

Executive Summary

Introduction

The Upper Thames River Conservation Authority (UTRCA) in partnership with the City of London (City) has undertaken a Master Repair Plan (MRP). This is a strategic document to assist in the overall planning for a period of up to 20 years to address aging infrastructure, flood protection, public use, and integration of other City initiatives. The intent of the Master Repair Plan is to develop the required strategic plan to allow the UTRCA and the City to have a method for determining when a trigger point for repair and/or replacement of a portion of the dyke is required.

The Master Repair Plan is being undertaken in accordance with the Master Planning requirements of the MEA Municipal Class Environmental Assessment (October 2000, as amended in 2007 and 2011).

The MEA offers four approaches for undertaking a Master Plan and based on our review Municipal Class EA Approach #2 appears to be the most accurate. Approach #2 allows for the preparation of a Master Plan document at the conclusion of Phases 1 and 2 of the Municipal Class EA process where the level of investigation, consultation and documentation are sufficient to fulfill the requirements for Schedule B projects identified within the Master Plan. Accordingly, the final public notice for the Master Plan could become the Notice of Completion for Schedule B projects within it. Any Schedule C projects, however, would have to fulfill Phases 3 and 4 prior to filing an Environmental Study Report (ESR) for public review. The Master Plan would provide the basis for future investigations for the specific Schedule C projects identified within it. While Master Plans are not subject to requests for a Part II Order, members of the public or other stakeholders may submit a request to the Minister for a Part II Order for individual Schedule B projects identified within the Master Plan.

Overview of West London Dyke

The West London Dyke is approximately 2,300 m long and runs along the west bank of the north branch of the Thames River extending north of Oxford Street to the Forks of the Thames River and then along the north bank of the main branch to the west of the Wharncliffe Road Bridge and terminating in Cavendish Park. The West London Dyke is primarily an engineered structure which protects life and property during periods of extreme river flows. In addition to serving a critical control function, the dyke is also an integral component of the City's recreational pathway system and its location at the Forks of the Thames makes it a prominent structure in the downtown area of the City.

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History of the West London Dyke

Due to the proximity of early settlements within London to the Thames River, these areas were often subjected to flood events. A catastrophic flood in July 1883 prompted the construction of a formalized dyke system. A flood event in April 1937 overtopped the dyke and resulted in five deaths, the destruction of approximately 1,100 homes and severe damage to roads and bridges. As a result of the flood, the dykes along the river were reconstructed and raised.

Flood control measures implemented subsequent to the formation of the UTRCA after the 1947 flood have resulted in the construction of several dams, flood control channels, floodwall and dyke rehabilitation.

Replacement of a 300 m section of dyke between the Queens Avenue Bridge and Rogers Avenue with a near vertical modular block wall with geogrid reinforcement was completed in 2007. This section was replaced rather than repaired after structural deficiencies were noted in 2006 during the initial stages of a concrete repair program.

Consultation

Residents within the area surrounding the West London Dyke as well as other stakeholders were provided with a Notice of Commencement, which included information on Public Information Centre 1 (PIC 1), Notice of Public Information Centre 2 (PIC 2), Notice of Public Information Centre 3 (PIC 3) and Notice of Completion through Canada Post.

Project Area Description

With regard to engineering review, costing, and trigger point determination, the Master Repair Plan considered the following segments (from upstream to downstream) which were derived based on the physical location and/or physical characteristics of the dyke:

1. Oxford North;
2. St. Patrick's (Oxford Street West – Empress Avenue);
3. Blackfriars (Empress Avenue – Cummings Avenue);
4. Natural Bank (Cummings Avenue – Leslie Street);
5. Labatt Park/Forks (Leslie Street – Dundas Street);
6. Wharncliffe (Dundas Street – Wharncliffe Road North);
7. Cavendish East; and
8. Cavendish West.

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These segments however are not intended to represent exact limits for future construction projects. Future works (involving repair or replacement) may involve either work within a segment, or overlapping or portions of segments.

