Municipal Structure Inventory and Inspection 2018

Town of New Tecumseth

January 8, 2019

Doug Austin, C.E.T.
Manager of Capital Projects and Asset Management
Engineering Department
Town of New Tecumseth
10 Wellington Street East
Alliston, Ontario
L9R 1A1

Dear Mr. Austin:

Project No: 11148861

Regarding: Municipal Structure Inventory and Inspection – 2018

GHD is pleased to submit this report with the respect to the results of the 2018 Municipal Structure Inventory and Inspection which outlines the results of our field inspection investigations for the above noted project.

This study was completed for the structure appraisals using Worktech's Asset Foundation Software. Structures were reviewed in accordance with the Municipal Bridge Appraisal Manual and Municipal Culvert Appraisal Manual.

With this report, all structure related data for those structures inspected in 2018 have been updated to present day values and the content of the report reflects conditions as of the time of the field data collection, in the summer of 2018 for the structure inventory.

We trust that this report will be beneficial to the Town of New Tecumseth in developing their asset management plans and wish to express appreciation for the opportunity for GHD to participate in the work.

Sincerely,
GHD Limited

Dennis Baxter, P. Eng.
Associate
Senior Manager, Bridges
dennis.baxter@ghd.com

DLB/jrep
Encl.

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
-	DLB	October 2018	Draft
1	JREP	December 2018	Town's comments November 23, 2018
2	JREP	January 2019	Removal of structures #12072 and #12073

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Stamp

LICENSED PROFESSIONAL ENGINEER
D. L. BAXTER
Jan 8/19
PROVINCE OF ONTARIO

Executive Summary

The Town of New Tecumseth 2018 Municipal Structure Inventory and Inspection Study provides a summary of structure condition ratings identified during rating surveys conducted by GHD Limited in 2018. A total of eighty-eight (88) structures of 1.8 m span or greater were reviewed in 2018 and are included in this report.

Data collection and structure ratings were completed in accordance with the Municipal Bridge Appraisal and Municipal Culvert Appraisal Manuals and the Ontario Structure Inspection Manual. The scope of the report includes summaries of collected data, with discussion and analysis regarding same.

A total of eighty-eight (88) bridge and culvert structures were inspected in 2018. A total of eighty-four (84) bridge and culvert structures are owned by the Town with one (1) bridge and two (2) culverts owned by the County of Simcoe along with one (1) bridge owned by the Canadian Pacific Railway. The assignment included an assessment of sixty-two (62) bridges and twenty-six (26) culverts which are currently identified on the Town of New Tecumseth's Road System.

Structure Ownership			
	# of Bridge(s)	# of Culvert(s)	Total #
Town of New Tecumseth	*60*	*24*	***84***
County of Simcoe	*1*	*2*	***3***
Canadian Pacific Railway	*1*	*0*	***1***
Total	***62***	***26***	***88***

Key items contained within the inspection report are summarized below:

- Three (3) existing bridges and two (2) existing culverts were added to the scope of the study since 2016. The structures have been identified as Bridge No. 00191, 12070, 12071 and Culverts No. 12074 and 12075.
- The County of Simcoe has confirmed ownership of Bridge No. 00191, Culvert No. 12055 and 12060. The Canadian Pacific Railway has confirmed ownership of Bridge No. 12034 located on 9th Line as shown in ***Table 12*** of this report.
- Two (2) bridges have existing load limit postings as identified in ***Table 1***. These existing load limits can be retained.
- There are twelve (12) bridges designated for further engineering investigations, as identified in ***Table 2*** at a total cost of ***$210,000***.
- Six (6) bridges are designated for replacement, as identified in ***Table 4*** at a total cost of ***$12,418,000.*** The bridge replacement needs are based on travel deck width deficiency, surface width deficiency, vertical clearance and deteriorated condition. Bridge No. 12034 has been designated for replacement and is owned by the Canadian Pacific Railway for which the replacement costs have been omitted from the total shown above.
- There is one (1) new grade separation to be constructed at this time, identified in ***Table 4*** as at a total cost of ***$6,767,000.***

- Fifty (50) bridges require rehabilitation, as identified in ***Table 5*** at an estimated cost of ***$11,323,000.*** Bridge No. 00191 has been designated for rehabilitation and is owned by the County of Simcoe for which the rehabilitation costs have been omitted from the total shown above.
- Seventeen (17) culverts require rehabilitation, as identified in ***Table 6*** at an estimated cost of ***$890,000***.
- Thirty-eight (38) bridges and six (6) culverts require guide rail installation, extension or upgrades, as identified in ***Table 7*** at a total cost of ***$3,564,000***. All NOW need guide rail requirement costs provided do not include the potential traffic control costs that may be incurred if the guide rail work is undertaken independent of other necessary works. Bridge No. 00191 and 12034 has been designated for guide rail rehabilitation and not owned by the Town for which the rehabilitation costs have been omitted from the total shown above.
- Bridge No. 12063 & 12065 will require on-going monitoring of the piers and abutments every 3 months to ensure safety and serviceability. Bridge 12033 will require on-going monitoring of the embankments after significant rainfall, as identified in ***Table 13***. Monitoring is to be completed by the Town. If a change in the existing condition is identified a structural engineer should be notified.
- An Adjusted for Owners Share summary of the total structure construction and rehabilitation needs resultant from the 2018 Structure Inspection for the ten year period is estimated to be ***$30,116,200*** for the existing Town's structure system. Of this total cost ***$20,131,200*** are for NOW needs, ***$8,657,000*** are for structure 1-5 year needs and ***$1,328,000*** are for the 6-10 year needs, as identified in ***Tables 14*** and ***15***.
- The average age of the Town's bridge structures is ***59.1*** years; the average age of the culvert structures is ***37.8*** years.

Recommended funding for the structure inventory would include sufficient capital expenditures that would allow the replacement of infrastructure as it meets its design life.

For new structures, the design lifespan is now 75 years; however, structures constructed prior to 2000 were generally designed for a 50 year lifespan. Accordingly between 1.5% and 2.0% of the overall current replacement value of the entire structure inventory of ***$69,939,827***, as identified in ***Table 16*** should be budgeted annually to ensure that the structure inventory can be maintained in perpetuity. It is noted that as the structures are replaced, the annual allocation could be reduced to 1.5%.

Based on the aforementioned structure inventory replacement value of ***$69,939,827*** and the data included in this report the estimated minimum annual capital program for structures should be in the amount of ***$1,356,000*** (1.94%) per year for the Town of New Tecumseth to maintain the current system adequacy. However, given the average age of the Town's structures inventory, it is quite probable that expenditures on structures will be even higher than estimated over the next decade as the older structures reach a terminal condition.

All costs contained within the structure appraisal reports include engineering and contingencies, and are based on 2018 construction dollars.

Rehabilitation and replacement recommendations are provided within this report. The costs associated within these recommendations should be budgeted above and beyond the recommended annual capital program amount of ***$1,356,000*** as shown above to maximize the service life of the structures.

Completion of the 2018 re-inspection of eighty-eight (88) bridge and culvert structures on the Town's road system has resulted in reliable and current data being available to the Town to implement a maintenance program ensuring the Town's structures are kept safe and in good repair. Maintenance of the Bridge and Culvert Management Program will require updating of databases on an on-going annual basis to reflect previous year rehabilitation/replacement project updates. It is recommended that the structures be re-inspected under the direction of a qualified structural engineer every two (2) years.

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1. Introduction

The Town of New Tecumseth 2018 Municipal Structure Inventory and Inspection Study provides a summary of structure condition ratings identified during rating surveys conducted by GHD Limited in 2018. All of the Town of New Tecumseth's structures of 1.8 m span or greater were reviewed in 2018. The Town of New Tecumseth's total inventory of eighty-eight (88) structures are included in this report.

The Province of Ontario passed amendments in 1997 to existing legislation in the Highway Traffic Act (HTA), The Bridges Act (BA) and the Public Transportation and Highway Improvement Act (PTHIA) Regulation 104/97 that requires all bridge and culvert structures with a span greater than 3.0 m to be inspected under the direction of a Professional Engineer at no greater than two (2) year intervals.

Under this regulation municipalities are responsible for ensuring that their bridges are kept safe and in good repair. This should be done through the performance of regular bridge inspections in accordance with the Ontario Structure Inspection Manual, or equivalent. A detailed inspection involves a thorough examination of bridge components, along with an assessment of the overall bridge condition.

This study is intended to provide documentation of the existing condition of the Town's structure inventory and establishment of recommendations and cost estimates for repair and/or upgrading of the structures to provide an economical and cost effective means of maintaining the current infrastructure.

Data collection and structure ratings were completed in accordance with the Municipal Bridge Appraisal and Municipal Culvert Appraisal Manuals and the Ontario Structure Inspection Manual 2000 Revised (Nov 2003 and Apr 2008). This study is in accordance with the Town's legislative requirements of The Public Transportation and Highway Act – Regulation 104/97.

The scope of the report includes summaries of collected data, with discussion and analysis regarding same.

Also under the new regulations, municipalities are still responsible for passing load limit bylaws. In place of the MTO review, engineering recommendations to support the load limit and the duration for which it is valid, must now be stamped by two (2) professional engineers.

GHD Limited was retained by the Town of New Tecumseth to inspect a total of eighty-eight (88) bridge and culvert structures on the Town of New Tecumseth's road system in 2018 and prioritize the maintenance, repair and replacement works for these structures.

GHD Limited has completed the structure appraisals using WorkTech's Asset Foundation Software.

The procedures used to carry out this 2018 structure inventory are explained in detail in the following manuals published by the Ministry of Transportation and Municipal Engineers Association.

a) **Municipal Bridge Appraisal Manual**
February 1992

b) **Municipal Culvert Appraisal Manual**

August 1993

c) **Ontario Structure Inspection Manual 2000 (OSIM)**

Revised (Nov 2003 and Apr 2008)

This report documents the visual inspection and recommendations for the maintenance, repair or replacement (MR&R) of the structures.

2. Scope of Work

The assignment included an assessment of sixty-two (62) bridges and twenty-six (26) culverts which are currently identified on the Town of New Tecumseth's road system. The work involved the following tasks:

1. A visual re-inspection for deficiencies and the recording of any relevant dimensions.
2. An updated photographic inventory of the structure appearance and deficiencies.
3. The compilation of the field review using Worktech Asset Foundation Software.
4. An individual assessment of the condition and state of repair/non-repair of each structure, as well as the recommendation of improvements and estimated costs to bring the existing structure to an acceptable level-of-service.
5. Recommendation of the feasible options and cost-effectiveness of maintaining the existing structure versus possible replacement and the costs and timing of the same.
6. Development of a spread sheet program to determine various condition and appraisal ratings for each structure. The program includes an algorithm to determine an Overall Condition Rating, Functional Needs Rating and Overall Rating for each structure as outlined in ***Appendix E***. Relative rankings of bridge and culvert needs have also been provided.
7. Identification of specific budget recommendations for detailed condition surveys and bridge rehabilitation/replacement including associated engineering design and supervision and construction estimates.

3. Structure Categorization

The following definitions were used in the preparation of the Bridge and Culvert Appraisal Reports:

Bridge - In general, transfers all live loads through a superstructure to a substructure and foundations. Bridges that were originally designed as a bridge and have some depth of fill placed over the deck have been inspected as a bridge.

Box or open type structure having less than 600 mm of cover have been inspected as a bridge and those with more than 600 mm of cover have been inspected as a culvert.

Culvert - In general, transfers all live loads through fill.

4. Structure Inventory and Identification of Maintenance, Repair and Replacement Needs

A total of eighty-eight (88) bridge and culvert structures were appraised in 2018. The results of our inspection and recommendations are summarized in the Municipal Bridge and Culvert Appraisal Sheets which are provided in ***Appendix F***. A summary of the results of the inspection program for all bridge and culvert structures has been presented in ***Appendices B and C***.

Appendix B contains a list of the sixty-two (62) bridges inventoried and appraised while ***Appendix C*** lists the twenty-six (26) culverts.

Based on a review of our inspection findings, recommendations and cost estimates were developed for structures which required maintenance, repair or replacement as shown in the Recommended Needs section of the structure appraisal reports. ***Tables B1 and C1*** included in ***Appendix B*** and ***Appendix C*** summarize basic structure data for all bridge and culvert needs identified through the structure appraisal. The priority ranking of the bridges and culverts based on the results of the Bridge and Culvert Management System are also shown. Of the eighty-eight (88) bridge and culvert structures that were appraised in 2018, recommendations are summarized in ***Sections 4.1 to 4.4*** of this report.

All costs contained within the structure appraisal reports include engineering and contingencies, and are based on 2018 construction dollars.

