

Town of Tecumseh



2018 Water and Wastewater Master Plan Update

12 November 2019

Project number T00572A

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Executive Summary

Background

Municipalities can recognize the benefit of comprehensive long-range planning exercises that examine problems and solutions for an overall system of municipal services. Master Plans are not intended to address specific local problems or to plan for projects on a project-by-project basis. The Class EA defines Master Plans as:

“Long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments.”

The Town of Tecumseh completed a Water and Wastewater Master Plan Update in 2008. It is recommended practice to review a Master Plan at least every five years to determine the need for a formal review and update to the Master Plan. Since the Master Plan Update was completed in 2008, several changes have occurred which have had significant impacts to the assumptions used in preparing the 2008 Plan and, as a result, it has been identified that the Plan needs to be updated. Significant issues impacting the Plan include:

- Projected growth rates within the Town of Tecumseh as identified in the 2008 Master Plan have not been realized. Updated Planning Projections identified in the County of Essex Official Plan project significantly lower growth rates for the Town. As a result, the timing for various Projects has been reviewed and revised, as appropriate.
- The Windsor Utilities Commission cancelled plans to construct the Banwell Reservoir and Booster Pumping Station at the Town of Tecumseh boundary. The additional storage and pumping capacity originally planned for the Banwell site have now been provided at the A.H. Weeks Water Treatment Plant in Windsor.
- The City of Windsor, in partnership with the Town of Tecumseh, advanced the timing of construction of the North-East Windsor Trunk Sanitary Sewer from Banwell Road/County Road 22 to 8th Concession Road in Oldcastle Hamlet. As a result, growth in Oldcastle Hamlet is expected to accelerate due to the availability of a sufficient outlet for wastewater.
- The Skyway Plaza WWTP has been decommissioned, and wastewater from the local service area has been temporarily directed to the North Talbot Road Trunk Sanitary Sewer for treatment and disposal at the Lou Romano WRP.
- Construction of the Herb Gray Parkway resulted in the relocation of the supply watermain to the Howard Avenue boundary connection and meter (MCT-12). As a result of re-routing this water supply main through the Town of LaSalle, this supply watermain has been closed and no longer provides supply capacity to the Town.
- The Town has completed a number of Studies which impact the servicing strategies identified in the 2008 Master Plan.

The purpose of Water and Wastewater Plan Update is to use updated planning projections for the Town of Tecumseh within the 2036 planning horizon, and to provide a technical review of the 2008 water and wastewater servicing strategies. The review recommends necessary strategy changes, updates to project phasing and updates to capital cost estimates which in turn will feed into the Development Charges process. This update is a critical component in the integrated planning process and is intended to consolidate and harmonize the Town's water and wastewater servicing strategies and capital program for the North and South Service Areas based on updated planning information, updated design criteria and updated project information.

Master Planning Process

The Municipal Class Environmental Assessment (EA) process clearly defines approaches for completion of Master Plans within the Class EA context. The Town of Tecumseh has prepared this Master Plan based generally on Approach 2, which involves preparing a Master Plan document at the conclusion of Phases 1 and 2 in order to fulfill the requirements for Schedule B projects. The Town of Tecumseh has identified select Schedule B projects that will follow on with separate studies in order to provide greater detail prior to finalizing property and/or easement requirements.

Planning Projections

Population projections for residential growth were prepared in consultation with the Town's Planning, Public Works and Environmental Services departments and include intensification of the urban settlement areas of Tecumseh, St. Clair Beach, Tecumseh Hamlet, Maidstone Hamlet and Oldcastle Hamlet. The population estimates are based on the available planning information including local growth analysis in the Town's Official Plans, planning documents and Secondary Plans for Tecumseh Hamlet, Maidstone Hamlet and the Manning Road Development Area. The distribution of population growth in the urban settlement areas is summarized in Table ES-1.

Table ES-1: Projected Population Statistics – 2016 through 2036+

SERVICE AREA		2016	2026	2036	URBAN BUILD-OUT
North	Tecumseh	12,180	12,244	12,272	15,380
	St. Clair Beach	3,484	3,646	3,718	3,894
	Tecumseh Hamlet	5,264	8,486	9,633	13,683
Southeast	Maidstone Hamlet	335	335	1,011	2,259
	Rural	1,164	1,164	1,164	1,164
Southwest	Oldcastle Hamlet	350	1,174	1,818	10,947
	Rural	453	453	453	430
Total		23,229	27,501	30,068	47,756

Recommended Servicing Strategies

The general servicing concepts from the 2008 Master Plan have been revised to incorporate updated information on servicing requirements, capacity allocations, scheduling, alignments and costing. Wherever possible, the alignments of new trunk facilities have been planned based on the location of existing road allowances and/or servicing corridors in order to ensure that servicing can proceed without undue delays resulting from the need to acquire property. However, the Town has the option to construct trunk facilities through new development lands if it can be shown to be cost effective to do so. In this event, the alignment of the trunk facilities may be altered based on approved Secondary Plans and/or Approved Draft Plans of Subdivision. Should the trunk facilities be implemented through new development lands, additional notification to the Public would be provided through the Planning Act notifications.

The timing of the various projects has been established based on anticipated growth rates in Tecumseh and on a fiscally responsible capital works program. The Town will have the option to advance or defer specific projects depending upon the rate of growth experienced in Tecumseh, or upon the petition by a developer (or group of developers) provided that the financial impacts of advancing certain projects are reviewed and mitigated through collection of Development Charges or through Front-End Financing arrangements.

Updated Water Servicing Strategy

In 2004, the Town of Tecumseh entered into a Water Servicing Agreement with the Windsor Utilities Commission (WUC) to secure a long term and reliable drinking water supply. In 2005, the Town completed an Addendum to the 2002 Water Master Plan based on the terms and conditions of the 2004 Water Servicing Agreement. The 2008 Master Plan further developed and refined the water servicing strategy based on the supply of potable water from WUC. Since the 2008 Master Plan Update, the Town has proceeded to implement various components of the planned system. The 2018 Master Plan refines the Water Servicing Strategy, but does not change the overall intent of the servicing strategy for the Town of Tecumseh.

Refinements to the water servicing strategy have been made due to recent changes by WUC, and due to accelerated growth in Oldcastle Hamlet. Significant water servicing strategy updates include:

- Due to ongoing concerns related to water system pressures in the south service area, implementation of the new Pressure Zone 2 has been advanced to ensure that adequate system pressure is provided during all future demand scenarios. In addition, the preliminary locations for the Booster Pumping Station and Elevated Storage Tank have been changed to Oldcastle Hamlet, with supply from the trunk watermain on Provincial Road. The entire service area south of Highway 401 will be included in the new Pressure Zone.

- Commencement of development within the Manning Road Area Secondary Plan has resulted in the need to advance the timing of water and wastewater servicing projects in the area. As a result, the timing for works planned to service growth in the West Tecumseh Hamlet area (WW-1 and W-4) may be deferred until further land use planning studies are completed.
- As a result of the relocation of the primary supply point for the South Service Area to Provincial Road, the need to supply the South Service Area via a large capacity trunk watermain from County Road 42 to Maidstone Hamlet along 12th Concession Road and 11th Concession Road was reviewed. The trunk watermain has been re-sized to provide supply capacity for the Highway Commercial Lands, with potential back-up supply from the new Pressure Zone 2 on 11th Concession Road.

The updated Water Capital Program, Class EA Schedules and Costs are detailed in Table ES-2. The 2018 preferred Water Servicing Strategy is depicted in Figure Nos. ES-1 and ES-2.

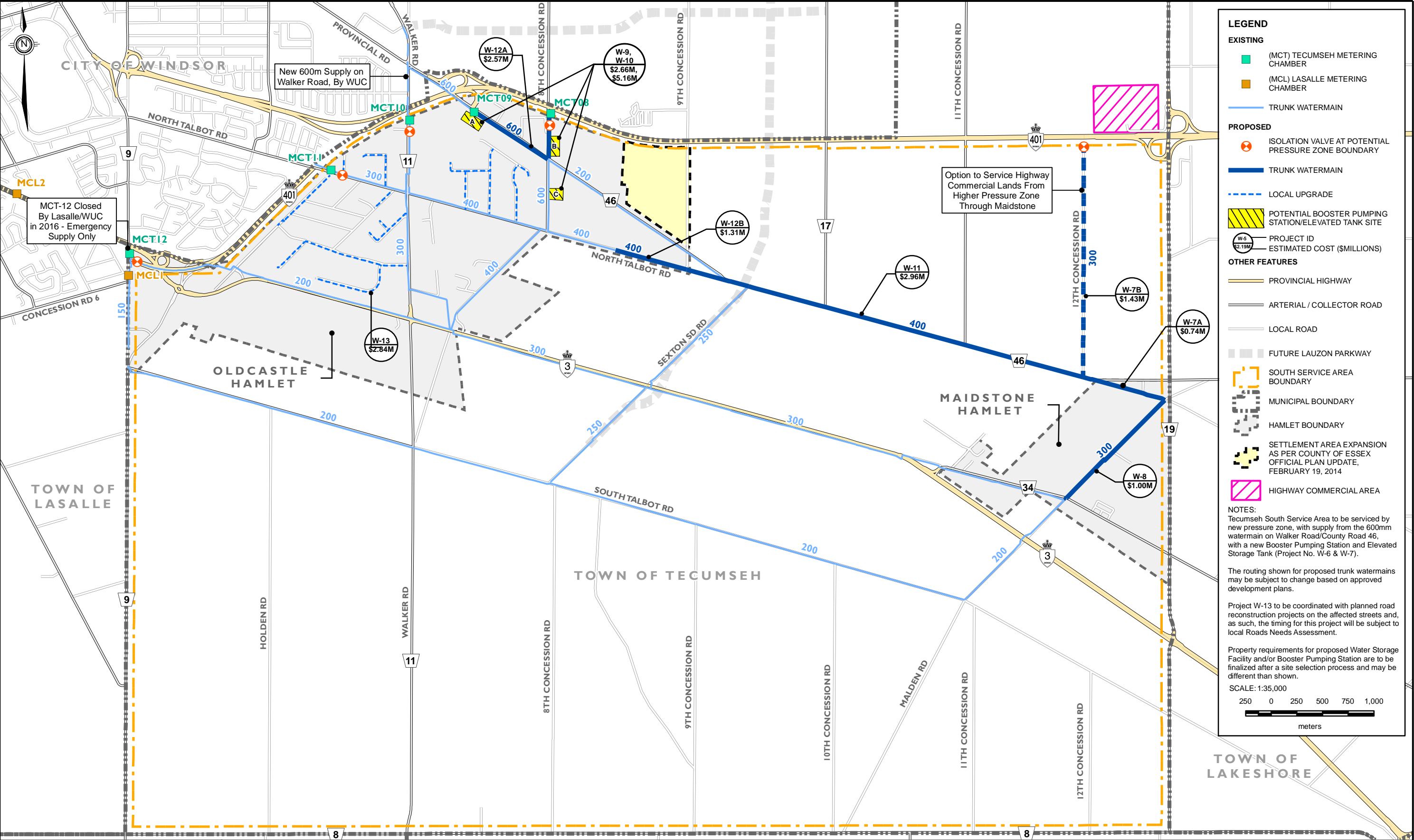
Table ES-2: Water Capital Program and EA Schedules

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
<u>NORTH SERVICE AREA</u>				
West Tecumseh Trunk Watermain CR 22 to CP Railway	W-1	Tecumseh Hamlet	B ¹	\$2.04
East Tecumseh Hamlet Watermain Connection	W-2A	Tecumseh Hamlet	B ¹	\$0.46
Trunk Watermain on Manning Road CR 22 to CP Railway	W-2B	Tecumseh Hamlet	A+	\$1.88
West Tecumseh Trunk Watermain CP Railway to CR 42	W-4	Tecumseh Hamlet	B ¹	\$2.26
Trunk Watermain on Manning Road CP Railway to CR 42	W-5A	Tecumseh Hamlet	A+	\$0.61
Trunk Watermain on CR 42, 11 th Concession Road to Manning Road	W-5B	Tecumseh Hamlet	A+	\$0.92
South Tecumseh Trunk Watermain CR 42 to Hwy 401	W-6	Tecumseh Hamlet	A+	\$1.72
<u>SOUTH SERVICE AREA</u>				
North Talbot Road Trunk Watermain Walker Road to 8 th Concession Road	W-3	Oldcastle Hamlet (Completed)		
South Tecumseh Trunk Watermain 12 th Concession Road to Malden Road	W-7A	Southeast Tecumseh	A+	\$0.74
South Tecumseh Trunk Watermain CR 46 to Hwy 401	W-7B	Southeast Tecumseh	A+	\$1.43
Maidstone Hamlet Trunk Watermain	W-8	Maidstone Hamlet	A+	\$1.00
Zone 2 Booster Pumping Station	W-9	Oldcastle Hamlet	B	\$2.66
Zone 2 Water Storage Facility	W-10	Oldcastle Hamlet	B	\$5.16
County Road 46 Trunk Watermain Sexton Road to Maidstone Hamlet	W-11	Southeast Tecumseh	A+	\$2.96

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
Southwest Tecumseh Trunk Watermain	W-12A	Oldcastle Hamlet	A+	\$2.57
North Talbot Road Trunk Watermain	W-12B	Oldcastle Hamlet	A+	\$1.31
Oldcastle Hamlet Watermain Upgrades	W-13	Oldcastle Hamlet	A+	\$2.84
Total Estimated Capital Cost				\$30.56

Notes:

1. Project may be approved (Schedule A) if implemented under a Planning Act Approval in accordance with Section A.2.9 of the Class EA Planning Process.



LEGEND

EXISTING

(MCT) TECUMSEH METERING CHAMBER

(MCL) LASALLE METERING CHAMBER

TRUNK WATERMAIN

PROPOSED

ISOLATION VALVE AT POTENTIAL PRESSURE ZONE BOUNDARY

TRUNK WATERMAIN

LOCAL UPGRADE

POTENTIAL BOOSTER PUMPING STATION/ELEVATED TANK SITE

PROJECT ID

ESTIMATED COST (\$MILLIONS)

OTHER FEATURES

PROVINCIAL HIGHWAY

ARTERIAL / COLLECTOR ROAD

LOCAL ROAD

FUTURE LAUZON PARKWAY

SOUTH SERVICE AREA BOUNDARY

MUNICIPAL BOUNDARY

HAMLET BOUNDARY

SETTLEMENT AREA EXPANSION AS PER COUNTY OF ESSEX OFFICIAL PLAN UPDATE, FEBRUARY 19, 2014

HIGHWAY COMMERCIAL AREA

NOTES:

Tecumseh South Service Area to be serviced by new pressure zone, with supply from the 600mm watermain on Walker Road/County Road 46, with a new Booster Pumping Station and Elevated Storage Tank (Project No. W-6 & W-7).

The routing shown for proposed trunk watermain may be subject to change based on approved development plans.

Project W-13 to be coordinated with planned road reconstruction projects on the affected streets and, as such, the timing for this project will be subject to local Roads Needs Assessment.

Property requirements for proposed Water Storage Facility and/or Booster Pumping Station are to be finalized after a site selection process and may be different than shown.

SCALE: 1:35,000

25002505007501,000

meters



CLIENT

TOWN OF TECUMSEH

PROJECT NAME:

WATER AND WASTEWATER MASTER PLAN UPDATE
PREFERRED WATER SERVICE STRATEGY
SOUTH SERVICE AREA

DRAWING No:

FIG ES-2

Wastewater

The 2008 Master Plan developed a wastewater servicing strategy based on the 2004 Wastewater Servicing Agreement with the City of Windsor. The 2008 Master Plan strategy fully utilized the available capacities in the Windsor system, and planned that all wastewater from the Town be directed to the Windsor collection system for ultimate treatment and disposal at either the Little River PCP or the Lou Romano WRP. The 2018 Master Plan does not change the overall philosophy of the 2008 Master Plan.

Refinements to the strategy have been incorporated in the 2018 Master Plan based on various studies recently completed by the Town of Tecumseh. Significant wastewater servicing strategy updates include:

- The Town of Tecumseh completed the Sanitary Sewer Assessment Report (Dillon 2011), which was commissioned by the Town in response to the widespread basement flooding event that occurred following the June 2010 rainfall event. This Study recommended various measures to address reductions in extraneous flows in the sanitary collection system, partnering with homeowners to manage the risk of basement flooding, further assessment and management of public infrastructure, and storm drainage improvements, primarily in areas north of County Road 22.
- The Town of Tecumseh completed the Sanitary Sewage Collection System Improvements Class Environmental Assessment (Dillon, April 2013). This Study recommended various improvements to the sanitary collection system including replacement of the Lakewood Pumping Station, and provision of on-line peak flow storage on the Lakewood Park Trunk Sewer, the Riverside Drive Trunk Sewer and the Dillon Drive Sanitary Sewer system.
- The servicing strategy for the Manning Road Secondary Plan area has been refined based on the Functional Servicing Report, Manning Road Secondary Plan Area (2015).
- The location of the Tecumseh Hamlet Diversion Sewer has been adjusted northward to Intersection Road to intercept more flow from the Lesperance Road Trunk Sanitary Sewer and divert the additional flow to the new West Tecumseh Trunk Sanitary sewer, thereby reducing the risk of sewer surcharging in the Lesperance Road Trunk Sanitary sewer during wet-weather events.
- The servicing strategy for the Highway Commercial lands and for Maidstone Hamlet have been revised to eliminate the need for a large capacity and deep trunk sanitary sewer. These areas will now be serviced using centralized sewage pumping stations with a common discharge forcemain with an outlet to the West Tecumseh Trunk Sanitary Sewer on County Road 42.
- Decommissioning of the Skyway Plaza WWTP in Oldcastle Hamlet and flow diversion from the Skyway Plaza WWTP to the North Talbot Road trunk sewer.

- Refined servicing strategy for the Oldcastle Hamlet area based on the Oldcastle Hamlet Sanitary Servicing – 8th Concession Road Trunk Sanitary Sewer Outlet, Preliminary Design Report (2018). The updated strategy fully utilizes the available capacity in the North East Windsor Trunk Sanitary Sewer outlet on 8th Concession Road at Highway 401 and accommodates growth in the expanded Oldcastle Hamlet area as identified in the County of Essex Official Plan.

The new servicing strategy incorporates flexibility for the Town to divert all or part of peak wet weather flows from existing trunk sewers south of County Road 22 to the new Northeast Windsor Trunk Sanitary Sewer, which outlets to the Little River PCP. This flexibility will permit Tecumseh to comply with its Wastewater Servicing Agreement with Windsor, and to limit peak flow discharge to the Cedarwood Outlet to the maximum approved rate, while maximizing the potential development areas to be serviced through the Banwell Road Outlet.

The updated Wastewater Capital Program, Class EA Schedules and Costs are detailed in Table ES-3. The 2018 preferred Wastewater Servicing Strategy is depicted in Figure ES-3.

Table ES-3: Wastewater System Servicing Strategy

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
West Tecumseh Trunk Sewer CR 22 to CP Railway	WW-1	Tecumseh Hamlet	B ¹	\$5.21
Tecumseh Hamlet Diversion Sewer	WW-2	Tecumseh Hamlet	A+	\$0.84
Sylvestre Pumping Station Upgrade	WW-4	Tecumseh Hamlet	B	\$0.64
North Talbot Road Trunk Sewer, Oldcastle Road (North Talbot to Chrysler Greenway)	WW-5A	Oldcastle Hamlet	A+	\$2.79
North Talbot Road Trunk Sewer, Oldcastle Road to 475 m east of Oldcastle Road	WW-5B	Oldcastle Hamlet	A+	\$0.60
West Tecumseh Trunk Sewer CP Railway to CR 42	WW-6	Tecumseh Hamlet	B ¹	\$4.16
CR 42 Diversion Sewer	WW-7	Tecumseh Hamlet	A+	\$1.00
South Tecumseh Trunk Sewer CR 42, Odessa Drive to 11 th Concession	WW-8A	Tecumseh Hamlet	A+	\$1.90
South Tecumseh Trunk Forcemain, CR42 to Hwy 401	WW-8B	Tecumseh Hamlet	A+	\$3.61
South Tecumseh Trunk Forcemain, Hwy 401 to North Talbot Road	WW-9A	Tecumseh Hamlet	A+	\$1.65
South Tecumseh Trunk Sewer, 11 th Concession Road to Malden Road	WW-9B	Southeast Tecumseh	A+	\$1.27
Maidstone Hamlet Trunk Sewer	WW-10	Maidstone Hamlet	A+	\$2.02

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
Southwest Tecumseh Trunk Sewer, Phase 1	WW-11A	Oldcastle Hamlet	A+	\$1.19
Southwest Tecumseh Trunk Sewer, Phase 2	WW-11B	Oldcastle Hamlet	A+	\$1.20
Manning Road Secondary Plan Area Trunk Sewer	WW-12	Tecumseh Hamlet	A+	\$1.10
Manning Road Secondary Plan Area Sanitary Lift Station	WW-13	Tecumseh Hamlet	A+	\$0.93
Highway Commercial Area Pumping Station ⁴	WW-14	Tecumseh Hamlet	B	\$0.99
Maidstone Hamlet Sanitary Pumping Station	WW-15	Maidstone Hamlet	B	\$0.99
County Road 46 Trunk Sanitary Sewer, Phase 1	WW-16A	Oldcaslte Hamlet	A+	\$1.31
County Road 46 Trunk Sanitary Sewer, Phase 2	WW-16B	Oldcaslte Hamlet	A+	\$2.55
Blackacre Drive Sanitary Servicing	WW-17	Oldcastle Hamlet	B	\$2.13
Howard Avenue Servicing, Blackacre Drive and Outer Drive to Hwy 3	WW-18A	Oldcastle Hamlet	B	\$1.33
Howard Avenue Servicing, Hwy 3 to MTO Carpool Lot	WW-18B	Oldcastle Hamlet	B	\$1.73
Purchase additional treatment capacity at Little River PCP	Windsor-2 ^{2,3}	Windsor	-	\$10.22
Purchase additional treatment capacity at Little River PCP	Windsor-4 ^{2,3}	Windsor	-	\$6.27
Total Estimated Capital Cost				\$57.64

Notes:

1. Project may be approved (Schedule A) if implemented under a Plan of Subdivision
2. Projects to be implemented by the City of Windsor in accordance with Wastewater Agreement, Nov. 2004. Costs taken from Article 9 of the Agreement, with costs escalated by 2% per year to reflect 2018 costs.
3. The timing for the Capacity Expansion to be determined in accordance with Article 4 of the Wastewater Servicing Agreement.
4. Project may be approved (Schedule A) if implemented under a Planning Act Approval in accordance with Section A.2.9 of the Class EA Planning Process.

