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AYR WASTEWATER MASTER PLAN

Prepared for:

REGION OF WATERLOO
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Appendix C Technical Memorandum No. 3 - Flow Monitoring Data Review
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Appendix E Public, Agency, Stakeholder and Aboriginal Consultation

1. INTRODUCTION AND PURPOSE

In 2012, the Regional Municipality of Waterloo (Region) initiated the preparation of a Wastewater Master Plan for the Village of Ayr (Ayr) in the Township of North Dumfries (Township). The purpose of the study was to develop short and long term wastewater servicing strategies for Ayr, taking into account sustainability for long term growth and financially responsible practices.

The study involved the development of growth and flow projections, the assessment of servicing opportunities and constraints, and the development and evaluation of alternatives for future servicing. The study defined infrastructure requirements and staging necessary to support the Region's growth plans to the year 2031 within the study area illustrated in Figure 1.1.

The study was conducted in accordance with the requirements for Master Plans under the Municipal Class Environmental Assessment (EA) (Municipal Engineers Association, June 2000, as amended in 2007 and 2011).

Consultation with the public, stakeholders and government review agencies was a vital component of the study. A Public Information Centre (PIC) was held to provide an opportunity for members of the public to obtain information on the Master Plan process, the alternative solutions, the evaluation of these alternatives and the recommended preferred alternative.

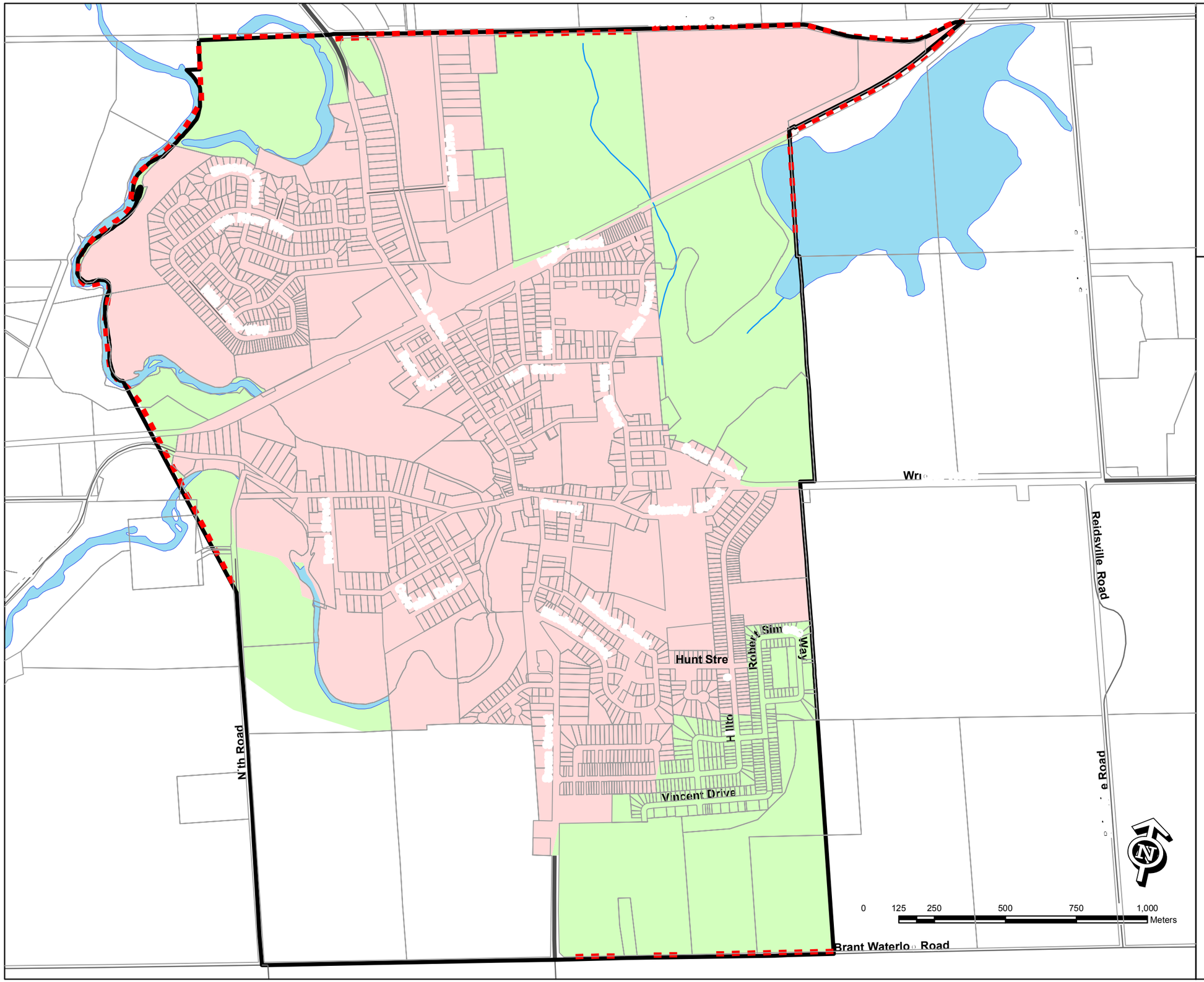
1.1 Background

The Village of Ayr is located in the Township of North Dumfries. The Region has historically been responsible for the wastewater treatment plant (WWTP) in Ayr. In 2005, the Region assumed ownership and responsibility for operating the wastewater collection system in Ayr. This system currently services a population of approximately 4,400 people, as well as several industrial, commercial and institutional properties.

The Ayr wastewater collection system and WWTP are operated by the Ontario Clean Water Agency (OCWA) on behalf of the Region. The wastewater system consists of: 350 sanitary sewers, totalling approximately 24,000 m; the Rose Street and Nith River Way Pumping Stations and associated forcemains; and the Ayr WWTP. In 2006, the Ayr WWTP was expanded to a rated capacity of 3,000 m^3/d to service a future population to the year 2025. At the same time, the Rose Street Pumping Station was also upgraded.

Residential development in Ayr has been steady in recent years, with an average of approximately 25 homes per year. Residential growth has been occurring primarily in the south end of Ayr in the Hilltop Subdivision. It is anticipated that the trend of residential growth will continue to occur in the south end. However, there is also potential for development in other areas of the village. By 2031, the Region has estimated that the Village of Ayr will have a residential population of approximately 8,700 persons and an employment population of approximately 3,500 persons.

Figure 1.1
Study Area



- Study Area
- Watercourse
- Waterbody
- Major Roads
- Minor Roads
- Property Lines
- Urban Area Boundary
- Built Up Area
- Designated Greenfield Area

Growth in Ayr has been limited by the remaining capacity in the wastewater collection system, specifically in the Swan Street Trunk Sewer. The trunk sewer is approaching its full design capacity. With more area in the south end that is within the settlement boundary, as well as lands that are located between the Township Urban Area Boundary Designation and the Countryside Line (as shown on Map 7 of the Regional Official Plan), the existing infrastructure has not been sized appropriately for the type of development that has been occurring (i.e., higher density than originally planned for). Therefore, a servicing strategy is required for the remainder of land in the Urban Boundary, including consideration for the lands located between the Township Urban Area Boundary Designation Line (as shown on Map 7 of the Regional Official Plan.

A Wastewater Master Plan is required for the entire village of Ayr in order to assess the opportunities and constraints within the existing system and recommend upgrades or enhancements as required in order to support the Region's planning objectives.

1.2 Objectives of the Ayr Wastewater Servicing Master Plan

The objectives of the Master Plan study were to:

- analyze the performance of the existing wastewater collection system in Ayr to identify servicing constraints and opportunities;
- develop short and long term wastewater servicing strategies for the Village of Ayr, taking into account sustainability for long-term growth and financially responsible practices; and
- satisfy the requirements for Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) (Municipal Engineers Association, June 2000, as amended in 2007 and 2011).

In addition, the strategy should focus on providing the necessary infrastructure in order to support the Region's growth plans, as outlined in the Regional Official Plan, and should cover a period from the present to 2031.

1.3 Class Environmental Assessment and Master Planning Process

The Municipal Class EA (Municipal Engineers Association, 2000, as amended in 2007 and 2011) outlines an approved planning process for municipal infrastructure projects, including wastewater projects. Municipal proponents can use the Class EA process to meet the requirements of the Ontario *Environmental Assessment Act* (EAA). Individual projects subject to the Municipal Class EA process are categorized as Schedule A, A^+, B, or C, depending on the type of project and its potential environmental effects. The Municipal Class EA planning and design process is illustrated in Figure 1.2.

The Master Plan provisions of the Municipal Class EA allow municipalities to develop long range plans for integrated infrastructure requirements. The Ayr Wastewater Servicing Master Plan was completed as a Master Plan, fulfilling the requirements of Phases 1 and 2 of the Municipal Class EA.

