

THE MUNICIPALITY OF WEST GREY

FORMER BENTINCK TOWNSHIP STRUCTURE RATING AND RATIONALE REPORT

DECEMBER 11, 2019

FINAL





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THE MUNICIPALITY OF WEST GREY

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1 INTRODUCTION

WSP has been retained by the Municipality of West Grey and tasked with the completion of a comprehensive evaluation of the current condition of the bridges under the Municipality's jurisdiction. The Municipality has a large number of structures under its jurisdiction, many of which are in the advanced stages of their lifecycle, and will require significant rehabilitation or replacement if they are to remain in use. It is understood that due to the available tax base for funding the maintenance and rehabilitation of its structures going forward, it is in the best interest of the Municipality to undergo strategic closures of a selection of its lowest value and importance structures, so that the remaining structures may be maintained and replaced to provide a functional, safe, and economically sustainable transportation network.

Each of the three (3) former townships of Bentinck, Glenelg, and Normanby within the Municipality of West Grey have their own specific and important histories and overall networks for transportation. Based on the unique attributes of each, it is recommended that each be analyzed and considered individually, as well as considered as part of the overall municipal transportation network. This report will focus on the evaluation and reporting related to the structure assets within the former Township of Bentinck.

The evaluations and reporting are based on all available information regarding the Municipality's roadway network and structure inventory. The condition and current and future needs of each structure are assessed on an ongoing basis during the biennial Ontario Structure Inspection Manual (OSIM) inspections.

It is the objective of this report to summarize the findings of the evaluation and assign an individual rating to each structure based on a number of criteria which will consider the condition, viability, and importance of each, identify those structures which are best suited for closure, and provide overall recommendations for the Municipality's consideration in moving forward with their structure asset management.

2 BACKGROUND INFORMATION

2.1 MUNICIPALITY OF WEST GREY STRUCTURES

The assets to be reviewed within this report include bridges and culverts greater than three (3) meters in span, as per the criteria for a structure defined by the Ontario Structure Inspection Manual (OSIM). The OSIM defines a bridge as; “A structure which provides a roadway or walkway for the passage of vehicles, pedestrians or cyclists across an obstruction, gap or facility and is greater than or equal to 3 m in span.”

The feasibility of maintaining each structure asset meeting the aforementioned criteria is assessed based on various criteria which consider the scale, value, condition, economy, importance in the community, and historical significance of each.

The Municipality of West Grey has a considerably large number of structure assets. There are a total of one-hundred and six (106) structures, including the Neustadt and Ayton dams, as well as the Durham and Neustadt pedestrian bridges. **Figure 1** shows a location map for all of the structures (found in **Appendix A**). The typical lifespan of a structure is 75 to 100 years, depending on various factors. Many of the bridges within the Municipality were constructed prior to 1950, with thirty-six (36) of those structures at or approaching the end of their useful life span. The below chart depicts the age distribution of the structure (bridge and culvert) assets within the municipality.

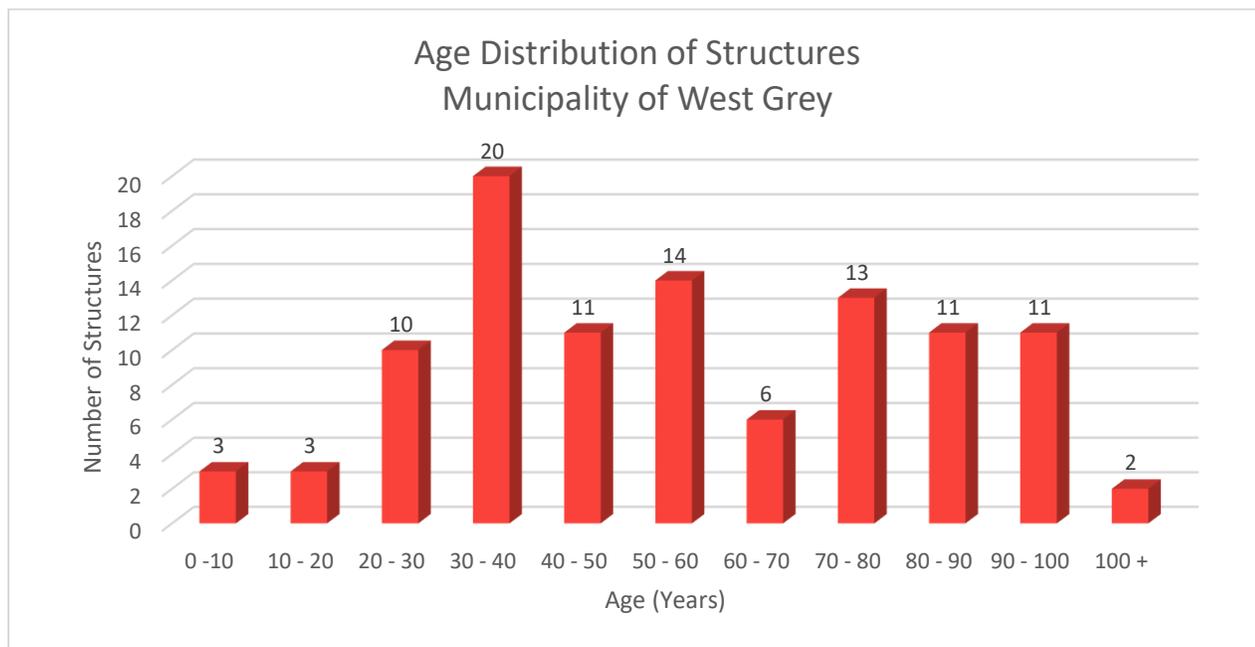


Chart 1 - Age Distribution of Structures - Municipality of West Grey

The current construction cost to replace a structure which has reached the end of its life span and is no longer a viable candidate for rehabilitation ranges from \$300,000 (smaller structures and culverts) to \$1,750,000 (larger span structures). Given the current tax base and funding available to the Municipality, it is recommended that a strategic plan be developed going forward identifying structures suitable for closure. The development of a strategic plan for closures will assist the Municipality in allocating funding and scheduling projects such that it can maximise its investment in a sustainable transportation network which best suits the needs of its residents.

2.2 BENTINCK AREA STRUCTURES

The former Township of Bentinck has forty-one (41) structure assets; twenty-seven (27) bridges and fourteen (14) culverts. **Figure 2** shows a location map for all of the structures (found in **Appendix A**). The structures range in age from twenty-one (21) to one-hundred and five (105) years. The age distribution of the Township of Bentinck’s structures is displayed in **Chart 2** below. The

distribution highlights sixteen (16) structures, which are approaching the end of their useful life span, which without replacement or significant rehabilitation, will face necessary closure in the near future.

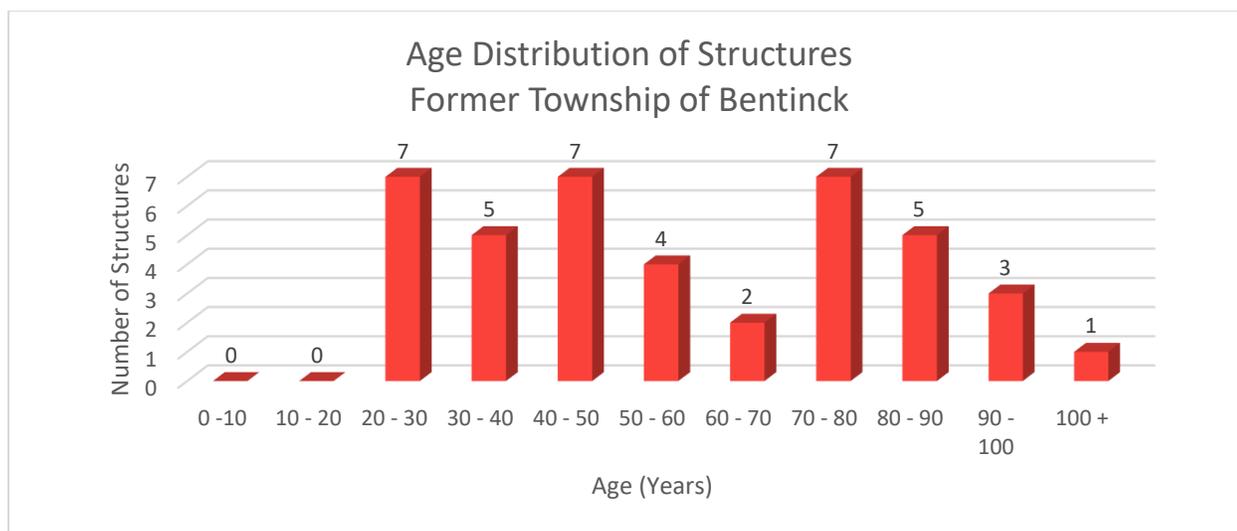


Chart 2 - Age Distribution of Structures - Township of Bentinck

2.2.1 STRUCTURE - BRIDGE CONDITION INDEX (BCI)

A mandatory biennial inspection and report based on the Ontario Structure Inspection Manual (OSIM) is undertaken for each structure (as defined within the OSIM) within the province of Ontario. One component generated during these inspections and reporting is the Bridge Condition Index (BCI), which weights the condition of each of the various elements of each structure and provides a numeric rating of its overall condition. This value is often one of the measures used in determining allocation of provincial funding. The BCI's range from 0 (poor condition) to 100 (excellent condition). As a general rule, structures with a BCI of less than 40 should be considered for immediate repair, rehabilitation, replacement, or closure. It is also recommended that planning for future rehabilitation and repairs be initiated for structures with a BCI between 40 and 60. **Chart 3** below illustrates the BCI distribution of the structures in the former Township of Bentinck.

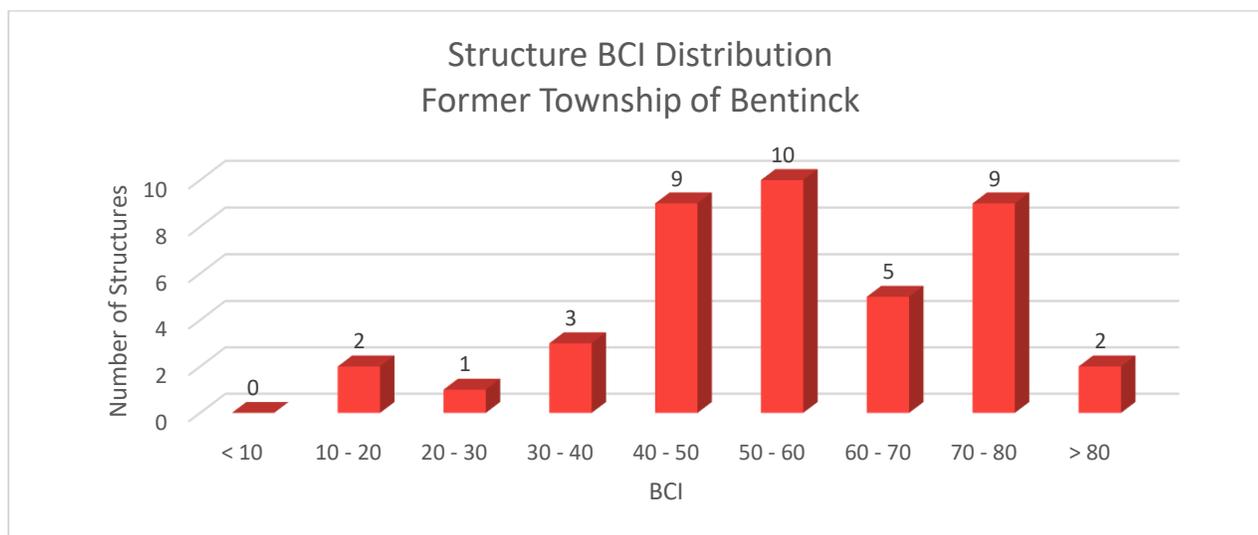


Chart 3 - Structure BCI Distribution – Former Township of Bentinck

In analyzing this distribution, it is noted that six (6) structures in Bentinck have BCI values lower than 40, indicating that rehabilitation or replacement of the structure should be scheduled immediately if they are to remain in safe and useful operating condition. This distribution also highlights that nineteen (19) structures fall within the BCI range of 40 to 60, and future planning for rehabilitation should be initiated.

