

APPENDIX B: LISTS OF APPROVED MATERIALS

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APPENDIX B: LISTS OF APPROVED MATERIALS

B1 – Street Lighting

APPENDIX B1
STREETLIGHTING MATERIAL LIST

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
1.0 LIGHTING					
1.1	Electrical Handholes	CSA	Precast concrete type complete with cover, 460mm Dia., as per OPSD 2112.02.		
1.2	Ducts	CSA C22.2, No.211.1 CSA C22.2, No.211.2 CSA Standard B137.1, Series 75 or ENT CSA C22.2, No.227.1	In boulevard, rigid PVC DB2 duct, 53mm Dia. Below roadways, rigid PVC Thickwall duct, 53mm Dia. Flexible duct (Polypipe) to be used for protection of cables entering the wiring aperture in the concrete poles.		
1.3	Cables	CSA C22.2 No.38	Power supply cables shall be 3-#2 AWG copper RWU90 (including ground wire), with cross- linked polyethylene insulation rated 600 volt. Street light cables shall be 1-2C#6		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>AWG copper and #10 AWG copper GND, 60°C, NMWU; or 2-#6 AWG copper RW90 and #8AWG copper GND RW90</p> <p>Riser wires from pole handhole to luminaire shall be #12 AWG stranded copper type RWU90 insulation.</p> <p>Insulation colour for line conductors for 1-phase, 3-wire 240/120V system shall be “Red” and “Black” and for 1 phase, 2-wire 120V system shall be “Red”. Insulation colour of all neutral conductors shall be “White”.</p> <p>Cable connectors in pole handholes shall be compression connectors with insulating covers.</p>		
1.4	Fuses		Fuse holders in pole handholes shall be in-line break-away type rated 600V complete with 10 amp KTK fuse.		
1.5	Grounding	CSA C22.2 No.41	Ground rods shall be solid steel, 19mm Dia., 3.0m long, copper clad for full length.		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
2.0 POLES					
2.1	Standard Roadway Lighting Poles	CSA A14-M1979	<p>Direct Buried, Class “B” spun concrete, tapered round with natural concrete smooth mold finish, complete with handhole cover plate, nameplate and ground lug.</p> <p>Arterial Roads – 12.2m (40Ft.) Collector Roads – 10.7m (35 ft.) or 12.2m Local Roads – 7.5m (25ft.) or 10.7m</p> <p>Base mounted galvanized octagonal steel poles as per OPSD-2415.010.</p> <p>Arterial Roads – 10.5m Collector Roads – 9.0m/10.5m Local Roads – 7.5m/9.0m</p>	StressCrete Sky Cast U.S.I.	
2.2	Poles for Walkways/Bikeways		<p>Base mounted contemporary pole with high tensible carbon steel shaft round (76mm) welded to top and bottom of anchor plate.</p> <p>Pole to be black semi-gloss powder coat finish complete with base cover assembled with</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>stainless steel hardware.</p> <p>Photobutton light control recessed near top of pole.</p>		
2.3	Poles for Commercial Sites		<p>Poles shall be metal type square or round to suit the luminaire style and shall be base mounted. Poles shall have durable powder coat finish, colour to match the luminaire.</p> <p>Poles in parking areas shall be restricted to 30 ft. (9.1m) in height. Poles may be reduced in height down to 12 ft. (3.65m) level for pedestrian pathway applications.</p> <p>Wherever feasible, poles shall be located off the edge of pavement, behind barrier curbs (islands).</p> <p>Concrete bases in parking areas shall be protected by bollards or shall be raised to minimum 900mm above grade and be 760mm diameter.</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
3.0 BRACKETS					
3.1	Standard Roadway Lighting Brackets		<p>Tapered elliptical aluminium brackets as per OPSD 2420.01. The length of the bracket depends on offset from pavement and pole height.</p> <p>Arterial Roads – 2.4m (10Ft.) preferred, 3.0m maximum Collector Roads – 1.8m (8 ft.) preferred Local Roads – 1.2m (6 ft.) preferred.</p>		
3.2	Walkways/Bikeways Brackets		Single or double brackets with bend aluminum tubing with decorative aluminum rod, welded assembly and cast aluminum adaptor.		
4.0 LUMINAIRES					
4.1	<p>Standard Roadway Luminaires: High Pressure Sodium</p> <p>NOTE – HPS fixtures were allowed in the past. Currently all luminaires are to be LED type. This section is kept for general information only. Designer to consult the Town at the project start-up to confirm all design parameters.</p>				

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
4.1.1	Arterial/Industrial Roads		<p>“Cobra Head” style, type II or III distribution pattern, medium cut-off, internally shielded with flat tempered glass lens and photocontrol receptacle.</p> <p>Lamp wattage to be long life 200W to 400W high pressure sodium.</p> <p>Luminaire housing to be die-cast aluminum with latch and standard grey polyester powder coat finish. Permanent type marking to be applied on underside of the luminaire housing for lamp wattage identification, (Yellow for HPS).</p> <p>Ballast to be C.W.I., 120 volt, 60Hz.</p>	<p>Cooper Lighting (OVF)</p> <p>AEL (series 315)</p> <p>GE (M-400A)</p>	
4.1.2	Local and Collector Roads		<p>“Cobra Head” style, type II or III distribution pattern, medium cut-off, internally shielded with flat tempered glass lens and photocontrol receptacle .</p> <p>Lamp wattage to be long life 70W</p>	<p>Cooper Lighting (OVH)</p> <p>AEL (Series 315)</p> <p>GE (M-250R2)</p>	

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			<p>to 150W high pressure sodium.</p> <p>Luminaire housing to be die-cast aluminum, with latch and standard grey polyester powder coat finish. Permanent type marking to be applied on underside of the luminaire housing for lamp wattage identification, (Yellow for HPS).</p> <p>Ballast to be C.W.I., 120 volt, 60Hz.</p>		
4.1.3	Photocontroller		<p>Model TRS-1</p> <p>Photocontroller to have minimum surge protection of 40,000 amps and a minimum load rating of 1,000W/1,800 VA.</p> <p>Must have operating strength of 5,000 volts, and the photocell must be silicon sensor in glass and metal hermetic enclosure.</p> <p>Photocells shall be rated for a</p>	FP Outdoor Lighting Controls/Sunrise Technologies	

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			minimum of 100,000 operational hours		
4.2	Standard Roadway Luminaires: LED – Cobra Head		<p>Luminaire – Cobra Head style, type 2 or 3 distribution pattern, rugged die cast aluminum housing with surge and brown-out protection, LED drivers and electronic transfer switch. Temperature control by robust heat sink ensuring a minimum of 80,000 hours L70 at 40C operating ambient.</p> <p>Operating range from – 40 to + 50C with light engines meeting the dust and moisture rating of IP-66. Luminaire design to meet CSA-C22.2 number 250 for 40C, wet location and to be ROHS compliant. Maximum total harmonic distortion to conform to ANSI C82.77: 2002.</p> <p>Solid state 120 volt 60 Hz electronic drivers with extended</p>	<p>CREE</p> <p>Cooper Lighting</p> <p>GE Lighting</p> <p>Leotek Green Cobra LED Family</p> <p>Lumec, Road Focus Family</p>	<p>XSP Series LED Street Luminaire</p> <p>XNV1/XNV2 LED Navion LED Verdeen LED</p> <p>GE Evolve LED</p> <p>GCL, GCM, GCL, GC2</p>

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>life to 100,000 hours minimum.</p> <p>LED colour temperature 4000 K nominal.</p> <p>All luminaires to be provided with a Dimming Module</p> <p>5 year limited warranty on LED light engine, LED drivers and all non-electrical components.</p>		
4.3	Standard Roadway Luminaires: LED - Decorative		<p>Luminaire – Decorative lantern style, available in numerous distribution patterns to meet project specific requirements, rugged die cast aluminum housing with surge and brown-out protection, LED drivers.</p> <p>Operating range from – 40 to + 40C, LED luminaire to meet IP65 rating. Luminaire design to meet CSA-C22.2 number 250 for 40C, wet location and to be ROHS compliant. Maximum total harmonic distortion to conform to ANSI C82.77: 2002.</p>	Cooper Lighting Sternberg Lighting	UTLD Post Top Decorative LED Springdale Arm Mount Decorative LED S640- XRLED Seville Series Decorative LED

