

4. State of the Infrastructure Summaries

4.1. Road System

4.1.1. Scope / Asset Type(s)

This section of the report will review road assets only with information drawn from the 2012 Road Needs Study.

4.1.2. Road System Inventory and Classification

Road sections within road systems may be classified in a number of ways, to illustrate the existing conditions by road environment, road class, surface type, surface width, and road drainage. The classifications provide assistance in developing further information, with respect to the road system, such as types of road improvements, road improvement costs, and improvement schedules.

4.1.3. Road Environment

Road sections were categorized into the following environments:

- Marsh
- Rural
- Urban

Rural roads are typical of areas with sparse developments or where development accounts for less than 50% of the street frontage. The urban environment is defined as being where curb and gutters (or similar) are present and a higher level of development is present (in some instances, urban roads do not have curb and gutter, but given the surrounding development type and level, have still been considered urban). The marsh environment is that surrounding the Holland Marsh area (Table 4.1).

Table 4.1: Roadside Environment and Surface Type Distribution

Roadside Environment	Surface Type								Number of Road Sections	Total		% of Total	
	Earth		Gravel		Surface Treated		Hot Mix Asphalt			CL (km)	Lane (km)	CL (km)	Lane (km)
	CL (km)	Lane (km)	CL (km)	Lane (km)	CL (km)	Lane (km)	CL (km)	Lane (km)		CL (km)	Lane (km)	CL (km)	Lane (km)
Marsh			4.88	9.75	1.66	3.31	15.57	31.13	34	22.10	44.20	9.03%	8.64%
Rural			44.97	89.95	55.13	110.25	63.34	126.54	167	163.44	326.74	66.81%	63.90%
Urban	0.19	0.19	1.03	1.03	0.11	0.22	57.77	138.94	327	59.10	140.38	24.16%	27.45%
Total	0.19	0.19	50.88	100.73	56.89	113.78	136.68	296.62	528	244.63	511.32		
% of Total	0.08%	0.04%	20.80%	19.70%	23.26%	22.25%	55.87%	58.01%					

Table 4.2: Road Class and Roadside Environment Distribution

Road Class	Roadside Environment						Number of Road Sections	Total		% of Total	
	Marsh		Rural		Urban			CL (km)	Lane (km)	CL (km)	Lane (km)
	CL (km)	Lane (km)	CL (km)	Lane (km)	CL (km)	Lane (km)		CL (km)	Lane (km)	CL (km)	Lane (km)
Arterial-major	11.77	23.542	16.64	33.37	12.29	45.77	98	40.70	102.674	16.64%	20.08%
Arterial-minor	3.31	6.610	28.22	56.45	2.80	8.38	47	34.33	71.434	14.03%	13.97%
Collector	1.54	3.070	94.60	189.19	11.23	22.46	147	107.36	214.728	43.89%	42.00%
Local	5.49	10.976	23.98	47.73	31.27	62.17	220	60.74	120.878	24.83%	23.64%
Laneway					1.51	1.60	16	1.51	1.603	0.62%	0.31%
Total	22.10	44.198	163.44	326.74	59.10	140.38	528	244.63	511.317		
% of Total	9.03%	8.64%	66.81%	63.90%	24.16%	27.45%					

4.1.4. Road Class

The classification of the road system was based on the class definitions and schedules as set forth in the *Town of Bradford West Gwillimbury Official Plan*, which recognizes the role and function of the road and the need to provide a hierarchy of transportation routes within the Town. In particular, the following classes have been considered:

Local Roads

- local roads are intended to provide access to abutting properties and to discourage through traffic
- travel speeds and road capacity are typically lower on local roads, reflective of the number of driveways and access points

Collector Roads

- collector roads are intended to collect traffic from individual local roads and direct it to arterial roads, County roads or Provincial highways
- direct access to abutting properties shall be minimized to the extent possible

Rural roads are designated collector roads as per the Town's Official Plan, however, dead-end rural roads were classified as local roads in that they do not provide a continuous function and thus do not serve a collector role.