Project Drivers

In order to properly define the long-term planning requirements for the West London Dyke, it is critical that appropriate project drivers (potential reasons to implement or otherwise initiate work) are defined. As part of the Master Repair Plan planning process, a conceptual list of project drivers were developed based on the guiding principles for presentation to interested stakeholders and for subsequent evaluation during selection of the preferred alternative(s). The project drivers identified are as follows:

- Flood Risk Reduction
- Public Safety
- Functional Improvements
- Environmental Considerations
- Funding Opportunities
- Other (Hydrologic Considerations)

Assessment of Environment

- The following provides a general description of each component in reference to the West London Dyke Structure and surrounding area:
- Natural Environment: Element addressing the protection of the natural and physical elements of the environment (i.e., air, water, land, etc.). This includes both natural heritage and environmentally sensitive areas;
- Social/Cultural Environment: Component that addresses the potential effects on the public, including adjacent landowners (residents, businesses), community groups, social elements, historical/archaeological and heritage factors, and development objectives of the City;
- Economic: Component that addresses capital and maintenance costs, potential flood damage impacts, etc.;
- Legal: Factor that considers potential land requirements related to each proposed alternative; and

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- Technical: Component that addresses the technical requirements and suitability of each alternative.

Engineering Review

As part of the technical component of the Master Repair Plan, a general engineering evaluation of the West London Dyke was undertaken. The intent of the engineering review was to establish the following:

- The current condition of the West London Dyke through a review of previous investigations and monitoring inspections;
- Information on the geotechnical characteristics of the site through literature review;
- Information related to potential legacy issues relating to environmental impacts based on past project experience and available documentation;
- Potential maintenance and constructability issues associated with the dyke;
- Requirements for approvals and permits;
- General guidelines for future work based on previous criteria established through the Phase 1 Replacement project; and
- Requirements or recommendations related to further engineering studies.

Alternative 4 has been identified as the preferred solution, with the exception of the section from Rogers Avenue to the Queens Avenue Bridge.

Review of Alternatives

The Master Plan and Class EA planning process recognizes that there are often many alternatives to address a particular issue or problem, and that these alternatives should be considered. Alternative solutions identified as part of the Master Repair Plan are listed as follows:

- **Alternative 1** – Do Nothing;
- **Alternative 2** – Replace with Similar Dyke (Existing Footprint);
- **Alternative 3** – Replace with New Dyke to 100 Year Standard + Freeboard; and
- **Alternative 4** – Replace with New Dyke to 250 Year Standard + Freeboard.

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Recommended Implementation Strategy

In general, the prioritization of projects is based on a review of the project drivers. Accordingly, the determination of priority has been based on known existing information as presented in Table E.1, primarily relating to the following:

- Current condition of the dyke;
- Potential to reduce overall flood damages;
- Constructability considerations; and
- Other impacts or considerations.

Table E.1: Project Implementation Schedule

Segment	Section	Type	Preferred Alt.	Estimated Cost	Estimated EA Cost	Implementation Schedule	Priority Ranking
Oxford North	North of south limit of Oxford St. Bridge	Concrete Revetment / Vegetated Berm	Alt. 4	\$3.7M / \$2.6M ⁷	N/A	10 + Years	8
St. Patrick	Oxford St. to St. Patrick St.	Concrete Revetment	Alt. 4	\$2.8M	N/A	5 to 10 Years	4
	St. Patrick St. to Empress Ave.	Concrete Revetment	Alt. 4	\$3.0M	N/A	5 to 10 Years	5
Blackfriars	Empress Ave. to Blackfriars St.	Concrete Revetment	Alt. 4	\$3.3M / \$2.2M ⁷	\$70-\$80K	1 to 5 Years	2
	Blackfriars St. to Cummings Ave.	Concrete Revetment	Alt. 4	\$2.2M	\$70-\$80K	1 to 5 Years	3
Natural Bank	Cummings Ave. to Leslie St.	Concrete Revetment (Naturalized Toe)	Alt. 4	\$4.6M	N/A	10 + Years	6

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Segment	Section	Type	Preferred Alt.	Estimated Cost	Estimated EA Cost	Implementation Schedule	Priority Ranking
Labatt Park/Forks	Leslie St. to Rogers Ave.	Concrete Revetment	Alt. 4	\$2.6M	N/A	1 to 5 Years	1
	Rogers Ave. to Queens Ave. Bridge	Modular Block Wall with Geogrid	Alt. 1	\$250K	N/A	10 + Years (work completed in 2007/08)	---
	Queens Ave. extending south to Forks	Natural Bank with Gabions	Alt. 4	\$500K	N/A	10 + Years	9 (assumed to coincide with Wharnccliffe segment work)
Wharnccliffe	From Forks to Wharnccliffe Rd. Bridge	Natural Bank with Gabions	Alt. 4	\$4.3M / \$3.3M	N/A	10 + Years	9
Cavendish East	Wharnccliffe Rd. Bridge extending west	Concrete Revetment	Alt. 4	\$2.8M	N/A	10 + Years	7
	From termination of concrete revetment extending west to City Works Yard	Natural Bank/Berm	Alt. 4	\$2.7M	N/A	10 + Years	10
Cavendish West	From City Works Yard extending north, then west along adjacent property limits	Vegetated Berm	Alt. 4	\$1.2M	N/A	10 + Years	10

Additional Studies

In addition to capital improvements and repairs, additional studies and programs have been recommended. Recommendations have been based on comments received during the consultation process, the evaluation of project drivers, input from both the UTRCA and the City, and the environmental and technical reviews completed for the West London Dyke.