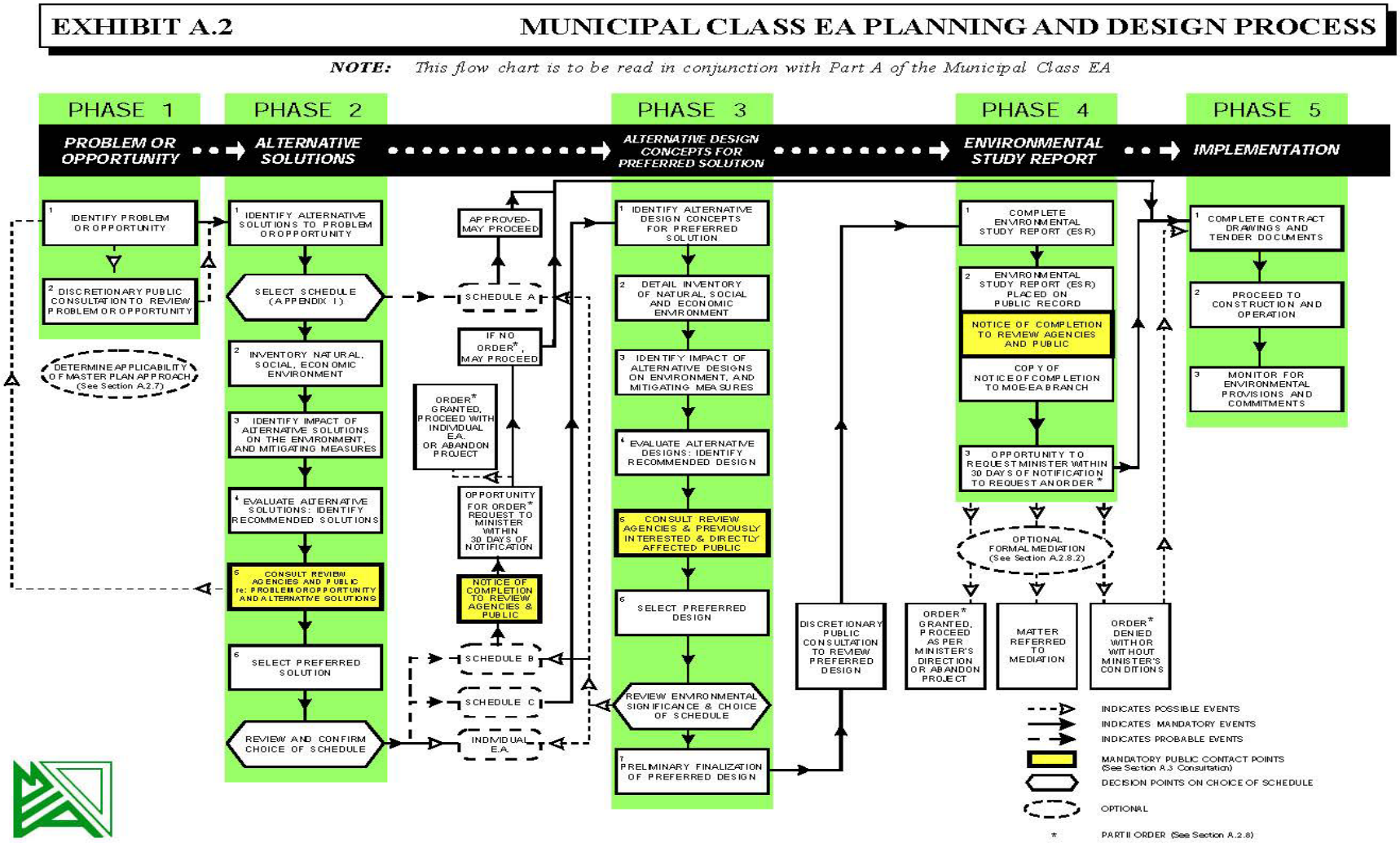


Figure 1.2 Municipal Class EA Process

Projects that result from the Master Planning process will be subject to the requirements of the Municipal Class EA process which may include further assessment for Schedule B activities. In addition, Phase 3 and Phase 4 requirements may need to be carried out for any Schedule C activities related to the Master Plan.

1.4 Report Format

The Master Plan report consists of the following sections:

- Section 1.0 – Introduction and Background;
- Section 2.0 – Existing Conditions;
- Section 3.0 – Planning and Growth Projections;
- Section 4.0 – Opportunities and Constraints Analysis;
- Section 5.0 – Development of Alternatives;
- Section 6.0 – Evaluation of Alternatives;
- Section 7.0 – Preferred Alternative and Implementation;
- Section 8.0 – Public, Agency, Stakeholder and Aboriginal Consultation;
- Section 9.0 – Recommendations; and,
- Section 10.0 – References.

Appendices A, B, C, and D contain technical memoranda prepared as part of this study. Appendix E contains documentation of public, agency, stakeholder and aboriginal consultation completed as part of this Master Plan.

2. EXISTING CONDITIONS

2.1 Introduction

This section provides a summary of existing environmental and technical conditions information developed for the Master Plan. Technical Memorandum No. 1, which is included in Appendix A, documents the background information and data review that was undertaken and should be consulted for more detailed information.

2.2 Existing Environmental Conditions

As part of the 2006 Class EA for the Expansion of the Ayr WWTP (Region of Waterloo, 2006), an inventory of natural environmental features was completed. The inventory was focused on the areas surrounding the Rose Street Pumping Station and the Ayr WWTP and identified Environmentally Sensitive Policy Areas (ESPAs), vegetation including woodlands and regionally significant plant species, wildlife including regionally significant breeding bird species, wetlands, and fish communities and aquatic habitats. The study identified that the Ayr WWTP is located within the floodplain of the Nith River and that the plant is also located adjacent to ESPA No, 43. This ESPA was designated because of the occurrence of a rich association of alluvial plains and a very high quality floodplain forest with a district Carolinian aspect.

On September 23, 2003, alternative environmental information was collected along Swan Street and Nith Road. Key findings are as follows:

- Coffin Creek, a cold water stream, was identified as crossing Swan Street at Fowler Street.
- An unnamed tributary crosses Swan Street between Mitchell Street and Burnside Drive.
- Few trees and no stream crossings were noted for Nith Road.

2.3 Existing Technical Conditions

The Ayr wastewater system consists of 350 sanitary sewers ranging in size from 250 mm to 750 mm, the Nith River Way Pumping Station, the Rose Street Pumping Station, and the Ayr WWTP. This section presents key information on the each of these system components.

2.3.1 Sanitary Sewers

Sanitary sewers in Ayr range in size from 250 mm to 750 mm. Figure 2.1 presents the location of the existing sanitary sewer system. Key elements of the system include:

- The Northumberland sanitary sewer which runs along Northumberland Street and extends from the Township Urban Area Boundary to Stanley Street where it discharges into the Stanley Street Sanitary Sewer. This trunk sewer receives wastewater from the newly constructed North Dumfries Community Centre and existing buildings located on Greenfield Road, Nith River Way, Broom Street, Seylor Street, Simone Place, Melissa Court, Nith River Court, Robson Street, Bute Street, McCrae Street, Thompson Street, Elliot Street, Manley Street, McDonald Street, Gibson Street and a portion of Inglis Street and Hall Street.

- The Swan Street sanitary sewer which extends from the vicinity of Hilltop Drive to Stanley Street and discharges into the Stanley Street Sanitary sewer. This sewer receives wastewater from Hilltop Drive, Burnside Drive, Watson Crescent, Mitchell Street, Field Street, Hunt Street, Jones Court, Fowler Street and St. Andrews Street.
- The Main Street sanitary sewer which runs along Hall Street and Main Street from James Street east to Main Street and then south to Stanley Street. This sewer discharges into the Stanley Street sanitary sewer and receives wastewater from Main Street, Scott Street, Cooper Street, Upton Court, Reed Place, Newell Street, James Street, Willison Street, Hope Street, Grey Street, and a portion of Hall Street, Hilltop Drive, and Stanley Street.
- The Stanley Street Sanitary Sewer which runs along Stanley Street from Main Street under the Nith River, along Church Street and Rose Street to the Rose Street Pumping Station. This sewer receives wastewater from Pipe Street, Walter Street, John Street, and Water Street.

2.3.2 Pumping Stations

There are two pumping stations within Ayr. These stations are the Nith River Way Pumping Station and the Rose Street Pumping Station.