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			<p>Solid state 120 volt 60 Hz electronic drivers with extended life to 100,000 hours minimum. Temperature control by robust heat sink ensuring a minimum of 100,000 hours L70 at 40C operating ambient</p> <p>LED colour temperature 4000 K nominal.</p> <p>All luminaires to be provided with a Dimming Module Minimum 7 year limited warranty (10 year preferred) on LED light engine, LED drivers and all non-electrical components.</p>	<p>King LED</p> <p>Cyclone Lighting</p> <p>Lumec, LU40 Family</p>	<p>King Luminaire K601 Decorative LED</p> <p>Hudson Post Top HUD4T4-NL Sidemount HUDS4A-NL</p>
4.4	Park Walkway/Bikeway Luminaires:		50W pulse start metal halide.		
4.5	Commercial Site Luminaires: Metal halide		<p>In general shall be of the "Architectural Site Lighting" style, contributing a cohesive look to the overall site lighting system.</p> <p>The architectural outdoor luminaries may be shoe-box or round type with good optics and</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>full cut-off with optional house side shielding.</p> <p>Luminaires at lower mounting heights shall have a vandal proof lens. The luminaires shall be post top arm mounted suitable for 1A to 4C configurations and also be suitable for optional wall mount applications.</p> <p>Luminaire housings shall be die-cast type with durable powder coat finish colour to match site architectural features.</p> <p>Lamp wattage for parking lot and site roadway lighting shall be in the 150 to 400 watt range, subject to application. Lamp wattage for pedestrian scale pathway and building zone lighting may be reduced to 70 watt metal halide.</p>		
5.0 POWER SUPPLY DISCONNECT					
5.1	Pole Mounted Disconnects		Pole mounted power supply disconnects shall be outdoor weatherproof type 240/120 V rated	Square 'D' (CQO)	

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			100 amps with 60 amp 2 pole main breaker suitable for service entrance.		
5.2	Pedestal Mounted Disconnects		<p>Pedestal mounted power supply disconnect shall be outdoor heavy gauge galvanized steel with lockable removable front cover complete with precast concrete base.</p> <p>Colour to be equipment green with powder coat finish.</p> <p>Interior power supply disconnect shall be 240/120 V rated 100 amps with 60 amp 2 pole main breaker suitable for service entrance. Branch breakers to be 30 amps 1 pole 120V.</p>	Pedestal Solutions Inc.	

APPENDIX B: LISTS OF APPROVED MATERIALS

B2 – Traffic Signals

APPENDIX B2

TRAFFIC SIGNALS MATERIAL LIST

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
1.0 TRAFFIC SIGNAL CONTROLLER					
1.1	Street Intersections	NEMA Standards Publication No. TS2-2016, TS2-Type 2 design specifications and all revisions	<p>8 phase, solid state, LCD display, microprocessor traffic based controller timer</p> <p>Programmable to start up in Phase 2 and 6 “Amber” and phase 4 and 8 “Red” intervals</p> <p>Capable of providing vehicle extensions of the actuated phases and capable of holding 4 different timing plans</p> <p>A “NEMA Plus” solid state 12 channel conflict monitor complete with LCD display and fault memory with RS-232 port and cable, EDI Model No. SSM-12LE.</p> <p>Include fully wired 12 position back panel set up to operate on the approximate number of vehicle and pedestrian phases</p> <p>Include wired 8 position detector rack</p>	<p>McCain</p> <p>Wavetronix</p>	ATC eX2 TS2 Type 2

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MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>Cabinet power supply to provide regulated DC power, unregulated AC power and a line frequency reference for the detector racks, load switches and auxiliary equipment.</p> <p>All time clocks to have a minimum of 12 hour power reserve complete with LCD display and fault memory, with RS-232 port and cable, EDI Model No. SSM-12LE.</p> <p>Twelve (12) solid state load switches with PDC for vehicle and pedestrian indications only, EDI Model No. 200 or approved equivalent. Indication lights showing the condition of "Green (Walk)", "Yellow" or "Red (Don't Walk)" drive turned "ON" at the load switch shall be provided integral with the load switch.</p> <p>Provisions for future dial-in communication access (Bell Canada) and a 1200 baud FSK modem.</p> <p>Two (2) rack-mount pedestrian, 2-channel, DC Isolator cards, EDI Model 242, or approved equivalent.</p> <p>Four (4) Loop detector units (2 channel), EDI LM 222 series, or</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>approved equivalent.</p> <p>Two (2) spare rack-mount slots wired for future emergency pre-emption cards.</p> <p>Police panel complete with a manual/auto switch, flash switch, and signal on/off switch.</p> <p>Thermostatically controlled 250W strip heater and fan which can be manually controlled.</p> <p>Four (4) Transfer Relays.</p> <p>NEMA solid state, 15A, 2-pole flasher, EDI Model #204 or approved equivalent.</p> <p>Radio interference filter.</p> <p>Two (2) internal circuit breakers for power feed:</p> <ul style="list-style-type: none"> • One 40 Amp for traffic signal system; and • One 15 Amp for cabinet accessories. <p>Duplex ground fault type convenience outlet.</p> <p>Lamp receptacle, complete with hand held lamp, bulb and switch.</p> <p>Switches inside the cabinet to simulate vehicle and pedestrian</p>		

APPENDIX B2: LISTS OF APPROVED MATERIALS

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>detector inputs directly to the controller.</p> <p>Switches for stop timing and flash toggle shall also be provided.</p> <p>Power surge protective device for filtering lightning and high voltage surges to ground, EDCO Model No. SHA-1210 or approved equivalent.</p> <p>Aluminium air vent cover, complete with dust filter.</p> <p>Two (2) Conflict Monitor check sheets verifying shop testing.</p> <p>Two (2) sets of equipment drawings, one (1) original bounded Manufacturer's operation manual with blank timing sheets, water-proof document bag, and two keys for the cabinet.</p> <p>The controller timer and cabinet shall be supplied completely wired and programmed to facilitate the mode of operation. Wiring drawings and connection instructions shall be included with the unit.</p> <p>Neoprene gasket installed between the base of a pad mounted cabinet and the concrete foundation.</p>		

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MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>All external input wiring within the cabinet shall be Mylar tagged, labelled, grouped, and neatly tied in an organized fashion. There is not to be any loose or excessive wiring.</p> <p>Where the controller is for a pedestrian activated crosswalk the controller will be Trafficware Model 980 TS-2 Type 2 Traffic Controller and shall have vehicle pre-emption and time based co-ordination capability with an EDI NEMA 6 Channel CMU with Canadian Fast Flash capability. It shall include a minimum 4 position detector rack with 2-2 channel rack detectors. There shall also be a single card rack to support the addition of an Optical Pre-emption card. The controller cabinet shall be type "G" if pole mounted and type "M" if base mounted. The assembly shall include a 8 position back panel, 8 NEMA Load Switches, 1-NEMA Flasher, Internal lighting, GFI convenience outlet, internal test switches including auto/flash, stop time and interval advance. There</p>		

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			shall be a police door on the front door of the cabinet and shall include auto/flash, manual/auto, and a police cord for manual control.		
2.0 CONTROLLER CABINET					
2.1	Pad Mounted		Aluminum door in door Type M-1 pad mount cabinet with base extension		
2.2	Pole Mounted		Type G		
3.0 CONCRETE POLE BASES					
3.1	For poles greater than 3.7 m		760 mm Dia. OPSD 2200.01 and with anchorage assemblies as per OPSD 2215.02 and 2215.03		
3.2	For poles 3.7 m and less		450 mm Dia as per OPSD 2200.04 An X is to be marked atop the concrete to show location of conduit entry A 20 mm sleeve to be provided in the concrete pole base for installation of ground wire		
4.0 TRAFFIC SIGNAL POLES					
4.1	Octagonal Steel Poles		Where a separate controller cabinet pole is required, the pole shall be 3.6		

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MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>metre (Powco Steel #8312) hot dipped galvanized heavy duty octagonal, base mount pole, complete with handhole cover and top cap.</p> <p>Poles shall be 6.1 metre (Powco Steel #8620) hot dipped galvanized heavy duty octagonal, base mount poles, complete with handhole covers and top cap. The pole is to be situated such that the final mast arm position is perpendicular to the roadway and such that the hand hole is on the opposite side of the roadway.</p> <p>Combination Traffic Signal / Luminaire Pole</p> <p>Poles shall be 9.1 metre (Powco Steel #8535) hot dipped galvanized heavy duty octagonal, base mount pole, complete with handhole covers and top cap. The pole is to be situated such that the final mast arm position is perpendicular to the roadway and such that the handhole is on the opposite side of the roadway.</p> <p>On higher speed roads the use of yielding poles may need to be considered.</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
5.0 ELECTRICAL CHAMBERS					
			<p>Electrical chamber for the electrical systems shall be round precast concrete handwells, complete with cast iron frame and grate. The inside diameter of handwell shall be:</p> <ul style="list-style-type: none"> • 460mm ID for three (3) conduit inserts or less (OPSD 2112.02), and • • 675mm ID for four (4) conduit inserts (OPSD 2112.03). <p>Electrical chamber for vehicle loop detection connections only shall be 300mm ID round precast concrete complete with cast iron frame and grate (OPSD 2112.01).</p> <p>Each electrical chamber shall be separately grounded to a ground rod positioned 600mm from the outside of the structure. The ground wire shall be a #6 bare stranded and affixed to the frame using 70amp SLU solderless connector. System ground ties within the electrical chamber shall be made with split bolts or thermal weld "T" taps.</p>		

