5. Asset Group Condition

5.1. Road System

An Asset Management Plan (AMP) should include condition assessments in accordance with standard engineering practices. Where condition assessments are not available or obsolete, subjective assessments based on asset age can be considered. The information in this section of the report is taken from the 2012 Road Needs Study (the Study).

5.1.1. Road Condition by Time of Need

Road sections were assessed a condition rating score on a 100 point basis that provided an overall indication of the physical condition related to the individual road elements that were considered in the assessment. The individual elements included:

- horizontal alignment,
- vertical alignment,
- surface condition,
- shoulder width,
- surface width,
- level of service,
- structural adequacy,
- drainage, and
- maintenance demand.

In addition to the condition rating, needs and improvements to an individual road section were determined by comparing the existing physical characteristics of the road system to the minimum tolerable standards, as defined in the *Inventory Manual for Municipal Roads* and/or established in conjunction with Town standards and relevant design guidelines. Should the existing conditions deviate from the standards, a need exists, otherwise, the road is considered adequate.

For each identified road improvement need, a corresponding improvement strategy was identified. The types of road improvements identified in the Road Needs Study, 2012 are as follows:

- R1/R2 - resurface with a single or double lift of asphalt or surface treatment (whichever applies)
- PR1/PR2 - pulverize and resurface with a single or double lift of asphalt or surface treatment
- (whichever applies)
- W - road widening
- WR - road widening and resurface
- BS - base and surface improvements
- REC - reconstruction
- RNS - reconstruction with nominal storm sewers

For each identified road section deficiency, the Time of Need was identified – NOW, within years 1 to 5, or within years 6 to 10 - which was based on minimum acceptable standards and a review of the required road improvements. Table 5.1 provides a summary of the road improvements, their associated Time of Need, and costs.

Table 5.1: Road Improvement Summary*

Improvement Strategy	Improvement Length (kms)				Improvement Costs (2012$)			
	NOW	1-5	6-10	Total	NOW	1-5	6-10	Total
Resurface	19.9	8.9	11.2	39.9	$4,161,759	$944,493	$1,827,140	$6,933,392
Base & Surface Improvements	1.4	4.8	0.0	6.1	$311,795	$1,645,773	$0	$1,957,568
Reconstruction	9.5	0.0	0.0	9.5	$4,937,161	$0	$0	$4,937,161
Widen (gravel roads)	8.2	0.0	0.0	8.2	$500,415	$0	$0	$500,415
Widen & Resurface	7.4	0.0	0.0	7.4	$2,000,916	$0	$0	$2,000,916
Total	**46.3**	**13.6**	**11.2**	**71.2**	**$11,912,046**	**$2,590,266**	**$1,827,140**	**$16,329,452**

* Road Needs Study, 2012

- 16% of the road system by length (39.0 of 244.6 km) had a surface condition deficiency;
- 9% (22.8 km) had a surface type deficiency (ie. gravel road to surface treated or surface treated road to asphalt);
- 8% (19.1 km) had a surface width deficiency; and
- 22% (55.0 km) had a structural deficiency.

Overall, approximately $16.3 million would be required over 10 years to improve the road system to suit current standards. This represented approximately 29% of the existing road system at the time.

In the four years since completing the Road Needs Study, approximately 28.8 kms of roadway has been reconstructed or rehabilitated (Table 5.2). This total does not include roads within new subdivisions. One project was reprioritized to accommodate forcemains for Green Valley and the Employment Lands, but was not initially listed as a priority project. Many other projects were either not identified in the Study or were improved differently from the recommendation in the Study.

Table 5.2: Recent Road Improvements, 2012 - 2015

Improvement Strategy	Improvement Length	
	CL (km)	Lane (km)
Resurface	5.2	11.6
Base & Surface Improvements	18.6	37.3
Reconstruction	5.0	10.0
Total	**28.8**	**58.9**

According to the Town's GIS database, the current road network measures 271.3 kilometers (centreline distance); a 10.9% increase over the 2012 road inventory.