LEGEND

EXISTING

PUMPING STATION

OUTLET LOCATION FOR DISCHARGE OF MONITORED FLOW

FLOW CONTROL CHAMBER

TRUNK SEWER

TEMPORARY DIVERSION SEWER TO LRWRP

TRUNK SEWER TO LRWRP

NORTHEAST WINDSOR TRUNK SEWER

PROPOSED

PUMPING STATION

A|B|C

POTENTIAL SITES FOR MAIDSTONE PUMPING STATION

WASTEWATER FORCEMAIN

DIVERSION SEWER

TRUNK SEWER

8TH CONCESSION ROAD SANITARY SEWER OUTLET SERVICE AREA

NORTH TALBOT ROAD SANITARY SEWER OUTLET SERVICE AREA

NOT INCLUDED IN SANITARY SEWER SERVICE AREA

WW-6

\$1.09M

PROJECT ID
ESTIMATED COST (\$MILLIONS)

PROVINCIAL HIGHWAY

COUNTY ROAD

LOCAL ROAD

FUTURE LAUZON PARKWAY

HIGHWAY COMMERCIAL AREA

MUNICIPAL BOUNDARY

HAMLET BOUNDARY

SETTLEMENT AREA EXPANSION AS PER COUNTY OF ESSEX
OFFICIAL PLAN UPDATE, FEBRUARY 19, 2014

NOTES:

The routing shown for proposed trunk sewers may be subject to change based on approved development plans.

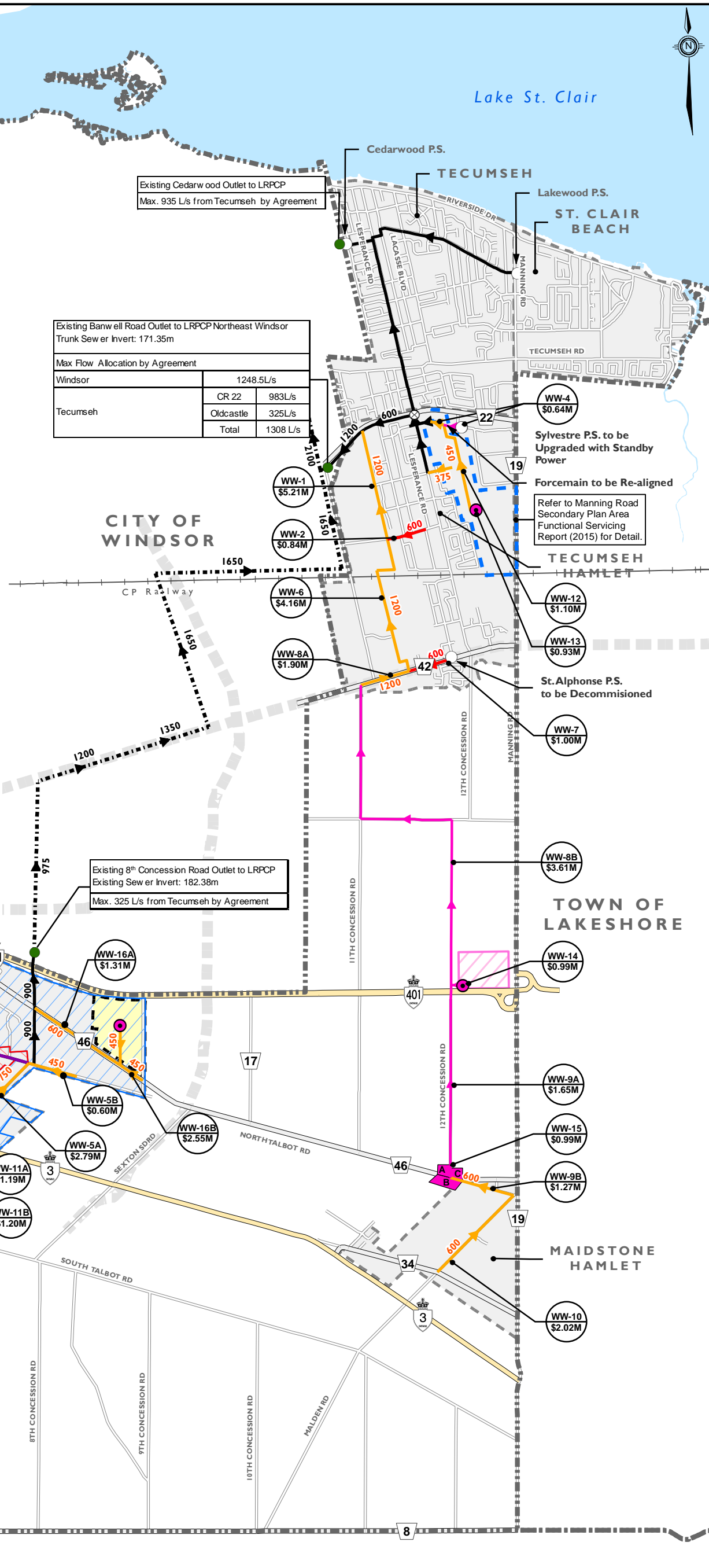
The exact location of the Sewage Pumping Stations to be determined through the detailed design process and/or through the Development Approvals process.

Oldcastle Pump Station No. 1 & 2 are identified in Oldcastle Hamlet Servicing - 8th Conc. Trunk Sanitary Sewer Outlet Preliminary Design Report (Dillon Consulting, May 2017)

SCALE: 1:55,000

500 250 0 500 1,000 1,500 2,000

meters



Implementation Plan

Based on the projections for water demand or wastewater flow requirements of the service areas developed from the 2018 Population Projections, the project timing requirements were determined. This process took into consideration a logical extension of growth from the existing development. The evaluation of timing also took into consideration the availability of and need to maximize the use of existing infrastructure (within both the Town of Tecumseh and City of Windsor) and best judgement on reasonable timing of subsequent expansions.

Project timing was also integrated with the results of recent studies, Class Environmental Assessments and reports, and where possible other road upgrade projects being planned by the County of Essex to ensure that underground infrastructure was not scheduled after completion of road improvements.

The updated Implementation Plans and Capital Costs for the North service area (TN) and South service area (TS) are summarized in Tables ES-4 and ES-5 respectively. Table ES-6 summarizes the anticipated timing and preliminary costs for purchasing additional wastewater conveyance and treatment capacity from the City of Windsor in accordance with the terms and conditions established in the Windsor –Tecumseh Wastewater Agreement.

Table ES-4: North Service Area Implementation Plan

TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	TIMING	COST (\$MILLION)
TN-1	W-2A, W-2B, WW-4, WW-12, WW-13	Manning Road Secondary Plan Area Servicing	0-5 years	\$5.01
TN-2	W-1, WW-1, WW-2	West Tecumseh Hamlet Servicing, Phase 1	6-10 years	\$8.09
TN-3	W-4, W-5, WW-6, WW-7, WW-8	West Tecumseh Hamlet Servicing, Phase 2	11-15 years	\$11.77
TN-4	W-6, WW-Bb, WW- 14	South Tecumseh Hamlet Servicing	16-20 years	\$7.03
Total Estimated Cost (2018\$)				\$31.09

Table ES-5: South Service Area Implementation Plan

TOWN REFERENCE ID	PROJECT ID'S	DESCRIPTION	TIMING	COST (\$MILLION)
TS-1	W-9, W-10, W-12A	Implementation of Tecumseh Zone 2	0-5 years	\$10.39
TS-2	W-12B, W-13 ¹ , WW-5A, WW-11A	Oldcastle Servicing, Phase 1	6-10 years	\$5.62
TS-3	W-13 ¹ , WW-5B, WW-16A, WW-17,	Oldcastle Hamlet Servicing, Phase 2	11-15 years	\$5.02
TS-4	W-7A, W-8, W-11, W-13 ¹ , WW-16B, WW-18A, WW-18B	Oldcastle Hamlet Servicing, Phase 3	16-20 years	\$11.37
TS-5	W-7B, W-131, WW-11B, WW-9A, WW-9B, WW-10, WW-15	Maidstone Hamlet Servicing	20+ years	\$9.03
Total Estimated Capital Cost (2018\$)				\$41.43

Notes:

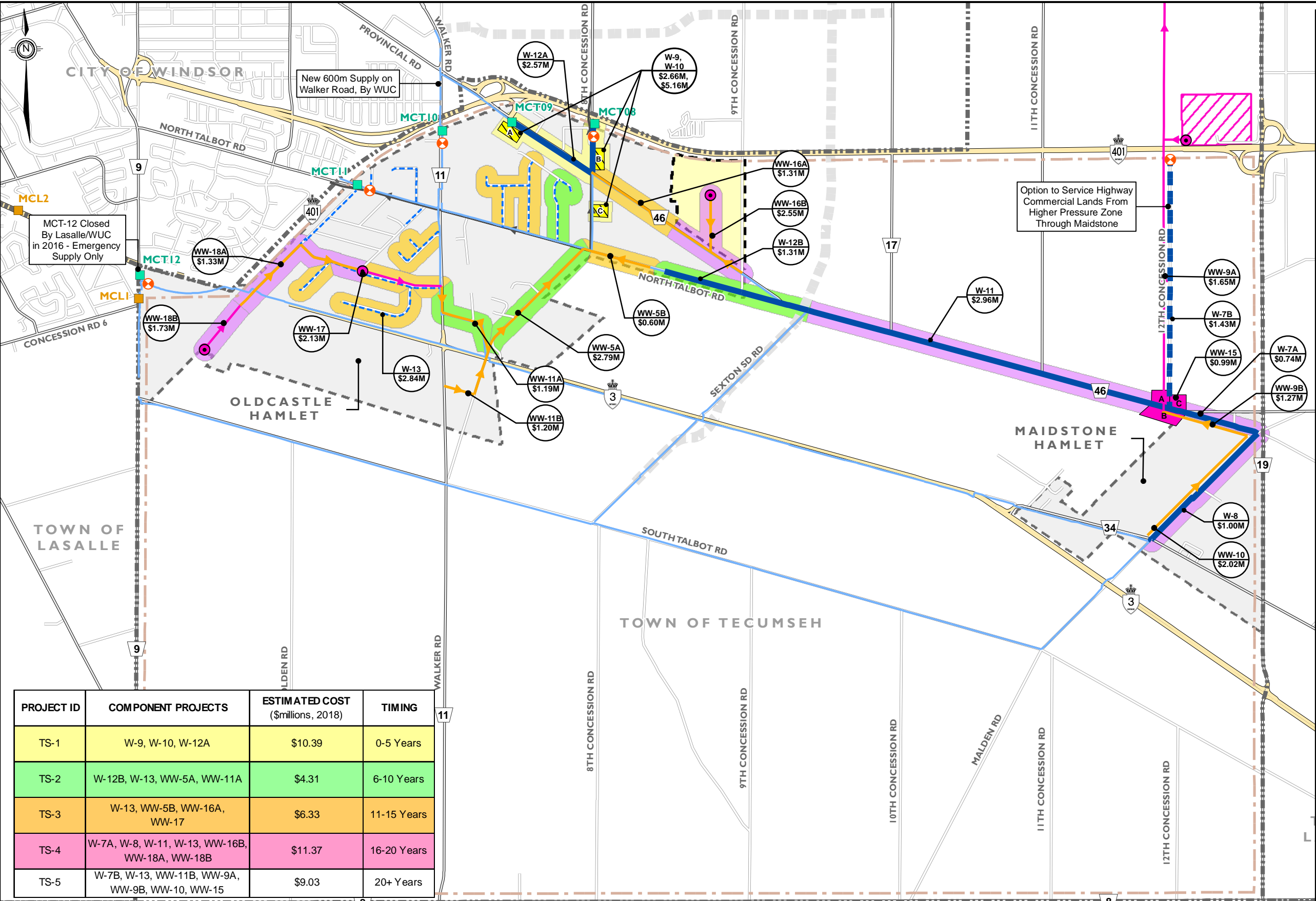
1. Portions of W-13 to be implemented with WW-17 and WW-18A
2. Implementation of the trunk watermain on 12th Concession Road and may be deferred

Table ES-6: Timing and Costs for Purchasing Additional Wastewater Capacity from Windsor

PROJECT ID	DESCRIPTION	ANTICIPATED TIMING	COST (\$MILLION)
Windsor -1	Northeast Windsor Trunk Sanitary Sewer, Forest Glade to Little River PCP	Completed	
Windsor-2	Purchase additional treatment capacity at Little River PCP ¹	2031	\$10.22
Windsor-3	Northeast Windsor Trunk Sanitary Sewer, Banwell Road to 8 th Concession Road	Completed	
Windsor-4	Purchase additional treatment capacity at Little River PCP ¹	2037	\$6.27
Total Estimated Cost for Purchasing Additional Capacity from Windsor			\$16.49

Notes:

1. Projects to be implemented by the City of Windsor in accordance with Wastewater Agreement, Nov. 2004. Costs taken from Article 9 of the Agreement, with costs escalated by 2% per year to reflect 2018 costs. Actual timing of Works may be triggered by either the City of Windsor or the Town of Tecumseh in accordance with Article 4 of the Agreement, once the plant reaches 90% of it's rated capacity.



LEGEND

EXISTING

(MCT) TECUMSEH METERING CHAMBER

(MCL) LASALLE METERING CHAMBER

TRUNK WATERMAIN

SANITARY SEWER

PROPOSED

ISOLATION VALVE AT POTENTIAL PRESSURE ZONE BOUNDARY

PUMPING STATION

TRUNK WATERMAIN

WASTEWATER FORCEMAIN

DIVERSION SEWER

TRUNK SEWER

LOCAL UPGRADE

POTENTIAL BOOSTER PUMPING STATION/ELEVATED TANK SITE

A|B|C

POTENTIAL SITES FOR MAIDSTONE PUMPING STATION

W-5

PROJECT ID

\$2.19M

ESTIMATED COST (\$MILLIONS)

PROJECT IMPLEMENTATION STRATEGY

0-5 YEARS

6-10 YEARS

11-15 YEARS

16-20 YEARS

OTHER FEATURES

PROVINCIAL HIGHWAY

ARTERIAL / COLLECTOR ROAD

LOCAL ROAD

FUTURE LAUZON PARKWAY

SOUTH SERVICE AREA

MUNICIPAL BOUNDARY

HAMLET BOUNDARY

SETTLEMENT AREA EXPANSION AS PER COUNTY OF ESSEX OFFICIAL PLAN UPDATE, FEBRUARY 19, 2014

HIGHWAY COMMERCIAL

NOTES:

The routing shown for proposed trunk watermain may be subject to change based on approved development plans.

SCALE: 1:35,000

240 0 240 480 720 960

meters

PROJECT ID	COMPONENT PROJECTS	ESTIMATED COST (\$millions, 2018)	TIMING
TS-1	W-9, W-10, W-12A	\$10.39	0-5 Years
TS-2	W-12B, W-13, WW-5A, WW-11A	\$4.31	6-10 Years
TS-3	W-13, WW-5B, WW-16A, WW-17	\$6.33	11-15 Years
TS-4	W-7A, W-8, W-11, W-13, WW-16B, WW-18A, WW-18B	\$11.37	16-20 Years
TS-5	W-7B, W-13, WW-11B, WW-9A, WW-9B, WW-10, WW-15	\$9.03	20+ Years

CLIENT

TOWN OF TECUMSEH

PROJECT NAME:

WATER AND WASTEWATER MASTER PLAN UPDATE
SOUTH SERVICE AREA
IMPLEMENTATION STRATEGY

DRAWING No:

FIG ES-5

Property Requirements

Schedule B Projects that will require property acquisition by the Town are summarized in Table ES-7.

Table ES-7: Property Requirements

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
W-1, WW-1, W-4 & WW-6	West Tecumseh Trunk Sewer and Watermain	Route N-1: min. 20.0 m wide easement between CR 22 and CR42 in Tecumseh Hamlet.	Alignment of trunk sewer and watermain along Route N-1 to be coordinated through Secondary Plan / Plan of Subdivision approvals. Town will secure/purchase permanent easement(s) prior to commencing detail design.
WW-4	Sylvestre Pumping Station Upgrade	A 3.0m wide permanent easement adjacent to Sylvestre Drive to house a stand-by generator in a sound attenuating enclosure.	Easement to be secured as a Condition of Site Plan Approval for adjacent development.
W-2A	East Tecumseh Watermain Connection	A minimum 5.0 m wide easement within or adjacent to the CP Rail corridor	Easement to be secured prior to construction
W-9, W-10	Zone 2 Booster Pumping Station and Elevated Storage Facility	A minimum 50m wide by 50 m deep (0.25 ha) parcel of land is required for the booster pumping station site. A 0.5 ha parcel of land is required for the elevated water storage facility site	Three alternative sites (A, B, and C) have been selected in Oldcastle Hamlet for the proposed booster pumping station and/or the elevated storage facility. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.
WW-15	Maidstone Hamlet Pumping Station	A minimum 20m x 20m parcel of land is required for the construction of a wastewater pumping station to service Maidstone Hamlet	Three potential sites near the intersection of Concession Road 11 and North Talbot Road have been selected for the proposed pumping station. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.
WW-16B	County Road 46 Trunk Sanitary Sewer, Phase 2	A minimum 20.0m wide corridor through new development land for the trunk sewer extension, and a minimum 20m x 20m parcel of land for a new lift station.	Lands to be dedicated to the Town of Tecumseh through registration of Plan(s) of Subdivision.
WW-17	Blackacre Drive Servicing	A minimum 15.0m x 15.0 m parcel of land for the new pumping station. A 6.0 m wide easement for the sanitary sewer extension from Oldcastle Road to McCord lane along or adjacent to the Chrysler Greenway.	A detailed evaluation of the potential alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
WW-18	Howard Avenue Servicing	A minimum 15.0m x 15.0 m parcel of land for the new pumping station. A 6.0 m wide easement for the sanitary sewer extension from Outer Drive to Howard Avenue.	A detailed evaluation of the potential alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.

Summary

The preferred water and wastewater servicing strategies will support the short and long-term servicing needs of the approved growth areas and provide flexibility for servicing potential growth areas in the future. The strategies will also support meeting operational requirements, water quality and level of service objectives.

Upon completion of the Master Plan Update or Phase 2 of the EA process, Schedule A, A+ and B projects may proceed to Phase 5, Implementation, subject to finalization of the 30-day review period and assuming no Part II Orders are received. However, during implementation of some of these projects, additional study and analysis may be undertaken such as during the area servicing stages of development. While this work may address refinement to alignments, siting and minimizing environmental impacts, these projects will not require further planning under the Class EA process. The preferred water and wastewater strategies do not include any Schedule C projects requiring further planning under the Class EA process.

Next Steps

The following implementation requirements will be addressed during the subsequent steps (primarily during detailed design) of the projects:

- Finalization of property requirements;
- Final refinement of infrastructure alignment and facility siting to ensure infrastructure is located outside regulated areas except for instances when it is unavoidable (watercourse crossings);
- Final refinement of construction methodologies including determination of crossing approaches including open-cut, tunneling and structural supporting requirements;
- Completion of additional supporting investigations including but not limited to:
 - Geotechnical investigations to support determination of construction requirements for the infrastructure;
 - Hydrogeological investigations to evaluate potential impacts, to support mitigative requirements during construction and determine any dewatering requirements;
 - Updated Natural and Cultural Heritage Studies in support of the final Site Selection for planned water and wastewater facilities;
 - Archeological Assessments for potential sites for water and wastewater facilities.

- Mitigation of potential construction related impacts including but not limited to:
 - Traffic control;
 - Noise, vibration and dust;
 - Air pollution;
 - Service interruption;
 - Environmental and water disturbance or contamination;
 - Siltation and erosion control.
- Approval Requirements as required but not limited to:
 - Environmental Compliance Approval from Ministry of Environment, Conservation and Parks;
 - Encroachment Permit from the Ministry of Transportation;
 - Approvals from the County of Essex;
 - Permit approvals from the Essex Region Conservation Authority (ERCA);
 - Associated Planning Act Approvals;
 - Temporary Permit to Take Water for construction dewatering from the Ministry of the Environment, Conservation and Parks.

1. Introduction and Background

1.1 Background

Ready and accessible public infrastructure is essential to the viability of existing and growing communities. Infrastructure planning, land use planning and infrastructure investment require close integration to ensure efficient, safe and economically achievable solutions to provide the required water and wastewater infrastructure. To balance the needs of growth with the protection of the natural, environmental and heritage resources, the Town of Tecumseh initiated an update of its Water and Wastewater Master Plan.

In 2002, the Town of Tecumseh (Town) approved a comprehensive Master Plan Update for water and wastewater servicing. This Master Plan, which was subsequently updated in 2005 and again in 2008, has provided the framework and vision for the water and wastewater servicing needs for the Town of Tecumseh to 2028 and beyond.

Due to a number of developments that have occurred since 2008, the Town initiated an update to its Water and Wastewater Master Plan to establish and/or validate the preferred water and wastewater servicing strategies based on projected growth and anticipated servicing needs. CIMA+ was retained to complete the update to the Town's Water and Wastewater Master Plan. This update is being undertaken in accordance with the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for Master Plans.