MATERIAL	STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
6.0 TRAFFIC SIGNAL ARMS				
		<p>Traffic single member arms shall be tapered spun aluminium, complete with mounting hardware and mounted so that traffic signal head clearances above the roadway are 5.2 metres. Approved manufacturers of traffic single member arms are:</p> <ul style="list-style-type: none"> • Sentinel Pole and Traffic Equipment Limited - TR Series; • Powerlite - SMA Series, <p>Or approved equal.</p>		
7.0 TRAFFIC SIGNAL HEADS				
		<p>Shall have polycarbonate "Special Highway" type signal heads with yellow door and housing, backboards, cowl visors, bird stops, plumbizer hanger system and steel reinforcing plates placed between the "Red" and "Amber" sections at locations indications on the Contract Drawings. Traffic signal heads shall have 300mm diameter "Red", "Amber" and "Green" sections with LED lamp indications.</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>The traffic signal heads shall be installed on plumbizer signal hanger.</p> <p><u>SPECIAL TRAFFIC HEADS</u></p> <p>Shall have polycarbonate “Type 9”, “Type 9A”, “Type 10”, “Type 10A”, “Type 11” and “Type 11A” traffic signal heads with yellow door and housing, backboards, cowl visors, bird stops, plumbizer hanger system and steel reinforcing plates placed between the “Amber” and “Green” sections at locations indications on the Contract Drawings. The traffic signal head sections shall be fitted with LED lamp indications, unless otherwise noted on drawings.</p> <p>The traffic signal heads shall be installed on plumbizer signal hanger</p> <p><u>LIGHT EMITTING DIODE (LED) LAMP UNITS</u></p> <p>shall have LED lamp indications for the traffic and pedestrian signal heads. The LED lamp units shall be meet the requirements of the:</p> <ul style="list-style-type: none"> • ITE Specification for ITE Publication No. ST-017B-2001 - Equipment and Material Standards of the 		

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			<p>Institute of Transportation Engineers, and</p> <ul style="list-style-type: none"> • ITE Specification for ITE Publication – Traffic Control Signal Heads – Part 2: LED Pedestrian Traffic Signal Modules (March 2004). • ITE Specification for ITE Publication – Traffic Control Signal Heads – Part 3: LED Vehicle Arrow Traffic Signal Modules (March 2004). • ITE Specification for ITE Publication – Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement (June 2005). <p>The following manufacturers of LED lamp units are approved for installation:</p> <ul style="list-style-type: none"> • Daylight – Distributed by Innovated Traffic Solutions Inc. • Leotek Electronic Corporation – Distributed by Electromega Ltd. • GELcore – Distributed by Tacel Limited. 		

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8.0 PEDESTRIAN HEADS AND MOUNTING BRACKETS				
		Shall have single section pedestrian heads complete with mounting hardware and LED lamp unit, installed in accordance with OPSD 2505.01 and OPSD 2524.01, providing a clearance from the bottom of signal to ground level of 2.75 metres.		
9.0 PEDESTRIAN PUSH BUTTONS AND SIGNS				
		<p>Push buttons shall be "Pelco" rectangular, yellow, freeze-proof, pedestrian push button assembly for pole mounting complete with stainless steel vandal proof screws, with diaphragm, at a mounting height of 1.1m. Anti-seize compound is to be applied to the face plate and mounting screws. It shall include Ra-12 (13 x 20cm) signs at all push buttons with an arrow indicating the direction of pedestrian crossing.</p> <p>EXTRA LOW VOLTAGE (ELV) CABLES FOR PEDESTRIAN PUSHBUTTONS</p> <p>Supply be four (4) conductor #18 AWG extra low voltage cable, in shielded core from the pedestrian</p>		

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			<p>pushbuttons to the controller cabinet, including 3.0 metres of spare cable in each electrical chamber.</p> <p>The cable shall meet the requirements of OPSS Specification No. 2420 and shall be installed in accordance with OPSD 2528.01 and OPSD 2529.01. The cable shall be "3M Company", Catalogue No. Canoga CC 30003 or approved equal.</p> <p>All groups of ELV pedestrian pushbutton cables in the controller cabinet, are to be tagged and labelled indicating phase number and leg of intersection.</p>		
10.0 LOW VOLTAGE LUMINAIRE CABLE					
			<p>The luminaire wire shall be #12 TWU single conductor, stranded copper, low voltage cable, rated 600 volts. Low voltage wire shall meet the requirements of OPSS 604, or type RWU 90 - cross link meeting the requirements of CSA Standard C22.2, No. 38. The luminaire runner cable shall be #8 TWU-90.</p> <p>The luminaire wire shall be sized so as to satisfy voltage drop</p>		

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			<p>requirements of the electrical equipment and shall not exceed 5%.</p> <p>All wire apertures drilled in steel or aluminium poles / mast arms shall be deburred and painted with grey zinc rich paint. Rubber grommets will be installed after the paint is dry.</p> <p>All joints in the luminaire wire shall be made above ground in the pole handholes or junction boxes unless otherwise specified. All equipment is to be adequately grounded, using a brass ground fitting attached to the pole ground lug.</p> <p>The riser wires inside the poles and in the mast arms shall be included in this item and shall be connected to the external wiring circuit in the underground conduit by means of one single pole waterproof fuse holder "Bussman -Tron", Catalogue No. "HEB-AA" with rubber boots, or approved equal, with one 10 amp midget ferrule fuse, "Buss" type "KTK" or approved equal. A fuse holder shall be installed inside the pole handhole and shall be secured to the connector clip supplied in the pole.</p>		

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			The luminaire wire shall be brought back and connected to the circuit breaker supplied and installed at the service pole.		
11.0 GROUND WIRE					
			<p>All ground wire splices inside electrical chambers and in poles shall be connected using a split bolt. Ground wire connections to ground rods shall be made with Thermit Weld connections.</p> <p>System Ground - shall be continuous #6 AWG TWH green, stranded copper ground wire through the entire main conduit system. The system ground wire is to be connected to all steel poles and maintenance hole / handwell frames (using 70amp SLU solderless connectors), junction boxes on wood poles, and the ground rods for each maintenance hole / handwell.</p> <p>Pole Grounding - shall be continuous #6 AWG TWH green, stranded copper ground wire from the ground lug in the steel pole (using 70amp SLU solderless connectors) to the ground rod</p>		

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			<p>located adjacent to the pole.</p> <p>Power Service Ground - A continuous #6 AWG bare, stranded copper ground wire will be installed from the service enclosure to the four (4) ground rods located 1000mm from pole, the second rod 3 metres from the first.</p> <p>A continuous #12 AWG TWH green, stranded copper ground wire shall be installed from the proposed luminaire fixture to the ground lug in the luminaire poles.</p> <p><u>GROUND RODS</u></p> <p>shall be 20mm x 3.0m copper clad ground rods where necessary to provide adequate system grounding. The ground rods driven into the ground shall be buried so that the top of the ground rods are 300mm below the finished grade.</p> <p>Grounds rods shall be driven on the exterior of electrical chambers.</p>		
12.0 UNDERGROUND CONDUIT					
			Shall be Rigid PVC conduit or High Density Polyethylene Pipe (HDPE) ducts runs. Sections of conduit are		

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			<p>to be joined together using solvent weld cement recommended by the conduit supplier. Depth shall be as per OPSD 2103.02 and installed below any existing subdrains.</p> <p>Open Cut Installation</p> <p>Rigid conduit systems installed by open cut, direct buried and subsurface installation shall be rigid polyvinyl chloride (PVC), unplasticized conduit conforming to CSA Standard C22.2 No. 211.0-03 and CSA Standard C22.2 No. 211.2-M1984 (R2003), except where otherwise indicated.</p> <p>Directional Boring</p> <p>Polyethylene duct installed by directional boring method shall be High Density Polyethylene Pipe (HDPE) in accordance with:</p> <ul style="list-style-type: none"> • United Laboratories, UL 651B – Standard Specification for Continuous Length HDPE Conduit • American Society for Testing and Materials International, ASTM F2160 – Standard Specification for Solid Wall High Density Polyethylene Conduit Based on Controlled 		