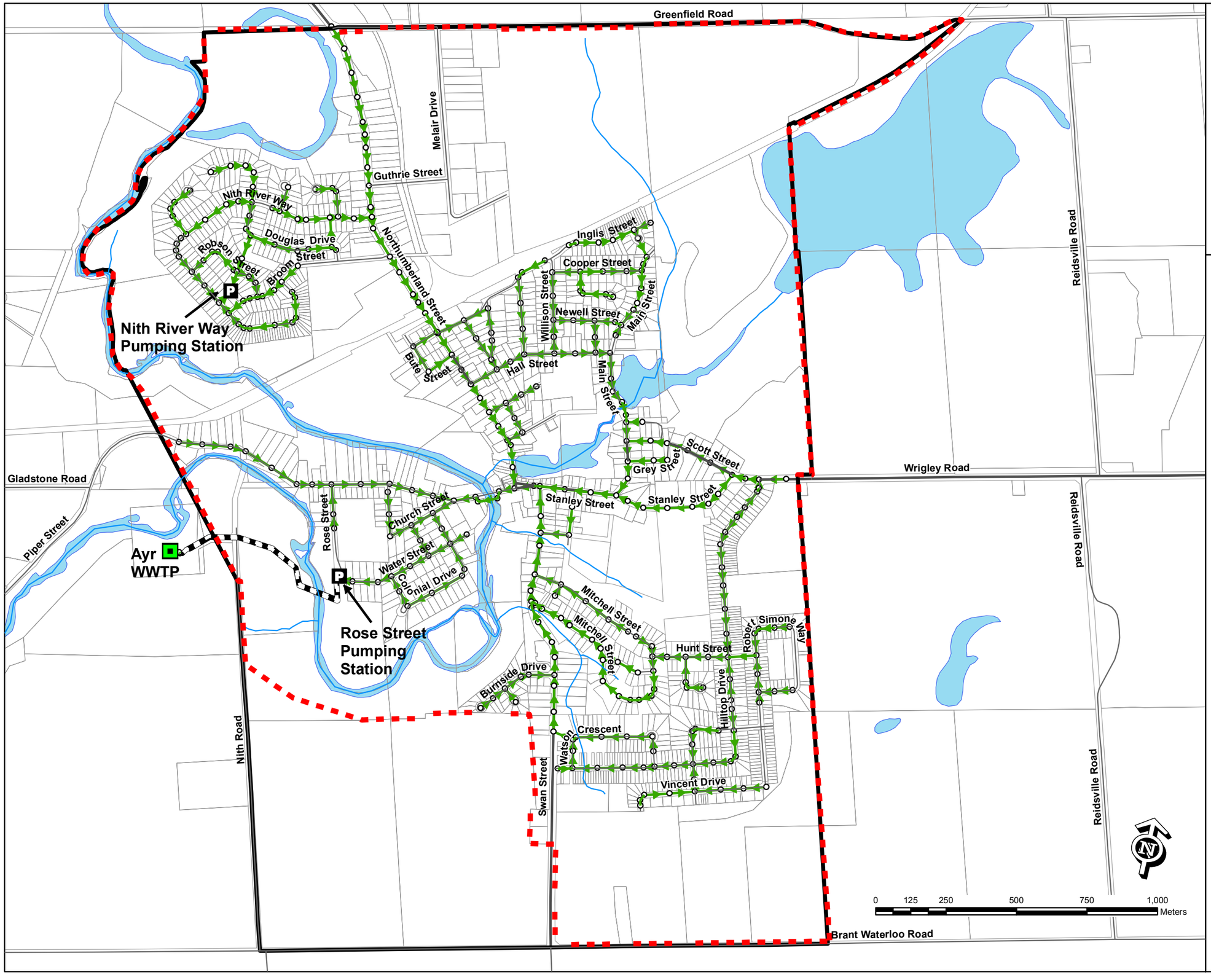
The Nith River Way Pumping Station is located on Nith River Way and services a relatively small area. It receives wastewater from Seyler Street, Nith River Way, Robson Street, Simone Place, Douglas Street and Bloom Street. The station is equipped with two 4 L/s pumps that pump into a 150 mm diameter forcemain that discharges into the Broom Street sanitary sewer. The firm capacity of the station was estimated to 3.9 L/s based with the largest pump out of service and a pump efficiency of 75%. The capacity of the forcemain is estimated to be 44.1 L/s based on a maximum velocity of 2.5 L/s.

The Rose Street Pumping Station receives all of the wastewater from Ayr and pumps it directly into the headworks of the Ayr WWTP. The station is located at the intersection of Rose Street and Water Street. The station is currently equipped with three 47 L/s pumps that pump all wastewater into a 200 mm diameter forcemain. The forcemain is located within an easement and travels under the Nith River. The station was upgraded in 2006 at the same time as the upgrade to the Ayr WWTP. The firm capacity of the station is estimated to be 80 L/s. The capacity of the forcemain has been estimated at 157 L/s.

2.3.3 Ayr WWTP

The Ayr WWTP is located on Nith Road immediately south of the Nith River. It is a package extended aeration plant that provides carbonaceous biological oxygen demand (CBOD) removal, nitrification, chemical phosphorus removal, disinfection, and sludge thickening. The plant was originally constructed in 1978, was updated and rerated in 2002 to a capacity of 1,500 m^3/d and was further expanded in 2006 to a rated capacity of 3,000 m^3/d. The plant expansion was completed to provide sufficient capacity for a projected population of 5,900 people by 2025.

Figure 2.1
Existing Wastewater System



- WWTP
- Existing Forcemain
- Pumping Station
- Existing Sanitary Sewers
- Existing Manholes
- Study Area
- Township Urban Area Boundary
- Property Lines

3. PLANNING AND GROWTH PROJECTIONS

3.1 Introduction

This section provides a summary of the population and growth projections developed for the Master Plan. Technical Memorandum No. 2, which is included as Appendix B, documents the development of population and growth estimates for Ayr and should be consulted for more detailed information.

Information for the development of these population and growth projections was provided by the Region of Waterloo Department of Planning, Housing and Community Services (Regional Planning) and the Planning Department of the Township of North Dumfries.

The current (2011) residential population for the Ayr Settlement Area has been estimated by the Region at 4,255 persons. The current (2011) employment population for the Ayr Settlement Area has been estimated by the Region at 1,853 persons.

3.2 Current Approved Growth

Figure 3.1 presents the location of the registered and draft plans for Ayr. The Urban Area Boundary in Ayr consists of the Designated Greenfield Area (DGA) and the Built-up Area (BUA). Table 3.1 presents the number of units and estimated population from the registered plans, draft plans and units where building permits have been issued but have not yet been constructed for the DGA in Ayr.

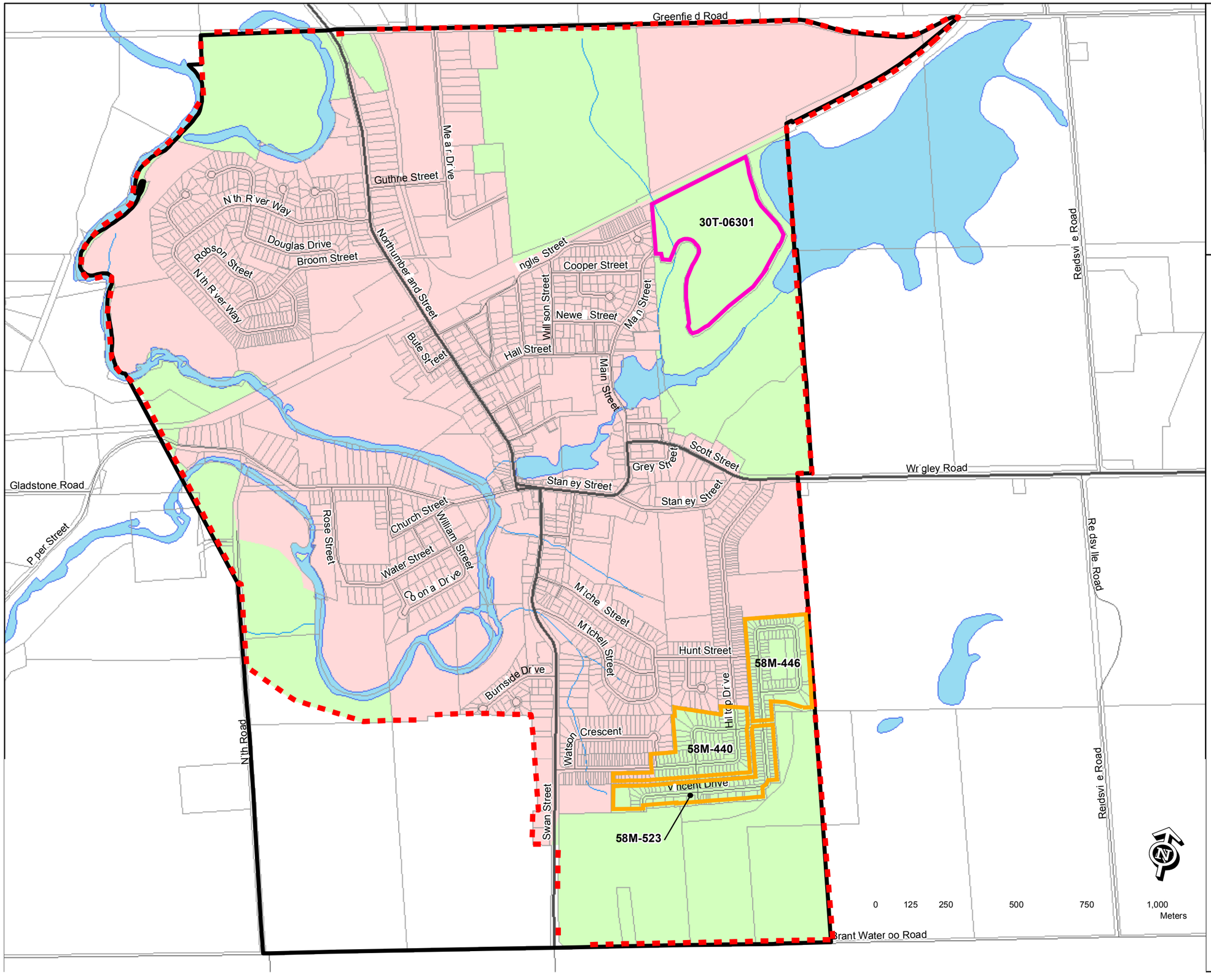
With the eventual occupation of registered un-built units, draft approved units and un-built units with building permits, the population of Ayr is projected to increase by 1,427 persons to a total residential population of 5,682. All of this growth will occur within the DGA as shown in Figure 3.1.

Table 3.1 Ayr Registered Unbuilt, Draft Approved and Un-Built Units with Building Permits

Plan ID	Total Residential Units	Estimated Residential Population
Registered Un-built Units		
58M-440 (30T-05301)	21	69
58M-446 (30T-05301)	49	162
58M-523 (30T-05301)	79	246
Total Registered Un-built Units	**149**	**477**
Draft Approved Plans		
30T-06301	236	718
Total Draft Approved Units	**236**	**718**
Un-built Units with Issued Building Permits		
58M-440	5	17
58M-446	20	66
58M-523	54	150
Total Un-Built Units with Building Permits	**79**	**233**
Total	**464**	**1,427**

Notes:
1. Information presented is for the DGA in Ayr. There are an additional 6 registered lots in the BUA.