4.1 Load Limit Bylaws

L3 postings govern single unit vehicles; L2 postings govern two unit vehicles; and L1 postings govern vehicle trains. Section 13 of Bill 92 amends Section 123 of the Highway Traffic Act dealing with the load limit by-laws. Municipalities retain the authority to pass load limit by-laws, but approval of the Minister of Transportation is no longer required. Two engineer's stamps for all load limit by-law recommendations, including load posting and duration, generally 2 years, are now required. Load posting assessments are currently being carried out during the annual bridge inspection updates. Load limit recommendations are summarized in ***Table 1***.

Table 1 Load Limit Recommendations

Load Limit Recommendations							
Structure No.	**Location**	**Existing Load Limit**			**Recommended Load Limit**		
		L3	**L2**	**L1**	**L3**	**L2**	**L1**
12001	*14th Line, Lot 9, Conc XIII/XIV, 14th Line, 1.50 km E of Town Road 10*	*15*	-	-	*15*	-	-
12034(*)	*9th Line, Lot 6, Conc VIII/IX, 9th Line, 0.15 km E of Tottenham Road*	*15*	-	-	*15*	-	-

(*) Structure ownership other than that of the Town of New Tecumseth

4.2 Engineering Investigations

There are a total of twelve (12) bridges designated for further engineering investigations to confirm visual repair recommendations as summarized in ***Table 2*** at a total cost of ***$210,000***. It is recommended that engineering investigations be completed within 2 to 4 years prior to structure rehabilitations.

Table 2 Engineering Investigations

Engineering Investigations					
Structure No.	**Priority**	**Location**	**Recommended Engineering Investigation**	**Cost for Budget Purposes**	**Estimated Rehabilitation Cost**
12020	*4*	*5th line, Lot 21, Conc IV/V, 5th Line, 0.30 km E of 20th Sideroad*	*Deck Condition Survey / Rehabilitate/Replace Analysis*	*$15,000*	*$202,000*
12032	*7*	*Strangways Bridge, Lot 10/11, Conc IX, 10th Sideroad, 0.35 km N of 9th Line*	*Deck Condition Survey*	*$20,000*	*$1,072,000*
12013	*13*	*11th Line, Lot 19, Conc X/XI, 11th Line, 0.90 km W of 20th Sideroad*	*Deck Condition Survey*	*$15,000*	*$151,000*
12024	*16*	*9th Line, Lot 16, Conc VIII/IX, 9th Line, 0.50 km E of 15th Sideroad*	*Deck Condition Survey / Environmental Study*	*$25,000*	*$471,000*
12012	*19*	*14th Line, Lot 21, Conc XIII/XIV, 14th Line, 0.40 km E of 20th Sideroad*	*Deck Condition Survey*	*$15,000*	*$345,000*
12002	*20*	*13th Line, Lot 9, Conc XII/XIII, 13th Line, 0.90 km W of 10th Sideroad*	*Deck Condition Survey*	*$25,000*	*$229,000*
12005	*21*	*12th Line, Lot 12, Conc XI/XII, 12th Line, 1.10 km E of 10th Sideroad*	*Deck Condition Survey*	*$15,000*	*$330,000*
11010	*45*	*Spring Creek Pedestrian Bridge, Albert Street School Site, Alliston, 0.05 km S of Albert Street*	*Load Capacity Evaluation*	*$10,000*	*$74,000*
12003	*39*	*Maynard Bridge, Lot 10/11, Conc XII, 10th Sideroad, 0.35 km N of 12th Line*	*Deck Condition Survey*	*$15,000*	*$600,000*
12015	*12*	*10th Line, Lot 21, Conc IX/X, 10th Line, 0.35 km E of 20th Sideroad*	*Deck Condition Survey*	*$15,000*	*$151,000*
12027	*60*	*11th Line, Lot 15, Conc X/XI, 11th Line, 0.35 km W of 15th Sideroad*	*Structure Investigation*	*$20,000*	*$0.00*
12033	*18*	*9th Line, Lot 9, Conc VIII/IX, 9th Line, 0.90 km W of 10th Sideroad*	*Structure Investigation*	*$20,000*	*$1,948,000*
			Total	***$210,000***	

Detailed Condition Survey - A detailed deck condition survey is generally carried out after a bridge has been identified for rehabilitation. The data collected is used to confirm the rehabilitation method and to provide improved quantity estimates for construction contract documents. The procedure for carrying out a detailed condition survey involves the observation and recording of surface defects and may also involve a delamination survey, cover meter survey, corrosion potential survey, coring of concrete components, asphalt sawn samples and physical testing of the concrete cores.

Environmental Study - An environmental study is twofold. For minor projects, it provides background studies necessary for obtaining permits from approving agencies. For major projects, it provides a full assessment of various rehabilitation/replacement alternatives, includes detailed environmental investigations, provides a public consultation process, confirms requirements from approving agencies and develops mitigating methods required for inclusion in construction contracts. For bridge structures over 40 years old, the environmental study will also assess the heritage value of the built structure and identify heritage considerations for the design process.

Load Capacity Evaluation - A load capacity evaluation is a determination of a bridge's capacity to carry traffic loads. The need for an evaluation may be created by any of the following: observed or suspected defects, deterioration, or damage that may affect load capacity; anticipated increase in actual or legally permitted traffic loading; change in road classification; review of an existing load limit posting; any altercation to a bridge that may affect its live load capacity; or unsatisfactory performance of the bridge in terms of serviceability or fatigue.

Structure Investigation - A structure investigation is any other engineering investigation required to confirm rehabilitation/replace recommendations such as hydrology, foundations, geotechnical, etc.

4.3 Structure Removal

- There are no structures designated for removal at this time.

4.4 Structure Replacements

- There are six (6) bridges designated for replacement at this time, as identified in ***Table 4*** at a total cost of ***$12,418,000***. Bridge No. 12034 has been designated for replacement and is owned by the Canadian Pacific Railway for which the replacement costs have been omitted from the total shown above.
- There is one (1) new grade separation to be constructed at this time, identified as Bridge No. 11000 in ***Table 4*** at a total cost of ***$6,767,000.***
- There are no culverts designated for replacement at this time.

4.5 Structure Rehabilitations

- Fifty (50) bridges require rehabilitation, as identified in ***Table 5*** at a total cost of ***$11,323,000*.** They are presented in order of priority as determined from the Bridge Improvement Priority Program. Bridge No. 00191 has been designated for rehabilitation and is owned by the County of Simcoe for which the rehabilitation costs have been omitted from the total shown above.
- Seventeen (17) culverts require rehabilitation, as identified in ***Table 6*** at a total cost of ***$890,000*.** They are presented in order of priority as determined from the Culvert Improvement Priority Program.
- There are a total of thirty-eight (38) bridges and six (6) culverts that require guide rail installation, extension or upgrades as identified in ***Table 7*** at a total cost of ***$3,564,000.*** Bridge No. 00191

and 12034 has been designated for guide rail rehabilitation and not owned by the Town for which the rehabilitation costs have been omitted from the total shown above.

- Overall Structure Inventory with priority rankings for all bridge and culvert structures has been identified in ***Tables 8, 9, 10 & 11*****.**
- Structures identified as not being owned by the Town have been presented in ***Table 12***.
- There are a total of three (3) bridges that require on-going monitoring by Town staff to ensure safety and serviceability. Bridge No. 12033 requires monitoring after each significant rainfall. Bridge No. 12063 and 12065 require monitoring of the piers and abutments at 3 month intervals.

Table 3 Structure Removal

Bridge Removal - 2018							
Bridge No.	**Priority**	**Location**	**Reason for Improvement**	**Estimated Remaining Service Life**	**Impact of Deferral**	**Interim Works to Extend Life**	**Replacement Cost**
-	-	-	-	-	-	-	-

Culvert Removal - 2018							
Culvert No.	**Priority**	**Location**	**Reason for Improvement**	**Estimated Remaining Service Life**	**Impact of Deferral**	**Interim Works to Extend Life**	**Replacement Cost**
-	-	-	-	-	-	-	-

Table 4 Structure Replacements

Bridge Replacements - 2018							
Bridge No.	**Priority**	**Location**	**Reason for Improvement**	**Estimated Remaining Service Life**	**Impact of Deferral**	**Interim Works to Extend Life and/or Address Safety Issues**	**Replacement Cost**
11011	*1*	*Boyne River Pedestrian Walkway, Dominion Street, Alliston, 0.05 km S of Fletcher Crescent*	*Deteriorated condition*	-	*Closure*	*NA*	*$720,000*
12004	*5*	*12th Line, 12th Line, 0.35 km E of 10th Sideroad*	*Deteriorated condition*	*5 -10 yrs*	*Reduced load limit posting*	*N/A*	*$2,022,000*
12001	*11*	*14th Line, 14th Line, 1.50 km E of County Road 10*	*Travel deck width deficiency and deteriorated condition*	*5 -10 yrs*	*Reduced load limit posting*	*N/A*	*$3,723,000*
12034(*)	*14*	*9th Line, 9th Line, 0.15 km E of Tottenham Road*	*Travel deck width deficiency and deteriorated condition*	*5 -10 yrs*	*Reduced load limit posting*	*Install steel beam guide rails on the bridge approaches*	*$5,310,000*
12033	*18*	*9th Line, 9th Line, 0.90 km W of 10th Sideroad*	*Travel deck width deficiency and deteriorated condition*	*>10 yrs*	*Load limit posting*	*Install steel beam guide rails on the bridge approaches*	*$1,948,000*
12037	*28*	*7th Line, 7th Line, 0.80 km E of Tottenhan Road*	*Surface width deficiency and vertical clearance deficiency*	*>10 yrs*	*N/A*	*N/A*	*$4,005,000*
						Total	***$17,728,000***

(*) Structure ownership other than that of the Town of New Tecumseth

Culvert Replacements - 2018							
Culvert No.	**Priority**	**Location**	**Reason for Improvement**	**Estimated Remaining Service Life**	**Impact of Deferral**	**Interim Works to Extend Life and/or Address Safety Issues**	**Replacement Cost**
-	-	-	-	-	-	-	-

Proposed Grade Separations					
Bridge No.	**Location**	**AADT**	**# Trains Per Day**	**Estimated Exposure Index**	**Cost**
11000	*Victoria Street, Victoria Street West (Hwy #89), 0.05 km W of Dufferin Street*	*16,490*	*21*	*346,290*	*$6,767,000*

Table 5 Structure Rehabilitations - Bridges

Bridge Rehabilitation Needs by Priority Ranking - 2018					
Bridge No.	**Priority**	**Bridge Name**	**Location**	**Recommended Work**	**Rehabilitation Cost**
Rehabilitations					
12065	*2*	*Beattie Bridge*	*13th Line, 0.20 km S of 13th Line*	*Replace miscellaneous piles (5 total) and replace pile cap at west pier*	*$124,000*
12063	*3*	*Beeton Creek Crossing*	*9th Line, 0.22 km N of 9th Line*	*Repair miscellaneous piles (14 in total), cross bracing, pier cap members*	*$178,000*
12020	*4*	*5th Line, Lot 21, Conc IV/V*	*5th Line, 0.30 km E of 20th Sideroad*	*Reface concrete abutment footings, repair vertical cracks in the abutment faces, repair deck soffit, wingwalls and install steel beam guide rails over the structure and on the approaches*	*$202,000*
12064	*6*	*Bailey Creek Bridge*	*10th Line, 0.10 km N of 10th Line*	*Repair miscellaneous piles (8 total), rotted timber pier members and rotted timber cross bracing*	*$130,000*
12032	*7*	*Strangways Bridge, Lot 10/11, Conc IX*	*10th Sideroad, 0.35 km N of 9th Line*	*Replace concrete deck topping, waterproof and pave, install new sealed expansion joints, reconstruct concrete curbs and parapet walls in conjunction with the deck topping replacement, repair girders and wingwalls and install steel beam guide rails on the bridge approaches*	*$1,072,000*
12009	*8*	*13th Line, Lot 21, Conc XII/XIII*	*13th Line, 0.08 km E of 20th Sideroad*	*Repair handrails, curbs, wingwalls, abutments, install steel beam guide rails on the bridge approaches, seal cracks in asphalt, repair soffit and restore roadway embankments*	*$197,000*
11001	*9*	*Cunninghan Bridge*	*Church Street North, Alliston, 0.13 km N of Victoria Street West*	*Overlay, waterproof and pave the bridge deck, convert to semi-integral, replace handrails, overlay concrete sidewalks, clean, paint and repair structural steel girders, restore embankments and patch wingwalls and replace bearings*	*$1,407,000*
12043	*10*	*2nd Line, Lot 5, Conc I/II*	*2nd Line, 0.55 km W of Tottenham Road*	*Install steel beam guide rails over the structure and on the approaches, repair concrete deck soffit, curbs, abutments, wingwalls and place rock protection in front of the abutments*	*$236,000*
12015	*12*	*10th Line, Lot 21, Conc IX/X*	*10th Line, 0.35 km E of 20th Sideroad*	*Repair concrete deck, soffit, abutment, wingwall and wearing surface, install steel beam guide rails on the bridge approaches continuous with the guide rail on the structure, replace deteriorated posts and place rock protection*	*$183,000*