1.0 INTRODUCTION

The Upper Thames River Conservation Authority (UTRCA) in partnership with the City of London (City) has undertaken a Master Repair Plan (MRP). This is a strategic document to assist in the overall planning for a period of up to 20 years. The objectives of this Master Repair Plan are as follows:

- To ensure that key problems and opportunities facing the UTRCA and the City with regard to the dyke are properly identified;
- To update the previous 2007 West London Dyke Flood Control Structure Master Plan in accordance with the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (June 2000, revised 2007 and 2011) process;
- To provide an overview of the existing condition of the dyke, level of flood protection currently provided, and present constraints (regulatory, land, transportation);
- To integrate other City initiatives pertaining to the dyke area;
- To provide general recommendations and design guidelines relating to various components of the West London Dyke and adjacent pathway system, such as wall structure, activity / use areas, natural environment, heritage features and interpretation, safety, access, etc. are properly identified; and
- The Master Repair Plan results in the implementation of the required projects on a cost effective, sustainable, and timely basis.

This Master Repair Plan sets out design recommendations, which will guide detailed design development for the various phases of the West London Dyke and Thames Valley Parkway upgrade and replacement. Preparation of the Master Repair Plan was undertaken after careful examination of existing conditions and findings gathered through the consultation process and review of other City initiatives.

1.1 STUDY OVERVIEW

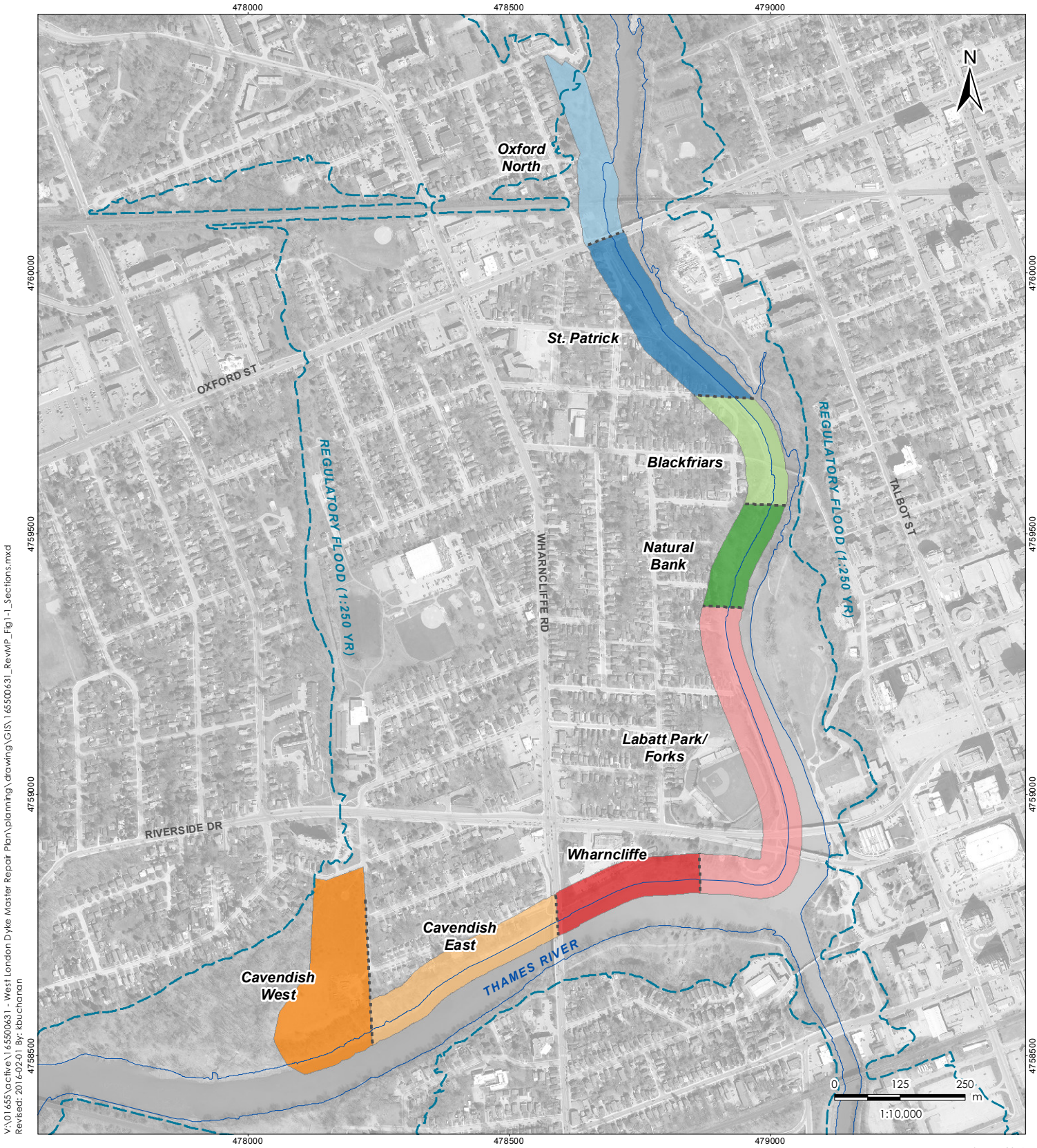
The Master Repair Plan provides a summary of existing conditions for the West London Dyke Flood Control Structure. Figure 1.1 illustrates a general overview of the study area. Subsequent figures within the Master Repair Plan will provide further detail of the study area. The study area is defined as the geographical area that could potentially be affected by any of the alternatives presented and was determined on the basis of the expected range of effects associated with the Master Repair Plan for the existing West London Dyke. Repair and replacement needs are identified and alternatives are developed to address these needs. Key steps taken in the development of this Master Repair Plan include the following:

