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Appendix A

Midland Waterworks Master Plan Update Preliminary Servicing Strategies Technical Memo (AECOM, March 18, 2019)

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Project name:
Town of Midland Waterworks Master Plan Update

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60545937

From:
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Date:
March 18, 2019

Memorandum

Subject: **Midland Waterworks Master Plan Update – Preliminary Servicing Strategies**

Introduction

AECOM Canada Inc. (AECOM) was retained as a consultant to update the Town of Midland Waterworks Master Plan. The previous Town of Midland Waterworks Master Plan was complete in 2013 and projected the waterworks requirements to 2031. The current update is using the estimated population growth to 2041 to determine the required infrastructure upgrades and capital works to meet the level of service that allows for a healthy and prosperous development in the Town of Midland. This Technical Memorandum summarizes the progress of the project, which includes:

- Estimation of future population in 5 year increments in each pressure zone;
- Evaluation of the storage, pump capacity, and well production capacity; and
- Selection of water servicing strategies.

Anticipated Population Growth

Estimated Population Growth in the Town of Midland

The table below illustrates the population forecasts and employment projections for the Town of Midland for the next 20 years. Note that the population projection for 2036 and 2041 are estimates only and have not been allocated by the County of Simcoe.

Table 1: Population and Employment Forecasts for the Town of Midland

Town of Midland	2006	2031	2036	2041
Population Forecasts	16,900	22,500	24,663	26,881
Employment Projections	12,000	13,800	15,127	16,487

Estimating Population Growth in Phases

A significant effort has been undertaken to estimate the population growth within the Town limits. The population forecasts and employment projections were made for the entire Town of Midland. In order to properly evaluate the Town of Midland water distribution system for existing and future conditions, the population projections must be distributed by pressure zones. Future growth information was gathered from the Town of Midland Planning Department. Existing and planned development information (Appendix C) and land use information (Appendix B) was used to create theoretical parcels of land where growth is expected (Figure 3). The type of growth (employment vs. residential) is defined by the existing land use information. For parcels where employment or residential information is not defined, an assumed split of 75% residential and 25% employment was assumed based on area of the parcel. The overall anticipated employment and residential growth was distributed by parcels using both land use information and the weighted ratio of residential vs. employment split calculated for the parcel with no land use information. The future population projections for growth areas is summarized in Table 2. The parcel ID number in Figure 3 are referenced in column 1 of Table 2. Parcels outside of the existing pressure zones were assigned to the closest existing pressure zone. No population growth was estimated for the existing built out areas of the Town. The results of the total population growth estimation are presented in Figure 1 and Figure 2.

Demand Calculation Assumptions

The following table lists assumption that were made to calculate the water demand requirements for the Town of Midland in this Waterworks Master Plan Update.

Description	Assumption
Per Capita Water Consumption for Existing Scenario (based on consumption records)	Residential – 200 lpcd Employment – 164 lpcd
Per Capita Water Consumption for Future Scenario (based on previous Water Master Plan estimates)	Residential – 246 lpcd Employment – 200 lpcd
Occupancy Rates (based on previous planning experience and previous Master Planning studies)	Low Density – 3.5 ppu Medium Density – 2.5 ppu High Density – 1.7 ppu Unknown – 2.2 ppu

Figure 1: Total Equivalent Population Growth by Pressure Zone

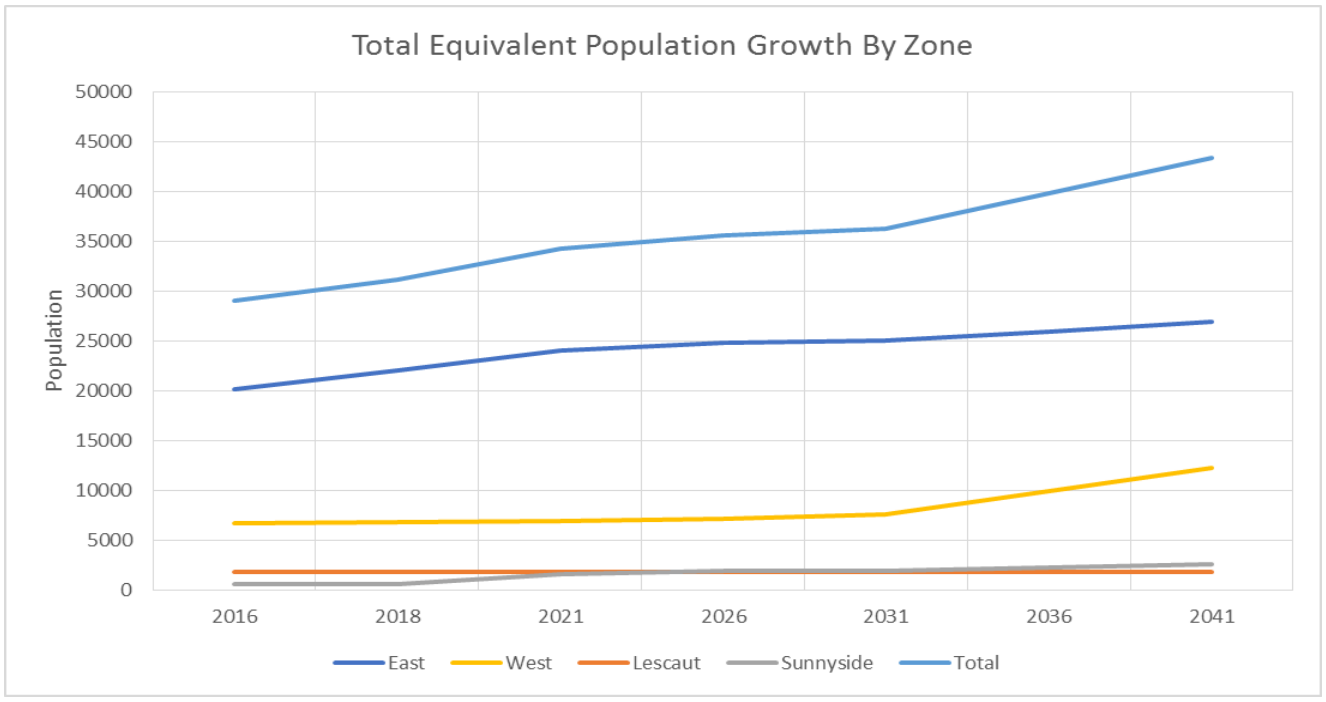


Figure 2: Total Estimated Population Growth for the Town of Midland

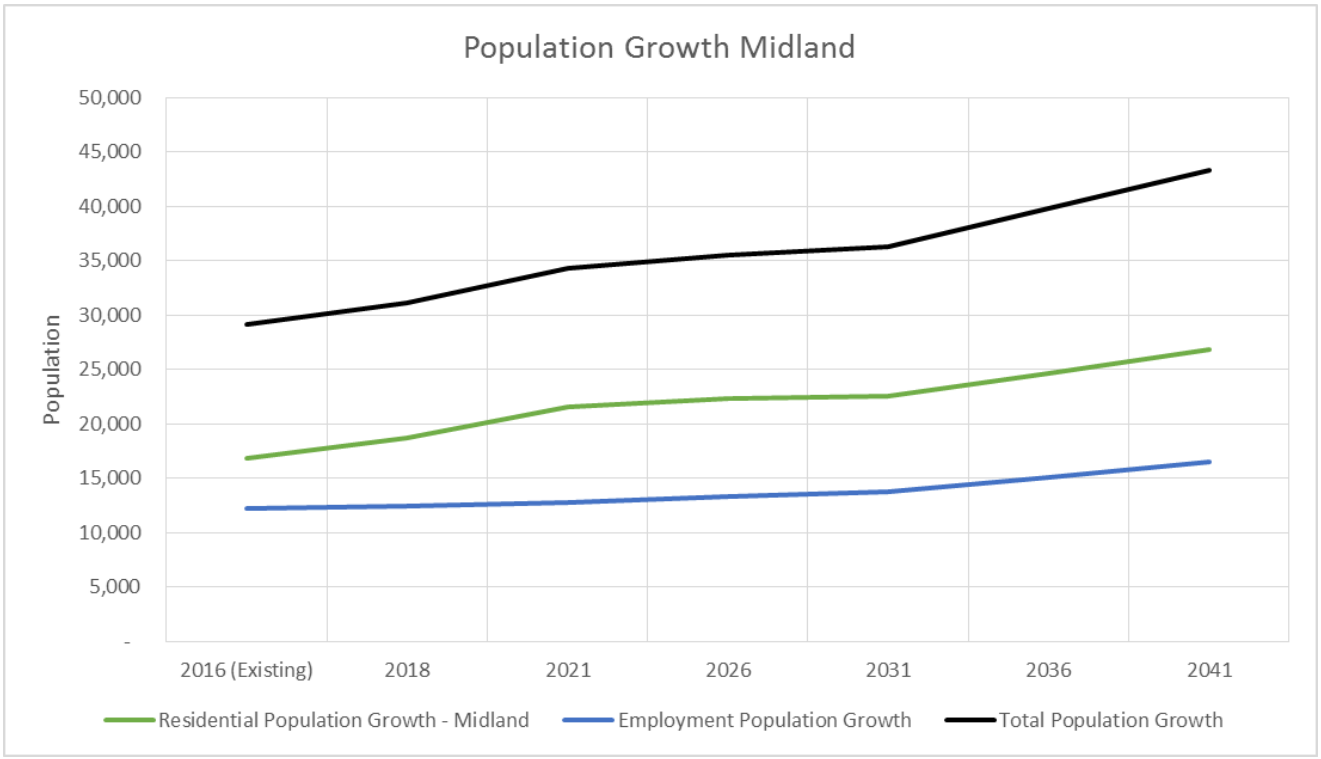


Figure 3: Town of Midland – Future Growth Areas

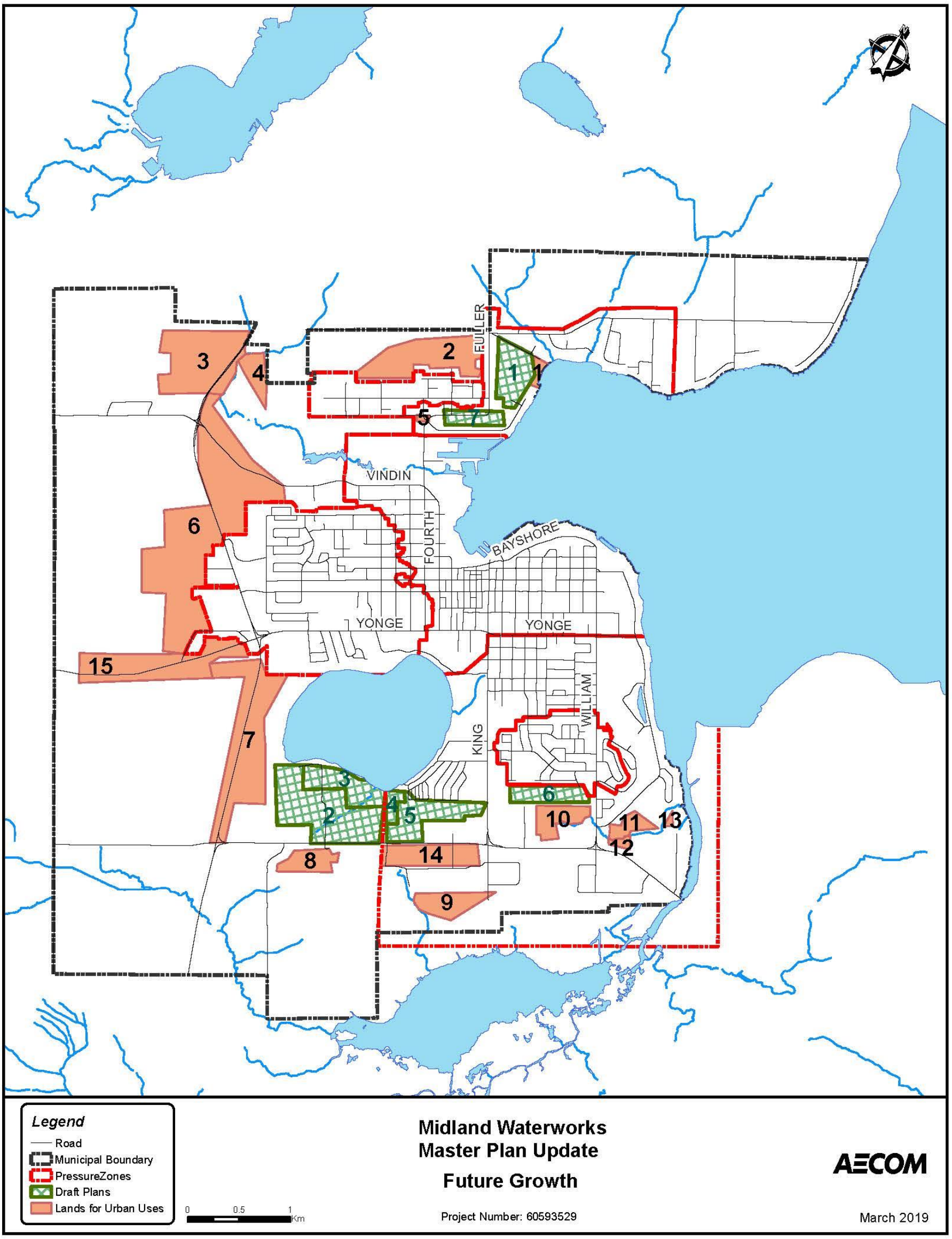


Table 2: Future Population Projections for Growth Areas

				Population									
ID	**Pressure Zone**	**Land Use***	**Growth Area Type**	**2021 - Res**	**2021 - Emp**	**2026 - Res**	**2026 - Emp**	**2031 - Res**	**2031 - Emp**	**2036- Res**	**2036 - Emp**	**2041- Res**	**2041 - Emp**
1	Sunnyside	Residential	Draft Plans	-	-	322	-	-	-	-	-	-	-
2	East	Residential		928	-	-	-	-	-	-	-	-	-
3	East	Open Space		928	-	-	-	-	-	-	-	-	-
4	East	Open Space		928	-	-	-	-	-	-	-	-	-
5	East	Residential		928	-	-	-	-	-	-	-	-	-
6	East	Residential		-	-	444	-	-	-	-	-	-	-
7	Sunnyside	Residential		945	-		-	-	-	-	-	-	-
1	East	Open Space	Urban Uses					-	-	-	-	-	-
2	Sunnyside	Residential		-	-		-	30	-	307	-	315	-
3	East	Restricted Rural		-	41	-	41	29	41	302	105	309	108
4	East	Restricted Rural		-	8	-	8	5	8	56	19	57	20
5	East	Residential		-	-	-	-	1	-	7	-	7	-
6	West	Restricted Rural + Employment		-	114	-	114	82	114	835	291	856	298
7	West	Restricted Rural + Employment		-	54	-	54	39	54	397	138	407	142
8	East	Employment		-	39	-	39	-	39	-	98	-	100
9	East	Employment		-	49	-	49	-	49	-	124	-	127
10	East	Employment		-	42	-	42	-	42	-	107	-	110
11	East	Employment		-	23	-	23	-	23	-	60	-	61
12	East	Employment		-	7	-	7	-	7	-	17	-	17
13	East	Employment		-	2	-	2	-	2	-	6	-	6
14	East	Employment		-	109	-	109	19	109	199	277	204	284
15	West	Employment		-	33	-	33	6	33	61	85	62	87
			Total Population	**4,658**	**522**	**766**	**522**	**211**	**522**	**2,163**	**1,327**	**2,218**	**1,360**

* Source: Town Of Midland - Official Plan Amendment No.1 - Scedule A

Table 3: Town of Midland - Existing and Future Estimated Population

	2016 (Existing)	**2018**	**2021**	**2026**	**2031**	**2036**	**2041**
Residential Population	16,864	18,727	21,522	22,289	22,500	24,663	26,881
Employment Population	12,233	12,442	12,755	13,278	13,800	15,127	16,487
Total Population	**29,097**	**31,169**	**34,278**	**35,566**	**36,300**	**39,790**	**43,368**

Storage, Pump Capacity, and Well Production Capacity Evaluation

The storage, pump capacity, and well production capacity evaluation is based on the estimated population growth numbers identified in the previous section of this Technical Memorandum. The Average Day Demand (ADD), Maximum Day Demand (MDD), and Peak Hour Demand (PHD) conditions were determined using the population projections and demand calculation assumptions.