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			<p>Outside Diameter; and</p> <ul style="list-style-type: none"> National Electrical Manufacturers Association, NEMA TC 7-2005 – Smooth-Wall Coilable Electrical Polyethylene Conduit <p>All road crossing trenches are to be backfilled with unshrinkable material as per OPSS 603.07 and OPSD 2103.03.</p> <p>The conduit layout shall be as follows install 2-100mm (4 inch) conduits between electrical chambers in road crossings, a 75 mm (3 inch) Rigid PVC conduit for traffic signal cabling and a 50mm (2 inch) Rigid PVC conduit for lighting cabling, when necessary from electrical chambers to traffic poles, 2-100 mm Rigid PVC conduits between the controller cabinet and closest electrical chambers. A 25mm Rigid PVC conduit shall be used for loop lead-in wires between the edge of pavement and nearest electrical chamber.</p>		
13.0 LOOP DETECTORS					
			Loops shall be sized and installed as		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>shown on the Contract Drawings and as per OPSD 2520.01 and OPSD 2520.02.</p> <p>Loop wire size shall be #14 AWG stranded RWU90 type.</p> <p>Loop home-run cable from electrical chamber to the controller cabinet shall be 2 conductor, #14 AWG extra low voltage cable with shielded twisted pair conductors, a high density polyethylene insulation and ground wire. Approved cables are Belden #8719 or Detector Systems, #DSI 1602, or approved equal.</p> <p>All loop splices are to be soldered and sealed with waterproof "3M Scotchcast", "Raycam", "KLICKIT II" kit, or approved equivalent.</p> <p>All single loops are to be wound 4 times. Quadrupole loops are to be wound 2-4-2.</p> <p>Saw slots should be 50mm to 75mm deep.</p> <p>Loops connected in the series are to be wound alternately in opposite rotation.</p> <p>Pieces of 150mm plastic foam backer rod are to be tightly packed within the sawcut slot every 2 metres</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>of the loop and lead-in sawcuts.</p> <p>Loop wire leads are to have a minimum of 5 twists per foot after leaving the loop saw slot.</p> <p>Loop sawcuts shall be fully sealed with hot applied tar or approved equivalent, and protected from traffic until completely dried.</p> <p>A loop inductance and leakage test is to be performed on the finished loop installation at the splice prior to being sealed. Loop inductance measurement shall be between 20 and 2,500 microhenries. Leakage resistance shall be equal to or greater than 100 megohms.</p>		
14.0 SIGNAL CABLE					
			<p>Shall be fourteen (14) gauge colour coded, traffic signal runner and riser cables to accommodate all equipment and installation operations specified in the Contract, including 3.0 metres of spare wire within each electrical chamber.</p> <p>The traffic signal cable shall meet the requirements of OPSS 2409.</p> <p>Traffic signal cable shall be installed</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>in the underground conduit system in accordance with the Standard Drawings OPSD 2528.01 and OPSD 2529.03 (Note B omitted), except that the conductor cable be changed to:</p> <ul style="list-style-type: none"> • All riser cables for traffic signal heads shall be seven (7) conductor, #14 AWG. • All riser cables for pedestrian heads shall be five (5) conductor, #14 AWG. • All runner cables for traffic signal heads and pedestrian heads shall be twelve (12) conductor #14 AWG, and installed in accordance with OPSD 2529.03 except that Note B be omitted. Suggest OPSD 2925.11 <p>The traffic signal heads on all legs of the intersection shall be wired separately to allow the addition of advance green or split phases without additional wiring being required.</p> <p>The traffic signal cable for each pedestrian phase will be brought back to the controller separately to accommodate separate "Walk" and</p>		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p>"Don't Walk" movements for each phase.</p> <p>Label all groups of traffic signal conductors in the controller cabinet indicating phase number, direction, and movement.</p> <p>All wire apertures drilled in steel or aluminum poles/ mast arms shall be deburred and painted with grey zinc rich paint. Rubber grommets will be installed after the paint is dry.</p>		
15.0 EQUIPMENT FOR POWER SUPPLY					
			<p>The power supply disconnect facility shall be installed to service the traffic signal control device and the related intersection lighting mounted on the traffic signal poles.</p> <p>Shall be a Square-D Model #CQ018M100RB load centre complete with circuit breakers at the supply location. The load centre shall include a 120/240V, 100A, 1Ø, 3 Wire assembly with:</p> <ul style="list-style-type: none"> 1 - Main Circuit Breaker - 2 pole - 240V - 100A common trip circuit breaker, Square D, Catalogue # QO-2100 or approved equal. 		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<ul style="list-style-type: none"> 4 - Lighting Circuit Breakers - 1 pole - 120/240 V - 30 A circuit breaker, Square D, Catalogue # QO-130 or approved equal. 1 - Traffic Signal Circuit Breaker - 1 pole - 120/240 V - 60 A circuit breaker, Square D, Catalogue # QO-160 or approved equal. Secondary Surge Suppressor, 650V Vac 2-pole secondary lightning arrester, Square D, Catalogue # QO2775SB or approved equal. <p>Or approved equivalent.</p> <ul style="list-style-type: none"> There shall be sufficient length of 3-1/C #2 AWG (Black & White) copper stranded RWU (-40°C) wire coiled at the weather head for the connection to the secondary supply / transformer on the service pole. 		
16.0 EMERGENCY PRE-EMPTION DETECTOR SYSTEM					

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			Shall be two “3M Optical Pre-emption detector Model 721”, Two Channel, 2 Directions with “Discriminator Model 452” Actuator card including harness, wiring, hardware, and testing and install sufficient optical pre-emption detector cable manufactured by “3M Company (Model #138)” and connect each optical detector to the controller cabinet.		
17.0 LUMINAIRES					
			<p>Luminaires shall be I.E.S. Type III-MSCO photometric curve, 250 Watt H.P.S. fixture housing, 250 Watt CWI ballast, for 120 Volt operation, complete with integral ballast, 250 Watt H.P.S. lamp, photo control receptacle, ground lug and photocell. The following luminaires are approved for installation:</p> <ul style="list-style-type: none"> American Electric - Catalogue # 125 25 S CT DT1 R3 DG, or General Electric – Catalogue # M-400 25 S 1 P 1 2 R MS3 U 		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
			<p><u>LUMINAIRE ELLIPTICAL BRACKETS</u></p> <p>Luminaire elliptical brackets shall be aluminum tapered elliptical mast arms, complete with mounting brackets and conform to OPSS 2420. Elliptical brackets shall be mounted in accordance with OPSD 2250.01. The following aluminum tapered elliptical brackets are approved for installation:</p> <ul style="list-style-type: none"> • 3.0 m Tapered Elliptical Bracket - Powerlite RE-10MA - 3mm Wall, 60mm x 100mm OD, <p>Or approved equal.</p>		