Arterial Roads (major/minor)

- roads that are major transportation routes carrying heavy volumes of inter-municipal traffic,
- may require and be planned for up to four through lanes (i.e. 2 per direction),
- road width, design and intersection improvements shall be designed so as to encourage through traffic to use these routes rather than collector or local roads,
- direct access to abutting properties will generally not be permitted.

Further to the above, a laneway designation has also been considered to reflect existing laneways and alleyways which typically provide access to rear yards and garages, with limited use otherwise (Table 4.2).

4.1.5. Surface Type

The surface type refers to the surface treatment construction of the individual road sections, including:

- earth/grass;
- gravel;
- surface treatment (ie. low class bituminous or LCB which consists of an application of emulsified or liquid asphalt and aggregate over an existing surface);
- asphalt (ie. high class bituminous or HCB).

Table 4.3 Road Surface Type*

Surface Type	Number of Road Sections	CL (km)	% of Total	Lane (km)	% of Total
Earth	2	0.19	0.08%	0.19	0.04%
Gravel	49	50.88	20.80%	100.73	19.70%
Surface Treated	50	56.89	23.26%	113.78	22.25%
Hot Mix Asphalt	427	136.68	55.87%	296.62	58.01%
Total	528	244.63	100.00%	511.32	100.00%

* Adapted from Road Needs Study, 2012

4.1.6. Surface Width

Surface width refers to the driving width of the road. For hard surfaced roads, the width is the actual width as measured from edge of pavement to edge of pavement (excluding shoulders) or curb face to curb face. For gravel roads, the surface width corresponds to the overall platform width (edge of road to edge of road) minus 1.0 meter for shoulders (0.5 meters per side).

Table 4.4 Surface Width*

Surface Width	Road Sections		Road Centerline	
	Number	Percent of Total	Kilometres	Percent of Total
Less than 5m	20	4%	2.1	1%
5 ≤ width < 6m	22	4%	18.8	8%
6 ≤ width < 7m	76	14%	75.1	31%
7 ≤ width < 8m	98	19%	70.1	29%
8 ≤ width < 9m	190	36%	54.9	22%
9 ≤ width < 10m	43	8%	7.6	3%
Greater than 10m	79	15%	16.0	7%
Total	528	100%	244.6	100%

* Road Needs Study, 2012

4.1.7. Road Drainage

Road drainage refers to the method of collecting and removing water from the platform of the road sections, including:

- no ditch;
- open roadside ditch;
- storm sewer without ditch; and
- ditch and storm sewer.

Table 4.5: Road Drainage*

Drainage Type	Road Sections		Road Centerline	
	Number	Percent of Total	Kilometres	Percent of Total
No Ditch	21	4%	2.4	1%
Open Ditch	190	36%	181.6	74%
Storm Sewer	309	59%	57.5	24%
Ditch & Storm Sewer	8	2%	3.1	1%
Total	528	100%	244.6	100%

* Road Needs Study, 2012

4.2. Structures – Bridges and Culverts (> 3 meter span)

4.2.1. Scope / Asset Type(s)

This section of the report addresses structure assets over the span of 3.0 meters. This includes structures defined as bridges and culverts. The information is drawn from the 2010 Municipal Bridge Inspection report.

4.2.2. Structure Inventory and Classification

According to the Ontario Structure Inspection Manual (OSIM), bridges and culverts are defined as follows:

Bridge - A structure which provides a roadway or walkway for the passage of vehicles, pedestrians or cyclists across an obstruction, gap or facility and is greater than or equal to 3 meters in span.

Culvert - A structure that forms an opening through soil.