Storage Capacity Requirement Evaluation

The storage capacity evaluation is based on the Ontario Ministry of Environment (MOE) storage requirement calculations. The detailed storage capacity calculations are attached in Table 4 and Table 5.

West Zone

The West pressure zone has two water storage facilities – Mountainview Tank (4.43ML) and Montreal Strandpipe (2.88ML). The calculated storage requirement in 2041 is 4.00 ML. This shows that the West pressure zone has a storage surplus of 3.32 ML.

East Zone (including Sunnyside and Lescout)

The East pressure zone has three water storage facilities – Dominion Standpipe (0.713ML), Everton Tank (5.80ML) and Hanly Tank (0.95ML). Sunnyside and Lescout pressure zones are direct pressure zones without floating storage therefore the storage requirement for these zones needs to be accounted for in the East Zone storage requirement calculations. The calculated storage requirement in 2041 for the East Zone, including Sunnyside and Lescout, is 10.37ML. This indicates that the East pressure zone has a storage deficiency of 4.55ML.

Storage Capacity Improvement Options

To improve storage capacity, a new water storage facility in the East pressure zone is required to provide sufficient fire, equalization, and emergency storage in the future.

Pump Capacity Requirement Evaluation

The pump capacity review calculations are attached in Table 4 and Table 5. The required firm pump capacity depends on whether there is adequate floating storage in the zone, does the floating storage cover fire storage requirement under the MOE fire considerations calculations, and does the floating storage cover equalization storage requirement under the same MOE required storage calculations?

East Zone

The East pressure zone has Wells 7A/7B (9.15MLD firm pump capacity), Flume Wellfield (6.55MLD firm pump capacity), and Well 15 (1.31MLD firm pump capacity) in operation for the total firm capacity of 17.02MLD. The required firm pump capacity for 2041 scenario in the East pressure zone is 15.45 MLD. Therefore the existing pump capacity is adequate to meet the future pump capacity requirements.

West Zone
The West pressure zone has Well 9 (1.96MLD firm pump capacity) and Dominion Pump Station (3.00MLD firm pump capacity), which transfers the required volume of water from the East pressure zone. The required firm pumping capacity for 2041 scenario is 4.62 MLD. Therefore, the existing pump capacity is adequate to meet the future pump capacity requirements.

Lescout Zone
The Lescout pressure zone has Hanly Booster Pump Station (0.82MLD firm pump capacity) and, according to the previous Waterworks Master Plan, Well 15 (1.31MLD firm pump capacity) can pump water into the zone. The required firm pumping capacity for 2041 scenario is 7.43MLD. This value is large because there is not floating storage in this direct pressure zone. Therefore, the pumping capacity in the Lescout pressure zone is inadequate to meet the future conditions.

Sunnyside Zone
Similar to the Lescout pressure zone, the Sunnyside pressure zone is a direct pressure zone and does not have a floating storage. The existing Everton Booster Pump Station (1.37MLD firm pump capacity) is inadequate to meet the required firm pump capacity of 6.03 MLD.

Pump Capacity Improvement Options
To improve pump capacity, fire pumps at Hanly BPS and Everton BPS are required to provide sufficient fire flow supply.

Well Production Requirement Evaluation

The well production capacity evaluation is based on the existing source capacity. For a conservative groundwater supply, it is assumed that the largest production capacity well is out of service for the zone in which it exists.

East Zone (including Sunnyside and Lescout)
Similar to the storage capacity evaluation, the East pressure zone combines the source water requirements for Sunnyside and Lescout because wells located in the East pressure zone provide water to the direct pressure zones. The supply capacity requirement is based on the Maximum Day Demand conditions. The East pressure zone has groundwater supply from Wells 7A/7B (9.15MLD), Flume clearwell (7.13MLD), and Well 15 (1.31MLD). With the largest well (7A) out the supply capacity is 12.67MLD. The required supply capacity for 2041 for the East pressure zone, including Sunnyside and Lescout, is 11.41MLD.

West Zone
The West pressure zone has Well 9 (1.96MLD) as the only groundwater well that is supplying water directly into the zone. The West pressure zone supply requirement under the MDD conditions in 2041 is 4.62 MLD. The supply deficiency is usually offset by the transfer of flow from the East pressure zone. The transfer requirement is calculated by taking the West zone supply requirement (MDD) and subtracting the Well 9 supply capacity. In 2041 the transfer requirement is calculated to be 2.66 MLD, while the East pressure zone surplus is only 1.26 MLD. Therefore, there is overall groundwater supply deficiency of 1.40 MLD by 2041.

Well Production Improvement Options
To improve overall groundwater supply security, additional well supply is required. It is important to note that because West pressure zone relies on the transfer of flow from the East pressure zone, securing groundwater well supply in the West pressure zone would add to the water supply security in that zone.

Table 4: Storage, Pump Capacity, and Well Production Capacity Calculations

Zone East

Storage Info

	Volume (ML)	Floating?
Dominion	0.713	yes
Sunnyside	5.80	Yes
Hanly	0.95	Yes

Scenario	Population		Demand (ML/d)			MOECC Fire Considerations		Storage (ML)			Storage Requirement (ML)	Available Storage (ML)	Storage Surplus/Deficit	Adequate Storage?
	RES	EMP	ADD	MDD	PHD	Sugg. FF (L/s)	Duration (hrs)	Fire	Equalization	Emergency				
2018	13,511	8,556	4.14	7.71	11.57	250	4	3.60	1.93	1.38	6.91	7.46	0.55	Yes
2021	16,306	8,716	4.86	9.04	13.56	250	4	3.60	2.26	1.47	7.33	7.46	0.14	Yes
2026	17,072	8,987	5.10	9.49	14.24	250	4	3.60	2.37	1.49	7.47	7.46	0.00	No
2031	17,092	9,258	5.16	9.60	14.40	250	4	3.60	2.40	1.50	7.50	7.46	-0.04	No
2036	17,291	9,946	5.35	9.95	14.92	318	5	5.72	2.49	2.05	10.26	7.46	-2.80	No
2041	17,495	10,651	5.54	10.30	15.45	318	5	5.72	2.58	2.07	10.37	7.46	-2.91	No

Zone East

Pump Info

Total Floating Stor: 7.46

Station Name	Existing Firm Pumping Capacity (ML/d)
Well 7A	4.92
Well 7B	4.23
Flume PS Firm Capacity	6.55
Well 15	1.31
	15.71

Adequate Floating Storage?	Floating Storage Covers Fire?	Floating Storage Covers Equalization?	Design Flow Condition	Required Firm Pumping Capacity (ML/d)	Firm Capacity - No. of Largest Pumps Offline
Yes	Yes	Yes	MDD	7.71	1
Yes	Yes	Yes	MDD	9.04	1
No	Yes	Yes	Lesser of PHD and MDD+FF	14.24	2
No	Yes	Yes	Lesser of PHD and MDD+FF	14.40	2
No	Yes	Yes	Lesser of PHD and MDD+FF	14.92	2
No	Yes	Yes	Lesser of PHD and MDD+FF	15.45	2

Zone West

Storage Info 0.086

	Volume (ML)	Floating?
Mountainview	4.43	Yes
Montreal	2.881	no

Scenario	Population		Demand (ML/d)			MOECC Fire Considerations		Storage (ML)			Storage Requirement (ML)	Available Storage (ML)	Storage Surplus/Deficit	Adequate Storage?
	RES	EMP	ADD	MDD	PHD	Sugg. FF (L/s)	Duration (hrs)	Fire	Equalization	Emergency				
2018	3,847	2,840	1.2513	2.314	3.47	159	3	1.72	0.58	0.57	2.87	7.31	4.44	Yes
2021	3,847	3,056	1.2772	2.361	3.54	159	3	1.72	0.59	0.58	2.88	7.31	4.43	Yes
2026	3,847	3,308	1.3275	2.454	3.68	159	3	1.72	0.61	0.58	2.91	7.31	4.40	Yes
2031	4,008	3,559	1.4175	2.621	3.93	159	3	1.72	0.66	0.59	2.97	7.31	4.35	Yes
2036	5,659	4,198	1.9517	3.609	5.41	159	3	1.72	0.90	0.65	3.27	7.31	4.04	Yes
2041	7,351	4,852	2.4995	4.621	6.93	189	3	2.04	1.16	0.80	4.00	7.31	3.32	Yes

Zone West

Pump Info

Total Floating Stor: 4.43

Station Name	Existing Firm Pumping Capacity (ML/d)
Well 9 Supply (l/s)	1.96
Dominion PS	3.00
	4.96

Adequate Floating Storage?	Floating Storage Covers Fire?	Floating Storage Covers Equalization?	Design Flow Condition	Required Firm Pumping Capacity (ML/d)	Firm Capacity - No. of Largest Pumps Offline
Yes	Yes	Yes	MDD	2.31	1
Yes	Yes	Yes	MDD	2.36	1
Yes	Yes	Yes	MDD	2.45	1
Yes	Yes	Yes	MDD	2.62	1
Yes	Yes	Yes	MDD	3.61	1
Yes	Yes	Yes	MDD	4.62	1

Zone Lescout

Storage Info

	Volume (ML)	Floating?

Scenario	Population		Demand (ML/d)			MOECC Fire Considerations		Storage (ML)			Storage Requirement (ML)	Available Storage (ML)	Storage Surplus/Deficit	Adequate Storage?
	RES	EMP	ADD	MDD	PHD	Sugg. FF (L/s)	Duration (hrs)	Fire	Equalization	Emergency				
2018	1,060	713	0.3294	0.609	0.91	79	2	0.57	0.15	0.18	0.90	0.00	-0.90	No
2021	1,060	713	0.3294	0.609	0.91	79	2	0.57	0.15	0.18	0.90	0.00	-0.90	No
2026	1,060	713	0.3294	0.609	0.91	79	2	0.57	0.15	0.18	0.90	0.00	-0.90	No
2031	1,060	713	0.3294	0.609	0.91	79	2	0.57	0.15	0.18	0.90	0.00	-0.90	No
2036	1,060	713	0.3294	0.609	0.91	79	2	0.57	0.15	0.18	0.90	0.00	-0.90	No
2041	1,060	713	0.3294	0.609	0.91	79	2	0.57	0.15	0.18	0.90	0.00	-0.90	No

Zone Lescout

Pump Info

Total Floating Stor: 0.00

Station Name	Existing Firm Pumping Capacity (ML/d)
Hanly BPS	0.82
Well 15	1.31
	2.13

Adequate Floating Storage?	Floating Storage Covers Fire?	Floating Storage Covers Equalization?	Design Flow Condition	Required Firm Pumping Capacity (ML/d)	Firm Capacity - No. of Largest Pumps Offline
No	No	No	Larger of PHD and MDD+FF	7.43	2
No	No	No	Larger of PHD and MDD+FF	7.43	2
No	No	No	Larger of PHD and MDD+FF	7.43	2
No	No	No	Larger of PHD and MDD+FF	7.43	2
No	No	No	Larger of PHD and MDD+FF	7.43	2
No	No	No	Larger of PHD and MDD+FF	7.43	2

Zone Sunnyside

Storage Info

	Volume (ML)	Floating?

Scenario	Population		Demand (ML/d)			MOECC Fire Considerations		Storage (ML)			Storage Requirement (ML)	Available Storage (ML)	Storage Surplus/Deficit	Adequate Storage?
	RES	EMP	ADD	MDD	PHD	Sugg. FF (L/s)	Duration (hrs)	Fire	Equalization	Emergency				
2018	309	247	0.1025	0.189	0.28	38	2	0.27	0.05	0.08	0.40	0.00	-0.40	No
2021	309	271	0.1073	0.198	0.30	38	2	0.27	0.05	0.08	0.40	0.00	-0.40	No
2026	309	271	0.1073	0.198	0.30	38	2	0.27	0.05	0.08	0.40	0.00	-0.40	No
2031	340	271	0.1149	0.212	0.32	38	2	0.27	0.05	0.08	0.41	0.00	-0.41	No
2036	654	271	0.1921	0.355	0.53	38	2	0.27	0.09	0.09	0.45	0.00	-0.45	No
2041	975	271	0.2713	0.502	0.75	64	2	0.46	0.13	0.15	0.73	0.00	-0.73	No

Zone Sunnyside

Pump Info

Total Floating Stor: 0.00

Station Name	Existing Firm Pumping Capacity (ML/d)
Sunnyside BPS	1.37
	1.37

Adequate Floating Storage?	Floating Storage Covers Fire?	Floating Storage Covers Equalization?	Design Flow Condition	Required Firm Pumping Capacity (ML/d)	Firm Capacity - No. of Largest Pumps Offline
No	No	No	Larger of PHD and MDD+FF	3.47	2
No	No	No	Larger of PHD and MDD+FF	3.48	2
No	No	No	Larger of PHD and MDD+FF	3.48	2
No	No	No	Larger of PHD and MDD+FF	3.50	2
No	No	No	Larger of PHD and MDD+FF	3.64	2
No	No	No	Larger of PHD and MDD+FF	6.03	2

Table 5: Storage, Pump Capacity, and Well Production Capacity Calculations – Continued

Zone	East						
Source Info			Station Name	Existing Source Capacity (ML/d)			
			Well 7A				4.92
Flume Clearwell (MLD)	7.13		Well 7B				4.23
Well 6	1.64		Flume Clearwell				7.13
Well 11	1.96		Well 15				1.31
Well 12	0.66				*		**12.67**
Well 14	0.98						*Largest Well Out
Well 16	1.31						
Well 17	1.23						
Zone East	**Required Supply Capacity (ML/d)**	**Zone Sunnyside**	**Required Supply Capacity (ML/d)**	**Zone Lescout**	**Required Supply Capacity (ML/d)**		**Total**
MDD	7.71	MDD	0.19	MDD	0.61		8.51
MDD	8.61	MDD	0.63	MDD	0.61		9.85
MDD	8.92	MDD	0.78	MDD	0.61		10.30
MDD	9.02	MDD	0.79	MDD	0.61		10.42
MDD	9.37	MDD	0.93	MDD	0.61		10.91
MDD	9.72	MDD	1.08	MDD	0.61		11.41
Zone	West						
Source Info			Station Name	Existing Firm Pumping Capacity (ML/d)			
			Well 9				1.96
							1.96
Zone West	**Required Supply Capacity (ML/d)**	**Transfer Requirement from Zone West (MLD)**	**Zone East Surplus Capacity (MLD)**	**Overall Supply Capacity Surplus (MLD)**			
MDD	2.31	0.35	4.16	3.81			
MDD	2.36	0.40	2.82	2.42			
MDD	2.45	0.49	2.37	1.88			
MDD	2.62	0.66	2.25	1.59			
MDD	3.61	1.64	1.76	0.11			
MDD	4.62	2.66	1.26	-1.40			

