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York Region

Newmarket

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YONGE STREET & DAVIS DRIVE STREETSCAPE MASTER PLAN

PHASE 5 REPORT: IMPLEMENTATION AND CAPITAL COSTS

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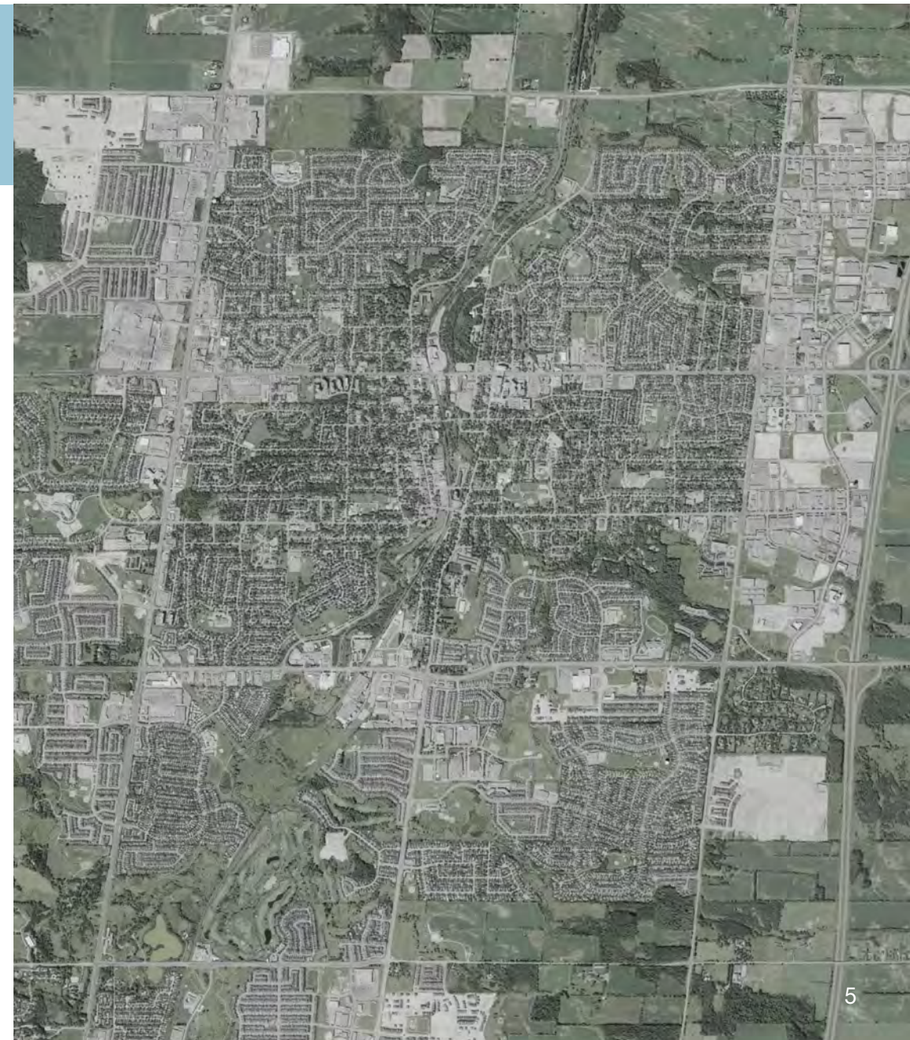
1.0 INTRODUCTION



1.1 EXECUTIVE SUMMARY

This report outlines the implementation strategy and funding for capital development, as well as the capital costs and operations and maintenance costs for the Yonge Street & Davis Drive Streetscape Master Plan (Yonge Street & Davis Drive Streetscape Master Plan). The Yonge Street & Davis Drive Streetscape Master Plan outlines a design for four streetscape corridors within the Town of Newmarket: Yonge Street North, Yonge Street South, Davis Drive West, and Davis Drive East. This report presents the fifth phase of the project as follows:

Phase 1: Research, Site Inventory, and SWOT Analysis

Phase 2: Vision Statement, Principles and Objectives

Phase 3: Streetscape Master Plan

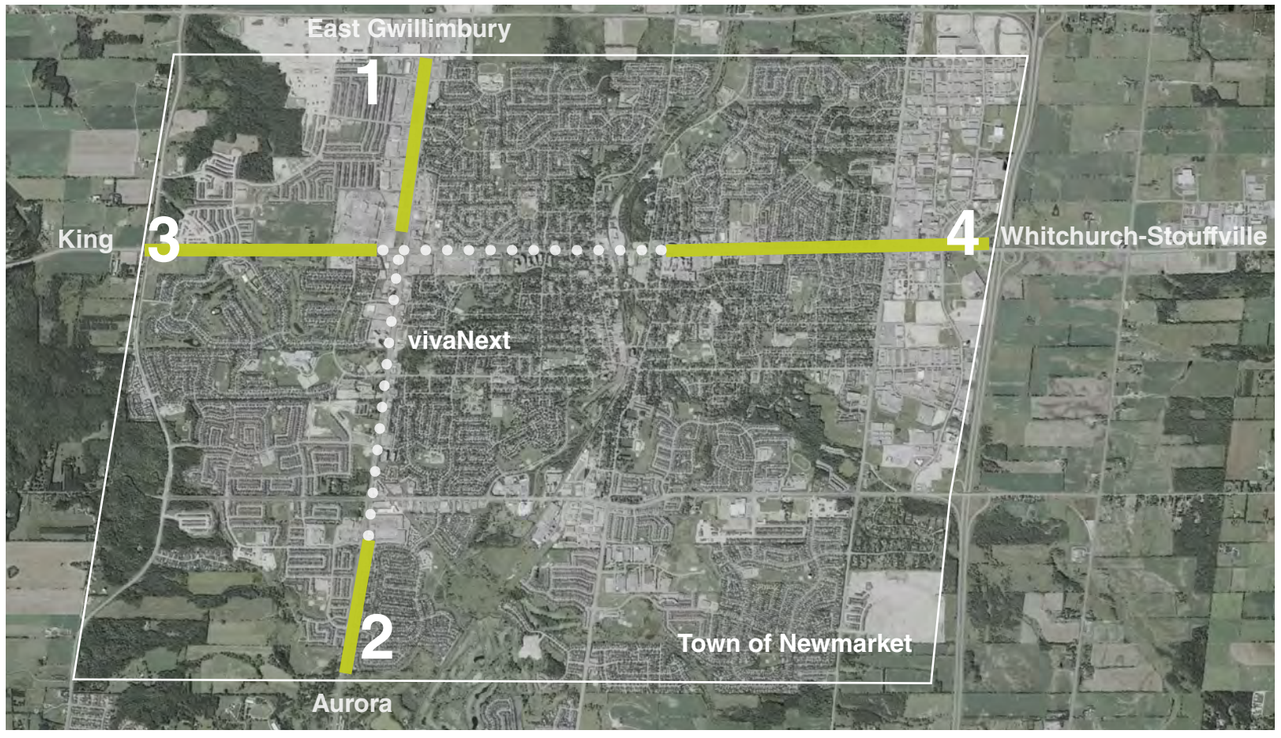
Phase 4: Detailed Design Guidelines and Standards

Phase 5: Implementation and Capital Costs

Yonge Street & Davis Drive Streetscape Master Plan presents a context-driven approach to creating a Vibrant, Green and Active streetscape. The Master Plan is organized through context-specific Streetscape Typologies that provide the appropriate infrastructure and streetscape geometry to fit the needs of the specific corridors.

Low Impact Development (LID) and sustainability are integral to upholding the vision for a Green streetscape. These LID/ sustainability initiatives include permeable hardscape surfaces, optimizing landscape zones and tree canopy, as well as the implementation of rain gardens to mitigate flooding issues and minimize potable water usage.

Within projected urbanized areas, the Streetscape Master Plan includes generous permeable concrete sidewalks, a permeable unit paved Furnishing/Planting Zone and a permeable Cycle Track. Less populated segments of the corridors contain a permeable Multi-Use Path (MUP) and a planted Landscape Zone. All corridors contain a permeable unit paved continuity strip. This report outlines the capital costs affiliated with these streetscape treatments as well as the operation and maintenance tasks, seasonal schedule and costs.



1.2 REPORT ORGANIZATION

The report is organized into the following sections:

Implementation

A high level overview of implementation strategies for Yonge Street and Davis Drive is presented including potential phasing and potential funding sources.

Capital Costs

An Order of Magnitude matrix is presented for each corridor (Yonge Street North, Yonge Street South, Davis Drive East, Davis Drive West) outlining the capital costs for streetscape materials and construction. The capital cost matrix does not include roadway construction costs.

Operations and Maintenance

The report concludes by providing a framework for the maintenance tasks categorized by season that should be completed in order to encourage the longevity of the streetscape. This section also includes Order of Magnitude Costs for operations and maintenance for each of the four corridors.