12013	13	*11th Line, Lot 19, Conc X/XI*	*11th Line, 0.90 km W of 20th Sideroad*	*Repair concrete deck soffit, handrails, wingwalls, retaining walls, curbs, abutments and fascias and install steel beam guide rails on the bridge approaches*	*$151,000*
12006	15	*12th Line, Lot 14, Conc XI/XII*	*12th Line, 2.10 km E of 10th Sideroad*	*Place rock protection on the embankments in front of the abutments and install steel beam guide rails on the bridge approaches and replace damaged sections, patch curbs, seal cracks in deck top and replace deteriorated section of soffit*	*$144,000*
12024	16	*9th Line, Lot 16, Conc VIII/IX*	*9th Line, 0.50 km E of 15th Sideroad*	*Install steel beam guide rails on the bridge approaches, place rock slope protection in the river channel in front of the abutments, repair handrails, curbs and soffit*	*$471,000*
12018	17	*6th Line, Lot 22, Conc V/VI*	*6th Line, 0.75 km E of 20th Sideroad*	*Replace the concrete curbs and handrails with cantilevered concrete curbs and parapet walls to eliminate the deck width deficiency, repair soffit and wingwalls and install steel beam guide rails on the bridge approaches*	*$208,000*
12012	19	*14th Line, Lot 21, Conc XIII/XIV*	*14th Line, 0.40 km E of 20th Sideroad*	*Overlay the bridge deck with latex modified concrete, repair concrete curbs, handrail, soffit, wingwalls, replace rock protection in front of the west abutment, install steel beam guide rails on the bridge approaches*	*$345,000*
12002	20	*13th Line, Lot 9, Conc XII/XIII*	*13th Line, 0.90 km W of 10th Sideroad*	*Repair concrete handrails, curbs and deck soffit, T-beam, pier, wingwalls, place rock protection on the embankments in front of the abutments and upgrade guide rail and replace deck drains*	*$229,000*
12005	21	*12th Line, Lot 12, Conc XI/XII*	*12th Line, 1.10 km E of 10th Sideroad*	*Patch, waterproof and pave the bridge deck, repair concrete handrails, curbs and wingwalls, backfill eroded areas of the roadway embankments and streambanks, place rock protection and install steel beam guide rail on the bridge approaches*	*$330,000*
12010	22	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.70 km N of 13th Line*	*Repair concrete handrails, curb, wingwall, soffit and install steel beam guide rails on the bridge approaches*	*$158,000*
12059	23	*Gilroy Bridge, Lot 1, Conc XII*	*Adjala-Tecumseth Townline, 0.20 km N of 12th Line*	*Replace curbs and handrails with parapet walls, install guide rail on the approaches and seal cracks in asphalt, restore roadway embankments, patch soffit and wingwall.*	*$310,000*
12054	24	*Centre Street North*	*Centre Street North, Beeton, 0.72 km N of Main Street*	*Patch repair fascia, soffit, curbs and replace handrail*	*$36,000*
12019	25	*5th Line, Lot 21, Conc IV/V*	*5th Line, 0.10 km E of 20th Sideroad*	*Install steel beam guide rails over the structure and on the approaches, repair concrete deck soffit, curbs, abutments, wingwalls, reface concrete abutment footings and repair vertical cracks in the abutment faces*	*$216,000*
12021	26	*4th Line, Lot 20, Conc III/IV*	*4th Line, 0.45 km W of 20th Sideroad*	*Repair curbs, abutments, deck soffit, north and south fascia and install steel beam guide rails over the structure and on the approaches*	*$170,000*
12049	27	*2nd Line, Lot 21, Conc I/II*	*2nd Line, 0.40 km E of 20th Sideroad*	*Repair curb, soffit, abutments, t-beams, wingwalls and guide rail end treatment*	*$84,000*
12039	29	*6th Line, Lot 7, Conc V/VI*	*6th Line, 0.75 km E of Tottenham Road*	*Remove existing fill from the bridge check, patch repair bridge deck, widen deck 0.6m each side and construct head wall to retain fill*	*$693,000*

12044	30	5th Line, Lot 7, Conc IV/V	5th Line, 0.80 km E of Tottenham Road	Patch soffit, wingwalls and curb and stabilize roadway embankments	$56,000
12030	31	Beder Turf Bridge, Lot 5, Conc IX/X	10th Line, 0.55 km W of Tottenham Road	Repair deck surface, handrails, soffit, abutments and install steel beam guide rails on the bridge approaches and extend deck drains	$164,000
12071	32	12th Line Pedestrian Trail CN Wood Bridge	12th Line, 0.1 km S of 12th Line	Patch abutments and wingwalls	$8,000
12016	33	9th Line, Lot 21, Conc VIII/IX	9th Line, 0.40 km E of 20th Sideroad	Replace deck drains, repair deck soffit, fascias and wingwalls, replace the concrete curbs and handrails with cantilevered concrete curbs and parapet walls to eliminate the deck width deficiency and install steel beam guide rails on the bridge approaches	$244,000
12008	34	Jebb Bridge, Lot 20/21, Conc XII	20th Sideroad, 0.68 km N of 12th Line	Seal crack and patch concrete deck, repair concrete handrail, install steel beam guide rail on the bridge approaches and restore embankment	$131,000
12023	35	10th Line, Lot 16, Conc IX/X	10th Line, 0.63 km E of 15th Sideroad	Repair concrete railings, curbs and wingwalls, and install steel beam guide rails on the bridge approaches	$143,000
12047	36	Ransom Bridge	10th Sideroad, 0.25 km N of 4th Line	Install steel beam guide rails over the structure and on the approaches, seal cracks, patch pot holes and seal cracks in wearing surface and repair abutment	$157,000
12026	37	Broom Bridge, Lot 18, Conc IX/X	10th Line, 1.20 km E of 15th Sideroad	Install steel beam guide rails on the bridge approaches, patch curbs, railing system, wingwalls and abutment	$131,000
12003	38	Maynard Bridge, Lot 10/11, Conc XII	10th Sideroad, 0.35 km N of 12th Line	Backfill eroded areas of the embankments and place rock protection and install steel beam guide rails on the approaches at the structure, repair parapet walls, girders, curbs, deck soffit, patch waterproof and pave, replace abutment bearings and resurface approach	$600,000
12045	39	4th Line, Lot 7, Conc III/IV	4th Line, 1.10 km E of Tottenham Road	Repair wingwall	$8,000
12036	40	7th Line, Lot 7, Conc VI/VII	7th Line, 1.10 km E of Tottenham Road	Widen super structure to eliminate the deck width deficiency, provide new curbs and barrier system, upgrade guide rail with end treatments, patch soffit and replace retaining wall	$699,000
12029	41	McCarron Bridge, Lot 7, Conc IX	10th Line, 1.10 km E of Tottenham Road	Install steel beam guide rails on the bridge approaches, patch curbs, handrail, seal construction joint on southeast wingwall and repair soffit	$138,000
12050	42	20th Sideroad, Lot 20/21, Conc 1	20th Sideroad, 0.30 km N of Highway 9	Upgrade guide rail end treatments, upgrade timber guide rail posts, seal cracks in the asphalt, patch repair curbs, parapet wall and soffit and replace expansion joint seals	$163,000
11010	43	Spring Creek Pedestrian Bridge	Albert Street, School Site, Alliston, 0.05 km S of Albert Street	Clean and paint structural steel	$74,000
12025	44	East Varcoe Bridge, Lot 16, Conc X/X1	11th Line, 0.95 km E of 15th Sideroad	Install steel beam guide rail on the bridge approaches, patch soffit, railing system and wingwall.	$132,000
11002	45	JJE McCague Bridge	Boyne Street, Alliston, 0.35 km N of Victoria Street East	Patch concrete end post, sidewalks, girders, restore undermined areas, place rock protection in front of abutments, replace	$170,000

				damaged section of aluminum handrail and expansion joint seals , remove polystyrene from end of deck and repair broken utility.	
12035	*46*	*Fish Bridge, Lot 5, Conc VIII/IX*	*9th Line, 0.50 km W of Tottenham Road*	*Install steel beam guide rails on the bridge approaches, patch repair handrails, soffit, fascia and curbs*	*$131,000*
00191(*)	*47*	*Nottawasaga River Bridge*	*Adjala-Tecumseth Townline, 0.42 km N of 12th Line*	*Seal cracks in asphalt and replace end treatment*	*$28,000*
12022	*48*	*West Varcoe Bridge, Lot 16, Conc X/XI*	*11th Line, 0.65 km E of 15th Sideroad*	*Install steel beam guide rail on the bridge approaches, patch handrails, curbs and abutments*	*$124,000*
12014	*49*	*20th Sideroad, Lot 20/21, Conc X*	*20th Sideroad, 0.50 km N of 10th Line*	*Install steel beam guide rails on the bridge approaches, patch repair soffit, wingwalls and replace deck drains*	*$144,000*
12007	*51*	*15th Sideroad, Lot 15/16, Conc XI*	*15th Sideroad, 0.10 km S of 12th Line*	*Upgrade guide rail end treatments, patch end dam*	*$108,000*
12038	*52*	*7th Line, Lot 5, Conc VI/VII*	*7th Line, 0.50 km W of Tottenham Road*	*Patch soffit and consider reconstructing the curbs with cantilevered sections, replacing railings to eliminate the travel deck width need and install steel beam guide rail on the bridge approaches*	*$364,000*
12058	*53*	*Adjala-Tecumseth Townline, Lot 1, Conc X*	*Adjala-Tecumseth Townline, 1.15 km N of 10th Line*	*Patch soffit*	*$7,000*
12011	*55*	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.40 km S of 14th Line*	*Patch repair wingwalls, soffit, curbs and install guide rail on the approaches and restore embankments*	*$155,000*
12057	*57*	*Adjala-Tecumseth Townline, Lot 1, Conc IX*	*Adjala-Tecumseth Townline, 0.30 km N of 9th Line*	*Patch repair parapet wall and soffit*	*$15,000*
12031	*59*	*10th Line, Lot 13, Conc IX/X*	*10th Line, 1.40 km E of 10th Sideroad*	*Patch repair approach curb*	*$14,000*
11003	*60*	*Sir Frederick Banting Road*	*Sir Frederick Banting Road, 0.20 km N of Victoria Street East*	*Repair curb and reconstruct approach sidewalks*	*$93,000*

(*) Structure ownership other than that of the Town of New Tecumseth

Table 6 Structure Rehabilitations - Culverts

Culvert No.	Priority	Culvert Name	Location	Recommended Work	Rehabilitation Cost
Culvert Rehabilitation Needs by Priority Ranking - 2018					
Rehabilitations					
12051	2	17th Sideroad, Lot 17/18, Conc I	17th Sideroad, 0.07 km S of 2nd Line	Repair concrete on soffit and abutment	$21,000
12042	3	3rd Line, Lot 4, Conc II/III	3rd Line, 0.75 km W of Tottenham Road	Patch soffit and abutments	$34,000
12075	4	Spring Creek Culvert	Victoria Street East (Hwy. 89), 0.34 km W of Industrial Parkway	Repair abutment wall, soffit and place rock protection in front of abutments	$161,000
12052-1-2	5	Lilly Street East	Lilly Street East, Beeton, 0.09 km E of Centre Street	Upgrade guide rail end treatments and replace rotted posts and replace retaining walls	$140,000
12041	7	Mill Street West	Mill Street West, Tottenham, 0.35 km W of Queen Street	Repair abutment wall, soffit and barrel ends	$21,000
12017	8	7th Line, Lot 22, Conc VI/VII	7th Line, 1.20 km E of 20th Sideroad	Install steel beam guide rail over the structure and on the approaches, patch cut-off wall and restore roadway embankments	$136,000
12040	9	Tecumseth Heights Drive	Tecumseth Heights Drive, 0.12 km S of 6th Line	Patch repair barrel and wingwall	$22,000
11012	10	CPR Pedestrian Underpass	Wellington Street East, Alliston, 0.10 km E of Centre Street	Repair abutment and retaining wall	$8,000
11005	11	Beattie Avenue	Beattie Avenue, Alliston, 0.10 km S of Cunningham Drive	Restore grouted rip-rap slope protection	$8,000
12062	15	7th Line, Lot 22, Conc VI/VII	7th Line, 0.54 km E of 20th Sideroad	Upgrade guide rail end treatments	$74,000
12048	16	4th Line, Lot 14, Conc III/IV	4th Line, 1.90 km E of 10th Sideroad	Patch repair barrel and repair guide rail end treatments and adjust height	$81,000
11009	17	Industrial Parkway / Spring Creek	Industrial Parkway, Alliston, 0.51 km S of Young Street	Patch repair barrel and headwall	$8,000
11007	18	Eight Avenue	Eighth Avenue, Alliston, 0.03 km S of Tupper Boulevard	Repair areas of culvert	$14,000
12069	21	Boyne Street High Flow Relief Culvert	Boyne Street, Alliston, 0.07 km N of Shephard Avenue	Patch repair soffit	$8,000
12061	22	20th Sideroad, Lot 20/21, Conc IV	20th Sideroad, 0.60 km N of 4th Line	Place rock protection at outlet to repair undermining	$6,000
12053	24	English Drive	English Drive , Beeton, 0.09 km E of Centre Street North	Upgrade guide rail end treatments	$74,000
11008	25	Church Street South	Church Street South, Alliston, 0.27 km N of Alderson Court	Upgrade guide rail end treatments and replace deteriorated wooden guide rail post	$74,000

Table 7 Summary of NOW Guide Rail Requirements

Older structures often lack approach guide rail or incorporate approach guide rail systems with buried or terminal ends that are considered to be deficient relative to current standards for end treatments. Additionally, railing systems on older structures often require augmentation with guide rail type systems installed in front of the railings. There are thirty-eight (38) bridges and six (6) culverts that require guide rail installation, extension of upgrades as identified in ***Table 7*** at a total cost of ***$3,564,000***. Bridge No. 00191 and 12034 has been designated for guide rail rehabilitation and not owned by the Town for which the rehabilitation costs have been omitted from the total shown above.