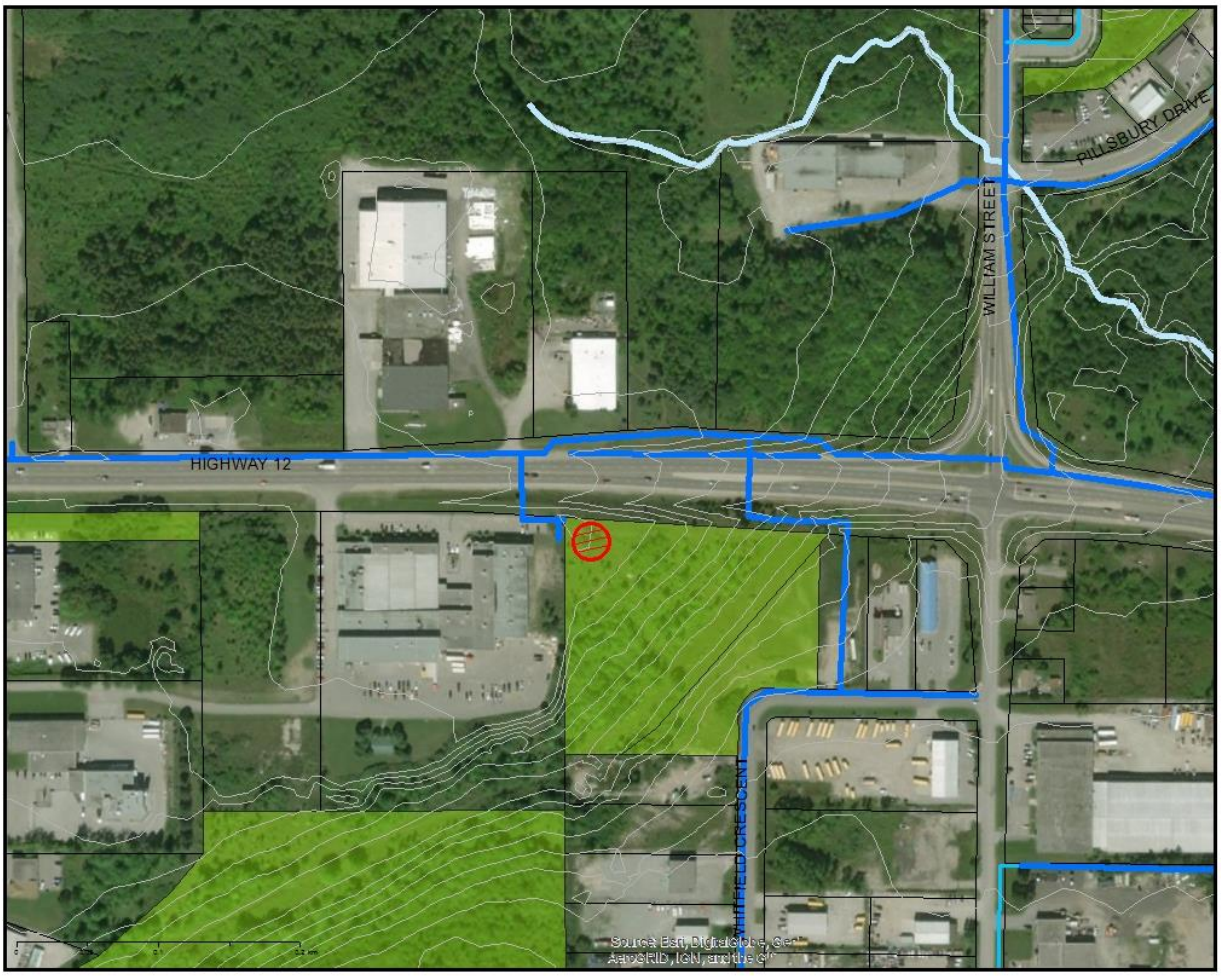
Selected Water Servicing Strategies for Consideration

As part of the Waterworks Master Plan Update, AECOM is evaluating a number of servicing alternatives and projects that could improve on the issues identified within the existing water distribution network (Figure 4) as well as storage, pump capacity, and well production supply capacity shortages identified through requirement evaluation in the previous section of this Memorandum.

Based on the evaluation, the servicing strategies and encompassing alternatives can be summarized as:

1. Improve storage capacity in the East Pressure Zone
    a. Alternative 1A – New Storage Tank at Wellfield 7A/7B

b. Alternative 1B – New Storage Tank at Hwy. 12 and King St.



c. Alternative 1C – Replace Dominion Standpipe with New Storage Tank

d. Alternative 1D – Replace Hanly ET with New Storage Tank

e. Alternative 1F – New Storage Tank in Sunnyside Pressure Zone

f. Alternative 1D – New Storage Tank in Lescout Pressure Zone

g. Alternative 1E – New Storage Tank in New Pressure Zone (south of Little Lake)

2. Secure additional groundwater supply

a. Alternative 2A – Commission Sundowner Well with new water treatment

b. Alternative 2B – Place Well 1A back in service

c. Alternative 2C – Undertake a study to determine a new groundwater well location

3. Improve fire flow supply to direct pressure zones

    a. Alternative 3A/3B – Increase firm pump capacity and install fire pump at Everton BPS and Hanly BPS

    b. Alternative 3C – Dedicate Well 15 to Lescout Pressure Zone and install fire pump at Hanly BPS

4. Provide sustainable water service to future development

    a. Alternative 4A – Connect area south of Little Lake to West Pressure Zone through new Highway 93 watermain

    b. Alternative 4B – Create a New Pressure Zone south of Little Lake with Booster Pump Station

    c. Alternative 4C – Twin the existing Harbourview Drive watermain

The identified strategies are evaluated based on technical criteria which encompasses operational complexity, energy use, system optimization, constructability, capital requirements, and the ability to mitigate existing key servicing issues. Details of the technical evaluation criteria are described in Table 6.

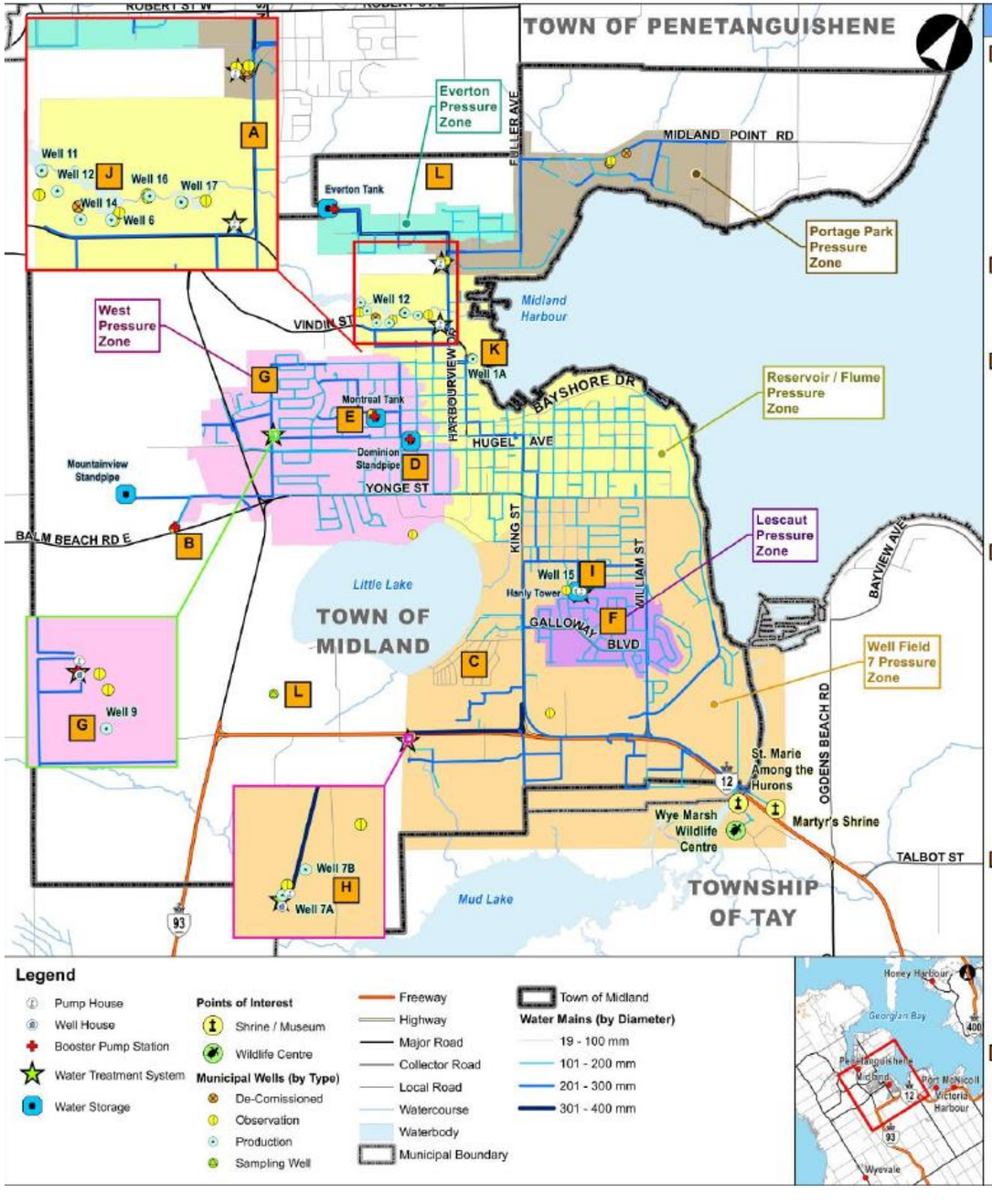
Table 6: Technical Evaluation Criteria

Technical Criteria	Description
Operational Complexity	Changes in the system operation may require additional SOPs and staff training. Reduced operational complexity is a benefit as it becomes easier to manage and operate the water system
Energy Use	Changes in the operation may increase or decrease overall energy use and energy required to meet the adequate service levels
System Optimization	Ability to maximize/optimize existing infrastructure or avoid upgrades
Capital Requirements	Amount of new infrastructure required
Key Issue Resolution	Ability to mitigate known issues

Next Steps

The selected servicing strategies will be evaluated for technical feasibility using the outlined technical evaluation criteria as well as the hydraulic model. The hydraulic model analysis is used to identify linear infrastructure limitations for the selected servicing strategies. As a result of this technical evaluation preferred strategies will be identified. The preferred strategies will be presented to the public in Public Information Centre #2 for comment.

Figure 4: Existing issues and solutions map – Town of Midland Waterworks



ISSUES AND SOLUTIONS

A Issue - Redundancy
Single feed watermain (300 mm) along Harbourview Dr. supplies to the Everton and Portage Park Pressure Zones

Solutions
1)Twin the existing watermain to improve the system redundancy, or
2)Recommission the wells (#22 and #23) in the Portage Park Pressure Zone, for emergency use

B Issue - Sundowner Well Water Quality

Solutions
Treatment process will be required.

C Issue - Pressure
Low pressure experienced around the area north of Highway 12 and west of King St.

Solutions
1)Provide new storage tank near Well 7A and 7B to higher water level; control water level for Russell Tower, or
2)Install a new local Booster Pump Station

D Issue – Aging Infrastructure
Dominion Standpipe is more than 100 years old and requires rehabilitation. Parts of the Town have aging watermains that contribute to water quality and odour issues at times.

Solutions
1)Refurbish existing storage facility, or
2)Abandon (if not required), or
3)Demolish existing and install a new storage facility at another location, or
4)Demolish existing and install a new storage facility at the same location.
5)Identify possible pipe replacement and flushing program requirements.

E Issue - Maintenance Cost and Operational Concerns
Montreal Tank requires coating (estimated cost of $150k) and is difficult to operate (i.e. requires pumping).

Solutions
1)Refurbish, or
2)Abandon (if not required)

F Issue - Fire Flow Constraint
Fire flow supply in Lescaut Pressure Zone not adequate

Solutions
Provide fire pump for Lescaut Pressure Zone

G Issue - Capacity Constraint
Well 9 capacity is not enough to meet the West Pressure Zone demand

Solutions
1)Place Sundowner well in service, or
2)Install a new tank near the Mountainview Standpipe with a new feedermain from Flume Pressure Zone

H Issue - Well Life Expectancy
Wells 7A and 7B are major supply source; more than 30 years old.

Solutions
1)Replace wells, or
2)Perform detailed Geotechnical works to control wells condition.

I Issue - Well Physical Integrity
Well 15 needs structural repairs (such as casing)

Solutions
1)Refurbish the well
2)Abandon (if not required)

J Issue - Physical Integrity
Well 12 in poor condition and beyond repair

Solutions
1)Install a new well, or
2)Abandon (if not required)

K Issue - Well Not in Service
Well 1A currently not in use

Solutions
1)Place the well in service to improve system's well supply capacity (if required), or
2)Abandon (if not required)

L Issue - New Water Service Required for Future Development

Solutions
Requires new infrastructure to provide sustainable water service to future development.

0 0.5 1 2
Kilometres

Datum: NAD 83 Zone 17
Source: AECOM, CLOCA, LIO, Town of Whitby

AECOM

Preferred Servicing Strategy

Based on the evaluation of the servicing alternatives, the following is a preferred servicing strategy:

- Alternative 1B – New Storage Tank (5.26ML) at Highway 12 and King Street intersection
- Alternative 2A – Commission Sundowner Well in the West Pressure Zone
- Alternative 3A/3B – Increase firm pump capacity and install fire pump at Everton BPS and Hanly BPS
- Alternative 4B - Create a New Pressure Zone south of Little Lake with Booster Pump Station

The preferred servicing strategy addresses key issues identified at the inception of the Waterworks Master Plan Update:

a) Low pressure experienced around the area north of Highway 12 and west of King Street can be mitigated by creating a new pressure zone south of Little Lake.

b) Dominion Standpipe is aging and requires rehabilitation. With commissioning of a new storage tank with enough storage capacity, Dominion Standpipe can be demolished.

c) Montreal Tank requires coating at an estimated cost of $150,000 and, according to the Operations staff, is difficult to operate. Based on the population growth in the West Pressure zone, there is sufficient storage capacity to abandon the Montreal Tank.

d) Lescout Pressure zone experiences inadequate fire flow supply. This can be mitigated through upgrade of the existing Hanly BPS with a fire pump.

e) Well 9 is the only groundwater well supplying the West Pressure Zone and therefore the West Pressure Zone relies on Dominion Booster Pump Station to transfer flow from the Eat Pressure Zone. Commissioning Sundowner Well with new water treatment would increase groundwater supply in the West Pressure Zone and reduce the reliance on Dominion BPS for transfer of flow from the East Pressure Zone.

f) Well 15 needs structural repairs. Through the analysis, it was identified that Well 15 is important in providing groundwater supply to the system and has the ability to increase firm supply capacity to Lescout Pressure Zone.

g) Well 12 is in poor condition and it is recommended that it is abandoned.

h) Well 1A, located in the East Pressure Zone, could increase overall groundwater supply capacity. However, the West Pressure Zone would still rely on Dominion BPS to transfer the flow.

