TO:	GENERAL COMMITTEE
SUBJECT:	LOVERS CREEK CHANNEL REHABILITATION/SLOPE STABILIZATION REMEDIAL WORKS ENVIRONMENTAL CLASS ENVIRONMENTAL ASSESSMENT
WARDS:	8
PREPARED BY AND KEY CONTACT:	L. COONEY, C.E.T. LWC. SR. INFRASTRUCTURE PLANNING TECHNOLGIST (Ext. 4514)
SUBMITTED BY:	J. WESTON, M.A.Sc., P. ENG., PMP DIRECTOR OF ENGINEERING
GENERAL MANAGER APPROVAL:	R. J. FORWARD, MBA, M.Sc., P.ENG. GENERAL MANAGER OF INFRASTRUCTURE & GROWTH MANAGEMENT
CHIEF ADMINISTRATIVE OFFICER APPROVAL:	C. LADD CHIEF ADMINISTRATIVE OFFICER

RECOMMENDED MOTION

1. That Alternative 3.5 (Cut Slope with Low Toe Protection and Channel Realignment) be endorsed as the preferred alternative for the Lovers Creek Channel Rehabilitation/Slope Stabilization Remedial Works Class EA and that staff publish a Notice of Completion in accordance with the Municipal Class EA process.

PURPOSE & BACKGROUND

2. The purpose of this staff report is to seek Council endorsement of the preferred alternative for Lovers Creek Channel Rehabilitation/Slope Stabilization Remedial Works Class Environmental Assessment adjacent to Brunton Park on Lovers Creek. Engineering staff have completed Phases 1 and 2 of the Municipal Class Environmental Assessment (Class EA) process for the proposed watercourse rehabilitation and slope stabilization works.

3. In 2006, slope failures occurring along the Lovers Creek valley slope adjacent to Brunton Park were observed (see Appendix A for study area). To address public safety concerns, a two meter chain link fence was erected approximately three meters back of the top of valley slope.

4. The Lovers Creek valley slope has continued to erode along the toe of the slope resulting in a very unstable condition that is now compromising the integrity of the chain link fence increasing public safety concerns. A geomorphic assessment investigation of the creek channel and slope bank has identified the steep unstable valley bank slope that will continue to migrate in a north westerly direction into the park and toward Brunton Crescent.

5. In July 2012, WALTERFEDY Engineering Consulting Ltd. was retained by the City of Barrie to complete Phases 1 and 2 of the Class EA process which included undertaking detailed background investigation, fishery studies, consultation with agencies and municipal staff to identify and select a preferred alternative solution. The preferred solution is to best address the instability of the valley slope and the erosion potential, the impact on and the quality of the existing natural features, the downstream water quality and the recreational / open space lands surrounding the site.

Alternative Descriptions

6. Several alternatives were considered to address the stabilization of the valley slope. The alternatives involved different techniques and combination of techniques to stabilize the slope and provide erosion protection of the slope base to mitigate the continued undermining. The techniques included toe protection through various stream channel armouring procedures to prevent erosion and the option of either cutting or filling the existing steep slope to implement a more gentle slope that is ultimately more stable. The alternatives are listed below and are further described and compared in Appendix B.

    - Alternative 1.0 – Do Nothing
    - Alternative 2.1 – Fill Slope with High Toe Protection
    - Alternative 2.3 – Cut Slope with Low Toe Protection
    - Alternative 3.1 – Fill Slope with High Toe Protection and Channel Realignment
    - Alternative 3.2 – Fill Slope with Low Toe Protection and Channel Realignment
    - Alternative 3.5 – Cut Slope with Low Toe Protection and Channel Realignment
    - Alternative 4.1 – Fill Slope with Channel Realignment
    - Alternative 4.3 – Cut Slope with Channel Realignment

7. The Public Information Centre (PIC) was held on March 21st, 2013 to receive public input, feedback from agencies and to address any questions on the alternatives. Letters inviting directly affected land owners, agencies and interest groups to attend the PIC were distributed prior to the meeting. A summary of major PIC comments and responses are included in Appendix "C".