Figure 3.1
Registered Unbuilt, Draft Approved and Unbuilt Units with Building Permits



3.3 2017 Conditions

As an interim step, a growth scenario representing potential conditions in 2017 was developed. This is an assumed scenario and represents development of all unbuilt units (with building permits), registered units and draft approved units along with completion of development within the South East Residential Area (within existing settlement area) and South East Residential Area (non-setttlement area). This scenario includes infill development within the existing Built-up Area. Based on discussions with Township Staff, it was determined that this development could possibly occur by 2017. It should be noted that the timeline for the completion of these developments will be based on a number of factors including the availability of the necessary Regional and Township infrastructure as well as market forces. With the completion of the growth assumed in this scenario, the residential population would be increased to 8,021 persons and the employment population would be increased to 2,071 persons. Table 3.2 presents the net developable area, estimated growth and total residential population and estimated total employment population for this scenario. Figure 3.1 presents the location of all unbuilt, registered, and draft approved development while Figure 3.2 presents the locations of the South East Residential (within settlement area) and South East Residential (non-settlement area) areas. These two areas are within the Designated Growth Areas (DGA).

Table 3.2 2017 Conditions – Projected Population

Area Designation	Net Developable Area (ha)	Estimated Units	Estimated Residential Population	Estimated Employment Population
South East Residential (within Existing Settlement Area)	39.6	557	1,457	103
South East Residential (Non-Settlement Area)	28.6	415	1,196	115
NE Residential	16.8	236	718	0
Total DGA	85	1,208	3,371	218
Total Built-up Area	253.4	1,602	4,651	1,853
Total Ayr	338.4	2,810	8,021	2,071

3.4 Growth to 2031

The Region has estimated growth projections to the year 2031 based on the build out of the current Township Urban Area. The residential population is projected to increase to 8,691 persons and the employment population is projected to increase to 3,572 persons. Table 3.3 presents the net developable area, estimated number of dwellings, estimated total residential population and estimated total employment population for 2031. Figure 3.2 presents the location of growth areas within the Township Urban Area Boundary.

Table 3.3 2031 Conditions – Projected Population

Area Designation	Net Developable Area (ha)	Estimated Units	Estimated Residential Population	Estimated Employment Population
South East Residential (Within Existing Service Area)(1)	39.6	557	1,457	103
South East Residential (Non Settlement Area)	28.6	415	1,196	115
N E Industrial (Dry)	34.6	0	0	1,274
N E Residential	33.5	402	1,195	82
North West	2.0	0	0	101
South West Landlocked (Settlement Area)	0	0	0	0
South West Landlocked (Non Settlement Area)	5.9	70	192	44
Total DGA	144.2	1,444	4,040	1,719
Total Built Up Area	253.4	1,602	4,651	1,853
Total Ayr (BUA and DGA)	**397.6**	**3,046**	**8,691**	**3,572**

Notes:
1. Information shown for the South East Residential Area is for both the areas that are currently partially serviced and partially unserviced.

3.5 Future Growth

The mature state of Ayr corresponds to build out of the current DGA, and the lands located between the Township Urban Area Boundary designation and the Countryside Line (as shown on Map 7 of the Regional Official Plan[1]). The "mature" state population figures were developed based on the capacity of lands between the Township Urban Area Boundary Designation and the Countryside Line should not be considered population projections.

Table 3.4 presents the net developable area, estimated number of dwellings, estimated residential total population and estimated total employment population for the mature state of Ayr located within the Urban Boundary Area (DGA and BUA)[2] and the lands located between the Township Urban Area Boundary designation and the Countryside Line (as shown on Map 7 of the Regional Official Plan). Figure 3.2 presents the location of the designated growth areas.

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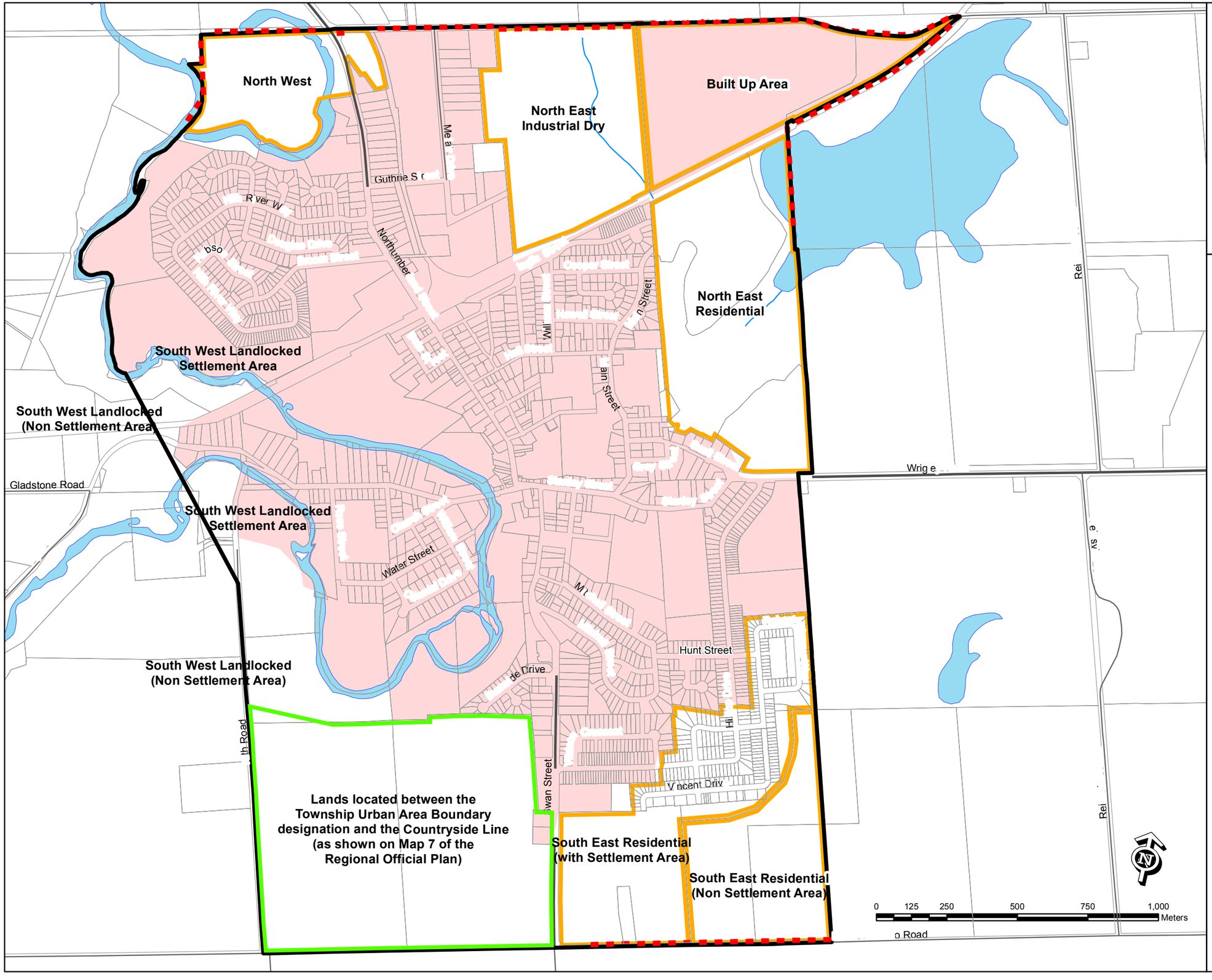
[1] As approved, with modifications, by the Minister of Municipal Affairs and Housing on December 22, 2010.

[2] The South East Residential Area (within Settlement Area) includes the three Registered Plans identified in Table 3.1 and the Stage 4 lands of Hilltop Estates. The South East Residential (Non Settlement Area) includes the Gillespie Lands. The North East Residential area includes the draft approved plan identified in Table 3.1 as well as additional development property located to the south.

Figure 3.2
Future Development Areas



Regional Planning estimated a residential population of 8,691 persons and an employment population of 3,572 persons within the Township Urban Area Boundary.

Regional Planning also provided figures for the build-out of the lands located between the Township Urban Area Boundary designation and the Countryside Line as shown on Map 7 of the Regional Official Plan. This area was identified in the Regional Official Plan as a future development area and is not within the DGA.

Table 3.4 presents the growth figures for this area. It is important to note that this area is not located within the Urban Area Boundary and an urban boundary expansion would be necessary before additional planning or growth could occur. Regional Planning do not expect that these lands will be required until after 2031. It is anticipated that growth in this area will not occur until after 2031. The future population figures shown in Table 3.3 are not population projections but represent the capacity of the land area.

Table 3.4 Ayr Mature State – Urban Boundary Expansion

Potential Growth Area	Net Developable Area (ha)	Estimated Units	Estimated Residential Population	Estimated Employment Population
Lands located between the Township Urban Area Boundary Designation and the Countryside Line as shown on Map 7 of the Regional Official Plan.	82.2	1,233	3,310	397
Total Ayr (BUA and DGA)	**397.6**	**3,046**	**8,691**	**3,572**
Total Ayr	479.8	4,279	12,001	3,969

Notes:
2. Unit and population estimates shown are not projections but instead represent the capacity of the lands.

Appendix B (Table 3.3) provides additional information on the potential timing of growth noted in Tables 3.1 and 3.2. Appendix B (Table 3.4) also provides additional information on the potential timing for specific infill development within the Ayr BUA[3].

3.6 Growth Projections

Growth projections were developed for Ayr for the short term (2012 to 2017), long term (2031) and ultimate buildout. Growth projections could not be developed for five year increments due to the significant uncertainties associated with predicting development timelines. It is important to note that the growth estimates developed for the Master Plan are intended only to be utilized to determine sanitary servicing and infrastructure requirements.

Table 3.5 presents the estimated residential and employment population estimates for existing conditions, 2017 conditions, 2031 conditions and ultimate buildout conditions.