Bridge structures were inspected in accordance with the OSIM. The OSIM sets standards for detailed visual inspection and condition rating of structures and their components. It provides a uniform inspection approach for all structures in Ontario. A detailed visual inspection is defined in the OSIM as follows:

An element by element “close-up” visual assessment of material defects, performance deficiencies and maintenance needs of a structure. Close-up is defined as “a distance close enough to determine the condition of the element”.

24 bridge and culvert structures were inventoried in the Municipal Bridge Inspection Report, 2010. Among the various types of bridges that make up the Town’s bridge inventory are many that have timber piled abutments within watercourses. Since 2010, a number of new structures have been constructed as part of development and road reconstruction projects, as well as 3 pedestrian bridges along the Town’s trail network. Some existing culverts may have been misidentified as smaller diameter culverts. These structures will need to be added to the inventory and inspected as per the legislated requirements.

4.3. Structures – Road Crossing Culverts (< 3 meter span)

Smaller diameter road crossing culverts convey traffic over a watercourse and provide the watercourse a means to move under a roadway. Without a culvert, travel over the watercourse would prove difficult and the roadway could be washed out. This section of the report addresses all crossing culverts sized 900mm to 2.9m in diameter. The information is drawn from the Road Needs Study: Culvert Inventory & Assessment, 2012.

4.3.1. Culvert Inventory and Classification

A culvert is defined as “any bridge that is embedded in fill and is used to convey water, pedestrians or animals through it”. Culverts were identified, classified and assessed in accordance with the Ontario Structure Inspection Manual (OSIM). The OSIM sets standards for detailed visual inspection and condition rating of structures and their components. It provides a uniform inspection approach for all structures in Ontario. A detailed visual inspection is defined in the OSIM as follows:

An element by element “close-up” visual assessment of material defects, performance deficiencies and maintenance needs of a structure. Close-up is defined as “a distance close enough to determine the condition of the element”.

46 culverts were identified by Town staff and inspected during the study period. All crossing culverts consisted of round or arch CSP (corrugated steel pipe) material except for culvert 01-001 (Leonard Road), which consisted of a cast in place concrete box culvert.

4.4. Water Linear

This section of the report addresses linear water assets (watermains) only. The content will provide a summary of the water system from a number of perspectives including dimensional information, diameter, and material type. The information is drawn from the Town’s GIS database.

4.4.1. Inventory and Classification

Table 4.6 identifies the distribution of the linear water assets by diameter and material type.

4.5. Wastewater Linear

This section of the report addresses linear wastewater assets (gravity and force mains) only. The content will provide a summary of the wastewater system from a number of perspectives including dimensional information, diameter, and material type. The information is drawn from the Town’s GIS database.

4.5.1. Inventory and Classification

Table 4.7 identifies the distribution of the linear wastewater assets by diameter and material type.

4.6. Stormwater Linear

This section of the report addresses linear stormwater assets (gravity mains) only. The content will provide a summary of the stormwater system from a number of perspectives including dimensional information, diameter, and material type. The information is drawn from the Town’s GIS database.

4.6.1. Inventory and Classification

Table 4.8 identifies the distribution of the linear stormwater assets by diameter and material type.

4.7. Stormwater Management Facilities

This section of the report addresses stormwater management (SWM) assets only. The content will provide a summary of the SWM facilities as listed in the Town’s comprehensive stormwater management master plan.

4.7.1. Inventory and Classification

Table 4.9 identifies the distribution of the SWM facilities by pond type. 24 SWM facilities were identified in the SWM inventory. These include all ponds within assumed and unassumed subdivisions. The Town has responsibility over a pond once it becomes operational.