8. A PDF version of the Class EA Report is available online by doing a keyword search on the City of Barrie web page (www.barrie.ca) for "class EA" and clicking on the first check marked result, then scrolling down to the Lovers Creek Channel Rehabilitation and Slope Stabilization Class EA Study Report. A hard copy of the report is also available in the Councillor's Lounge.

ANALYSIS

9. Valley toe protection is the armouring of the slope to provide erosion protection. The alternatives 2.1, 2.3, 3.1, 3.2 and 3.5 include valley toe protection to decrease the potential of future erosion. The higher the toe protection extends up the slope the greater the cost to construct the solution. The slope protection techniques could involve granite boulders or retaining walls, both will be investigated during detailed design.

10. The channel alignment relocation included in Alternatives 3.1, 3.2, 3.5, 4.1 and 4.5 provides increased level of erosion protection as the watercourse channel forces, due to sharp bend, are removed from directly undercutting the valley toe of slope. The channel relocation does however require the acquisition of private property and is more costly to construct.

11. The alternatives 4.1 and 4.2 include watercourse channel relocation that provides a buffer area between the main channel of the creek and the toe of the slope. The toe of the slope will not be armoured therefore slope erosion could continue.

12. All alternatives have been evaluated based on the physical, natural, social, cultural, and economic environments through the Class EA process. Comments and responses received at the PIC from residents and agencies were considered in the development of the preferred alternative. Section 5.2 Table 10 of the Class EA report provides a summary of the evaluation scoring and ranking. The study team has ranked alternative 3.5 as the preferred alternative for the following reasons:

    - The watercourse realignment will improve the hydraulic characteristics of the creek and floodway conveyance

- Adds toe of slope erosion protection
- Restores the impacted areas of the watercourse and valley slope
- Enhances aquatic habitat with the intention of restoring cold water fisheries in this area of the creek

A drawing of the Preferred Alternative is included in Appendix "D".

13. The Lake Simcoe Region Conservation Authority (LSRCA) was involved in the analysis of technical and natural environmental elements of this study. The LSRCA commented on the flood conveyance, alternative channel re-alignment, proposed natural stream design requirements and were involved in the ranking and scoring process. The valley floodway conveyance remains unchanged for the regulatory flood event for all the alternatives. The LSRCA agrees that alternative 3.5 is the preferred alternative.

ENVIRONMENTAL MATTERS

14. This project has met the requirements for a Class EA with consideration for physical, natural, social, cultural and economic criteria in the development of the preferred alternative.

15. The preferred alternative stabilizes the existing creek, minimizes the future potential for erosion on the slope and restores the natural environment.

ALTERNATIVES

16. There is one alternative available for consideration by General Committee:

Alternative #1 General Committee could alter the proposed recommendation by selecting another alternative.

This alternative is not recommended because the preferred alternative solution has been chosen through the Class EA process to address the valley slope instability in the best way possible to minimize impacts to the physical, natural, social, cultural and economic environments as well as considering comments received from the public and agencies.

FINANCIAL

17. There are no direct financial implications for the Corporation resulting from the proposed recommendation however capital funds for implementation of the preferred alternative (Alternative 3.5 - Cut Slope with Low Toe Protection and Channel Realignment) for Lovers Creek channel rehabilitation/slope stabilization remedial works have been submitted for prioritization through the annual Business Plan process. If Council does endorse the preferred alternative, the project will continue to be considered in future Business Plans.

18. The project is to include detailed design, including obtaining the necessary agency permits to work within a cold-water fishery, and acquisition of required property which are both expected to each take a year to complete. Construction would then be proposed in the third year of the project. The costs for the project are estimated as follows:

Phase	Cost
Detailed Design	$50,000
Construction & Property	$359,000
Total	$409,000