Bridge Guide Rail Requirements - 2018				
Bridge No.	**Bridge Name**	**Location**	**Recommended Work**	**Estimated Cost**
12002	*13th Line, Lot 9, Conc XII/XIII*	*13th Line, 0.90 km W of 10th Sideroad*	*Upgrade guide rail*	*$91,000*
12003	*Maynard Bridge, Lot 10/11, Conc XII*	*10th Sideroad, 0.35 km N of 12th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12005	*12th Line, Lot 12, Conc XI/XII*	*12th Line, 1.10 km E of 10th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12006	*12th Line, Lot 14, Conc XI/XII*	*12th Line, 2.10 km E of 10th Sideroad*	*Install steel beam guide rail on the bridge approaches and replace damaged sections*	*$91,000*
12007	*15th Sideroad, Lot 15/16, Conc XI*	*15th Sideroad, 0.10 km S of 12th Line*	*Upgrade guide rail end treatments*	*$91,000*
12008	*Jebb Bridge, Lot 20/21, Conc XII*	*20th Sideroad, 0.68 km N of 12th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12009	*13th Line, Lot 21, Conc XII/XIII*	*13th Line, 0.08 km E of 20th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12010	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.70 km N of 13th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12011	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.40 km S of 14th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12012	*14th Line, Lot 21, Conc XIII/XIV*	*14th Line, 0.40 km E of 20th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12013	*11th Line, Lot 19, Conc X/XI*	*11th Line, 0.90 km W of 20th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12014	*20th Sideroad, Lot 20/21, Conc X*	*20th Sideroad, 0.50 km N of 10th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12015	*10th Line, Lot 21, Conc IX/X*	*10th Line, 0.35 km E of 20th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12016	*9th Line, Lot 21, Conc VIII/IX*	*9th Line, 0.40 km E of 20th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12018	*6th Line, Lot 22, Conc V/VI*	*6th Line, 0.75 km E of 20th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*

12019	*5th Line, Lot 21, Conc IV/V*	*5th Line, 0.10 km E of 20th Sideroad*	*Install steel beam guide rail over the structure and on the approaches*	*$91,000*
12020	*5th Line, Lot 21, Conc IV/V*	*5th Line, 0.30 km E of 20th Sideroad*	*Install steel beam guide rail over the structure and on the approaches*	*$91,000*
12021	*4th Line, Lot 20, Conc III/IV*	*4th Line, 0.45 km W of 20th Sideroad*	*Install steel beam guide rail over the structure and on the approaches*	*$91,000*
12022	*West Varcoe Bridge, Lot 16, Conc X/XI*	*11th Line, 0.65 km E of 15th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12023	*10th Line, Lot 16, Conc IX/X*	*10th Line, 0.63 km E of 15th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12024	*9th Line, Lot 16, Conc VIII/IX*	*9th Line, 0.50 km E of 15th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12025	*East Varcoe Bridge, Lot 16, Conc X/X1*	*11th Line, 0.95 km E of 15th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12026	*Broom Bridge, Lot 18, Conc IX/X*	*10th Line, 1.20 km E of 15th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12029	*McCarron Bridge, Lot 7, Conc IX*	*10th Line, 1.10 km E of Tottenham Road*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12030	*Beder Turf Bridge, Lot 5, Conc IX/X*	*10th Line, 0.55 km W of Tottenham Road*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12032	*Strangways Bridge, Lot 10/11, Conc IX*	*10th Sideroad, 0.35 km N of 9th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12033	*9th Line, Lot 9, Conc VIII/IX*	*9th Line, 0.90 km W of 10th Sideroad*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12034(*)	*9th Line, Lot 6, Conc VIII/IX*	*9th Line, 0.15 km E of Tottenham Road*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12035	*Fish Bridge, Lot 5, Conc VIII/IX*	*9th Line, 0.50 km W of Tottenham Road*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12036	*7th Line, Lot 7, Conc VI/VII*	*7th Line, 1.10 km E of Tottenham Road*	*Upgrade guide rail end treatments*	*$91,000*
12038	*7th Line, Lot 5, Conc VI/VII*	*7th Line, 0.50 km W of Tottenham Road*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
12039	*6th Line, Lot 7, Conc V/VI*	*6th Line, 0.75 km E of Tottenham Road*	*Install steel beam guide rail on the bridge approaches*	*$65,000*
12043	*2nd Line, Lot 5, Conc I/II*	*2nd Line, 0.55 km W of Tottenham Road*	*Install steel beam guide rails over the structure and on the approaches*	*$91,000*
12047	*Ransom Bridge*	*10th Sideroad, 0.25 km N of 4th Line*	*Install steel beam guide rails over the structure and on the approaches*	*$91,000*
12049	*2nd Line, Lot 21, Conc I/II*	*2nd Line, 0.40 km E of 20th Sideroad*	*Repair guide rail end treatment*	*$15,000*
12050	*20th Sideroad, Lot 20/21, Conc 1*	*20th Sideroad, 0.30 km N of Highway 9*	*Upgrade guide rail end treatments, upgrade timber guide rail posts*	*$65,000*
12059	*Gilroy Bridge, Lot 1, Conc XII*	*Adjala-Tecumseth Townline, 0.20 km N of 12th Line*	*Install steel beam guide rail on the bridge approaches*	*$91,000*
00191(*)	*Nottawasaga River Bridge*	*Adjala-Tecumseth Townline, 0.42 km N of 12th Line*	*Replace guide rail end treatment*	*$13,000*

Culvert Guide Rail Requirements - 2018				
Culvert No.	**Culvert Name**	**Location**	**Recommended Work**	**Estimated Cost**
12048	*4th Line, Lot 14, Conc III/IV*	*4th Line, 1.90 km E of 10th Sideroad*	*Repair guide rail end treatments and adjust height*	*$65,000*
12017	*7th Line, Lot 22, Conc VI/VII*	*7th Line, 1.20 km E of 20th Sideroad*	*Install steel beam guide rail over the structure and on the approaches*	*$91,000*
12062	*7th Line, Lot 22, Conc VI/VII*	*7th Line, 0.54 km E of 20th Sideroad*	*Upgrade guide rail end treatments*	*$65,000*
11008	*Church Street South*	*Church Street South, Alliston, 0.27 km N of Alderson Court*	*Upgrade guide rail end treatments and replace deteriorated wooden guide rail posts*	*$65,000*
12053	*English Drive*	*English Drive , Beeton, 0.09 km E of Centre Street North*	*Upgrade guide rail end treatments*	*$65,000*
12052-1-2	*Lilly Street East*	*Lilly Street East, Beeton, 0.09 km E of Centre Street*	*Upgrade guide rail end treatments*	*$65,000*

(*) Structure ownership other than that of the Town of New Tecumseth

All guide rail requirement costs provided do not include the potential traffic control costs that may be incurred if the guide rail work is undertaken independent of other necessary works.

Table 8 Overall Bridge Inventory

Overall Bridge Inventory - 2018			
Bridge No.	**Priority**	**Bridge Name**	**Location**
00191(*)	*47*	*Nottawasaga River Bridge*	*Adjala-Tecumseth Townline, 0.42 km N of 12th Line*
11000	*61*	*Victoria Street*	*Victoria Street East (Hwy #89), 0.05 km W of Dufferin Street*
11001	*9*	*Cunninghan Bridge*	*Church Street North, Alliston, 0.13 km N of Victoria Street West*
11002	*45*	*JJE McCague Bridge*	*Boyne Street, Alliston, 0.35 km N of Victoria Street East*
11003	*60*	*Sir Frederick Banting Road*	*Sir Frederick Banting Road, 0.20 km N of Victoria Street East*
11010	*43*	*Spring Creek Pedestrian Bridge*	*Albert Street, School Site, Alliston, 0.05 km S of Albert Street*
11011	*1*	*Boyne River Pedestrian Walkway*	*Dominion Street, Alliston, 0.05 km S of Fletcher Crescent*
12001	*11*	*14th Line, Lot 9, Conc XIII/XIV*	*14th Line, 1.50 km E of County Road 10*
12002	*20*	*13th Line, Lot 9, Conc XII/XIII*	*13th Line, 0.90 km W of 10th Sideroad*
12003	*38*	*Maynard Bridge, Lot 10/11, Conc XII*	*10th Sideroad, 0.35 km N of 12th Line*
12004	*5*	*12th Line, Lot II, Conc XI/XII*	*12th Line, 0.35 km E of 10th Sideroad*
12005	*21*	*12th Line, Lot 12, Conc XI/XII*	*12th Line, 1.10 km E of 10th Sideroad*
12006	*15*	*12th Line, Lot 14, Conc XI/XII*	*12th Line, 2.10 km E of 10th Sideroad*
12007	*51*	*15th Sideroad, Lot 15/16, Conc XI*	*15th Sideroad, 0.10 km S of 12th Line*
12008	*34*	*Jebb Bridge, Lot 20/21, Conc XII*	*20th Sideroad, 0.68 km N of 12th Line*
12009	*8*	*13th Line, Lot 21, Conc XII/XIII*	*13th Line, 0.08 km E of 20th Sideroad*
12010	*22*	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.70 km N of 13th Line*
12011	*55*	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.40 km S of 14th Line*
12012	*19*	*14th Line, Lot 21, Conc XIII/XIV*	*14th Line, 0.40 km E of 20th Sideroad*
12013	*13*	*11th Line, Lot 19, Conc X/XI*	*11th Line, 0.90 km W of 20th Sideroad*
12014	*49*	*20th Sideroad, Lot 20/21, Conc X*	*20th Sideroad, 0.50 km N of 10th Line*
12015	*12*	*10th Line, Lot 21, Conc IX/X*	*10th Line, 0.35 km E of 20th Sideroad*

12016	33	9th Line, Lot 21, Conc VIII/IX	9th Line, 0.40 km E of 20th Sideroad
12018	17	6th Line, Lot 22, Conc V/VI	6th Line, 0.75 km E of 20th Sideroad
12019	25	5th Line, Lot 21, Conc IV/V	5th Line, 0.10 km E of 20th Sideroad
12020	4	5th Line, Lot 21, Conc IV/V	5th Line, 0.30 km E of 20th Sideroad
12021	26	4th Line, Lot 20, Conc III/IV	4th Line, 0.45 km W of 20th Sideroad
12022	48	West Varcoe Bridge, Lot 16, Conc X/XI	11th Line, 0.65 km E of 15th Sideroad
12023	35	10th Line, Lot 16, Conc IX/X	10th Line, 0.63 km E of 15th Sideroad
12024	16	9th Line, Lot 16, Conc VIII/IX	9th Line, 0.50 km E of 15th Sideroad
12025	44	East Varcoe Bridge, Lot 16, Conc X/X1	11th Line, 0.95 km E of 15th Sideroad
12026	37	Broom Bridge, Lot 18, Conc IX/X	10th Line, 1.20 km E of 15th Sideroad
12027	58	11th Line, Lot 15, Conc X/XI	11th Line, 0.35 km W of 15th Sideroad
12028	50	Deadman Bridge, Lot 10/11, Conc X	10th Sideroad, 0.40 km N of 10th Line
12029	41	McCarron Bridge, Lot 7, Conc IX	10th Line, 1.10 km E of Tottenham Road
12030	31	Beder Turf Bridge, Lot 5, Conc IX/X	10th Line, 0.55 km W of Tottenham Road
12031	59	10th Line, Lot 13, Conc IX/X	10th Line, 1.40 km E of 10th Sideroad
12032	7	Strangways Bridge, Lot 10/11, Conc IX	10th Sideroad, 0.35 km N of 9th Line
12033	18	9th Line, Lot 9, Conc VIII/IX	9th Line, 0.90 km W of 10th Sideroad
12034(*)	14	9th Line, Lot 6, Conc VIII/IX	9th Line, 0.15 km E of Tottenham Road
12035	46	Fish Bridge, Lot 5, Conc VIII/IX	9th Line, 0.50 km W of Tottenham Road
12036	40	7th Line, Lot 7, Conc VI/VII	7th Line, 1.10 km E of Tottenham Road
12037	28	7th Line, Lot 7, Conc VI/VII	7th Line, 0.80 km E of Tottenhan Road
12038	52	7th Line, Lot 5, Conc VI/VII	7th Line, 0.50 km W of Tottenham Road
12039	29	6th Line, Lot 7, Conc V/VI	6th Line, 0.75 km E of Tottenham Road
12043	10	2nd Line, Lot 5, Conc I/II	2nd Line, 0.55 km W of Tottenham Road
12044	30	5th Line, Lot 7, Conc IV/V	5th Line, 0.80 km E of Tottenham Road