Table 4.9: SWM Facilities by Type

	Pond Type				
	Wet	Dry	Combined	Wetland	Total
Number	18	4	1	1	24

Table 4.6: Water Linear Asset, Length (m) by Material and Diameter

Material	Diameter (mm)										Total (m)	% of Total	
	50	100	150	200	250	300	350	400	500	600			
Asbestos Cement			2,637.8			447.1						3,085.0	2.2%
Cast Iron			594.7			2,388.7						2,983.3	2.1%
Concrete Pressure Pipe								6,909.3	5,438.3	5,093.0		17,440.6	12.5%
Copper	570.2											570.2	0.4%
Ductile Iron		242.2	12,487.7	1,954.4	179.8	2,135.7		305.2				17,305.0	12.4%
Polyethylene		986.4										986.4	0.7%
Polyvinyl Chloride		169.7	33,698.9	23,150.7	15,215.0	21,810.0	2,640.4	865.1				97,549.8	69.7%
Total (m)	570.2	1,398.4	49,419.0	25,105.2	15,394.9	26,781.5	2,640.4	8,079.6	5,438.3	5,093.0		139,920.4	
% of Total	0.4%	1.0%	35.3%	17.9%	11.0%	19.1%	1.9%	5.8%	3.9%	3.6%			

Table 4.7: Wastewater Linear Asset, Length (m) by Material and Diameter

Material	Diameter (mm)																	Total (m)	% of Total
	50	100	125	150	200	250	300	350	375	400	450	500	525	600	675	750	900		
Asbestos Cement				36.7	12,524.5	4,509.2	1,659.2	1,509.6		989.2	843.9	76.4		251.9				22,400.5	20.3%
Concrete Pipe				11.5	707.2	180.1	80.4	5.8	75.0		887.6		1,658.2	486.6				4,092.4	3.7%
Forcemain		139.9		805.6			731.0	2,331.0		2,958.6				1,617.0				8,583.1	7.8%
Polyethylene	11.3																	11.3	0.0%
Polyvinyl Chloride			21.1	109.2	55,246.5	5,411.5	5,414.8	281.7	4,748.3		1,025.0		22.5	1,057.5	172.8	999.9	188.4	74,699.2	67.7%
VCP					60.1		521.7											581.8	0.5%
Total (m)	11.3	139.9	21.1	962.9	68,538.3	10,100.8	8,407.1	4,128.0	4,823.3	3,947.8	2,756.6	76.4	1,680.8	3,413.0	172.8	999.9	188.4	110,368.3	
% of Total	0.0%	0.1%	0.0%	0.9%	62.1%	9.2%	7.6%	3.7%	4.4%	3.6%	2.5%	0.1%	1.5%	3.1%	0.2%	0.9%	0.2%		

Table 4.8: Stormwater Linear Asset, Length (m) by Material and Diameter

Material	Diameter														
	200	250	300	350	375	400	450	500	525	600	675	700	750	825	850
Asbestos Cement		65.4	58.6	55.9		66.2	66.3	148.4							
Concrete Pipe	152.0	1,122.8	11,908.5	240.2	13,691.9	402.9	12,378.0	38.8	12,203.9	9,880.1	4,899.8	200.8	4,044.7	2,524.4	236.4
Corrugated Steel Pipe							99.3	92.6		8.2		18.6			
Polyethylene							11.6								
Polyvinyl Chloride	215.6	3,622.8	5,481.1		3,790.2		3,056.3		126.1	159.3					
Total (m)	367.6	4,811.0	17,448.3	296.2	17,482.1	469.1	15,611.5	279.8	12,330.0	10,047.6	4,899.8	219.4	4,044.7	2,524.4	236.4
% of Total	0.3%	4.4%	15.8%	0.3%	15.8%	0.4%	14.1%	0.3%	11.2%	9.1%	4.4%	0.2%	3.7%	2.3%	0.2%