LINKAGE TO 2010 – 2014 COUNCIL STRATEGIC PLAN

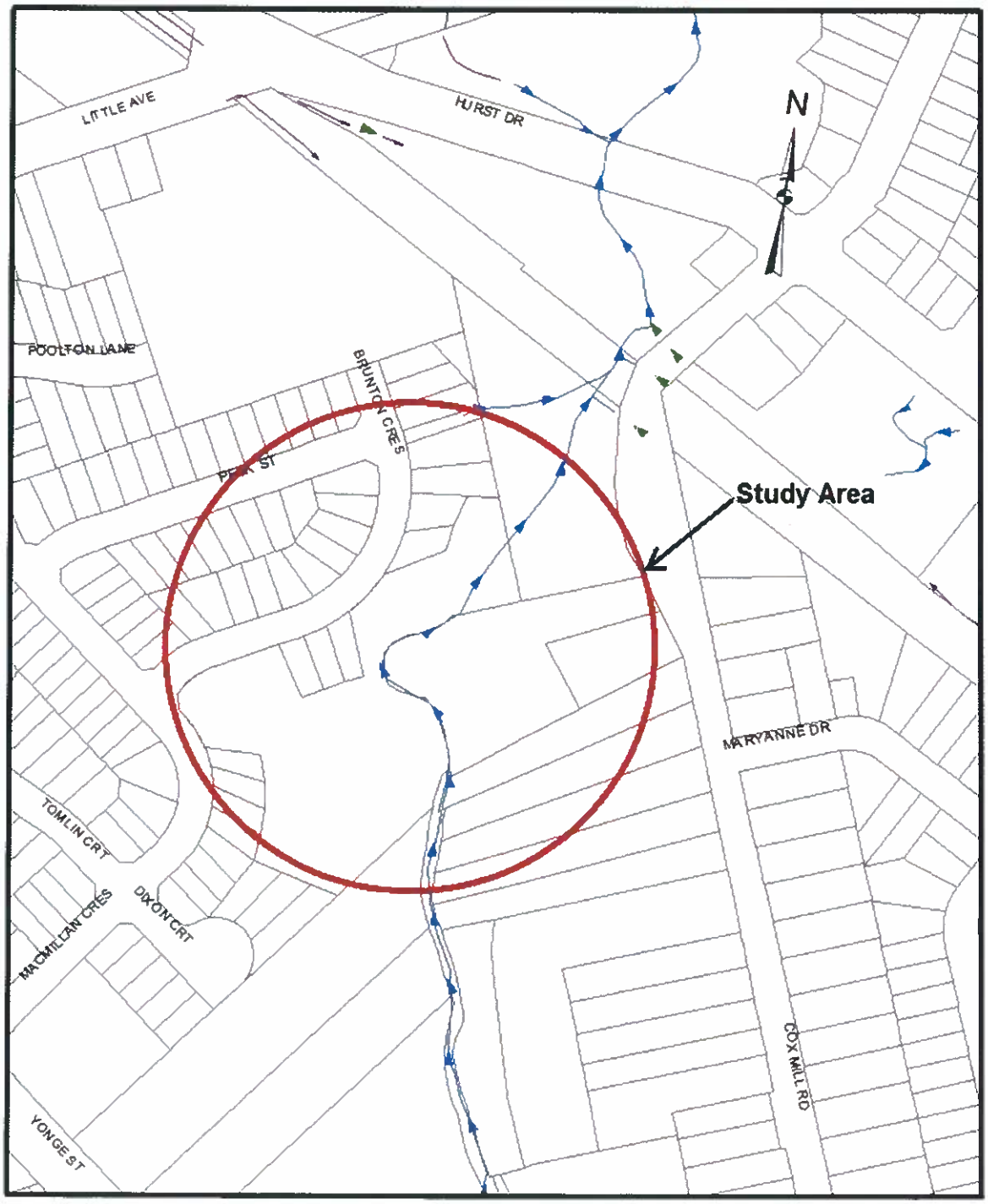
19. The recommendations included in this Staff Report support the following goal identified in the 2010-2014 City Council Strategic Plan:

    ☒ Manage Growth and Protect the Environment

20. Implementation of the Preferred Alternative would mitigate the valley slope instability issues, enhance the natural environment by decreasing the erosion potential in the area, maintain flood water conveyance in Lovers Creek and improve public safety.