The ultimate build out residential population for Ayr is estimated to be 12,001 persons.

[3] Figure 3.3 in Appendix B illustrates the location of these infill developments. Appendix B also outlines two properties located north of the Urban Area Boundary which were included in the future wastewater service area.

Significant growth is anticipated between 2012 and 2017 with the majority of the growth occurring as in-fill development within the BUA or development of the Hilltop Estates and Gillespie Lands located in the South East Residential Areas. It is important to note that historically growth has occurred at average rate of 25 units per year. During the period from 2012 to 2017, residential population growth of 3,767 persons is anticipated which represents development at an approximate rate of 250 units per year over the next 5 years.

Table 3.5 Growth Estimates

Area	2011 Population		2017 Conditions		2031 Conditions		Ultimate Build Out Conditions	
	Res.	Empl.	Res.	Empl.	Res.	Empl.	Res.	Empl.
South East Residential (Within Existing Settlement Area)	0	0	1,457	103	1,457	103	1,457	103
South East Residential (Non Settlement Area)	0	0	1,196	115	1,196	115	1,196	115
NE Industrial (Dry)	0	0	0	0	0	1,274	0	1,274
NE Residential	0	0	718	0	1,195	82	1,195	82
North West	0	0	0	0	0	101	0	101
South West Landlocked (Settlement Area)	0	0	0	0	0	0	0	0
South West Landlocked (Non Settlement Area)	0	0	0	0	192	44	192	44
Lands located between the Township Urban Area Boundary Designation and the Countryside Line as shown on Map 7 of the Regional Official Plan.	0	0	0	0	0	0	3,310	397
Current Developed Area	**4,255**	**1,853**	**4,651**	**1,853**	**4,651**	**1,853**	**4,651**	**1,853**
Totals	**4,255**	**1,853**	**8,021**	**2,071**	**8,691**	**3,572**	**12,001**	**3,969**

Notes:

1. Populations shown in 2031 are projections. Populations shown for 2017 are interim values developed from information provided by the Township planner.
2. Existing Conditions population obtained from 2012 Water and Wastewater Monitoring Report (Region of Waterloo, 2012).
3. 2017 Population projections include all draft approved, registered and unbuilt units with building permits and development within the BUA.
4. 2031 Population projections include the mature state of Ayr within the BUA and the DGA.
5. Ultimate Build Out data include the mature state of Ayr. For the lands located between the Township Urban Area Boundary Designation and the Countryside Line as shown on Map 7 of the Regional Official Plan., the figures are not population projections but represent the capacity of the lands.
6. No change in the BUA data from 2017 to 2031.

4. OPPORTUNITIES AND CONSTRAINTS ANALYSIS

To complete the servicing opportunities and constraints analysis, an existing H2OMAP SEWER model of the Ayr wastewater system was utilized. As a first step, the existing model was reviewed and recalibrated based on the historical flow monitoring results. Technical Memorandum No. 3, which is included in Appendix C provides the analysis of historical flow data and should be consulted for more detailed information. More detailed information on opportunities and constraints analysis is provide in Technical Memorandum No. 4, which is located in Appendix D.

4.1 Model Recalibration Results

To complete the opportunities and constraints analysis, the H2OMAP SEWER model was reviewed, recalibrated and utilized. Appendix D documents the methodology and results of the model recalibration process. Tables 4.1 and 4.2 present summaries of the model recalibration results and shows that the model reasonably predicts both dry weather and total peak flows under existing conditions.

Table 4.1 Dry Weather Flow Model Calibration Results

Monitoring Site	Average Measured Dry Weather Flow (L/s)	Average Modelled Dry Weather Flow (L/s)	Peak Measured Dry Weather Flow (L/s)	Peak Modelled Dry Weather Flow (L/s)
MH345 (Swan Street)	1.9	1.9	3.2	3.1
MH322 (Northumberland)	7.5	7.6	12.7	12.5
MH305 (Stanley Street)	1.8	1.8	3.1	3.1
MH 301 (Stanley Street)	11.4	11.2	16.7	17.9
MH403 (Water Street)	14.2	12.9	19.7	19.5

Table 4.2 Total Flow Model Calibration Results

Monitoring Site	Average Measured Dry Weather Flow (L/s)	Peak Modelled Dry Weather Flow (L/s)	Modelled Infiltration Flow (L/s)	Total Modelled Peak Flow (L/s)	Peak Measured Total Flow (L/s)
MH345 (Swan Street)	1.9	3.1	3.2	6.3	5.2
MH322 (Northumberland)	7.5	12.5	12.6	20.1	20.3
MH305 (Stanley Street)	1.8	3.1	2.9	6.0	4.7
MH 301 (Stanley Street)	11.4	17.9	0	24.9	23.0
MH403 (Water Street)	14.2	19.5	0	26.5	25.1

In general, comparison of measured average and peak flows at each site indicates a strong agreement between modelled and measured values.

4.2 Opportunities and Constraints Assessment Methodology

A methodology to identify capacity constraints and opportunities within the Ayr wastewater system was developed. The methodology was developed by considering the Region's design standards for sanitary sewers, pumping stations and for treatment facilities. The following sections discuss the methodology used in this Master Plan to assess sanitary sewers, pumping stations and treatment facilities.

4.2.1 Sanitary Sewer System and Pumping Stations

To assess the capacity of the existing sanitary sewer system to convey future flows, future flows were calculated based on the growth projections identified in Section 3 and the Region of Waterloo design flow allowances. Table 4.3 presents the design flow allowances.

Table 4.3 Region of Waterloo – Design Flow Allowances

	Residential	Industrial	Commercial	Other
Average Flow	350 Lpcd	0.50 L/s/ha	Core 1.16 L/s/ha Shopping Mall 0.3 L/s/ha General 0.6 L/s/ha	In accordance with MOE Guidelines
Peaking Factor	Harmon Formula $F = 1 + (14/(4+\sqrt{P}))$ (P = Population / 1000)	Peaking factor as per MOE guidelines "Typical Industry Sewage Flow peaking factor"	Peak factor of 2.5.	In accordance with MOE Design Guidelines.
Infiltration Allowance	Infiltration allowance of 0.15 L/s/ha	Infiltration allowance of 0.15 L/s/ha	Infiltration allowance of 0.15 L/s/ha	Infiltration allowance of 0.15 L/s/ha

The values shown in Table 4.3 compare well with those identified in the MOE Design Guidelines for Sewage Works (2008). As an example, the MOE Design Guidelines for Sewage Works recommend a per capita wastewater generation rate of 225 - 450 Lpcd be utilized to project future flows. The value of 350 Lpcd used by the Region is within the recommended range. In addition, the MOE Design Guidelines for Sewage Works also recommends an infiltration allowance ranging from 0.1 L/s/ha to 0.28 L/s/ha be utilized to determine future flows. The Region's design infiltration allowance of 0.15 L/s/ha is within the range identified by the MOE Design Guidelines for Sewage Works.

Sanitary sewer capacity deficiencies were identified if the full flow capacity of the sanitary sewer was exceeded by the projected flow. It was also noted where the projected flow approached the capacity of the sanitary sewer. If the projected flows reached or exceeded 75% of the full flow capacity, the projected flow was identified as approaching the full flow capacity. The projected flow was defined as the sum of the current peak flow plus the future development peak flow.

For pumping stations, future flows were calculated based on the growth projections identified in Section 3 and the Region of Waterloo design flow allowances. Pumping station deficiencies were identified if the pumping station firm capacity (calculated pumping capacity with the largest pump out of service) was exceeded by the projected peak flow. Forcemain deficiencies were not noted where the projected peak flow

exceeded the capacity where the capacity was calculated based on a maximum velocity of 2.5 m/s. This is considered a conservative approach and is considered suitable for use in a Master Planning Study.

4.2.2 Ayr WWTP

To assess the capacity of the existing Ayr WWTP to treat future flows, the approach utilized by the Region in the 2012 Water and Wastewater Monitoring Approach was used. This approach utilizes the existing average per capita flow along with the projection of future growth to estimate future flows. Unlike the sanitary sewer system, future flows are projected for average flow conditions and compared against the facility rated average flow capacity to identify any constraints. For this Master Plan, the Region's per capita flow generation rate of 350 Lpcd was applied to new growth. This is appropriate for a Master Plan and consistent with the approach taken by the Region in previous studies.

The Region reviews available capacity at the Ayr WWTP on an annual basis as part of the Water and Wastewater Monitoring Reports.

4.3 Future Scenarios

A number of scenarios were developed to represent future conditions in Ayr. The following sections provide information on the future population estimates and estimated future flows for each of the following scenarios:

- Scenario 1 – Existing conditions;
- Scenario 2 – Development of all unbuilt units with building permits, registered units and draft approved units;
- Scenario 3 – Development of all unbuilt units with Building permits, registered units and draft approved units plus completion of development in the South East Residential (within settlement area) and South East Residential (non-settlement area) lands and infill development within the Built-up Area. For the purposes of evaluation, this scenario is assumed to represent conditions in 5 years based on information on development timing obtained from the Township. It should be noted that this scenario may represent conditions beyond 2017 depending on actual growth.
- Scenario 4 – Development to 2031; and
- Scenario 5 – Development to a Mature State.

Information on the development of population estimates for each of these scenarios is included in Section 3. The following sections describe the projected populations and flows for each scenario.

4.3.1 Scenario 1 – Existing Conditions

Scenario 1 represents existing conditions. Table 4.4 presents the population and flows for this scenario. For each scenario, the peak flow at the Rose Street Pumping Station and the average flow to the Ayr WWTP are provided.