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

An Asset Management Plan should include condition assessments in accordance with standard engineering practices. Provincial legislation requires that all structures with a span of 3 meters or greater be inspected under the supervision of a structural engineer every two years, in accordance with

the Ontario Structure Inspection Manual (OSIM) or equivalent. The information in this section of the report is taken from the 2010 Municipal Bridge Inspection report.

5.2.1. Structures Inventory by Time of Need

Structures were inspected and then prioritized based on their need for rehabilitation or replacement. Each structure was given a priority of high, medium, or low depending on the severity of the damage and structural defects that were of concern. High priority indicates that rehabilitation or replacement is necessary within a year of the report. Medium priority indicates that repairs are required and should be taken within 1-5 years of the report. Low priority indicates that repairs may be needed but are not urgent at the time of the report. Of the 24 structures inspected, 3 structures were given a high priority rating, 2 structures were given a medium priority rating and 19 structures were given a low priority rating.

Table 5.3: Bridge Priority Summary

Replacement Priority	Number of Structures	Replaced Since 2010	Total Remaining
Low	19	2	17
Medium	2		2
High	3	2	1
Total	24		20

*Municipal Bridge Inspection, 2010

Since the last structures report was completed, the following structures have been reconstructed:

- Doanes Bridge (Line 5 & Canal Road) – 2012
- MacMillan Bridge (Sideroad 5 & Canal Road) – 2013
- Line 6 Bridge – 2014
- Newton Robinson Bridge – 2016

One high priority structure remains from the original report.

As has been noted, Provincial legislation requires a two-year inspection cycle. The Town must complete regular structures report in order to properly assess and monitor the condition of the assets. The 2010 report is becoming obsolete and must be updated to determine the current condition of the existing structures. For example, BWG has a number of bridges with timber piled abutments that require regular monitoring for movement and possible underwater inspection. A number of new structures have been constructed through development and capital projects as well as pedestrian bridges along our trail network. These need to be added to the inventory and inspected regularly.

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

An Asset Management Plan (AMP) should include condition assessments in accordance with standard engineering practices. All crossing culverts sized 900mm to 2.9m in diameter were inventoried and assessed in accordance with the Ontario Structure Inspection Manual (OSIM). Culverts in this size range are not subject to Provincial legislation requires that all structures with a span of 3 meters or greater be inspected under the supervision of a structural engineer every two years. The information in this section of the report is taken from the 2012 Road Needs Study: Culvert Inventory & Assessment report.

5.3.1. Structures Inventory by Time of Need

A total of 56 needs were noted within a 10-year assessment horizon - 42 maintenance related and 14 rehabilitation related. Maintenance needs include repairs to culvert sections, removal of debris, silt, vegetation and/or other deleterious material from the culvert, the provision of erosion protection, repair of potholes and cracks in the road and adjustment to existing guide rail. Rehabilitation needs include the replacement of the entire culvert (4 instances) or select sections, repaving of the road approaches to address poor conditions, and the installation of guide rail where such does not otherwise exist.

Maintenance and rehabilitation strategies were then prioritized based on the levels outlined in the OSIM:

Priority Level	Description
Urgent	An unexpected repair or rehabilitation that is required immediately. The design is to be done immediately and construction should also be in the current construction year.
< 1 Year (Now)	A rehabilitation that is required with some degree of urgency but can still be completed in a reasonable time frame (also known as a "Now" need). The design phase should be started within a few months with construction being completed by the end of the next construction year.
1 -5 Year	A rehabilitation that can be done in a normal time frame. The rehabilitation is to be designed and preferably completed in one to five years.
6 – 10 year	Some rehabilitation work is expected in 6 to 10 years.
None	No work is expected in the next 10 years.

Summaries of the improvements and replacements based on time of need are included below:

Table 5.4: Culvert Improvement Summary

	Time of Need			
	<1 yr	1-5 yrs	6-10 yrs	Total
No. of Needs	33	14	4	51

Table 5.5: Culvert Replacement Summary

	Time of Need						
	<1 yr	1-5 yrs	6-10 yrs	11-15 yrs	16-20 yrs	20+ yrs	Total
Culvert Replacements	0	2	2.5	14	8.5	19	46

5.4. Water Linear

An Asset Management Plan (AMP) should include condition assessments in accordance with standard engineering practices. The Town's GIS asset databases do not currently include condition data for the water linear assets. However, the databases do include a listing of construction dates and material types for the respective asset groups. Pipe materials have generally accepted life expectancies, which were drawn from other publicly available AMPs and through consultation with department managers.