2.2.2 STRUCTURE ASSET SUMMARY

The condition criteria of the structures within the former Township of Bentinck area have been analyzed to provide a baseline for the overall rating of the structures. To better understand the needs of each structure moving forward, the timing, type and an approximate value of rehabilitation or replacement works have been established. Rehabilitation costs are provided for all structures where the structural condition is such that rehabilitation can restore the structure to a safe and useful condition. Replacement has been specified only where rehabilitation is no longer a structurally viable or economic option for a structure. Rehabilitation is not considered to be an economically viable option where the cost to rehabilitate equals or exceeds the cost of replacement. The approximate replacement value of each structure has also been provided to give an overall indication of the value of the asset.

These established values and information for each structure, along with the age and Bridge Condition Index (BCI), have been summarized in **Table 1** in **Appendix A**.

3 EVALUATION OF STRUCTURES

3.1 METHODOLOGY

In order to achieve a rating system which would clearly demonstrate the condition and value (as an asset to the Municipality) of each individual structure, as well as provide a platform for comparing the structures to one another in future decision-making processes, a universal procedure was developed and applied to each of the structures within the former Township of Bentinck. The procedure considers several criteria, each yielding its own numeric value ranging from 1 to 10 (1 being poor and 10 being excellent). Due to the varying overall impact of each criteria, each has then been classified as primary, secondary, or tertiary, and weighted accordingly in the development of each Overall Structure Rating. The overall structure rating is provided on a scale of 1 to 100, with 1 being poor and 100 being excellent.

Table 2 below summarizes the considered criterion, and indicates their classification and weight within the Overall Structure Rating matrix.

Table 2 – Structure Rating Criteria

RATING CRITERIA	CLASSIFICATION	RATING RANGE	OVERALL RATING WEIGHT
Bridge Condition index (BCI)	Primary	1 to 10	20
Asset Value	Primary	1 to 10	20
Emergency Services – EMS and Fire	Primary	1 to 10	20
Traffic	Secondary	1 to 10	10
Transportation Network	Secondary	1 to 10	10
Municipal Services – School Board and Waste Management	Secondary	1 to 10	10
Historical Significance	Tertiary	1 to 10	5
Detour Impact	Tertiary	1 to 10	5
TOTAL			100

3.2 PRIMARY CRITERIA

3.2.1 BRIDGE CONDITION INDEX (BCI)

To develop the rating for the Bridge Condition Index (BCI) criteria, the BCI determined in the 2017 or 2018 OSIM inspection was directly converted to a 1 to 10 scale (1 being poor and 10 being excellent structural condition). The weight of this primary criterion within the Overall Structure Rating matrix is 20 out of 100 points. **Table 3** below defines each structures rating for this criterion.

Table 3 Structure BCI Ratings

STRUCTURE ID	BCI VALUE	BCI RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)	STRUCTURE ID	BCI VALUE	BCI RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)
B-001	52.01	5.2	10	B-022	87.56	8.8	18
B-002	75.22	7.5	15	B-023	59.81	6.0	12
B-003	33.36	3.3	7	B-025	37.77	3.8	8
B-004	60.53	6.1	12	B-026	50.86	5.1	10
B-005	67.72	6.8	14	B-027	45.08	4.5	9
B-006	45.61	4.6	15	B-028	13.33	1.3	3
B-007	16.07	1.6	3	B-104	70.60	7.1	14
B-008	50.21	5.0	10	B-105	70.60	7.1	14
B-009	48.29	4.8	10	B-107	72.63	7.3	15
B-010	71.21	7.1	14	B-112	61.65	6.2	12
B-011	47.62	4.8	10	B-113	49.52	5.0	10
B-012	50.19	5.0	10	B-114	58.38	5.8	12
B-013	59.65	6.0	12	B-115	47.06	4.7	9
B-014	94.03	9.4	19	B-118	75.00	7.5	15
B-015	53.33	5.3	11	B-119	73.59	7.4	15
B-016	72.56	7.3	15	B-120	46.73	4.7	9
B-017	47.96	4.8	10	B-121	75.00	7.5	15
B-018	51.24	5.1	10	B-195	41.52	4.2	8
B-019	61.80	6.2	12	B-196	69.34	6.9	14
B-020	28.65	2.9	6	B-198	57.87	5.8	12
B-021	38.35	3.8	8				

3.2.2 ASSET VALUE

The asset value is assessed as a rating ranging from 1 (low overall value as an asset to the Municipality) to 10 (high overall value as an asset to the Municipality). The rating of this criterion is made up of two considerations, the replacement value of the structure, and its current stage within its estimated life cycle. A structure which has a high replacement value would be a large span or multi-span bridge, an intermediate replacement value would be a bridge or ridge frame concrete culvert with an average span, and low replacement value a small rigid frame or pipe culvert. This criterion's rating is intended to measure the structure's value (in its current condition) as either an asset to or burden on the Municipality's asset management. The following table illustrates the rating scale for the Asset Value rating:

		Replacement Value		
		High	Intermediate	Low
Lifecycle Stage (Years)	75 +	Poorest (1/10)	Poor (2/10)	Poor (3/10)
	50 to 75	Poor (2/10)	Poor (3/10)	Fair (4/10)
	25 to 50	Good (7/10)	Good (6/10)	Fair (5/10)
	0 to 25	Best (10/10)	Excellent (9/10)	Excellent (8/10)

Each Asset Value Rating is then weighted as 20 out of 100 points within the Overall Structure Rating matrix. **Table 4** below defines each structures rating for this criterion.

Table 4 Asset Value Ratings

STRUCTURE ID	ASSET VALUE RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)	STRUCTURE ID	ASSET VALUE RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)
B-001	3	6	B-022	7	14
B-002	7	14	B-023	6	12
B-003	2	4	B-025	1	2
B-004	3	6	B-026	2	4
B-005	3	6	B-027	9	18
B-006	2	4	B-028	2	4
B-007	6	12	B-104	5	10
B-008	2	4	B-105	5	10
B-009	3	6	B-107	4	8
B-010	6	12	B-112	8	16
B-011	3	6	B-113	4	8
B-012	5	10	B-114	4	8
B-013	3	6	B-115	5	10
B-014	7	14	B-118	5	10
B-015	9	18	B-119	3	6
B-016	7	14	B-120	5	10
B-017	1	2	B-121	5	10
B-018	2	4	B-195	4	8

STRUCTURE ID	ASSET VALUE RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)	STRUCTURE ID	ASSET VALUE RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)
B-019	6	12	B-196	4	8
B-020	1	2	B-198	4	8
B-021	6	12			

3.2.3 EMERGENCY SERVICES – EMS AND FIRE

One of the critical considerations when assessing the importance of a structure within the context of the Municipality's transportation network is its use as a response route for emergency services. To measure this importance and provide a numeric rating (from 1 to 10) for each structure, a number of factors are taken into consideration. If a structure is part of a primary route used by the Fire Service and EMS, it is given the highest rating of 10 points. If the closure of a structure would result in an significant increase in the length of an emergency route or response time, it is assessed at a high rating of 8 to 10, depending on the scale of the increase. A structure which is not considered to be used as a primary route for emergency services, but is on a paved (asphalt or surface treatment) road is given a rating of 6 to 8 as it would be prioritized for use as a response route ahead of an unpaved road whenever possible. Structures which receive the lowest rating in all the aforementioned categories are rated from 1 to 5 for importance as a part of the overall municipal emergency service routes.

Table 5 below displays each structures rating from 1 to 10 (10 being of high and 1 being low) as a measure of its importance with regards to emergency services routes.

Table 5 Emergency Service Ratings

STRUCTURE ID	RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)	STRUCTURE ID	RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)
B-001	10	20	B-022	7	14
B-002	10	20	B-023	7	14
B-003	10	20	B-025	3	6
B-004	8	16	B-026	8	16
B-005	9	18	B-027	6	12
B-006	8	16	B-028	8	16
B-007	1	2	B-104	8	16
B-008	6	12	B-105	8	16
B-009	6	12	B-107	10	20
B-010	5	10	B-112	6	12
B-011	7	14	B-113	5	10
B-012	7	14	B-114	8	16
B-013	8	16	B-115	8	16
B-014	10	20	B-118	4	8
B-015	9	18	B-119	6	12
B-016	9	18	B-120	7	14
B-017	9	18	B-121	6	12
B-018	10	20	B-195	10	20
B-019	10	20	B-196	6	12

STRUCTURE ID	RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)	STRUCTURE ID	RATING (1-10)	OVERALL RATING (MAX. 20 POINTS)
B-020	3	6	B-198	6	12
B-021	6	12			

3.3 SECONDARY CRITERIA

3.3.1 TRAFFIC

The measured traffic volumes for a section of road can provide insight into many aspects of the decision-making process for the operation of a transportation network. They establish the number of users with respect to adjoining and adjacent road sections, give an overview of the traffic flow within a given area, and are a key indicator of the significance of a specific section of road within the overall network.

During the month of September 2016, the Municipality of West Grey's Public Works Department conducted traffic volumes counts for each roadway within the Municipality. The traffic volumes obtained are a key component utilized in ranking (from 1 to 10) the importance of each structure with regards to traffic within the Municipality.

Figure 3 illustrates the traffic volume data collected in the Bentinck Township area by the Public Works Department, and can be found in **Appendix A**. Each section of road has been colour coded and categorized by volume, and given a rating range which can be applied to each structure as follows:

Colour	Average Daily Traffic	Rating Range
	>1,000	8-10
	200 - 999	6-8
	100-199	4-6
	50 -99	2-4
	0 - 49	0-2

When rating each individual structure within the Bentinck Township area, the structure is bound by the rating range of its road (above), and is assessed within that range based on its proximity to higher ranked road sections, potential for seasonal volume fluctuation, and proximity to points of significant trip generation. The individual rating of each structure (from 1 to 10) as a measure of its importance with regards to traffic considerations is defined below in **Table 6**.