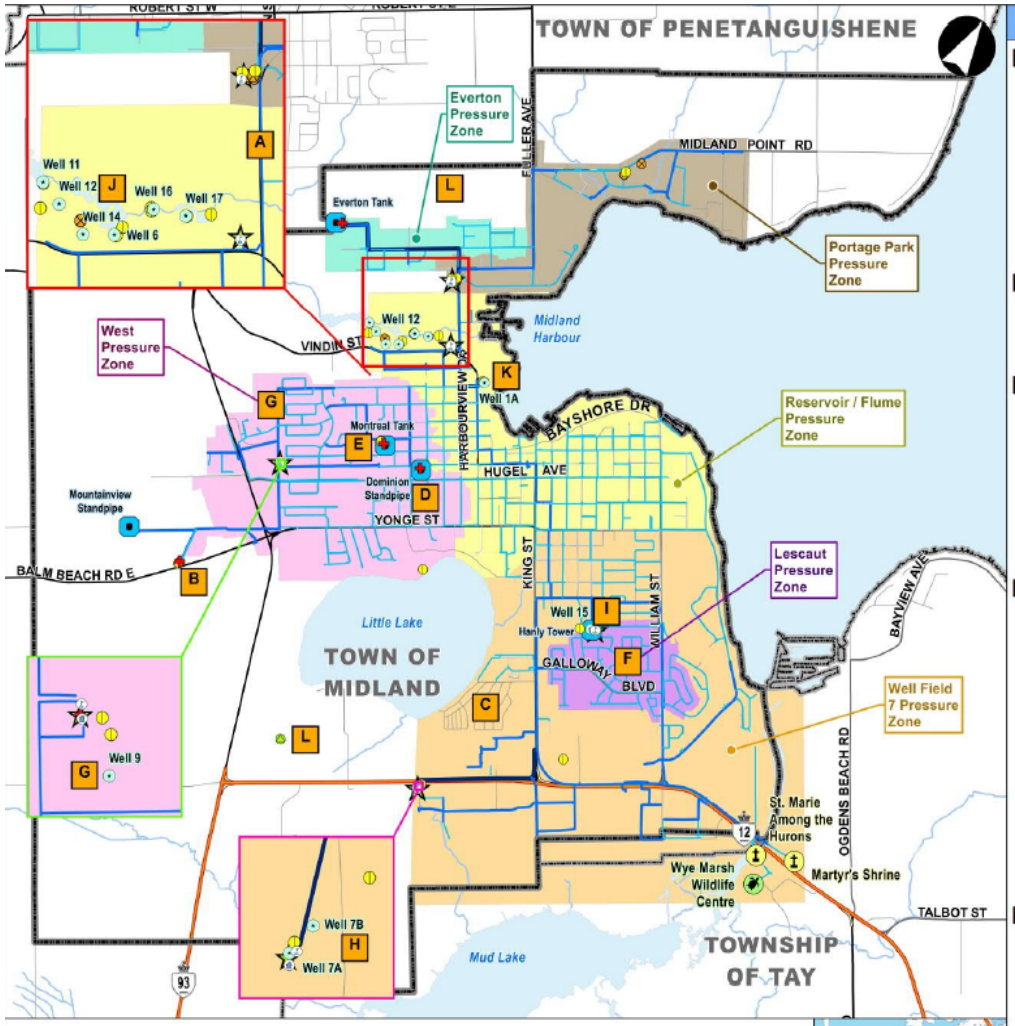
Appendix A – Maps of Servicing Strategies and Alternatives

Town of Midland Waterworks Master Plan Update 2019

Preliminary Servicing Strategies and Alternatives

Existing Issues and Solutions Map

Town of Midland Waterworks Master Plan Update 2019



ISSUES AND SOLUTIONS

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Solutions
Treatment process will be required.

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Low pressure experienced around the area north of Highway 12 and west of King St.

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Montreal Tank requires coating (estimated cost of $150k) and is difficult to operate (i.e. requires pumping).

Solutions
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2)Abandon (if not required)

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Fire flow supply in Lescaut Pressure Zone not adequate

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Well 9 capacity is not enough to meet the West Pressure Zone demand

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Well 15 needs structural repairs (such as casing)

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2)Abandon (if not required)

J Issue - Physical Integrity
Well 12 in poor condition and beyond repair

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Well 1A currently not in use

Solutions
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L Issue - New Water Service Required for Future Development

Solutions
Requires new infrastructure to provide sustainable water service to future development.

0 0.5 1 2
Kilometres

Datum: NAD 83 Zone 17
Source: AECOM, CLOCA, LIO, Town of Whitby

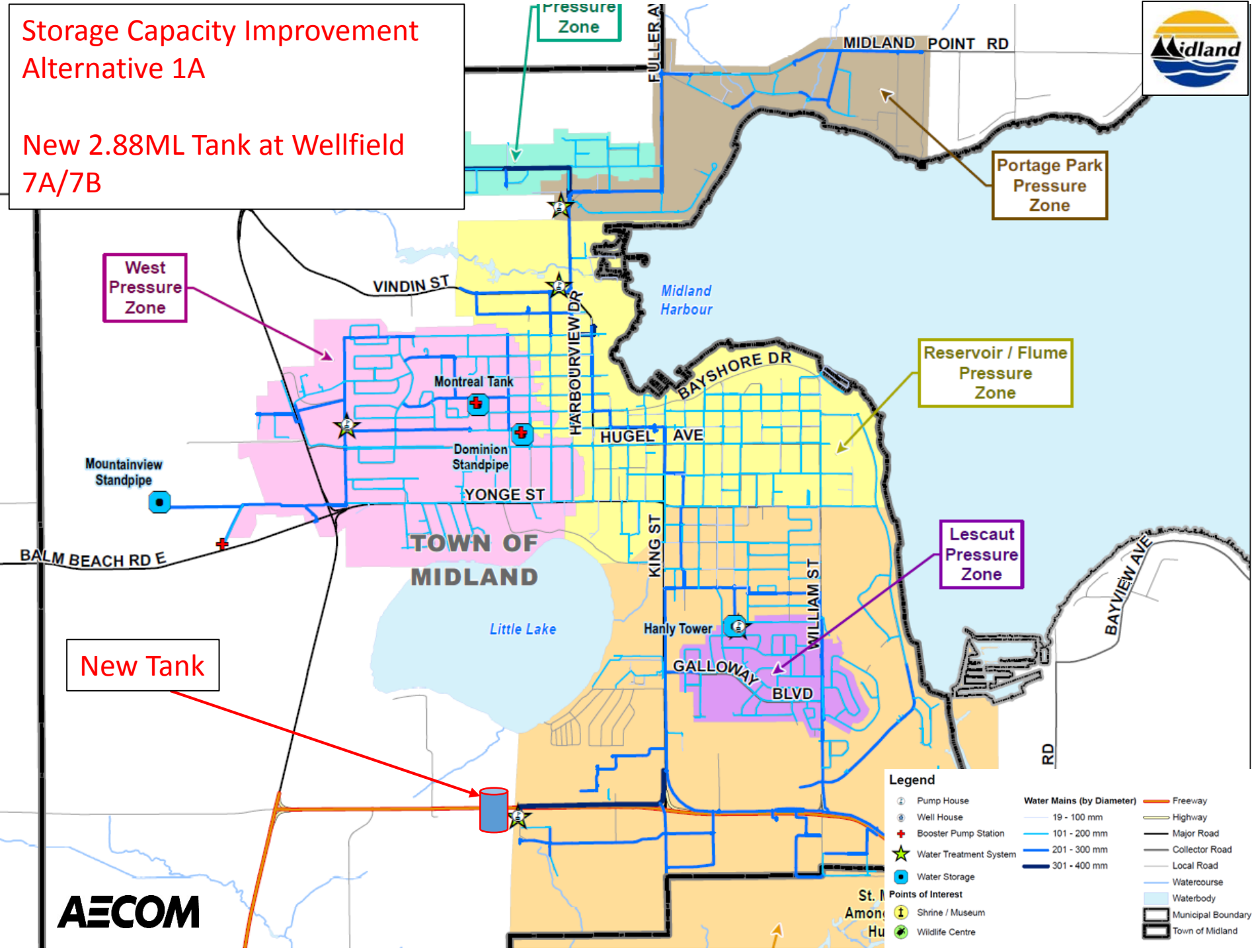
AECOM

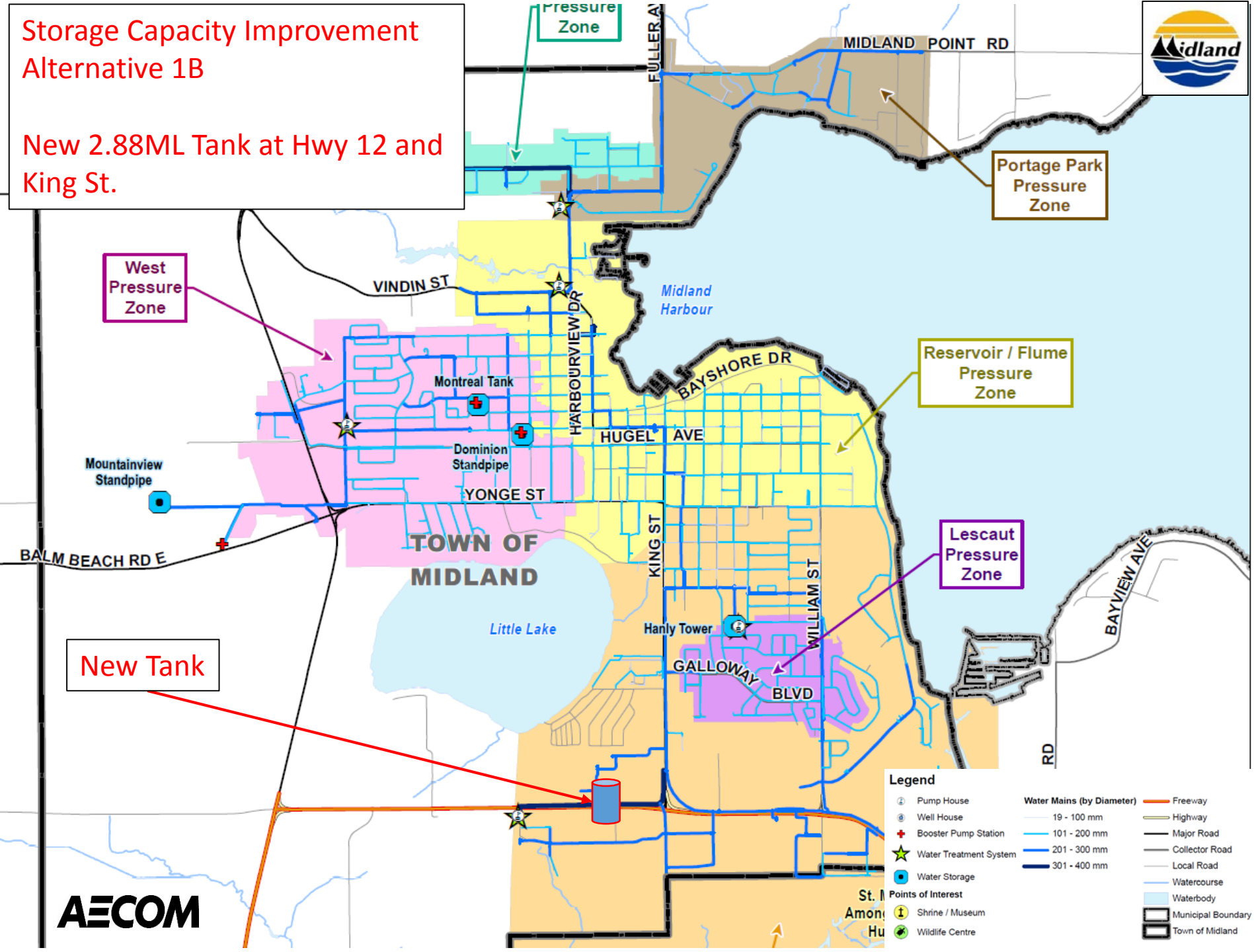
Proposed Service Improvement Strategies

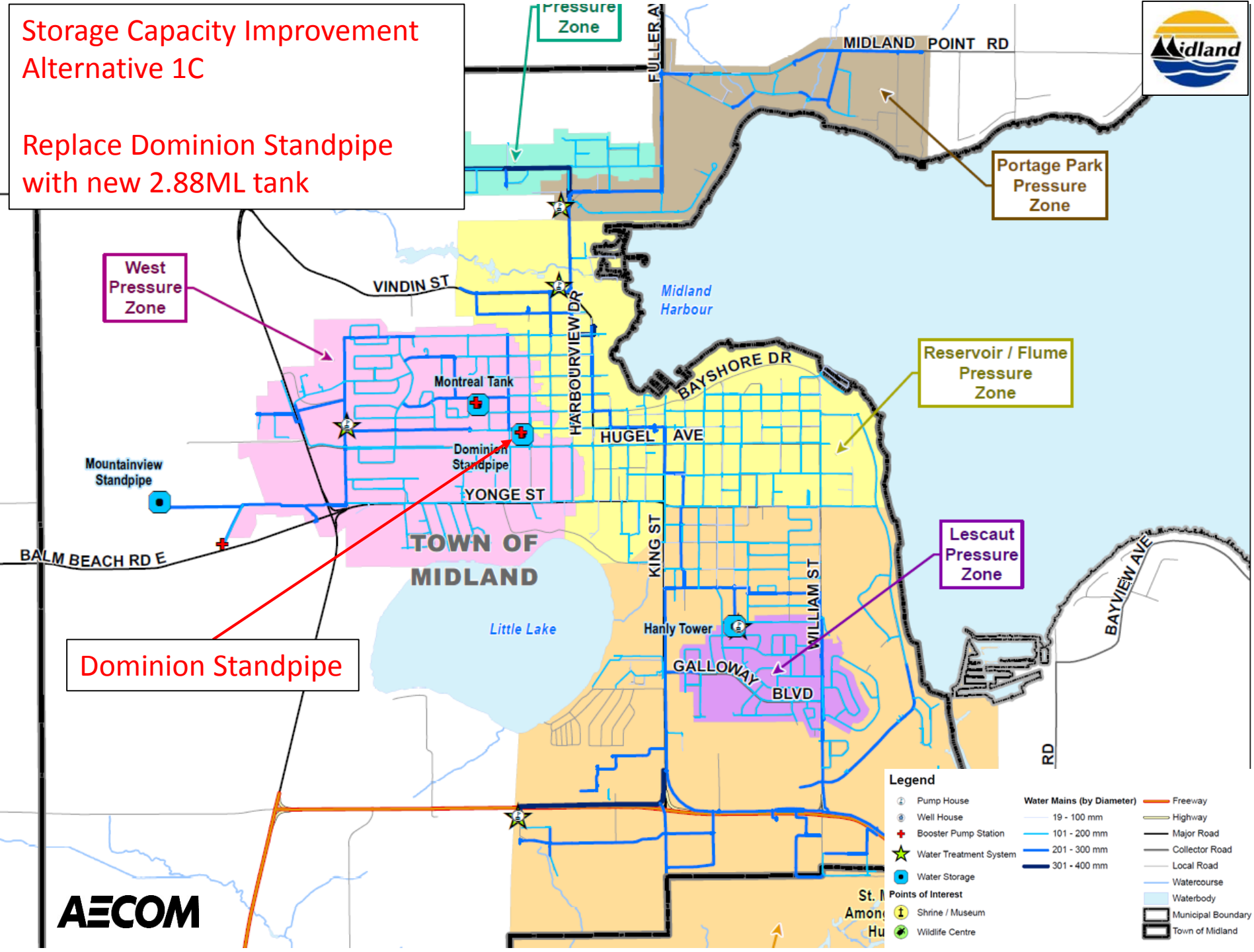
1. Improve Storage Capacity in the East Pressure Zone
2. Secure Additional Groundwater Supply Capacity
3. Improve Fire Flow Supply to Direct Pressure Zones
4. Provide Sustainable Water Service to Future Development

Improve Storage Capacity in the East Pressure Zone

Town of Midland Waterworks Master Plan Update 2019


Storage Capacity Improvement Alternative 1A
New 2.88ML Tank at Wellfield 7A/7B
Pressure Zone
MIDLAND POINT RD
FULLER AV
Portage Park Pressure Zone
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
Little Lake
Hanly Tower
GALLOWAY BLVD
BAYVIEW AVE
RD
New Tank
AECOM
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
19 - 100 mm
101 - 200 mm
201 - 300 mm
301 - 400 mm
Freeway
Highway
Major Road
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland


Storage Capacity Improvement Alternative 1B
New 2.88ML Tank at Hwy 12 and King St.
Pressure Zone
MIDLAND POINT RD
FULLER AV
Portage Park Pressure Zone
West Pressure Zone
VINDIN ST
HARBOURVIEW DR
Midland Harbour
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
Dominion Standpipe
HUGEL AVE
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
Little Lake
Hanly Tower
GALLOWAY BLVD
BAYVIEW AVE
RD
New Tank
AECOM
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
19 - 100 mm
101 - 200 mm
201 - 300 mm
301 - 400 mm
Freeway
Highway
Major Road
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland


Storage Capacity Improvement Alternative 1C
Replace Dominion Standpipe with new 2.88ML tank
Pressure Zone
MIDLAND POINT RD
Portage Park Pressure Zone
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
Dominion Standpipe
HUGEL AVE
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
Lescaut Pressure Zone
WILLIAM ST
BAYVIEW AVE
Little Lake
Hanly Tower
GALLOWAY
BLVD
Dominion Standpipe
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
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101 - 200 mm
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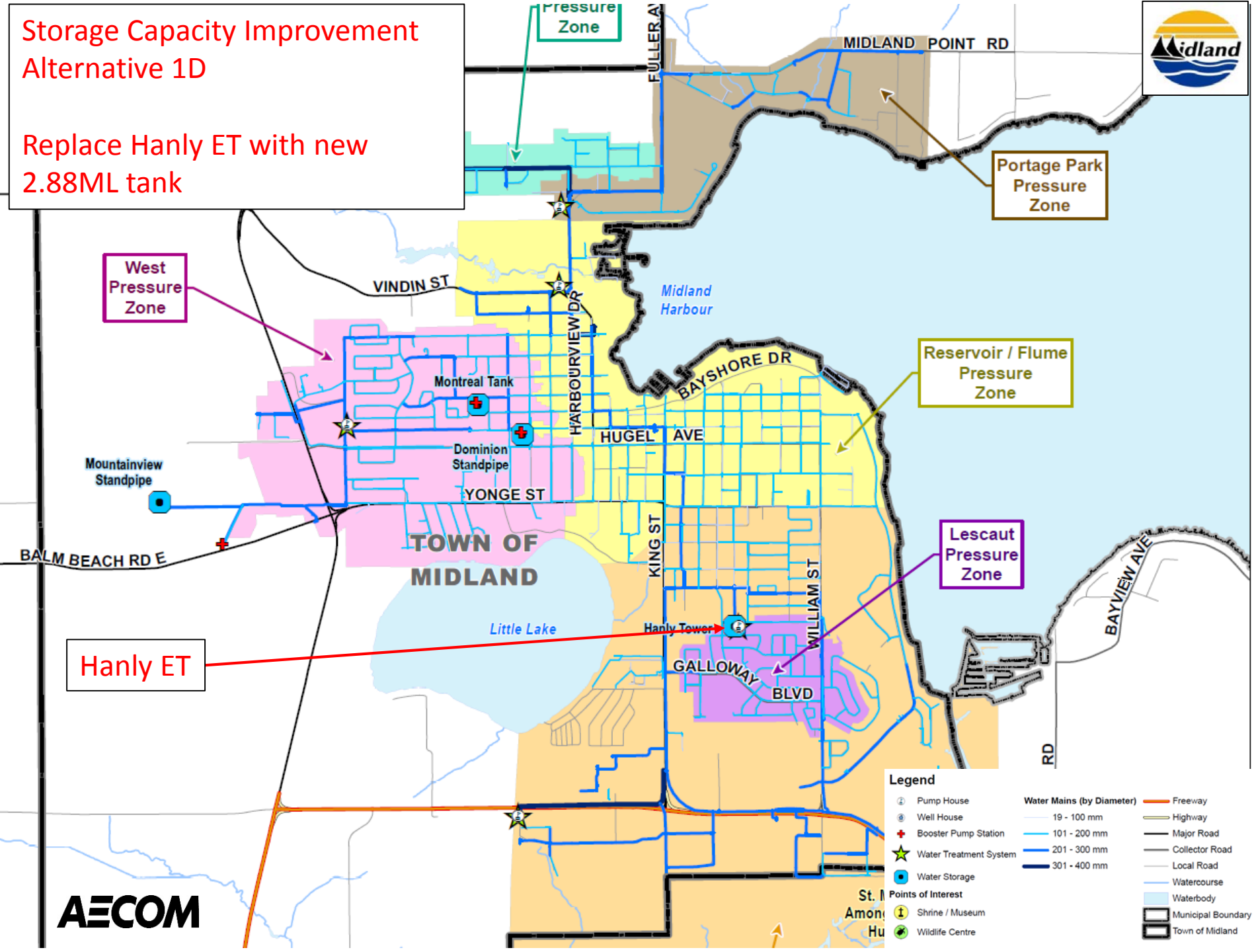
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland
AECOM


Storage Capacity Improvement Alternative 1D
Replace Hanly ET with new 2.88ML tank
Pressure Zone
MIDLAND POINT RD
Portage Park Pressure Zone
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
Dominion Standpipe
HUGEL AVE
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
Little Lake
Hanly Tower
Hanly ET
GALLOWAY BLVD
BAYVIEW AVE
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
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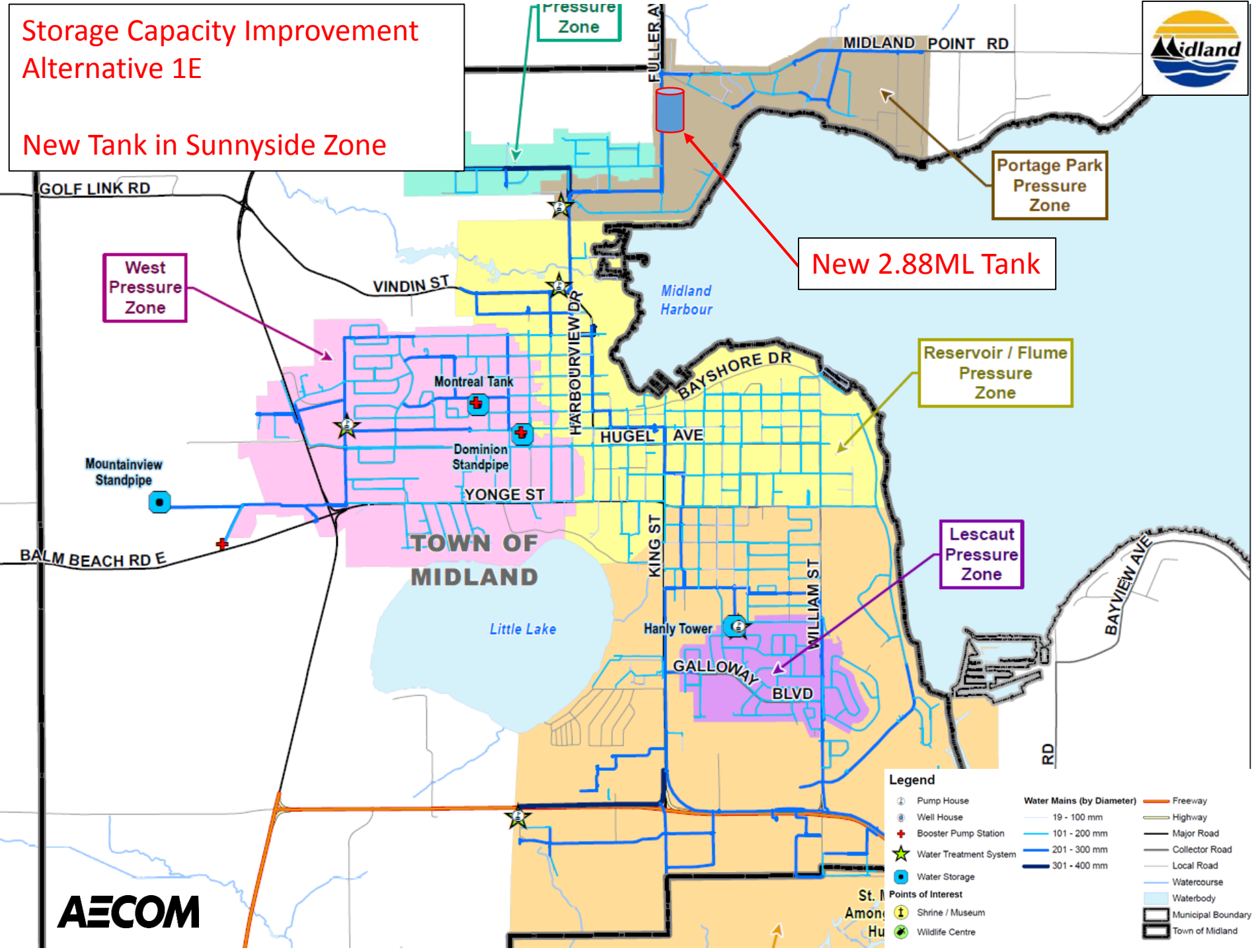
101 - 200 mm
201 - 300 mm
301 - 400 mm
Freeway
Highway
Major Road
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland
AECOM


Storage Capacity Improvement
Alternative 1E
New Tank in Sunnyside Zone
Pressure Zone
MIDLAND POINT RD
FULLER AV
Portage Park Pressure Zone
New 2.88ML Tank
GOLF LINK RD
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
KING ST
TOWN OF MIDLAND
BALM BEACH RD E
Lescaut Pressure Zone
WILLIAM ST
Little Lake
Hanly Tower
GALLOWAY BLVD
BAYVIEW AVE
RD
Legend
Pump House
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Water Storage
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Shrine / Museum
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Waterbody
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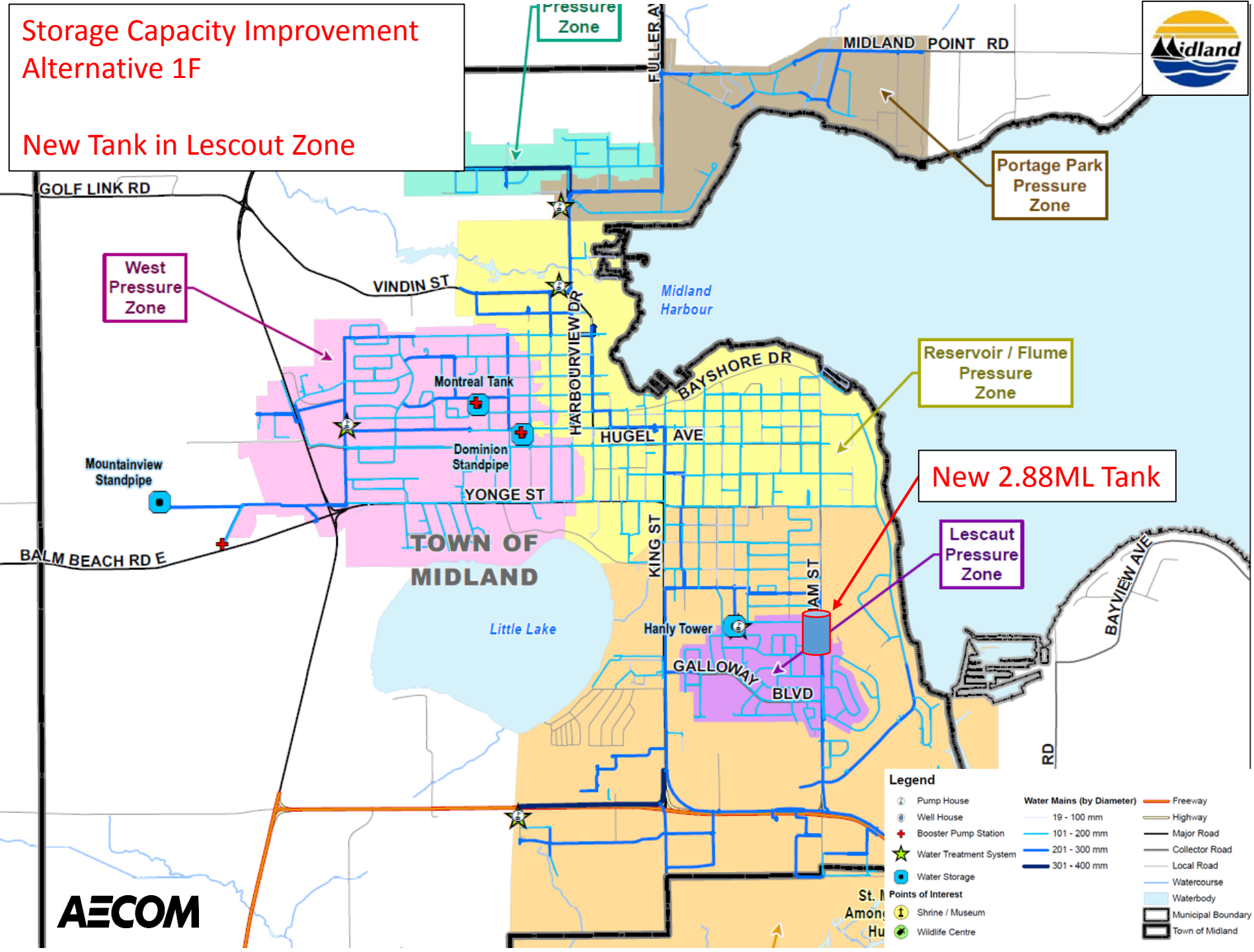
Town of Midland
AECOM