Appendix "A"

Study Area



Appendix "B"

Alternative Comparison

Alternative	Creek Relocation	Creek Impacts	Park Impacts	Armour Protection	Land Acquisition	Constructability	Cost
Alternative 1.0 Do Nothing	No	Creek erosion and associated negative aquatic impacts would continue	Continued erosion and loss of park land	None	None	n/a	$0
Alternative 2.1 Fill Slope with High Toe Protection	No	No creek improvements	None	High toe protection 4 to 6 meters high	None	Difficult. Would need to be constructed from top of slope	$325,000
Alternative 2.3 Cut Slope with Low Toe Protection	No	No creek improvements	2:1 slope encroaches 16m into park & ± 3m from Brunton Cres. sidewalk	Low toe protection 2 to 3 meters high	None	Difficult. Would need to be constructed from top of slope	$304,400
Alternative 3.1 Fill Slope with High Toe Protection and Channel Realignment	Yes ±12m to East	Creek will be stabilized, naturalized, and erosion mitigated	None	High toe protection 4 to 6 meters high	±0.10 Ha	Difficult. Small staging area and impact to flood plain	$440,160
Alternative 3.2 Fill Slope with Low Toe Protection and Channel Realignment	Yes ±12m to East	Creek will be stabilized, naturalized, and erosion mitigated	None	Low toe protection 2 to 3 meters high	±0.10 Ha	Difficult. Smallest staging area and impact to flood plain	$356,000
Alternative 3.5 Cut Slope with Low Toe Protection and Channel Realignment	Yes ±12m to East	Creek will be stabilized, naturalized, and erosion mitigated	2:1 slope encroaches 16m into park & ± 3m from Brunton Cres. sidewalk	Low toe protection 2 to 3 meters high	±0.10 Ha	Creek relocation creates staging area at bottom of slope	$409,000
Alternative 4.1 Fill Slope with Channel Realignment	Yes ±12m to East	Creek will be stabilized and naturalized	None	None risk of future erosion on slope	±0.10 Ha	Difficult. Smallest staging area and impact to flood plain	$444,000
Alternative 4.3 Cut Slope with Channel Realignment	Yes ±12m to East	Creek will be stabilized and naturalized	2:1 slope encroaches 16m into park & ± 3m from Brunton Cres. sidewalk	None risk of future erosion on slope	±0.10 Ha	Creek relocation creates staging area at bottom of slope	$247,000

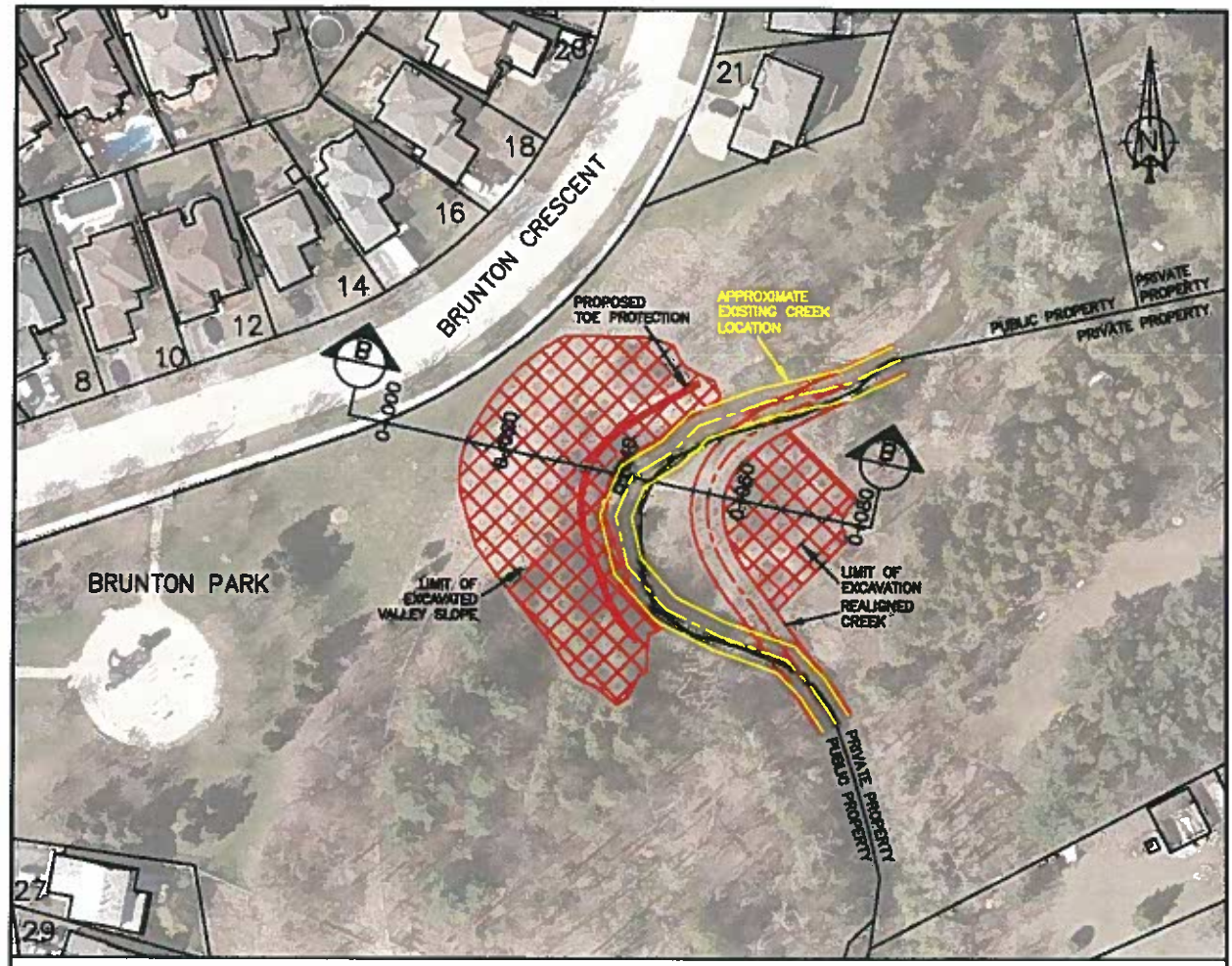
Appendix "C"