Table 6 Traffic Ratings

STRUCTURE ID	RATING RANGE	OVERALL RATING (MAX. 10 POINTS)	STRUCTURE ID	RATING RANGE	OVERALL RATING (MAX. 10 POINTS)
B-001	4 - 6	6	B-022	2 - 4	4
B-002	6 - 8	7	B-023	6 - 8	8
B-003	6 - 8	7	B-025	0 - 2	2
B-004	4 - 6	6	B-026	6 - 8	7
B-005	4 - 6	5	B-027	4 - 6	5
B-006	4 - 6	4	B-028	6 - 8	8
B-007	0 - 2	1	B-104	4 - 6	5
B-008	4 - 6	5	B-105	6 - 8	7
B-009	4 - 6	6	B-107	6 - 8	8
B-010	2 - 4	4	B-112	0 - 2	2
B-011	0 - 2	2	B-113	0 - 2	2
B-012	6 - 8	7	B-114	0 - 2	1
B-013	4 - 6	5	B-115	6 - 8	8
B-014	6 - 8	7	B-118	0 - 2	2
B-015	6 - 8	7	B-119	4 - 6	6
B-016	6 - 8	7	B-120	0 - 2	2
B-017	6 - 8	7	B-121	4 - 6	5
B-018	4 - 6	6	B-195	6 - 8	7
B-019	6 - 8	7	B-196	4 - 6	5
B-020	6 - 8	7	B-198	0 - 2	2
B-021	6 - 8	7			

3.3.2 TRANSPORTATION NETWORK

Within any transportation network, there are primary, secondary, and tertiary roadways, which provide varying levels of service to road users. The level of service of an individual section depends on the traffic volumes and quality of the roadway. The assessment of the quality of roadway should consider road and corridor width, the surface type (gravel, surface treatment, asphalt, concrete), condition, potential for congestion, and design and posted speeds. Based on these factors, each structure within the Bentinck area has been assigned a level of service category of ‘A’ (primary road), ‘B’ (secondary road), or ‘C’ (tertiary road), and subsequently rated from 1 to 10 based on its overall importance within the overall transportation networks of the former Bentinck Township and the Municipality of West Grey. The level of service and individual rating of each structure (from 1 to 10) as a measure of its importance with regards to overall transportation network is defined below in *Table 7*.

Table 7 Transportation Network Ratings

STRUCTURE ID	LEVEL OF SERVICE	OVERALL RATING (MAX. 10 POINTS)	STRUCTURE ID	LEVEL OF SERVICE	OVERALL RATING (MAX. 10 POINTS)
B-001	A	9	B-022	B	7
B-002	A	9	B-023	B	8
B-003	A	9	B-025	C	3
B-004	B	6	B-026	B	5
B-005	B	6	B-027	C	4
B-006	B	7	B-028	B	8
B-007	C	1	B-104	B	7
B-008	C	6	B-105	A	8
B-009	B	7	B-107	A	9
B-010	C	5	B-112	C	3
B-011	C	5	B-113	B	5
B-012	B	7	B-114	B	2
B-013	B	6	B-115	B	7
B-014	A	8	B-118	C	4
B-015	B	7	B-119	B	7
B-016	B	7	B-120	C	4
B-017	A	8	B-121	C	5
B-018	A	9	B-195	B	7
B-019	B	7	B-196	B	5
B-020	B	6	B-198	C	4
B-021	B	6			

3.3.3 MUNICIPAL SERVICES – SCHOOL BOARD AND WASTE MANAGEMENT

This criterion is intended to assess and measure the importance of each individual structure for facilitating the municipal services such as school bus routes and waste pick up. Each structure has been individually assessed as to the impact its closure on the provision of these services. Each structure is rated from 1 to 10 (10 being a great impact on the provision of municipal services, and 1 being a very low impact) and that rating is then applied within the Overall Structure Rating matrix. When rating each structure, consideration was given to whether a structure’s closure would impede the provision of services for any resident, if a detour route is available, the additional distance and time of the ideal detour route, as well as to any site-specific concerns received from the School Board following their review.

Table 8 below displays each structure’s rating as a measure of its importance with regards to the provision of municipal services to the residents of West Grey.

Table 8 Municipal Services Rating

STRUCTURE ID	OVERALL RATING (MAX. 10 POINTS)	STRUCTURE ID	OVERALL RATING (MAX. 10 POINTS)
B-001	6	B-022	7
B-002	7	B-023	6
B-003	6	B-025	3
B-004	6	B-026	6
B-005	8	B-027	5
B-006	7	B-028	9
B-007	2	B-104	9
B-008	5	B-105	9
B-009	8	B-107	7
B-010	6	B-112	5
B-011	9	B-113	9
B-012	7	B-114	5
B-013	6	B-115	6
B-014	8	B-118	4
B-015	9	B-119	5
B-016	9	B-120	6
B-017	10	B-121	5
B-018	10	B-195	10
B-019	10	B-196	8
B-020	7	B-198	8
B-021	9		

3.4 TERTIARY CRITERIA

3.4.1 HISTORIC SIGNIFICANCE

The Ontario Heritage Act, introduced in 1975, is intended to give municipalities and provincial government agencies the power to preserve elements of their jurisdictions with established historic significance. Subsequently, the Ontario Heritage Bridge Guidelines (OHBG) were developed and published by the Ministry of Transportation (MTO) to provide direction regarding the conservation of bridges considered historically significant, or, “Heritage” bridges. Bridges are identified, evaluated, and, if they are determined to have “heritage value”, are listed on the Ontario Heritage Bridge List (OHBL). For the purpose of determining a numeric rating within the Overall Structure Rating matrix, each structure was assessed based on the following guideline:

Criteria	Rating
Listed on OHBL with significance of 8 or higher	5
Listed on OHBL with significance of 5 to 7	4
Listed on OHBL with significance of less than 5	3
Structure is more than 40 years old and has unique characteristics	2
Structure is more than 40 years old but has no unique characteristics	1
Structure is less than 40 years old	0

The historic significance rating of each structure (from 1 to 5) are shown below in **Table 9**.

Table 9 Historic Significance Ratings

STRUCTURE ID	OVERALL RATING (MAX. 5 POINTS)	STRUCTURE ID	OVERALL RATING (MAX. 5 POINTS)
B-001	1	B-022	0
B-002	1	B-023	0
B-003	1	B-025	4
B-004	1	B-026	1
B-005	1	B-027	0
B-006	1	B-028	4
B-007	1	B-104	0
B-008	1	B-105	0
B-009	1	B-107	1
B-010	0	B-112	0
B-011	1	B-113	1
B-012	1	B-114	1
B-013	1	B-115	1
B-014	0	B-118	0
B-015	0	B-119	1
B-016	1	B-120	0
B-017	4	B-121	0
B-018	2	B-195	1
B-019	1	B-196	1
B-020	4	B-198	1
B-021	1		

3.4.2 DETOUR IMPACT

The final criterion to be considered is the availability of a detour route at each structure, were it to be closed and decommissioned, and a temporary closure of a neighbouring structure be required. Each structure is considered individually and given a rating from 1 to 10 (1 being minimal detour impact, 10 being high detour impact), taking into account the availability of a detour route, suitability of the proposed detour to accept the re-routed traffic, and the additional distance and time required to travel the available route. **Table 10** below defines the individual rating of each structure (from 1 to 10) and weight within the Overall Structure Rating matrix.

Table 10 Detour Impact Ratings

STRUCTURE ID	RATING (1-10)	OVERALL RATING (MAX. 5 POINTS)	STRUCTURE ID	RATING (1-10)	OVERALL RATING (MAX. 5 POINTS)
B-001	2	1	B-022	6	3
B-002	4	2	B-023	4	2
B-003	2	1	B-025	2	1
B-004	4	2	B-026	4	2
B-005	6	3	B-027	4	2
B-006	6	3	B-028	10	5
B-007	2	1	B-104	10	5
B-008	4	2	B-105	10	5
B-009	10	5	B-107	4	2
B-010	6	3	B-112	4	2
B-011	10	5	B-113	4	2
B-012	6	3	B-114	2	1
B-013	4	2	B-115	4	2
B-014	6	3	B-118	4	2
B-015	8	4	B-119	4	2
B-016	8	4	B-120	4	2
B-017	10	5	B-121	4	2
B-018	10	5	B-195	10	5
B-019	10	5	B-196	10	5
B-020	10	5	B-198	10	5
B-021	8	4			

3.5 OVERALL STRUCTURE RATING MATRIX

To establish an Overall Structure Rating for each structure within the Bentinck area, each of the primary, secondary, and tertiary rating criteria have been given weight based on importance within the overall rating matrix. The results of the application of the Overall Structure Rating matrix for each structure are presented in **Table 11** below.

Table 11 Overall Structure Ratings

STRUCTURE ID	BCI (MAX 20)	ASSET VALUE (MAX 20)	EMS (MAX 20)	TRAFFIC (MAX 10)	TRANSPORTATION NETWORK (MAX 10)	MUNICIPAL SERVICES (MAX 10)	HISTORIC SIG. (MAX 5)	DETOUR IMPACT (MAX 5)	OVERALL STRUCTURE RATING (MAX 100)
B-001	10	6	20	6	9	6	1	1	59
B-002	15	14	20	7	9	7	1	2	75
B-003	7	4	20	7	9	6	1	1	55
B-004	12	6	16	6	6	6	1	2	55
B-005	14	6	18	5	6	8	1	3	61
B-006	15	4	16	4	7	7	1	3	57
B-007	3	12	2	1	1	2	1	1	23
B-008	10	4	12	5	6	5	1	2	45
B-009	10	6	12	6	7	8	1	5	55
B-010	14	12	10	4	5	6	0	3	54
B-011	10	6	14	2	5	9	1	5	52
B-012	10	10	14	7	7	7	1	3	59
B-013	12	6	16	5	6	6	1	2	54
B-014	19	14	20	7	8	8	0	3	79
B-015	11	18	18	7	7	9	0	4	74
B-016	15	14	18	7	7	9	1	4	75
B-017	10	2	18	7	8	10	4	5	64
B-018	10	4	20	6	9	10	2	5	66
B-019	12	12	20	7	7	10	1	5	74
B-020	6	2	6	7	6	7	4	5	43
B-021	8	12	12	7	6	9	1	4	59
B-022	18	14	14	4	7	7	0	3	67
B-023	12	12	14	8	8	6	0	2	62
B-025	8	2	6	2	3	3	4	1	29
B-026	10	4	16	7	5	6	1	2	51
B-027	9	18	12	5	4	5	0	2	55
B-028	3	4	16	8	8	9	4	5	57
B-104	14	10	16	5	7	9	0	5	66
B-105	14	10	16	7	8	9	0	5	69
B-107	15	8	20	8	9	7	1	2	70
B-112	12	16	12	2	3	5	0	2	52
B-113	10	8	10	2	5	7	1	2	46
B-114	12	8	16	1	2	5	1	1	46
B-115	9	10	16	8	7	6	1	2	59
B-118	15	10	8	2	4	4	0	2	45
B-119	15	6	12	6	7	5	1	2	54

STRUCTURE ID	BCI (MAX 20)	ASSET VALUE (MAX 20)	EMS (MAX 20)	TRAFFIC (MAX 10)	TRANSPORTATION NETWORK (MAX 10)	MUNICIPAL SERVICES (MAX 10)	HISTORIC SIG. (MAX 5)	DETOUR IMPACT (MAX 5)	OVERALL STRUCTURE RATING (MAX 100)
B-120	9	10	14	2	4	6	0	2	43
B-121	15	10	12	5	5	5	0	2	54
B-195	8	8	20	7	7	10	1	5	66
B-196	14	8	12	5	5	8	1	5	58
B-198	12	8	12	2	4	8	1	5	52

As highlighted in “Red” in **Table 11** above, there are eight (8) structures, including four (4) bridges and four (4) culverts, with a rating below 50 out of a possible 100 points. Each of these eight (8) structures will be subsequently assessed and a determination made as to whether each is a viable candidate for closure based on their low overall value to the municipality and impact of closure. Each structure is reviewed and presented in depth in the following section, *Individual Structure Assessment and Rationale*.