12045	39	*4th Line, Lot 7, Conc III/IV*	*4th Line, 1.10 km E of Tottenham Road*
12046	56	*4th Line, Lot 9, Conc III/IV*	*4th Line, 0.85 km W of 10th Sideroad*
12047	36	*Ransom Bridge*	*10th Sideroad, 0.25 km N of 4th Line*
12049	27	*2nd Line, Lot 21, Conc I/II*	*2nd Line, 0.40 km E of 20th Sideroad*
12050	42	*20th Sideroad, Lot 20/21, Conc 1*	*20th Sideroad, 0.30 km N of Highway 9*
12054	24	*Centre Street North*	*Centre Street North, Beeton, 0.72 km N of Main Street*
12056	54	*2nd Line, Lot 22, Conc I/II*	*2nd Line, 0.80 km E of 20th Sideroad*
12057	57	*Adjala-Tecumseth Townline, Lot 1, Conc IX*	*Adjala-Tecumseth Townline, 0.30 km N of 9th Line*
12058	53	*Adjala-Tecumseth Townline, Lot 1, Conc X*	*Adjala-Tecumseth Townline, 1.15 km N of 10th Line*
12059	23	*Gilroy Bridge, Lot 1, Conc XII*	*Adjala-Tecumseth Townline, 0.20 km N of 12th Line*
12063	3	*Beeton Creek Crossing*	*9th Line, 0.22 km N of 9th Line*
12064	6	*Bailey Creek Bridge*	*10th Line, 0.10 km N of 10th Line*
12065	2	*Beattie Bridge*	*13th Line, 0.20 km S of 13th Line*
12070	62	*Beeton Creek Pedestrian Bridge*	*9th Line, 0.22 km N of Lilly Street*
12071	32	*12th Line Pedestrian Trail CN Wood Bridge*	*12th Line, 0.1 km S of 12th Line*

(*) Structure Ownership other than that of the Town of New Tecumseth

Table 9 Overall Bridge Inventory by Priority Ranking

Overall Bridge Inventory by Priority Ranking - 2018			
Bridge No.	**Priority**	**Bridge Name**	**Location**
11011	*1*	*Boyne River Pedestrian Walkway*	*Dominion Street, Alliston, 0.05 km S of Fletcher Crescent*
12065	*2*	*Beattie Bridge*	*13th Line, 0.20 km S of 13th Line*
12063	*3*	*Beeton Creek Crossing*	*9th Line, 0.22 km N of 9th Line*
12020	*4*	*5th Line, Lot 21, Conc IV/V*	*5th Line, 0.30 km E of 20th Sideroad*
12004	*5*	*12th Line, Lot II, Conc XI/XII*	*12th Line, 0.35 km E of 10th Sideroad*
12064	*6*	*Bailey Creek Bridge*	*10th Line, 0.10 km N of 10th Line*
12032	*7*	*Strangways Bridge, Lot 10/11, Conc IX*	*10th Sideroad, 0.35 km N of 9th Line*
12009	*8*	*13th Line, Lot 21, Conc XII/XIII*	*13th Line, 0.08 km E of 20th Sideroad*
11001	*9*	*Cunninghan Bridge*	*Church Street North, Alliston, 0.13 km N of Victoria Street West*
12043	*10*	*2nd Line, Lot 5, Conc I/II*	*2nd Line, 0.55 km W of Tottenham Road*
12001	*11*	*14th Line, Lot 9, Conc XIII/XIV*	*14th Line, 1.50 km E of County Road 10*
12015	*12*	*10th Line, Lot 21, Conc IX/X*	*10th Line, 0.35 km E of 20th Sideroad*
12013	*13*	*11th Line, Lot 19, Conc X/XI*	*11th Line, 0.90 km W of 20th Sideroad*
12034(*)	*14*	*9th Line, Lot 6, Conc VIII/IX*	*9th Line, 0.15 km E of Tottenham Road*
12006	*15*	*12th Line, Lot 14, Conc XI/XII*	*12th Line, 2.10 km E of 10th Sideroad*
12024	*16*	*9th Line, Lot 16, Conc VIII/IX*	*9th Line, 0.50 km E of 15th Sideroad*
12018	*17*	*6th Line, Lot 22, Conc V/VI*	*6th Line, 0.75 km E of 20th Sideroad*
12033	*18*	*9th Line, Lot 9, Conc VIII/IX*	*9th Line, 0.90 km W of 10th Sideroad*
12012	*19*	*14th Line, Lot 21, Conc XIII/XIV*	*14th Line, 0.40 km E of 20th Sideroad*
12002	*20*	*13th Line, Lot 9, Conc XII/XIII*	*13th Line, 0.90 km W of 10th Sideroad*
12005	*21*	*12th Line, Lot 12, Conc XI/XII*	*12th Line, 1.10 km E of 10th Sideroad*
12010	*22*	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.70 km N of 13th Line*

12059	*23*	*Gilroy Bridge, Lot 1, Conc XII*	*Adjala-Tecumseth Townline, 0.20 km N of 12th Line*
12054	*24*	*Centre Street North*	*Centre Street North, Beeton, 0.72 km N of Main Street*
12019	*25*	*5th Line, Lot 21, Conc IV/V*	*5th Line, 0.10 km E of 20th Sideroad*
12021	*26*	*4th Line, Lot 20, Conc III/IV*	*4th Line, 0.45 km W of 20th Sideroad*
12049	*27*	*2nd Line, Lot 21, Conc I/II*	*2nd Line, 0.40 km E of 20th Sideroad*
12037	*28*	*7th Line, Lot 7, Conc VI/VII*	*7th Line, 0.80 km E of Tottenhan Road*
12039	*29*	*6th Line, Lot 7, Conc V/VI*	*6th Line, 0.75 km E of Tottenham Road*
12044	*30*	*5th Line, Lot 7, Conc IV/V*	*5th Line, 0.80 km E of Tottenham Road*
12030	*31*	*Beder Turf Bridge, Lot 5, Conc IX/X*	*10th Line, 0.55 km W of Tottenham Road*
12071	*32*	*12th Line Pedestrian Trail CN Wood Bridge*	*12th Line, 0.1 km S of 12th Line*
12016	*33*	*9th Line, Lot 21, Conc VIII/IX*	*9th Line, 0.40 km E of 20th Sideroad*
12008	*34*	*Jebb Bridge, Lot 20/21, Conc XII*	*20th Sideroad, 0.68 km N of 12th Line*
12023	*35*	*10th Line, Lot 16, Conc IX/X*	*10th Line, 0.63 km E of 15th Sideroad*
12047	*36*	*Ransom Bridge*	*10th Sideroad, 0.25 km N of 4th Line*
12026	*37*	*Broom Bridge, Lot 18, Conc IX/X*	*10th Line, 1.20 km E of 15th Sideroad*
12003	*38*	*Maynard Bridge, Lot 10/11, Conc XII*	*10th Sideroad, 0.35 km N of 12th Line*
12045	*39*	*4th Line, Lot 7, Conc III/IV*	*4th Line, 1.10 km E of Tottenham Road*
12036	*40*	*7th Line, Lot 7, Conc VI/VII*	*7th Line, 1.10 km E of Tottenham Road*
12029	*41*	*McCarron Bridge, Lot 7, Conc IX*	*10th Line, 1.10 km E of Tottenham Road*
12050	*42*	*20th Sideroad, Lot 20/21, Conc 1*	*20th Sideroad, 0.30 km N of Highway 9*
11010	*43*	*Spring Creek Pedestrian Bridge*	*Albert Street, School Site, Alliston, 0.05 km S of Albert Street*
12025	*44*	*East Varcoe Bridge, Lot 16, Conc X/X1*	*11th Line, 0.95 km E of 15th Sideroad*
11002	*45*	*JJE McCague Bridge*	*Boyne Street, Alliston, 0.35 km N of Victoria Street East*
12035	*46*	*Fish Bridge, Lot 5, Conc VIII/IX*	*9th Line, 0.50 km W of Tottenham Road*
00191(*)	*47*	*Nottawasaga River Bridge*	*Adjala-Tecumseth Townline, 0.42 km N of 12th Line*

12022	48	*West Varcoe Bridge, Lot 16, Conc X/XI*	*11th Line, 0.65 km E of 15th Sideroad*
12014	49	*20th Sideroad, Lot 20/21, Conc X*	*20th Sideroad, 0.50 km N of 10th Line*
12028	50	*Deadman Bridge, Lot 10/11, Conc X*	*10th Sideroad, 0.40 km N of 10th Line*
12007	51	*15th Sideroad, Lot 15/16, Conc XI*	*15th Sideroad, 0.10 km S of 12th Line*
12038	52	*7th Line, Lot 5, Conc VI/VII*	*7th Line, 0.50 km W of Tottenham Road*
12058	53	*Adjala-Tecumseth Townline, Lot 1, Conc X*	*Adjala-Tecumseth Townline, 1.15 km N of 10th Line*
12056	54	*2nd Line, Lot 22, Conc I/II*	*2nd Line, 0.80 km E of 20th Sideroad*
12011	55	*20th Sideroad, Lot 20/21, Conc XIII*	*20th Sideroad, 0.40 km S of 14th Line*
12046	56	*4th Line, Lot 9, Conc III/IV*	*4th Line, 0.85 km W of 10th Sideroad*
12057	57	*Adjala-Tecumseth Townline, Lot 1, Conc IX*	*Adjala-Tecumseth Townline, 0.30 km N of 9th Line*
12027	58	*11th Line, Lot 15, Conc X/XI*	*11th Line, 0.35 km W of 15th Sideroad*
12031	59	*10th Line, Lot 13, Conc IX/X*	*10th Line, 1.40 km E of 10th Sideroad*
11003	60	*Sir Frederick Banting Road*	*Sir Frederick Banting Road, 0.20 km N of Victoria Street East*
11000	61	*Victoria Street*	*Victoria Street East (Hwy #89), 0.05 km W of Dufferin Street*
12070	62	*Beeton Creek Pedestrian Bridge*	*9th Line, 0.22 km N of Lilly Street*