The Four Streetscape Corridors

1 Yonge Street North
Davis Drive to Town Boundary

2 Yonge Street South
Town Boundary to Sawmill Valley Drive

3 Davis Drive West
Bathurst Street to 200m West of Yonge Street

4 Davis Drive East
Patterson Street to Highway 404

2.0 IMPLEMENTATION

2.1 IMPLEMENTATION STRATEGY OVERVIEW

The successful implementation and maintenance of the Yonge Street & Davis Drive Streetscape Master Plan requires commitment and buy-in by key decision makers for its design, implementation and on-going maintenance. The improvement of the public realm is essential infrastructure which is just as important as roadway paving and storm sewers. Public realm improvements are necessary to create vibrant walkable communities to encourage people to want to live, work and play in the Town of Newmarket. The Yonge Street & Davis Drive Streetscape Master Plan vision and initiatives need to be included as key elements within capital project scope and budget including long-term maintenance.

This will require a coordinated approach between York Region, the Town of Newmarket and stakeholders including vivaNext, YRT transit, Newmarket Hydro, utilities, Ministry of Transportation of Ontario (MTO), Lake Simcoe Region Conservation Authority (LSRCA), local businesses, developers as well as private land owners.

The following key points describe at a high level key implementation strategies:

Policy

Strategies
Official Plan and Zoning Bylaw Updates

Updates to the Official Plan and Zoning By-Law are integral the realization of the Yonge Street & Davis Drive Streetscape Master Plan. Following this, property redevelopment will depend on the private market, but will be guided through the Development Review/Site Plan Control process.

Development Charges By-law Updates

It is important to continually review the Town of Newmarket's existing development charges by-laws to ensure that they align with current initiatives before they expire in order to continue to levy development charges.

Initiatives
Tax Increment Funding

Tax increment financing (TIF) is a public financing tool used to subsidize infrastructure and other community improvement projects. The method uses the future gains in taxes to subsidize current improvements. In general, public realm improvements for an existing neighbourhood will drive up property values and property tax revenues. When an increase in site value and private investment generates an increase in tax revenues, it is called the "tax increment". TIF dedicates these tax increments within a defined district to finance the debt issued to pay for the public realm infrastructure improvements. It therefore creates funding for the implementation of the Master Plan by borrowing against the future increase in these property tax revenues.

Design/ Construction
Special Area Development Charges Bylaws

The Town of Newmarket may pass Special Area Development Charges (SAC) by-laws for the Yonge Street and Davis Drive corridors in the future as more planning and engineering information becomes available during detailed design.

Development

Strategies
The addition of transit and public realm improvements along the Yonge Street and Davis Drive corridors makes development in these areas attractive.

Private developers should be required to contribute to the enhancement of the public realm and streetscape according to the Yonge Street & Davis Drive Streetscape Master Plan. Ensure that new development proposals incorporate the streetscape Master Plan into the Detailed Design of the public realm fronting their land parcel.

Utilities

Strategies
Underground hydro services are considered more suitable than over-head service where streetscape aesthetics is a major consideration and where an urban form with street-oriented buildings is desirable. Buried hydro lines also allow a smaller setback from the lot line which ultimately increases the developable area (building footprint) and return in investment to developers.

Consider creating a Public Utilities Coordinating Committee (PUCC) to establish long term strategic coordination of utility locations including hydro, gas, Bell, and existing utility re-locations. The committee would also oversee the impact of future development applications on utility servicing and on-going maintenance procedures

Initiatives
York Region and the Town of Newmarket may consider developing a Special Policy Area outlining hydro installation standards for new areas of intensification within the Yonge Street and Davis Drive corridors through a cost-sharing plan with Newmarket Hydro and private developers.

Design/Construction
In the pre-planning preliminary engineering stage, it is important to identify and protect an ideal duct bank location along the corridor for the purposes of burying hydro. The proposed duct bank location should be situated to minimize disruption to the executed streetscape elements in the future as the corridor intensifies and funding becomes available to underground electrical services.

Public Art Committee

Strategy
Create a public art policy between both York Region and the Town of Newmarket that requires public art installation as part of the development process. A public art steering committee should also be developed for the study area in order to establish an overall vision for identifying public art opportunities within the public right-of-way as well as on private property. The steering committee would include members from York Region, the Town of Newmarket, private developers and the public.

Initiatives
Section 37 of the Planning Act may be used as an implementation strategy for public art. The Town of Newmarket may accept investment in public art from developers in exchange for an increase to building height or density beyond what is outlined in local zoning by-laws.

Design/Construction
Detailed design of the public realm should provide public art of civic scale in highly visible locations along the Yonge Street and Davis Drive corridors. The artwork should respond to and incorporate the local context. Structural footings should be designed to be aesthetically integrated into the streetscape boulevard surface finishes.

Inter-Departmental Collaboration

It is imperative that the various departmental decision makers at York Region and the Town of Newmarket work closely to ensure that the design, implementation, inspection and maintenance of capital and redevelopment projects along the Yonge Street and Davis Drive corridors is being met. The importance of a well designed, constructed and maintained public realm must be extended to the various service operators and providers that impact public realm throughout the Town of Newmarket and York Region. It is essential to explicitly outline expectations and deliverables. The quality of urban design and the level of service must be clearly established and supported with appropriate funding.

2.2 PHASED PLAN AND CAPITAL CONSTRUCTION

There are four Capital projects underway that currently correspond with this streetscape study:

VIVANEXT – D1 AND Y3

The Yonge Street & Davis Drive Streetscape Master Plan visually ties into two existing vivaNext corridors: D1 along Davis Drive and Y3 along Yonge Street. The Yonge Street & Davis Drive Streetscape Master Plan takes into consideration the urbanized vivaNext active transportation geometry and initiatives, streetscape finishes and aesthetic, while maintaining the overall Yonge Street & Davis Drive Streetscape Master Plan vision. The D1 corridor is currently open. The Y3 corridor is currently under construction with a planned opening of 2018.

YORK REGION -YONGE STREET – From Davis Drive to Green Lane

The Yonge Street & Davis Drive Streetscape Master Plan - Yonge Street North corridor integrates the design initiatives of the York Region- Yonge Street improvements while maintaining the Yonge Street & Davis Drive Streetscape Master Plan vision. The Master Plan presents the interim condition providing a fully designed and integrated boulevard treatment and a planted median. This stretch of Yonge Street is currently undergoing detailed design. Construction is anticipated to start in 2020.

Once funding for the vivaNext BRT is confirmed, potentially within the next 25 years, the centre median and an outside through lane will be removed and replaced by the rapidway with a running width of 3.5m in each direction. The boulevard curb line will remain fixed as well as the streetscape treatment behind the curb including cycle track, mature tree planting, hydro, utilities, traffic signals, lighting and pedestrian infrastructure.

YORK REGION - BATHURST STREET - Bathurst Street intersection improvements at Davis Drive

The Davis Drive West corridor integrates the design initiatives of the York Region- Bathurst Street intersection improvements while maintaining the Yonge Street & Davis Drive Streetscape Master Plan vision. Improvements include double left-turn lanes, street lighting, improved sidewalks and transit stops and a gateway signage feature with accompanying planting at the south east corner of the intersection. This intersection is currently undergoing detailed design. Construction is anticipated to start in 2017.

The Yonge Street & Davis Drive Streetscape Master Plan retains the elements of the Bathurst Street intersection improvements at Davis Drive. The Streetscape Master Plan envisions Davis Drive and Bathurst Street intersection as a gateway to the Town of Newmarket. Accordingly, the Master Plan suggests the addition of gateway banding in the roadway with corresponding street trees, a planted median, as well as banners within the median. The Master Plan also contains planters, a Multi-Use Path (MUP) and pavement markings that transition from the MUP to the on-road bike lanes west of Bathurst Street.

The construction and implementation of the streetscape for the remaining corridors, particularly Davis Drive East and Yonge Street South, may rely on development led initiatives. The economic market, private investment and other factors may impact when specific areas of the Streetscape Master Plan are constructed.

2.3 FUNDING STRATEGIES

As York Region and the Town of Newmarket transform from a suburban area into an urban centre, the streetscape corridors will serve a greater number of people and stakeholders due to the increased population density.

In the lower density neighbourhoods that line Davis Drive West and Yonge Street South, property parcels have a relatively large streetscape frontage. Consequently tax revenue from fewer parties is collected per metre of streetscape in comparison to a more densely populated area.

Areas undergoing urban intensification such as Yonge Street North will have a much higher density. This creates more tax revenue per metre of streetscape in comparison to the Yonge Street South corridor and the Green Typology areas along Davis Drive (East and West).

While it is recognized that not all tax revenue will go towards public realm streetscape improvements, it is useful to understand that denser areas result in a more efficient streetscape cost per unit (source: City of Vaughan- Citywide Streetscape Implementation Manual, EDA, 2014).

Tax revenue can help to offset the increase in Capital and Maintenance Costs for the Urban Typology Segments.