Table 4.4 Scenario 1 – Population and Flows

Description	Estimated Value
Existing Residential Population	4,255
Existing Employment Population	1,853
Peak Flow including Infiltration to Rose Street Pumping Station (L/s)	31.6[1, 2]
Average Flow to Ayr WWTP (m^3/d)	1,324

Note:
1. Existing peak flows derived based on existing flow monitoring data (2010).
2. Peak flow includes peak flow of 5.1 L/s. This value was estimated as measured data is not available for the North Dumfries Community Complex.

Under existing conditions, the peak flow to the Rose Street Pumping Station is 31.6 L/s. The existing peak flow includes an allowance for the recently constructed North Dumfries Community Centre as this facility was commissioned following the collection of flow monitoring data in 2010. The average flow at the Ayr WWTP is 1,324 m^3/d.

4.3.2 Scenario 2 – Unbuilt Units, Registered Units and Draft Approved Units

Scenario 2 represents the occupancy of all unbuilt units (with building permits), registered units, and draft approved development. This scenario also includes an allowance for the peak flow from the North Dumfries Community Centre. Table 4.5 presents the estimated future growth population, estimated peak flow to the Rose Street Pumping Station and the estimated average flow to the Ayr WWTP for this scenario.

Table 4.5 Scenario 2 – Estimated Population and Flows

Description	Estimated Value
Existing Residential Population	4,255
Scenario 2 Additional Residential Population	1,427
Scenario 2 Total Residential Population (4,255+1,427)	5,682
Existing Employment Population	1,853
Scenario 2 Additional Employment Population	0
Scenario 2 Total Employment Population (1,853+0)	1,853
Scenario 2 Additional Service Area (ha)	42.8
Scenario 2 Additional Average Wastewater Flow (1,427x350/86400) (L/s)	5.8
Scenario 2 Additional Infiltration (42.8 x 0.15 L/s/ha) (L/s)	6.4
Scenario 2 Peaking Factor at the Rose Street Pumping Station	3.07
Existing Peak Flow at the Rose Street Pumping Station (L/s)	31.6
Scenario 2 Additional Peak Flow at the Rose Street Pumping Station (5.8 x 3.07+ 6.4) (L/s)	24.2
Scenario 2 Total Peak Flow to the Rose Street Pumping Station (31.6+24.2) (L/s)	55.8
Existing Average Flow to the Ayr WWTP (m^3/d)	1,324
Scenario 2 Additional Average Flow to the Ayr WWTP (1,427*350/1000) (m^3/d)	499
Scenario 2 Total Average Flow to the Ayr WWTP (1,324 + 499) (m^3/d)	1,824
Notes: 1. Estimated peak flow of 5.1 L/s for the North Dumfries Community Centre is included in existing peak flow.	

Under Scenario 2, the peak flow estimated for the Rose Street Pumping Station was 55.8 L/s while the average projected at the Ayr WWTP was 1,824 m^3/d.

4.3.3 Scenario 3 – 2017 Conditions

Scenario 3 represents development of all unbuilt units (with building permits), registered units and draft approved development along with complete development within the South East Residential (within settlement area) and South East Residential (non-settlement area) and infill development within the existing Built-up Area. Based on information provided by the Township, it was assumed that these developments could occur within Ayr by the year 2017. It should be noted that all of these developments may not occur until sometime after 2017. Table 4.7 presents the estimated future growth population, estimated peak flow to the Rose Street Pumping Station and the estimated average flow to the Ayr WWTP for this scenario.

Table 4.6 Scenario 3 – Estimated Population and Flows

Description	Value
Existing Residential Population	4,255
Scenario 3 Additional Residential Population	3,767
Scenario 3 Total Residential Population (4,255+3,767)	8,021
Existing Employment Population	1,853
Scenario 3 Additional Employment Population	218
Scenario 3 Total Employment Population (1,853+218)	2,071
Scenario 3 Additional Service Area (ha)	85
Scenario 3 Additional Average Wastewater Flow ((3,767+218)x350/86400) (L/s)	16.1
Scenario 3 Additional Infiltration (85 x 0.15 L/s/ha) (L/s)	12.8
Scenario 3 Peaking Factor at the Rose Street Pumping Station	2.95
Existing Peak Flow at the Rose Street Pumping Station (L/s)	31.6
Scenario 3 Additional Peak Flow at the Rose Street Pumping Station (16.1 x 2.95 + 12.8) (L/s)	60.3
Scenario 3 Total Peak Flow to the Rose Street Pumping Station (31.6+60.3) (L/s)	91.9
Existing Average Flow to the Ayr WWTP (m^3/d)	1,324
Scenario 3 Additional Average Flow to the Ayr WWTP ((3,767+218) x 350/1000) (m^3/d)	1,318
Scenario 3 Total Average Flow to the Ayr WWTP (1,324 + 1,256) (m^3/d)	2,642

Under Scenario 3, the estimated peak flow to the Rose Street Pumping Station is 91.9 L/s and the estimated average flow to the Ayr WWTP is 2,642 m^3/d.

4.3.4 Scenario 4 – 2031 Conditions

Scenario 4 represents development to the year 2031 as identified in the Region's Official Plan. Development would occur within the existing Built-Up Areas as well as in the Designated Greenfield Areas. No development is planned to occur outside of the Township Urban Boundary Designation within the planning horizon for this study (i.e. 2031). Table 4.7 presents the estimated future growth population, estimated peak flow to the Rose Street Pumping Station and the estimated average flow to the Ayr WWTP for this scenario.

Table 4.7 Scenario 4 – Estimated Population and Flows

Description	Value
Existing Residential Population	4,255
Scenario 4 Additional Residential Population	4,436
Scenario 4 Total Residential Population (4,255+4,436)	8,691
Existing Employment Population	1,853
Scenario 4 Additional Employment Population	1,719
Scenario 4 Total Employment Population (1,853+1,719)	3,572
Scenario 4 Additional Service Area (ha)	187
Scenario 4 Additional Average Wastewater Flow ((4,436+1,719)x350/86400) (L/s)	24.93
Scenario 4 Additional Infiltration (187 x 0.15 L/s/ha) (L/s)	28.1
Scenario 4 Peaking Factor at the Rose Street Pumping Station	2.87
Existing Peak Flow at the Rose Street Pumping Station (L/s)	31.6
Scenario 4 Additional Peak Flow at the Rose Street Pumping Station (24.93 x 2.87+ 28.1) (L/s)	99.6
Scenario 4 Total Peak Flow to the Rose Street Pumping Station (31.6+99.6) (L/s)	131.2
Existing Average Flow to the Ayr WWTP (m^3/d)	1,324
Scenario 4 Additional Average Flow to the Ayr WWTP (4,436 x 350/1000) (m3/d)	1,553
Scenario 4 Total Average Flow to the Ayr WWTP (1,324 + 1,553) (m3/d)	2,877

Under Scenario 4, the peak flow estimated to the Rose Street Pumping Station is 131.2 L/s and the estimated average flow to the Ayr WWTP is 2,877 m^3/d.

4.3.5 Scenario 5 – Mature State of Ayr

Scenario 5 represents development of Ayr to a Mature State. Population estimates for the Mature State were developed by Regional Planning. For the lands located between The Township Urban Area Boundary Designation and the Countryside Lane (as shown on Map 7 of the Regional Official Plan), future populations are based on the capacity of the land area. Table 4.8 presents the estimated future growth population, estimated peak flow to the Rose Street Pumping Station and the estimated average flow to the Ayr WWTP for this scenario.

Table 4.8 Scenario 4 – Estimated Population and Flows

Description	Value
Existing Residential Population	4,255
Scenario 5 Additional Residential Population	7,746
Scenario 5 Total Residential Population (4,255+7,746)	12,001
Existing Employment Population	1,853
Scenario 5 Additional Employment Population	2,116
Scenario 5 Total Employment Population (1,853+2,116)	3,969
Scenario 5 Additional Service Area (ha)	269.2
Scenario 5 Additional Average Wastewater Flow ((7,746+2,116)x350/86400) (L/s)	40.0
Scenario 5 Additional Infiltration (269.2 x 0.15 L/s/ha) (L/s)	40.4
Scenario 5 Peaking Factor at the Rose Street Pumping Station	2.75
Existing Peak Flow at the Rose Street Pumping Station (L/s)	31.6
Scenario 5 Additional Peak Flow at the Rose Street Pumping Station (40.0 x 2.75+ 40.4) (L/s)	150.2
Scenario 5 Total Peak Flow to the Rose Street Pumping Station (31.6+150.2) (L/s)	181.8
Existing Average Flow to the Ayr WWTP (m^3/d)	1,324
Scenario 5 additional Average Flow to the Ayr WWTP (7,746 x 350/1000) (m^3/d)	2,711
Scenario 5 Total Average Flow to the Ayr WWTP (1,324 + 2,711) (m^3/d)	4,035

Under Scenario 5 conditions (mature state), the peak flow estimated to the Rose Street Pumping Station is 181.9 L/s and the estimated average flow to the Ayr WWTP is 4,035 m^3/d.

4.4 System Constraints

To assess system capacity constraints, the information presented in the previous sections was combined with model analyses of the existing sanitary sewer system. The findings of the constraints information are summarized below. More detailed information is provided in Appendix D.

- Under existing conditions, all existing sanitary sewers have sufficient full flow capacity to convey peak flows, the Nith River Way and Rose Street Pumping Stations have sufficient firm capacity to pump peak flows and the Ayr WWTP has sufficient rated capacity to treat average day flow.
- With development of unbuilt registered and draft approved growth, one section of the Stanley Street sanitary sewer (between Swan Street and Northumberland Street) was identified where the projected peak flows exceeded the full flow capacity. Two sanitary sewers on Swan Street (in the vicinity of Mitchell Street) were identified

where the projected peak flow reached 75% of the full flow capacity. Both the capacity and forcemain capacity to pump and convey projected peak flows. The Ayr WWTP has sufficient rated capacity to treat projected flows.