4 INDIVIDUAL STRUCTURE ASSESSMENT AND RATIONAL

4.1 STRUCTURE REVIEW

Each structure within the former Township of Bentinck has been given an numeric rating to indicate its overall significance as an asset within the Municipality of West Grey. The below noted structures fall into the lowest rating class (less than 50 of a possible 100-point rating) have been identified as a potential candidate for closure.

Structure	Bridge/Culvert	Rating
B-007	Bridge	23
B-008	Bridge	45
B-020	Bridge	43
B-025	Bridge	29
B-113	Culvert	45
B-114	Culvert	46
B-118	Culvert	45
B-120	Culvert	43

Within this section, the site specific current conditions and future potential of each of the above noted structures will be summarized.

4.1.1 STRUCTURE B-007 (23/100)

Structure B-007 is located on the 30th Sideroad between Concession 12 and Concession 10 in the northeast portion of the former Township of Bentinck (see *Figure 2 – Structure location map* in **Appendix A**). The structure received the lowest rating in Bentinck, 23 out of a possible 100 points, primarily attributable to its type, location, and current condition. The structure was originally constructed in 1975, having concrete block abutments and pier, steel beams, and a wooden deck and barrier railing. A view of the structure elevation and from the north approaching perspective are shown in *Images 1 and 2* below.



Image 1 - B-007 Elevation View



Image 2 - B-007 View from North Approach

Structure B-007 serves a very small number of road users as it is located at a point on the 30th sideroad where the roadway is not maintained during the winter, and has a very low level of service considered substandard for typical travel. The structure is in poor overall condition, with recent inspections indicating that if it is to remain open, the structure requires significant immediate repairs. It is currently unsafe for public use due to the substandard barrier as well as the lack of any approach barrier protection with a significant hazard area, especially at the north approach. Due to the asset value and importance within the municipality, as well as the significant hazard and liability posed by the structure in its current condition, structure B-007 warrants consideration for closure by the Municipality in its future strategic planning.

4.1.2 STRUCTURE B-008 (45/100)

Structure B-008 is located on the Baseline Road between Concession 12 and Concession 10 in the northeast portion of the former Township of Bentinck (see **Figure 2 – Structure location map** in **Appendix A**). The structure received a rating of 45 points out of a possible 100 points, primarily attributable to its location, and current condition. The structure was originally constructed in 1935, having few, if any, repairs completed since. The structure spans nine (9) metres and is a rigid frame concrete structure with concrete barrier railing and an exposed concrete deck. A view of the structure in elevation and from the south approaching perspective are shown in **Images 3 and 4** below.



Image 3 - B-008 Elevation View



Image 4 - B-008 View from South Approach

Structure B-008 serves a relatively low number of road users with respect to other structures in the Municipality, as it is located on Baseline Road, which is discontinuous and varies in condition throughout its north/south length. Portions of Baseline Road are not maintained during the winter, or are not traversible to the standard vehicle. The structure is in poor overall condition, with recent inspections indicating that significant repairs are required if it is to remain open. Concrete produced and placed at the time of this structures original construction is known to be of significantly poorer quality than that of following periods, and therefore extensive concrete repairs are anticipated in the immediate future. The structure has an approximate replacement value of \$650,000, and the estimated cost to complete the immediate repairs required for the structure to remain open and in a safe condition is \$100,000. If the necessary repairs are completed, the structure could continue to serve road users for approximately 25 more years before requiring replacement. The structure has close proximity to Welbeck, Grey Road 25, and Provincial Highway 6, and may have future potential for serving an increased number of road users if the Baseline Road is improved.

As structure B-008 is a viable candidate for rehabilitation and has the potential for future increase in importance of this asset within the Municipality of West Grey, the Municipality may consider the scheduling of repairs in order to remain open and in a safe operating condition. In the future, when rehabilitation is no longer a viable option, the structure may warrant consideration for closure by the Municipality in its future strategic planning.

4.1.3 STRUCTURE B-020 (43/100)

Structure B-020, known as the Kennedy Bridge, is located on Concession 2 between Grey Road 3 and Allen Park Road in the south-central portion of the former Township of Bentinck (see *Figure 2 – Structure location map in Appendix A*). The structure received a rating of 43 points out of a possible 100 points, primarily attributable to its currently unsafe structural condition, which has resulted in the structures interim closure. The structure was originally constructed in 1920, having only minor repairs completed since. The structure spans approximately twenty-three (23) metres and is a steel pony truss structure with concrete abutments and timber deck overlain by an asphalt wearing surface. A view of the structure elevation and from the approaching perspective are shown in *Images 5 and 6* below.



Image 5 - B-020 Elevation View



Image 6 - B-020 View from Approach

Prior to its closure, structure B-020 served a relatively high number of road users with respect to other structures in the Municipality, as it is located on Concession 2, which has a high level of service and serves as an indirect, but well travelled route between the Hanover and Durham areas. The structure is in very poor and unsafe condition, resulting in its interim closure, while all potential options regarding its future are considered. Recent inspections of structure B-020 indicate that rehabilitation of the structure is no longer an economically viable option due to the high cost of the repairs compared to the poor condition of its foundation, which will ultimately limit the lifespan of the structure once rehabilitated. In addition to the foundation concerns, steel bridges constructed during this era were typically designed for a load of 15 imperial tons, which is the equivalent of 13.6 metric tonnes, and therefore a full rehabilitation of the structure would still require an imposed load limit posting of 13 tonnes. Due to its necessary closure, provisions have already been made in establishing alternate detour routing of traffic and emergency and municipal services in the area, which will lessen the burden of a permanent closure. The current estimated replacement value of this structure is \$1,000,000 due to its long span and high level of service.

In the case of this structure, replacement or closure are the two feasible options, each warranting consideration by the Municipality in its future strategic planning.

4.1.4 STRUCTURE B-025 (29/100)

Structure B-025, known as the Hudson bridge, is located on Sideroad 10 between Concession 2 and the Normanby Bentinck Townline in the southwest portion of the former Township of Bentinck (see *Figure 2 – Structure location map in Appendix A*). The structure received a rating of 29 points out of a possible 100 points, primarily attributable to poor condition of its main structural elements and its location and importance within the overall transportation network. The structure was originally constructed in 1918, having only minor repairs completed since. The structure spans approximately twenty-nine (29) meters and is a steel pony truss structure with concrete abutments and timber deck overlain by an asphalt wearing surface. A view of the structure elevation and from the approaching perspective are shown in *Images 7 and 8* below.



Image 7 - B-025 Elevation View



Image 8 - B-025 View from Approach

Structure B-025 serves a relatively low number of road users with respect to other structures in the Municipality, as it is located on Sideroad 10, which has a low level of service and is not a through road at either Concession 2 or the Normanby Bentinck Townline. The structure is in poor condition, and is approaching the end of its lifecycle, with necessary closure or replacement required in the immediate future. Recent inspections of structure B-025 indicate that rehabilitation of the structure is no longer an economically viable option due to the high cost of the repairs compared to the poor condition of its abutments, which will ultimately limit the lifespan of the structure once rehabilitated. In addition to the foundation concerns, steel bridges constructed during this era were typically design for a load of 15 imperial tons, which is the equivalent of 13.6 metric tonnes, and therefore a full rehabilitation of the structure would still require an imposed load limit posting of 13 tonnes. The current estimated replacement value of this structure is relatively high at \$1,250,000 due to its long span.

In the case of this structure, replacement or closure are the two feasible options. Due to the high cost of replacement and low overall importance within the municipal transportation network, structure B-025 warrants consideration for closure by the Municipality in its future strategic planning.

4.1.5 STRUCTURE B-113 (45/100)

Structure B-113 is located on the 3rd Sideroad between Concession 2 and Baseline Road in the northeast portion of the former Township of Bentinck (see *Figure 2 – Structure location map* in **Appendix A**). The structure received a rating of 45 points out of a possible 100 points, primarily attributable to its location and overall importance within the West Grey transportation network. The structure was originally constructed in 1960, having few, if any, repairs completed since. The structure spans five (5) metres and is an open footing rigid frame concrete structure overlain by a granular wearing surface. A view of the structure elevation is shown in *Image 9* below.



Image 9 - B-113 Elevation View

Structure B-113 serves a relatively low number of road users with respect to other structures in the Municipality, as it is located on the low traffic volume 3rd Sideroad between Baseline Road and Concession, which both also receive minimal traffic in this area. Recent inspections indicate that the structure is in fair overall condition, and with rehabilitation and regular maintenance, the structure still has significant lifespan remaining. The structure has an approximate replacement value of \$525,000. If repairs are scheduled as they become necessary, the structure could continue to serve road users within the Municipality for approximately 40 more years before requiring replacement. The structure has close proximity to Welbeck, Grey Road 25, and provincial Highway 6, and may have future potential for serving an increased number of road users if the area becomes busier and the level of service of the adjoining roads are improved.

As structure B-113 is a viable candidate for rehabilitation and has the potential for future increase in importance of this asset, it may be considered for the scheduling of repairs in order to remain open and in a safe operating condition. In the future, when rehabilitation is no longer a viable option, the structure may warrant consideration for closure by the Municipality in its future strategic planning.

4.1.6 STRUCTURE B-114 (46/100)

Structure B-114 is located on the dead-end road Old Bridge Road South north of Grey Road 4 in the south-central portion of the former Township of Bentinck (see *Figure 2 – Structure location map* in **Appendix A**). The structure received a rating of 46 points out of a possible 100 points, primarily attributable to its location and overall importance within the West Grey transportation network. The structure was originally constructed in 1950, having few, if any, repairs completed since. The structure spans just over three (3) metres and is an open footing rigid frame concrete structure overlain by an asphalt wearing surface. A view of the structure elevation is shown in *Image 10* below.



Image 10 - B-114 Elevation View

Structure B-114 serves a relatively low number of road users with respect to other structures in the Municipality, as it is located on Old Bridge Road South, and primarily serves the two (2) resident properties between the structure and its dead-end. Were the structure to be closed, the relocation of these two entrances would need to be coordinated in order to prevent stranding of the properties. Recent inspections indicate that the structure is in fair overall condition, and with rehabilitation and regular maintenance, the structure still has significant lifespan remaining. The structure has an approximate replacement value of \$500,000. If repairs are scheduled as they become required, the structure could continue to serve road users within the Municipality for approximately 30 more years before requiring replacement. At the end of the structures lifespan, when replacement becomes required, there is the potential to replace the structure with a more cost effective alternative, such as twin pipe culverts or an open-footed arch pipe.