5.4.1. Water Linear Inventory by Estimated Time of Need and Estimated Condition

Table 5.6: Water Length (m) by Time of Need and Estimated Condition*

Estimated Condition	Time of Need	Length (m)	% of System
Very Good	Adequate	72,644.5	**51.9%**
Good	6 to 10	39,226.3	**28.0%**
Fair	1 to 5	5,030.0	**3.6%**
Poor	Now	9,169.7	**6.6%**
Very Poor	Urgent	13,849.8	**9.9%**
Total		**139,920.4**	**100.0%**

* See Table 3.1 for estimated condition category definitions

Table 5.7: Water Length (m) by Material and Estimated Condition*

	Material							Total	
Estimated Condition	**Asbestos Cement**	**Cast Iron**	**Concrete Pressure Pipe**	**Copper**	**Ductile Iron**	**Polyethylene**	**Polyvinyl Chloride**	**Length (m)**	**% of Total**
Very Good			10,531.3				62,113.2	**72,644.5**	51.9%
Good			6,909.3	313.3	170.5		31,833.3	**39,226.3**	28.0%
Fair				241.7	1,292.9	986.4	2,509.0	**5,030.0**	3.6%
Poor	3,085.0			15.3	4,975.1		1,094.3	**9,169.7**	6.6%
Very Poor		2,983.3			10,866.5			**13,849.8**	9.9%
Total	**3,085.0**	**2,983.3**	**17,440.6**	**570.2**	**17,305.0**	**986.4**	**97,549.8**	**139,920.4**	
% of Total	2.2%	2.1%	12.5%	0.4%	12.4%	0.7%	69.7%		

* See Table 3.1 for estimated condition category definitions

5.4.2. Remaining Service Life – Water Linear

Table 5.8: Water Length (m) by Material and Remaining Service Life

	Material							Total	
Remaining Service Life	**Asbestos Cement**	**Cast Iron**	**Concrete Pressure Pipe**	**Copper**	**Ductile Iron**	**Polyethylene**	**Polyvinyl Chloride**	**Length (m)**	**% of Total**
> 10 Years	3,085.0		17,440.6	570.2	6,297.2	986.4	97,549.8	**125,929.2**	90.0%
6 - 10 Years					6,114.2			**6,114.2**	4.4%
1 - 5 Years		46.9			1,748.5			**1,795.4**	1.3%
0 Years		2,936.4			3,145.1			**6,081.5**	4.3%
Total	**3,085.0**	**2,983.3**	**17,440.6**	**570.2**	**17,305.0**	**986.4**	**97,549.8**	**139,920.4**	
% of Total	2.2%	2.1%	12.5%	0.4%	12.4%	0.7%	69.7%		

5.5. Wastewater Linear

An Asset Management Plan (AMP) should include condition assessments in accordance with standard engineering practices. The Town's GIS asset databases do not currently include condition data for the wastewater linear assets. However, the databases do include a listing of construction dates and material types for the respective asset groups. Pipe materials have generally accepted life expectancies, which were drawn from other publicly available AMPs and through consultation with department managers.

5.5.1. Wastewater Linear Inventory by Estimated Time of Need and Estimated Condition

Table 5.9: Wastewater Length (m) by Time of Need and Estimated Condition*

Estimated Condition	Time of Need	Length (m)	% of System
Very Good	Adequate	55,528.6	**50.4%**
Good	6 to 10	24,540.8	**22.3%**
Fair	1 to 5	21,518.8	**19.5%**
Poor	Now	8,598.0	**7.8%**
Total		**110,186.2**	**100.0%**