(*) Structure ownership other than that of the Town of New Tecumseth

Table 10 Overall Culvert Inventory

Overall Culvert Inventory - 2018			
Culvert No.	**Priority**	**Culvert Name**	**Location**
11004	*14*	*Dufferin Street South*	*Dufferin Street South, Alliston, 0.01 km N of Parsons Road*
11005	*11*	*Beattie Avenue*	*Beattie Avenue, Alliston, 0.10 km S of Cunningham Drive*
11006	*6*	*King Street South*	*King Street South, Alliston, 0.05 km N of Beattie Avenue*
11007	*18*	*Eight Avenue*	*Eighth Avenue, Alliston, 0.03 km S of Tupper Boulevard*
11008	*25*	*Church Street South*	*Church Street South, Alliston, 0.27 km N of Alderson Court*
11009	*17*	*Industrial Parkway / Spring Creek*	*Industrial Parkway, Alliston, 0.51 km S of Young Street*
11012	*10*	*CPR Pedestrian Underpass*	*Wellington Street East, Alliston, 0.10 km E of Centre Street*
12017	*8*	*7th Line, Lot 22, Conc VI/VII*	*7th Line, 1.20 km E of 20th Sideroad*
12040	*9*	*Tecumseth Heights Drive*	*Tecumseth Heights Drive, 0.12 km S of 6th Line*
12041	*7*	*Mill Street West*	*Mill Street West, Tottenham, 0.35 km W of Queen Street*
12042	*3*	*3rd Line, Lot 4, Conc II/III*	*3rd Line, 0.75 km W of Tottenham Road*
12048	*16*	*4th Line, Lot 14, Conc III/IV*	*4th Line, 1.90 km E of 10th Sideroad*
12051	*2*	*17th Sideroad, Lot 17/18, Conc I*	*17th Sideroad, 0.07 km S of 2nd Line*
12052-1-2	*5*	*Lilly Street East*	*Lilly Street East, Beeton, 0.09 km E of Centre Street*
12052-2-2	*23*	*Lilly Street East*	*Lilly Street East, Beeton, 0.09 km E of Centre Street*
12053	*24*	*English Drive*	*English Drive , Beeton, 0.09 km E of Centre Street North*
12055(*)	*13*	*15th Sideroad, Lot 15/16, Conc V*	*15th Sideroad, 0.50 km N of 5th Line*
12060(*)	*12*	*15th Sideroad, Lot 15/16, Conc I*	*15th Sideroad, 0.30 km N of Highway 9*
12061	*22*	*20th Sideroad, Lot 20/21, Conc IV*	*20th Sideroad, 0.60 km N of 4th Line*
12062	*15*	*7th Line, Lot 22, Conc VI/VII*	*7th Line, 0.54 km E of 20th Sideroad*
12066	*26*	*Parsons Road Culvert*	*Parsons Road, Alliston, 0.1 km S of Albert Street*
12067	*19*	*10th Sideroad Culvert*	*10th Sideroad, 0.27 km N of 14th Line*

12068	*20*	*Boyne Street Arch Culvert*	*Boyne Street, Alliston, 0.06 km N of Shephard Avenue*
12069	*21*	*Boyne Street High Flow Relief Culvert*	*Boyne Street, Alliston, 0.07 km N of Shephard Avenue*
12074	*1*	*20th Sideroad*	*20th Sideroad, 0.45 km N of 14th Line*
12075	*4*	*Spring Creek Culvert*	*Victoria Street East (Hwy. 89), 0.34 km W of Industrial Parkway*

(*) Structure ownership other than that of the Town of New Tecumseth

Table 11 Overall Culvert Inventory by Priority Ranking

Overall Culvert Inventory by Priority Ranking - 2018			
Culvert No.	**Priority**	**Culvert Name**	**Location**
12074	*1*	*20th Sideroad*	*20th Sideroad, 0.45 km N of 14th Line*
12051	*2*	*17th Sideroad, Lot 17/18, Conc I*	*17th Sideroad, 0.07 km S of 2nd Line*
12042	*3*	*3rd Line, Lot 4, Conc II/III*	*3rd Line, 0.75 km W of Tottenham Road*
12075	*4*	*Spring Creek Culvert*	*Victoria Street East (Hwy. 89), 0.34 km W of Industrial Parkway*
12052-1-2	*5*	*Lilly Street East*	*Lilly Street East, Beeton, 0.09 km E of Centre Street*
11006	*6*	*King Street South*	*King Street South, Alliston, 0.05 km N of Beattie Avenue*
12041	*7*	*Mill Street West*	*Mill Street West, Tottenham, 0.35 km W of Queen Street*
12017	*8*	*7th Line, Lot 22, Conc VI/VII*	*7th Line, 1.20 km E of 20th Sideroad*
12040	*9*	*Tecumseth Heights Drive*	*Tecumseth Heights Drive, 0.12 km S of 6th Line*
11012	*10*	*CPR Pedestrian Underpass*	*Wellington Street East, Alliston, 0.10 km E of Centre Street*
11005	*11*	*Beattie Avenue*	*Beattie Avenue, Alliston, 0.10 km S of Cunningham Drive*
12060(*)	*12*	*15th Sideroad, Lot 15/16, Conc I*	*15th Sideroad, 0.30 km N of Highway 9*
12055(*)	*13*	*15th Sideroad, Lot 15/16, Conc V*	*15th Sideroad, 0.50 km N of 5th Line*
11004	*14*	*Dufferin Street South*	*Dufferin Street South, Alliston, 0.01 km N of Parsons Road*
12062	*15*	*7th Line, Lot 22, Conc VI/VII*	*7th Line, 0.54 km E of 20th Sideroad*
12048	*16*	*4th Line, Lot 14, Conc III/IV*	*4th Line, 1.90 km E of 10th Sideroad*
11009	*17*	*Industrial Parkway / Spring Creek*	*Industrial Parkway, Alliston, 0.51 km S of Young Street*

11007	*18*	*Eight Avenue*	*Eighth Avenue, Alliston, 0.03 km S of Tupper Boulevard*
12067	*19*	*10th Sideroad Culvert*	*10th Sideroad, 0.27 km N of 14th Line*
12068	*20*	*Boyne Street Arch Culvert*	*Boyne Street, Alliston, 0.06 km N of Shephard Avenue*
12069	*21*	*Boyne Street High Flow Relief Culvert*	*Boyne Street, Alliston, 0.07 km N of Shephard Avenue*
12061	*22*	*20th Sideroad, Lot 20/21, Conc IV*	*20th Sideroad, 0.60 km N of 4th Line*
12052-2-2	*23*	*Lilly Street East*	*Lilly Street East, Beeton, 0.09 km E of Centre Street*
12053	*24*	*English Drive*	*English Drive , Beeton, 0.09 km E of Centre Street North*
11008	*25*	*Church Street South*	*Church Street South, Alliston, 0.27 km N of Alderson Court*
12066	*26*	*Parsons Road Culvert*	*Parsons Road, Alliston, 0.1 km S of Albert Street*

(*) Structure ownership other than that of the Town of New Tecumseth

Table 12 Non-Owned Structures within the Town of New Tecumseth

Non-Owned Structures - 2018			
Structure No.	**Owner**	**Structure Name**	**Location**
00191(*)	*County of Simcoe*	*Nottawasaga River Bridge*	*Adjala-Tecumseth Townline, 0.42 km N of 12th Line*
12034(*)	*Canadian Pacific Railway*	*9th Line, Lot 6, Conc VIII/IX*	*9th Line, 0.15 km E of Tottenham Road*
12055(*)	*County of Simcoe*	*15th Sideroad, Lot 15/16, Conc I*	*15th Sideroad, 0.30 km N of Highway 9*
12060(*)	*County of Simcoe*	*15th Sideroad, Lot 15/16, Conc V*	*15th Sideroad, 0.50 km N of 5th Line*

4.6 Monitoring

Bridge No. 12033, 12063 & 12065 will require on-going monitoring to ensure safety and serviceability as shown in ***Table 13***. Monitoring is to be completed by the Town. If a change in the existing condition is identified a structural engineer should be notified.

Table 13 Monitoring

Monitoring		
Structure No.	**Location**	**Monitoring Requirements**
12033	*9th Line, Lot 9, Conc VIII/IX, 9th Line, 0.90 km W of 10th Sideroad*	*Monitor embankments after significant rainfall*
12063	*Beeton Creek Crossing, 9th Line, 0.22 km N of 9th Line*	*Monitor piers and abutments every 3 months*
12065	*Beattie Bridge, 13th Line, 0.20 km S of 13th Line*	*Monitor piers and abutments every 3 months*

5. Structure Inventory and Construction Needs Summary

Tables 14 and 15 which follow provide a summary of the total structure construction and rehabilitation needs resultant from the 2018 structure inspections. For the ten year period, the Adjusted for Owners Share rehabilitation needs are estimated to be ***$30,116,200*** for the existing Town's structure system. Of this total cost ***$20,131,200*** are for NOW needs, ***$8,657,000*** are for structure 1-5 year needs and ***$1,328,000*** are for the 6-10 year needs.

- Bridge No. 12037 – 7th Line, Lot 7, Conc VI/VII located 0.8 km E of Tottenham Road, constructed in 1930 carries 7th Line under the CPR railway mileage marker 38.01. The bridge is assumed to have shared ownership with the Canadian Pacific Railway (assumed 85% New Tecumseth and 15% CPR ownership).
- Bridge No. 00191, Culvert No. 12055 and 12060 along 15th Sideroad have been assumed by the County of Simcoe.
- Bridge No. 12034 (9th Line Wooden Bridge) is currently owned by the Canadian Pacific Railway (assumed 0% New Tecumseth ownership).

The appraisals for these structures include improvement needs and all associated costs and the rational for those assumptions. The structures assumed to have shared or 0% ownership have been detailed in ***Table 14 & 15*** **– Adjusted for Owner Share**.

Table 14 Bridge Improvement Needs Summary

Not Adjusted for Owners Share ($)				
	NOW	1-5	6-10	Total
Const	12,736,000.00	4,389,000.00	0.00	**17,125,000.00**
Const Extra	4,265,000.00	2,841,000.00	0.00	**7,106,000.00**
Inspection	95,000.00	115,000.00	0.00	**210,000.00**
Rehab	3,559,000.00	4,426,000.00	886,000.00	**8,871,000.00**
Rehab Extra	723,000.00	1,895,000.00	250,000.00	**2,868,000.00**
Total	**21,378,000.00**	**13,666,000.00**	**1,136,000.00**	**36,180,000.00**

Adjusted for Owners Share ($)				
	NOW	1-5	6-10	Total
Const	11,663,500.00	1,711,000.00	0.00	**13,374,500.00**
Const Extra	3,721,700.00	311,000.00	0.00	**4,032,700.00**
Inspection	95,000.00	115,000.00	0.00	**210,000.00**
Rehab	3,468,000.00	4,406,000.00	886,000.00	**8,760,000.00**
Rehab Extra	712,000.00	1,887,000.00	250,000.00	**2,849,000.00**
Total	**19,660,200.00**	**8,430,000.00**	**1,136,000.00**	**29,226,200.00**

Table 15 Culvert Improvement Needs Summary

Not Adjusted for Owners Share ($)				
	NOW	1-5	6-10	Total
Const	0.00	0.00	0.00	**0.00**
Const Extra	0.00	0.00	0.00	**0.00**
Inspection	0.00	0.00	0.00	**0.00**
Rehab	416,000.00	182,000.00	173,000.00	**771,000.00**
Rehab Extra	55,000.00	45,000.00	19,000.00	**119,000.00**
Total	**471,000.00**	**227,000.00**	**192,000.00**	**890,000.00**

Adjusted for Owners Share ($)				
	NOW	1-5	6-10	Total
Const	0.00	0.00	0.00	**0.00**
Const Extra	0.00	0.00	0.00	**0.00**
Inspection	0.00	0.00	0.00	**0.00**
Rehab	416,000.00	182,000.00	173,000.00	**771,000.00**
Rehab Extra	55,000.00	45,000.00	19,000.00	**119,000.00**
Total	**471,000.00**	**227,000.00**	**192,000.00**	**890,000.00**

5.1 Structure Inventory Replacement Value

Table 16 (below) provides a conservative estimate of current replacement value on a per structure basis. The Current Replacement Value (CRV) is the estimated in-kind replacement cost of each structure. The construction cost of a structure is primarily a function of the size of the structure measured in terms of its span and width and represented by the total deck area (plan area = length x span for culverts). As such, the basic construction cost of the structure is established using the dimensions of the bridge or culvert and a $/m^2 of deck area/plan area unit cost. Current Replacement Value Factors are summarized in ***Section 4*** of this report.

Table 16 Structure Replacement Value

Structure Type	Range of Replacement Values	Average Replacement Value	Total Replacement Values
Bridge	*$361,145 - $2,485,189*	*$917,445*	*$55,964,160*
Culvert	*$298,210 - $955,595*	*$537,526*	*$13,975,667*
		Total	***$69,939,827***

6. Normal Structure Maintenance

A summary of normal structure maintenance for all bridge and culvert structures has been presented in ***Table 17*** (below) as a result of the 2018 inspections.