The Town of Tecumseh has established goals to blend the economic and social activities of a growing Town with the preservation and protection of natural areas and resources through a sustainable approach to land management. The Official Plan provides a long term strategic policy framework to guide growth and development while protecting and preserving natural areas and resources through a sustainable approach to land management.

The 2018 Master Plan builds on previous work undertaken as part of the 2002 Master Plan, the 2005 Water Master Plan Addendum, and the 2008 Master Plan Update. This update is being undertaken in accordance with the Municipal Engineers Association (MEA) Class Environmental Assessment (EA), Approach 2 process for Master Plans with extensive public and agency participation. The update is a critical component in the committed approach to providing sustainable services and will form the new framework and vision for the water and wastewater servicing needs for the Town to 2039 and beyond.

1.2 Master Plan Update Goals and Objectives

The Water and Wastewater Master Plan documents the development and selection of the preferred water and wastewater servicing strategies to meet the servicing needs of existing and future development to 2036.

The key objectives Master Plan Update objectives were defined as follows:

- Review planning forecasts to 2036 and determine the impact on servicing needs for the Town;
- Evaluate and incorporate proposed water and wastewater servicing needs to 2036;
- Confirm or refine water and wastewater policies to provide guidelines to the process and to the development/evaluation of servicing strategies;
- Integrate previous and concurrent related studies including:
 - Town of Tecumseh Sanitary Sewage Collection System Improvements Class Environmental Assessment, Environmental Screening Report, (Dillon, April 2013);
 - Addendum to the Water and Wastewater Master Plan, Oldcastle Hamlet Wastewater Servicing (Stantec, September 2013);
 - Town of Tecumseh Sanitary Sewage Collection System Improvements Class Environmental Assessment (Dillon, April 2013);
 - Town of Tecumseh 2014 Development Charge Background Study (Watson, July 2014);
 - Functional Servicing Report, Manning Road Secondary Plan Area, Town of Tecumseh (Dillon, April 2015);
 - Office Consolidation, Manning Road Secondary Plan Area-Specific Development Charge Background Report (Watson, Oct 2015);
 - Updated Official Plan for the County of Essex, approved by MMAH April 28, 2018;
 - Oldcastle Hamlet Sanitary Servicing – 8th Concession Road Trunk Sanitary Sewer Outlet, Preliminary Design Report, (Dillon, May 2018).
- Complete and document the Master Planning process in accordance with the Class Environmental Assessment process;
- Update the water and wastewater servicing strategies in consideration of:
 - meeting technical service requirements;
 - optimizing existing infrastructure;
 - minimizing impact to or enhance the natural, social and economic environments;
 - providing cost effective solutions.
- Establish a preferred long-term servicing strategy and implementation plan to meet the existing and future servicing needs of the Town;
- In general, the overall goals for the water and wastewater servicing strategies are:
 - Provide high level of service to existing users and approved growth;
 - Provide security of supply;
 - Mitigate impacts to natural, social and economic environments;

- Best meet policy statements;
- Ensure servicing meets the technical criteria;
- Endeavour to optimize existing infrastructure;
- Ensure the strategies are cost-effective.

1.3 Master Plan Update Study Components

The focus of the Water and Wastewater Master Plan Update consists of the evaluation of the water distribution and wastewater collection systems for the Town of Tecumseh. The analysis undertaken as part of this study deals primarily with the trunk infrastructure for the water and wastewater systems ultimately serviced by the water and wastewater treatment plants located within the City of Windsor. This infrastructure consists of the trunk watermains and sewers, major pumping stations and water storage facilities.

This Master Plan Update details the updated capital and implementation program for the trunk infrastructure as part of the Town of Tecumseh water and wastewater systems and provides all supporting reference data and deliverables.

1.4 Relevant Historical Reports

1.4.1 2008 Town of Tecumseh Water and Wastewater Master Plan Update

The 2008 Master Plan identified the location, capacity, timing and costing for the required infrastructure as well the steps required to implement the projects. The Town of Tecumseh has been proceeding with completing the study, design and construction requirements of various projects based on the servicing strategies identified in the 2008 Master Plan. The following is a list of studies completed by the Town since the 2008 Master Plan Update:

- Tecumseh Sanitary Sewage Collection System Improvements Class EA, Environmental Screening Report, (April 2013);
- Addendum to the Water and Wastewater Master Plan, Oldcastle Hamlet Wastewater Servicing (Sept 2013);
- Functional Servicing Report, Manning Road Secondary Plan Area, Town of Tecumseh (April 2015);
- Manning Road Secondary Plan Area-Specific Development Charge Background Report (Watson, Oct 2015);
- Oldcastle Hamlet Sanitary Servicing – 8th Concession Road Trunk Sanitary Sewer Outlet, Preliminary Design Report, (May 2018).

The recommendations of the above noted studies have been incorporated into the 2018 Master Plan.

1.4.2 Windsor Utilities Commission

Since completion of the 2008 Master Plan Update, the Windsor Utilities Commission has completed a number of studies that impact the Town's Water Master Plan, namely the Windsor Water System Master Plan (October 2009), the Water Master Plan Update (2014), and the Potable Water Reservoir and Central Corridor Feedermain Municipal Class Environmental Assessment Study (September 2014). It should be noted that the Windsor Master Plan studies were undertaken on behalf of WUC as internal studies, and were not subjected to scrutiny through Public Consultation.

These studies confirmed WUC's intention to delete the construction of the previously recommended Banwell Reservoir and Booster Pumping Station, and to relocate the additional storage and pumping capacity at the AH Weeks Water Treatment Plant. The Commission's intent to continue to operate the distribution system on a single pressure zone controlled by the high water elevation at the Hanna Elevated Tank was also confirmed.

1.5 Master Plan Update Class EA Report Outline

This Master Plan Class EA Report documents the planning and design process followed and conclusions reached for the Town of Tecumseh Water and Wastewater Master Plan Update.

This Master Plan Class EA Report forms part of the overall deliverables for the Master Plan project. Based on the approach followed, the documentation has been prepared as described below:

1.5.1 Master Plan Update Class EA Report

The Water and Wastewater Master Plan Update Class EA Report, including all Appendices, is the documentation placed on public record for the Class EA review period.

This report contains and describes all required phases of the planning process and incorporates the procedure considered essential for compliance with the Environmental Assessment Act.

This Report contains the following sections:

- Introduction and Background – provision of relevant information and reports as basis to the Master Plan Update;
- Master Planning Process – description of the Class EA Master Planning process and approach taken under this Master Plan Update;
- Problem/Opportunity Statement – definition of the problem/opportunity needing to be addressed under this study and presentation of baseline planning information;
- Master Plan Methodologies – description of the approach, specific tasks and relevant background information unique to the completion of the Town of Tecumseh Master Plan Update;

- Existing Conditions – description of the natural and social environments within the Town of Tecumseh;
- Water:
 - Existing Water System – provides a description of the existing water system operating philosophy and trunk infrastructure;
 - Water Design Criteria – confirmation and definition of the design criteria used for the water system;
 - Water Servicing Strategy Review – description of the rationale for the servicing strategy and confirmation of changes to the approved program.
- Wastewater:
 - Existing Wastewater System – provides a description of the existing wastewater system operating philosophy and trunk infrastructure;
 - Wastewater Design Criteria – confirmation and definition of the design criteria used for the wastewater system, including plants, conveyance and analysis approaches;
 - Wastewater Servicing Strategy Review – description of the rationale for the servicing strategy and confirmation of changes to the approved program.
- Preferred Solution:
 - Preferred Servicing Strategies – description of the preferred water and wastewater servicing strategies;
 - Other Servicing Considerations – description of additional servicing requirements, whether growth-related or non-growth/operational related;
 - Implementation – description of overall implementation considerations.

Appendix 1 – Project and Implementation Data

This Appendix contains relevant project, implementation and technical analysis information.

Key information includes:

- Planning data;
- Background system data including historical water and wastewater flow conditions;
- Water demand and wastewater flow calculations;
- System capacity calculations;
- Information on the Development Charges program.

Appendix 2 – Public Consultation

This Appendix contains all relevant documentation of the public consultation process including notices, comments and responses, and distributed information. The presentation material from the Public Information Centre (PIC) held during the process is included.

2. Master Planning Process

Municipalities in Ontario are subject to the provisions of the *Environmental Assessment Act* (EAA) and its requirements. The Ontario MEA “Municipal Class Environmental Assessment” document (October 2000, as amended in 2007, 2011 and 2015) provides municipalities with a five-phase planning procedure approved under the EAA to plan and undertake all municipal sewage, water, stormwater and transportation projects that occur frequently, are usually limited in scale and have a predictable range of environmental impacts and applicable mitigation measures.

The Municipal Class Environmental Assessment (EA) process clearly defines approaches for completion of Master Plans. The Town of Tecumseh has prepared this Master Plan Update based generally on Approach 2, which involves preparing a Master Plan document at the conclusion of Phases 1 and 2 in order to fulfill the requirements for Schedule B projects. However, as has been the practice of the Town of Tecumseh, many Schedule B projects will follow on with separate studies. Any Schedule C projects identified would continue to fulfill Phases 3 and 4.

Key components of the Class EA planning process include:

- Consultation early and throughout the process;
- Determine a reasonable range of alternatives;
- Consideration of effects on the environment and ways to avoid/reduce the impacts;
- Systematic evaluation of the alternatives;
- Document the process; and
- Traceable decision making.

2.1 Types of Projects

Based on the Municipal Class EA document, projects are classified as one of four potential types (or “Schedules”) of undertakings. Each of the classifications requires a different level of review to complete the requirements of the Class EA, and thus comply with the EAA, as follows:

Schedule “A”	Projects are limited in scale, have minimal adverse effects and include the majority of municipal water and wastewater operations and maintenance activities. These projects are pre-approved and may be implemented without further review under the Class EA process.
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Schedule "A+"	Projects are limited in scale, but where impact to the public may be more significant. These projects are pre-approved; however, the proponent is obligated to notify the public of infrastructure projects being implemented in their area. The public has the right to comment to the municipal officials/council in their area; however, considering that the projects are pre-approved, there is no appeal process to the Minister of the Environment for these projects.
Schedule "B"	<p>Projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process involving mandatory contact with the directly affected public and relevant review agencies to ensure that they are aware of the project and that their concerns are addressed, where possible.</p> <p>Schedule "B" projects require that Phases 1 and 2 of the Class EA planning process be followed, and that a Project File / Report be prepared and submitted for review by the public. If there are no outstanding concerns raised by the public and/or the review agencies, the proponent may proceed to implementation (Phase 5).</p>
Schedule "C"	Projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures (Phases 1 to 4) specified under the Municipal Class EA document. Schedule "C" projects require that an Environmental Study Report (ESR) be prepared and submitted for review by the public. If there are no outstanding concerns raised by the public and/or the review agencies, the proponent may proceed to implementation (Phase 5).

If there are no outstanding issues remaining after the public review period for Schedule B or Schedule C projects, then the project is approved and may proceed to construction. However, should there be any unresolved issues remaining during the public review period, any party may request that the Minister of the Environment consider a Part II Order. The Minister would then decide to deny the request for a Part II Order; refer the matter to mediation; or require the proponent to comply with Part II of the EA Act.

The Class EA process flowchart is provided in Figure 2-1.

2.1.1 Master Planning Process

Municipalities recognize the benefits of comprehensive, long-range planning exercises that examine problems and solutions for an overall system of municipal services. The Municipal Class EA for Water and Wastewater Projects recognizes the importance of master plans as the basis for sound environmental planning. The Class EA defines master plans as:

“Long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments.”

Master plans have distinguishing features that set them apart from project specific studies. These features include the following:

- Master plans are broad in scope and focus on the analysis of a system for the purpose of outlining a framework for the provision of future works and developments.
- Specific projects recommended in a master plan are part of a larger management system and are distributed geographically throughout the study area. The implementation of specific projects may occur over an extended time frame.

According to the Class EA document, a master plan must at least satisfy the requirements of Phases 1 and 2 of the Class EA process and incorporate the five key principles of environmental planning, as identified in Section 2.1. The master plan must document public and agency consultation at each phase of the process and a reasonable range of alternative solutions must be identified and systematically evaluated.

The Town of Tecumseh Water and Wastewater Master Plan (2018) fulfills these requirements. This Master Plan Update is designed to build on the decision making completed in the previous Master Plan exercises and present a refined strategy. The approach for the Master Plan Update is to confirm the existing projects and where applicable, evaluate and develop any new components. This approach would also be scrutinized through a public and agency consultation process and be fully documented.

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA

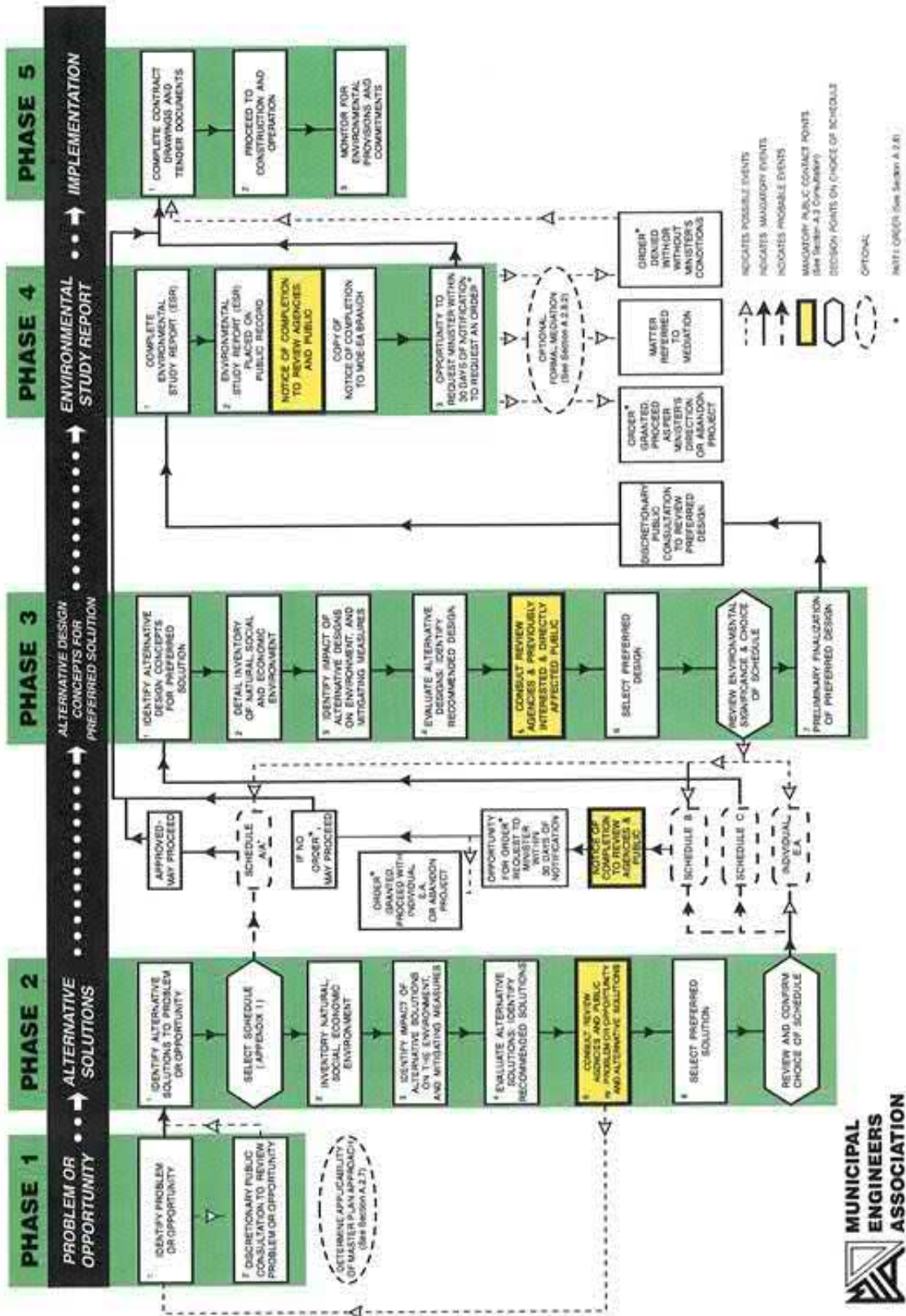


Figure 2-1: Municipal Class EA Planning and Design Process

2.2 Consultation and Communication

At the outset of the Master Plan Update process, a Public Consultation Plan was developed. The activities that were undertaken as part of the process are described in the following sections and are considered critical and required under the Class EA Master Planning process.

Full documentation of the consultation and communication program is contained in the appendices to this report.

2.2.1 Public Access to Information

At the onset of the project, the Town developed and maintained a Mandatory Contact List. A copy of the mandatory Contact List is included in Appendix B. All Notices and relevant project materials was sent to all Agencies and members of the public identified on the Mandatory Contact List, and those who had expressed interest in the process. Notices of the Study Commencement and the Public Information Centre (PIC) were published in the local papers.

2.2.2 Public Information Centres

Through Phases 1 and 2 of a Municipal Class EA, the study proponent (in this case, the Town of Tecumseh) is required to consult the public only once the alternative solutions to the problem being addressed have been evaluated, and a preferred option selected. The Town of Tecumseh notified the public of the Master Plan Update and of the upcoming PIC on June 8, 2018. A PIC was held on Wednesday, June 19, 2018. PIC No. 1 was held in the Council Chambers at the Town of Tecumseh offices on Lesperance Road in the Town of Tecumseh.

Notice of the PIC was also mailed directly to each agency contact included on the Town's Contact List such that any concerned parties would be aware of the opportunities to become involved in the Master Planning process.

All of the materials presented at this PICs are included in the Appendix B.

2.2.3 Aboriginal Consultation

The Notice of Project Commencement was mailed to each of the following government departments and First Nations, along with an invitation to provide input into the Study:

- Indian and Northern Affairs Canada;
- Ministry of Aboriginal Affairs;
- Chippewa's of the Thames First Nation;
- Chippewa's of Kettle & Stoney Point First Nation;
- Aamjiwnaang First Nation;

- Walpole island First Nation / Bkejwanong Territory;
- Caldwell First Nation;
- Moravian of the Thames;
- Metis Nation of Ontario.

Each of the above agencies and First Nation's representatives were also provided with the Notice of Public Information Center, as well as a copy of the information package.

3. Problem/Opportunity Statement

3.1 Study Area

The Town of Tecumseh is situated in the northwest portion of the Essex County and covers approximately 9,413 hectares. The Town is bordered by the City of Windsor and the Town of LaSalle to the west, Lake St Clair to the north, the Town of Lakeshore to the east and the Towns of Essex and Amherstburg to the south. The study area for the Water and Wastewater Master Plan Update covers the urban settlement areas of Tecumseh, St Clair Beach and Tecumseh Hamlet in the North Service area, Maidstone Hamlet and the Highway Service Centre area in the Southeast (SE) Service area, and Oldcastle Hamlet in the Southwest (SW) Service area.

The Study Area for this Master Plan consists of the existing designated urban areas of the Town of Tecumseh, and includes the anticipated growth between the present date and 2036 and beyond. A map of the Study Area is included in

Figure 3-1.

3.2 Planning Projections

Planning projections for residential growth were prepared in consultation with the Town's Planning, Public Works and Water departments and include intensification of the urban settlement areas of Tecumseh, St. Clair Beach, Tecumseh Hamlet, Maidstone Hamlet and Oldcastle Hamlet. The projections are based on the available planning information including local growth analysis in the Town's Official Plans, planning documents and Secondary Plans for Tecumseh Hamlet, Maidstone Hamlet and the Manning Road Development Area.

In 2008, the Town completed a comprehensive review and update for the Master Plan for water and wastewater servicing. This update was initiated in light of the new Water and Wastewater servicing agreements between the Town of Tecumseh and the City of Windsor. The Agreements assured the Town of Tecumseh with a long term secure supply of potable water as well as wastewater treatment capacity.

The 2008 Master Plan Update developed updated best estimates within the 2028 planning horizon and to review and validate the water and wastewater servicing strategies identified in the previous master plan. Best Planning Estimates (BPE) for residential growth were prepared in consultation with the Town's Planning, Public Works and Environmental Services Departments and included intensification of the urban settlement areas of Tecumseh, St. Clair Beach, Tecumseh Hamlet, Maidstone Hamlet and Oldcastle Hamlet. The BPE were based on planning information available at the time of the update, planning documents and Secondary Plans for Tecumseh Hamlet, Maidstone Hamlet and the Manning Road Development Area. The distribution of population growth in the urban settlement areas, as estimated in the 2008 Master Plan Update, is presented below in Table 3-1.

Table 3-1: 2008 Master Plan Population Projections

SERVICE AREA		2008	2018	2028	URBAN BUILD-OUT (2028+)
North	Tecumseh	13,773	14,029	14,029	14,029
	St. Clair Beach	3,957	4,138	4,138	4,138
	Tecumseh Hamlet	3,838	10,529	15,720	21,085
Southeast	Maidstone Hamlet	449	449	2,000	3,000
	Rural	1,300	1,490	1,680	2,300
Southwest	Oldcastle Hamlet	466	1,066	2,052	2,437
	Rural	531	581	631	767
Total		24,314	32,282	40,250	47,756

The 2011 Census revealed a total residential population in the Town of 23,610 people, which was lower than the baseline population included within the 2008 Update. This change indicates that the projected population growth included in the 2008 Master Plan Update were optimistic, and have not been realized as originally projected.