Structure B-114 is a viable candidate for rehabilitation. The Municipality may wish to consider the scheduling of repairs as they become necessary in order for the structure to remain open and in a safe operating condition. In the future, when rehabilitation is no longer a viable option, the structure may warrant consideration for closure by the Municipality in its future strategic planning.

4.1.7 STRUCTURE B-118 (45/100)

Structure B-118 is located on Concession 14 between Grey Road 3 and the 10th Sideroad in the northwest portion of the former Township of Bentinck (see *Figure 2 – Structure location map* in **Appendix A**). The structure received a rating of 45 points out of a possible 100 points, primarily attributable to its location, asset value, and overall importance within the West Grey transportation network. The structure was originally constructed in 1980, having only regular maintenance completed since. The structure consists of two elliptical twin corrugated steel pipes, each with a width of 2.4 meters and a height of 1.9 meters. A view of the structure elevation is shown in *Image 11* below.



Image 11 - B-118 Elevation View

Structure B-118 serves a relatively low number of road users with respect to other structures in the Municipality, as it is located on an unpaved, low traffic portion of Concession 14. Recent inspections indicate that the structure is in fair-to-good overall condition, and with regular maintenance and repairs as required, the structure still has significant lifespan remaining. The structure has an approximate replacement value of \$350,000. If repairs are scheduled as they become required, the structure could continue to serve road users within the Municipality for approximately 25 more years before requiring replacement. At the end of the structures lifespan, when replacement becomes required, the structure could be replaced with similar elliptical pipes.

As structure B-118 is a viable candidate for rehabilitation, the Municipality may wish to consider the scheduling of repairs as they become necessary in order to maintain the structure in its current condition. At the end of the structures lifespan, it will warrant consideration by the Municipality for replacement as it is relatively inexpensive and will enable the preservation of a through road with the potential for increased future importance.

4.1.8 STRUCTURE B-120 (43/100)

Structure B-120 is located on the 10th Sideroad between Concession 12 and Concession 14 Sideroad in the northwest portion of the former Township of Bentinck (see **Figure 2 – Structure location map** in **Appendix A**). The structure received a rating of 43 points out of a possible 100 points, primarily attributable to its location, asset value, and overall importance within the West Grey transportation network. The structure was originally constructed in 1981, having only regular maintenance completed since. The structure consists of two elliptical twin corrugated steel pipes, each with a width of 2.4 meters and a height of 1.7 meters. A view of the structure elevation is shown in **Image 12** below.



Image 12 - B-120 Elevation View

Structure B-120 serves a relatively low number of road users with respect to other structures in the Municipality, as it is located on an unpaved, low traffic portion of the 10th Sideroad. Recent inspections indicate that the structure is in fair-to-good overall condition, and with regular maintenance and repairs as required, the structure still has significant lifespan remaining. The structure has an approximate replacement value of \$300,000. If repairs are scheduled as they become required, the structure could continue to serve road users within the Municipality for approximately 25 more years before requiring replacement. At the end of the structure's lifespan, when replacement becomes required, the structure could be replaced with similar elliptical pipes.

As structure B-120 is a viable candidate for rehabilitation, the Municipality may wish to consider the scheduling of repairs as they become necessary in order to maintain the structure in its current condition. At the end of the structure's lifespan, it will warrant consideration by the Municipality for replacement as it is relatively inexpensive and will enable the preservation of a through road with the potential for increased future importance.

5 RECOMMENDATIONS

Through the development of the Overall Structure Rating matrix, a universal classification and rating system, WSP has completed an in-depth review and evaluation of each of the Municipality of West Grey's structures within the former Township of Bentinck area. This review has identified eight (8) structures within the municipality which are of the lowest value and importance within the context of the overall transportation network. Each of these eight (8) structures were evaluated individually for their suitability for potential future closure, with considerations and general recommendations previously outlined.

It is understood that considering the available tax base for funding the maintenance and rehabilitation of its structures going forward, it is in the best interest of the Municipality to undergo strategic closures of a selection of the poorest condition structures. The remaining structures may then be maintained and replaced to provide an adequate, safe, and economically sustainable road network. To that end, it is recommended that the Municipality consider the below action at each of the eight (8) structures:

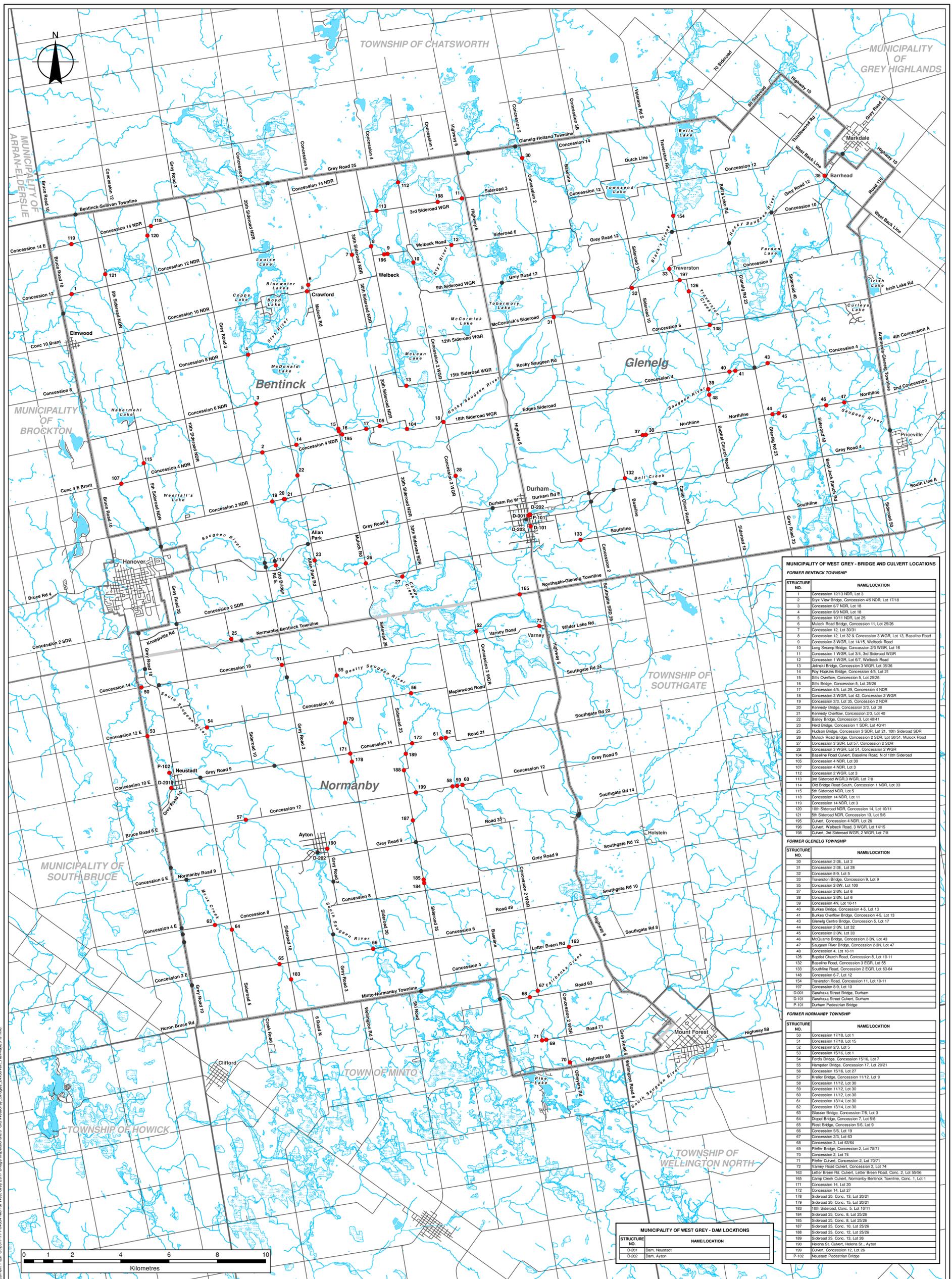
Structure	Recommended Action
B-007	Permanent Closure
B-008	Continued Monitoring, Completion of Rehabilitation Work, Potential Closure at end of Lifecycle
B-020	Permanent Closure
B-025	Permanent Closure
B-113	Completion of Rehabilitation Work, Replacement at end of Lifecycle
B-114	Completion of Rehabilitation Work, Potential Closure at end of Lifecycle
B-118	Completion of Rehabilitation Work, Replacement at end of Lifecycle
B-120	Completion of Rehabilitation Work, Replacement at end of Lifecycle

The rating, assessments, and recommendations within are based on all available information regarding the Municipality's roadway network and structure inventory, and are intended to assist in the development of a strategic structure asset management plan to support an functional, safe, and economically sustainable transportation network in the Municipality of West Grey.

A TABLES AND FIGURES

TABLE 1
Structure Rating and Rationale Report
Former Township of Bentinck
The Municipality of West Grey

