the future of Springbank Dam will be made early in 2018. After that decision is made, the One River EA will proceed with Stage 2. Stage 2 will be carried out in late winter, spring and summer of 2018 and it is anticipated to be concluded early in the fall of 2018. Stage 2 of the One River EA will include additional gathering of background data on the various projects being considered for the river management plan, additional consultation and engagement opportunities and the evaluation and selection of the preferred strategy.
SECTION 9

References

(Biloka, G. S., R. E. Brazier (2008), Understanding the influence of suspended solids on water quality and aquaHc biota, Water Resources, 42:12, 2849-2861).


Upper Thames River Conservation Authority. 2015. Springbank Reservoir Shoreline Vegetation Succession Study, 2007 to 2014: A study to examine the natural re-vegetation of shorelines previously under long duration seasonal water.

Upper Thames River Conservation Authority, 2015. Springbank Reservoir Reptiles At Risk: Documentation and Study of Species At Risk Reptiles Along the former Springbank Dam Reservoir.


Appendix A

Stage 1 Technical Memorandum
1.0 Purpose

The purpose of this Technical Memorandum (TM) is to present the approach for completing the One River Master Plan Environmental Assessment (EA). In particular, the approach for completing Phase 1 of the Class EA, and Stage 1 of Phase 2 of the Class EA is described. Phase 1 involves confirming the problem/opportunity statement, and Stage 1 of Phase 2 involves defining and assessing options for the Springbank Dam. Once a preferred option for the Springbank Dam is determined, alternative strategies for River Management in the study area will be identified and evaluated in detail so that a preferred overall strategy can be selected.

2.0 Background

2.1 Purpose of the One River Master Plan

The overall purpose of the One River Master Plan EA is to develop a comprehensive plan, through engagement with First Nations and Métis, and in consultation with the public, and agency stakeholders, for implementing various projects within the One River study area that are being considered. These projects will represent both infrastructure needs and the community’s recreational and ecological vision for the Thames River in the City. As part of the EA process, findings from other studies, plans, and projects will be taken into consideration in order to select preferred options on the basis of their net social/cultural, environmental, technical, and economic impacts. Key amongst these other studies, plans, and projects to be incorporated into the evaluation process are The London Plan which has identified the vision for the Thames Valley Corridor and the Thames Valley Corridor Plan (TVCP) recommendations that relate to the riverfront environment, accessibility and use improvement, and the “Back to the River” design. The EA will be part of the implementation of the objectives and vision put forward in these plans and designs. The Master Plan will recommend various projects to form a basis for future infrastructure improvements and river management that also incorporates the vision and objectives of The London Plan and the Thames Valley Corridor Plan. For all projects identified in the Master Plan that trigger the criteria of a Schedule B or C project, further assessment, consultation and documentation will be required to meet the requirements of the Municipal Engineers Association (MEA) Class EA.
2.2 Municipal Class Environmental Assessment

The Ontario Environmental Assessment Act allows municipalities to meet the requirements of the Act either through “Individual” EAs or approved categories of “Class” EAs. Projects implemented to protect and enhance the Thames River will meet the EA Act requirements by following the requirements outlined in the MEA’s Municipal Class EA document (as amended in 2007 and 2011, and 2015). The MEA process is illustrated in Figure 2.1, and identifies project Schedules (i.e. A, A+, B and C) based on their potential impacts.

The Municipal Class EA is not only applicable for individual projects, but also for Master Plans that involve considering infrastructure systems or groups of related projects, as is the case with One River. The One River Master Plan EA will follow the Approach #1 Master Plan process outlined in the MEA’s Municipal Class EA document and meet Phases 1 and 2 of the process. The objective of this Master Plan-level EA is to develop a comprehensive plan for integration and implementation of various projects and plans already defined to varying degrees for the One River study area, as well as new projects and plans developed as part of this EA.
3.0 One River Master Plan EA Process

3.1 Overview of EA Process

In Phase 1 of the Master Plan EA process background information will be reviewed and the problem opportunity/problem definition will be confirmed, while in Phase 2 alternatives will be developed and assessed and the preferred strategy selected. It is recognized that in Phase 2 there are numerous alternatives to be evaluated in order to select and develop the overall strategy for the One River study area. The approach for evaluating these alternatives involves the following two stages:

- Stage 1: The ultimate selection of an option for Springbank Dam will be a determining factor in the identification and evaluation of river management strategies going forward. These strategies include various infrastructure projects as defined in the EA’s Terms of Reference and the design of the Back
to the River elements. It is therefore necessary to determine the preferred option for the dam first so that the option selected can inform the decision-making process on the river management strategies.