	Diameter												Total (m)	% of Total	
	900	975	1000	1050	1200	1350	1500	1650	1800	2000	2400	Other			
Asbestos Cement														460.9	0.4%
Concrete Pipe	4,191.4	2,004.4	245.4	2,649.0	2,122.8	3,104.5	2,300.7	377.5	1,052.6	87.3	647.3	274.3		92,982.4	84.2%
Corrugated Steel Pipe									101.8	87.5				407.9	0.4%
Polyethylene														11.6	0.0%
Polyvinyl Chloride	43.3						13.9							16,508.6	15.0%
Total (m)	4,234.6	2,004.4	245.4	2,649.0	2,122.8	3,104.5	2,314.6	377.5	1,154.4	174.8	647.3	274.3		110,371.4	
% of Total	3.8%	1.8%	0.2%	2.4%	1.9%	2.8%	2.1%	0.3%	1.0%	0.2%	0.6%	0.2%			

4.8. Fleet

This section of the report addresses fleet assets only. The content will provide a summary of the fleet assets compiled from vehicle licence and fuel usage records.

4.8.1. Inventory and Classification

Table 4.10 identifies the approximate distribution of fleet assets among the Town’s departments. There are many vehicle lists currently being maintained within the Town which makes an accurate count difficult. It is recommended that a single source of vehicle and equipment information be maintained within the Town’s computerized maintenance management system (CMMS). A single database will allow all staff to record fleet and equipment information consistently as well as reference the same information across all Town departments. The following table summarizes the number of fleet by Division in the ‘A’ category; pickup and light-duty trucks, general purpose tractors, as identified in the Town’s PSAB records. This does not include many of the larger, specialized fleet assets such as fire trucks and hydro excavating (Vactor) trucks. Future updates will include all fleet and related equipment assets.

Table 4.10: Department Fleet* Distribution

Department	Division	Number
	Facilities / Parks & Property	17
	Transportation	33
	Wastewater	10
	Water	11
Community Services Total		71
Corporate Services	Bylaw	3
	Building	5
	Capital	2
	Development	1
Development & Engineering Total		8
	Holland Marsh Drainage	2
Grand Total		84

*PSAB asset spreadsheets: Fleet, Machinery & Equipment, as of December 31,2015

4.9. Facilities

This section of the report addresses Town facilities only. The content will provide a summary of the Town’s municipal facilities and property maintenance areas. This information is taken from the Parks and Open Space Service Manual, 2016.

4.9.1. Inventory and Classification

There are 16 municipal facilities identified in the service manual. The total outdoor property size for these Town owned facilities is 10.3 acres (4.2 hectares). 2 locations are leased for Town offices:

- 310 Barrie Street - Units 2 & 4B
- 100 Dissette Street – Units 4, 7 & 8

Other buildings related to water and wastewater are also included in this inventory.

4.10. Parks

This section of the report addresses park assets only. The content will provide a summary of the Town’s parks and open space areas. This information is taken from the Parks and Open Space Service Manual, 2016.

4.10.1. Inventory and Classification

Table 4.11 identifies the quantity of parks, open spaces and Town maintained cemeteries.

Table 4.11: Parks & Open Spaces* Summary

Type	Number	Acreage	Hectares
Community Parks	4	43.5	17.6
Neighbourhood Parks	9	59.9	24.2
Parkettes	11	8.3	3.4
Open Spaces	3	13.1	5.3
Woodlots	2	10.3	4.2
Cemeteries	10	19.8	8.0
Total	37	154.9	62.7

*Parks and Open Space Service Manual, 2016

Details regarding land improvements (i.e. play structures, sports fields, etc.) at each location are provided in the Parks and Open Space Service Manual, 2016. Future parks and those currently under development are not included in the above inventory and will be added once the Town begins maintenance on the grounds and amenities.

4.11. Transit

This section of the report addresses transit assets only. The content will provide a summary of the Town’s transit fleet and bus stops.

4.11.1. Inventory and Classification

The Town’s transit system assets consist of busses, bus stops (pads), signs and shelters. Most of the assets are operated and maintained under agreement to contractors. Transit assets consist of:

- 3 busses; cycled between 2 routes,
- 83 pads for active bus stops; inactive bus stops have their pads remaining,
- 11 shelters.