The realization of Yonge Street & Davis Drive Streetscape Master Plan will likely employ a number of different funding sources including some or all of the following:

2.3.1 York Region Municipal Streetscape Partnership Program (MSPP)

The MSPP is a funding program created by York Region that provides financial aid for streetscape design projects on Regional Roads within the nine local municipalities. York Region has committed up to $1 million annually to the program (subject to Regional Council review and approval). Yonge Street and Davis Drive are both eligible for MSPP funding as they are Regional Roads located in the Town of Newmarket. Further, the MSPP is applicable to projects initiated by the Town of Newmarket that demonstrate a desire to exceed the Regional standard of streetscape.

2.3.2 Public Private Partnerships

There is a unique funding partnership called Public-Private Partnerships (P3s). This type of initiative maximizes the expertise of both the private and public sector to expand the number and scale of infrastructure investments for public benefit. P3s are an alternative approach to fund and implement projects within a municipality.

The streetscapes along the vivaNext corridors successfully follow the P3 funding strategy and were delivered on time and within the agreed budget. Premium upgrades to the streetscape such as public art, gateway features, furniture or custom paving will be paid for by the local municipality namely the Town of Newmarket.

2.3.3 Development Charges (DC)

Development Charges (DC) can be used to subsidize the streetscape costs. A DC is a one-time fee charged to developers when they acquire a building permit. The funds collected as Development Charges are intended to contribute to public infrastructure including streetscape and public realm improvements necessary to accommodate urban intensification and growth. For more information, refer to *The Regional Municipality of York 2012 Development Charge Background Study*.

2.3.4 Section 37- Ontario Planning Act

Capital gained from Section 37 of the Ontario Planning Act may provide an opportunity to supplement the streetscape's capital cost. Local municipalities may accept investment in public space from developers who desire to increase building height or density beyond what is outlined in zoning by-laws. Amongst the acceptable public investments are streetscape projects.

This is consistent with York Region's Official Plan objective outlined in Section 5.4 item 15, Regional Centres and Corridors:

"To require local municipalities to adopt official plan policies and related zoning by-law provisions, to provide community benefits in Regional Centres and Corridors in exchange for additional height and density, consistent with the Increased Density provision of the Planning Act. Community benefits shall include consideration of (blue added for emphasis):

a. Transit station improvements, in addition to lands required as a condition of development approval;
b. Social housing;
c. Direct pedestrian connections to transit stations;
d. Regional community and health facilities;
e. Regional emergency medical services and police stations;
f. Additional facilities and services identified by local municipalities; and,
g. Appropriate provisions for pedestrian and cycling facilities."

Accordingly, funding from Section 37 can be utilized to offset pedestrian and cycling facilities, as well as connections to vivaNext and YRT bus transit.

FUNDING STRATEGIES (CONTINUED)

2.3.5 Site Plan Approval

Private land developers benefit directly from transit projects due to increased land value within 500m of a station or stop. Therefore transit infrastructure projects such as vivaNext that are required to support the build-out of the Secondary Plan Area may be identified through the development application approvals process at the municipal level.

Agreements can be set in place to provide funding for public realm enhancements as part of the negotiations with land developers through site plan approval in exchange for increased density for example. This mechanism may facilitate the realization and build out of the Yonge Street & Davis Drive Streetscape Master Plan.

2.3.6 Tax Increment Financing (TIF)

Tax Increment Financing (TIF) diverts property tax revenue increases from a certain district and dedicates the funds to a particular economic development project or public improvement project in the area. TIF from new and existing developments in the area is a potential funding source for the Yonge Street and Davis Drive Streetscape improvements.

2.3.7 The Federal Gas Tax Fund (GTF)

Part of the New Building Canada Plan, the federal Gas Tax Fund (GTF) provides long-term funding to Canadian municipalities to aid with building and revitalizing local public infrastructure. Legislated as a permanent source of federal infrastructure funding, the federal GTF provides $2 billion annually. The funding is provided to provinces and territories twice a year, and is passed along to municipalities.

2.3.8 Green Municipal Fund (GMF)

The Green Municipal Fund (GMF) is funding available to all municipal governments and their partners through the Federation of Canadian Municipalities (FCM). GMF finances capital projects that “improved air, water, and soil, and mitigate the impacts of climate change” (www.fcm.ca). GMF also funds projects that promote active transportation in proximity to transit nodes. GMF is typically in the form of a loan combined with a grant valued at 15% of the loan amount.

2.3.9 Per Cent for Art Funding

Public Art along the corridors can be funded through ‘percent’ contributions from future developments, or from the Public Art Reserve Fund.

As stated by the *Urban Centres Secondary Plan-Town of Newmarket* in Section 12.3.3 Public Art:

i. For private development applications, the contribution to public art will be calculated on the basis of 0.5% of the value of construction as determined through the Toronto Area Chief Building Officials Committee Construction Value Standard in effect at the time of the declaration of a Complete Application by the Town.

ii. All major regional and local municipal buildings or other public facilities in the Urban Centres shall dedicate 1% of the capital budget to public art.

This program can aid with funding public art throughout the corridors and specifically within the median on Yonge Street North.

2.3.10 IMPLEMENTATION AND CONSTRUCTION RESPONSIBILITIES MATRIX

			LEAD	STAKEHOLDERS					
PHASE	CATEGORY	TASK	York Region	Town of Newmarket	VivaNEXT	Newmarket Hydro	Interface Local Municipalities	LSRCA	Business Community
1 Pre-BRT	Strategies and Initiatives	Align and Harmonize Plans	●	●			●		
		Coordinate Among Utilities	●			●			
		Discussion, Coordination and Negotiation with Stakeholders	●	●	●	●		●	
		Discuss Operations and Maintenance Agreements	●	●					●
		Process for Public Art Policy	●	●			●		●
		Establish Funding Sources and Mechanisms	●	●					●
		Confirm Early Implementation Priorities	●	●					
	Design and Construction	Coordinate with Private Developers	●	●					
		Coordinate with Bus Rapid Transit (BRT) Design	●		●				●
		Prepare Detailed Streetscape Designs	●						●
2 BRT Construction	Strategies and Initiatives	Continue to Align and Harmonize Plans	●	●			●		
		Continue Utility Coordination	●	●		●			●
		Continue Stakeholder Coordination	●	●	●	●		●	
		Finalize Operations and Maintenance Agreements	●	●					●
		Establish Harmonized Public Art Policy	●	●			●		●
		Expand and Develop Funding Sources and Mechanisms	●	●					●
	Design and Construction	Continue to Monitor Implementation Priorities	●	●					
		Continue Coordinate with Private Developers	●	●					●
		Continue to Coordinate with BRT Design	●	●	●				
		Continue Detailed Streetscape Designs	●						
		Operate and Maintain Existing Streetscape	●	●					●
3 Post-BRT Construction	Strategies and Initiatives	Continue to Align and Harmonize Plans	●	●			●		
		Continue to Coordinate Among Utilities	●	●		●			●
		Finalize Implementation and Operational Negotiations with Stakeholders	●	●	●	●		●	
		Finalize Operations and Maintenance Agreements	●	●					●
		Continue Process for Public Art Policy	●	●			●		●
		Continue to Expand and Develop Funding Sources and Mechanisms	●	●					●
	Design and Construction	Monitor Implementation Priorities and Opportunities	●	●					
		Continue to Coordinate with Private Developers (as required)	●	●					●
		Prepare Detailed Streetscape Designs	●						
		Continue to Operate and Maintain Existing Streetscape	●	●	●				●

3.0 CAPITAL COSTS

3.1 CAPITAL COSTS ORDER OF MAGNITUDE OVERVIEW

The following matrices provide a capital costs order of magnitude for implementation of the Yonge Street & Davis Drive Streetscape Master Plan. To the left is an overview matrix presenting the final figures for each corridor.

Capital costs for each corridor are included for boulevard and median elements including pavers, planters, street lighting, furniture, irrigation and plant material. The figures cover the projected material and installation costs based on best practices. The order of magnitude does not include roadway elements such as asphalt paving, curb and gutter, traffic signals, and storm water infrastructure. It is assumed that the irrigation central controller is already owned by the Region.