- **Stage 2:** Once the option for the Springbank dam is selected, alternative strategies for river management, which consist of different types of projects related to infrastructure and river improvements, will be developed and assessed. A preferred strategy will be selected based on environmental, social/cultural, technical and cost criteria.

Following the two-stage assessment process, the preferred strategy will be developed in detail, including for each individual project estimated costs, schedule for implementation, and additional approval and assessment requirements.

Figure 3.1 illustrates the One River Master Plan EA approach and how it fits within the required Phase 1 and Phase 2 of the MEA process as illustrated in Figure 2.1. An important aspect of the EA is the communication with City Council at key milestones in the project. At key milestones, project details will be provided to Council for their guidance or approval. Details of the process are described in detail in the following sections.

### 3.2 Establishing Environment Conditions

To assess the alternatives, the existing conditions in the study area must be identified and the impacts of alternatives on existing conditions must be determined. The Ontario Environmental Assessment Act, which is the basis for the Municipal Class Environmental Assessment process, defines the environment very broadly as:

- Air, land, or water
- Plant and animal life, including humans
- Social, economic, and cultural conditions that influence the life of humans or a community
- Any building, structure, machine, or other device or thing made by humans
- Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities
- Any part or combination of the foregoing, and the interrelationships between any two or more of them, in or of Ontario

Consequently, in order to assess Springbank Dam options and resulting River Management strategies, the impacts on the natural, social and cultural environment as well as the technical implications and costs of the options and strategies must be evaluated. The level of information being collected becomes more detailed as the Phase 2 evaluation proceeds. For example, when assessing Springbank Dam options existing background information will be reviewed, along with input from approval agencies and consultation with First Nations, stakeholders and the public to assist in the evaluation. To assess the River Management strategies, more detailed inventories and evaluations will be undertaken to better understand the impacts on the social and cultural and natural environment in the area of Springbank Dam and the Forks of the Thames River. Detailed site-specific field inventories will be undertaken on individual projects as identified in this Master Plan.
Figure 3.2 illustrates the increasing level of detail for the natural environment studies and inventories that will be undertaken during the Master Plan, as well as the subsequent work on individual projects. It should be noted that the level of detail for the environmental program, while sufficient to meet the requirements of the Master Plan process, does not meet the City’s requirements for an Environmental
Impact Study (EIS) or Subject Lands Status Report (SLSR); however the data collected would be considered under future EIS and SLSR work at the appropriate time for the individual projects that may be identified in the Master Plan.

Figure 3.2: Level of Detail for Evaluating Options and Strategies

3.3 Stakeholder Consultation
Stakeholder consultation is an integral part of the Master Plan process, and various methods will be used to solicit input from stakeholders. These are described below.

3.3.1 Public Consultation
Public consultation will include individual public stakeholder meetings with the City, Public Information Centres (PICs) and Pop-Up Events. Pop-Up Events will be informal information sessions held in the summer months at festivals, events and other public engagement opportunities. They will provide a chance to receive feedback from members of the public through the use of short, electronic surveys.

3.3.2 First Nation and Métis Engagement
First Nations and Métis input is key to Master Plan success. As part of the scope of work for stage one of the EA, the goal is to have early and continuous input from the First Nations on the problem definition, alternatives, evaluation criteria and the overall preferred strategy. The City has already begun consultations with the Chippewas of the Thames First Nations (COTTFN) and recognizes the importance of continuing engagement throughout the process, and being proactive in seeking their input.

3.3.3 Steering Committee Meetings
The Internal Steering Committee is comprised of City staff and is responsible for the business issues associated with the project and for providing guidance and support to the sponsor, project manager and project team. The steering committee consists of staff who are representative of the business area(s) and have a direct, vested interest in realizing the project’s deliverables and objectives. Participation is determined by the project sponsor.
3.3.4 **Agency Advisory Committee Meetings**

An Agency Advisory Committee has been formed to provide guidance on regulatory processes and issues that may arise as the project progresses. These agencies include the MNRF, MOECC, UTRCA, LTRCA and DFO. The intent of the Agency meetings is to determine the issues and challenges around permitting and approvals for the dam alternatives in Stage 1 and for infrastructure and river management options in Stage 2.