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- On-site field visits and photo documentation to gain an in-depth appreciation of the dyke and pathway system, existing conditions, and to identify opportunities and constraints;
- Public consultation via Public Information Centres (PICs) with notification given through:
 - Mail out (Canada Post) to surrounding residents as shown in Figure 1.2, and
 - Newspaper advertisement in the London Free Press or the Londoner.
- Agency consultation;
- Aboriginal consultation;
- Technical review consisting of:
 - Planning / environmental review,
 - Hydraulic review,
 - Engineering review,
 - Costing (planning, design, implementation and maintenance), and
 - Trigger point determination.
- Preparation of preliminary design concepts for discussion purposes;
- Preparation of the draft Master Repair Plan;
- Circulation of the draft Master Repair Plan for comments; and
- Finalized Master Repair Plan document.

Through regular Project Team meetings between the City, UTRCA, and Stantec, modifications or revisions may have been made to the scope of work required as guided by the terms of reference for this project.



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 Revised: 2016-02-01 By: kbuchanan

February 2016
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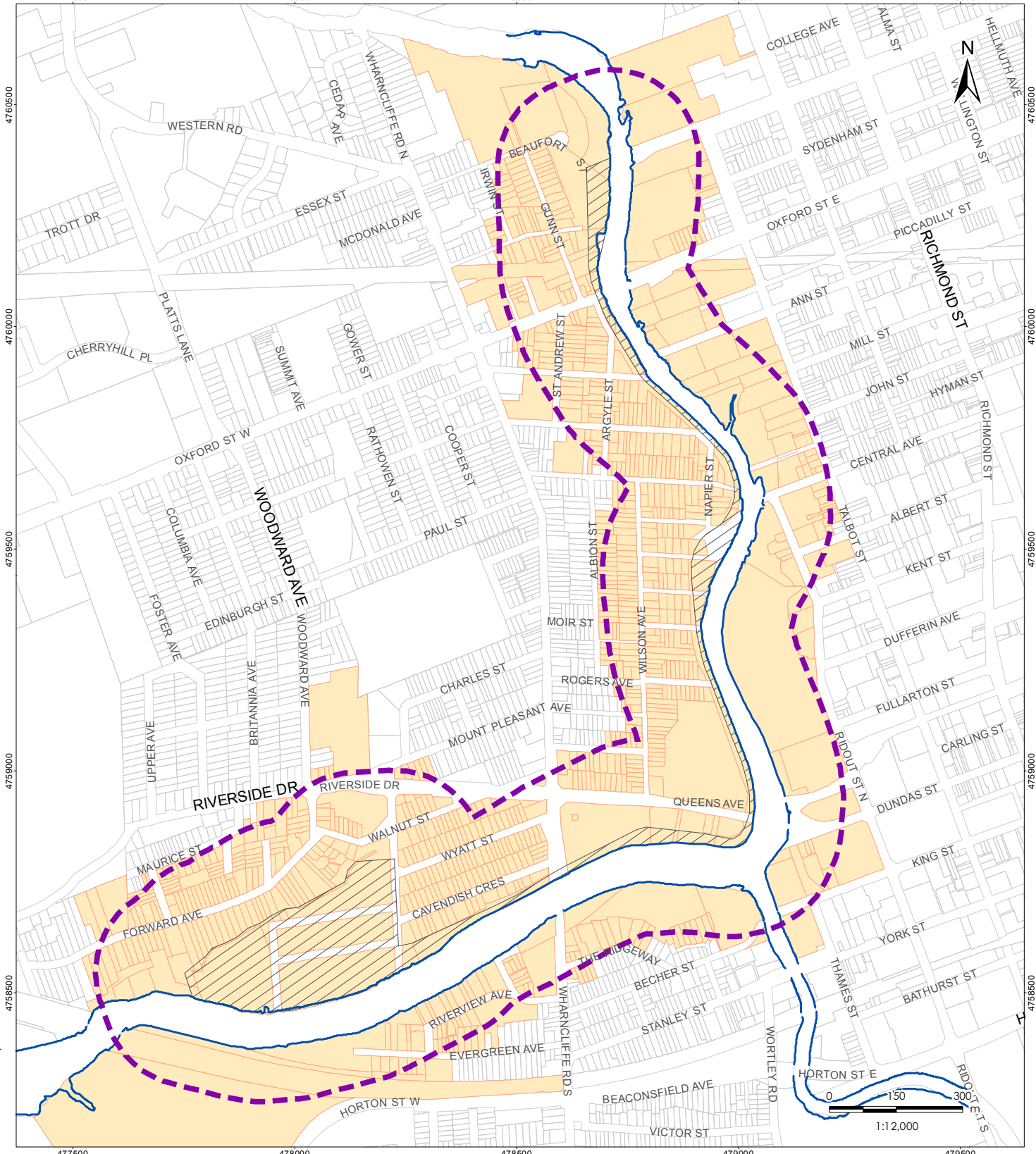


Client/Project
 Upper Thames River Conservation
 Authority & City of London
 West London Dyke Master Repair Plan

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
 2. Imagery and base features used under license with the City of London, © 2009-2015.

Figure No.
1.1
 Title

Study Area



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 Revised: 2016-02-01 By: kbuchanan

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 17N
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Legend

- 200 Metre Notification Area
- Notification Parcel
- Parcel

Mail-Out Summary
 Dyke Side Bank - 780 Parcels
 Opposite Bank - 186 Parcels
 Total - 966 Parcels

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 West London Dyke Master Repair Plan

Figure No.
1.2

Title
Location of Notification Mail-Out