APPENDIX B: LISTS OF APPROVED MATERIALS

B3 – Storm Sewer System

APPENDIX B3

STORM SEWER SYSTEM MATERIAL LIST

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
1.0 SEWER MAIN & CATCHBASIN LEADS				
PVC (300mm to 450mm)	CSA B182.2	<ul style="list-style-type: none"> - DR 35 - Rubber gasket in integral bell and spigot joints - Green in colour 	IPEX Westlake Pipe & Fittings Diamond Plastics	As per individual manufacturer
Concrete	CSA A257.2	<ul style="list-style-type: none"> - Rubber gasket type joints certified to CSA A257.3 	OCPA Plant Prequalification Member	
PVC Profile Pipe	CSA B182.4	<ul style="list-style-type: none"> - PVC Profile Pipe 	IPEX	Ultra-Rib
Polypropylene Pipe	CSA B182.13	<ul style="list-style-type: none"> - Polypropylene Pipe 	ADS	Sanitite HP Pipe
2.0 CONNECTION TEES & FITTINGS				
PVC Sewer Main	CSA B182.2	<ul style="list-style-type: none"> - DR 28 - Injection molded (100 mm dia. to 300 mm dia.) or factory-fabricated gasketed tee (375 mm dia. and larger) 	IPEX Westlake Pipe & Fittings Galaxy Plastics Ltd.	As per individual manufacturer
Concrete Sewer Main	CSA A257.2,3	<ul style="list-style-type: none"> - Factory-fabricated tee 	OCPA Plant Prequalification Member	
PVC Profile Pipe	CSA B182.4	<ul style="list-style-type: none"> - PVC Profile Fittings 	Westlake Pipe & Fittings IPEX	As per individual manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
			Galaxy Plastics Ltd.	
Polypropylene Pipe	ASTM F2764	- Polypropylene Pipe Fittings	ADS Galaxy Plastics Ltd.	INSERTA TEE EZ Tee
3.0 SERVICE LATERALS & FITTINGS				
PVC Pipe	CSA B182.2	- DR 28 - Rubber gasket in integral bell and spigot joints - White or grey in colour	IPEX Westlake Pipe & Fittings Diamond Plastics Next Polymers	As per individual manufacturer
PVC Fittings	CSA B182.2	- Lateral PVC Fittings	Westlake Pipe & Fittings IPEX Galaxy Plastics Ltd.	As per individual manufacturer
4.0 TEST FITTINGS				
PVC	CSA B182.2	- Bootjack Fitting for double connections - Straight test fitting at property line	IPEX	As per individual manufacturer
Cast Iron	CSA B70	- Bootjack Fitting for double connections - Straight test fitting at property line	Crowle	As per individual manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		-		
5.0 SUB-DRAINS				
HDPE	OPSS 1840 BNQ 3624-115	- Perforated, with geo-textile sock filter		
6.0 MAINTENANCE HOLES				
Concrete	CSA A257.4	- Rubber gasket type joints certified to CSA A257.3	OCPA Plan Pre- Qualification Member	
7.0 FRAMES & GRATES – MAINTENANCE HOLES				
Cast Iron Ductile Iron	OPSS 1850	- Storm grate as per OPSD 401.010 (closed cover) with date and “STORM” cast into the cover - Adjustable/Autostable Frame -	EJ Canada Cedar Infrastructure Products	As per individual manufacturer
8.0 CATCHBASINS				
Concrete	CSA A257.4	- Use pre-cast concrete grade adjustment units with Moduloc tape between layers	OCPA Plant Pre- Qualification Member	

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
	OPSS 1850	<ul style="list-style-type: none"> - Frame & grate as per OPSD-OPSD 400.100 - Rear yard catchbasin frame & grate as per OPSD-400.120 		
9.0 CULVERTS				
Concrete	CSA A257.2		OCPA Plant Prequalification Member	
CSP	CSA G401	<ul style="list-style-type: none"> - Galvanized - Wall thickness as recommended by manufacturer for H20 loading. - Minimum wall thickness 2.0 mm for road crossing, 1.6 mm for entrance. 		
HDPE (up to 600 mm)	CSA B182.6-02	<ul style="list-style-type: none"> - 320 kPa pipe stiffness - Smooth Interior Wall 	Armtec ADS Solen	As per manufacturer
10.0 HEADWALL AND ENDWALL TREATMENTS (Only if Approved by the Town)				
Concrete			OCPA Plant Prequalification Member	As per individual manufacturer
11.0 ADJUSTMENT UNITS				
Concrete	CSA A257.4	<ul style="list-style-type: none"> - Pre-cast concrete grade adjustment units with Moduloc tape between layers 	OCPA Plant Pre-qualification Member	As per individual manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Ductile HDPE		<ul style="list-style-type: none"> - Riser rings (only to be used when approved by the Town) - IPEX Lifesaver adjustment units 	Sigma IPEX	MH-640102 DI (38 mm) MH-640102 DI (51 mm) Lifesaver

APPENDIX B: LISTS OF APPROVED MATERIALS

B4 – Wastewater System

APPENDIX B4

WASTEWATER SYSTEM MATERIAL LIST

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
1.0 SEWER MAIN				
PVC (200mm to 525mm)	CSA B182.2	<ul style="list-style-type: none"> - DR35 - Colour: green - Rubber gasket in integral bell and spigot joints - "Kor-n-seal" gaskets on all pipes entering maintenance holes 	IPEX NAPCO Next Polymers Diamond Plastics	As per individual manufacturer
Reinforced Concrete Pipe (600mm and above)	CSA A257.2	<ul style="list-style-type: none"> - Minimum Class 65-D - Rubber gasket type joints certified to CSA A257.3 - Sulphate resistant cement 	CPCQA Certified Plant Member	As per individual manufacturer
2.0 CONNECTION TEES & FITTINGS				
PVC	CSA B182.2	<ul style="list-style-type: none"> - DR28 - Injection molded or factory-fabricated gasketed tees 	IPEX Westlake Pipe Galaxy Plastics Ltd.	As per individual manufacturer
Reinforced Concrete Pipe	CSA A257.2 CSA A257.3	<ul style="list-style-type: none"> - Factory fabricated tee for PVC lateral connection 	CPCQA Certified Plant Member	As per individual manufacturer
3.0 SERVICE LATERALS				

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
PVC	CSA B182.2	<ul style="list-style-type: none"> - DR28 - Colour: green - Rubber gasket in integral bell and spigot joints 	IPEX Westlake PipeNext Polymers Diamond Plastics	As per individual manufacturer
4.0 VERTICAL RISERS				
PVC	CSA B182.2	<ul style="list-style-type: none"> - For use with sewer main depths in excess of 4.5 m 	Westlake Pipe	As per manufacturer (varies by size)
5.0 TEST FITTINGS				
PVC	CSA B182.2	<ul style="list-style-type: none"> - Straight test fitting at property line 	IPEX	As per individual manufacturer
Cast Iron	CSA B70	<ul style="list-style-type: none"> - Straight test fitting at property line 	Crowle	As per individual manufacturer
6.0 SERVICE SADDLES				
PVC	CSA B182.2	<ul style="list-style-type: none"> - For use as a new service connection to an existing municipal sewer only - SDR35 Gasket Hub x Gasket Saddle Tee c/w Stainless Steel Clamps and Short Skirt 	Westlake PipeGalaxy Plastics Ltd. IPEX	As per manufacturer (varies by size)
7.0 MAINTENANCE HOLES				

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Concrete	CSA A257.4	<ul style="list-style-type: none">- Rubber gasket type joints certified to CSA A257.3- “Kor-n-seal” gaskets on all pipes entering maintenance holes- Factory cast inserts for internal non-penetrating frost straps- Precast factory-made benching up to obvert	CPCQA Certified Plant Member	As per individual manufacturer
8.0 FRAMES & GRATES				
Cast Iron	OPSS 1850	<ul style="list-style-type: none">- Grate as per OPSD 401.010 (closed cover) with date and “SANITARY” cast into the cover	Bibby-Ste-Croix Star Pipe Canada	As per individual manufacturer
Ductile Iron	OPSS 1850	<ul style="list-style-type: none">- Adjustable/Autostable Frame<ul style="list-style-type: none">- C-50M-ONT- C-50M-ONT (Watertight Option)	Bibby-Ste-Croix	
		<ul style="list-style-type: none">- SELFLEVEL – MC401010243	EJ Canada	
9.0 ADJUSTMENT UNITS				
Concrete	CSA A257.4	<ul style="list-style-type: none">- Pre-cast concrete grade adjustment units with Moduloc tape between layers	CPCQA Certified Plant Member	As per individual manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Ductile Iron		- Riser rings (only to be used when approved by the Town)	Sigma	MH-640102 DI (38 mm) MH-640102 DI (51 mm)
10.0 FORCEMAIN				
PVC	CSA B137.3 AWWA C900 or, AWWA C905	- SDR26 (minimum) - Colour; White	IPEX Westlake Pipe	As per individual manufacturer
11.0 WATERTIGHT FRAME & GRATE				
Watertight Frame & Grate	ASTM D2240, ASTM D412, ASTM D573, ASTM D395, ASTM D746		Hamilton-Kent	The Life Span System
12.0 WATERPROOF MEMBRANE				
Waterproof Membrane/ Petrolatum Tape	ASTM D412, ASTM E96, ASTM E154		Blueskin R.W. Meadows Denso Petrolatum Tape	WP200 Mel-Roll as per manufacturer
13.0 SERVICE ABANDONMENT SLEEVE				
Service Abandonment Sleeve		Stainless Steel	Link-Pipe	As per manufacturer
14.0 FORCEMAIN TRACER WIRE				
Forcemain Tracer Wire (Open cut)		#12 AWG (0.0808" diameter" high strength copper clad steel conductor (HS-CCS), insulated with a 30 mm high density polyethylene (HDPE) insulation,	Electrical Suppliers Galaxy Plastics/Bren Technologies Canada Wire Copperhead	As per manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		rated for direct burial use at 30 volts	Phillips Pirelli	
Forcemain Tracer Wire (Directional Drilling and Jack & Bore Installations)		<ul style="list-style-type: none"> - Extra High Strength - Colour coded green - Minimum 4 wires to be pulled 	Copperhead	845G-EHS 1045G-EHS 1245G-EHS
15.0 TRACER WIRE WATERPROOF CONNECTOR				
Tracer Wire Waterproof Connector	ASTM D1248, ASTM B910/B910M		Copperhead	Low-voltage Ace Connectors (SC-PB-01)
16.0 TRACER WIRE TEST STATION				
Tracer Wire Test Station		Colour Coded Green	Rhino	72" RhinoDome Test Station