* See Table 3.1 for estimated condition category definitions

Table 5.10: Wastewater Length (m) by Material and Estimated Condition*

	Material						Total	
Estimated Condition	**Asbestos Cement**	**Concrete Pipe**	**Forcemain**	**Polyethylene**	**Polyvinyl Chloride**	**Vitrified Clay**	**Length (m)**	**% of Total**
Very Good	59.3	3,162.5	6,086.3		46,220.5		**55,528.6**	50.4%
Good	2,176.1	102.5	1,801.2		20,461.1		**24,540.8**	22.3%
Fair	12,391.9	821.6	695.6	11.3	7,598.3		**21,518.8**	19.5%
Poor	7,773.3	5.8			419.3	399.7	**8,598.0**	7.8%
Total	**22,400.5**	**4,092.4**	**8,583.1**	**11.3**	**74,699.2**	**399.7**	**110,186.2**	
% of Total	20.3%	3.7%	7.8%	0.0%	67.8%	0.4%		

* See Table 3.1 for estimated condition category definitions

5.5.2. Remaining Service Life – Wastewater Linear

Table 5.11: Wastewater Length (m) by Material and Remaining Service Life

	Material						Total	
Remaining Service Life	**Asbestos Cement**	**Concrete Pipe**	**Forcemain**	**Polyethylene**	**Polyvinyl Chloride**	**Vitrified Clay**	**Length (m)**	**% of Total**
> 10 Years	22,400.5	4,092.4	8,583.1	11.3	74,699.2	459.8	**110,246.3**	99.9%
6 - 10 Years						122.0	**122.0**	0.1%
Total	**22,400.5**	**4,092.4**	**8,583.1**	**11.3**	**74,699.2**	**581.8**	**110,368.3**	
% of Total	20.3%	3.7%	7.8%	0.0%	67.7%	0.5%		

5.6. Stormwater Linear

An Asset Management Plan (AMP) should include condition assessments in accordance with standard engineering practices. The Town's GIS asset databases do not currently include condition data for the stormwater linear assets. However, the databases do include a listing of construction dates and material types for the respective asset groups. Pipe materials have generally accepted life expectancies, which were drawn from other publicly available AMPs and through consultation with department managers.

5.6.1. Stormwater Linear Inventory by Estimated Time of Need and Estimated Condition

Table 5.12: Stormwater Length (m) by Time of Need and Estimated Condition*

Estimated Condition	Time of Need	Length (m)	% of System
Very Good	Adequate	58,811.3	**53.3%**
Good	6 to 10	22,463.1	**20.4%**
Fair	1 to 5	21,840.5	**19.8%**
Poor	Now	6,848.6	**6.2%**
Very Poor	Urgent	407.9	**0.4%**
Total		**110,371.4**	**100.0%**

* See Table 3.1 for estimated condition category definitions

Table 5.13: Stormwater Length (m) by Material and Estimated Condition*

	Material					Total	
Estimated Condition	**Asbestos Cement**	**Concrete Pipe**	**Corrugated Steel Pipe**	**Polyethylene**	**Polyvinyl Chloride**	**Length (m)**	**% of Total**
Very Good		42,790.0		11.6	16,009.7	**58,811.3**	53.3%
Good		22,272.4			190.7	**22,463.1**	20.4%
Fair	460.9	21,071.4			308.2	**21,840.5**	19.8%
Poor		6,848.6				**6,848.6**	6.2%
Very Poor			407.9			**407.9**	0.4%
Total	**460.9**	**92,982.4**	**407.9**	**11.6**	**16,508.6**	**110,371.4**	
% of Total	0.4%	84.2%	0.4%	0.0%	15.0%		

* See Table 3.1 for estimated condition category definitions

5.6.2. Remaining Service Life – Stormwater Linear

Table 5.14: Stormwater Length (m) by Material and Remaining Service Life

	Material					Total	
Remaining Service Life	**Asbestos Cement**	**Concrete Pipe**	**Corrugated Steel Pipe**	**Polyethylene**	**Polyvinyl Chloride**	**Length (m)**	**% of Total**
> 10 Years	460.9	92,982.4		11.6	16,508.6	109,963.5	99.6%
0 Years			407.9			407.9	0.4%
Total	460.9	92,982.4	407.9	11.6	16,508.6	110,371.4	
% of Total	0.4%	84.2%	0.4%	0.0%	15.0%		

5.7. Stormwater Management Facilities

An Asset Management Plan (AMP) should include condition assessments in accordance with standard best practices. The Town is currently conducting visual inspections of its stormwater management (SWM) facilities, as part of the development of the comprehensive stormwater master plan. The visual inspections will assist in determining required maintenance, according to the O&M manual, to ensure the SWM facility continues to meet storm discharge water quality and quantity objectives as well as maintain storm pond design capacity. There are no defined lifecycles for SWM facilities in PSAB.