Table 17 Normal Structure Maintenance Summary

Bridge Maintenance		
Bridge No.	**Location**	**Maintenance Requirements**
00191(*)	*Nottawasaga River Bridge, Adjala-Tecumseth Townline, 0.42 km N of 12th Line*	*Replace barrier rail end cap*
11002	*JJE McCague Bridge, Boyne Street, Alliston, 0.35 km N of Victoria Street East*	*Replace junction box cover plates, patch wearing surface and replace damaged section of guide rail*
11010	*Spring Creek Pedestrian Bridge, Albert Street, School Site, Alliston, 0.05 km S of Albert Street*	*Replace broken longitudinal braces on both sides and level approach*
11011	*Boyne River Pedestrian Walkway, Dominion Street, Alliston, 0.05 km S of Fletcher Crescent*	*Replace missing bolt and railing fasteners and repair handrails*
12003	*Maynard Bridge, Lot 10/11, Conc XII, 10th Sideroad, 0.35 km N of 12th Line*	*Reposition parapet rails*
12005	*12th Line, Lot 12, Conc XI/XII, 12th Line, 1.10 km E of 10th Sideroad*	*Repair hazard markers*
12006	*12th Line, Lot 14, Conc XI/XII, 12th Line, 2.10 km E of 10th Sideroad*	*Replace broken cross brace and clean channel*
12007	*15th Sideroad, Lot 15/16, Conc XI, 15th Sideroad, 0.10 km S of 12th Line*	*Pad approaches and replace worn deck boards*
12009	*13th Line, Lot 21, Conc XII/XIII, 13th Line, 0.08 km E of 20th Sideroad*	*Patch potholes, unplug deck drains and remove beaver dam*
12010	*20th Sideroad, Lot 20/21, Conc XIII, 20th Sideroad, 0.70 km N of 13th Line*	*Remove beaver dam and tree from watercourse and regrade approaches*
12011	*20th Sideroad, Lot 20/21, Conc XIII, 20th Sideroad, 0.40 km S of 14th Line*	*Unplug deck drains and remove beaver dam*

12012	*14th Line, Lot 21, Conc XIII/XIV, 14th Line, 0.40 km E of 20th Sideroad*	*Unplug deck drains*
12013	*11th Line, Lot 19, Conc X/XI, 11th Line, 0.90 km W of 20th Sideroad*	*Clear deck drains and patch asphalt deck*
12014	*20th Sideroad, Lot 20/21, Conc X, 20th Sideroad, 0.50 km N of 10th Line*	*Clean deck drains*
12015	*10th Line, Lot 21, Conc IX/X, 10th Line, 0.35 km E of 20th Sideroad*	*Clean deck drains and repair hazard markers*
12016	*9th Line, Lot 21, Conc VIII/IX, 9th Line, 0.40 km E of 20th Sideroad*	*Clear deck drains, remove vegetation and repair hazard markers*
12018	*6th Line, Lot 22, Conc V/VI, 6th Line, 0.75 km E of 20th Sideroad*	*Repair hazard markers*
12020	*5th Line, Lot 21, Conc IV/V, 5th Line, 0.30 km E of 20th Sideroad*	*Reposition/replace hazard markers*
12021	*4th Line, Lot 20, Conc III/IV, 4th Line, 0.45 km W of 20th Sideroad*	*Reposition hazard markers*
12022	*West Varcoe Bridge, Lot 16, Conc X/XI, 11th Line, 0.65 km E of 15th Sideroad*	*Repair surface treatment and pad approaches*
12023	*10th Line, Lot 16, Conc IX/X, 10th Line, 0.63 km E of 15th Sideroad*	*Clean deck drains*
12024	*9th Line, Lot 16, Conc VIII/IX, 9th Line, 0.50 km E of 15th Sideroad*	*Clean deck drains*
12025	*East Varcoe Bridge, Lot 16, Conc X/X1, 11th Line, 0.95 km E of 15th Sideroad*	*Patch wearing surface and reposition hazard marker*
12027	*11th Line, Lot 15, Conc X/XI, 11th Line, 0.35 km W of 15th Sideroad*	*Repair guide rail, deck wearing surface, reconnect handrail and replace damaged hazard marker*
12032	*Strangways Bridge, Lot 10/11, Conc IX, 10th Sideroad, 0.35 km N of 9th Line*	*Remove trees from under structure and replace deteriorated timber guide posts*
12033	*9th Line, Lot 9, Conc VIII/IX, 9th Line, 0.90 km W of 10th Sideroad*	*Clean out debris from deck drains*
12034(*)	*9th Line, Lot 6, Conc VIII/IX, 9th Line, 0.15 km E of Tottenham Road*	*Repair/replace damaged hazard markers and repair/replace deck bolts and loose members*
12035	*Fish Bridge, Lot 5, Conc VIII/IX, 9th Line, 0.50 km W of Tottenham Road*	*Repair hazard markers*
12036	*7th Line, Lot 7, Conc VI/VII, 7th Line, 1.10 km E of Tottenham Road*	*Restore roadway embankment and attach guide rail to structure*
12038	*7th Line, Lot 5, Conc VI/VII, 7th Line, 0.50 km W of Tottenham Road*	*Seal cracks and pad approaches*
12044	*5th Line, Lot 7, Conc IV/V, 5th Line, 0.80 km E of Tottenham Road*	*Remove beaver dam and restore extruder end treatment*
12049	*2nd Line, Lot 21, Conc I/II, 2nd Line, 0.40 km E of 20th Sideroad*	*Restore hazard marker, remove sand and vegetation from deck top and patch potholes*
12050	*20th Sideroad, Lot 20/21, Conc 1, 20th Sideroad, 0.30 km N of Highway 9*	*Clean deck expansion joints, replace missing asphalt deck drain and patch pothole*
12057	*Adjala-Tecumseth Townline, Lot 1, Conc IX, Adjala-Tecumseth Townline, 0.30 km N of 9th Line*	*Repair east handrail*

Culvert Maintenance

Culvert No.	Location	Maintenance Requirements
11004	*Dufferin Street South, Dufferin Street South, Alliston, 0.01 km N of Parsons Road*	*Reattach extruder loader end treatment in the northwest quadrant*
11005	*Beattie Avenue, Beattie Avenue, Alliston, 0.10 km S of Cunningham Drive*	*Replace broken and deteriorated guide rail posts*
11006	*King Street South, King Street South, Alliston, 0.05 km N of Beattie Avenue*	*Replace deteriorated guide rail posts*

11009	*Industrial Parkway / Spring Creek, Industrial Parkway, Alliston, 0.51 km S of Young Street*	*Patch pothole on sidewalk*
12040	*Tecumseth Heights Drive, Tecumseth Heights Drive, 0.12 km S of 6th Line*	*Replace wooden posts as required and reattach and tighten cables*
12041	*Mill Street West, Mill Street West, Tottenham, 0.35 km W of Queen Street*	*Repair handrail*
12051	*17th Sideroad, Lot 17/18, Conc I, 17th Sideroad, 0.07 km S of 2nd Line*	*Tighten loose cables, replace deteriorated/broken guide rail posts and extend guide rail cable at northwest*
12053	*English Drive, English Drive , Beeton, 0.09 km E of Centre Street North*	*Replace broken wood post on sidewalk guide rail and repair chain link fence*
12055(*)	*15th Sideroad, Lot 15/16, Conc V, 15th Sideroad, 0.50 km N of 5th Line*	*Repair hazard markers*
12062	*7th Line, Lot 22, Conc VI/VII, 7th Line, 0.54 km E of 20th Sideroad*	*Re-instate hazard marker*
12066	*Parsons Road Culvert, Parsons Road, Alliston, 0.1 km S of Albert Street*	*Tighten cable guide rail*

7. Recommended Program Funding Levels

Recommended program funding level calculations are typically based on the length of or number of the infrastructure types and average widths of same within the database.

It should be noted that the budgetary recommendations in this report do not include items in the budget related to development and growth. Those items are in addition to the recommendations in this report and should require another funding source.

7.1 Capital Replacements

Recommended funding for the structures inventory would include sufficient capital expenditures that would allow the replacement of infrastructure as it meets its design life.

For new structures, the design lifespan is now 75 years; however, structures constructed prior to 2000 were generally designed for a 50 year lifespan. Accordingly between 1.5% and 2.0% of the overall current replacement value of the entire structure inventory of ***$69,939,827*** as shown in ***Table 16*** should be budgeted annually to ensure that the structure inventory can be maintained in perpetuity. It is noted that as the structures are replaced, the annual allocation could be reduced to 1.5%.

Based on the aforementioned structure inventory replacement value of ***$69,939,827*** and the data shown in ***Section 4*** of this report, the estimated minimum annual capital program for structures should be in the amount of ***$1,356,000*** (1.94%) per year for the Town of New Tecumseth to maintain the current system adequacy. However, given the average age of the Town's structures inventory, it is quite probable that expenditures on structures will be even higher than estimated over the next decade as the older structures reach a terminal condition.

The average age of the Town's bridge structures is ***59.1*** years; the average age of the culvert structures is ***37.8*** years.

7.2 Major Maintenance

Rehabilitation and replacement recommendations are provided within this report ***(see section 4)***. The costs associated within these recommendations should be budgeted above and beyond the recommended replacement budget suggested in ***Section 7.1*** to maximize the service life of the structures.

8. Provincial Financial Information Return (FIR)

The Financial Information Return (FIR) data provided below in ***Table 18*** includes only those structures 3.0m span or greater owned by the Town of New Tecumseth. ***Appendix D*** contains a list of the fifty-eight (58) bridges and twenty-two (22) culverts included in this section.

8.1 Bridges and Culverts:

Total Square Metres of Surface Area for Bridges and Culverts………………… **10,379 m²**

Table 18 Ratings of Bridges and Culverts

Structure Type	Number of structures where the condition of primary components is rated as good to very good, requiring only repair	Total Number
Bridge	*36*	*58*
Culvert	*21*	*22*
Subtotal	***57***	***80***

Primary Components have been rated as good or very good condition in accordance with the Material Condition Rating (MCR) of the Superstructure & Substructure for Bridges and the Barrel MCR value for Culverts.

Primary Components – The main load carrying components of the structure.

Superstructure Primary Components – Beams / girders, thick slabs, truss top and bottom chords, vertical and diagonals, arch ribs, ties, vertical and diagonals, stringers and floor beams, load bearing diaphragms that directly support or transmit wheel loads, connections to primary components, barrel of culverts, tunnels and soil-steel structures.

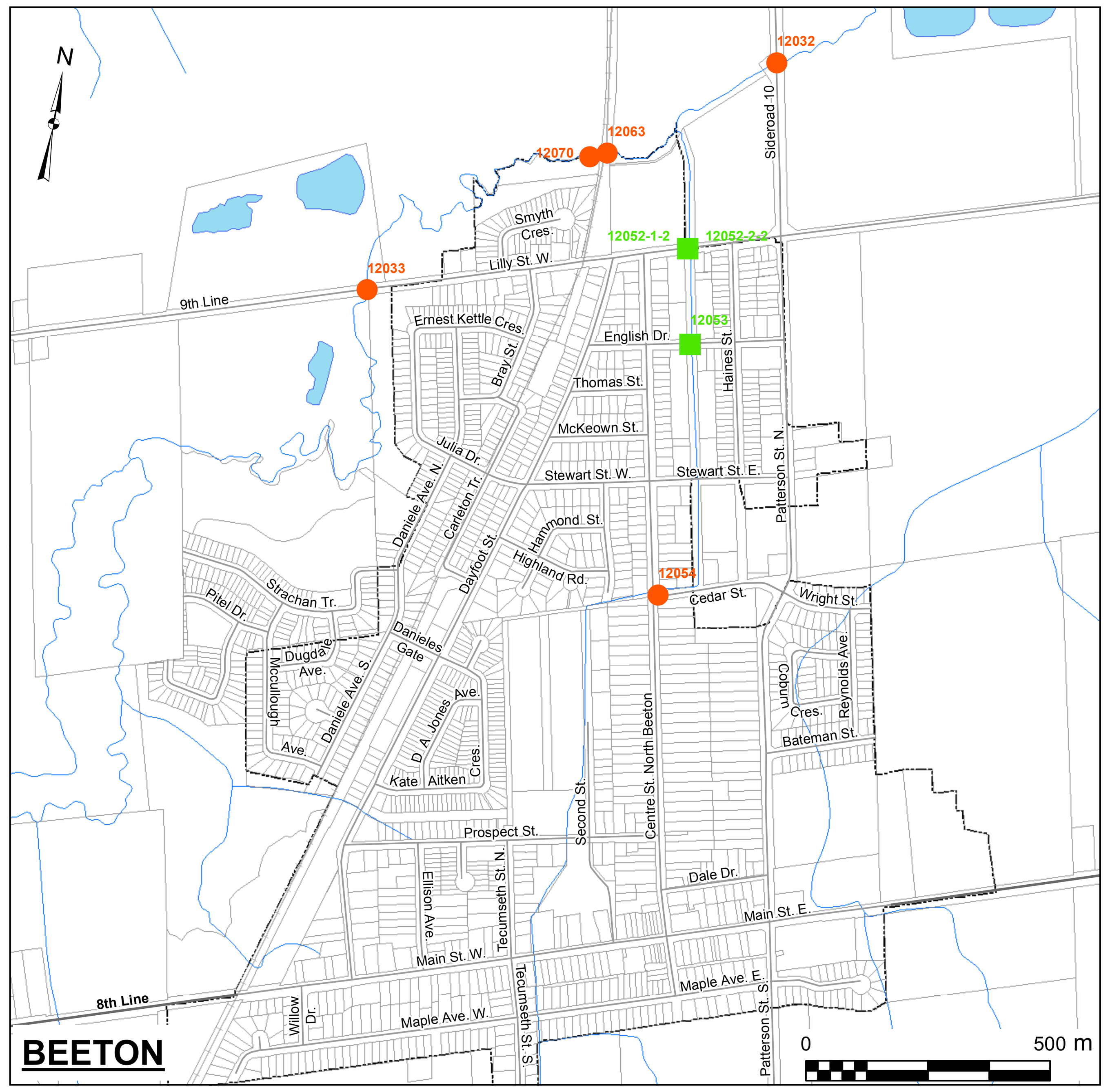
Substructure Primary Components – Foundations, abutment walls and piers are to be considered as primary components.