Structure	Location	Bridge or Culvert	Year Built	Year Replaced	Age (2018)	BCI Value	Work Required in Immediate Future	Work Required in Near Future	Candidate for Rehabilitation	Estimated Cost of Rehabilitation	Candidate for Replacement	Asset Replacement Value (Present Day)
B-001	Concession 12 & 13 NDR, Lot 3	Bridge	1935	-	83	52.01	No	Yes	Yes	\$ 108,000.00		\$ 600,000.00
B-002	Styx View Bridge, Concession 4 & 5, Lot 17 & 18	Bridge	1970	-	48	75.22	No	No	Yes	\$ 75,000.00		\$ 1,250,000.00
B-003	Concession 6 & 7, Lot 18	Bridge	1940	-	78	33.36	Yes		No		Yes	\$ 650,000.00
B-004	Concession 8 & 9, NDR, Lot 18	Bridge	1935	-	83	60.53	No	No	Yes	\$ 80,000.00		\$ 600,000.00
B-005	Concession 10 & 11, Lot 25	Bridge	1940	-	78	67.72	No	No	Yes	\$ 95,000.00		\$ 600,000.00
B-006	Concession 11, Lot 25 & 26	Bridge	1935	-	83	45.61	No	Yes	yes	\$ 90,000.00		\$ 675,000.00
B-007	Concession 12, Lot 30 & 31	Bridge	1975	-	43	16.07	Yes		No		Yes	\$ 650,000.00
B-008	Concession 12, Lot 33 & 13, 3W	Bridge	1935	-	83	50.21	No	Yes	Yes	\$ 100,000.00		\$ 650,000.00
B-009	Concession 3W, Lot 14 & 15	Bridge	1940	-	78	48.29	No	Yes	Yes	\$ 115,000.00		\$ 600,000.00
B-010	Long Swamp Bridge, Concession 2 & 3W, Lot 16	Bridge	1979	1992	26	71.21	No	No	Yes	\$ 45,000.00		\$ 625,000.00
B-011	Concession 1W, Lot 3 & 4	Bridge	1940	-	78	47.62	No	Yes	Yes	\$ 110,000.00		\$ 600,000.00
B-012	Concession 1W, Lot 6 & 7	Bridge	1975	-	43	50.19	No	Yes	Yes	\$ 95,000.00		\$ 600,000.00
B-013	Jelinski Bridge, Concession 3W, Lot 35 & 36	Bridge	1940	-	78	59.65	No	Yes	Yes	\$ 40,000.00		\$ 600,000.00
B-014	Roy Hopkins Bridge, Concession 4 & 5, Lot 21	Bridge	1924	1992	26	94.03	No	No	Yes	\$ 20,000.00		\$ 1,500,000.00
B-015	Sills (Overflow) Concession 5, Lot 25 & 26	Bridge	1935	1997	21	53.33	No	Yes	Yes	\$ 50,000.00		\$ 650,000.00
B-016	Sills Bridge, Concession 5, Lot 25 & 26	Bridge	1974	-	44	72.56	No	No	Yes	\$ 65,000.00		\$ 1,100,000.00
B-017	Concession 4 & 5, Lot 29	Bridge	1920	-	98	47.96	No	Yes	Yes	\$ 125,000.00		\$ 1,250,000.00
B-018	Concession 2 & 3W, Lot 42	Bridge	1945	-	73	51.24	No	Yes	Yes	\$ 100,000.00		\$ 1,100,000.00
B-019	Concession 2 NDR & 3, Lot 35	Bridge	1975	-	43	61.8	No	No	Yes	\$ 35,000.00		\$ 850,000.00
B-020	Kennedy Bridge, Concession 2 & 3, Lot 40	Bridge	1920	-	98	28.65	Yes		No		Yes	\$ 1,000,000.00
B-021	Kennedy Overflow ,Concession 2 & 3, Lot 40	Bridge	1970	-	48	38.35	Yes		Yes	\$ 105,000.00		\$ 650,000.00
B-022	Bailey Bridge, Concession 3, Lot 40 & 41	Bridge	1981	-	37	87.56	No	No	Yes	\$ 25,000.00		\$ 1,250,000.00
B-023	Herd Bridge, Concession 1S, Lot 40 & 41	Bridge	1988	-	30	59.81	No	Yes	Yes	\$ 55,000.00		\$ 675,000.00
B-025	Hudson Bridge, Concession 3S, Lot 20 & 21	Bridge	1913	-	105	37.77	Yes		No		Yes	\$ 1,250,000.00
B-026	Concession 2S, Lot 50 & 51, Mulock Road	Bridge	1935	-	83	50.86	No	Yes	Yes	\$ 35,000.00		\$ 650,000.00
B-027	Concession 3S, Lot 57	Bridge	1940	1996	22	45.08	No	Yes	Yes	\$ 65,000.00		\$ 700,000.00
B-028	Schenk Bridge, Concession 2 & 3W, Lot 51	Bridge	1920	-	98	13.33	Yes		No		Yes	\$ 850,000.00
B-104	Base Line Road Culvert	Culvert	1992	-	26	70.6	No	No	Yes	\$ 20,000.00		\$ 300,000.00
B-105	Concession 4 (NDR) Lot 30	Culvert	1992	-	26	70.6	No	No	Yes	\$ 15,000.00		\$ 400,000.00
B-107	Concession 4 (NDR) Lot 3	Culvert	1955	-	63	72.63	No	No	Yes	\$ 80,000.00		\$ 525,000.00
B-112	Concession 2 (WGR) Lot 3	Culvert	1994	-	24	61.65	No	No	No		Yes	\$ 350,000.00
B-113	3rd Sideroad (WGR) Lot 7/8	Culvert	1960	-	58	49.52	No	Yes	Yes	\$ 35,000.00		\$ 525,000.00
B-114	Old Bridge Road South	Culvert	1950	-	68	58.38	No	Yes	Yes	\$ 25,000.00		\$ 500,000.00
B-115	5th Sideroad (NDR) Lot 5	Culvert	1970	-	48	47.06	No	Yes	Yes	\$ 35,000.00		\$ 525,000.00
B-118	Concession 14 (NDR) Lot 5	Culvert	1980	-	38	75	No	No	Yes	\$ 40,000.00		\$ 350,000.00
B-119	Concession 14 (NDR) Lot 3	Culvert	1941	-	77	73.59	No	No	Yes	\$ 30,000.00		\$ 550,000.00
B-120	10th Sideroad (NDR) Lot 10/11	Culvert	1981	-	37	46.73	No	Yes	Yes	\$ 60,000.00		\$ 300,000.00
B-121	5th Sideroad (NDR) Lot 5/6	Culvert	1979	-	39	75	No	No	Yes	\$ 45,000.00		\$ 300,000.00
B-195	Concession 4 (NDR) Lot 26	Culvert	1960	-	58	41.52	No	Yes	Yes	\$ 45,000.00		\$ 500,000.00
B-196	Welbeck Rd. Concession (WGR) Lot 14/15	Culvert	1960	-	58	69.34	No	No	Yes	\$ 90,000.00		\$ 525,000.00
B-198	Sideroad 3 WGR Lot 7/8	Culvert	1965	-	53	57.87	No	Yes	Yes	\$ 45,000.00		\$ 525,000.00
									Total Cost of Rehabilitation =	\$ 2,198,000.00	Total Cost of Replacement =	\$ 28,350,000.00



MUNICIPALITY OF WEST GREY - BRIDGE AND CULVERT LOCATIONS

FORMER BENTINCK TOWNSHIP

STRUCTURE NO.	NAME/LOCATION
1	Concession 12/13 NDR, Lot 3
2	Sty View Bridge, Concession 4/5 NDR, Lot 17/18
3	Concession 6/7 NDR, Lot 18
4	Concession 8/9 NDR, Lot 18
5	Concession 10/11 NDR, Lot 23
6	Mulock Road Bridge, Concession 11, Lot 25/26
7	Concession 12, Lot 30/31
8	Concession 12, Lot 32 & Concession 3 WGR, Lot 13, Baseline Road
9	Concession 3 WGR, Lot 14/15, Welbeck Road
10	Long Swamp Bridge, Concession 2/3 WGR, Lot 16
11	Concession 1 WGR, Lot 3/4, 3rd Sideroad WGR
12	Concession 1 WGR, Lot 6/7, Welbeck Road
13	Jelinski Bridge, Concession 3 WGR, Lot 35/36
14	Roy Hopkins Bridge, Concession 4/5, Lot 21
15	Silt Overflow, Concession 5, Lot 25/26
16	Silt Bridge, Concession 5, Lot 25/26
17	Concession 4/5, Lot 29, Concession 4 NDR
18	Concession 3 WGR, Lot 42, Concession 2 WGR
19	Concession 2/3, Lot 35, Concession 2 NDR
20	Kennedy Bridge, Concession 2/3, Lot 38
21	Kennedy Overflow, Concession 2/3, Lot 40
22	Bailey Bridge, Concession 3, Lot 40/41
23	Head Bridge, Concession 3 SDR, Lot 40/41
24	Hudson Bridge, Concession 3 SDR, Lot 21, 10th Sideroad SDR
25	Mulock Road Bridge, Concession 2 SDR, Lot 50/51, Mulock Road
26	Concession 3 SDR, Lot 57, Concession 2 SDR
27	Concession 2 WGR, Lot 51, Concession 2 SDR
28	Baseline Road Culvert, Baseline Road, 1/4 of 18th Sideroad
104	Concession 4 NDR, Lot 30
105	Concession 4 NDR, Lot 30
107	Concession 4 NDR, Lot 30
112	Concession 2 WGR, Lot 3
113	3rd Sideroad WGR/3 WGR, Lot 7/8
114	Old Bridge Road South, Concession 1 NDR, Lot 33
115	5th Sideroad NDR, Lot 5
118	Concession 14 NDR, Lot 11
119	Concession 14 NDR, Lot 3
120	10th Sideroad NDR, Concession 14, Lot 10/11
121	5th Sideroad NDR, Concession 13, Lot 5/6
195	Culvert, Concession 4 NDR, Lot 28
196	Culvert, Welbeck Road, 3 WGR, Lot 14/15
198	Culvert, 3rd Sideroad WGR, 2 WGR, Lot 7/8

FORMER GLENELG TOWNSHIP

STRUCTURE NO.	NAME/LOCATION
30	Concession 2/3E, Lot 9
31	Concession 2/3E, Lot 28
32	Concession 8/9, Lot 5
33	Traverson Bridge, Concession 9, Lot 9
35	Concession 2/3N, Lot 10/9
37	Concession 2/3N, Lot 6
38	Concession 2/3N, Lot 6
39	Concession 2/3N, Lot 6
40	Burkes Bridge, Concession 4/5, Lot 13
41	Burkes Overflow Bridge, Concession 4/5, Lot 13
43	Glenelg Centre Bridge, Concession 5, Lot 17
44	Concession 2/3N, Lot 10/11
45	Concession 2/3N, Lot 33
46	McQuane Bridge, Concession 2/3N, Lot 43
47	Saugen River Bridge, Concession 2/3N, Lot 47
49	Concession 4, Lot 10/11
126	Baptist Church Road, Concession 8, Lot 10/11
132	Baseline Road, Concession 3 EGR, Lot 55
133	Southline Road, Concession 2 EGR, Lot 63/64
148	Concession 8/7, Lot 12
154	Traverson Road, Concession 11, Lot 10/11
197	Concession 8/9, Lot 10
D-001	Gartrava Street Bridge, Durham
D-101	Gartrava Street Culvert, Durham
P-101	Durham Pedestrian Bridge

FORMER NORMANBY TOWNSHIP

STRUCTURE NO.	NAME/LOCATION
50	Concession 17/18, Lot 1
51	Concession 17/18, Lot 15
52	Concession 2/3, Lot 5
53	Concession 15/16, Lot 1
54	Ford's Bridge, Concession 15/16, Lot 7
55	Hampden Bridge, Concession 17, Lot 20/21
56	Concession 15/16, Lot 27
57	Kruller Bridge, Concession 11/12, Lot 9
58	Concession 11/12, Lot 30
59	Concession 11/12, Lot 30
60	Concession 11/12, Lot 30
61	Concession 13/14, Lot 30
62	Concession 13/14, Lot 30
63	Slusser Bridge, Concession 7/8, Lot 3
64	Drapel Bridge, Concession 7, Lot 5/6
65	Riest Bridge, Concession 5/6, Lot 9
66	Concession 5/6, Lot 19
67	Concession 2/3, Lot 12
68	Concession 3, Lot 63/64
69	Pfeffer Bridge, Concession 2, Lot 70/71
70	Concession 2, Lot 74
71	Pfeffer Culvert, Concession 2, Lot 70/71
72	Varney Road Culvert, Concession 2, Lot 74
163	Letter Breen Rd Culvert, Letter Breen Road, Conc. 2, Lot 55/56
165	Camp Creek Culvert, Normanby/Bentinck Townline, Conc. 1, Lot 1
171	Concession 14, Lot 20
172	Concession 14, Lot 27
178	Sideroad 20, Conc. 13, Lot 20/21
179	Sideroad 25, Conc. 13, Lot 20/21
183	10th Sideroad, Conc. 5, Lot 10/11
184	Sideroad 25, Conc. 8, Lot 25/26
185	Sideroad 25, Conc. 8, Lot 25/26
187	Sideroad 25, Conc. 10, Lot 25/26
188	Sideroad 25, Conc. 12, Lot 25/26
189	Sideroad 25, Conc. 13, Lot 26
190	Helena St. Culvert, Helena St., Aylon
199	Culvert, Concession 12, Lot 26
P-102	Neustadt Pedestrian Bridge