5.8. Fleet

An Asset Management Plan (AMP) should include condition assessments in accordance with standard best practices. The Town's fleet assets are listed in the PSAB records as well as on other spreadsheets maintained by various other divisions. These lists do not include condition data for the fleet assets. However, the PSAB records do include purchase dates, service life and category types for the fleet assets, in keeping with the Town's PSAB policy.

5.8.1. Remaining Service Life – Fleet

The anticipated asset lifecycle for feel varies depending on the service area and vehicle / equipment type. Table 5.15 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.

Lifecycle for this category is between 7 – 15 years.

Table 5.15: Number of Vehicles by Remaining Service Life and Division – Fleet (Cat. A)

	Division							
Remaining Service Life	**Building**	**By-Law**	**Fire**	**Leisure**	**PW**	**Transit**	**W & WW**	**Total**
6 - 10 Years	4	1	2	8	11		3	**29**
1 - 5 Years	1	2	3	5	7	3	8	**29**
0 Years				4	5		5	**14**
Total	**5**	**3**	**5**	**17**	**23**	**3**	**16**	**72**

5.9. Facilities

An Asset Management Plan (AMP) should include condition assessments in accordance with standard best practices. The Town's facilities assets are listed in the PSAB records and include the year built or replaced, but do not currently include condition data. Maintenance activities for each facility is documented in the Parks and Open Spaces Service Manual, 2016.

5.9.1. Facility Inventory Time of Need and Condition

Lifecycles for facility components can vary from 10 to 50 years; mechanical / electrical components would be in the 15 year range, a roof in the 20 year range and a building structure in the 50 year range. These lifecycles assume adequate maintenance is provided throughout the course of the components life.

Comprehensive condition summaries of some the Town's facilities are performed periodically. Year built / installed and the expected service life can be used to estimate condition and replacement date where no condition assessment exists. Assessments are conducted on a regular schedule (i.e. 5 years), as per the facility maintenance schedule or on an as-needed basis. A condition summary will identify the remaining service of an individual component and prioritize its replacement based on actual condition and position on the lifecycle deterioration curve.

5.10. Parks

An Asset Management Plan (AMP) should include condition assessments in accordance with standard best practices. The Town's park assets include land and land improvements.

5.10.1. Parks Inventory Estimated Service Life

Land usually has an indefinite life that exceeds the useful lives of the buildings, roads or structures situated on it. The cost of acquired land is not amortized as land normally maintains its value over time. Land improvements within the boundaries of the Town's parks and open spaces (i.e. sports fields, trails, parking lots, etc.) have a useful life ranging from 15 – 25 years. Some examples, as of December 31, 2015 PSAB data, include:

- Sports fields – 25 years
- Play structures (incl. splash pads) – 15 years
- Benches and bleachers – 15 years
- Fencing – 20 years
- Trails – 20 years
- Parking lots – 25 years

Rehabilitation and replacement activities occur according to remaining service life and visual inspections. Future updates to the Asset Management Plan will include actual / estimated conditions and remaining service life for land improvements.

5.11. Transit

An Asset Management Plan (AMP) should include condition assessments in accordance with standard best practices. The Town contracts out the operations and maintenance to most of the transit assets. The assets are owned by the Town and are recorded in the Town's PSAB records. These records do not include condition data for the transit assets. However, the PSAB records do include the purchase dates and service life.

5.11.1. Parks Inventory Estimated Service Life

Transit assets, including busses, bus pads, shelters and signs have a useful life ranging from 7 – 25 years:

- Bus – 7 years
- Bus pad – 25 years
- Shelter – owned and maintained by supplier
- Signs – N/A

Busses were purchased in 2104; remaining life is estimated at 5 years. The majority of bus pads were constructed in 2014 with additions in 2015 and 2016; remaining life is estimated at 23 years for the