APPENDIX B: LISTS OF APPROVED MATERIALS

B5 – Water Distribution System

APPENDIX B5

WATER DISTRIBUTION SYSTEM MATERIAL LIST

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
1.0 WATERMAIN				
PVC Pipe	AWWA C900 CSA B137.3	<ul style="list-style-type: none"> - DR18, Pressure Class 235 - Rubber gasket in integral bell and spigot joints - Colour coded "Blue" - 6 m pipe length - CI OD 	IPEX Westlake Pipe & Fittings Next Polymers Diamond Pipe National Pipe	As per individual manufacturer
Ductile Iron	AWWA C151/A21.51 AWWA C104/A21.4 AWWA C111	<ul style="list-style-type: none"> - Minimum Pressure Class 350 (100 mm to 300 mm diameter) - Cement Mortar Lined - Rubber gasket in integral bell and spigot joints - Polyethylene encasement - 6 m pipe length 	U.S. Pipe Canada Pipe Clow McWane	As per individual manufacturer
High Density Polyethylene (HDPE)	AWWA C906 CSA B137.1	<ul style="list-style-type: none"> - Minimum DR 11 - Thermal butt fusion joining of pipe - CI OD - Blue stripe 	Infra Pipe Solutions	As per individual manufacturer
Concrete	AWWA C301(L)	<ul style="list-style-type: none"> - Pre-stressed concrete lined cylinder pipe 	Decast Forterra	As per individual manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Concrete	AWWA C301(E)	- Pre-stressed concrete lined embedded cylinder pipe	Decast Forterra	As per individual manufacturer
2.0 WATER SERVICES				
Copper	ASTM B88 NSF/ANSI 61	- Type 'K' - Heavy wall - Soft copper - Horizontal gooseneck	Great Lakes Copper Inc.	As per manufacturer
Cross-linked Polyethylene (PEX)	ASTM F876 AWWA C904 CSA B137.5 NSF/ANSI 61 NSF/ANSI 14	- Cross-linked Polyethylene (PEX)	IPEX Rehau	Blue904 MUNICIPEX
3.0 WATERMAIN FITTINGS				
Ductile Iron Compact Ductile Iron	AWWA C110/A21.10 AWWA C153/A21.53 AWWA C104/A21.4 AWWA C111/A21.11	- Minimum Pressure Class 350 - Cement Mortar Lined - Mechanical joint	Sigma Star Bibby St. Croix Tyler Union	As per manufacturer
4.0 WATERMAIN VALVES				
Gate Valves	AWWA C509 AWWA C515 AWWA C111/A21.11	- Non-rising stem and 50 mm square operating nut - Open counter clockwise - Resilient seat gate	Mueller Clow AVK Bibby	A2360 F-6100 Series 25/00 As per manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		<ul style="list-style-type: none"> - Epoxy coating internal and external per AWWA C550 - Mechanical joints with restrainers - Bond breaker between concrete support and valve body - Stainless steel bolts 		
Pressure Reducing Valves	AWWA C530 NSF/ANSI 61	<ul style="list-style-type: none"> - Flanged - Epoxy coating internal and external as per AWWA C116/ A21.16 	Singer CLA-VAL	As per manufacturer As per manufacturer
Reduced Pressure Principle Back Flow Preventer	AWWA C511 CSA B64.4 NSF/ANSI 61		Watts	#909 Series
Air Release Valve	NSF/ANSI 61 AWWA C512		Apco CLA-VAL A.R.I.	As per manufacturer 34AR-332-3/4" As per manufacturer
5.0 FIRE HYDRANTS				
Fire Hydrant	AWWA C502	<ul style="list-style-type: none"> - 1.98 m barrel length - Post type dry barrel compression shutoff with ball valve closing with flow, opening counter clockwise 	Mueller Clow	Century (Canada Valve) M67B Brigadier

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		<ul style="list-style-type: none"> - M.J elbow - 2 side outlets with 2.5" CSA standard hose nozzle threads - 1 - 4" Storz pumper nozzle outlet - Breakaway flange - Self draining 		
Hydrant Painting		<ul style="list-style-type: none"> - Hydrant colour shall be Fire Engine Red - Top and side nozzle caps shall be painted based on hydrant flows (front storz nozzle to remain black). 	Tremclad - Benjamin Moore (paint)	

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Hydrant Marker		<ul style="list-style-type: none"> - 48" in height fluorescent yellow - Installed on side port 	Flexstake LHS Inc.	FH 800 Series Pretzel Marker
6.0 VALVE BOXES				
		- 150 mm cover	Bibby Sigma or approved equivalent	VB800 As per manufacturer
		- Guide Plate	Bibby Sigma or approved equivalent	VB875 VB4500
		- Extension 300 mm	Bibby Sigma or approved equivalent	VB700 VB4253, VB4512
		- Extension 450 mm	Bibby Sigma or approved equivalent	VB705 VB4401, VB4518
		- Extension 600 mm	Bibby Sigma or approved equivalent	VB710 VB4400, VB4524
		- Adjustable valve box upper section	Bibby Sigma or approved equivalent	VB404-7393 As per manufacturer
7.0 VALVE STEM EXTENSIONS				
		- Required for additional depth over m	Bibby or approved equivalent	VB950

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		- 52 mm top operating c/w set screw		
8.0 RESTRAINT DEVICES				
MJ Restraining Gland for Ductile Iron Water Main	ASTM A536 AWW C111/A21.11	- Colour code black for ductile iron use	Uni-Flange/Ford Stargrip EBAA Iron	Series 1400 Series 3000 Series 1100
MJ Restraining Gland for PVC Water Main	- ASTM standard F1674-96 - ANSI/AWWA C111/A21.11		Uni-Flange/Ford Stargrip EBAA Iron Sigma Smith-Blair	Series 1300 Series 4000 Series 2000 ONE-LOK SLC Cam-Lock 120
Pipe Joint Restraint for PVC Water Main		- The split ring restraint design shall incorporate a series of non-directional machined serrations (not 'as cast') on the inside diameter to provide positive restraint, exact fit, 360 degree contact and support of the pipe wall. -	Uni-Flange/Ford Stargrip EBAA Iron Sigma	Series 1390 Stargrip 1100C Series 1500 PV-LOK
Joint Restraint System In-	- AWWA standard C900 - CSA standard B137.3 - NSF 61	- Integral Joint Restraint System	IPEX Westlake Pipe & Fittings	Terrabrute Cetra-Lok

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
line for PVC Water Main		- PVC DR18 Pressure Class 235 pipe		
9.0 CORROSION PROTECTION				
Sacrificial Caps	ASTM B418 – Type 2	- 99.9% high grade Zinc - Steel core - Coated with low resistant depolarizing material: 175 grams	Galaxy Plastics/Bren Technologies	SAP Cap
Zinc Anodes	ASTM B418 – Type 2	- 99.9 high grade Zinc - Supplied with a 3m #10 coper wire with THW insulation	Galaxy Plastics/Bren Technologies Interprovincial Corrosion Control	As per manufacturer
Protective Coatings	AWWA C217	- Petrolatum Tape System consisting of paste, mastic and tape - Applied as per manufacturer specifications	Denso North America Interprovincial Corrosion Control Petro Coating Systems	As per manufacturer
10.0 METALLIC CAUTION TAPE				
		- Mylar marking tape c/w metallic backing - Metallic Backing Tape “Caution Water Main” Blue and Silver	Galaxy Plastics/Bren Technologies	As per manufacturer
11.0 TRACER WIRE				

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Tracer Wire (Open Cut)		#12 AWG (0.0808" diameter" high strength copper clad steel conductor (HS-CCS), insulated with a 30 mm high density polyethylene (HDPE) insulation, rated for direct burial use at 30 volts	Electrical Suppliers Galaxy Plastics/Bren Technologies Canada Wire Copperhead Phillips Pirelli	As per individual manufacturer
Tracer Wire (Directional Drilling and Jack & Bore Installations)		<ul style="list-style-type: none"> - Extra High Strength - Colour coded blue - Minimum 4 wires to be pulled 	Copperhead	845G-EHS 1045G-EHS 1245G-EHS
Tracer Wire Waterproof Connector	ASTM D1248 ASTM B910/B910M	Connector in-line splice Max. Voltage 30V Solid brass lug	Copperhead King Innovation	SC-PB-01 Low-voltage Ace Connectors
Tracer Wire Test Station		Colour Coded Blue	Rhino	72" RhinoDome Test Station
Hydrant Three Terminal Test Station		Blue in Colour	Copperhead	Cobra T3 Hydrant Flange Package
Grounding Anode Rod		ANO-12 Andoe, Magnesium	Copperhead	Ground Rod 12 - AWG
12.0 TIE RODS (19mm)				
		- Stainless Steel		As per manufacturer
13.0 SERVICE BOXES				