Storage Capacity Improvement
Alternative 1F
New Tank in Lescout Zone
Pressure Zone
MIDLAND POINT RD
Portage Park Pressure Zone
GOLF LINK RD
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
Dominion Standpipe
HUGEL AVE
Mountainview Standpipe
YONGE ST
New 2.88ML Tank
Lescaut Pressure Zone
KING ST
TOWN OF MIDLAND
BALM BEACH RD E
Little Lake
Hanly Tower
GALLOWAY BLVD
BAYVIEW AVE
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Pump House
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Local Road
Watercourse
Waterbody
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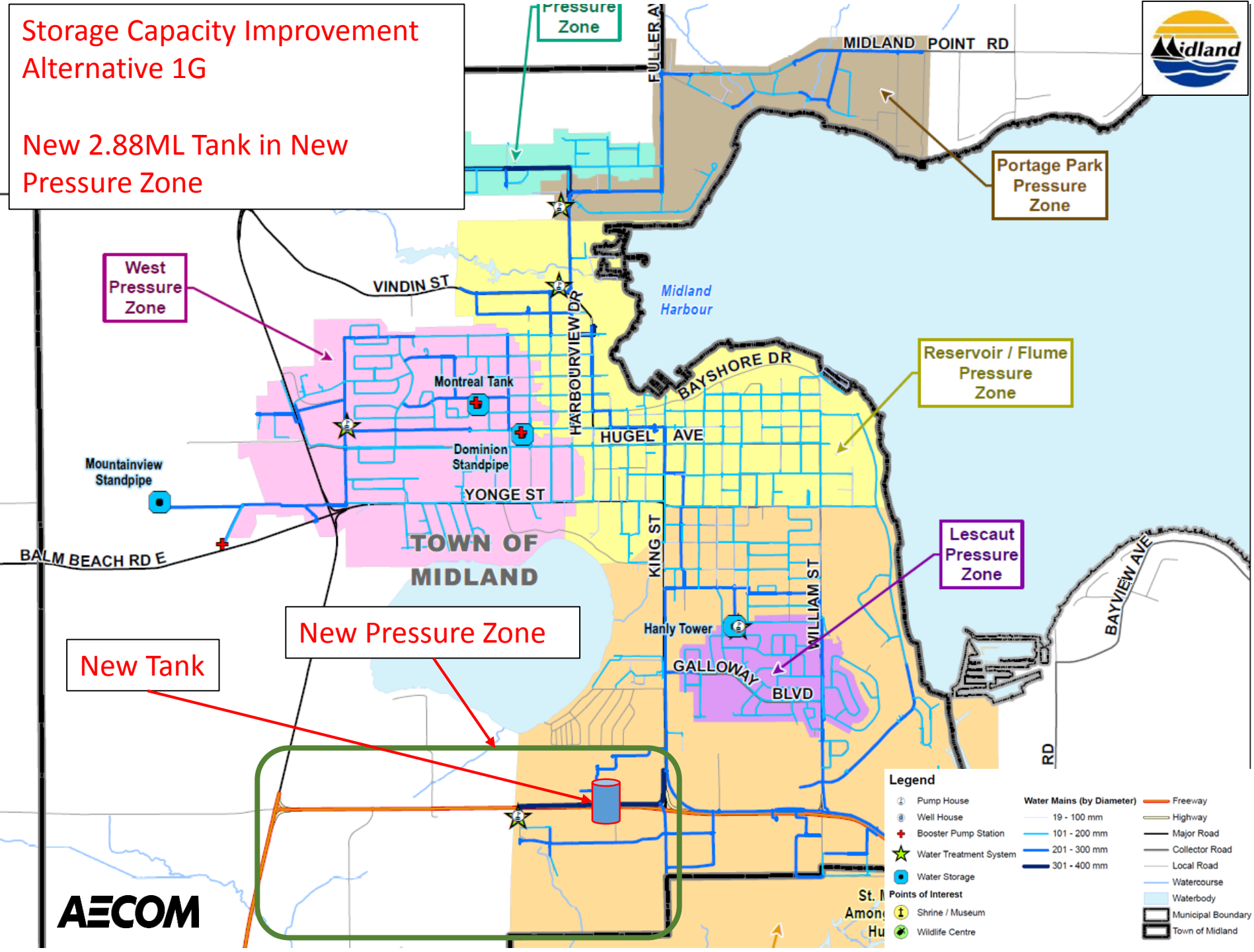
Storage Capacity Improvement Alternative 1G
New 2.88ML Tank in New Pressure Zone
Pressure Zone
FULLER AV
MIDLAND POINT RD
Portage Park Pressure Zone
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
BAYVIEW AVE
Hanly Tower
GALLOWAY BLVD
New Pressure Zone
New Tank
RD
Legend
Pump House
Well House
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Town of Midland
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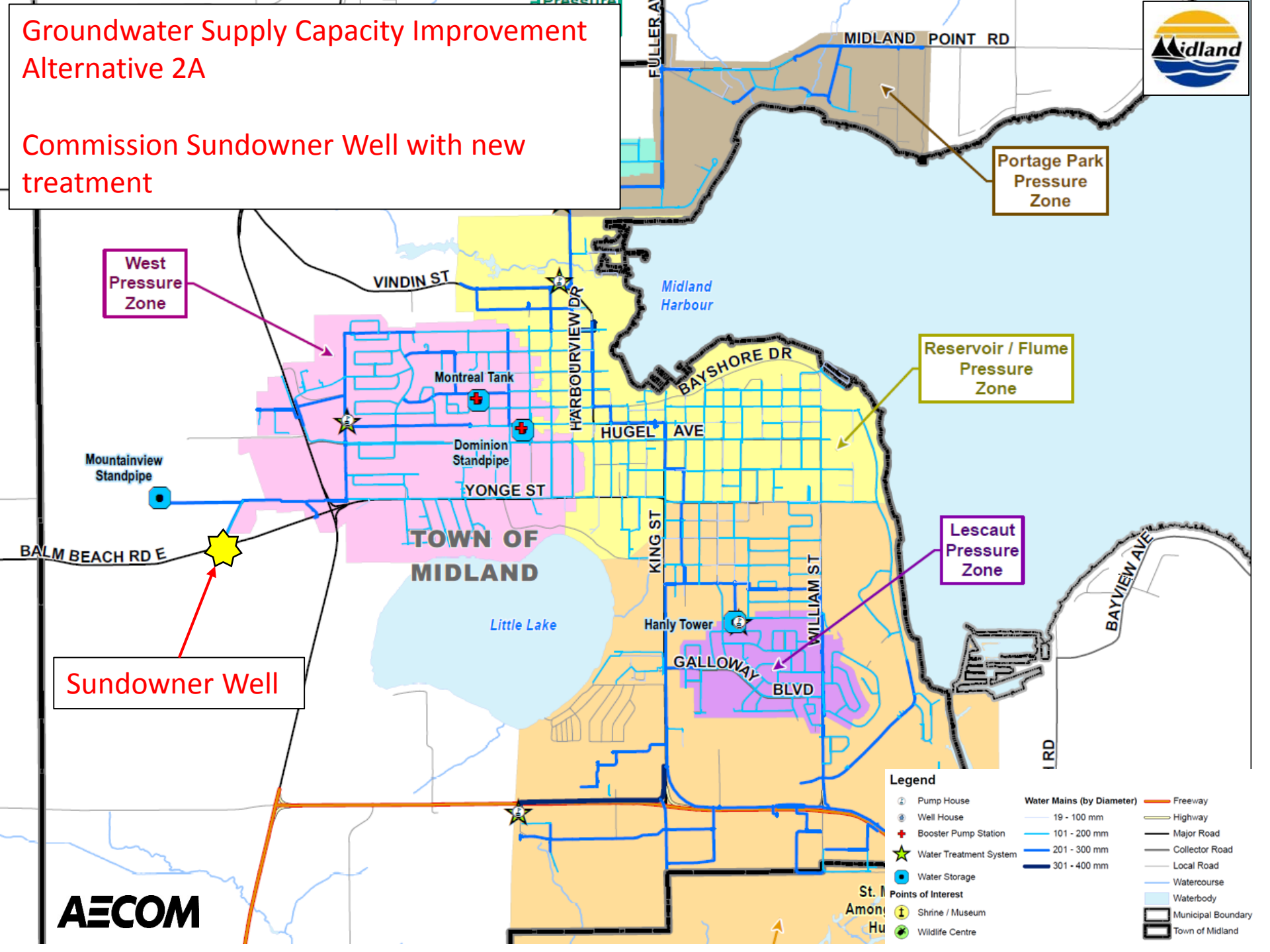
Secure Additional Groundwater Supply Capacity

Town of Midland Waterworks Master Plan Update 2019


Groundwater Supply Capacity Improvement Alternative 2A
Commission Sundowner Well with new treatment
Portage Park Pressure Zone
West Pressure Zone
Reservoir / Flume Pressure Zone
Lescaut Pressure Zone
Sundowner Well
MIDLAND POINT RD
VINDIN ST
HARBOURVIEW DR
Midland Harbour
BAYSHORE DR
HUGEL AVE
Montreal Tank
Dominion Standpipe
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
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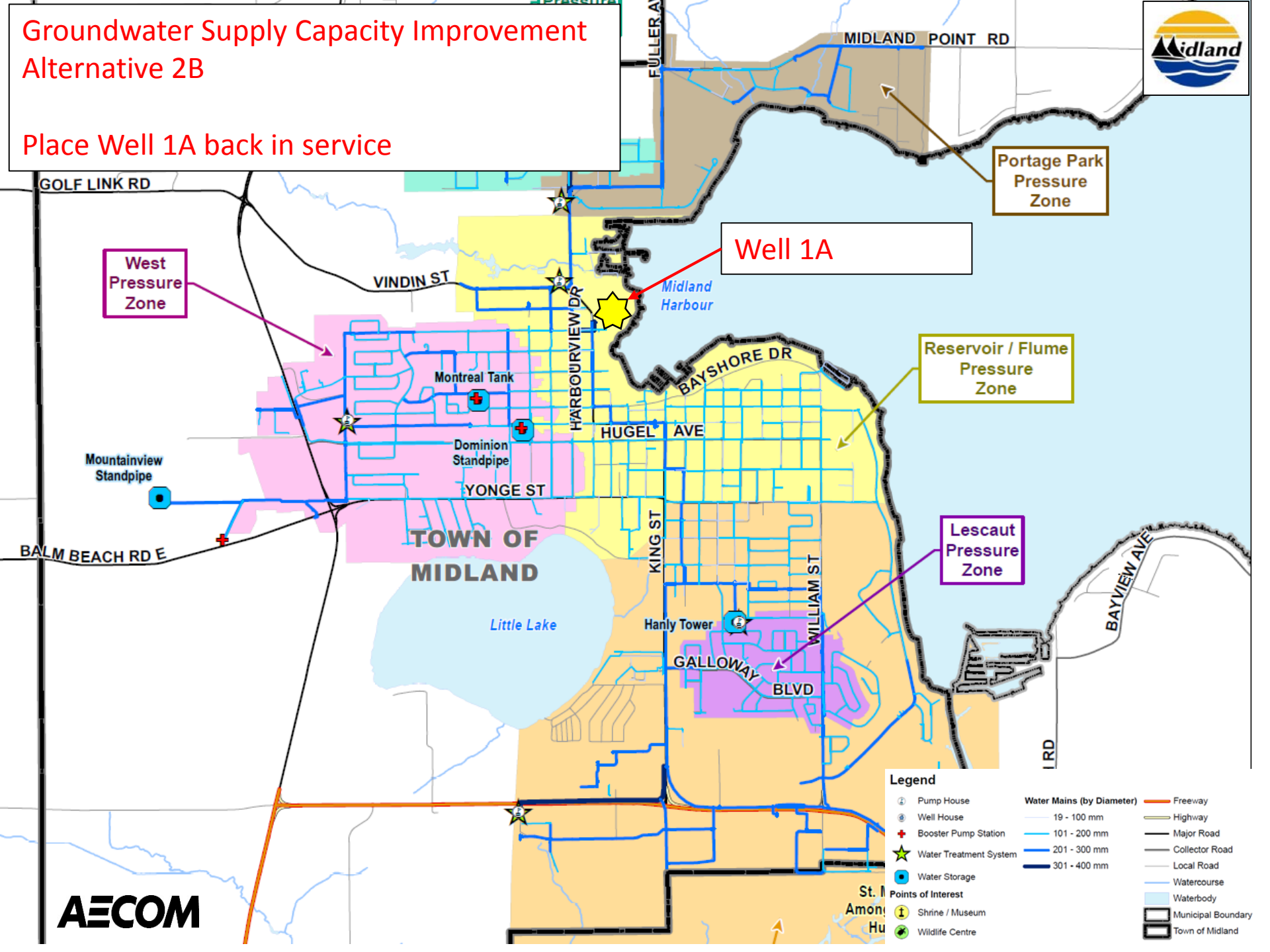
Groundwater Supply Capacity Improvement
Alternative 2B
Place Well 1A back in service
MIDLAND POINT RD
Portage Park Pressure Zone
Well 1A
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
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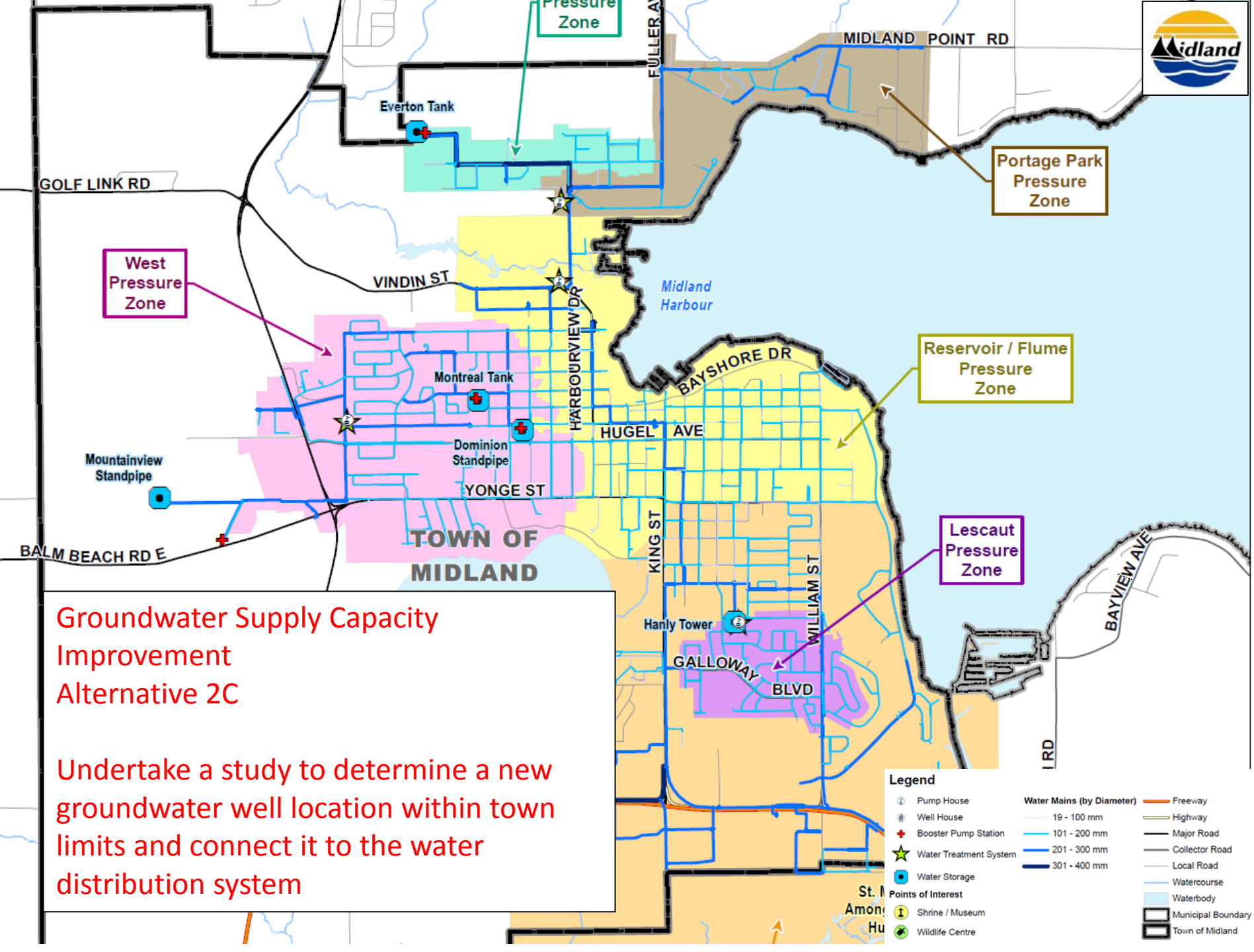
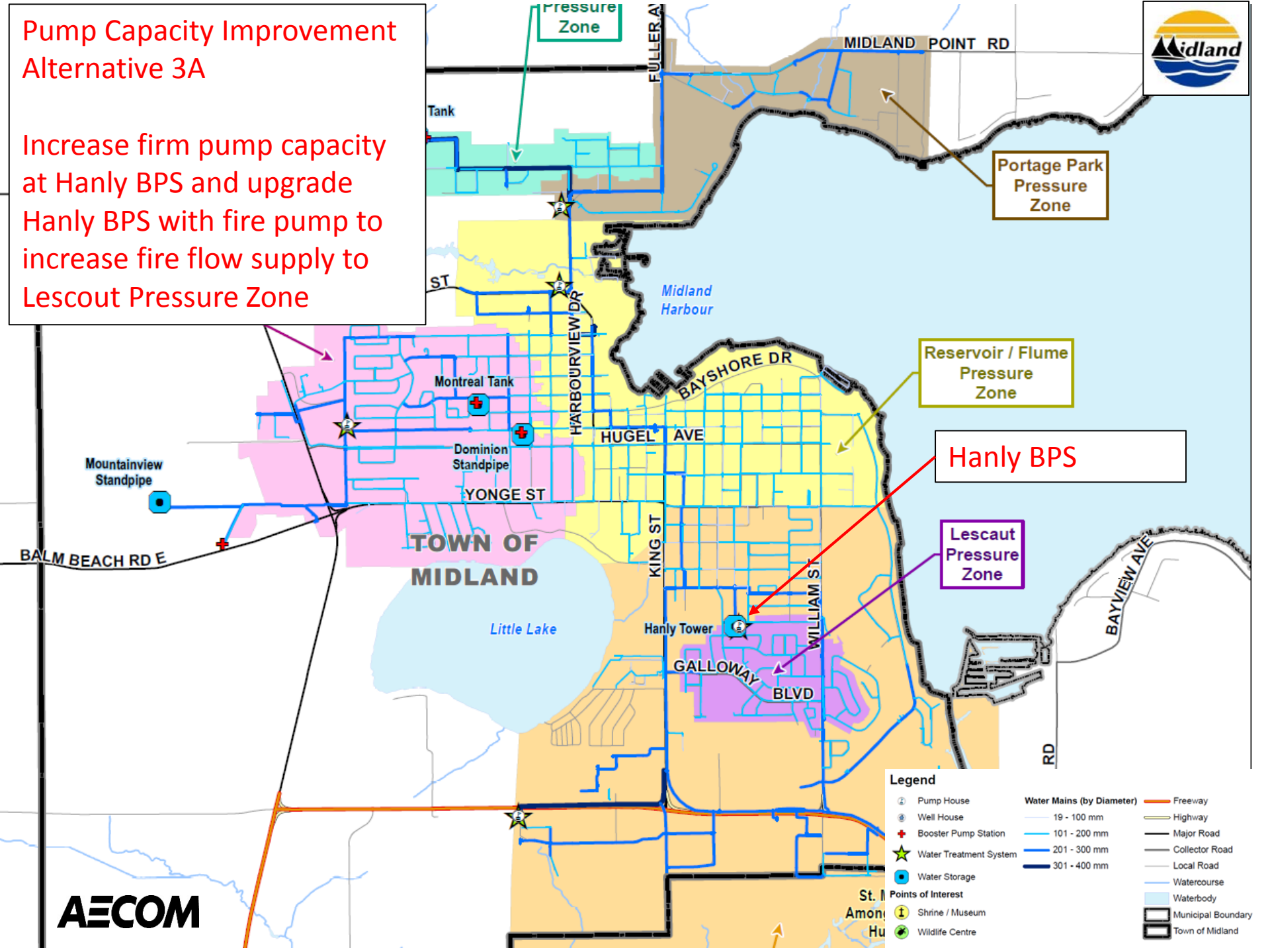