On this basis, previously established population projections have been revised based on best available planning information, which include the developmental potential by urban and rural areas, as established in the following documents and sources:

- Town of Tecumseh 2014 Development Charge Background Study, Town of Tecumseh and Watson & Associates Economics Ltd., July 21, 2014.
- Town of Tecumseh Sandwich South Official Plan, Consolidated Copy June 2014.
- The Tecumseh Hamlet Secondary Plan, June 2012.
- The Corporation of the Town of Tecumseh, Planning and Building Services Report No. 04/15. Town of Tecumseh New Official Plan Process, Housing and Residential Intensification Discussion Paper, March 2015.
- The Corporation of the Town of Tecumseh, Planning and Building Services Report No. 39/14. Town of Tecumseh New Official Plan Process, Growth Management / Urban Structure Discussion Paper, July 2014.
- Oldcastle Hamlet Sanitary Servicing – 8th Concession Trunk Sanitary Sewer Outlet, Preliminary Design Report, 2018.
- 2011 and 2016 Census data.

Updated Population Projections for the 2018 Master Plan are summarized below in Table 3-2.

Table 3-2: Updated Population Projections

SERVICE AREA		2016	2026	2036	URBAN BUILD-OUT (2036+)
North	Tecumseh	12,180	12,244	12,272	15,380
	St. Clair Beach	3,484	3,646	3,718	3,894
	Tecumseh Hamlet	5,264	8,486	9,633	13,683
Southeast	Maidstone Hamlet	335	335	1,011	2,259
	Rural	1,164	1,164	1,164	1,164
Southwest	Oldcastle Hamlet	350	1,174	1,818	10,947
	Rural	453	453	453	430
Total		23,229	27,501	30,068	47,756



3.3 Problem/Opportunity Statement

The purpose of the Problem/Opportunity Statement is to define the principal starting point in the undertaking of the Master Plan Class EA and assist in defining the scope of the project.

As such, the Problem/Opportunity Statement has been defined as:

- By 2036, the Town of Tecumseh could experience population growth to over 30,000 people – an increase of about 7,000 residents.
- Beyond 2016, growth will continue to a planned “Build-Out” population of approximately 47,700 persons, based on the availability of water supply and wastewater treatment capacities.
- Water and Wastewater infrastructure upgrades will be required to service future residential and non-residential lands
- A comprehensive Water and Wastewater Master Plan will ensure implementation of a sustainable growth strategy
- Changes to the Windsor Utilities Water Master Plan have resulted in the need to review and update the Town’s water servicing strategy, particularly in the south service area, including the Hamlets of Oldcastle and Maidstone.

4. Master Plan Methodologies

4.1 Overview

A number of tasks and evaluation requirements were undertaken as part of the Master Plan process.

Under any Master Plan, the methodology for analyzing planning information, developing water demands and wastewater flows and modelling the systems needs to be developed to best serve the proponent.

4.2 Population and Employment Data

This Master Plan makes use of the planning information derived through the Planning Projections process in order to assess growth areas and allocate future water demands and wastewater flows.

4.3 Evaluation Criteria

The Master Plan evaluation approach followed typical evaluation of impacts under Class EA evaluation criteria including:

- Physical and Natural Environment:
 - Impact on vegetation, fish and wildlife; surface drainage and groundwater; soil and geology
 - Impact on areas of natural and scientific interest, and environmentally-sensitive areas
 - Disruption of topographical features.
- Social, Economic, and Cultural Environment:
 - Impact on existing and proposed development
 - Impact on archaeological and historic sites
 - Impact on agricultural resources
 - Impact on recreational areas
 - Impact on other utilities
 - Coordination with proposed roadway development.
- Financial Factors:
 - Construction, operation and maintenance (life-cycle) costs
 - Best use of existing infrastructure
 - Flexibility for scheduling works.

- Technical Factors:
 - Level of service
 - Security and reliability
 - Impact on existing infrastructure
 - Constructability
 - Impact on operations and maintenance
 - Meeting legislated criteria and regulations.

4.4 Implementation and Scheduling

Typically, scheduling of infrastructure upgrades should be planned to ensure that actual flows do not exceed approximately 85 - 90% of full design capacity. This approach should ensure that future upgrades are undertaken approximately 2 years before flow projections meet available capacity.

This concept is more easily achieved for the projects further out in the planning horizon. Given that many upgrades are required in the short term (i.e., before 10 years), some projects have been identified with accelerated schedules and in-service dates as soon as feasible.

Total project scheduling has been based on total project delivery requirements including identifying all project components such as additional studies, Class EA studies, design, and construction requirements.

5. Existing Conditions

5.1 Natural Environment

A detailed review of the biophysical, socio-economic and cultural environments was undertaken as part of the Approved 2002 Water and Wastewater Master Plan. Detailed description of the environment within the Study area can be found in the 2002 Master Plan document.

As was documented in the 2008 Update, as a result of the City of Windsor's annexation of the "Airport Lands" from the Town of Tecumseh, the Airport Woodlot is no longer within the Town's boundary. There are no other significant changes to the Biophysical Environment or natural features of interest as described in 2002 Master Plan.

The Province provides guidance for the identification of areas to be protected from urban uses/growth through the Provincial Policy Statement (PPS, 2005). With the PPS guidelines in mind, the following areas were confirmed as constraint areas for development in the 2008 Master Plan Update. Constraint Areas for Development:

- Fairplay Woods, ESA Site #38
- McAuliffe Woods

A review of updated Planning Documents for the Town has not identified any new or exoanded Natural Environmetal constraint areas. As a result, the above noted areas were retained and considered in the Master Plan Update Process.

In addition to the two constraint areas identified, consideration was given to potential impacts to watercourses at crossings with the alignments of trunk sewers and watermain facilities.

5.2 Existing Water System

5.2.1 Water Supply

The Town of Tecumseh is supplied with water from the City of Windsor. The A.H. Weeks water treatment plant (WTP), the trunk transmission mains, the pumping stations and reservoirs in the City of Windsor are owned and operated by the Windsor Utilities Commission (WUC).

The Windsor (A. H. Weeks) Water Treatment Plant is owned and operated by the Windsor Utilities Commission (WUC). It has been confirmed by the WUC that the plant currently has a rated capacity of 349,000 m³/day (76.8 MIGD). Raw water to the WTP is drawn from the Detroit River. The main treatment processes at the Windsor WTP consist of coagulation, flocculation, sedimentation, filtration, and disinfection with ozone as the primary disinfectant.

The Water Agreement between the Windsor Utilities Commission and the Town of Tecumseh includes the following conditions:

- WUC is responsible for supplying water to the Town on a continuous basis up to a maximum daily flow of 87 MLD.
- The Town will remain responsible for its own distribution system within the boundaries of Tecumseh and any new storage works that may be required to supply its fire flow of water.
- WUC will deliver peak hourly flow and maintain sufficient storage in the existing elevated water tank for fire flows in Tecumseh
- Storage for equalization and peak hour flow of water for the Town will be the responsibility of WUC.

In accordance with Article 3 of the 2004 Water Agreement, the Town completed construction of the following works in order to meet current and future servicing needs in Tecumseh:

- 12 new metering facilities and connections to the Windsor Water System along the Town boundary at Dillon Drive, McNorton Street, Tecumseh Road, County Road 22, Intersection Road, County Road 42, Baseline Road, 8th Concession Road, Provincial Road (County Road 46), Walker Road, North Talbot Road and Howard Avenue (Talbot Road).
- New water supply feeder mains on McNorton Street, Lesperance Road, Tecumseh Road, Manning Road, County Road 22, County Road 42 and Provincial Road.

5.2.2 Local Distribution System

The Town of Tecumseh owns and operates the distribution system within the Town of Tecumseh, including metering facilities at the Town boundary. The Town also owns and operates one elevated storage facility with a capacity of 4,540 m³ (1.0 MIG). The WUC currently utilizes approximately 50% of the available storage within the Tecumseh elevated water tank for pump control.

North Service Area

The north service area comprises the urban settlement areas of Tecumseh, St. Clair Beach and Tecumseh Hamlet, as well as the rural area south of County Road 42 and north of Highway 401. The north service area accounts for approximately 90% of the Town's current population.

The north service area is supplied water through metering facilities and connections to the Windsor water system at the Town boundary at Dillon Drive, McNorton Street, Tecumseh Road, County Road 22, County Road 42 and Baseline Road. A metering facility was also constructed on Intersection Road in anticipation of construction of the Banwell Reservoir and Booster Pumping Station by WUC. The water mains in the north service area range in size from 100mm to 600mm in diameter and consist of various pipe material including cast iron, ductile iron and PVC.

The Town of Tecumseh owns and operates an elevated water storage facility with a storage capacity of 4.5 ML (1.0 MIG). This storage capacity is used for fire flows for the Town of Tecumseh, and is currently utilized by the WUC for pump control at the AJ Brian and George Avenue pumping stations.

The Town of Lakeshore is also supplied water from the WUC through the Tecumseh system via the north service area through four bulk water meters located east of Manning Road. The Town of Lakeshore has indicated that they are looking to phase these supply locations out over time; however, they need to maintain these supply points for now.

South Service Area

The south service area includes the urban settlement areas of Maidstone Hamlet and Oldcastle Hamlet and the rural area south of Highway 401.

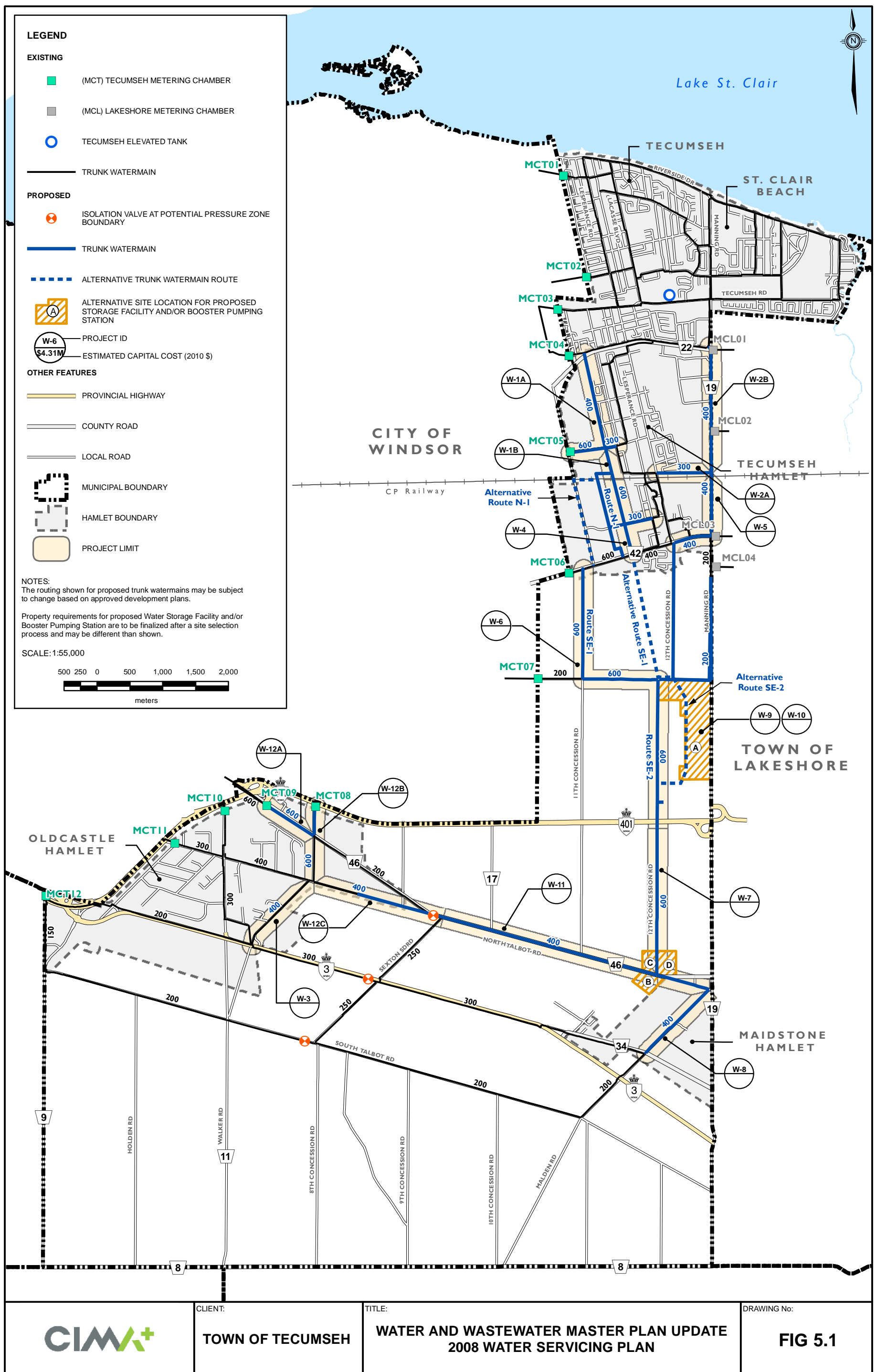
The existing distribution system in the south service area is supplied water through metering facilities and connection to the Windsor water system along the Town boundary at, 8th Concession Road, Provincial Road, Walker Road, North Talbot Road and Howard Avenue (Talbot Road). The watermains range in size from 100mm to 600mm in diameter and consist of various pipe material including cast iron, ductile iron and PVC.

As part of the construction of the Herb Gray Parkway, the supply watermain to the Howard Avenue metering facility (MCT-12) was re-routed through the Town of LaSalle. Subsequent to the re-routing of the supply watermain, the supply connection has been closed, and supply of potable water to the Town of Tecumseh through MCT-12 is no longer being utilized.

Staff from the Town's Water Department have confirmed that there has been no increase to the number of low system pressure complaints or adverse water quality results due to the closure of MCT-12.

5.2.3 Approved Water Servicing Strategy

The Water Servicing Strategy approved under the 2008 Wastewater Master Plan Update is depicted on Figure 5-1.



5.3 Existing Wastewater System

5.3.1 Wastewater Treatment

Wastewater generated in the Town of Tecumseh is currently treated in the City of Windsor. The existing urban areas in the former Village of St Clair Beach, Town of Tecumseh, Tecumseh Hamlet and a portion of Oldcastle Hamlet are serviced by the Little River Pollution Control Plant (LRPCP). A portion of Oldcastle Hamlet is also serviced by the Lou Romano Water Reclamation Plant (LRWRP).

The Little River PCP is owned and operated by the City of Windsor, and is located in the northeast corner of the City adjacent to Lake St Clair. The Plant has a reported nominal capacity of 72,800 m³/day (16 MIGD). In accordance with the 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh, the Town's capacity allocation at the Little River PCP has been set initially at 19.8 ML/d (4.37 MIGD). Provisions are included in the Agreement to permit the Town to purchase additional capacity in the plant when required, up to a maximum of 38.0 ML/d (8.37 MIGD), subject to contributing to the capital cost of the plant expansion.

In accordance with the 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh, the Town's capacity allocation at the Lou Romano WRP has been limited to 2.72 ML/d (0.6 MIGD). In addition, peak instantaneous discharge rates shall be restricted to a maximum of 85 L/s, due to limitations in the City's conveyance system. There are no firm provisions included within the 2004 Agreement to allow Tecumseh to increase their capacity allocation at the Lou Romano WRP; however, the Agreement permits both parties to negotiate the sale of additional treatment capacity should additional conveyance capacity become available.

The Skyway Plaza Wastewater Treatment Plant was constructed in 1998 as a temporary facility to service a commercial plaza and a 22 lot residential subdivision located within Oldcastle Hamlet. This plant has now been decommissioned, and wastewater has been diverted temporarily to discharge to the Windsor collection system and the Lou Romano WRP. Ultimately, wastewater from this service area will be directed to the East Windsor Trunk Sanitary Sewer on 8th Concession Road which outlets to the Little River PCP.

5.3.2 Wastewater Collection System

General

The local wastewater collection system is owned and operated by the Town of Tecumseh. The collection system consists of local collection sewers including lateral service connections to the property lines, trunk sewers, pumping stations and forcemains, and associated appurtenances. Sewer sizes range from 200mm to 1200mm diameter. In addition, the Town installed a 2250mm diameter sanitary sewer and in-line storage facility through Lakewood Park in 2014 to mitigate against impacts during wet weather events. Flow rates and flow volumes are measured at the connection points to the Windsor system using flumes and SCADA monitoring.

North Service Area

The collection system in the North Service Area was originally constructed as three separate systems in the 1970's under a Provincial Sewage Works Program administered by the Ministry of the Environment. Each system was designed to ultimately discharge wastewater flows to the Cedarwood pumping station in the urban settlement of Tecumseh. By Agreement with the City, the outlet at the Cedarwood Pumping Station is limited to a maximum peak flow rate of 935 L/s.

In accordance with Article 11 of the 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh, the North-East Windsor Trunk Sanitary Sewer was constructed up to the south side of the intersection of Banwell Road and County Road 22 (EC Row Expressway). This new trunk facility provided a new outlet for the Town of Tecumseh with discharge to the Little River PCP.

By Agreement with the City of Windsor, the total outlet from the Town of Tecumseh to the North-East Windsor Trunk Sanitary Sewer is limited to a maximum peak flow rate of 1,308 L/s, including an allowance of 325 L/s from Oldcastle Hamlet.

South Service Area

Subsequent to the 2008 Wastewater Master Plan, the City of Windsor and Town of Tecumseh constructed the North-East Trunk Sanitary Sewer from County Road 22 to the south side of Highway 401 on 8th Concession Road to provide a wastewater outlet for portions of Oldcastle Hamlet.

By Agreement with the City of Windsor, the outlet from Oldcastle Hamlet in the Town of Tecumseh to the North-East Windsor Trunk Sanitary Sewer is limited to a maximum peak flow of 325 L/s.

In 2010, the Town of Tecumseh extended a 600mm trunk sanitary sewer from the Windsor collection system on North Talbot Road, across Highway 401 to provide an outlet for existing and new development within Oldcastle Hamlet, with treatment to be provided at the Lou Romano WRP.

By Agreement with the City, the outlet to the North Talbot Road Trunk Sanitary Sewer is limited to a maximum peak flow rate of 85 L/s.

5.3.3 Approved Wastewater Servicing Strategy

The Wastewater Servicing Strategy approved under the 2008 Wastewater Master Plan Update is depicted on Figure 5-2.

6. Water System Criteria and Strategy Review

6.1 Unit Water Demand Criteria

The design criteria utilized for the Tecumseh Water and Wastewater Master Plan Update is based on previous data used in the 2008 Master Plan, historical records and updated information developed through the water and wastewater servicing review process with Town staff.

The design criteria establishes the parameters utilized to develop projected flows, evaluate system capacities, determine future needs, and determine the scheduling and implementation plan.

The Tecumseh water distribution system is being analyzed and designed based on MECP Design Guidelines and historical monitored flow rates.

Confirmation of the water consumption criteria used in the 2008 Master Plan was undertaken. Current flow data from the boundary meters was compared to the estimated flows based on consumption criteria and current populations. The recent data demonstrated consistent results with 2008 Master Plan design criteria. As such, no change to the current design criteria is recommended.

Table 6-1: Water Demand Criteria

PARAMETER	CRITERIA
Proposed Residential Consumption	347 L/cap/day
ICI Consumption	21,430 L/ha/day
Highway Service Centre Consumption	28,000 L/ha/day
Maximum Day Factor	2.0
Peak Hour Factor	3.0

6.2 Design Criteria for System Components and Operation

6.2.1 System Operation

The Windsor Utilities Commission (WUC) currently operates their transmission and distribution system within a single pressure zone. Within the Town of Tecumseh, the system is also operated on a single pressure zone, with the maximum system pressure limited by the High Water Level in the Tecumseh Elevated Tank.

Under peak demand conditions, system pressures in the Southeast and Southwest service areas are low due to higher ground elevations and limitations in transmission capacity.

6.2.2 Supply Capacity

According to the Amending Water Agreement, the WUC is responsible for supplying water to the Town on a continuous basis up to a maximum daily flow of 87 ML/D (19.1 MIGD) and is also responsible to deliver peak hourly flow to the Town.

Pumping stations are rated on their “firm” capacity to supply water. Based on the MECP Design Guidelines, it is recommended that the pumping station’s firm capacity be based on the station’s capacity with the largest pump out of service.

6.2.3 Storage Capacity

As per the terms and conditions outlined in the 2004 Windsor-Tecumseh Water Agreement and Amending Water Agreement, the Town is responsible for its own distribution system within the boundaries of Tecumseh and any new storage works that may be required to supply its fire flow of water. Storage for equalization and peak hour flow of water for the Town is the responsibility of WUC.

The fire flow criteria for the Town of Tecumseh, as reported in the 2008 Master Plan are summarized in Table 6-2.

Table 6-2: Fire Flow Criteria

YEAR	CRITERIA	GUIDELINE
2008	227 L/s for 3.0 hours	IAO ¹
2013	280 L/s for 4.5 hours	MOE ¹
2018	280 L/s for 4.5 hours	MOE ¹
2023	378 L/s for 6.0 hours	MOE ²
20-Year (2028)	378 L/s for 6.0 hours	MOE ²

Notes: 1. Based on a single fire in the largest urban centre

2. Based on the serviced population in an integrated north and south service areas

6.2.4 Distribution Capacity

The distribution system is sized to convey the greater of peak hour flows or maximum day plus fire flows. Within each pressure zone in the distribution system, the range of acceptable pressures under normal operating conditions is between 40 psi (275 kPa) and 100 psi (690 kPa). Under fire flow conditions, it is acceptable for system pressures to drop to 20 psi (140 kPa).

6.3 Water Unit Costs

For the development and evaluation of alternative solutions as well as for the development of the preferred solution capital program, financial analysis has been required. To facilitate this financial analysis, unit costing for the horizontal and vertical works have been derived.

These unit costs have been used as a benchmark tool to approximate the total project costs. However, where applicable, the cost estimates for each project have been refined based on unique aspects of the implementation or construction of the project or where more detailed costing information is available from Class EA studies, conceptual design or even detailed design.

The water infrastructure capital cost estimates were developed using historical construction information for the Town of Tecumseh, as well as recent project delivery costs trends. The Unit Cost estimates include Engineering and Contingency.