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		<ul style="list-style-type: none"> - Steel boot only - Lids to be threaded to the steel pipe upper section. Set screw only permitted for repairs 	Mueller Clow Bibby Sigma	As per manufacturer
14.0 SERVICE BOX RODS				
		<ul style="list-style-type: none"> - 36" stainless steel - Stainless steel cotter pins 	Mueller Clow Bibby	As per manufacturer
15.0 SERVICE SADDLES				
PVC Water Main (19 mm to 50 mm)	NSF/ANSI 61	<ul style="list-style-type: none"> - Cast bronze service saddle - Double strap 	Robar Cambridge Brass	2706 Series 812
Ductile Iron Water Main (19 mm to 50 mm)	NSF/ANSI 61			
Tapping Sleeve – PVC and Ductile Iron Water Main	NSF/ANSI 61	<ul style="list-style-type: none"> - Stainless Steel, Type 663 	Smith-BlairRobar	Type 663 6606
16.0 SPACERS				
Casing End		<ul style="list-style-type: none"> - Seal-virgin SBR and Bands - T-304 stainless steel 	Cascade PSI	As per manufacturer As per manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Casing Spacers		- Fusion coated steel casing insulators	Cascade PSI	As per manufacturer As per manufacturer
17.0 MAIN STOPS				
19mm	AWWA C800 NSF/ANSI 61	Set screw for accepting tracer wire when connecting to Cross-linked Polyethylene (PEX) piping.	Mueller Cambridge Brass Ford	H25008 301-A3H3 19mm-FB1000- 3-Q 17072 Compression
25mm	AWWA C800 NSF/ANSI 61	Set screw for accepting tracer wire when connecting to Cross-linked Polyethylene (PEX) piping.	McDonald Brass Mueller Cambridge Brass Ford	4701B-T H25008 301-A4H4 25mm-FB1000- 4-Q 17072 Compression
38mm	AWWA C800 NSF/ANSI 61	Set screw for accepting tracer wire when connecting to Cross-linked Polyethylene (PEX) piping.	McDonald Brass Mueller Cambridge Brass Ford	4701B-T H25008 301-A6H6 38mm-FB1000- 6-Q 17072 Compression
52mm	AWWA C800 NSF/ANSI 61	Set screw for accepting tracer wire when connecting to Cross-linked Polyethylene (PEX) piping.	McDonald Brass Mueller Cambridge Brass Ford	4701B-T H25008 301-A7H7

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
				52mm-FB1000-7-Q 17072 Compression
18.0 CURB STOPS				
19mm	AWWA C800 NSF/ANSI 61	<ul style="list-style-type: none"> - Non Self-draining - Set screw for accepting tracer wire on one nut (road side) when connecting to Cross-linked Polyethylene (PEX) piping. 	Mueller Cambridge Brass Ford	B-25209N 202-H3H3 B44-333
25mm	AWWA C800 NSF/ANSI 61	<ul style="list-style-type: none"> - Non Self-draining - Set screw for accepting tracer wire on one nut (road side) when connecting to Cross-linked Polyethylene (PEX) piping. 	Mueller Cambridge Brass Ford	B-25209N 202-H4H4 B44-444
38mm	AWWA C800 NSF/ANSI 61	<ul style="list-style-type: none"> - Non Self-draining - Set screw for accepting tracer wire on one nut (road side) when connecting to Cross-linked Polyethylene (PEX) piping. 	Mueller Cambridge Brass Ford	B-25209N 202-H6H6 B44-666
52mm	AWWA C800	<ul style="list-style-type: none"> - Non Self-draining 	Mueller	B-25209N

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
	NSF/ANSI 61	- Set screw for accepting tracer wire on one nut (road side) when connecting to Cross-linked Polyethylene (PEX) piping.	Cambridge Brass Ford	202-H7H7 B44-777
19.0 COUPLINGS				
19mm	AWWA C800 NSF/ANSI 61		Mueller Cambridge Brass Ford McDonald Brass	H-15-403 118-H3H3 C44-33 4758T
25mm	AWWA C800 NSF/ANSI 61		Mueller Cambridge Brass Ford McDonald Brass	H-15-403 118-H4H4 C44-44 4758T
38mm	AWWA C800 NSF/ANSI 61		Mueller Cambridge Brass Ford McDonald Brass	H-15-403 118-H6H6 C44-66 4758T
52mm	AWWA C800 NSF/ANSI 61		Mueller Cambridge Brass Ford McDonald Brass	H-15-403 118-H7H7 C44-77 4758T
Asbestos to PVC Cast Iron to PVC	NSF/ANSI 61	- Hymax 2000 Coupling and Hymax 2100 Flanged Adapter - Omni Coupling System Cast Couplings	Krausz Industries Smith-Blair GF multi joint	As per individual manufacturer

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
HDPE to PVC	NSF/ANSI 61	-	GF multi joint or approved equivalent	As per individual manufacturer
20.0 SAMPLING STATION				
		1.7 m minimum depth of bury	Kupferle	Eclipse #88-SS
21.0 FRAMES & GRATES – VALVE CHAMBER MAINTENANCE HOLE				
Cast Iron	OPSS 1850	<ul style="list-style-type: none">- Grate as per OPSD 401.010 (closed cover) with date cast into the cover- Adjustable/Autostable Frame<ul style="list-style-type: none">- C-50M-ONT- MH62502-D- SELFLEVEL – MC401010243	Bibby-Ste-Croix Star Pipe Canada, Inc.	As per individual manufacturer
Ductile Iron	OPSS 1850		Bibby-Ste-Croix Sigma EJ Canada	
22.0 ADJUSTMENT UNITS				
Concrete	CSA A257.4	<ul style="list-style-type: none">- Pre-cast concrete grade adjustment units with Moduloc tape between layers- Riser rings (only to be used when approved by the Town)	OCPA Plant Pre-qualification Member	As per individual manufacturer MH-640102 DI (38 mm) MH-640102 DI (51 mm)
Ductile			Sigma	
23.0 WATERPROOF MEMBRANE/PETROLATUM TAPE				
Waterproof Membrane/			Blueskin R.W. Meadows Denso Petrolatum Tape	WP200 Mel-Roll

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Petrolatum Tape				as per manufacturer

APPENDIX B: LISTS OF APPROVED MATERIALS

B6 – Parks and Landscaping

APPENDIX B6

PARKS AND LANDSCAPING MATERIAL LIST

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
1.0 PLAYGROUND EQUIPMENT				
1.1 Swings	<p>CAN/CSA Standards Z614 – Children’s Playspaces and Equipment (latest edition)</p> <p>Accessibility for Ontarians with Disabilities Act, 2005 and Ontarians with Disabilities Act, 2001</p>	<p>Neighbourhood Park: 2 seats for toddlers, 4 belt seats, and 1 accessible seat for children with disabilities</p> <p>Community Park: 5 seats for toddlers, 6 belt seats, and 1 accessible seat for children with disabilities</p> <p>- All styles approved, prefer rubber over wood.</p> <p>- All swing posts shall be embedded in footings (anchor footing to bedrock where depth of cover is not at least 1200mm)</p> <p>- Top cross bar shall be min. 2440mm above finished grade</p>	Certified playground suppliers	

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		<ul style="list-style-type: none"> - Minimum 4 seats provided in one unit or two separate units - Minimum 2 belt seats, 1 toddler seat, 1 seat for a disabled child - All swing chains shall be 1/4" galvanized 		
1.2 Junior Creative Structure	<p>CAN/CSA Standards Z614 – Children’s Playspaces and Equipment (latest edition)</p> <p>Accessibility for Ontarians with Disabilities Act, 2005 and Ontarians with Disabilities Act, 2001</p>	<p><u>Neighbourhood Park:</u> 2-3 decks with min. 1 roof, transfer station & stairs, 2 plastic slides – single and dual track, climber, tunnel or bridge between decks, 3-4 activity panels, and talk tube or alternate</p> <p><u>Community Park:</u> 2-3 decks with min. 1 roof, transfer station & stairs, 2 plastic slides – single and dual track, climber, tunnel or bridge between decks, 3-4 activity panels, and talk tube or alternate</p>	Certified playground suppliers	