Groundwater Supply Capacity Improvement
Alternative 2C

Undertake a study to determine a new groundwater well location within town limits and connect it to the water distribution system

Improve Fire Flow Supply to Direct Pressure Zones

Town of Midland Waterworks Master Plan Update 2019


Pump Capacity Improvement Alternative 3A
Increase firm pump capacity at Hanly BPS and upgrade Hanly BPS with fire pump to increase fire flow supply to Lescout Pressure Zone
Pressure Zone
Tank
FULLER AV
MIDLAND POINT RD
Portage Park Pressure Zone
ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
Dominion Standpipe
HUGEL AVE
Hanly BPS
Mountainview Standpipe
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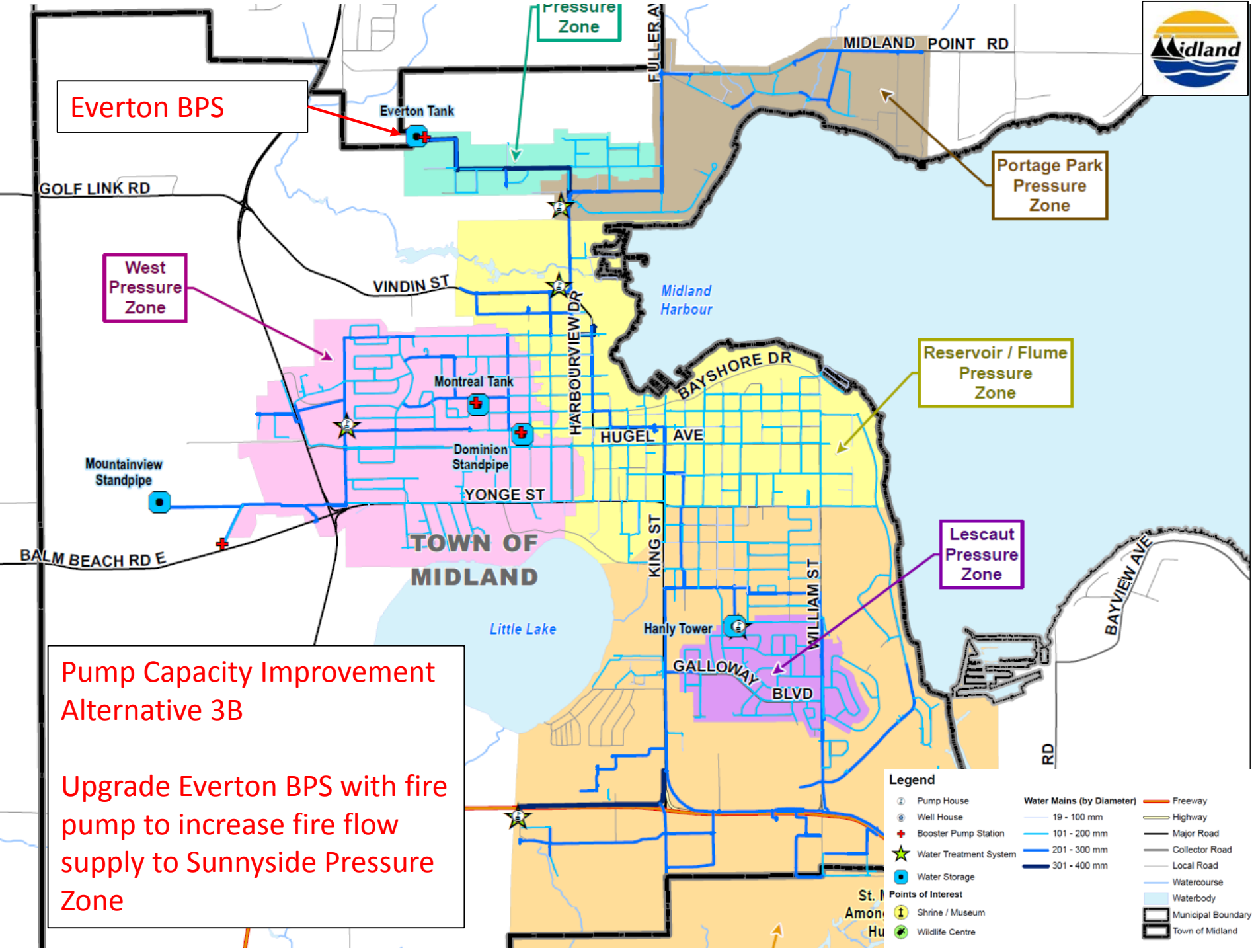
Everton BPS
Everton Tank
Pressure Zone
FULLER AV
MIDLAND POINT RD
Portage Park Pressure Zone
GOLF LINK RD
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
Little Lake
Hanly Tower
GALLOWAY BLVD
BAYVIEW AVE
RD
Pump Capacity Improvement Alternative 3B
Upgrade Everton BPS with fire pump to increase fire flow supply to Sunnyside Pressure Zone
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
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301 - 400 mm
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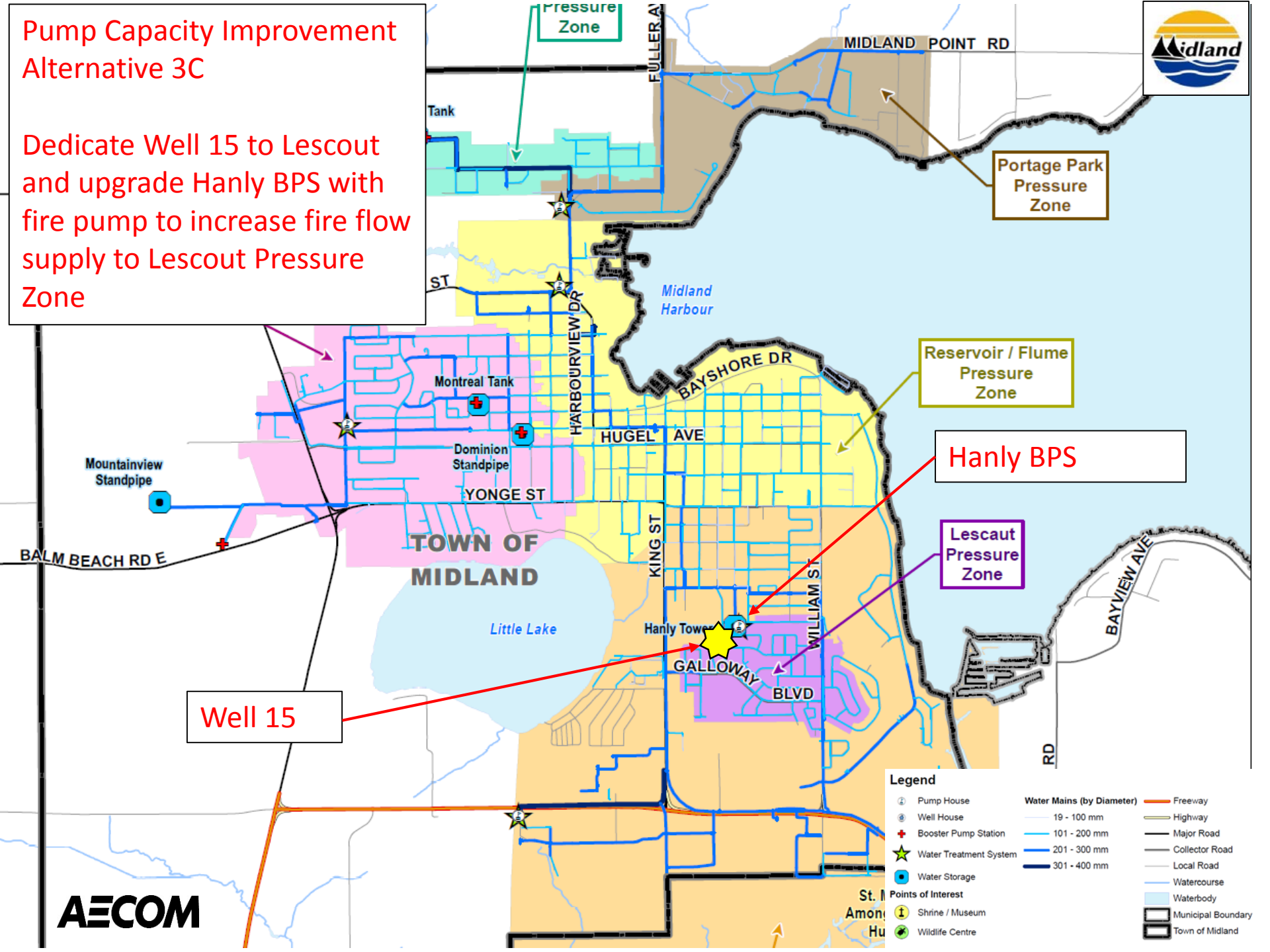
Highway
Major Road
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland


Pump Capacity Improvement Alternative 3C
Dedicate Well 15 to Lescout and upgrade Hanly BPS with fire pump to increase fire flow supply to Lescout Pressure Zone
Pressure Zone
Tank
FULLER AV
MIDLAND POINT RD
Portage Park Pressure Zone
ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
Dominion Standpipe
HUGEL AVE
Hanly BPS
Mountainview Standpipe
YONGE ST
KING ST
TOWN OF MIDLAND
Lescaut Pressure Zone
BALM BEACH RD E
Little Lake
Hanly Tower
WILLIAM ST
BAYVIEW AVE
GALLOWAY
BLVD
Well 15
RD
Legend
Pump House
Well House
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Water Treatment System
Water Storage
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Shrine / Museum
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Highway
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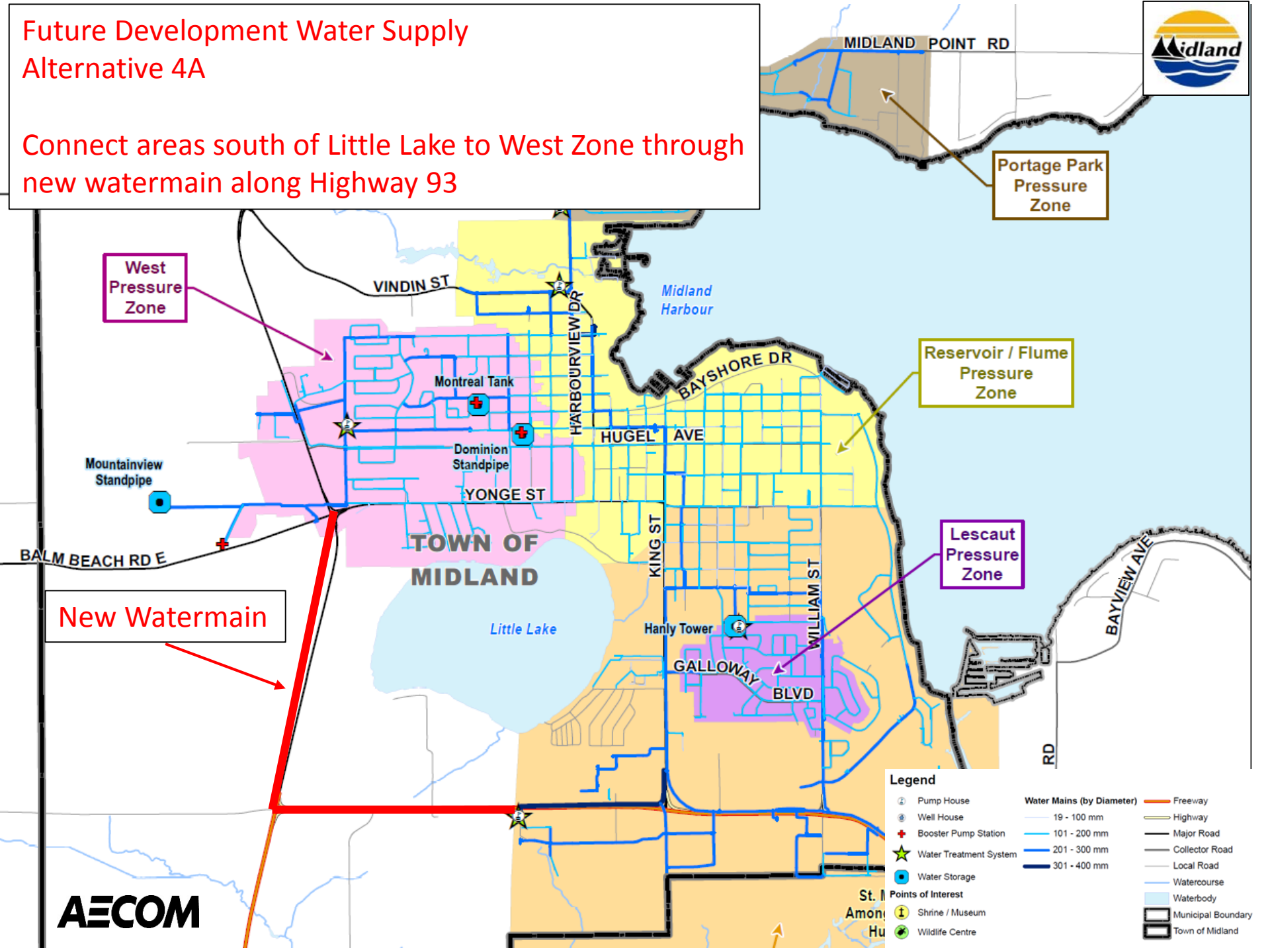
Watercourse
Waterbody
Municipal Boundary
Town of Midland
AECOM