- Under 2017 conditions, one section of the Stanley Street sanitary sewer and nine sections of the Swan Street sanitary sewer were identified where projected peak flows exceeded the full flow capacity. A further four sections of the Swan Street sanitary sewer were identified where the projected peak flow reached 75% of the full flow capacity. The Nith River Way has sufficient pumping and forcemain capacity to pump and convey peak flows. The Rose Street Pumping Station has sufficient forcemain capacity to convey projected peak flows but insufficient firm capacity to pump projected peak flows. The Ayr WWTP has sufficient rated capacity to treat projected flows.
- For Mature State conditions, one section of the Stanley Street sewer and fourteen sections of the Swan Street sanitary sewer have insufficient capacity to convey projected peak flows. The Nith River Way Pumping Station has sufficient firm and forcemain capacity to pump and convey peak projected flows. The Rose Street Pumping Station has insufficient firm and forcemain capacity to pump and convey projected peak flows. The Ayr WWTP has insufficient rated capacity to treat projected coverage flows.
- Under 2031 conditions, one section of the Stanley Street sanitary sewer, and nine sections of the Swan Street sanitary sewer were identified where projected peak flows exceeded the full flow capacity. A further four sections of the Swan Street sanitary sewer were identified where the projected peak flow reached 75% of the full flow capacity. The Nith River Way Pumping Station has sufficient firm pumping capacity and forcemain capacity to pump and convey projected peak flows. The rose Street Pumping Station has sufficient forcemain capacity to convey projected peak flows but insufficient firm capacity to pump projected peak flows. The Ayr WWTP has sufficient rated capacity to treat projected flows.

5. DEVELOPMENT OF ALTERNATIVES

A total of three alternatives were developed to provide servicing capacity for the Village of Ayr to the year 2031. Although these alternatives were sized to provide capacity to the year 2031, consideration was given to future expandability to accommodate additional flows for the Mature State of Ayr. The following sections provide information on each alternative. In addition, Technical Memorandum No. 4, included in Appendix D, documents the development of alternatives and should be consulted for more detailed information.

5.1 Alternative 1 – Do Nothing

The "Do Nothing" alternative consists of allowing development to proceed as planned within the existing Built-Up Area and the Designated Greenfield Areas without the construction of any additional wastewater infrastructure to service this growth.

5.2 Alternative 2 – Capacity Improvements in the Existing System

Alternative 2 consists of capacity improvements within the existing systems to provide sufficient capacity to convey future flows in 2031. This alternative consists of replacing or twinning existing sanitary sewers on Stanley Street and Swan Street that have insufficient capacity to convey peak flows in 2031. The existing 450 mm diameter sanitary sewer on Stanley Street would need to be replaced or twinned. This section is located within the village core between Swan Street and Northumberland Street. For the purposes of evaluation, it has been assumed that additional capacity will be provided by constructing a new twin 675 mm diameter sanitary sewer. An upgrade to the Rose Street Pumping Station would also be required to provide an additional pumping capacity of 52 L/s. This additional capacity could be provided through upgrade of the existing station. An upgrade to the Rose Street Pumping Station forcemain would not be required.

To service the DGA lands within the South East Residential lands (both within the existing settlement area and outside of the existing settlement area), a new pumping station is required to service the low lying area in the south east. The pumping station would be designed to pump flows from the Southeast Residential Settlement and Non-Settlement Areas. The current draft approved, registered and unbuilt units with building permits would not be serviced by this pumping station and flows from these areas would continue to be conveyed by gravity to the Swan Street Sanitary Sewer. For this alternative, the pumping station would likely be located in the vicinity of Brant Waterloo Road east of Swan Street and the new forcemain would discharge into the Swan Street sanitary sewer. The new pumping station could be designed such that the wet well elevation would allow for servicing of the Southeast Residential (Settlement Area) and Southeast Residential (Non-Settlement Area) lands.

Figure 5.1 presents the location of required facilities for Alternative 2 while Table 5.1 presents the estimated cost of upgrades. Appendix D contains a breakdown of alternative costs.

Figure 5.1
Alternative 2
Existing System
Capacity Upgrades

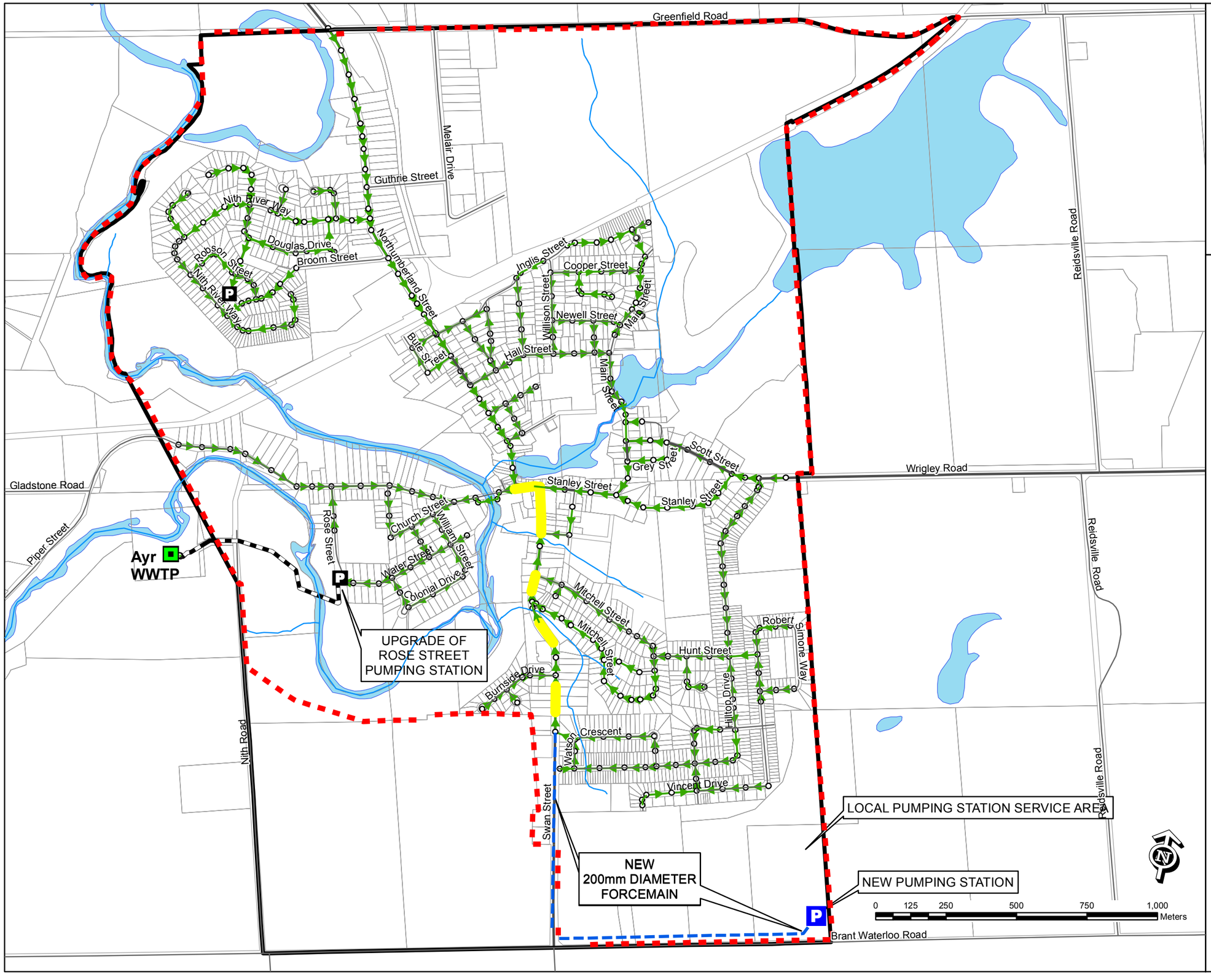


Table 5.1 Alternative 2 – Estimated Costs

Description of Required Works	Unit Cost	Estimated Cost
Twin of 589 m of sanitary sewers on Swan Street including road restoration	$607/m/ 300 mm sanitary sewer	$358,000
Stanley Street sanitary sewer between Swan Street and Northumberland Road- 69 m of 675 mm diameter sanitary sewer complete including road restoration	$1,294/m	$89,000
New Pumping Station located at southeast corner of Brant Waterloo Road and Swan Street with a pumping capacity of 37L/s.	L.S.	$689,000
New manholes on Swan and Stanley (14)	$6,800/each	$95,000
New forcemain on Swan Street – 750 m of 200 mm diameter forcemain including full road restoration on Swan Street	$540/m of 200 mm diameter forcemain including road restoration	$405,000
Reconnection of 30 existing sanitary sewer laterals	$1,000/each	$30,000
Rose Street Pumping Station capacity expansion to firm capacity of 132 L/s.	L.S.	$65,000
Sub-Total		$1,731,000
Engineering and Contingencies (25%)		$433,000
Total Project Cost for Alternative 2		$2,163,000

Notes:
1. All costs are project costs are in 2012 dollars.
2. The total cost for this alternative includes a 25% allowance for engineering and contingencies.

The estimated costs shown in Table 5.1 do not include the costs to construct local sanitary sewers that will collect wastewater and discharge into the new pumping station as these new local sanitary sewers will likely be constructed as part of the planned residential developments.