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
1.3 Senior Creative Structure	CAN/CSA Standards Z614 – Children’s Playspaces and Equipment (latest edition) Accessibility for Ontarians with Disabilities Act, 2005 and Ontarians with Disabilities Act, 2001	<u>Neighbourhood Park:</u> 3-6 decks with min. 1 roof, transfer station with stairs, accessibility ramp, 2 plastic slides – straight and spiral both open, 3 climbers, rock wall or similar activity, 4-5 activity panels, and sliding pole <u>Community Park:</u> 5-7 decks with min. 1 roof, transfer station with stairs, accessibility ramp, 2-3 plastic slides – straight and spiral both open, 3-4 climbers, rock wall or similar activity, 5-7 activity panels, and sliding pole	Certified playground suppliers	
Spring / Spinning Toy		<u>Neighbourhood Park:</u> 2 units varying types <u>Community Park:</u> 3 - 4 units varying types - Spring toy see saws - Saddlemates, dino, fire chief car	Certified playground suppliers	

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		<ul style="list-style-type: none"> - Spring rider, giant see saw, 4-way rock-a-bout - Selected spring products 		
Slide		<ul style="list-style-type: none"> - Attached to creative structures, no independent slides - High vandalized areas, specify stainless steel slide - All other areas specify poly slides - Open slides are required, slide tubes are not approved - Straight, wavy and spirals are acceptable 	Certified playground suppliers	
Decks		<ul style="list-style-type: none"> - Steel with plastisol coating preferred; plastic wood or Trex is acceptable - Provide minimum 1 set of stairs 	Certified playground suppliers	
Climbers		<ul style="list-style-type: none"> - Chain net, cable net, and cargo net climbers shall have one piece coupling or nut and bolt couplings. Screw 	Certified playground suppliers	

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
		couplings are not acceptable - Finish: zinc bath, polyester powder coat		
Activity Panels		- Steel bars at ends of ramps - Mix up steel bars, poly windows, activity panels - Provide 40% of activity panels on ground level for wheelchair users - Percussion musical panels permitted in low vandalized areas - (Tic tac toe, Mirror, Little Tikes 7 station panel, Poly windows, Steering wheel)	Certified playground suppliers	
Fibre		- engineered wood fibres minimum 300mm (12") deep	Certified playground suppliers	
Crushed granite sand	CSA Compliant			

MATERIAL	CERTIFICATION	SPECIFICATIONS	MANUFACTURER	CATALOGUE NO.
Rubber			Certified playground suppliers	

APPENDIX B: LISTS OF APPROVED MATERIALS

B7 – Fencing

APPENDIX B7
FENCING MATERIAL LIST

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
1.0 ACOUSTICAL FENCE					
1.1 Polyvinyl Chloride (PVC)					
	PVC	AASHTO "Guide Specifications for Structural Design of Sound Barriers"	<ul style="list-style-type: none"> - Silent Protector for absorptive applications. - Tuf-Barrier for reflective applications. 	Atlantic Industries Limited (AIL).	

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
2.0 CHAIN LINK FENCE					
2.1 Fabric and Wire					
	Steel Wire hot dipped galvanized after weaving Steel Wire electro galvanized before weaving Black Vinyl Coated		<ul style="list-style-type: none"> - Minimum requirement for zinc coating – 0.5 kg/m² - 38 mm wire mesh - 3.4 mm (9 gauge) steel wire fabric 		
2.2 Post and Rails					
	Galvanized Steel	ASTM Designation A 120	<ul style="list-style-type: none"> - Schedule 40 Pipe - Conforming to current specifications for black and hot dipped, zinc coated, welded and seamless pipe - Minimum requirement for zinc coating – 0.5 kg/m² 		
2.3 Fittings and Hardware					
	Frames and Braces Cast Fittings Other Fittings	ASTM Specifications (A	Suitable Aluminum Alloy or Steel Ductile Iron		

MATERIAL		STANDARDS	FEATURES	MANUFACTURER	CATALOGUE No.
		152)	<ul style="list-style-type: none"> - Minimum requirement for zinc coating – 0.5 kg/m² for frames and braces - Minimum requirement for zinc coating – 0.6 kg/m² for cast and other fittings 		
3.0 WOOD PRIVACY FENCE					
	Construction grade cedar Approved brown pressure treated wood		<ul style="list-style-type: none"> - Zinc coated twisted steel nails #11 Gauge 		

APPENDIX B: LISTS OF APPROVED MATERIALS

B8 – Seed Mixes & Tree Species

APPENDIX B8

SEED MIX AND TREE SPECIES MATERIAL LIST

RECOMMENDED SEED MIXES

For undeveloped open space that is not adjacent to sensitive areas:

- 45% Creeping Red Fescue
- 30% Kentucky Blue Grass
- 25% Perennial Rye Grass

For stormwater management ponds and channels, refer to the Conservation Authority planting Guidelines or use:

Lowland

- 2% Awl Sedge (*Carex stipata*)
- 5% Bebb's Sedge (*Carex bebbi*)
- 1% Purple Stemmed Aster (*Aster puniceus*)
- 25% Fowl Bluegrass (*Poa palustris*)
- 40% Fox Sedge (*Carex vulpinoidea*)
- 5% Great Blue Lobelia (*Lobelia siphilitica*)
- 1% New England Aster (*Aster novae-angliae*)
- 1% Path Rush (*Juncus tenuis*)
- 7% Canada Goldenrod (*Solidago canadensis*)
- 10% Soft Rush (*Juncus effusus*)
- 1% Tall Manna Grass (*Glyceria grandis*)
- 1% Virginia Wild Rye (*Elymus virginicus*)
- 1% Wild Bergamot (*Monarda fistulosa*)

Upland

- 25% Canada Wild Rye (*Elymus canadensis*)
- 25% Indian Grass (*Sorghastrum nutans*)
- 20% Little Bluestem (*Schizachyrium scoparium*)
- 12% Black Eyed Susan (*Rudbeckia fulgida*)
- 10% Sand Dropseed (*Sporobolus cryptandrus*)
- 4% Canada Goldenrod (*Solidago Canadensis*)
- 2% New England Aster (*Aster novae-angliae*)
- 1% Heath Aster (*Aster ericoides*)
- 1% Wild Bergamot (*Monarda fistulosa*)

RECOMMENDED BOULEVARD TREES

Family	Botanical Name	Common Name
Sapindaceae	<i>Acer x freemanii</i> cvs.	Freeman Maple
Sapindaceae	<i>Acer rubrum</i>	Red Maple
Sapindaceae	<i>Acer saccharum</i>	Sugar Maple
Sapindaceae	<i>Aesculus glabra</i>	Ohio Buckeye
Sapindaceae	<i>Aesculus flava</i>	Yellow Buckeye
Rosaceae	<i>Amelanchier</i> spp.*	Serviceberry
Cannabaceae	<i>Celtis occidentalis</i>	Nothorn Hackberry
Fabaceae	<i>Gleditsia triacanthos</i> var. <i>inermis</i>	Thornless Honeylocust
Ginkgoaceae	<i>Ginkgo biloba</i>	Ginkgo
Fabaceae	<i>Gymnocladus dioicus</i>	Kentucky Coffeetree (male cultivar)
Magnoliaceae	<i>Liriodendron tulipifera</i>	Tulip Tree
Rosaceae	<i>Malus</i> cvs.*	Flowering Crabapple (non-fruiting, disease resistant)
Nyssaceae	<i>Nyssa sylvatica</i>	Black-Gum
Platanaceae	<i>Platanus acerfolia</i>	London Plane Tree
Rosaceae	<i>Prunus virginiana</i> 'Schubert'*	Schubert ChokeCherry
Rosaceae	<i>Pyrus calleryana</i>	Ornamental Pear (not Bradford cultivar)
Fagaceae	<i>Quercus alba</i>	White Oak
Fagaceae	<i>Quercus macrocarpa</i>	Bur Oak
Fagaceae	<i>Quercus muehlenbergii</i>	Chinquapin Oak
Fagaceae	<i>Quercus palustris</i>	Pin Oak
Fagaceae	<i>Quercus rubra</i>	Northern Red Oak
Oleaceae	<i>Syringa reticulata</i>	Japanese Tree Lilac
Malvaceae	<i>Tilia cordata</i>	Littleleaf Linden
Malvaceae	<i>Tilia americana</i> 'Redmond'	Linden, 'Redmond'
Ulmaceae	<i>Ulmus</i> X 'Homestead'	Homestead Elm
Ulmaceae	<i>Zelkova serrata</i>	Japanese Zelkova

* Small trees are to be used only in situations where space is constrained.

RECOMMENDED PARK TREES

The Town of Innisfil recommends the use of native trees in parks, when appropriate. The Town will review the proposed species on a case-by-case basis.