Table 6-3: Benchmark Unit Capital Costs for Water Facilities

INFRASTRUCTURE	UNIT	UNIT COST
Pumping Capacity	per L/s of capacity	\$ 17,600
Elevated Tank Capacity	per m ³ of volume	\$ 890

Table 6-4: Benchmark Unit Capital Costs for Watermains

INFRASTRUCTURE	UNIT	UNIT COST
300 mm diameter	per m of length	\$630
400 mm diameter	per m of length	\$980
450 mm diameter	per m of length	\$1,060
500 mm diameter	per m of length	\$1,220
600 mm diameter	per m of length	\$ 1,350

6.4 Tecumseh Water Servicing Strategy Review

As part of this Master Plan Update, the Town's water servicing strategy has been reviewed to address changes to some of the original assumptions and conditions that were taken into account when developing the water servicing strategy during the previous 2008 Water and Wastewater Master Plan Update. This Master Plan Update also provides an opportunity to review and validate the components of the water servicing strategy and the proposed timing and projected costs of projects within the Master Plan. The major circumstances that triggered the need for a detailed review of the existing water servicing strategy – as approved from the 2008 Master Plan Update, include:

- During the period from 2011 to 2014, WUC re-evaluated options for providing additional storage capacity for the amalgamated Water System, and ultimately cancelled plans to construct the Banwell Road Reservoir and Pumping Station, as originally considered within the 2007 Addendum. After completion of a Schedule B Class EA (AECOM, September 2014), the revised preferred solution approved by WUC was to construct a new 35 ML reservoir in George Avenue Park directly adjacent to the existing George Avenue High Lift Pumping station and the A.H. Weeks WTP, approximately 9.0 km away from the Town boundary. The preferred solution also included the construction of new feeder mains in the City to meet

existing and future demands throughout the Windsor-Tecumseh-LaSalle service areas, all based on a single pressure zone.

- Prior to the construction of the Herb Gray Parkway, Tecumseh and LaSalle had separate water supply connections to the Windsor water system and separate metering chambers. During construction of the parkway, two new watermain crossings were constructed for the Town of LaSalle, and the direct supply connection to Tecumseh from the Windsor Water system at MCT-12 to one of the new LaSalle watermains without any prior consultation with the Town of Tecumseh. The Tecumseh connection was subsequently closed due to a dispute with the Town of LaSalle and City of Windsor.
- Low pressure problems in the south service area have been reported in Oldcastle Hamlet and Maidstone Hamlet during peak demand periods – WUC is unable at the present time to address the capacity limitations in the Windsor System and improve system pressure in Tecumseh's south service area.
- Growth in the South Service Area, particularly in the Oldcastle Hamlet has been accelerated in the recent years following completion of the North Talbot Road Trunk Sanitary Sewer, as well as the extension of the North East Windsor Trunk Sanitary Sewer on 8th Concession Road. This in turn has resulted in lower pressures being experienced in the South Service Area, particularly within the Maidstone Hamlet. This situation is expected to deteriorate further over time as growth continues in the South Service area and in Windsor as overall water demands increase.
- The Town of Tecumseh's Growth Management Plan Discussion Paper (2014) identified an expansion of the Oldcastle Hamlet boundary to the east of 9th Concession Line between Provincial Road and Highway 401, is proposed for commercial / industrial development. The proposed expansion of the Oldcastle Hamlet area was incorporated into the Approved County Official Plan.

6.5 Water Demand Projections

Utilizing the Town of Tecumseh planning projections and water design criteria, the water demand projections for the Town of Tecumseh are summarized in the following Table 6-5.

Table 6-5: Town of Tecumseh Water Demand Projections

SERVICE AREA		MAXIMUM DAY WATER DEMAND (ML/D)			
		2016	2026	2036	BUILD-OUT (2036+)
North Tecumseh	Tecumseh	11.4	11.8	12.2	14.7
	St. Clair Beach	3.3	3.4	3.4	3.6
	Tecumseh Hamlet	4.9	8.9	11.3	20.3
	Highway Service Centre	-	-	2.6	2.6
	Sub-Total	19.6	24.1	29.6	41.1
South Tecumseh	Maidstone Hamlet	0.3	0.5	1.2	2.0
	Oldcastle Hamlet	0.3	3.7	8.8	14.8
	Rural Areas south of Hwy 401	1.5	1.5	1.5	1.5
	Sub-Total	2.2	5.7	11.5	18.3
Total Max. Day Demands		21.7	29.7	41.1	59.4

6.6 Water Storage Requirements

Both the Town and the City currently operate their water distribution systems on a single pressure zone, which is a reasonable approach when the area has limited topographical relief, as in the case of the majority of the Town and the City. However, as populations and demands increase, friction losses in piping may impact the ability of the water system to deliver water to remote areas of the distribution system with adequate capacity and pressure.

In light of the pressure deficiencies currently being experienced in the South Service area, the Town has identified the need to improve the system pressures during peak demand conditions throughout the South Service area, and to meet the area's long-term water storage requirements for fire protection. An opportunity to implement a second (higher) pressure zone for the South Service area has been identified as the Preferred Solution to augment system pressures in the South Service area, particularly in the Maidstone Hamlet, and to provide additional storage for Fire Protection. Implementation of a new Pressure Zone 2 in the South Service Area also has the potential benefit of reducing the capacity requirements for the watermain crossing Highway 401 at 11th Concession Road.

Utilizing the Town of Tecumseh planning projections and water design criteria, the water storage requirements for the Town of Tecumseh are summarized below in Table 6-6.

Table 6-6: Fire Storage Requirements

YEAR	COMBINED SERVICE AREA	SEPARATED SERVICE AREAS	
		NORTH	SOUTH
2016	4.5 ML	4.1 ML	0.7 ML
2021	9.1 ML	4.8 ML	0.9 ML
2026	9.1 ML	5.5 ML	1.7 ML
2031	9.1 ML	5.8 ML	2.0 ML
Build Out (2036+)	9.1 ML	6.3 ML	5.7 ML

The Town of Tecumseh currently has 4.5 ML of storage capacity within the Tecumseh Elevated Tank; however, approximately 50% of the available storage is currently utilized by the WUC for pump control, on an interim basis.

6.7 Opportunities and Constraints

6.7.1 Pumping Stations and Reservoirs

The Town of Tecumseh has identified the need for a booster pumping station to provide adequate system pressures during peak demand conditions in the Southeast Service area, and an additional water storage facility to meet their long-term water storage requirements for fire protection. WUC will also require additional storage and pumping capacity, and had originally identified a new water storage reservoir and pumping station near Banwell Road and the EC ROW Expressway. The WUC has now identified that they have sufficient storage and pumping capacity within their system to meet projected demands.

A new Pressure Zone 2 in the Town would require the construction of the following facilities:

- A new reservoir, either in the form of an in-ground reservoir, or as an elevated tank. In order to provide adequate storage for Fire Protection in the south service area, a minimum storage volume of 5,700 m³ (1.3 MIG) is recommended for this facility.
- A new booster pumping station (BPS) in the South Service Area. The new BPS should be equipped with booster pumps with sufficient head to maintain adequate system pressures throughout the South Service Area under Peak Hour conditions. The Booster Pumping Station should be connected to a high capacity trunk watermain near the boundary with Windsor to ensure adequate capacity is available for full servicing of the South Service Area.
- Pressure Reducing Valves (PRV) and/or check valves at all boundary connection points to prevent over-pressurizing the Windsor system. Any interconnection between Tecumseh Zone 1 and Tecumseh Zone 2 should also be provided with a Zone Isolation valve. Any interconnection between Zone 2 and Zone 1 in the Tecumseh Distribution system should also be provided with a Zone isolation valve.

It is recommended that the additional storage be provided in the form of an elevated tank rather than an in-ground reservoir, due to the following advantages:

- The elevated tank may be used for pump control for the new BPS.
- The elevated tank may be filled during off-peak periods, thereby reducing operating costs resulting from Time-of-Use energy charges.
- The stored water will be available for use under emergency conditions, and in the event of an extended power outage in the area.

There may be a possibility to combine the storage and pumping requirements for both the Town and WUC into a single facility, in order to save on capital and ongoing maintenance and operations costs. Further review of this possibility will be considered through the Town and City's Permanent Joint Staff Liaison Committee.

6.7.2 Transmission Mains

The South Tecumseh trunk watermain, as recommended in the 2008 Master Plan Update, was originally intended to provide water supply for new growth south of CR 42, including the designated Highway Commercial lands located adjacent to Manning Road just north of Highway 401. This trunk watermain was also intended to be the primary feed for a new BPS and Elevated Storage facility planned to service Zone 2 in the Maidstone Hamlet area. This strategy was developed based on supply from the Banwell Road Reservoir and Pumping Station, which has now been eliminated from WUC's plans.

WUC's updated Water Master Plan (2014) envisions strengthening their distribution system to the south along Walker Road, County Road 42, and Howard Avenue which will improve system capacity for south Windsor and the Town of LaSalle. As such, there is the opportunity to utilize the 600mm watermain connection on Provincial Road as the primary source for Tecumseh's South Service area. By altering the primary source of supply to the Provincial Road connection, the capacity of the South Tecumseh Trunk Watermain may be reduced south of County Road 42. This option will also provide the benefit of locating the Town's Fire Storage in close proximity to the Industrial/Commercial areas in Oldcastle Hamlet.

6.8 Overview of Updated Water Servicing Strategy

In general, the majority of the components of the water servicing strategy approved in the 2008 Water and Wastewater Master Plan Update remain valid. The primary changes to the 2008 water servicing strategy are as follows:

- Revised alignments, capacities and scheduling of watermains in line with BPEs and related studies
- Addition of a second pressure zone to service the entire South Service Area. The North Service area will remain on the existing system pressures as supplied by WUC.

- Relocation of the proposed Booster Pumping Station and Storage Facility from Maidstone Hamlet to Oldcastle Hamlet with supply from the existing trunk watermain on Provincial Road, and expansion of Pressure Zone 2 to encompass all of the South Service area. Provision of additional storage capacity in Zone 2 for pump control and additional fire flow storage in the South Service Area.

It should also be noted that the timing of the various projects has been established based on anticipated growth rates in Tecumseh and on a fiscally responsible capital works program. The Town will have the option to advance or defer specific projects depending upon the rate of growth experienced in Tecumseh, or upon the petition by a developer (or group of developers) provided that the financial impacts of advancing certain projects are reviewed and mitigated through collection of Development Charges or through Front-End Financing arrangements.

6.9 Recommended Strategy

The Updated Water Servicing Strategy includes a number of separate and distinct projects that will provide an ultimate consolidated servicing scheme to maximize the use of existing infrastructure and provide capacity for new growth in designated growth areas of the Town. The Servicing Strategy is depicted on Figure 6- and Figure 6- for the north and south services areas respectively, and a brief description of each of the Projects is provided below:

6.9.1 W-1 – West Tecumseh Trunk Watermain from CR 22 to CP Railway

This trunk watermain will provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area, and will improve fire flows in existing developments south of CR 22. The alignment of this trunk watermain should be established through approved Secondary Plans and co-ordinated through proposed Plans of Subdivision.

Based on a Preliminary Design, a 400 mm trunk watermain from CR 22 to Intersection Road and 600 mm trunk watermain from Intersection Road to CP Railway is required within the Tecumseh Hamlet West Planning Area. In addition, a 300 mm watermain is required on Intersection Road from the West Tecumseh Trunk Watermain to Shawnee Road.

6.9.2 W-2A – East Tecumseh Hamlet Watermain Connection

This trunk watermain will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area, and will improve fire flows in existing developments south of CR 22. Based on a Preliminary Design, a 300 mm trunk watermain along CP Railway line from Lesperance Road to Manning Road is required.

6.9.3 W-2B - Trunk Watermain on Manning Road from CR 22 to CP Railway

This trunk watermain will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area south of CR 22. Construction of this watermain could be coordinated with future Manning Road upgrades. Based on a Preliminary Design, a 400 mm trunk watermain on Manning Road from CR 22 to CP Railway is required.

6.9.4 W-4 - West Tecumseh Trunk Watermain from CP Railway to CR 42

Similar to W-1, this trunk watermain will provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area, and will improve fire flows in existing developments south of CP Railway. It will also connect the feedermain on County Road 22 to the feedermain on County Road 42, to provide looping for the main potable water feed lines from the Windsor system into the Town of Tecumseh. The alignment of this trunk watermain should be established through approved Secondary Plans and co-ordinated through proposed Plans of Subdivision.

Based on a Preliminary Design, a 600 mm trunk watermain from CP Railway to CR 42 is required within the Tecumseh Hamlet West Planning Area. In addition, a 300 mm watermain connection to the existing watermain on St. Alphonse Avenue is proposed.

6.9.5 W-5A - Trunk Watermain on Manning Road south of CP Railway

Similar to W-4, this trunk watermain will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area, and will improve fire flows in existing developments south of CP Railway. Construction of this watermain could be coordinated with future Manning Road upgrades.

Based on a Preliminary Design, a 400 mm trunk watermain on Manning Road from CP Railway to CR 42 is required.

6.9.6 W-5B - Trunk Watermain on CR 42, 12th Concession Road to Manning Road

The trunk watermain on CR 42 will extend direct service from the existing CR 42 feedermain with supply from the City of Windsor at Banwell Road. In conjunction with Project 5A above, this project will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area, and will improve fire flows in existing developments south of CP Railway.

Construction of this watermain should be coordinated with planned County Road 42 upgrades.

6.9.7 W-6 – South Tecumseh Trunk Watermain from CR 42 to Highway 401

Construction of the South Tecumseh trunk watermain from County Road 42 to Highway 401 will provide water supply for new growth south of CR 42 including the designated Highway Commercial lands located adjacent to Manning Road just north of Highway 401. The alignment of this watermain is proposed to extend along 11th Concession Road south of County Road 42 to Baseline Road, then easterly along Baseline Road from 11th Concession to 12th Concession Road, then south on 12th Concession Road from Baseline Road to Highway 401. Consideration may be given to an Alternative Route for this trunk watermain during preparation of Secondary Plans for the future development areas south of County Road 42, should these lands be designated for growth in future Official Plan Updates.

Based on a Preliminary Design, a 600 mm trunk watermain from CR 42 to Highway 401 is proposed for the areas south of CR 42.

6.9.8 W-7A - South Tecumseh Trunk Watermain 12th Concession Road to Malden Road

Construction of the South Tecumseh trunk watermain from 12th Concession Road to Malden Road in Maidstone Hamlet will improve water supply and improve Available Fire Flows for existing and new growth in Maidstone Hamlet. The alignment of this watermain will be along North Talbot Road / Middle Road to Malden Road.

On a Preliminary basis, a 400 mm diameter trunk watermain has been selected.

6.9.9 W-8 – Maidstone Hamlet Trunk Watermain

Construction of the Maidstone Hamlet trunk watermain will provide servicing for existing development and new growth within Maidstone Hamlet. The preliminary alignment of the watermain is along Malden Road from Middle Road to Talbot Road (CR 34). On a preliminary basis, a 400 mm diameter trunk watermain has been selected for this watermain.

6.9.10 W-9 – Zone 2 Booster Pumping Station

Construction of the Zone 2 Booster Pumping Station will permit the Town to operate the water system in the southeast area of Tecumseh at a higher pressure zone, in order to provide adequate pressures throughout the full range of demand scenarios. Four (4) alternative sites including the Town owned lands near the Manning Road/ Baseline Road have been identified for the location of the proposed booster pumping station. The rated capacity of the booster pumping station is estimated at 100 L/s.

6.9.11 W-10 – Zone 2 Water Storage Facility

Construction of the Zone 2 Water Storage Facility will supplement the existing fire storage already provided within the Tecumseh Elevated Tank, will provide Tecumseh with minimum fire storage required for an integrated Tecumseh system, and will provide storage for pump control for the booster pumping station. Four (4) alternative sites including the Town owned lands near the Manning Road/ Baseline Road have been identified for the location of the proposed water storage facility. The storage capacity requirement is estimated at 4.55 ML (1.0 MIG).

6.9.12 W-11 – County Road 46 Trunk Watermain, Sexton Sideroad to 12th Concession Road

This project includes construction of a trunk watermain on County Road 46 (North Talbot Road) from Sexton Sideroad to 12th Concession Road. Construction of the trunk watermain will provide water supply for the southeast service area.

Based on a Preliminary Design, a 400 mm trunk watermain on County Road 46 is required to convey drinking water and fire flows to Maidstone Hamlet.

6.9.13 W-12A - Southwest Tecumseh Trunk Watermain

This project involves construction of trunk watermain on 8th Concession Road from Highway 401 to North Talbot Road, and on County Road 46 from Highway 401 to 8th Concession Road. This project will strengthen the overall distribution network for the southwest service area, and will provide the primary feed for the Zone 2 Booster Pumping Station and Storage Facility. The actual timing of the watermain works on 8th Concession Road and on County Road will be dependent upon Windsor completing the watermain extensions to the Tecumseh boundary.

Based on a Preliminary Design, 600 mm trunk watermain 8th Concession Road and Provincial Road.

6.9.14 W-12B – North Talbot Road Trunk Watermain

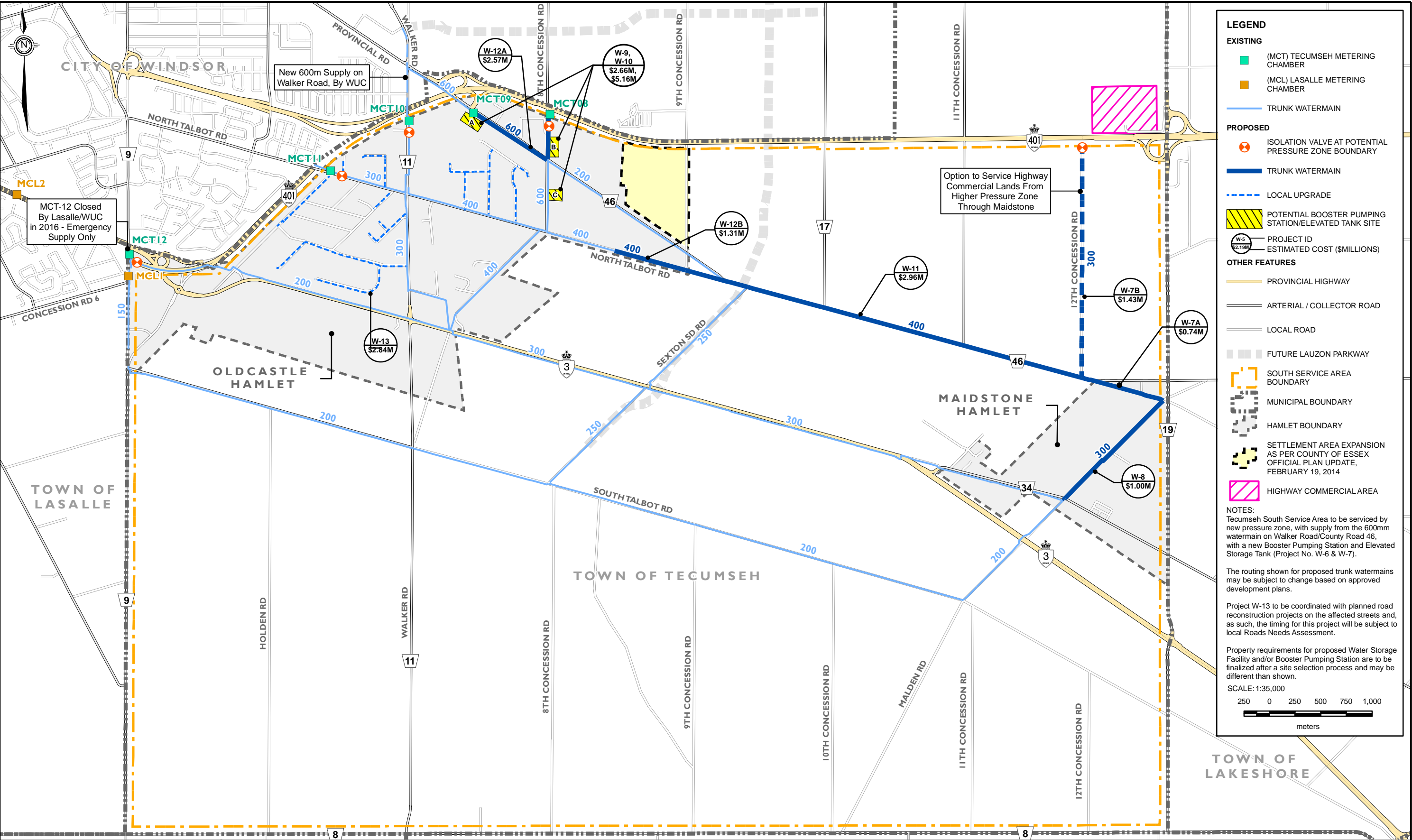
This project involves the construction of a new trunk watermain on North Talbot Road from Concession Road 8 to Sexton Sideroad. This project will improve system pressures and supply capacity to the southeast service area, and will ultimately form a portion of the trunk watermain providing water supply to Maidstone hamlet.

Based on a preliminary Design, a 400mm trunk watermain will be required on North Talbot Road.

6.9.15 W-13 – Oldcastle Hamlet Watermain Upgrades

This project involves the construction of local watermain upgrades within Oldcastle Hamlet to ensure that the local distribution system can convey adequate Fire Flows in accordance with the updated Water Design Criteria for ICI lands. In general, a minimum 300mm watermain is required in order to ensure that sufficient Fire Flows will be available throughout the Hamlet of Oldcastle.

The watermain upgrades should be coordinated with local road improvements throughout the hamlet to minimize disturbance of the businesses in the area.