1.2 STUDY SCHEDULE

The Master Repair Plan was initiated in April 2010. The study was placed on hold in early 2013 pending updates to flood elevation information. Three Public Information Centres (PICs) were held throughout the duration of the study to obtain feedback and comments from the public, agencies and First Nation communities.

1.3 PROBLEM IDENTIFICATION

The UTRCA and the City of London are undertaking a Master Repair Plan covering the next 20-year period to address aging infrastructure, flood protection, public use, and integration of other City initiatives. The intent of the Master Repair Plan is to develop the required strategic plan to allow the UTRCA and the City to have a method for determining when a trigger point for repair and/or replacement of a portion of the dyke is required. Based on information known, conceptual designs will be presented; however, they will be subject to more detailed investigation prior to implementation.

1.4 INTENT OF REPORT

The intent of the Master Repair Plan is to address public, agency, and First Nation community requirements and concerns and to ensure all possible alternatives and opportunities are fairly assessed and reviewed in a public forum before being finalized and carried forward for implementation.

As shown in Figure 1.3, the objective of this report is not necessarily to detail when a specific municipal infrastructure project will be implemented but rather to review on behalf of the UTRCA and the City the following:

- Project drivers, or in other words, the reasons for the need to initiate a project (such as to enhance flood protection measures, repair or replace failing sections, integration of additional pathways, etc.); and
- Identifying the solutions that are possible and defining a preferred solution for a project.

This process is undertaken through the MEA Municipal Class Environmental Assessment (EA) process. With this information, the UTRCA and the City have the ability to identify what would constitute a “trigger point” to implement the project. A “trigger point” is reached when the need for the project (i.e., project drivers) is greater than the cost to implement it.