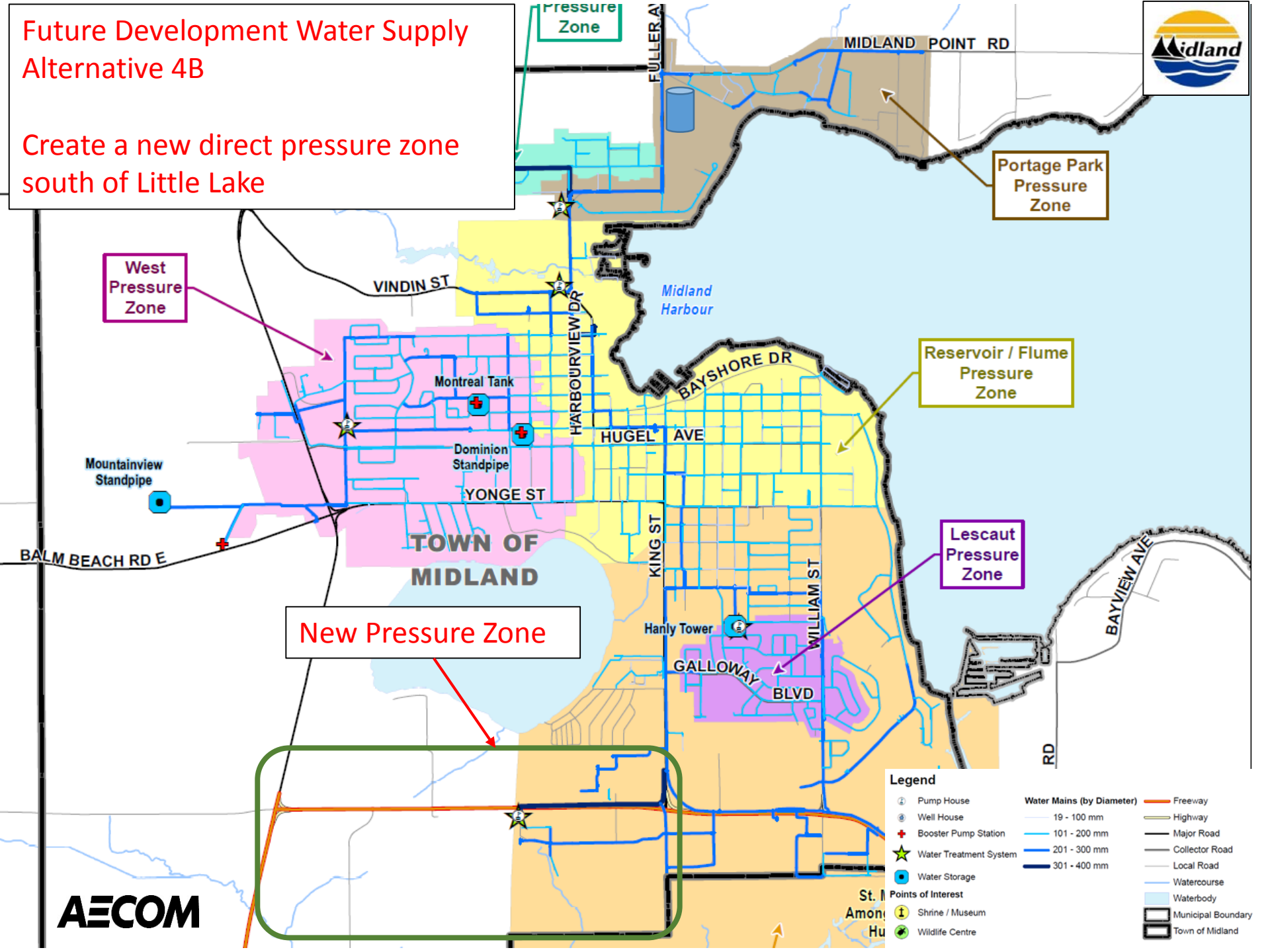
Provide Sustainable Water Service to Future Development

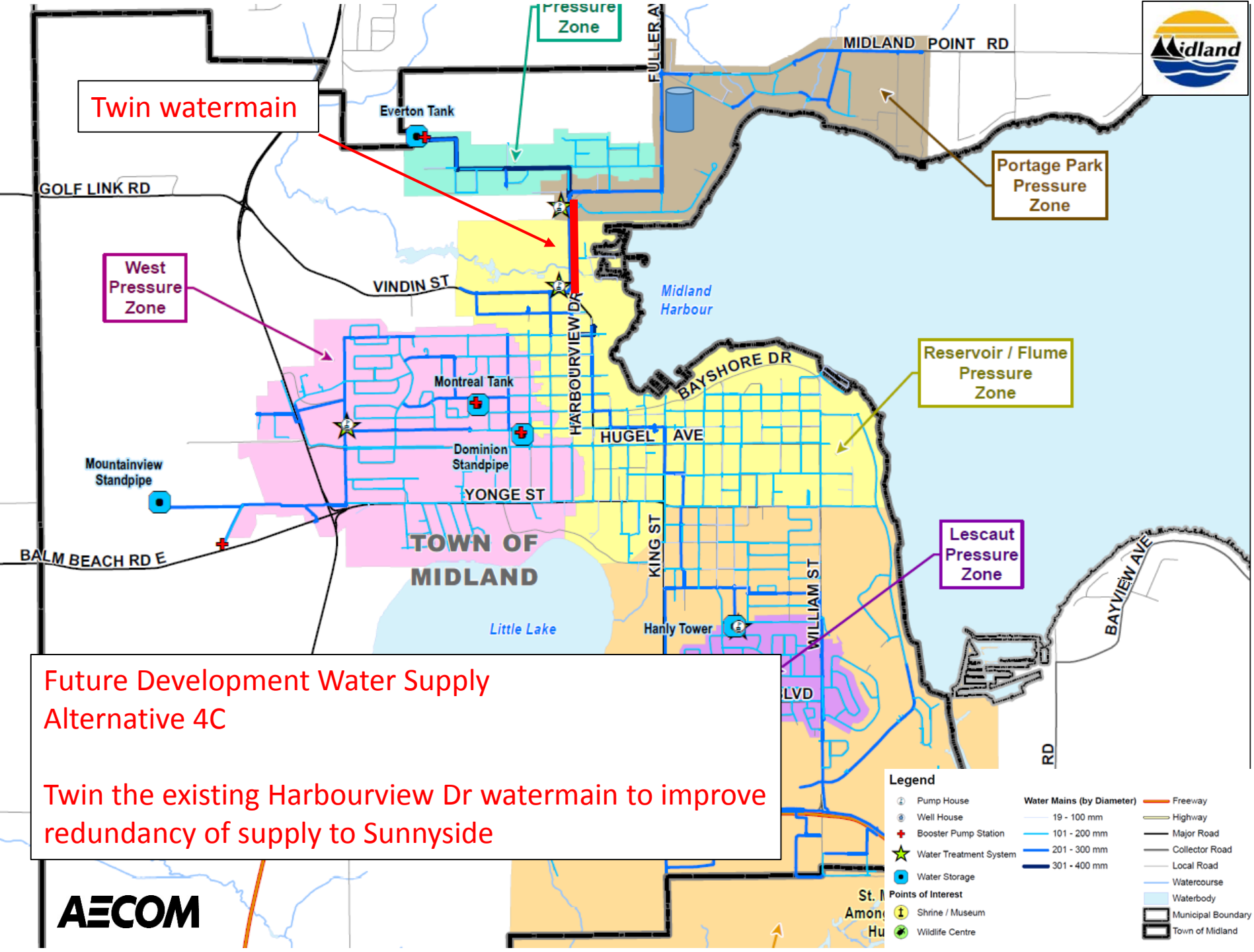
Town of Midland Waterworks Master Plan Update 2019

Future Development Water Supply Alternative 4A

Connect areas south of Little Lake to West Zone through new watermain along Highway 93




Future Development Water Supply Alternative 4B
Create a new direct pressure zone south of Little Lake
Pressure Zone
MIDLAND POINT RD
Portage Park Pressure Zone
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
BAYVIEW AVE
New Pressure Zone
Hanly Tower
GALLOWAY BLVD
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
19 - 100 mm
101 - 200 mm
201 - 300 mm
301 - 400 mm
Freeway
Highway
Major Road
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland
AECOM


Twin watermain
Everton Tank
Pressure Zone
FULLER AV
MIDLAND POINT RD
Portage Park Pressure Zone
GOLF LINK RD
West Pressure Zone
VINDIN ST
Midland Harbour
HARBOURVIEW DR
BAYSHORE DR
Reservoir / Flume Pressure Zone
Montreal Tank
HUGEL AVE
Dominion Standpipe
Mountainview Standpipe
YONGE ST
BALM BEACH RD E
TOWN OF MIDLAND
KING ST
WILLIAM ST
Lescaut Pressure Zone
Little Lake
Hanly Tower
BAYVIEW AVE
Future Development Water Supply
Alternative 4C
Twin the existing Harbourview Dr watermain to improve redundancy of supply to Sunnyside
Legend
Pump House
Well House
Booster Pump Station
Water Treatment System
Water Storage
Points of Interest
Shrine / Museum
Wildlife Centre
Water Mains (by Diameter)
19 - 100 mm
101 - 200 mm
201 - 300 mm
301 - 400 mm
Freeway
Highway
Major Road
Collector Road
Local Road
Watercourse
Waterbody
Municipal Boundary
Town of Midland
AECOM

Appendix B - Official Plan Land Use Map

TOWN OF MIDLAND

OFFICIAL PLAN LAND USE SCHEDULE 'A'

TOWN OF PENETANGUISHENE

SECONDARY PLAN
Subject to Section 3.6.6

Waste Disposal
Assessment Area 500 m

Limits of
Former Landfill

EXCEPTION
Subject to Section 3.3.13.7

SPECIAL POLICIES
Subject to Section 3.3.7

GEORGIAN BAY

N

TOWNSHIP OF TINY

SPECIAL POLICIES
Subject to
Section 3.3.13.5

LITTLE LAKE

SPECIAL POLICIES
Subject to Section 3.3.13.6

SPECIAL POLICIES
Subject to Section 3.3.7

AGGREGATE RESOURCES
Subject to Section 3.6.5

SECONDARY PLAN
Subject to Section 3.6.6

Wye River

SPECIAL POLICIES
Subject to
Section 3.1.6.1

TOWNSHIP OF TAY

AGGREGATE RESOURCES
Subject to Section 3.6.5

WYE MARSH

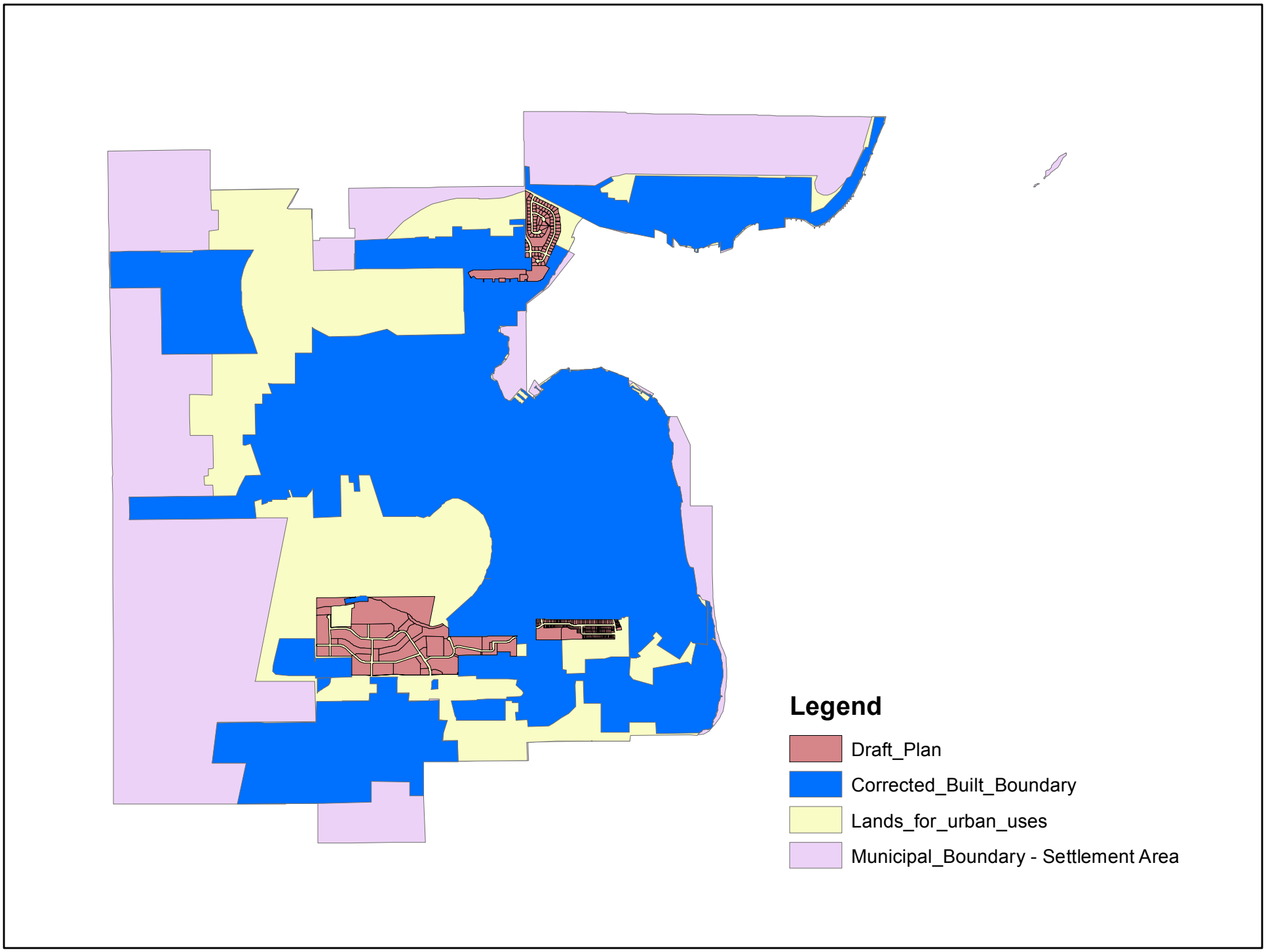
THIS IS SCHEDULE "A' TO
OFFICIAL PLAN AMENDMENT
No. 1 TO THE OFFICIAL PLAN
OF THE TOWN OF MIDLAND

Legend

- Employment Areas
- Downtown District
- Residential District
- Open Space District
- Environmental Protection
- Restricted Rural
- Waterfront Mixed-Use

DRAWN BY: TOWN OF MIDLAND PLANNING DEPARTMENT
DATE: FEBRUARY 2004
OFFICE CONSOLIDATION: NOVEMBER 2017

Appendix C – Development Planning Information provided by Town of Midland


Legend
Draft_Plan
Corrected_Built_Boundary
Lands_for_urban_uses
Municipal_Boundary - Settlement Area