LEGEND

EXISTING

(MCT) TECUMSEH METERING CHAMBER

(MCL) LASALLE METERING CHAMBER

TRUNK WATERMAIN

PROPOSED

ISOLATION VALVE AT POTENTIAL PRESSURE ZONE BOUNDARY

TRUNK WATERMAIN

LOCAL UPGRADE

POTENTIAL BOOSTER PUMPING STATION/ELEVATED TANK SITE

PROJECT ID

ESTIMATED COST (\$MILLIONS)

OTHER FEATURES

PROVINCIAL HIGHWAY

ARTERIAL / COLLECTOR ROAD

LOCAL ROAD

FUTURE LAUZON PARKWAY

SOUTH SERVICE AREA BOUNDARY

MUNICIPAL BOUNDARY

HAMLET BOUNDARY

SETTLEMENT AREA EXPANSION AS PER COUNTY OF ESSEX OFFICIAL PLAN UPDATE, FEBRUARY 19, 2014

HIGHWAY COMMERCIAL AREA

NOTES:

Tecumseh South Service Area to be serviced by new pressure zone, with supply from the 600mm watermain on Walker Road/County Road 46, with a new Booster Pumping Station and Elevated Storage Tank (Project No. W-6 & W-7).

The routing shown for proposed trunk watermain may be subject to change based on approved development plans.

Project W-13 to be coordinated with planned road reconstruction projects on the affected streets and, as such, the timing for this project will be subject to local Roads Needs Assessment.

Property requirements for proposed Water Storage Facility and/or Booster Pumping Station are to be finalized after a site selection process and may be different than shown.

SCALE: 1:35,000

25002505007501,000

meters



CLIENT
TOWN OF TECUMSEH

PROJECT NAME:
**WATER AND WASTEWATER MASTER PLAN UPDATE
PREFERRED WATER SERVICE STRATEGY
SOUTH SERVICE AREA**

DRAWING No:
FIG 6.2

7. Wastewater System Criteria and Strategy Review

7.1 Design Criteria

The design criteria utilized for the 2018 Tecumseh Water and Wastewater Master Plan Update is based on previous data used in the approved Master Plan, historical records and updated information developed through the water and wastewater servicing review process with Town staff.

The design criteria establishes the parameters utilized to develop projected flows, evaluate system capacities, determine future needs, and determine the scheduling and implementation plan.

7.2 Unit Wastewater Flow Criteria

The design criteria utilized for the Tecumseh Water and Wastewater Master Plan Update is based on previous data used in the approved Master Plan, historical records and updated information developed through the wastewater servicing review process with Town staff.

The design criteria establishes the parameters utilized to develop projected flows, evaluate system capacities, determine future needs, and determine the scheduling and implementation plan.

7.3 Unit Wastewater Flow Criteria

Based on the available information, the Master Plan recommends that the criteria presented in Table 7-1 be used for design and analysis of sewer systems in Tecumseh.

Table 7-1: Wastewater Flow Design Criteria

PARAMETER	AREA	CRITERIA
Sewage Generation Rate	Existing Developed areas ¹	229 l/cap/day
	New Development	300 L/cap/day
Infiltration Allowance	Existing Developed areas ¹	
	St Clair Beach	33,000 L/ha/day
	Tecumseh	34,000 L/ha/day
	Tecumseh Hamlet	29,000 L/ha/day
	New Development	16,415 L/ha/day

Notes: 1. Taken from monitoring results reported in the I&I Control Study, CH2M Hill, January 2005

7.4 Design Criteria for System Components and Operation

7.4.1 Pumping Capacity

The Tecumseh wastewater system is primarily gravity serviced from the south to the north. There are currently four major wastewater pumping stations, Cedarwood, Lakewood, St Alphonse and Sylvestre, which are considered part of the trunk wastewater system.

Pumping stations are rated on their firm capacity to pump flows. Firm rated capacity is defined as the capacity of the station with the largest pump out of service.

Each pumping station must have sufficient firm capacity to meet peak wet weather flows for its respective catchment.

7.4.2 Trunk Sewer Capacity

Trunk sewer capacity is determined based on the pipe volume (function of diameter) and slope. Design of sewer pipes is based on maintaining a minimum cleansing velocity in the pipe through a combination of diameter and slope.

The trunk sewer capacity is based on the cumulative peak wet weather flows.

7.4.3 Treatment Capacity

While wastewater conveyance systems are designed and rated to deliver peak wastewater flow to the treatment facilities, the treatment plants themselves are rated for average day flows based on traditional plant rating.

Similar to water, plant expansions have been traditionally scheduled on a “just in time” basis. Additional capacity has been scheduled and installed in “steps” based on growth projections and in order to stagger capital expenditures.

With potential fluctuations in flow requirements and the potential fluctuations in plant capacities due to operating conditions, loadings, equipment performance and emergency conditions, it has been noted that plant capacity can be reached sooner than anticipated.

It has been determined during this project, that scheduling of plant expansions should be based on, where possible, not exceeding approximately 85 - 90% of full capacity. This approach should establish scheduling the future expansions before water demand projections meet available capacity.

7.5 Wastewater Unit Costs

For the development and evaluation of alternative solutions as well as for the development of the preferred solution capital program, financial analysis has been required. To facilitate this financial analysis, unit costing for the horizontal and vertical works have been derived.

These unit costs have been used as a benchmark tool to approximate the total project costs. However, where applicable, the cost estimates for each project have been refined based on unique aspects of the implementation or construction of the project.

The wastewater infrastructure capital cost estimates were developed using historical construction information for the Town of Tecumseh as well as recent project delivery costs trends.

Table 7-2: Unit Capital Costs for Wastewater Pumping Stations

WASTEWATER PUMPING STATION	UNIT COST	BASIS
New Stations and Expansions	\$9,750	Per L/s peak flow capacity

Table 7-3: Unit Capital Costs for Gravity Sewers

DIAMETER (mm)	3 m to 5 m
375	\$634
450	\$657
525	\$705
600	\$766
675	\$846
750	\$940
825	\$1,157
900	\$1,411
975	\$1,723
1050	\$1,896
1200	\$2,155

Table 7-4: Unit Capital Costs for Sanitary Force mains

DIAMETER (mm)	UNIT COST
150	\$347
200	\$462
250	\$578
300	\$693
350	\$846
400	\$999

7.6 Wastewater Flow Projections

Utilizing the Town of Tecumseh planning projections and wastewater flow criteria, the peak wastewater flow projections for the Town of Tecumseh are summarized in the following Table 7-5, and the Wastewater Treatment Capacity projections are summarized in Table 7-6.

Table 7-5: Town of Tecumseh Peak Wastewater Flow Projections

SERVICE AREA		PEAK FLOW (L/S)			
		2016 ¹	2026	2036	BUILD-OUT (2036+)
Peak Flow Rates to Little River PCP					
North Service Area	Tecumseh	406	412	417	456
	St. Clair Beach	191	194	196	199
	Tecumseh Hamlet	236	316	356	524
	Sub-Total – North Area	833	922	969	1,180
South Service Area	Highway Service Centre	-	-	29	29
	Maidstone Hamlet	-	-	37	68
	Oldcastle Hamlet	21.7	101	166	286
	Sub-Total – South Area	21.7	101	232	384
Total Peak Flow to Little River PCP		854.7	1,029	1,201	1,563
Peak Rate Permitted by Agreement					
	Cedarwood Outlet				935
	Banwell Road Outlet				1,308
	Total				2,243
Peak Flow Rate to Lou Romano WRP					
South Service Area	Oldcastle Hamlet	3.5	24	65	84
	Total to Lou Romano WRP	3.5	24	65	84
Peak Rate Permitted by Agreement					
	North Talbot Road Outlet				85

Notes:

1. Reported Peak Flows taken from SCADA monitoring data provided by SUMMA Engineering Ltd for January to July 2016.

Table 7-6: Projected Average Day Flows - Treatment Capacity

SERVICE AREA		AVERAGE DAY FLOWS (MLD)			
		2016 ¹	2026	2036	BUILD-OUT (2036+)
Treatment Capacity at Little River PCP					
North Service Area	Tecumseh	6.5	6.6	6.7	7.7
	St. Clair Beach	2.1	2.1	2.2	2.2
	Tecumseh Hamlet	2.9	4.4	5.1	8.9
	Sub-Total – North Area	11.5	13.1	14.0	18.8
South Service Area	Highway Service Centre	-	-	0.5	0.6
	Maidstone Hamlet	-	-	0.5	1.2
	Oldcastle Hamlet	0.4	2.3	4.0	7.4
	Sub-Total – South Area	0.4	2.6	5.0	9.2
Total Average Day Flow to Little River PCP		11.9	15.7	18.9	28.0
Maximum Average Day Flow by Agreement					
	Current				19.8
	Ultimate				38.0
Treatment Capacity at Lou Romano WRP					
South Service Area	Oldcastle Hamlet	0.3	0.4	1.3	1.8
	Total to Lou Romano WRP	0.3	0.4	1.3	1.8
Maximum Average Day Flow by Agreement					2.72

Notes:

1. Reported Total Flows taken from SCADA Monitoring data provided by SUMMA Engineering for January to July 2016.

7.7 Tecumseh Wastewater Servicing Strategy Review

The Tecumseh wastewater servicing strategy has been reviewed in light of a number of changes that have occurred, subsequent to completion of the 2008 Water and Wastewater Master Plan Update, which have impacted the assumptions used during the 2008 Master Plan Update. The most relevant changes impacting the validity of the wastewater servicing strategy recommended in the previous 2008 Master Plan Update include:

- Addendum to Water and Wastewater Master Plan – Oldcastle Hamlet Wastewater Servicing Study (Stantec, September 2013). Due to an immediate need to address effluent quality issues experienced at the Skyway Plaza Wastewater Treatment Plant (WWTP), the Town identified that decommissioning of the Skyway Plaza WWTP and diversion of wastewater to the Lou Romano WRP via the newly built North Talbot Trunk Sewer was the preferred option to address these issues. By diverting flow from the Skyway Plaza to the Lou Romano WRP, service area boundaries for lands in Oldcastle Hamlet to be serviced by the Little River PCP were revised.
- Completion of the Manning Road Secondary Plan and the associated Functional Servicing Plan (FSP) (Dillon Consulting, 2015). The FSP made minor adjustments to the routing of trunk sewers, specifically related to the area south of Baillargeon Drain. The East Tecumseh Trunk Sewer Outlet was originally planned to be located along the CPR tracks to the south. The FSP recommended that the East Tecumseh Trunk Sewer alignment be shifted further to the north to intercept more flows from the existing Lesperance Road trunk sewer and divert these flows to the planned West Tecumseh Trunk Sanitary Sewer. This adjustment would reduce flow in the existing Lesperance Road Trunk Sanitary Sewer near CR 22.
- Expansion of the Oldcastle Hamlet settlement area, as adopted by the County of Essex on February 19, 2014 as part of their Official Plan Update.
- Reduced development pressure for the development of the Highway Commercial Lands, and recognition of the high capital cost of the extension of a trunk gravity sewer from County Road 42 to Maidstone Hamlet, including an under-crossing of Highway 401.

7.8 Opportunities and Constraints

7.8.1 Infiltration and Inflow Reduction

The 2002 Master Plan identified that system limitations were resulting from excessive Inflow and Infiltration (I&I) in the older sections of the sewer collection system. Following a number of recommendations made in an Infiltration and Inflow Control Study completed in 2005, the Town has implemented a number of strategies in an effort to reduce I&I such as:

- Monitoring of the sanitary sewer system in St Clair Beach and Tecumseh Hamlet.
- Storm sewer upgrades on Pentilly Lane, which was identified as one of the major sources of I&I in the St Clair Beach area.

- Reconstruction of Brighton Road which included provisions for dedicated storm sewer service connections to each lot to permit connection of foundation drains and roof leaders to the storm sewer system.
- Implementation of downspout disconnection and installation of backflow preventers as strategies to eliminate basement flooding.

The Town continues to monitor flows within the existing collection system to establish the effectiveness of the strategies implemented to date.

7.8.2 Trunk Sewers

The proposed alignment of the trunk sewers within the Town has, as much as possible, followed the alignment of existing road allowances to ensure that there are no delays in extending services. However, there may be opportunities to select alternative routes, which may be preferred. Potential alternative trunk facility alignments are depicted on the recommended Master Plan Update.

The alternative routing of the trunk facilities should be further evaluated prior to commencing detail design for the affected project. Should the alternative route be selected for implementation, permanent easements will be secured and/or purchased by the Town prior to construction.

7.8.3 Wastewater Treatment Plant Expansions

The Little River PCP provides wastewater treatment for the North Service Area, the Southeast Service Area, and the majority of the Southwest Service Area of the Town of Tecumseh.

In accordance with the Wastewater Servicing Agreement with the City of Windsor, the Town of Tecumseh will be responsible for 25% of the cost of any capacity expansions at the Little River PCP to expand the plant beyond a allocated capacity of 4.37 MIGD (19.8 MLD) for the Town. Based on lower growth projections for the Town, timing for the expansion of the Little River PCP may be deferred until 2031 for the initial expansion. A subsequent expansion would then be required in 2037, provided that the projected growth is realized in both the Town and the City of Windsor.

Notwithstanding the above projected schedule, the City of Windsor will need to test and rate the actual capacity of the Little River PCP after each expansion to further refine scheduling and expansion requirements. The Town of Tecumseh should monitor the City's progress through ongoing Permanent Joint Staff Liaison Committee meetings.

7.9 Wastewater Servicing Strategy Overview

The primary focus of the revised strategy was to prioritize for infrastructure in those areas where growth is anticipated to occur first while maximizing the existing allowable conveyance and treatment capacities as per existing agreements and providing enough flexibility to the Town for project implementation according to the geographical distribution of the future growth.

In general, the majority of the components of the wastewater servicing strategy approved in the 2008 Water and Wastewater Master Plan Update remain valid. The primary changes to the 2008 wastewater servicing strategy are as follows:

- Elimination of the East Tecumseh Trunk Sewer within the existing utility corridor south of CP Railway for lands on the east side of Tecumseh Hamlet.
- Completion of the Manning Road Secondary Plan FSR has provided further detail for the servicing requirements of the new development lands east of Lesperance Road and north of the CN Railway line. The FSR has added the requirements for a new Sanitary Pumping Station and trunk sewer within these lands, as well as documented the ultimate capacity requirements for the existing sewer outlets on Westlake Drive and Gouin Street.
- Elimination of the South Tecumseh Trunk Sewer between CR42 and Highway 3 to service designated lands in the Maidstone Hamlet Secondary Plan, the Highway Service Centre lands and the existing developments in the Southeast Service Area.
- Provision of a new forcemain between North Talbot Road and CR42 to service designated lands in Maidstone Hamlet Secondary Plan and the Highway Service Centre lands.
- Provision of a new pumping station in Maidstone Hamlet to convey flows from the Maidstone Hamlet to the north discharge outlet at CR42. Three (3) alternative sites in the vicinity of the intersection of 12th Concession Road and North Talbot Road have been identified for the location of the proposed Pumping Station. Alternative sites for the pumping station should be explored further based on the timing and specific location of future developments within the area.
- Provision of new trunk sewers for existing developments and new growth in the Southwest service area with discharge to the Little River PCP through the future 8th Concession Road Outlet.
- Provision of a three (3) new pumping stations in Oldcastle Hamlet to convey flows from the area to the 8th Concession Road Outlet, with ultimate discharge to Little River PCP.

Wherever possible, the alignments of new trunk facilities have been planned based on the location of existing road allowances and/or servicing corridors in order to ensure that servicing can proceed without undue delays resulting from the need to acquire property. However, the Town has the option to construct the trunk facilities through new development lands if it can be shown to be cost effective to do so. In this event, the alignment of the trunk facilities may be altered based on approved Secondary Plans and/or Approved Draft Plans of Subdivision. Should the trunk facilities be implemented through new development lands, additional notification to the Public would be provided through the Planning Act notifications.

It should also be noted that the timing of the various projects has been established based on anticipated growth rates in Tecumseh and on a fiscally responsible capital works program. The Town will have the option to advance or defer specific projects depending upon the rate of growth experienced in Tecumseh, or upon the petition by a developer (or group of developers) provided that the financial impacts of advancing certain projects are reviewed and mitigated through collection of Development Charges or through Front-End Financing arrangements.

7.10 Recommended Strategy

The Updated Wastewater Servicing Strategy includes a number of separate and distinct projects that will provide an ultimate consolidated servicing scheme to maximize the use of existing infrastructure and provide capacity for new growth in designated growth areas of the Town. The Servicing Strategy is depicted on Figure 8-, and a brief description of each of the Projects is provided below.

7.10.1 WW-1 – West Tecumseh Trunk Sewer from County Road 22 to CP Railway

Construction of a new Trunk Sanitary Sewer through new development lands west of Shawnee Road from CR 22 to the CP Railway corridor. The West Tecumseh Trunk Sewer is proposed to provide for new development lands within the Tecumseh Hamlet West Planning Area, to provide an outlet for existing and new growth south of CP Railway, and to provide additional relief for existing flows within the Lesperance Road trunk sewer. The alignment of this sewer should be established through Approved Secondary Plans and co-ordinated through proposed Plans of Subdivision.

The alignment of the sewer should be kept as low and deep as possible to maximize the gravity service area of the pipeline. Based on Preliminary Design, a 1200 mm diameter sewer is required.

In order to comply with the Wastewater Agreement between the City and the Town, a flow measurement facility will be required on this trunk sewer prior to discharging to the outlet sewer on County Road 22. The design of the flow measurement facility will be subject to the approval of the City of Windsor.

7.10.2 WW-2 – Tecumseh Hamlet Diversion Sewer

In order to alleviate system surcharges in the Lesperance Road trunk sewer between CP Railway and County Road 22, a new diversion sewer will be constructed along Intersection Road from the existing trunk sewer on St. Anne Street to the West Tecumseh Trunk Sewer to relieve pressure on the existing Lesperance Road Trunk Sanitary Sewer. All flows from the St Alphonse pump station, along with local drainage for existing development on St Anne Street, Murray Crescent and Shawnee Road south of Intersection Road will be diverted to the new West Tecumseh Trunk Sewer.

This facility should be designed to accommodate a projected interim peak flow rate of 173 L/s, and an ultimate projected peak flow rate of 85 L/s. The ultimate projected peak flow rate is lower than the interim projected peak flow rate due to the planned diversion of flows at County Road 42 (Project WW-7). On a preliminary basis, a new 600 mm diameter sewer will be required.

7.10.3 WW-3 - East Tecumseh Trunk Sewer

This Project has been deleted based on the findings of the Functional Servicing Report for the Manning Road Secondary Plan Area. Wastewater servicing for this area will now be directed to the Manning Road Pumping Station (WW-13) and Trunk Sewer (WW-12) to outlet to the Lesperance Road Trunk sanitary sewer at Westlake Drive.

7.10.4 WW-4 - Sylvestre Pumping Station Upgrade

New development lands located east of the existing developed areas in Tecumseh Hamlet, west of Manning Road and north of the Baillargeon Drain will be serviced through local sewers to outlet to the trunk sewer on Westlake Drive. As part of the development of this area, the existing forcemain from the Sylvestre Pumping Station should be re-aligned to discharge to the Westlake Drive trunk sewer.

In order to ensure continuity of service during emergency situations or power outages, the existing Sylvestre Pumping Station should be upgraded with the provision of Stand-by power in a sound attenuating enclosure. On a Preliminary basis, it is anticipated that a Permanent Easement, approximately 5 m wide by 6 m long will be required for construction of the pad-mounted generator; however, the easement requirements and stand-by power facility requirements will be subject to further review prior to implementation. Property for the Pumping Station Upgrade should be acquired through the Development Approvals process.

7.10.5 WW-5A - North Talbot Road Trunk Sewer, Oldcastle Road (North Talbot to Chrysler Greenway)

Construction of a 750mm trunk sanitary sewer on Oldcastle Road south of North Talbot Road to Pentilly Lane, and a 600mm trunk sanitary sewer on Oldcastle Road from Pentilly Lane to the Chrysler Greenway to provide wastewater service for existing and planned Industrial / Commercial growth. The preliminary design for this sewer was completed in the Oldcastle Hamlet Sanitary Servicing – Preliminary Design Report.

7.10.6 WW-5B - North Talbot Road Trunk Sewer

Construction of a 450mm trunk sanitary sewer on North Talbot Road from 8th Concession Road to approximately 475 m east of 8th Concession Road, to provide wastewater service for existing and planned Industrial / Commercial growth. The preliminary design for this sewer was completed in the Oldcastle Hamlet Sanitary Servicing – Preliminary Design Report.

7.10.7 WW-6 - West Tecumseh Trunk Sewer, CP Railway to CR 42

Construction of a trunk sanitary sewer from north of the CP Railway line to County Road 42. Similar to WW-1, this trunk sewer will provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area south of CP Railway, and will provide an outlet for existing and new growth south of CP Railway. The alignment of this sewer should be established through Approved Secondary Plans and co-ordinated through proposed Plans of Subdivision.

This portion of the West Tecumseh Trunk Sewer should be designed to accommodate a projected ultimate peak flow rate of 773 (1,098) L/s. Based on Preliminary Design, a 1200 mm sewer is required at a minimum design gradient of 0.07%.

7.10.8 WW-7 - CR 42 Diversion Sewer

This project involves the construction of a new diversion sewer on County Road 42 from Lesperance Road to outlet to the new West Tecumseh Trunk Sewer in the same alignment as the existing sewer on County Road 42. All flows generated by existing development south of County Road 42 will be diverted through this sewer to the new outlet. Provision of this Diversion Sewer will permit the Town to decommission the St Alphonse pumping station, and thereby eliminate the ongoing operation and maintenance costs for this station.

The CR42 Diversion sewer should be designed for a projected peak ultimate flow rate of 90 L/s. A 600 mm sewer has been selected on a preliminary basis.

7.10.9 WW-8A - South Tecumseh Trunk Sewer, CR 42 - Odessa Dr. to 11th Concession Rd

Construction of the South Tecumseh Trunk Sewer on County Road 42 from the West Tecumseh Trunk Sewer to 11th Concession Road will provide a wastewater outlet for planned growth south of County Road 42, including the Highway Commercial Lands and existing and new developments in Maidstone Hamlet.