3.3.5 **Back to the River Design Integration**

The Back to the River “Ribbon of the Thames” award-winning design incorporates a number of elements that support a River vision that has been called bold and exciting. It focuses on bringing people back to the River to enjoy a significant cultural and heritage resource and engage in activities that reflect the River’s beauty and cultural significance. Coordination will be done with the Ribbon of the Thames Civitas/Stantec team on how the design elements of Back to the River can be integrated into the EA evaluation and be adapted to potentially changing water levels.

3.3.6 **TVCP Integration**

The City has developed a corridor based plan for the Thames River that looks at the multifunctional role of the river corridor. Recommendations from that plan will be considered and integrated into the EA process.

3.3.7 **Official Plan Integration**

As required by the planning Act, all municipal works shall comply with the City’s Official Plan (OP). Proposed projects under this EA will be reviewed against all OP policies.

4.0 **Phase 1: Problem/Opportunity Statement**

The Problem/Opportunity Statement is a clear, concise description of the issue(s) that need to be considered as part of an EA process. The ultimate goal of the EA is to deliver an outcome that addresses and resolves the problem/opportunity statement. Based on early stakeholder engagement and background information, a draft One River Master Plan EA Problem/Opportunity Statement has been prepared, which recognizes the collective responsibility of all stakeholders in maintaining and enhancing these “shared natural, cultural, recreational and aesthetic resources”. One of our first goals will be to finalize and confirm this EA Problem/Opportunity Statement (Phase 1 of the Class EA process). Our approach will be to consult with the Steering Committee, Agency Advisory Committee, and First Nations early in the process to re-present the Problem/Opportunity Statement, and receive endorsement.

The detailed problem/opportunity statement that has been defined is as follows:

“The river that flows through London’s downtown has many names:

- Deshkan Ziibiing (known to the Anishnaabeg and Lenape of the Great Lakes);
- Kahwy’hatati (ONYOTA:KA); and,
- The Thames (John Graves Simcoe)

This river is both our inheritance and our living legacy. It is our collective responsibility to maintain and enhance this shared natural, cultural recreational and aesthetic resource. The One River Master Plan Environmental Assessment will consider the area historically influenced by the Springbank Dam and will provide a plan that coordinates critical infrastructure projects in ways that improve the overall health of the river, identifies and creates an understanding of potential impacts these projects may have on downstream communities, species at risk and/or endangered species and where possible avoids them and respects the vision of Back to the River’s “The Ribbon of the Thames” concept plan. This study, in the context of many other ongoing initiatives, will preserve for future generations this valuable resource and allow people of all abilities to enjoy and access this designated Canadian Heritage River.”
The above statement was developed based on a review of the information provided during the various stakeholder engagement sessions held in 2016, as well as the background information available, the study objectives, and the input from the March 8th, 2016 public meeting. This statement has been endorsed by City Council.

5.0 Phase 2-Stage 1: Assessment of Springbank Dam Options

As discussed above, Stage 1 of the process will see the determination of a preferred option for the Springbank Dam through the identification and description of the options, review of existing environmental conditions, assessment of impacts, and selection of a preferred option. Throughout the process of evaluation of options in Stage 1 and Stage 2 of the EA, The London Plan and the TVCP will provide a key basis for the definition of criteria.

5.1 Springbank Dam Options

The Springbank Dam options include:

- **Do Nothing** so that the dam is left in its current condition with no upgrades, repairs or repurposing.
- **Free-Flowing River** so that the dam is decommissioned and no longer provides a water retention function. Dam decommissioning as part of the recommendations may include options for repurposing the dam structure and various river enhancements, ecological enhancements and recreational enhancements upstream that work within the hydrologic and hydraulic limitations associated with lower water levels during the summer months when, otherwise, the dam may have been operated to increase water depths upstream.
- **Reinstating the Dam** so it provides a water retention function. Dam repair allows for dam operation during months when higher water levels upstream would promote additional recreational opportunities associated with higher water levels. Reinstating the dam does not preclude adding options similar to repurposing the dam.