The following matrices are included herein:

- 3.1.1 Yonge Street North Capital Costs Order of Magnitude
- 3.1.2 Yonge Street South Capital Costs Order of Magnitude
- 3.1.3 Davis Drive West Capital Costs Order of Magnitude*
- 3.1.4 Davis Drive East Capital Costs Order of Magnitude*

**Includes costs for both the Davis Urban Streetscape Typology and the Davis Green Streetscape Typology.*

Capital Costs by Corridor Segment: Hydro Comparison				
	Above Ground Hydro		Underground Hydro	
Streetscape Corridor	Cost/ km	Total Corridor Cost	Cost/ km	Total Corridor Cost
Yonge Street North	$7,368,105	$13,041,546	$10,868,105	$19,236,546
Yonge Street South	$4,353,375	$7,487,805	$7,853,375	$13,507,805
Davis Drive West	$4,728,082	$9,125,199	$8,228,082	$15,880,199
Davis Drive East	$4,736,704	$10,615,779	$8,236,704	$19,365,779
Total Costs		**$40,270,329**		**$67,990,329**

Capital Costs by Corridor Segment (Retaining Above Ground Hydro)							
Streetscape Corridor	Streetscape Typology	Length (km)		Cost/ km	Subtotal Cost	Average Cost/ km	Total Corridor Cost
Yonge Street North	Yonge Urban	1.77	km	$7,368,105	$13,041,546	$7,368,105	**$13,041,546**
Yonge Street South	Green	1.72	km	$4,353,375	$7,487,805	$4,353,375	**$7,487,805**
Davis Drive West	Davis Urban	0.40	km	$7,586,411	$3,034,564	$4,728,082	**$9,125,199**
	Green	1.53	km	$3,980,807	$6,090,635		
Davis Drive East	Davis Urban	0.60	km	$5,679,765	$3,407,859	$4,736,704	**$10,615,779**
	Green	1.90	km	$3,793,642	$7,207,920		
						Total	**$40,270,329**

Cost Comparison

Existing Streetscape Policy Capital Costs Order of Magnitude

The Capital Costs for a streetscape without a median is approximately **$ 700,000/ km.**

The Capital Costs for a streetscape with a median is approximately **$ 1,800,000/ km.**

Sourced from the South Yonge Street Corridor Streetscape Master Plan Study, Phase 5: Implementation Strategy (EDA 2011) referencing the 2011 Urban Cross Section from Transportation Services, Road- Capital Delivery.

Enhanced Streetscape Capital Costs Order of Magnitude

The Capital Costs for the **vivaNext** streetscape is approximately **$ 6,600,000/ km.**

The Capital Costs for the **South Yonge Street Corridor Streetscape Master Plan Ultimate Vision** is approximately **$ 10,900,000/ km** with Utility Duct Banks and **$ 8,200,000/km** without.

The Capital Costs for the **South Yonge Street Corridor Streetscape Master Plan Pre-Subway Plan** is approximately **$ 9,500,000/ km** with Utility Duct Banks and **$ 7,100,000/km** without.

Sourced from the South Yonge Street Corridor Streetscape Master Plan Study, Phase 5: Implementation Strategy (EDA 2011).

Yonge Street & Davis Drive Streetscape Capital Costs Order of Magnitude: Buried Hydro

The Capital Cost for burying 27.6kV, 3 phase circuit hydro poles is approximately **$ 3,500/ linear metre**. This cost does not include the relocation of other utilities. The table to the left compares the costing with retaining above ground hydro along the corridors versus buried hydro.

The Capital Cost for the relocation of a hydro pole is approximately **$30,000**. Hydro pole relocation may need to occur with the implementation of the Streetscape Master Plan. The number of hydro poles to be relocated cannot be determined until Detailed Design. (*Sourced from the 2015 D1 vivaNext costs from Kiewit Design Builder.)*

The *Feasibility Study Undergrounding Overhead Wires: Town of Newmarket Yonge and Davis Corridors* (2013) estimates the cost for undergrounding hydro along a 4.3km stretch of Yonge Street (from just south of Mulock Drive to the northern Town boundary) would be $33 million, including training and engineering costs.

Yonge Street North

3.1.1 YONGE STREET NORTH CAPITAL COSTS ORDER OF MAGNITUDE

Yonge Street North- Yonge Urban Streetscape Typology - 1.77 km (1770 linear metres) INTERIM CONDITION							
	Streetscape Element	**Typical Width**	**Quantity**	**Unit**	**Unit Cost**	**Subtotal Cost**	**Additional Notes**
Hardscape	Continuity Strip	0.6 m	1980	m²	$225	$445,500	Eco Pavers on high performance bedding base (HPB).
	Furnishing Zone (Permeable Unit Pavers)	2.35 m	2370	m²	$225	$533,250	Eco Pavers on permeable concrete base.
	Cycle Track (FilterPave)	1.5 m	4950	m²	$300	$1,485,000	FilterPave (permeable asphalt).
	Visual/ Tactile Buffer (Permeable Unit Pavers)	0.4 m	1320	m²	$225	$297,000	Eco Pavers on a permeable concrete base.
	Permeable Concrete Sidewalk	2.0 m	4400	m²	$150	$660,000	Lafarge Hydromedia (permeable concrete).
	Intersection Permeable Unit Paving		11000	m²	$200	$2,200,000	Eco Pavers on a permeable concrete base at intersection plazas.
Roadway	Median (Planted)		1130	linear m	$580	$655,400	Assume average total width of 4 metres. Includes continuity strip, precast concrete planter, softscape material. Does not include curb.
	Median (Paved)		295	linear m	$400	$118,000	Assume average width of 2 metres. Includes Eco Pavers on a high performance bedding base (HPB). Does not include curb.
	Intersection Crosswalks (TrafficPatternsXD)	3.0 m	1745	m²	$185	$322,825	TrafficPatternsXD pigmented impressed asphalt
	Gateway Banding (Unit Pavers in Concrete Cradle)	0.6 m	86	m²	$250	$21,375	
Planters	Street Tree in Grate	2.35m	83	each	$14,400	$1,195,200	Includes cost of tree, grate and soil cell structure.
	Rain Garden with 2 Trees	2.35 m	80	each	$25,000	$2,000,000	Includes cost of tree, pre-cast planter wall, inlets/outlets and drainage material
Irrigation	Automated Irrigation of Intersection Planters and Medi-ans		1770	linear m	$368	$651,360	Includes cost of irrigation line installation and water line connection installation.
Site Furniture	Street Lights with Pedestrian Luminaire		101	each	$14,000	$1,416,000	Extruded aluminum poles with LED luminaire, shipping not included.
	Pedestrian Luminaire		101	each	$9,000	$910,286	Extruded aluminum poles with LED luminaire, shipping not included.
	Gateway Banner Poles		5	each	$6,500	$32,500	Gateway locations, extruded aluminum poles with signage slots, shipping not includ-ed.
	YRT Bus Shelter and related YRT furniture					$-	Cost of shelter/furniture included in YRT Capital Budget
	Furnishing (Benches, Trash Receptacles, Bike Parking)		5	intersections	$10,925	$97,850	Assumes 2 benches, 3 bike racks, and 2 trash receptacles at signalized intersections, as well as 1 bench every 250m and 1 trash receptacle every 500m midblock.
Hydro	Burying Hydro		1770	linear m	$3,500	$6,195,000	Costs only includes burying hydro, all other utility relocation is not included. If hydro is not buried, some hydro poles may need to be relocation (to be addressed in Detailed Design).
				Total Cost		**$13,041,546**	
				Total Cost/ km		**$7,368,105**	

Total Cost with Buried Hydro	**$19,236,546**
Total Cost with Buried Hydro/ km	**$10,868,105**

3.1.2 YONGE STREET SOUTH CAPITAL COSTS ORDER OF MAGNITUDE

Yonge Street South- Green Streetscape Typology with Urban Transition - 1.72 km (1720 linear metres)							
	Streetscape Element	**Typical Width**	**Quantity**	**Unit**	**Unit Cost**	**Subtotal Cost**	**Additional Notes**
Hardscape	Continuity Strip	0.6 m	1722	m²	$225	$387,450	Eco Pavers on high performance bedding base (HPB).
	MUP (FilterPave)	3.0 m	8610	m²	$300	$2,583,000	FilterPave (permeable asphalt).
	Intersection Permeable Unit Paving		3250	m²	$225	$731,250	Eco Pavers on a permeable concrete base.
Roadway	Median (Planted)		995	linear m	$580	$577,100	Assume average total width of 4 metres. Includes continuity strip, precast concrete planter, softscape material. Does not include curb.
	Median (Paved)		170	linear m	$400	$68,000	Assumes average width of 2 metres. Includes Eco Pavers on a high performance bedding base (HPB). Does not include curb.
	Gateway Banding (Unit Pavers in Concrete Cradle)	0.6 m	31	m²	$250	$7,650	
	Intersection Crosswalks (Traffic PatternstXD)	3.0 m	775	m²	$185	$143,375	TrafficPatternsXD pigmented impressed asphalt.
Planters	Street Trees in Grates	2.35 m	12	each	$14,400	$172,800	Includes cost of tree, grate and soil cell structure.
	Trees in Softscape		274	each	$450	$123,300	60 mm DBH typical.
	Precast Planters with 2 trees	2.35 m	9	each	$15,800	$142,200	Includes cost of tree/shrubs, precast planter and soil cell structure if required.
	Precast Planters with 3 trees	2.35 m	2	each	$27,000	$54,000	Includes cost of tree/shrubs, precast planter and soil cell structure if required.
Irrigation	Automated Irrigation of Medians		995	linear m	$130	$129,350	Medians only for trees with understorey planting. Includes cost of irrigation line installation and water line connection installation.
Site Furniture	Street Lights with Pedestrian Luminaire		98	each	$14,000	$1,376,000	Extruded aluminum poles with LED luminaire, shipping not included.
	Pedestrian Luminaire		98	each	$9,000	$884,571	Extruded aluminum poles with LED luminaire, shipping not included.
	Gateway Banner Poles		5	each	$6,500	$32,500	Gateway locations, extruded aluminum poles with signage slots, shipping not included.
	YRT Bus Shelter and related YRT furniture					$-	Cost of shelter/furniture included in YRT Capital Budget.
	Furnishing (Benches, Bike Parking, Trash)		3	intersections	$10,925.00	$75,259	Assumes 2 benches, 3 bike racks, and 2 trash receptacles at signalized intersections, as well as 1 bench every 250m and 1 trash receptacle every 500m midblock.
Hydro	Burying Hydro		1720	linear m	$3,500.00	$6,020,000	Costs only includes burying hydro, all other utility relocation is not included. If hydro is not buried, some hydro poles may need to be relocation (to be addressed in Detailed Design).
				Total Cost		**$7,487,805**	
				Total Cost/ km		**$4,353,375**	