Summary of Major Comments and Responses

Concerns	Responses
• Concerned about the disruption to the Lovers Creek watercourse.	• Lovers Creek is currently eroding the valley slope adjacent to Brunton Park creating slope instability and public safety concerns. The physical disruption to the watercourse will be temporary during construction. The preferred alternative watercourse realignment will move the erosive forces away from the toe of the valley slope, improve channel flow and restore the natural environment. To minimize disruption the new watercourse channel would be constructed and flow diverted before naturalizing the old watercourse channel area.
• Concerned with disruption to the habitat surrounding Lovers Creek.	• The disruption to the surrounding habitat would be temporary during construction. The preferred alternative adjusts the horizontal alignment of the creek and creates a vegetative buffer between the toe of the slope and the relocated creek.
• Concerned about disruption to Brunton Park.	• Disruption to the Park would be temporary during construction. The impacted area of the park will be naturalized with safer slope conditions. The area of the park impacted is offset from the playground area and is not expected to affect the park functions.
• Extending slope within 3 meters of the sidewalk will reduce the aesthetics of the park.	• Preferred Alternative includes dense native vegetation on the new slope that would reinstate the natural habitat and enhance park aesthetics.
• Would like to confirm that that the study area and proposed project will have no impact on land located at the intersection of MacMillan Crescent and Yonge Street.	• The preferred alternative has accounted for all drainage areas tributary to the study area. Proposed rehabilitation / slope stabilization remedial works will not have a direct impact on this property.
• Concerned with the alternatives that indicate channel re-alignment as it would result in a loss of property along the watercourse.	• The preferred alternative requires approximately 0.10 ha (0.25 ac) of land acquisition for the watercourse channel realignment. Final land acquisition requirements will be determined with detailed design. The property owner will be compensated for the lands required to realign the watercourse. The adjacent property will continue to have access to the watercourse.
• Concerned with general public climbing down slope and trespassing on private property. Would like to see barrier fencing installed as part of the project works. • Watercourse is eroding the watercourse embankment along private property frontage (east side of channel). Concerned that proposed channel and slope works identified in study will increase this erosion and further affect lands.	• The preferred alternative includes dense vegetation restoration to the valley slope to control access. The feasibility of fencing along the property edge will be investigated during detail design. • During detail design, existing erosion issues immediately upstream and downstream of the watercourse channel realignment will be reviewed and mitigated as required.

Appendix "D"

Preferred Alternative



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SECTION B – B