On a Preliminary basis, a 1200 mm diameter tank sewer has been selected for the Trunk sewer.

7.10.10 WW-8B - South Tecumseh Trunk Forcemain, CR42 to Highway 401

Construction of the South Tecumseh Trunk Forcemain from Highway 401 to County Road 42 will provide an outlet for new development within the Highway Commercial Area, and will ultimately provide an outlet for existing and new development in Maidstone Hamlet.

The South Tecumseh Trunk Forcemain from Highway 401 to County Road 42 should be designed to accommodate a peak flow rate of 100 L/s. On a preliminary basis, a 300 mm forcemain has been selected; however, construction of smaller diameter twin force mains should be considered during detailed design to accommodate interim conditions before development proceeds within in Maidstone Hamlet.

7.10.11 WW-9A - South Tecumseh Trunk Forcemain, Hwy 401 to North Talbot Road

Construction of the South Tecumseh Trunk Forcemain from Highway 401 to North Talbot Road in Maidstone Hamlet will provide an outlet for existing and new growth within Maidstone Hamlet. The alignment of this forcemain will be along 12th Concession Road from Highway 401 to the site of the new Maidstone Pumping Station.

The South Tecumseh Trunk forcemain should be designed to accommodate the ultimate projected peak flow rate of 75 L/s for Maidstone Hamlet. In addition, the station should be designed to permit a future expansion of the capacity of the station should an adjustment of the Maidstone Hamlet area be considered. On a Preliminary basis, a 300 mm diameter trunk forcemain has been selected; however, construction of smaller diameter twin forcemains should be considered during detailed design to accommodate interim conditions as development proceeds within Maidstone Hamlet.

7.10.12 WW-9B - South Tecumseh Trunk Sewer, 12th Concession Road to Malden Road

Construction of the South Tecumseh Trunk Sewer along Middle Road from the site of the Maidstone Pumping Station to Malden Road in Maidstone Hamlet will provide an outlet for existing and new growth within Maidstone Hamlet.

The South Tecumseh Trunk sewer should be designed to accommodate the ultimate projected peak flow rate of 125 L/s for Maidstone Hamlet. On a Preliminary basis, a 600 mm diameter trunk sewer has been selected.

7.10.13 WW-10 - Maidstone Hamlet Trunk Sewer

Construction of the Maidstone Trunk Sanitary sewer on Malden Road will provide servicing for existing development and new growth within Maidstone Hamlet. The preliminary alignment of the sewer is along Malden Road from Middle Road to Talbot Road (CR 34).

This sewer should be designed to accommodate the projected ultimate peak flows from Maidstone Hamlet of 90 L/s, plus an allowance for future growth beyond the current Maidstone Hamlet urban area. On a preliminary basis, an ultimate peak design flow of 125 L/s has been considered for this sewer, and a 600 mm sewer has been selected.

7.10.14 WW-11A – Southwest Tecumseh Trunk Sewer, Phase 1

This Project involves the construction of a trunk sanitary sewer from Oldcastle Road on the Chrysler Greenway and McCord Lane to Walker Road, to provide sanitary servicing capacity for existing and new developments within Oldcastle Hamlet.

The Preliminary design for this facility is documented in the Oldcastle Hamlet, 8th Concession Road Outlet Preliminary Design Report.

7.10.15 WW-11A – Southwest Tecumseh Trunk Sewer, Phase 1

This Project involves the construction of a trunk sanitary sewer on Oldcastle Road from Highway 3 to approximately 410 m south of Highway 3, including installation of a sewer extension within an easement to provide a sanitary outlet for new developments on Walker Road.

The Preliminary design for this facility is documented in the Oldcastle Hamlet, 8th Concession Road Outlet Preliminary Design Report.

7.10.16 WW-12 – Manning Road Secondary Plan Area Trunk Sanitary Sewer

The Sanitary Servicing Plan for the Manning Road Secondary Plan area has been established by approval of the Manning Road Secondary Plan Functional Servicing Report.

Portions of the MRSP area will drain to existing local sewers that outlet to the existing Lesperance Road trunk sewer. Existing sewer outlets on Sylvestre Drive and Gouin Street will be utilized. In addition, a small area is proposed to drain to the Lesperance Road trunk sewer through a new local sewer outlet in the vicinity of Cavalry Court.

On a preliminary basis, a 450mm trunk sanitary sewer is required.

7.10.17 WW-13 – Manning Road Secondary Plan Area Sanitary Pumping Station

As noted above, the Sanitary Servicing Plan for the Manning Road Secondary Plan area has been established by approval of the Manning Road Secondary Plan Functional Servicing Report.

The Functional Servicing Report recommends construction of a duplex submersible lift station with a firm rated capacity of 27.1 L/s, to be constructed within the Manning Road Secondary Plan area at the intersection of Street A and Street B, and will discharge directly to the Manning Road Secondary Plan Area Trunk Sanitary Sewer (WW-12).

7.10.18 WW-14 – Highway Commercial Lands Pumping Station

Construction of a duplex submersible pumping station complete with stand-by power, with a firm rated capacity of 29 L/s, to be constructed on the Highway Commercial Lands to provide service for the development of these lands. To accommodate future growth beyond the current designated limits of the Highway Commercial lands, consideration should be made to design the wet-well for an ultimate capacity of 44 L/s.

Consideration could also be given to accomodating the flows from the future Maidstone Hamlet Pumping Station (Project WW-15) to reduce the reduce the operational complexity for the two stations pumpng through a singel forcemain.

7.10.19 WW-15 – Maidstone Hamlet Sanitary Pumping Station

Construction of a triplex submersible pumping station complete with stand-by power, with a firm rated capacity of 68 L/s, to be constructed on the on lands to be acquired by the Town of Tecumseh, to provide an outlet for wastewater servicing in the Hamlet of Maidstone. To accommodate future growth beyond the current designated limits of Maidstone Hamlet, consideration should be made to design the wet-well for an ultimate capacity of 125 L/s.

Construction of the facility should be staged, with provision to add additional pumps in the future. As growth proceeds in the service area, future pump(s) may be added to provide the full capacity required.

7.10.20 WW-16A – County Road 46 Trunk Sanitary Sewer, Phase 1

Construction of a trunk sanitary sewer on County Road 46 from 8th Concession Road to the west limits of the newly expanded Oldcastle Hamlet area. This sewer will provide sanitary servicing for existing and proposed Industrial / Commercial developments in the existing and newly designated lands east of 8th Concession Road.

The Preliminary design for this facility is documented in the Oldcastle Hamlet, 8th Concession Road Outlet Preliminary Design Report.

7.10.21 WW-16B – County Road 46 Trunk Sanitary Sewer, Phase 2

Construction of a trunk sanitary sewer on County Road 46 from the west limit of the expanded Oldcastle Hamlet area to 9th Concession Road, as well as a trunk sanitary sewer through new development lands from County Road 46 northerly approximately 650 m to a local lift station. This sewer will provide sanitary servicing for proposed Industrial / Commercial developments in the existing and newly designated lands west of 9th Concession Road.

The Preliminary design for this facility is documented in the Oldcastle Hamlet, 8th Concession Road Outlet Preliminary Design Report.

7.10.22 WW-17 – Blackacre Drive Sanitary Servicing

This project includes the construction of a Pumping Station No. 1 on Blackacre Drive, and the associated outlet to Southwest Tecumseh Trunk Sewer (WW-13). This project will provide servicing for wastewater generated by existing and new development in the Oldcastle Hamlet planning area.

In accordance with the Preliminary Design Report for Oldcastle Hamlet Sanitary Servicing – 8th Concession Trunk Sanitary Sewer (Dillon Consulting, May 2017), a sanitary pumping station is required in the vicinity of the intersection of Blackacre Drive and Pulleyblank Street in order to provide service the balance of the designated lands to the south and the west, while minimizing the depth of the sewers.

7.10.23 WW-18A – Howard Avenue Sanitary Servicing, Blackacre Drive and Outer Drive to Hwy 3

This project includes the construction of trunk sanitary sewers on Blackacre Drive and on Outer Drive, north of Talbot Road (Hwy 3). This project will provide servicing for wastewater generated by existing and new development in Oldcastle Hamlet north of Hwy 3, as well as provide an outlet for existing and new development in the area of Oldcastle Hamlet recently isolated from the rest of Oldcastle due to the construction of the Herb Grey Parkway.

The Preliminary design for this facility is documented in the Oldcastle Hamlet, 8th Concession Road Outlet Preliminary Design Report.

7.10.24 WW-18B – Howard Avenue Sanitary Servicing, Hwy 3 to MTO Carpool Lot

This project includes the construction of a Pumping Station No. 2 on Outer Drive, and the associated outlet to the local sewers on Outer Drive north of Talbot Road (Hwy 3). This project will provide servicing for wastewater generated by existing and new development in the area of Oldcastle Hamlet recently isolated from the rest of Oldcastle due to the construction of the Herb Grey Parkway.

The Preliminary design for this facility is documented in the Oldcastle Hamlet, 8th Concession Road Outlet Preliminary Design Report.

8. Preferred Servicing Strategies

The preferred servicing strategies for the Town of Tecumseh water and wastewater systems are detailed in the following sections.

The capital cost estimated for the programs are based on the following criteria:

- Review of unit costs identified in the Master Plan and Technical Servicing Review;
- Updated project requirements identified through the Master Plan Update;
- Updated project requirements and project costs identified through available Class EA studies, conceptual designs, or pre-design reports for any projects currently underway;
- Updated costs based on recent industry trends and construction costs;
- 2018 dollars.

Details on the base unit costs used to develop the cost estimates is provided in the Appendices.

8.1 Water Capital Program

The complete water capital program for the servicing strategies developed under the Town of Tecumseh's Master Plan Update is provided in Table 8-1, and depicted in Figure 6-1 and Figure 6-2.

Table 8-2 provides the Town's Project ID number, project descriptions, project schedule and estimated total project costs.

The Water Master Plan Update succeeds the Development Charges By-Law Update and is based on more recent findings and decisions due to further completion of related studies, further technical analysis and financial considerations. In general, the water servicing strategy for the Town's North Service Area has remained the same; however, budget and timing has been further refined and therefore could be marginally different to those prepared for the 2014 DC process. The Servicing Strategy for the South Service Area has been more significantly altered, due to the WUC's decision to cancel the Banwell Reservoir and to expand the capacity of their internal distribution system. Water supply to the Town's South Service Area will now be provided directly from the Windsor system at County Road 46 and 8th Concession Road, and a new Pressure Zone (Zone 2) will be implemented for all lands in Tecumseh south of Highway 401.

Table 8-1: Updated Water System Servicing Strategy

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
<u>NORTH SERVICE AREA</u>				
West Tecumseh Trunk Watermain CR 22 to CP Railway	W-1	Tecumseh Hamlet	B ¹	\$2.04
East Tecumseh Hamlet Watermain Connection	W-2A	Tecumseh Hamlet	B ¹	\$0.46
Trunk Watermain on Manning Road CR 22 to CP Railway	W-2B	Tecumseh Hamlet	A+	\$1.88
West Tecumseh Trunk Watermain CP Railway to CR 42	W-4	Tecumseh Hamlet	B ¹	\$2.26
Trunk Watermain on Manning Road CP Railway to CR 42	W-5A	Tecumseh Hamlet	A+	\$0.61
Trunk Watermain on CR 42, 11 th Concession Road to Manning Road	W-5B	Tecumseh Hamlet	A+	\$0.92
South Tecumseh Trunk Watermain CR 42 to Hwy 401	W-6	Tecumseh Hamlet	A+	\$1.72
<u>SOUTH SERVICE AREA</u>				
North Talbot Road Trunk Watermain Walker Road to 8 th Concession Road	W-3	Oldcastle Hamlet (Completed)		
South Tecumseh Trunk Watermain 12 th Concession Road to Malden Road	W-7A	Southeast Tecumseh	A+	\$0.74
South Tecumseh Trunk Watermain CR 46 to Hwy 401	W-7B	Southeast Tecumseh	A+	\$1.43
Maidstone Hamlet Trunk Watermain	W-8	Maidstone Hamlet	A+	\$1.00
Zone 2 Booster Pumping Station	W-9	Oldcastle Hamlet	B	\$2.66
Zone 2 Water Storage Facility	W-10	Oldcastle Hamlet	B	\$5.16
County Road 46 Trunk Watermain Sexton Road to Maidstone Hamlet	W-11	Southeast Tecumseh	A+	\$2.96
Southwest Tecumseh Trunk Watermain	W-12A	Oldcastle Hamlet	A+	\$2.57
North Talbot Road Trunk Watermain	W-12B	Oldcastle Hamlet	A+	\$1.31
Oldcastle Hamlet Watermain Upgrades	W-13	Oldcastle Hamlet	A+	\$2.84
Total Estimated Capital Cost				\$30.56

Notes:

1. Project may be approved (Schedule A) if implemented under a Planning Act Approval in accordance with Section A.2.9 of the Class EA Planning Process.

8.2 Wastewater Capital Program

The complete wastewater capital program for the servicing strategies developed under the Town of Tecumseh's Master Plan Update is provided in Table 8-2 and depicted in Figure 8-1.

Table 8- provides the Town's Project ID number, project descriptions, project schedule and estimated total project costs.

The Wastewater Master Plan Update succeeds the Development Charges By-Law Update and is based on more recent findings and decisions due to the Wastewater Agreement with the City of Windsor, further completion of related studies, further technical analysis and financial considerations. The wastewater servicing strategy has been substantially revised as a result of the Wastewater Agreement and the provision of treatment capacity at the Little River PCP and the Lou Romano WRP, as well as the provision of a additional outlets at Banwell Road and 8th Concession Road. As a result, the impact of the Updated Wastewater Master Plan on the Town's Development Charge bylaw will need to be reviewed.

Table 8-2: Updated Wastewater System Servicing Strategy

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
West Tecumseh Trunk Sewer CR 22 to CP Railway	WW-1	Tecumseh Hamlet	B ¹	\$5.21
Tecumseh Hamlet Diversion Sewer	WW-2	Tecumseh Hamlet	A+	\$0.84
Sylvestre Pumping Station Upgrade	WW-4	Tecumseh Hamlet	A+	\$0.64
North Talbot Road Trunk Sewer, Oldcastle Road (North Talbot to Chrysler Greenway)	WW-5A	Oldcastle Hamlet	A+	\$2.79
North Talbot Road Trunk Sewer, Oldcastle Road to 475 m east of Oldcastle Road	WW-5B	Oldcastle Hamlet	A+	\$0.60
West Tecumseh Trunk Sewer CP Railway to CR 42	WW-6	Tecumseh Hamlet	B ¹	\$4.16
CR 42 Diversion Sewer	WW-7	Tecumseh Hamlet	A+	\$1.00
South Tecumseh Trunk Sewer CR 42, Odessa Drive to 11 th Concession	WW-8A	Tecumseh Hamlet	A+	\$1.90
South Tecumseh Trunk Forcemain, CR42 to Hwy 401	WW-8B	Tecumseh Hamlet	A+	\$3.61
South Tecumseh Trunk Forcemain, Hwy 401 to North Talbot Road	WW-9A	Tecumseh Hamlet	A+	\$1.65
South Tecumseh Trunk Sewer, 11 th Concession Road to Malden Road	WW-9B	Southeast Tecumseh	A+	\$1.27
Maidstone Hamlet Trunk Sewer	WW-10	Maidstone Hamlet	A+	\$2.02

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST (\$MILLION)
Southwest Tecumseh Trunk Sewer, Phase 1	WW-11A	Oldcastle Hamlet	A+	\$1.19
Southwest Tecumseh Trunk Sewer, Phase 2	WW-11B	Oldcastle Hamlet	A+	\$1.20
Manning Road Secondary Plan Area Trunk Sewer	WW-12	Tecumseh Hamlet	A+	\$1.10
Manning Road Secondary Plan Area Sanitary Lift Station	WW-13	Tecumseh Hamlet	A+	\$0.93
Highway Commercial Area Pumping Station	WW-14	Tecumseh Hamlet	B ¹	\$0.99
Maidstone Hamlet Sanitary Pumping Station	WW-15	Maidstone Hamlet	B	\$0.99
County Road 46 Trunk Sanitary Sewer, Phase 1	WW-16A	Oldcaslte Hamlet	A+	\$1.31
County Road 46 Trunk Sanitary Sewer, Phase 2	WW-16B	Oldcaslte Hamlet	A+	\$2.55
Blackacre Drive Sanitary Servicing	WW-17	Oldcastle Hamlet	B	\$2.13
Howard Avenue Servicing, Blackacre Drive and Outer Drive to Hwy 3	WW-18A	Oldcastle Hamlet	B	\$1.33
Howard Avenue Servicing, Hwy 3 to MTO Carpool Lot	WW-18B	Oldcastle Hamlet	B	\$1.73
Purchase additional treatment capacity at Little River PCP	Windsor-2 ^{2,3}	Windsor	-	\$10.22
Purchase additional treatment capacity at Little River PCP	Windsor-4 ^{2,3}	Windsor	-	\$6.27
Total Estimated Capital Cost				\$57.64

Notes:

1. Project may be approved (Schedule A) if implemented under a Planning Act Approval in accordance with Section A.2.9 of the Class EA Planning Process.
2. Projects to be implemented by the City of Windsor in accordance with Wastewater Agreement, Nov. 2004. Costs taken from Article 9 of the Agreement, with costs escalated by 2% per year to reflect 2018 costs.
3. The timing for the Capacity Expansion to be determined in accordance with Article 4 of the Wastewater Servicing Agreement.

LEGEND

EXISTING

PUMPING STATION

OUTLET LOCATION FOR DISCHARGE OF MONITORED FLOW

FLOW CONTROL CHAMBER

TRUNK SEWER

TEMPORARY DIVERSION SEWER TO LRWRP

TRUNK SEWER TO LRWRP

NORTHEAST WINDSOR TRUNK SEWER

PROPOSED

PUMPING STATION

A|B|C

POTENTIAL SITES FOR MAIDSTONE PUMPING STATION

WASTEWATER FORCEMAIN

DIVERSION SEWER

TRUNK SEWER

8TH CONCESSION ROAD SANITARY SEWER OUTLET SERVICE AREA

NORTH TALBOT ROAD SANITARY SEWER OUTLET SERVICE AREA

NOT INCLUDED IN SANITARY SEWER SERVICE AREA

WW-6

\$1.00M

PROJECT ID
ESTIMATED COST (\$MILLIONS)

PROVINCIAL HIGHWAY

COUNTY ROAD

LOCAL ROAD

FUTURE LAUZON PARKWAY

HIGHWAY COMMERCIAL AREA

MUNICIPAL BOUNDARY

HAMLET BOUNDARY

SETTLEMENT AREA EXPANSION AS PER COUNTY OF ESSEX
OFFICIAL PLAN UPDATE, FEBRUARY 19, 2014

NOTES:

The routing shown for proposed trunk sewers may be subject to change based on approved development plans.

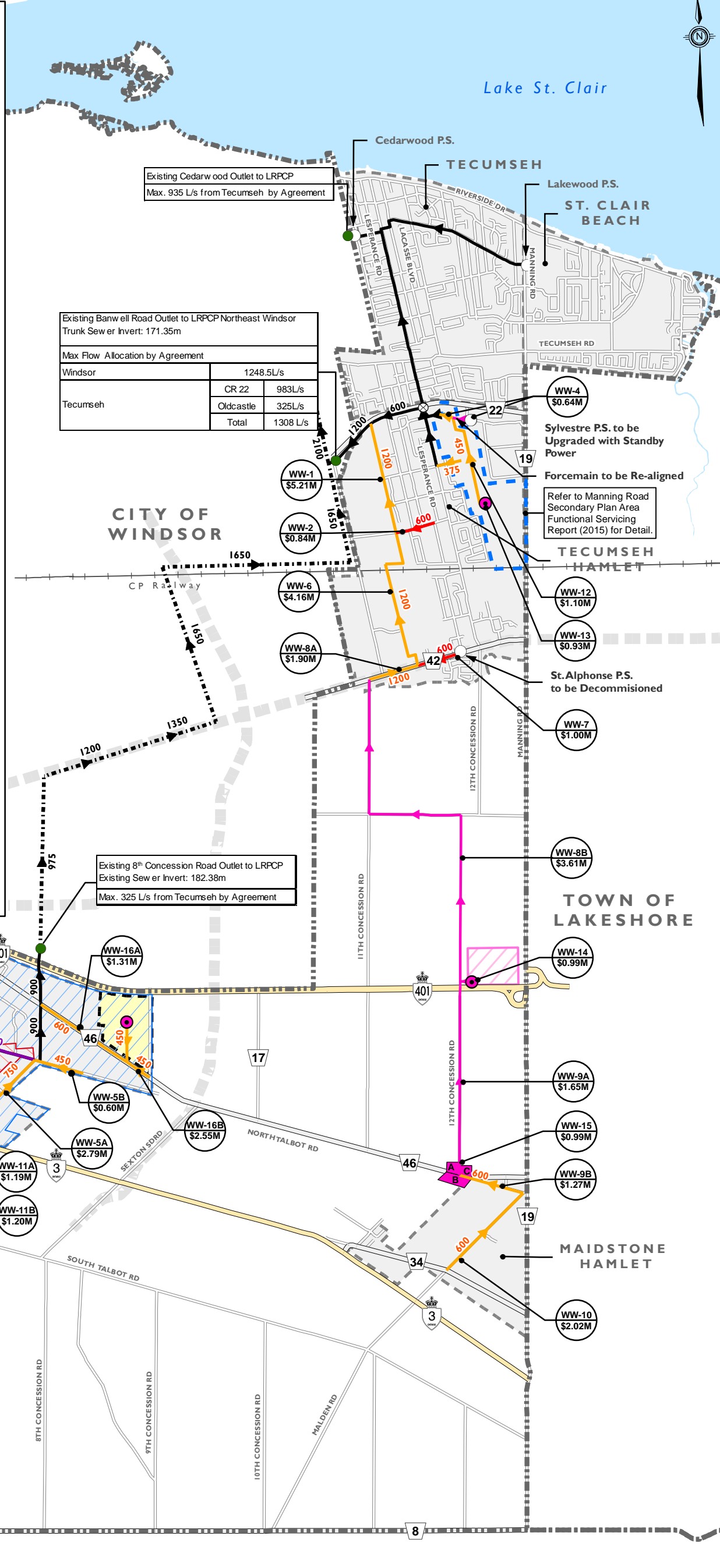
The exact location of the Sewage Pumping Stations to be determined through the detailed design process and/or through the Development Approvals process.