Total Cost with Buried Hydro	**$13,507,805**
Total Cost with Buried Hydro/ km	**$7,853,375**

3.1.3 DAVIS DRIVE WEST CAPITAL COSTS ORDER OF MAGNITUDE

DAVIS DRIVE WEST - TOTAL LENGTH 1.93km (1930 linear metres)							
	Streetscape Element	**Typical Width**	**Quantity**	**Unit**	**Unit Cost**	**Subtotal Cost**	**Additional Notes**
Davis Drive West- Davis Urban Streetscape Typology- 0.4km (400 linear metres)							
Hardscape	Continuity Strip	0.6 m	450	m²	$225	$101,250	Eco Pavers on high performance bedding base (HPB).
	Furnishing Zone (Permeable Unit Pavers)	2.35 m	564	m²	$225	$126,900	Eco Pavers on a permeable concrete base.
	Cycle Track	1.5 m	1125	m²	$300	$337,500	FilterPave (permeable asphalt).
	Permeable Concrete Sidewalk	2.0 m	700	m²	$150	$105,000	Lafarge Hydromedia (permeable concrete).
	Intersection Permeable Unit Paving		4000	m²	$225	$900,000	
Roadway	Intersection Crosswalks (Traffic PatternsXD)	3.0 m	300	m²	$185	$55,500	TrafficPatternsXD pigmented impressed asphalt.
Planters	Street Tree in Grate	2.35 m	9	each	$14,400	$129,600	Includes cost of tree, grate, soil cell structure.
	Precast Planter with 2 trees	2.35 m	40	each	$15,800	$632,000	Includes cost of tree/shrubs, precast planter, soil cell structure if required.
Irrigation	Automated Irrigation of Planters		400	linear m	$260	$104,000	Includes cost of irrigation line installation and water line connection installation.
Site Furniture	Street Lights with Pedestrian Luminaire		23	each	$14,000	$320,000	Extruded aluminum poles with LED luminaire, shipping not included.
	Pedestrian Luminaire		23	each	$9,000	$205,714	Extruded aluminum poles with LED luminaire, shipping not included.
	YRT Bus Shelter and related YRT furniture					$-	Cost of shelter/furniture included in YRT Capital Budget.
	Furnishing (Benches, Bike Parking, Trash)		1	intersections	$10,925	$17,100	Assumes 2 benches, 3 bike racks, and 2 trash receptacles at signalized intersection, as well as 1 bench every 250m and 1 trash receptacle every 500m midblock.
		Cost/km	**$7,586,411**	**Total Cost/ Segment**		**$3,034,564**	
Davis Drive West- Green Streetscape Typology - 1.53km (1530 linear metres)							
Hardscape	Continuity Strip	0.6 m	1752	m²	$225	$394,200	Eco Pavers on high performance bedding base (HPB)
	MUP	3.0 m	8760	m²	$300	$2,628,000	FilterPave (permeable asphalt)
	Intersection Permeable Unit Paving		648	m²	$225	$145,800	
Roadway	Median (Planting)		280	linear m	$580	$162,400	Assume average total width of 4 metres. Includes continuity strip, precast concrete planter and softscape material. Does not include curb.
	Median (Paved)		270	linear m	$400	$108,000	Assumes average width of 2 metres. Includes Eco Pavers on a high performance bedding base (HPB). Does not include curb.
	Gateway Banding (Unit Pavers in Concrete Cradle)	0.6 m	36	m²	$250	$9,000	
	Intersection Crosswalks (TrafficPatternstXD)	3.0 m	265	m²	$185	$49,025	TrafficPatternsXD pigmented impressed asphalt
Planters	Trees in Softscape		293	each	$450	$131,850	60 mm DBH typical.
Irrigation	Automated Irrigation of Medians		280	linear m	$130	$36,400	Includes cost of irrigation line installation and water line connection installation.
Site Furniture	Street Lights with Pedestrian Luminaire		103	each	$14,000	$1,440,000	Extruded aluminum poles with LED luminaire, shipping not included.
	Pedestrian Luminaire		103	each	$9,000	$925,714	Extruded aluminum poles with LED luminaire, shipping not included.
	Gateway Banner Poles		3	each	$6,500	$19,500	Gateway locations, extruded aluminum poles with signage slots, shipping not included.
	YRT Bus Shelter and related YRT furniture					$-	Cost of shelter/furniture included in YRT Capital Budget
	Furnishing (Benches, Bike Parking, Trash)		2	intersections	$10,925	$40,746	Assumes 2 benches, 3 bike racks, and 2 trash receptacles at signalized intersection, as well as 1 bench every 250m and 1 trash receptacle every 500m midblock.
Hydro	Burying Hydro: Entire Davis Drive West Corridor		1930	linear m	$3,500	$6,755,000	Costs only includes burying hydro, all other utility relocation is not included. If hydro is not buried, some hydro poles may need to be relocation.
		Cost/km	**$3,980,807**	**Total Cost/ Segment**		**$6,090,635**	

Total Cost with Buried Hydro	**$15,880,199**	**Total Cost for Davis West**	**$9,125,199**
Total Cost with Buried Hydro/ km	**$8,228,082**	**Cost for Davis West/ km**	**$4,728,082**

Davis Drive East

3.1.4 DAVIS DRIVE EAST CAPITAL COSTS ORDER OF MAGNITUDE

DAVIS DRIVE EAST - TOTAL LENGTH 2.5 km (2500 linear metres)							
	Streetscape Element	**Typical Width**	**Quantity**	**Unit**	**Unit Cost**	**Subtotal Cost**	**Additional Notes**
Davis Drive East- Davis Urban Streetscape Typology - 0.6 km (600 linear metres)							
Hardscape	Continuity Strip	0.6 m	594	m²	$225	$133,650	Eco Pavers on high performance bedding base (HPB).
	Furnishing Zone (Permeable Unit Pavers)	2.35 m	1340	m²	$225	$301,388	
	Cycle Track	1.5 m	1680	m²	$300	$504,000	FilterPave (permeable asphalt).
	Permeable Concrete Sidewalk	2.0 m	1980	m²	$150	$297,000	Lafarge Hydromedia (permeable concrete).
	Intersection Unit Paving		650	m²	$200	$130,000	
Roadway	Median (Paved)		40	linear m	$400	$16,000	Assumes average width of 2 metres. Includes Eco Pavers on a high performance bedding base (HPB). Does not include curb.
	Gateway Banding (Unit Pavers in Concrete Cradle)	0.6 m	72	m²	$250	$18,000	
	Intersection Crosswalks (TrafficPatternsXD)	3.0 m	600	m²	$185	$111,000	
Planters	Street Tree in Grate		18	each	$14,400	$259,200	Includes cost of tree, grate and soil cell structure.
	Planter with 2 trees		24	each	$25,900	$621,600	Includes cost of tree/shrubs, precast planter and soil cell structure if required.
Irrigation	Automated Irrigation of Planters		600	linear m	$260	$156,000	Includes cost of irrigation line installation and water line connection installation.
Site Furniture	Street Lights with Pedestrian Luminaire		34	each	$14,000	$480,000	Extruded aluminum poles with LED luminaire, shipping not included.
	Pedestrian Luminaire		34	each	$9,000	$308,571	Extruded aluminum poles with LED luminaire, shipping not included.
	Gateway Banner Poles		5	each	$6,500	$32,500	Gateway locations, extruded aluminum poles with signage slots.
	YRT Bus Shelter and related YRT furniture					$-	Cost of shelter/furniture included in YRT Capital Budget.
	Furnishing (Benches, Bike Parking, Trash)		3	intersections	$10,925	$38,950	Assumes 2 benches, 3 bike racks, and 2 trash receptacles at signalized intersection, as well as 1 bench every 250m and 1 trash receptacle every 500m midblock.
		Cost/ km	**$5,679,765**	**Total Cost/ Segment**		**$3,407,859**	
Davis Drive East- Green Streetscape Typology - 1.9km (1,900 linear metres)							
Hardscape	Continuity Strip	0.6 m	2280	m²	$225	$513,000	Eco Pavers on high performance bedding base (HPB).
	MUP (FilterPave)	3.0 m	10604	m²	$300	$3,181,200	FilterPave (permeable asphalt).
	Intersection Unit Paving		1300	m²	$225	$292,500	
Roadway	Median (Paved)		336	linear m	$400	$134,400	Assumes average width of 2 metres. Includes Eco Pavers on a high performance bedding base (HPB). Does not include curb.
	Intersection Crosswalks (TrafficPatternstXD)	3.0 m	1092	m²	$185	$202,020	
Planters	Trees		487	each	$800	$389,600	60 mm DBH typical.
Irrigation	Automated Irrigation	N/A					
Site Furniture	Street Lights with Pedestrian Luminaire		107	each	$14,000	$1,498,000	Extruded aluminum poles with LED luminaire, shipping not included.
	Pedestrian Luminaire		107	each	$9,000	$963,000	Extruded aluminum poles with LED luminaire, shipping not included.
	YRT Bus Shelter and related YRT furniture						Cost of shelter/furniture included in YRT Capital Budget.
	Furnishing (Benches, Bike Parking, Trash)		2	intersections	$10,925	$34,200	Assumes 2 benches, 3 bike racks, and 2 trash receptacles at signalized intersection, as well as 1 bench every 250m and 1 trash receptacle every 500m midblock.
Hydro	Burying Hydro: Entire Davis Drive East Corridor		2500	linear m	$3,500	$8,750,000	Costs only includes burying hydro, all other utility relocation is not included. If hydro is not buried, some hydro poles may need to be relocation.
		Cost/ km	**$3,793,642**	**Total Cost/ Segment**		**$7,207,920**	
	Total Cost with Buried Hydro	**$19,365,779**		**Total Cost for Davis East**		**$10,615,779**	
	Total Cost with Buried Hydro/ km	**$8,236,704**		**Total Cost/ km**		**$4,736,704**	