As a first step, we will develop conceptual designs for each option, outlining the works required for construction.

5.2 Review of Environmental Conditions

The next step will be to determine, analyze and document the existing conditions in the study area that may be impacted by the different Springbank Dam options. Natural, social/cultural and technical/cost conditions will be established.

5.2.1 Natural Environment

Since the non-operation of the Springbank Dam in 2005, water levels, sediment transport and vegetation has modified the upstream aquatic environment allowing for certain riverine adapted species to move freely and occupy areas of the river that were previous uninhabitable for those species. The new riverine adapted species include several federally regulated Species at Risk (SAR) that now occupy the upstream sections for not just basking and foraging activities but also for breeding and nursery habitat.

To assess the impacts of the dam options on the natural environment, baseline ecological and physical environmental conditions will be established through environmental analysis and field programs. The focus of the assessment is on aquatic species including SAR and their habitat that is directly affected by predicted changes in the environment associated with future dam operation options. The study area falls within the Carolinian zone, and terrestrial SAR that will be directly affected will have habitat immediately adjacent to the River and will also be identified through field programs. Based on this understanding and linkages, the following levels of data collection have been determined:
1. **Priority Items:** This includes information needed to be able to define and assess the criteria for the One River project and evaluate potential effects. Items include: geomorphology, aquatic habitat assessment and mapping, mussel surveys, fisheries survey and riparian vegetation characterization.

2. **Stakeholder Items:** This includes information that has been identified by additional stakeholders that may not be critical to the technical approach, but may be critical in gathering support and recognition of the current condition and function of the various parts of the Thames within the study area. Items include additional fisheries surveys, reptile coverboard surveys, additional vegetation characterization and bird surveys.

3. **Protocol Items:** These are items that need to be collected based on standard local, provincial or federal protocols if specific approaches are to be used (e.g. evaluating significant wildlife habitat has standard terms and templates for evaluation). Some of these items may include amphibian surveys, breeding bird surveys and three season ecological land classification (ELC).

4. In addition to establishing the baseline ecological and physical environmental conditions, the Stage 1 analysis of water quality will include a review and summary of available background water quality data and a statistical analysis of the water quality comparing key indicators with the dam in place and with the river unobstructed by the dam. Water quality data upstream and downstream of the dam will be included in the analysis.

### 5.2.2 Social and Cultural Environment

Whether the Springbank dam is decommissioned, re-instated or left in its current condition will have varying implications on the social and cultural environment. The baseline social and cultural environment conditions will be established in the following ways:

- **Reviewing, and documenting land use and users in the area.** Background information will be reviewed to establish baseline land use conditions. In addition, input from public stakeholders (i.e. recreational, downstream communities) First Nations and Métis, will be considered in determining potential concerns and impacts.

- **Completing an Archaeological and Heritage Assessment:** The Thames River is a Canadian Heritage River that has been an important cultural region for as long as 11,000 years. It is an area of aboriginal/First Nations and European cultural heritages, and as such has the potential for unknown archaeological resources. A Stage 1 Archaeological Assessment will be completed which will involve a desktop investigation to review relevant background material information, evaluate the study area’s archaeological potential, and provide information to make recommendations regarding the need for additional archaeological work where impacts are anticipated in undisturbed areas, if any. All work will meet requirements of the Ontario Ministry of Tourism, Culture and Sport’s (MTCS) 2011 Standards and Guidelines for Consultant Archaeologists in accordance with the Ontario Heritage Act. The information will be used to aid in the alternatives assessment.

- **Using the baseline hydrological and geomorphology data to establish potential risks to public safety as a result of increased flooding or shoreline erosion.**

- **Integration of the London Plan and the TVCP vision and objectives will provide guidance to the EA in regard to the preservation and enhancement of the Thames River health, vistas, beauty and cultural heritage while accommodating compatible infrastructure, accessibility and recreation.**

- **Integration of the Back to the River design elements that support the ecological, accessibility and recreation objectives of the EA.**
5.2.3 Technical and Economic Environment

Technical implications of a project relate to such factors as constructability (i.e. the ease of implementation, including the ability to receive required permits and approvals), long-term operations and maintenance requirements, and the compatibility with other planned infrastructure projects (e.g. Ribbon of the Thames). Evaluating these technical implications requires that the construction works for each option be clearly identified, the upstream/downstream impacts on the natural and social environments be determined, and the appropriate approvals agencies be consulted with. The City of London has established the Agency Advisory Committee, and has held three meetings with them to start identifying approval requirements for Springbank Dam options.