Oldcastle Pump Station No. 1 & 2 are identified in Oldcastle Hamlet Servicing - 8th Conc. Trunk Sanitary Sewer Outlet Preliminary Design Report (Dillon Consulting, May 2017)

SCALE: 1:55,000

500 250 0 500 1,000 1,500 2,000

meters



9. Implementation Plan

The preferred water and wastewater servicing strategies will support the short and long term servicing needs of the approved growth areas and provide flexibility for servicing potential growth areas in the future. The strategies will also support meeting operational requirements, water quality and level of service objectives.

Upon completion of the Master Plan Update or Phase 2 of the EA process, Schedule A, A+ and B projects may proceed to Phase 5, Implementation, subject to finalization of the 30-day review period and assuming no Part II Orders are received. However, during implementation of some of these projects, additional study and analysis may be undertaken such as during the area servicing stages of development. While this work may address refinement to alignments, siting and minimizing environmental impacts, these projects will not require further planning under the Class EA process. The preferred water and wastewater strategies do not include any Schedule C projects requiring further planning under the Class EA process.

The following implementation requirements will be addressed during the subsequent steps (primarily during detailed design) of the projects:

- Finalization of property requirements
- Final refinement of infrastructure alignment and facility siting to ensure infrastructure is located outside regulated areas except for instances when it is unavoidable (watercourse crossings)
- Final refinement of construction methodologies including determination of crossing approaches including open-cut, tunneling and structural supporting requirements
- Completion of additional supporting investigations including but not limited to:
 - Geotechnical investigations to support determination of construction requirements for the infrastructure
 - Hydrogeological investigations to evaluate potential impacts, to support mitigative requirements during construction and determine any dewatering requirements
- Mitigation of potential construction related impacts including but not limited to:
 - Traffic control
 - Noise, vibration and dust
 - Air pollution
 - Service interruption
 - Environmental and water disturbance or contamination
 - Siltation and erosion control

- Approval Requirements as required but not limited to:
 - Certificates of Approval from Ministry of Environment
 - Encroachment Permit from the Ministry of Transportation
 - Approvals from the County of Essex
 - Permit approvals from the Essex Region Conservation Authority (ERCA)
 - Associated Planning Act Approvals
 - Temporary Permit to Take Water for construction dewatering from the Ontario Ministry of the Environment.

Based on the projections for water demand or wastewater flow requirements of the service areas developed from the 2008 BPE, the project timing requirements were determined. This process took into consideration a logical extension of growth from the existing development. The evaluation of timing also took into consideration the availability of and need to maximize the use of existing infrastructure (in both the Town of Tecumseh and the City of Windsor) and best judgement on reasonable timing of subsequent expansions.

Project timing was also integrated with the results of recent studies, Class Environmental Assessments and reports, and where possible other road upgrade projects being planned by the County of Essex and/or the Ministry of Transportation (MTO), to ensure that underground infrastructure was not scheduled after completion of road improvements. This review resulted in several projects being accelerated.

Total project scheduling has been determined for each service area. Some project components have been initiated based on the updated servicing strategies and have been incorporated into recent budgets. Working within an affordability envelope, the Town has prioritized a list of essential projects that will commence detail design in 2019/2020.

In order to provide for a reasonable range of development opportunity within the Town, the following sections outline the proposed Implementation Plan.

9.1 North Service Area

In order to accommodate growth within the West Tecumseh Hamlet and the Manning Road Secondary Plan areas, the proposed Implementation Plan for the projects in the North Service Area (TN) was developed as depicted on Figure 9-1, and as summarized in Table 9-1.

Table 9-1: North Service Area Implementation Strategy

TOWN REF. ID.	PROJECT ID's	DESCRIPTION	START OF CONST'N	COST (\$MILLION)
TN-1	W-2A, W-2B, WW-4, WW-12, WW-13	Manning Road Secondary Plan Area Servicing	0-5 years	\$5.01
TN-2	W-1, WW-1, WW-2	West Tecumseh Hamlet Trunk Facilities, Phase 1	6-10 years	\$8.09
TN-3	W-4, W-5, WW-6, WW-7, WW-8	West Tecumseh Hamlet Trunk Facilities, Phase 2	11-15 Years	\$11.77
TN-4	W-6, WW-8B, WW-14	Highway Commercial Lands Servicing	16-20 years	\$7.03
Total Capital Cost				\$31.90

Notes:

1. Project may be approved (Schedule A) if implemented under a Planning Act Approval in accordance with Section A.2.9 of the Class EA Planning Process.

A description of the key components and justification of the North Service Area Implementation Strategy is provided below:

- Given the Planning Approvals issued for the Manning Road Secondary Plan area, servicing efforts should be focused on delivering services to new development lands in the area. In addition to the trunk sanitary sewer and pumping station required to service these lands, construction of Trunk Watermain along Manning Road – North Section will strengthen the distribution system and provide additional capacity for Fire Flows to the Manning Road Secondary Plan area.

The existing Trunk Sewer on Westlake Drive will provide an outlet for wastewater generated by new and existing developments located in the Manning Road Secondary Plan area. This outlet sewer will also provide the Town with an opportunity to re-direct the discharge from the Sylvestre Pumping Station, thereby removing the forcemain from the County's Road Allowance.

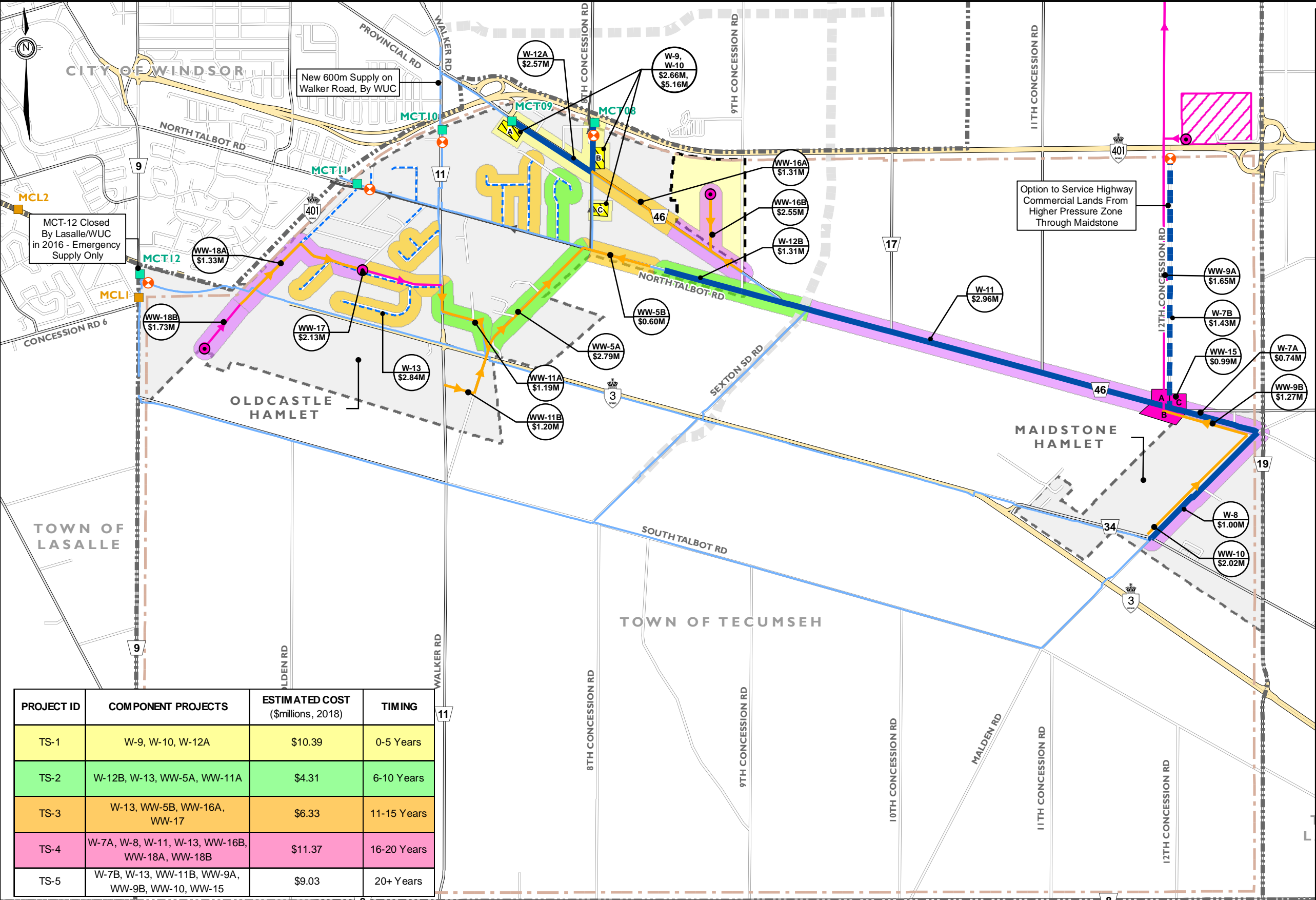
As part of the re-routing of the Sylvestre Pumping Station forcemain, the Sylvestre Pumping Station should be upgraded with standby power in a sound-attenuating enclosure to ensure continuity of service during power outages. The station will need to be further upgraded after the twenty-year planning period to its rated design capacity to accommodate full build-out of the industrial subdivision.

- Construction of the West Tecumseh Trunk Facilities – Phase 1 (TN-2) will facilitate development within the designated urban area of west Tecumseh Hamlet between County Road 22 and CP Railway, and will provide a wastewater outlet capacity for the Southeast Service area. Construction of the West Tecumseh Trunk Facilities will also provide the Town with an opportunity to divert wastewater generated from the lands south of Intersection Road to the new West Tecumseh Trunk Sewer; thereby reducing flow in the Lesperance Road Trunk Sewer north of CP Railway and alleviating potential surcharge in the system north of intersection Road under wet-weather conditions.

- Construction of the West Tecumseh Trunk Facilities – Phase 2 (TN-3) will facilitate development within the designated urban area of west Tecumseh Hamlet between the CP Railway and County Road 42, and will extend the wastewater outlet and water distribution capacity for the Southeast Service area. Connecting the trunk watermain to the County Road 42 Feedermain will also complete the primary feedermain loop in Tecumseh for supply from the Windsor system.
- Construction of the County Road 42 Diversion Sewer (TN-4) will direct all wastewater flows from South of County Road 42 to the new West Tecumseh trunk sewer, and will allow the Town to decommission the St. Alphonse Pumping Station. In addition, construction of the Trunk Watermain on Manning Road – South Section and County Road 42 (TN-4) will strengthen the distribution system on the east side of the Town to ensure that there is adequate capacity to distribute fire flows to the North Service area of the Town.

9.2 South Service Area

In order to accommodate development of the Highway Commercial Lands, and to accommodate existing and new developments within Oldcastle and Maidstone Hamlets, the Implementation Plan was developed for projects in South Service (TS) as depicted on Figure 9-2, and as summarized in Table 9-2.



LEGEND

EXISTING

(MCT) TECUMSEH METERING CHAMBER

(MCL) LASALLE METERING CHAMBER

TRUNK WATERMAIN

SANITARY SEWER

PROPOSED

ISOLATION VALVE AT POTENTIAL PRESSURE ZONE BOUNDARY

PUMPING STATION

TRUNK WATERMAIN

WASTEWATER FORCEMAIN

DIVERSION SEWER

TRUNK SEWER

LOCAL UPGRADE

POTENTIAL BOOSTER PUMPING STATION/ELEVATED TANK SITE

A|B|C

POTENTIAL SITES FOR MAIDSTONE PUMPING STATION

W-5

PROJECT ID

\$2.19M

ESTIMATED COST (\$MILLIONS)

PROJECT IMPLEMENTATION STRATEGY

0-5 YEARS

6-10 YEARS

11-15 YEARS

16-20 YEARS

OTHER FEATURES

PROVINCIAL HIGHWAY

ARTERIAL / COLLECTOR ROAD

LOCAL ROAD

FUTURE LAUZON PARKWAY

SOUTH SERVICE AREA

MUNICIPAL BOUNDARY

HAMLET BOUNDARY

SETTLEMENT AREA EXPANSION AS PER COUNTY OF ESSEX OFFICIAL PLAN UPDATE, FEBRUARY 19, 2014

HIGHWAY COMMERCIAL

NOTES:

The routing shown for proposed trunk watermain may be subject to change based on approved development plans.

SCALE: 1:35,000

240 0 240 480 720 960

meters

PROJECT ID	COMPONENT PROJECTS	ESTIMATED COST (\$millions, 2018)	TIMING
TS-1	W-9, W-10, W-12A	\$10.39	0-5 Years
TS-2	W-12B, W-13, WW-5A, WW-11A	\$4.31	6-10 Years
TS-3	W-13, WW-5B, WW-16A, WW-17	\$6.33	11-15 Years
TS-4	W-7A, W-8, W-11, W-13, WW-16B, WW-18A, WW-18B	\$11.37	16-20 Years
TS-5	W-7B, W-13, WW-11B, WW-9A, WW-9B, WW-10, WW-15	\$9.03	20+ Years

CLIENT
TOWN OF TECUMSEH

PROJECT NAME:
WATER AND WASTEWATER MASTER PLAN UPDATE
SOUTH SERVICE AREA
IMPLEMENTATION STRATEGY

DRAWING No:
FIG 9.2

Table 9-2: South Service Area Implementation Strategy

TOWN REF. ID.	PROJECT ID's	DESCRIPTION	START OF CONST'N	COST (\$MILLION)
TS-1	W-9, W-10, W-12A	Implementation of Tecumseh Zone 2	0-5 years	\$10.39
TS-2	W-12B, W-13 ¹ , WW-5A, WW-11A	Oldcastle Servicing, Phase 1	6-10 years	\$5.62
TS-3	W-13 ¹ , WW-5B, WW-16A, WW-17,	Oldcastle Hamlet Servicing, Phase 2	11-15 years	\$5.02
TS-4	W-7A, W-8, W-11, W-13 ¹ , WW-16B, WW-18A, WW-18B	Oldcastle Hamlet Servicing, Phase 3	16-20 years	\$11.37
TS-5	W-7B, W-131, WW-11B, WW-9A, WW-9B, WW-10, WW-15	Maidstone Hamlet Servicing	20+ years	\$9.03
Total Estimated Capital Cost				\$41.43

Notes:

1. Portions of W-13 to be implemented with WW-17 and WW-18A
2. Implementation of the trunk watermain on 12th Concession Road and may be deferred

A description of the key components and justification of the Southeast Service Area Implementation Strategy is provided below.

- TS-1 - Construction of the Zone 2 Booster Pumping Station, Elevated Storage Facility and the Southwest Tecumseh Trunk Watermain on County Road 46 and on 8th Concession Road will increase system pressures in the south service area and ensure adequate storage for emergency conditions in the south service area.
- TS-2 - Construction of Oldcastle Servicing – Phase 1 will provide sanitary servicing for existing and new development along Oldcastle Road, McCord Lane and Walker Road south of Blackacre Drive. This Project will also include installation of the Trunk Watermain on North Talbot Road to complete the loop to County Road 46, and prepare for the future extension of additional conveyance capacity to Maidstone Hamlet.
- TS-3 - will provide sanitary servicing for existing and new development along North Talbot Road and County Road 46 east of Concession Road 8, as well as for properties fronting on Blackacre Drive between Walker Road and Pulleyblank Road. between Walker Road and Pulleyblank Street. Local watermain in Oldcastle Hamlet should be upgraded according to the Town's anticipated local servicing schedule to improve Available Fire Flows for the existing developments in the area.
- TS-4 – Construction of the Oldcastle Hamlet Servicing Phase 3 will provide services for new development in the newly designated lands north of County Road 46 west of 9th Concession Road, as well as for new and existing developments on Blackacre Drive, Outer Drive, and on Oldcastle Road south of Highway 3.

- TS-5 – Construction of Maidstone Hamlet Servicing will provide trunk drinking water distribution and wastewater collection services to Maidstone Hamlet to service existing developments and new growth. The 12th Concession Road trunk watermain will provide additional security of supply to the Highway Commercial Area and rural areas south of County Road 42.

9.3 Additional Wastewater Treatment Capacity

Based on the growth projections and design criteria, the Town of Tecumseh will exceed the current capacity allocation at the Little River PCP at some point in the future. Table 9-3 summarizes the anticipated timing and preliminary costs for purchasing additional wastewater conveyance and treatment capacity from the City of Windsor in accordance with the terms and conditions established in the Windsor –Tecumseh Wastewater Agreement.

Based on the current population projections, the Town of Tecumseh will require the City of Windsor to proceed with the first expansion of the Little River PCP by 2031. The second expansion of the plant would then be required in 2037, to secure capacity beyond 19.9 ML/d.

Total wastewater flow to the Little River PCP should be monitored and reviewed with the Permanent Joint Liaison Committee to ensure that the required plant expansions occur when needed.

Table 9-3: Timing and Costs for Purchasing Additional Wastewater Capacity from Windsor

PROJECT ID	DESCRIPTION	ANTICIPATED TIMING	COST (\$MILLION)
Windsor -1	Northeast Windsor Trunk Sanitary Sewer, Forest Glade to Little River PCP	Completed	
Windsor-2	Purchase additional treatment capacity at Little River PCP ¹	2031	\$10.22
Windsor-3	Northeast Windsor Trunk Sanitary Sewer, Banwell Road to 8 th Concession Road	Completed	
Windsor-4	Purchase additional treatment capacity at Little River PCP ¹	2037	\$6.27
Total Estimated Cost for Purchasing Additional Capacity from Windsor			\$16.49

Notes:

1. Projects to be implemented by the City of Windsor in accordance with Wastewater Agreement, Nov. 2004. Costs taken from Article 9 of the Agreement, with costs escalated by 2% per year to reflect 2018 costs. Actual timing of Works may be triggered by either the City of Windsor or the Town of Tecumseh in accordance with Article 4 of the Agreement, once the plant reaches 90% of it's rated capacity.

9.4 Property Requirements

As much as possible, all recommended Projects are planned within existing road allowances and/or utility corridors. However, for certain projects property acquisition will be required. A summary of the anticipated property requirements is provided below.

Table 9-4: Property Requirements

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
WW-1, W-1, WW-6 and W-4	West Tecumseh Trunk Sewer and Watermain	Route N-1: min. 20.0 m wide easement between CR 22 and CR 42 in Tecumseh Hamlet	Alignment of trunk sewer and watermain along Route N-1 to be coordinated through Secondary Plan / Plan of Subdivision approvals. Town will secure / purchase permanent easement(s) prior to commencing detail design
WW-4	Sylvestre Pumping Station Upgrade	A minimum 25m wide by 30 m deep (.075 ha) is required for the building site on or adjacent to Sylvestre Drive in Tecumseh Hamlet	An evaluation of alternative sites for the proposed building in close proximity to the existing pumping station will be undertaken prior to commencing detail design. The Town will purchase any required property prior to construction.
W-9	Zone 2 Booster Pumping Station	A min. 50m wide by 50m deep (0.25 ha) parcel of land is required for the booster pumping station site between Baseline Road and Maidstone Hamlet.	Three alternative sites (A, B, and C) have been selected for the proposed booster pumping station. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.
W-10	Zone 2 Water Storage Facility	A 5.0 ha parcel of land is required for the water storage facility site between Baseline Road and Maidstone Hamlet.	Three alternative sites (A, B, and C) have been selected for the proposed water storage facility. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.

In addition, the Town may wish to consider alternative routing of trunk facilities south of County Road 42 to minimize impacts on watercourse crossings and to reduce the capital cost of the projects. The alternative routes that may be considered are shown on the Updated Water and Wastewater Master Plans. In the event that the alternative routes are considered, the following additional property requirements will apply.

Table 9-5: Potential Property Requirements for Routing Alternatives

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
WW-8 & W-6	South Tecumseh Trunk Sewer and Watermain	Alternative Route SE-1: min. 20.0 m wide easement through vacant agricultural lands between CR 42 and Baseline Road	Alternative routing of trunk sewer and/or trunk watermain to be evaluated prior to commencing detail design. If alternative routing is selected as the preferred design, Town will secure /purchase permanent easement(s).
		Alternative Route SE-2: min. 20.0 m wide easement around ESPA #38 through vacant lands between Baseline Road and Hwy 401	



Appendix A

Project and Implementation Data



A-1

Appendix A-1

2008 Water and Wastewater Master Plan Update,
Executive Summary



A-2

Appendix A-2

Water and Wastewater Servicing Agreements



A-3

Appendix A-3

Sanitary Sewage Collection System Improvements
Environmental Study Report



A-4

Appendix A-4

Manning Road Secondary Plan Area, Functional
Servicing Report



A-5

Appendix A-5

Addendum to Water and Wastewater Master Plan,
Oldcastle Servicing



A-6

Appendix A-6

Oldcastle Hamlet Sanitary Servicing – 8th
Concession Road Trunk Sanitary Sewer Outlet,
Preliminary Design Report



A-7

Appendix A-7

2014 Development Charge Background Study



A-8

Appendix A-8

Project Data Sheets



A-9

Appendix A-9

Cost Estimates





Appendix B

Public Consultation



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