4.0 MAINTENANCE AND OPERATIONS

4.1 MAINTENANCE AND OPERATIONS OVERVIEW

Proper maintenance of a streetscape is integral to realizing the full Streetscape Master Plan Vision and long term health and vigor of the plant material. The following sections outline maintenance responsibilities, maintenance and operations strategies and the affiliated costs through an Order of Magnitude for each corridor.

4.2 JURISDICTIONAL RESPONSIBILITY

The Town of Newmarket is responsible for maintaining all plant material (for the roadways with four lane cross sections), as well as the hardscape components of the boulevard and median including wet vacuuming of the cycle track, MUP, median and sidewalk in the warmer months and snow removal in the winter months. Although the Town of Newmarket will plow the sidewalks and MUPs along the Davis Drive and Yonge Street corridors within the study area, private property owner's with frontage along these corridors are expected to clear snow and ice between municipal plowings.

York Region Natural Heritage and Forestry will maintain the soft plant material within the public ROW along the Yonge Street North corridor, as it is a six lane cross section. This includes all plant material within the boulevard planters, trees in softscape and the planted medians.

Jurisdictional Responsibility		
Operations and Maintenance	York Region	Town of Newmarket
Boulevard Cleaning		√
Median Cleaning		√
Wet Vacuum Sweep		√
Routine Sweep		√
Debris Pick-up (MadVac)		√
Rain Garden Cleaning	*Yonge Street North*	
Hardscape Boulevard Repairs		√
Repair of Special Features		√
Pavement Markings	√	
Other Routine Maintenance (Patrol, Signs, etc.)		√
Softscape Maintenance	*Yonge Street North*	√
Routine Winter Maintenance		√
Snow Removal (Boulevard)		√

4.3 MAINTENANCE AND OPERATIONS STRATEGIES

The following section provides high level maintenance requirements for the Yonge Street & Davis Drive Streetscape Master Plan streetscape components categorized by season. The section provides more detail of the tasks outlined in the Operations and Maintenance Order of Magnitude cost matrices in Section 4.4.

4.3.1 Spring/ Summer

Cleaning – Permeable Unit Pavers, Pervious Asphalt and Concrete

Thoroughly clean and perform a wet vacuum sweep of the pervious concrete sidewalk, permeable cycle track and permeable paver surfaces in the spring after winter de-icing operations have ended. The sweep is intended to remove surface debris and siltation from the pores to assure permeability and long functional life of the permeable pavements.

Automated Irrigation Spring Opening

Initiate spring opening in May once the threat of frost has ended. Inspect the irrigation lines and connections to ensure the structural integrity of the system has not been damaged. Also, inspect the backflow devices with threaded unions on either end to ensure that they are properly functioning. Backflow preventers require yearly testing and certification. The seals on the backflow devices may need to be replaced every 2 to 3 years because they are prone to cracking when stored in winter conditions. The system should be tested prior to operation.

Irrigation/Watering of Plant Material

Keep trees, shrubs, and perennials watered in the early stages particularly during the establishment period. Trees in grates, urban planters and the median will be watered using an automated drip irrigation system, as well as through manual irrigation to charge the subsurface soil cells. Shrubs in softscape should be manually watered with approximately 750 litres of water every five days during the growing season from early May to the end of September. Trees in softscape are only watered using gator bags in the establishment period. Tree Gator bags with a capacity of 57 litres should be filled and sufficient water should be applied to wet the top 30cm of soil within the dripline of the tree. The water should be equally distributed throughout the entire planting bed (if applicable) in such a manner that prevents the displacement of the mulch and/or soil.

Maintenance of Urban Planters, Landscaped Centre Medians and Planting Beds

Monthly maintenance of urban planters, landscaped centre medians and planting beds may consist of the following:

- Remove and dispose of all grassy and broad-leafed weeds within the planted area by hand pulling or mechanical means without causing damage to the adjacent plants, including their root systems;
- Remove and dispose of any spent flowers on the herbaceous and woody perennials including 'browned off' flower stalks;
- Remove and dispose of all litter and debris from the planters, landscaped centre medians, planting beds and surrounding hardscape areas;
- Prune shrubs to maintain a neat, tidy and natural appearance and to maintain growth within the space limitations. Perform this task seasonally in accordance with the current best horticultural practice for each particular shrub species;
- Prune shrubs so that all dead, damaged, and diseased wood is removed;
- Prune back any shrubs, perennials or ornamental grasses that are encroaching onto the roadway, cycle track or pedestrian walkway;
- Inspect soil access hatches to ensure soil volumes are adequate in soil cells; and
- Cut back woody and herbaceous perennials to a height of 75 mm to maintain sightlines and dispose of the clippings.

Maintenance of Rain Gardens

- After snow removal operations have ended in the spring and the threat of de-icing is gone (last week of May), remove the sluice gate at the rain garden inlet/outlet in order that surface runoff from the roadway may enter the rain garden for filtration and irrigation;
- Inspect rain gardens bi-monthly (or after a major rainfall event) for sediment. If the sediment load is clogging the operation of the rain garden and restricting plant growth, it should be removed;
- Ensure that inlets and outlets are cleaned regularly;
- Monitor root growth to ensure that they are not blocking inlet/outlets, filters or preventing infiltration;
- Maintain and prune plant material as noted above; and
- If sever drought conditions occur, manually water rain gardens with a watering truck.
- Prune shrubs so that all dead, damaged, and diseased wood is removed.

4.3.2 Fall Maintenance

Cleaning – Permeable Unit Pavers, Pervious Asphalt and Concrete

Thoroughly clean and perform a wet vacuum sweep of the pervious concrete sidewalk, permeable cycle track and permeable paver surfaces in the fall after leaves have fallen to remove surface debris and siltation from pores to assure permeability and long functional life of the permeable pavements.

Automated Irrigation Fall Closing

In early October, turn off the water supply and remove the backflow devices. Ensure all irrigation lines and backflow devices are fully drained. Store backflow devices in a protected indoor environment.

Fall Maintenance Urban Planters, Landscape Centre Medians and Planting Beds

Fall maintenance routine of urban planters, landscaped centre medians and planting beds may consist of the following:

- Remove and dispose of all grassy and broad-leafed weeds within the planted area by hand pulling or mechanical means without causing damage to the adjacent plants, including their root systems;
- Remove and dispose of all litter and debris from the planters, landscaped centre medians, planting beds and surrounding hardscape areas;
- Ornamental grasses and perennials should not be cut back at this time, except for any plants that are encroaching onto the roadway or pedestrian walkway. The ornamental grass stalks and perennials will provide winter interest;
- Prune back any shrubs, perennials or ornamental grasses that are encroaching onto the roadway, cycle track or pedestrian walkway; and

Fall Maintenance of Rain Gardens

- Long before de-icing operations have begun (mid-October), install the sluice gate at the rain garden inlet/outlet to prevent roadway surface runoff and salts from entering the rain garden. Plants will enter a dormancy stage and will therefore not need as much irrigation;
- Inspect the rain garden for sediment. Remove as required;
- Clean inlets and outlets; and
- Cut back and prune plant material as noted above.