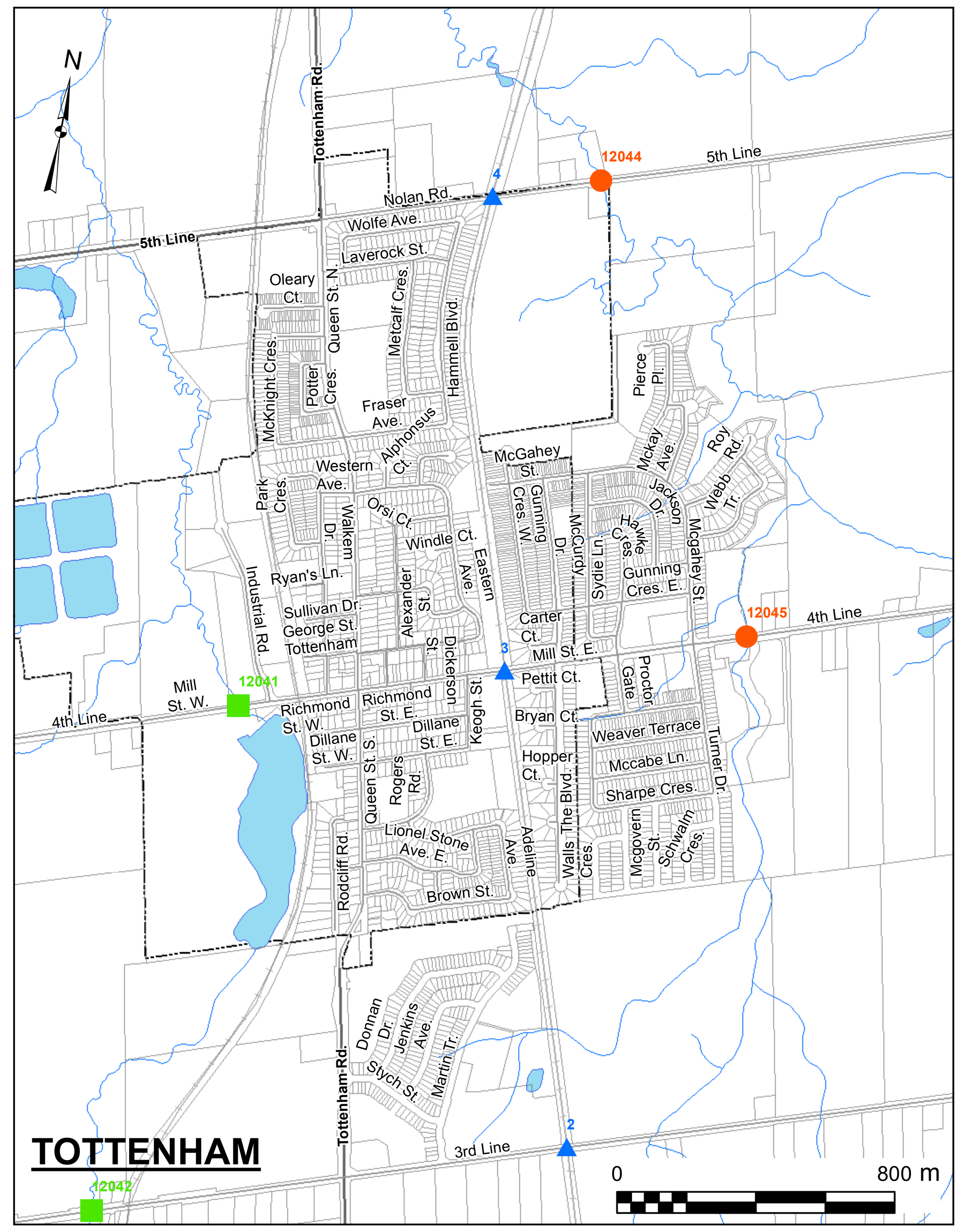
9. Conclusions

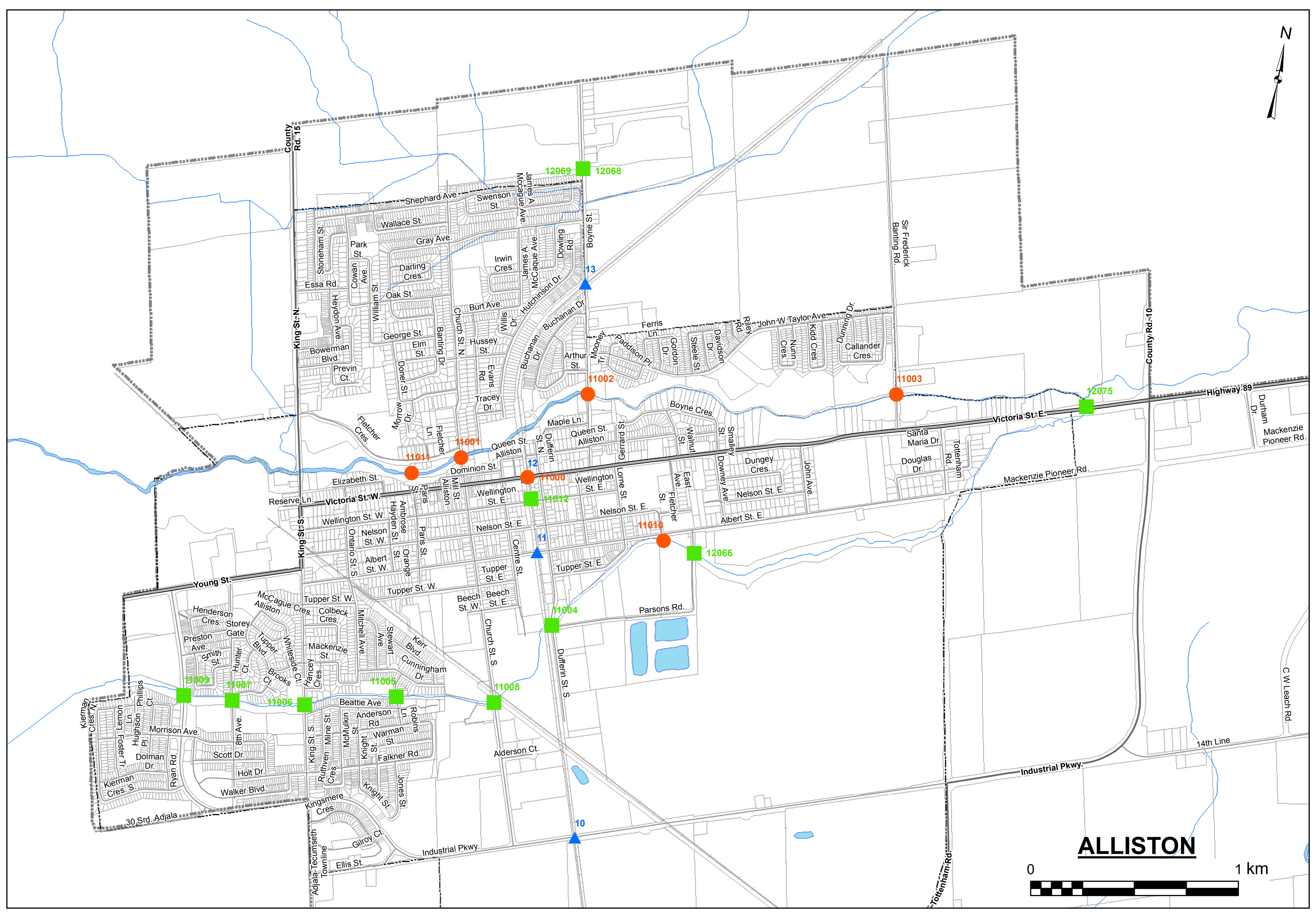
Completion of the 2018 re-inspection of the eighty-eight (88) bridge and culvert structures on the Town's road system has resulted in reliable and current data being available to the Town to implement a maintenance program ensuring the Town's structures are kept safe and in good repair.

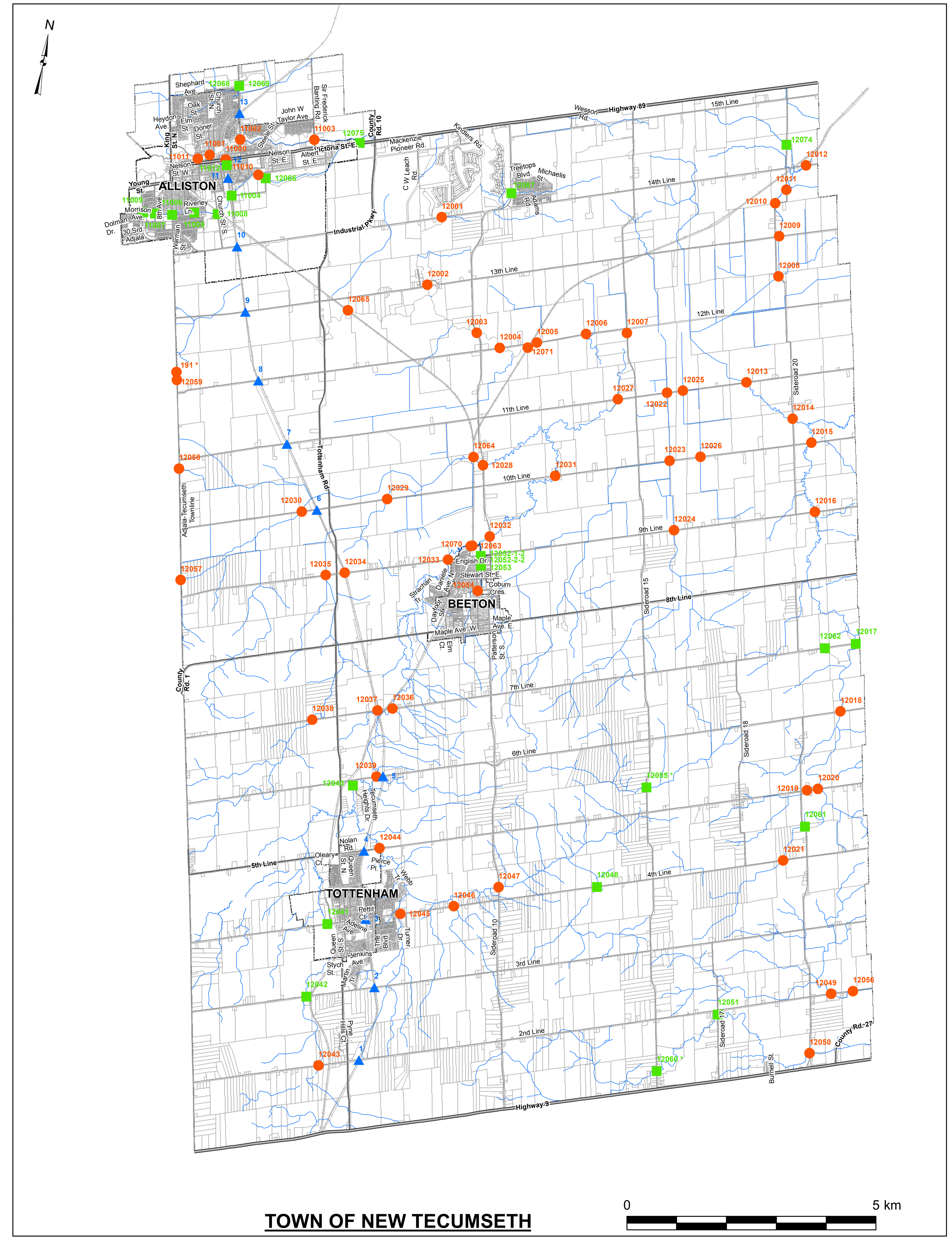
Maintenance of the Bridge and Culvert Management Program will require updating of the database on an on-going annual basis to reflect previous year rehabilitation/replacement project updates. It is recommended that the structures be re-inspected by a qualified structure engineer every two (2) years.

We trust that the foregoing will assist you in implementing a cost effective structure maintenance, repair and replacement program.









TOWN OF NEW TECUMSETH
2018 STRUCTURE INSPECTIONS

APPENDIX A - KEY PLAN

LEGEND

Provincial Highway	Bridge
County Road	Culvert
Local Road	Rail Line Crossing
Community Boundary	(*) Non-Owned Town Structure

JANUARY 2019