The construction works for each option and the operating/maintenance requirements will be used to determine the general costs of each option. Costs established at this stage will be high level, and be estimates for comparison purposes only.

5.3 Approach to Evaluate Springbank Dam Options

For Stage 1, our approach involves describing the impacts of the options on the various components of the environment. A draft set of criteria for evaluating options is presented in Table 5.1, which will be finalized based on Stakeholder input. For each option, the potential impacts for each criterion will be estimated. The goal is to determine the basic feasibility of each option based on the potential impacts, and if there are significant impacts that would serve to “screen-out” the option from further evaluation. Where possible we will quantify impacts (e.g. capital costs, mapping techniques to establish extent of impacts on natural environment, potential length of time to receive approaches). When impacts cannot be quantified we will describe the impacts based on stakeholder input and expert judgement.

5.4 Recommended Springbank Dam Option

Based on the assessment of impacts, a determination of the feasibility of each option will be established and a preferred option will be recommended and presented to City Council, and agency and public stakeholders for input and comments. The preferred option for the Springbank Dam will be finalized following Council and stakeholder input. Any concerns raised will be addressed and comments/responses will be documented.

6.0 Schedule for Stage 1

The schedule for major deliverables and consultation activities that are part of Stage 1 are illustrated in Figure 6.1. As illustrated, public engagement is an important component of this project and as such, numerous public engagement events are planned throughout the summer to provide input into this important stage of the project.

7.0 Next Steps

Currently we are proceeding with fully defining the Springbank Dam options and undertaking necessary background reviews, inventories, field work and analysis to establish existing conditions, and the impacts on the environment of the options. The Stage 1 options and evaluation process will be presented to stakeholders’ numerous times, as illustrated in the schedule in Figure 6.1. The preferred Springbank Dam option will be determined based on the outcome of the evaluation.

Once the option for the Springbank Dam is confirmed, the Stage 2 assessment of River Management strategies will begin. This will be a more detailed evaluation of specific works, including integration of River maintenance and enhancements identified in plans such as the Thames Valley Corridor Plan, Restoration and Flood Protection Plans, plans for infrastructure renewal including the PPCP and, in particular, the Back to the River’s “Ribbon of the Thames” Concept Plan. Using similar, but more detailed criteria as identified in Table 5.1, an analysis that considers environmental, technical,
social/cultural (community), and economic (cost) criteria will be undertaken. At Stage 2, criteria importance ratings (weights) will also be established based on consultation with the City, and in consideration of community, First Nation, Métis, and agency inputs during the Class EA consultation process, to best reflect the priorities of all stakeholders. River management strategies will be scored and ranked to establish the preferred overall River Management Strategy that best addresses the problem/opportunity statement and “will preserve for future generations this valuable resource and allow people of all abilities to enjoy and access this designated Canadian Heritage River”.