MUNICIPALITY OF WEST GREY - DAM LOCATIONS

STRUCTURE NO.	NAME/LOCATION
D-201	Dam, Neustadt
D-202	Dam, Aylon

LEGEND

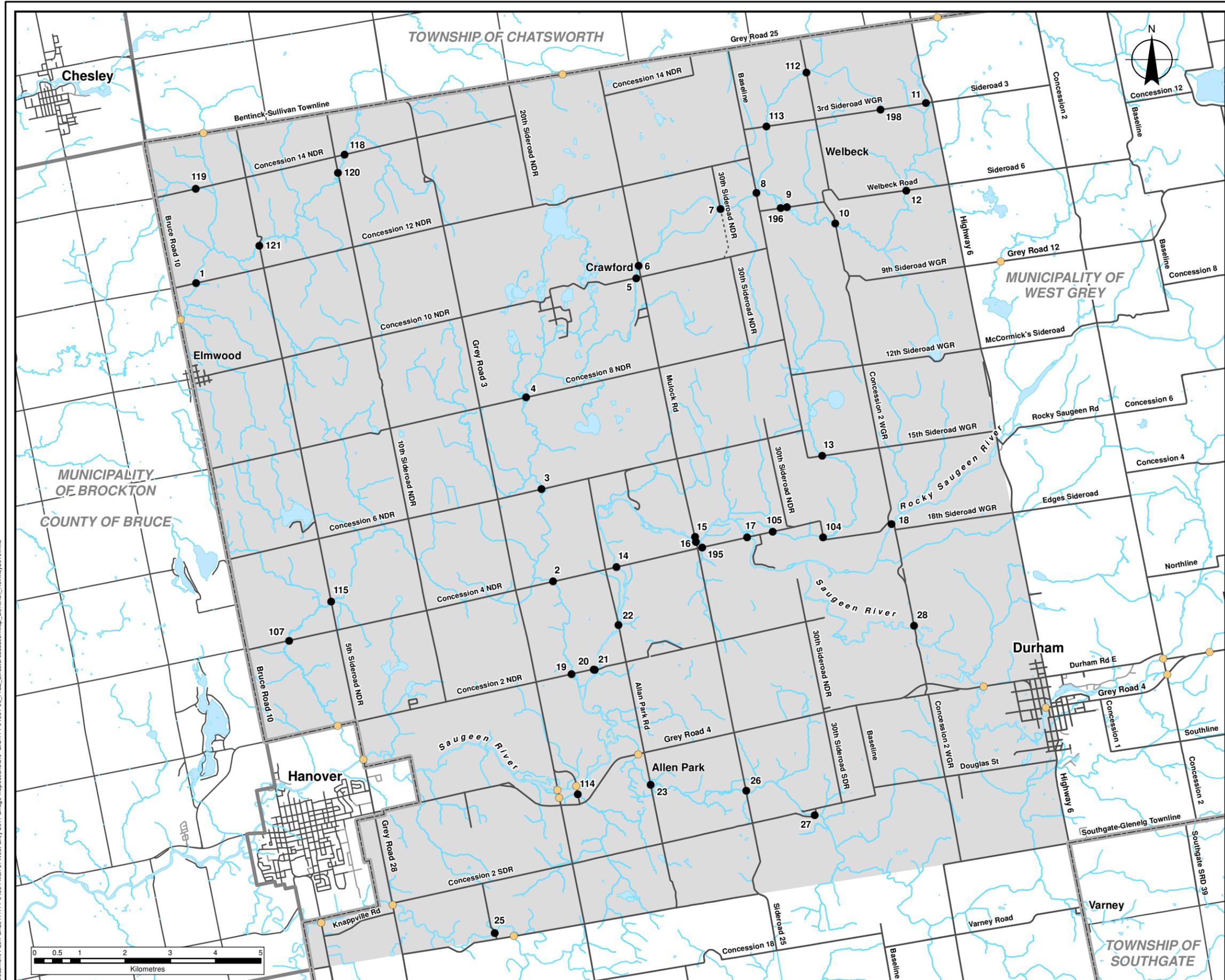
- WEST GREY MUNICIPAL BOUNDARY
- MUNICIPAL BOUNDARY
- WEST GREY BRIDGE/CULVERT/DAM ASSET
- GREY COUNTY BRIDGE/CULVERT ASSET
- WATERBODY
- WETLAND - EVALUATED
- STREAM

**BRIDGE, CULVERT & DAM LOCATIONS
MUNICIPALITY OF WEST GREY**

PROJECT:	171-04854-00	DATE:	MAY 2019
DRAWN/APPROVED:	JET/CW/KH	SCALE:	SEE SCALE BAR



FIGURE:



STRUCTURE NO.	NAME/LOCATION
1	Concession 12/13 NDR, Lot 3
2	Styx View Bridge, Concession 4/5 NDR, Lot 17/18
3	Concession 6/7 NDR, Lot 18
4	Concession 8/9 NDR, Lot 18
5	Concession 10/11 NDR, Lot 25
6	Mulock Road Bridge, Concession 11, Lot 25/26
7	Concession 12, Lot 30/31
8	Concession 12, Lot 32 & Concession 3 WGR, Lot 13, Baseline Road
9	Concession 3 WGR, Lot 14/15, Welbeck Road
10	Long Swamp Bridge, Concession 2/3 WGR, Lot 16
11	Concession 1 WGR, Lot 3/4, 3rd Sideroad WGR
12	Concession 1 WGR, Lot 6/7, Welbeck Road
13	Jelinski Bridge, Concession 3 WGR, Lot 35/36
14	Roy Hopkins Bridge, Concession 4/5, Lot 21
15	Sills Overflow, Concession 5, Lot 25/26
16	Sills Bridge, Concession 5, Lot 25/26
17	Concession 4/5, Lot 29, Concession 4 NDR
18	Concession 3 WGR, Lot 42, Concession 2 WGR
19	Concession 2/3, Lot 35, Concession 2 NDR
20	Kennedy Bridge, Concession 2/3, Lot 38
21	Kennedy Overflow, Concession 2/3, Lot 40
22	Bailey Bridge, Concession 3, Lot 40/41
23	Herd Bridge, Concession 1 SDR, Lot 40/41
25	Hudson Bridge, Concession 3 SDR, Lot 21, 10th Sideroad SDR
26	Mulock Road Bridge, Concession 2 SDR, Lot 50/51, Mulock Road
27	Concession 3 SDR, Lot 57, Concession 2 SDR
28	Concession 3 WGR, Lot 51, Concession 2 WGR
104	Baseline Road Culvert, Baseline Road, N of 18th Sideroad
105	Concession 4 NDR, Lot 30
107	Concession 4 NDR, Lot 3
112	Concession 2 WGR, Lot 3
113	3rd Sideroad WGR, 3 WGR, Lot 7/8
114	Old Bridge Road South, Concession 1 NDR, Lot 33
115	5th Sideroad NDR, Lot 5
118	Concession 14 NDR, Lot 11
119	Concession 14 NDR, Lot 3
120	10th Sideroad NDR, Concession 14, Lot 10/11
121	5th Sideroad NDR, Concession 13, Lot 5/6
195	Culvert, Concession 4 NDR, Lot 26
196	Culvert, Welbeck Road, 3 WGR, Lot 14/15
198	Culvert, 3rd Sideroad WGR, 2 WGR, Lot 7/8

LEGEND

- WEST GREY MUNICIPAL BOUNDARY
- FORMER BENTINCK TOWNSHIP
- WATERBODY
- RIVER/STREAM
- ROAD MAINTAINED IN WINTER
- NO WINTER ROAD MAINTENANCE
- WEST GREY BRIDGE/CULVERT/DAM ASSET
- GREY COUNTY BRIDGE/CULVERT ASSET

BASE MAP DATA PROVIDED BY THE COUNTY OF GREY AND THE MINISTRY OF NATURAL RESOURCES AND FORESTRY, LAND INFORMATION ONTARIO, RETRIEVED FROM <https://www.javacoapp.lrc.gov.on.ca>