4.3.3 Winter Maintenance

Snow Removal in Boulevard Areas - Unit Pavers, Pervious Asphalt and Concrete

It is recommended that rubber polycarbonate blades be applied to the steel sidewalk snow plow blades for the boulevard areas. This will mitigate damage to the surface and corners of unit pavers as well as the textured surface of the pervious concrete and asphalt.

De-icing - Pervious Asphalt and Concrete

The void structure of pervious concrete and asphalt pavement facilitates a faster thawing of ice and snow on the pavement surface compared with impervious pavements at temperatures below freezing. Therefore, de-icing chemicals and anti-skid materials are needed sparingly. It should be noted that conventional de-icing chemicals such as sand or de-icing agents that contain fertilizer ingredients such as Ammonium Sulfate and Ammonium Nitrate are not recommended. Consider the use of Magnesium Chloride for de-icing. As noted above, a thorough cleaning/wet vacuum sweep of the surface should be completed bi-annually following the cold weather season in the spring and once in the fall after leaves have fallen to assure long functional life.

Winter Preparation of Plant Material

In order to protect plant species from harmful salt spray, it is recommended that burlap protection be applied particularly to plant material within the centre medians. Winter protection may consist of burlap, attached to plastic orange fencing installed at a height of 120 cm that is attached to steel posts spaced every 250 cm.

PERVIOUS PAVEMENT

Pervious pavements have numerous LID benefits particularly stormwater management quality and quantity control, reduced heat island effect and low carbon footprint due to use of recycled material. While there may be increased maintenance requirements over impervious surfaces such as wet vacuuming, there is reduced snow removal due to faster thawing of snow and ice.

Numerous University of New Hampshire studies indicate that porous pavements reduce the need for de-icing materials by up to 70%. Porous pavement induces ice to melt faster than traditional pavements, as the melting water does not remain on the surface to insulate the remaining ice.

IBI Group recommends that a detailed cost benefit analysis be conducted to review construction, installation and maintenance costs of pervious versus impervious pavements in the public ROW for the sidewalk and cycle track.

4.3.4 Maintenance and Operations Strategy Schedule Matrix

	Spring/ Summer		Fall		Winter	
	Task	**Timing**	**Task**	**Timing**	**Task**	**Timing**
Hardscape	Clean and wet vacuum sweep pervious hardscape surface	After winter de-icing operations have ended	Clean and wet vacuum sweep pervious hardscape surface	After leaves have fallen	Snow Removal and De-icing	As needed.
Softscape	Initiate opening of automated irrigation system/ rain garden irrigation system • Inspect irrigation lines and connections • Test and certify backflow preventers • Replace anything necessary • Remove rain garden sluice gate	Once threat of frost has ended	Initiate closing of automated irrigation system/ rain garden irrigation system • Turn off water supply • Remove backflow devises • Drain all backflow devices • Replace rain garden sluice gate	Early October		
	Irrigation/ watering of plant materials • Operate automated drip irrigation for trees and urban planters • Manually water trees and shrubs in softscape • Fill Tree Gator bags	As Necessary				
	Planter maintenance • Remove weeds and spent flowers • Remove litter and debris • Prune plant material • Inspect soil volumes	Monthly	Planter maintenance • Remove weeds and spent flowers • Remove litter and debris • Prune plant material • Inspect soil volumes	As Necessary	Winter preparation of plant material • Apply burlap protection to plant material within centre median	At the beginning of the season
	Rain Garden Maintenance • Inspect for sediment load clogging • Clean inlets and outlets • Monitor root growth • Maintain and prune plant material	Bi-Monthly	Rain Garden Maintenance • Inspect for sediment load clogging • Clean inlets and outlets • Prune plant material	As Necessary		

**Includes operations and maintenance for the boulevard and median, does not include the roadway.*

4.4 OPERATIONS AND MAINTENANCE ORDER OF MAGNITUDE

The following section provides the projected maintenance and operations cost for all four streetscape corridors. The matrix below provides an overview of the total operations and maintenance costs for each streetscape corridor. More detail regarding the seasonal operations and maintenance tasks and affiliated costs for each corridor follows.

Maintenance and operations costs have been established based on previous projects as well as input from York Region and the Town of Newmarket. Costs are in 2016 Canadian dollars. The Consumer Price Index (CPI) should be used to obtain an accurate cost in the future.

The following matrices are included herein:

- 4.4.1 Yonge Street North Operations and Maintenance Order of Magnitude
- 4.4.2 Yonge Street South Operations and Maintenance Order of Magnitude
- 4.4.3 Davis Drive West Operations and Maintenance Order of Magnitude*
- 4.4.4 Davis Drive East Operations and Maintenance Order of Magnitude*

**Includes operations and maintenance costs for both the Davis Urban Streetscape Typology and the Davis Green Streetscape Typology.*

Maintenance and Operations Costs by Corridor Segment							
Streetscape Corridor	**Streetscape Typology**	**Length (km)**		**Cost/ km/Year**	**Subtotal Cost**	**Corridor Cost/km**	**Total Corridor Cost**
Yonge Street North	Yonge Urban	1.77	km	$194,450	$343,521	$194,450	$343,521
Yonge Street South	Green	1.72	km	$87,945	$151,161	$87,945	$151,161
Davis Drive West	Davis Urban	0.40	km	$188,450	$74,560	$144,128	$225,253
	Green	1.53	km	$99,805	$150,693		
Davis Drive East	Davis Urban	0.60	km	$188,450	$111,922	$143,198	$297,657
	Green	1.90	km	$97,945	$185,735		
						Total	**$1,017,592**

Cost Comparison

Existing Streetscape Operations and Maintenance Costs

The Order of Magnitude Operations and Maintenance for a streetscape without a median is approximately **$ 10,000**/ km.

Sourced from the South Yonge Street Corridor Streetscape Master Plan Study, Phase 5: Implementation Strategy (EDA 2011).

Enhanced Streetscape Operations and Maintenance

The Order of Magnitude Operations and Maintenance for the South Yonge Street Corridor Streetscape Master Plan Ultimate Vision is approximately **$ 365,000/ km.**

The Order of Magnitude Operations and Maintenance for the South Yonge Street Corridor Streetscape Master Plan Pre-Subway Plan is approximately **$ 263,000/ km.**

Sourced from the South Yonge Street Corridor Streetscape Master Plan Study, Phase 5: Implementation Strategy (EDA 2011).

Maintenance and Operations Costs Comparison: York Region Streetscapes	
STREETSCAPE	**AVERAGE COST / KM/ YEAR**
Yonge Street & Davis Drive Streetscape Master Plan	$ 142,250
South Yonge Street Corridor Streetscape Master Plan	$ 300,000
vivaNext Streetscape (Highway 7)	$ 190,000

Yonge Street North

4.4.1 YONGE STREET NORTH OPERATIONS AND MAINTENANCE ORDER OF MAGNITUDE

Yonge Street North- Urban Streetscape Typology (1.77 km) INTERIM CONDITION					
Season	Operation/ Maintenance	km	Cost/km/Year	Frequency of Task	Total Cost/ Year
Non Winter	Boulevard Cleaning (i.e. Spring Cleanup)	1.77	$4,500	Once Yearly	$7,965
	Median Cleaning (i.e. Spring Cleanup Islands)	1.45	$2,050	Once Yearly	$2,973
	Wet Vacuum Sweep - Cycle Track and Sidewalk	1.77	$2,700	Twice Yearly	$4,779
	Routine Sweeping	1.77	$1,100	Twice Yearly	$1,947
	Inspections	1.77	$100	Once Yearly	$177
	Debris Pick-up using MadVac	1.77	$1,700	Eight Times Yearly	$3,009
	Rain Garden Cleaning	1.77	$6,000	Four Times Yearly	$10,620
	Hardscape Blvd Repairs	1.77	$2,200	As Required	$3,894
	Repair of Special Features (i.e. Planters, Banners, Gateway Banding etc.…)	1.77	$2,000	As Required	$3,540
	Pavement Markings	1.77	$63,000	Once Every 3 Years	$111,510
	Other Routine Maintenance (Patrol, Signs, etc..)	1.77	$1,000	Multiple Times per Year	$1,770
	Softscape Maintenance (i.e. Forestry)	1.77	$51,000	Multiple Times per Year	$90,270
Winter	Routine Winter Maintenance	1.77	$22,100	As Required	$39,117
	Snow removal	1.77	$35,000	Twice Yearly	$61,950
	Total		$194,450		$343,521

Cost to be covered by the Town of Newmarket: **$ 229,002**
Cost to be covered by York Region: **$ 114,519**