Table 5.1: Draft Evaluation Criteria for Assessing Springbank Dam Options

<table>
<thead>
<tr>
<th>Category &amp; Criterion</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Natural Environmental</strong></td>
<td></td>
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<tr>
<td>Water Quality</td>
<td>The potential of the option to maintain or improve water quality to Provincial Water Quality Objectives (PWQOs) or better.</td>
</tr>
<tr>
<td>Geomorphology</td>
<td>The potential of the option to result in a stable streambank condition with respect to slope stability and erosion (upstream and downstream).</td>
</tr>
<tr>
<td>Sedimentation</td>
<td>The potential for the option to optimize sediment transport to a stable sediment load condition.</td>
</tr>
<tr>
<td>Species at Risk</td>
<td>The potential of the option to protect sensitive species and species at risk (both aquatic and terrestrial).</td>
</tr>
<tr>
<td>Terrestrial Habitat</td>
<td>The potential for the option to maintain or enhance terrestrial habitat by protecting sensitive areas.</td>
</tr>
<tr>
<td>Aquatic Habitat</td>
<td>The potential for the option to maintain or enhance aquatic habitat that supports benthic and fish communities.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>The ability of the option to protect groundwater resources from a quality and quantity perspective.</td>
</tr>
<tr>
<td><strong>Social/Cultural Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Cultural Heritage</td>
<td>The potential of the option to protect cultural/heritage resources.</td>
</tr>
<tr>
<td>Public Health &amp; Safety</td>
<td>The potential of the option to minimize risk or liability to community health and safety resulting from flooding.</td>
</tr>
<tr>
<td>Recreation Opportunity</td>
<td>The potential of the option to provide or enhance recreational activities.</td>
</tr>
<tr>
<td>Downtown Integration</td>
<td>The potential of the option to impact the integration of the River with the downtown area.</td>
</tr>
<tr>
<td>River Destinations</td>
<td>The potential for the option to permit city-wide destinations that include both built (mixed-use developments) and natural places.</td>
</tr>
<tr>
<td>Urban Waterfronts</td>
<td>The potential for the solution to permit an “urban” waterfront in certain locations.</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>The ability of the option to maintain or enhance the visual character of the study area.</td>
</tr>
<tr>
<td>Stakeholder Acceptance</td>
<td>The potential of the option to be accepted by stakeholders including landowners, First Nations, Métis, and the public based on comments and feedback received through public consultation during the study.</td>
</tr>
<tr>
<td>The London Plan Integration</td>
<td>The ability of option to incorporate recommendations from The London Plan.</td>
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CH2M HILL CANADA LIMITED
### TVCP Integration
The ability of option to incorporate recommendations from the TVCP.

### Technical and Economic

<table>
<thead>
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<th>Feature</th>
<th>Description</th>
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<tr>
<td>Flood Control</td>
<td>The ability of the alternative to allow for the required flooding control.</td>
</tr>
<tr>
<td>Erosion Control</td>
<td>The ability of the alternative to mitigate streambank erosion upstream and downstream of Springbank Dam.</td>
</tr>
<tr>
<td>Constructability, Implementation, and Work Scope</td>
<td>The ability of the option to be constructed and implemented on a technical, regulatory, and practical basis; within a reasonable scope of work. In particular, the ability of the option to meet required approvals from the City of London and regulating agencies (UTRCA, MNRF, MOECC, DFO).</td>
</tr>
<tr>
<td>Operations &amp; Maintenance</td>
<td>The ability of the option to be operated and maintained within regular operating parameters at the City. (Operational and Maintenance requirements of the options will be described).</td>
</tr>
<tr>
<td>Compatibility with existing and planned infrastructure projects</td>
<td>The ability of the option to be compatible with existing and planned projects upstream/downstream of the Springbank Dam (e.g. Back to the River components and TVCP recommendations).</td>
</tr>
<tr>
<td>Relative Capital Cost</td>
<td>Estimated capital cost relative to other options. (Will a cost range for each option for comparison purposes only in Stage 1).</td>
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Figure 6.1: Schedule for Completing the Phase 1 and Phase 2 Stage 1 Evaluation
Appendix B

Background Environmental Report
REVISED

ONE RIVER MASTER PLAN
BACKGROUND ENVIRONMENTAL DATA REPORT
CITY OF LONDON
THAMES RIVER

Report Prepared for:
CH2M HILL CANADA LIMITED AND
CITY OF LONDON

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REVISED

ONE RIVER MASTER PLAN
BACKGROUND ENVIRONMENTAL DATA REPORT
CITY OF LONDON
THAMES RIVER

Report prepared for CH2M Hill Canada Limited and the City of London, October 2017

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Senior Water Resources Engineer

DISCLAIMER

We certify that this report is accurate and complete and accords with the information available during the site investigation. Information obtained during the site investigation or provided by third parties is believed to be accurate but is not guaranteed. We have exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

This report was prepared for CH2M Hill Canada Limited and The City of London. The report may not be relied upon by any other person or entity without our written consent and that of CH2M Hill Canada Limited and the City of London. Any uses of this report by a third party, or any reliance on decisions made based on it, are the responsibility of that party. We are not responsible for damages or injuries incurred by any third party, as a result of decisions made or actions taken based on this report.
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<td>BSC</td>
<td>Bird Studies Canada</td>
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<tr>
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