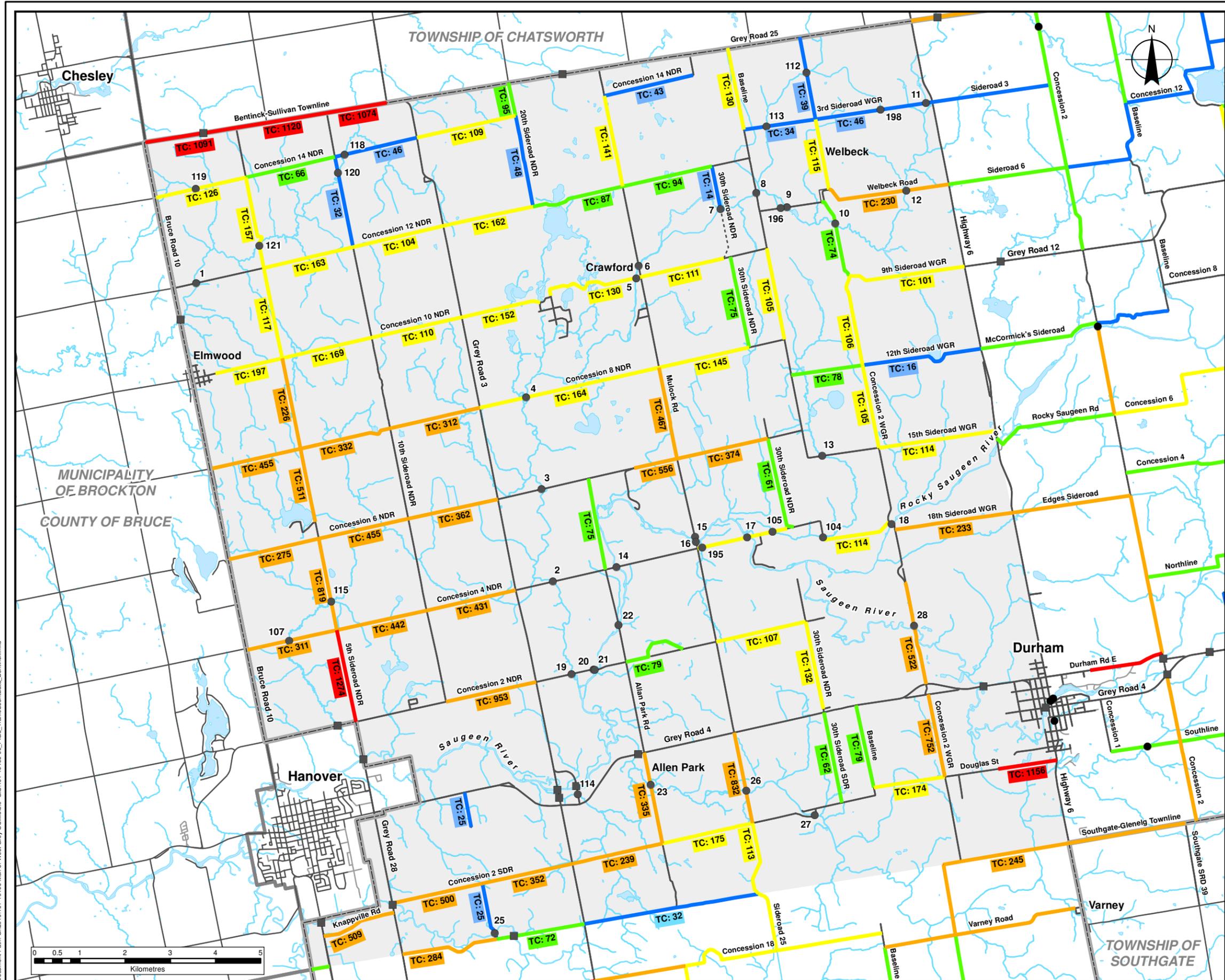
WSP

1450 1st AVENUE WEST, SUITE 101
OWEN SOUND, ONTARIO CANADA N4K 6W2
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**STRUCTURE LOCATION MAP
STRUCTURE RATING AND RATIONAL REPORT
FORMER BENTINCK TOWNSHIP
MUNICIPALITY OF WEST GREY**

SCALE:	1:85,000	DATE:	MAY 2019
DRAWN:	JET	PROJECT:	171-04854-00
APPROVED:	KH/CW	FIGURE:	2

Document Path: G:\2017\171-04854_Mun of West Grey 2017 Bridge Inspection\8.0 GIS\171-04854-00_FIG2_StructureLocationMap_Bentinck_RevMay2019.mxd



STRUCTURE NO.	NAME/LOCATION
1	Concession 12/13 NDR, Lot 3
2	Styx View Bridge, Concession 4/5 NDR, Lot 17/18
3	Concession 6/7 NDR, Lot 18
4	Concession 8/9 NDR, Lot 18
5	Concession 10/11 NDR, Lot 25
6	Mulock Road Bridge, Concession 11, Lot 25/26
7	Concession 12, Lot 30/31
8	Concession 12, Lot 32 & Concession 3 WGR, Lot 13, Baseline Road
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23	Herd Bridge, Concession 1 SDR, Lot 40/41
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27	Concession 3 SDR, Lot 57, Concession 2 SDR
28	Concession 3 WGR, Lot 51, Concession 2 WGR
104	Baseline Road Culvert, Baseline Road, N of 18th Sideroad
105	Concession 4 NDR, Lot 30
107	Concession 4 NDR, Lot 3
112	Concession 2 WGR, Lot 3
113	3rd Sideroad WGR, 3 WGR, Lot 7/8
114	Old Bridge Road South, Concession 1 NDR, Lot 33
115	5th Sideroad NDR, Lot 5
118	Concession 14 NDR, Lot 11
119	Concession 14 NDR, Lot 3
120	10th Sideroad NDR, Concession 14, Lot 10/11
121	5th Sideroad NDR, Concession 13, Lot 5/6
195	Culvert, Concession 4 NDR, Lot 26
196	Culvert, Welbeck Road, 3 WGR, Lot 14/15
198	Culvert, 3rd Sideroad WGR, 2 WGR, Lot 7/8

LEGEND

- WEST GREY MUNICIPAL BOUNDARY
- WEST GREY STRUCTURE - BRIDGE/CULVERT/DAM
- GREY COUNTY BRIDGE/CULVERT ASSET
- WEST GREY ROADS - AVERAGE DAILY TRAFFIC (ADT)**
 - 1,000 AND OVER ADT (2016 TRAFFIC COUNT)
 - 200 - 999 ADT (2016 TRAFFIC COUNT)
 - 100 - 199 ADT (2016 TRAFFIC COUNT)
 - 50 - 99 ADT (2016 TRAFFIC COUNT)
 - 0 - 49 ADT (2016 TRAFFIC COUNT)

BASE MAP DATA PROVIDED BY THE COUNTY OF GREY AND THE MINISTRY OF NATURAL RESOURCES AND FORESTRY, LAND INFORMATION ONTARIO, RETRIEVED FROM <https://www.javacoapp.lrc.gov.on.ca>

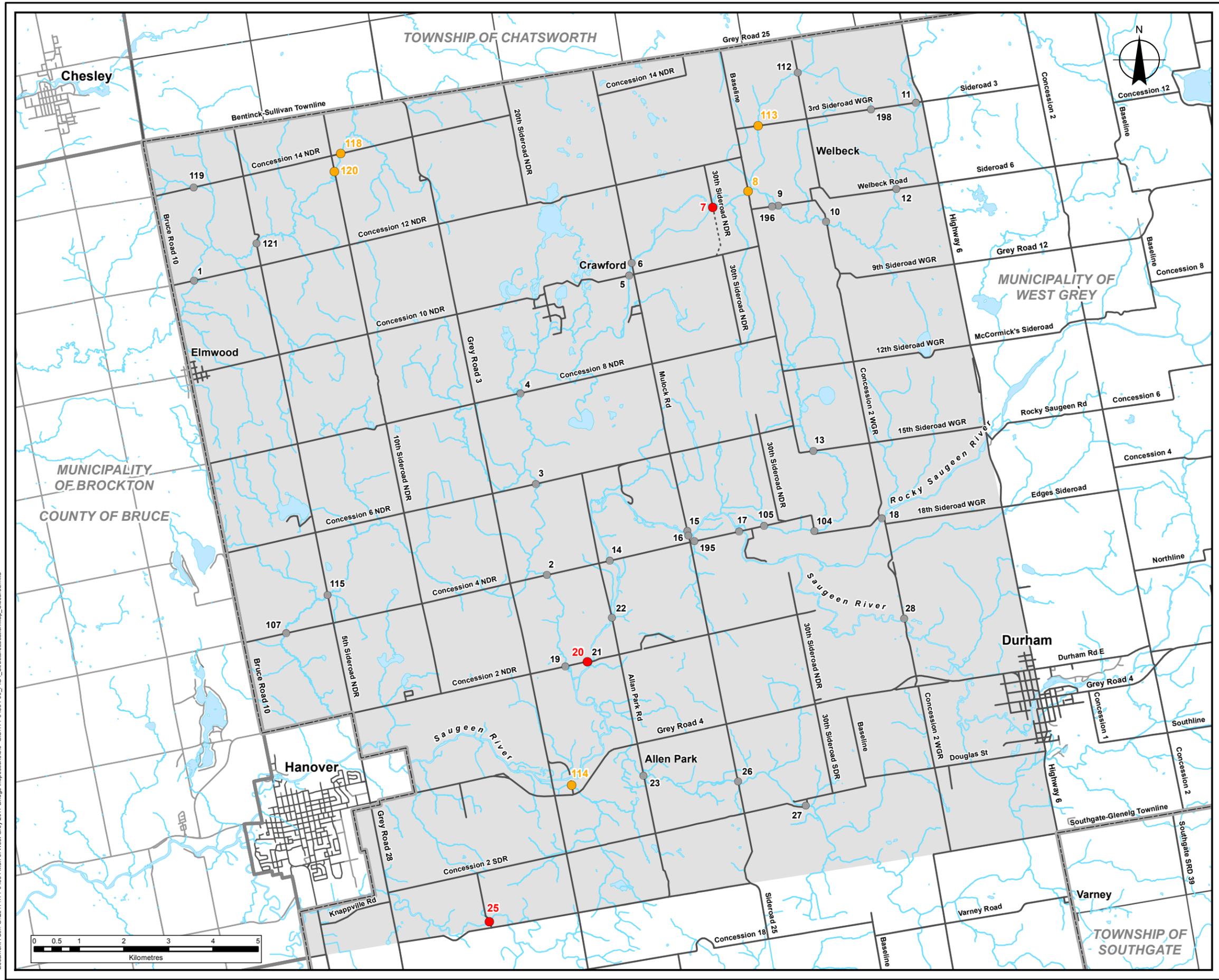
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**TRAFFIC COUNT DATA
 STRUCTURE RATING AND RATIONAL REPORT
 FORMER BENTINCK TOWNSHIP
 MUNICIPALITY OF WEST GREY**

SCALE:	1:85,000	DATE:	DEC 2019
DRAWN:	JET	PROJECT:	191-10406-00
APPROVED:	KH/CW	FIGURE:	3

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STRUCTURE NO.	NAME/LOCATION
1	Concession 12/13 NDR, Lot 3
2	Styx View Bridge, Concession 4/5 NDR, Lot 17/18
3	Concession 6/7 NDR, Lot 18
4	Concession 8/9 NDR, Lot 18
5	Concession 10/11 NDR, Lot 25
6	Mulock Road Bridge, Concession 11, Lot 25/26
7	Concession 12, Lot 30/31
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22	Bailey Bridge, Concession 3, Lot 40/41
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107	Concession 4 NDR, Lot 3
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114	Old Bridge Road South, Concession 1 NDR, Lot 33
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119	Concession 14 NDR, Lot 3
120	10th Sideroad NDR, Concession 14, Lot 10/11
121	5th Sideroad NDR, Concession 13, Lot 5/6
195	Culvert, Concession 4 NDR, Lot 26
196	Culvert, Welbeck Road, 3 WGR, Lot 14/15
198	Culvert, 3rd Sideroad WGR, 2 WGR, Lot 7/8

LEGEND

- WEST GREY MUNICIPAL BOUNDARY
- FORMER BENTINCK TOWNSHIP
- ROAD MAINTAINED IN WINTER
- NO WINTER ROAD MAINTENANCE
- 1 BRIDGE/CULVERT
- 7 RECOMMENDED STRUCTURE CLOSURE
- 8 RECOMMENDED STRUCTURE REHABILITATION AND/OR POTENTIAL FUTURE CLOSURE

BASE MAP DATA PROVIDED BY THE COUNTY OF GREY AND THE MINISTRY OF NATURAL RESOURCES AND FORESTRY, LAND INFORMATION ONTARIO, RETRIEVED FROM <https://www.javacoapp.lrc.gov.on.ca>



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**STRUCTURE LOCATION MAP
RECOMMENDED CLOSURES
STRUCTURE RATING AND RATIONAL REPORT
FORMER BENTINCK TOWNSHIP
MUNICIPALITY OF WEST GREY**

SCALE:	1:85,000	DATE:	JUL 2018
DRAWN:	JET	PROJECT:	171-04854-00
APPROVED:	KH/CW	FIGURE:	4

Document Path: G:\2017\171-04854_Mun of West Grey 2017 Bridge Inspections\8.0 GIS\171-04854-00_FIG4_StructureLocationMap_Closures.mxd