* *Total Cost/km/ Year assumes the presence of a median*

Yonge Street South

4.4.2 YONGE STREET SOUTH OPERATIONS AND MAINTENANCE ORDER OF MAGNITUDE

Yonge Street South- Green Streetscape Typology (1.72 km)					
Season	Operation/ Maintenance	km	Cost/ km/ Year	Frequency of Task	Total Cost/ Year
Non Winter	Boulevard Cleaning (i.e. Spring Cleanup)	1.72	$595	Once Yearly	$1,023.40
	Median Cleaning (i.e. Spring Cleanup Islands)	1.17	$190	Once Yearly	$222.30
	Wet Vacuum Sweep of MUP	1.72	$2,700	Twice Yearly	$4,644.00
	Routine Sweeping	1.72	$600	Twice Yearly	$1,032.00
	Inspections	1.72	$35	Once Yearly	$60.20
	Debris Pick-up using MadVac	1.72	$300	Twice Yearly	$516.00
	Hardscape Blvd Repairs	1.72	$1,775	As Required	$3,053.00
	Repair of Special Features (i.e. Planters, Banners, Gateway Banding etc.…)	1.72	$2,000	As Required	$3,440.00
	Pavement Markings	1.72	$9,000	Once per year	$15,480.00
	Other Routine Maintenance (Patrol, Signs, etc..)	1.72	$750	Multiple Times per year	$1,290.00
	Softscape Maintenance (i.e. Forestry)	1.72	$35,000	Multiple Times per year	$60,200.00
Winter	Routine Winter Maintenance	1.72	$10,000	As Required	$17,200.00
	Snow removal	1.72	$25,000	Twice Yearly	$43,000.00
	Total		$87,945		$151,160.90

Cost to be covered by the Town of Newmarket: **$ 135,680**
Cost to be covered by York Region: **$ 15,480**

* *Total Cost/km/ Year assumes the presence of a median*

Davis Drive West

4.4.3 DAVIS DRIVE WEST OPERATIONS AND MAINTENANCE ORDER OF MAGNITUDE

Davis Drive West (1.93 km)									
		Davis Urban Streetscape Typology- 0.40 km				Green Streetscape Typology- 1.53 km			
Season	Operation/ Maintenance	km	Cost/km/ Year	Frequency of Task	Total Cost/ Year	km	Cost/ km/ Year	Frequency of Task	Total Cost/ Year
Non Winter	Boulevard Cleaning (i.e. Spring Cleanup)	0.4	$4,500	Once Yearly	$1,800	1.53	$595	Once Yearly	$910
	Median Cleaning (i.e. Spring Cleanup Islands)	0	$2,050	Once Yearly	$-	0.55	$2,050	Once Yearly	$1,128
	Wet Vacuum Sweep - Cycle Track and Sidewalk/MUP	0.4	$2,700	Twice Yearly	$1,080	1.53	$2,700	Twice Yearly	$4,131
	Routine Sweeping	0.4	$1,100	Twice Yearly	$440	1.53	$600	Twice Yearly	$918
	Inspections	0.4	$100	Once Yearly	$40	1.53	$35	Once Yearly	$54
	Debris Pick-up using MadVac	0.4	$1,700	Eight Times Yearly	$680	1.53	$300	Twice Yearly	$459
	Hardscape Blvd Repairs	0.4	$2,200	As Required	$880	1.53	$1,775	As Required	$2,716
	Repair of Special Features (i.e. Planters, Banners, Gateway Banding etc.)	0.4	$2,000	As Required	$800	1.53	$2,000	As Required	$3,060
	Pavement Markings	0.4	$63,000	Once Every 3 Years	$25,200	1.53	$9,000	Once per year	$13,770
	Other Routine Maintenance (Patrol, Signs, etc..)	0.4	$1,000	Multiple Times per year	$400	1.53	$750	Multiple Times per year	$1,148
	Softscape Maintenance (i.e. Forestry)	0.4	$51,000	Multiple Times per year	$20,400	1.53	$35,000	Multiple Times per year	$53,550
Winter	Routine Winter Maintenance	0.4	$22,100	As required	$8,840	1.53	$10,000	As Required	$15,300
	Snow removal	0.4	$35,000	Twice Yearly	$14,000	1.53	$35,000	Twice Yearly	$53,550
	Total		$188,450		$74,560		$99,805		$150,693
						Total Cost for Davis Drive West Corridor			$225,253

Cost to be covered by the Town of Newmarket: **$ 186,283**
Cost to be covered by York Region: **$ 38,970**

* *Total Cost/km/ Year assumes the presence of a median*

Davis Drive East

4.4.4 DAVIS DRIVE EAST OPERATIONS AND MAINTENANCE ORDER OF MAGNITUDE

Davis Drive East (2.5 km)									
		Davis Urban Streetscape Typology- 0.60 km				Green Streetscape Typology- 1.90 km			
Season	Operation/ Maintenance	km	Cost/km/ Year	Frequency of Task	Total Cost/ Year	km	Cost/ km/ Year	Frequency of Task	Total Cost/ Year
Non Winter	Boulevard Cleaning (i.e. Spring Cleanup)	0.60	$4,500	Once Yearly	$2,700.00	1.90	$595	Once Yearly	$1,131
	Median Cleaning (i.e. Spring Cleanup Median Islands)	0.04	$2,050	Once Yearly	$82.00	-	$190	Once Yearly	$-
	Wet Vacuum Sweep - Cycle Track and Sidewalk/ MUP	0.60	$2,700	Twice Yearly	$1,620.00	1.90	$2,700	Twice Yearly	$5,130
	Routine Sweeping	0.60	$1,100	Twice Yearly	$660.00	1.90	$600	Twice Yearly	$1,140
	Inspections	0.60	$100	Once Yearly	$60.00	1.90	$35	Once Yearly	$67
	Debris Pick-up using MadVac	0.60	$1,700	Eight Times Yearly	$1,020.00	1.90	$300	Twice Yearly	$570
	Hardscape Blvd Repairs	0.60	$2,200	As Required	$1,320.00	1.90	$1,775	As Required	$3,373
	Repair of Special Features (i.e. Planters, Banners, Gateway Banding, etc.)	0.60	$2,000	As Required	$1,200.00	1.90	$2,000	As Required	$3,800
	Pavement Markings	0.60	$63,000	Once Every 3 Years	$37,800.00	1.90	$9,000	Once per year	$17,100
	Other Routine Maintenance (Patrol, Signs, etc.)	0.60	$1,000	Multiple Times per year	$600.00	1.90	$750	Multiple Times per year	$1,425
	Softscape Maintenance (i.e. Forestry)	0.60	$51,000	Multiple Times per year	$30,600.00	1.90	$35,000	Multiple Times per year	$66,500
Winter	Routine Winter Maintenance	0.60	$22,100	As required	$13,260.00	1.90	$10,000	As Required	$19,000
	Snow removal	0.60	$35,000	Twice Yearly	$21,000.00	1.90	$35,000	Twice Yearly	$66,500
	Total		$188,450		$111,922.00		$97,945		$185,735
							Total Cost for Davis Drive East Corridor		$297,657

Cost to be covered by the Town of Newmarket: **$ 242,757**
Cost to be covered by York Region: **$ 54,900**

* *Total Cost/km/ Year assumes the presence of a median*

5.1 CONCLUSION

The Streetscape Master Plan emphasizes the importance of having an attractive public realm. By offering comfortable cycle tracks, wide tree lined boulevards, attractive paving, good lighting, amenities such as comfortable benches and bike racks and generously planted landscaped areas- pedestrians, transit users, cyclists and drivers all feel part of a growing community. The new streetscape will also cultivate and enhance the activities in the adjacent private realm. Wider sidewalks lined with leafy deciduous trees in tree grates will enhance future outdoor patio space and forecourt plazas. Pedestrian amenities such as the York Region coordinated benches, bike rings and trash receptacles will enhance the pedestrian environment. The streetscape therefore becomes an important part of the civic infrastructure and contributes to place making and community building.
Capital Costs have been balanced with Maintenance and Operations cost in order to plan a successful streetscape that upholds the vision for a Green, Active and Vibrant streetscape. Maintenance of the streetscape is integral to uphold the Master Plan vision and should be carefully considered at the detailed design stage.

A. GLOSSARY OF ACRONYMS AND TERMS

AODA	Accessibility for Ontarians with Disabilities Act
BRT	Bus Rapid Transit
DBH	Diameter at Breast Height
DC	Development Charges
GMF	Green Municipal Fund
GTF	Gas Tax Fund
LID	Low Impact Development
LSRCA	Lake Simcoe Region Conservatoin Authority
MSPP	York Region Municipal Streetscape Partnership Program
MTO	Ministry of Transportation Ontario
MUP	Multi-Use Path
O+M	Operations and Maintenance
OP	Official Plan
P3	Private Public Partnership
ROW	Right-of-Way
TIF	Tax Increment Fund

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FINAL