A capacity assessment of this alternative was completed to confirm that the upgrades recommended would provide the required system capacity. The capacity assessment was completed in two steps. In the first step, the H2OMAP SEWER model was used to identify under capacity sections under steady state conditions. In the second step, a dynamic model was used to assess whether additional capacity could be provided under surcharge conditions, particularly in the Stanley Street Sanitary Sewer. The H2OMAP SEWER model results identified that the Stanley Street sanitary sewer between Swan Street and Northumberland Street had insufficient capacity to convey peak flows. The dynamic model identified surcharge elevations of 1m would occur in this section under peak flow conditions. As this surcharge is significant, the need for a twin of this section on Stanley Street was confirmed.

5.3 Alternative 3 – Construct New Pumping Station and Forcemain to Service New Development Areas

Alternative 3 consists of limited upgrades to the existing wastewater system and construction of a new local collection system, new pumping station and new forcemain

that would convey flows from the majority of Southeast DGA lands directly to the Ayr WWTP. The current registered, unbuilt with building permits and draft approved units located in the Southeast DGA would continue to be serviced through the Swan Street sanitary sewer. This alternative would provide sufficient capacity for peak flows up to 2031 and would have the benefit of being expandable to provide sufficient capacity for development beyond 2031 to the Mature State of Ayr. In addition, this alternative would require a minor upgrade of the Rose Street Pumping Station to increase the firm capacity by 16 L/s. Flows from any development within the existing Built-Up Area along with draft approved, registered and unbuilt units would continue to be conveyed by the existing collection system.

To assess whether upgrades would be required within the existing system, a two-step capacity assessment was completed. In the first step, the H2OMAP SEWER model was utilized to identify under capacity sections under steady state conditions. The assessment identified that the Stanley Street sanitary sewer section located between Swan Street and Northumberland Street has insufficient capacity to convey peak flows under this alternative. The need and upgrade was assessed using a dynamic model. The results identified that the existing section could convey the peak flow of 96 L/s under a surcharge depth of 0.30m. A review of the plan/profile drawing of this section did identify the presence of a number of connected properties with basements that could be impacted by surcharge. The lowest basement is at an elevation of 281.3 m while the maximum water level predicted in the Stanley Street sanitary sewer was 280.3 m. As a result, this alternative does not include an upgrade to the existing Stanley Street sanitary sewer. It should be noted that this assessment was completed using basement elevation data contained on the historical plan/profile drawing of the Stanley Street sanitary sewer. It is recommended that a survey be completed to confirm these basement elevations.

This alternative consists of the following:

- Construction of new local sanitary sewers within the Southeast Residential (within settlement area and non-settlement area) lands to convey wastewater to the new pumping station;
- A new pumping station with a firm capacity of 37 L/s, located at the north east corner of Brant Waterloo Road and Swan Street. The pumping station design and land area would consider potential future expansion to service the Future South West area (lands located between the Township Urban Boundary Designations and Countryside Line, as shown on Map 7 of the Regional Official Plan).
- A new 200 mm diameter forcemain from the new pumping station along Brant Waterloo Road, Ninth Road and within the Ayr WWTP property to the Ayr WWTP. This forcemain would discharge into the headworks of the facility.
- A minor upgrade to the Rose Street Pumping station to increase the firm capacity from 80 L/s to 96 L/s.

Figure 5.2 presents the location of required facilities while Table 5.2 presents the estimated cost of upgrades.

Figure 5.2
Alternative 3
Construct New Pumping Station and Forcemain to Service Growth

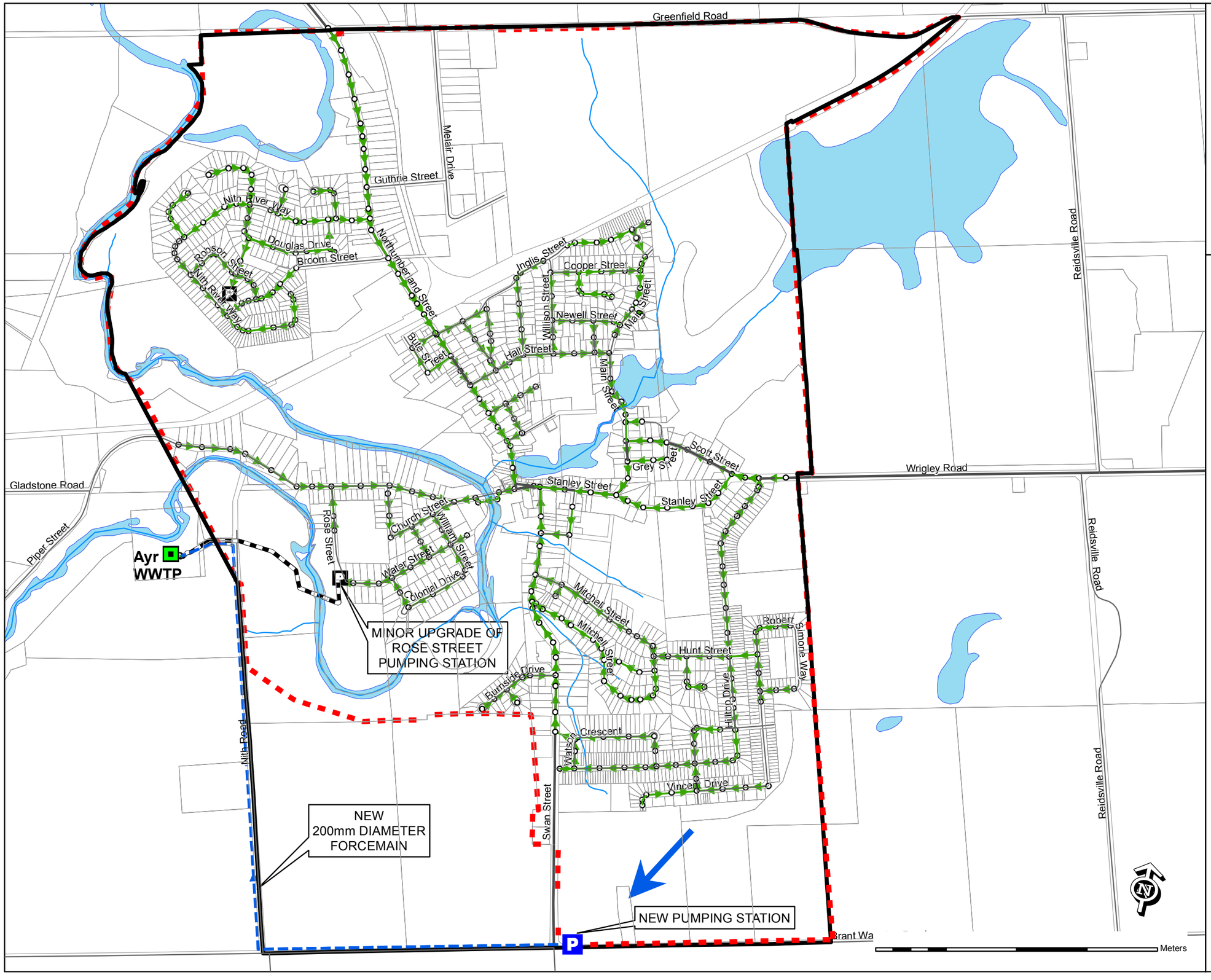


Table 5.2 Alternative 3 – Construct New Pumping Station and New Forcemain to Service New Development Areas – Estimated Capital Costs

Required Upgrade	Unit Cost	Estimated Cost
New Pumping Station located at southeast corner of Brant Waterloo Road and Swan Street with a pumping capacity of 37 L/s.		$689,000
New forcemain on Brant Waterloo Road, Ninth Road, and Ayr WWTP property discharging directly to headworks of Ayr WWTP, 2500m of 200 mm diameter forcemain	$351/200 mm forcemain with gravel road restoration	$878,000
Increase firm capacity of the Rose Street Pumping Station from 80 L/s to 96 L/s	L.S.	$10,000
Sub-Total		$1,577,000
Engineering and Contingencies (25%)		$392,000
Total Project Cost for Alternative 3		$1,958,000

Notes:
1. All costs are project costs are in 2012 dollars.
2. The total cost for this alternative includes a 25% allowance for engineering and contingencies.

A capacity assessment of this alternative was completed to confirm that the recommended upgrades would provide the required system capacity to convey peak flows in 2031.

6. EVALUATION OF ALTERNATIVES

Technical Memorandum No. 4, included in Appendix D, documents the evaluation of alternatives and should be consulted for more detailed information.

6.1 Evaluation Methodology and Criteria

A qualitative alternative evaluation process was conducted in order to evaluate the alternatives and select a recommended preferred alternative. Evaluation criteria were developed and used to evaluate all three alternatives. The developed criteria address the natural, social, technical and economic environment. Table 6.1 presents the evaluation criteria.

Table 6.1 Evaluation Criteria

Criteria	Description
Natural Environment	
Impacts on water resources	Impacts on water quantity and water quality of receiving waters including the Nith River.
Impacts on terrestrial resources	Impacts on terrestrial resources.
Impacts on groundwater resources	Impacts on groundwater quality and quantity.
Social Environment	
Impacts on Adjacent Land Owners	Noise and visual distraction impacts on adjacent land owners resulting from the long term operation of a facility.
Impacts during Construction (noise, odour, dust)	Noise, dust, odour, traffic and visual distraction impacts on residents during construction.
Impact on Future Development	Flexibility of alternative to provide Mature State servicing in a cost effective manner.
Potential for Odour Impacts	Potential for odour impacts due to the long term operation of required facilities.
Technical Environment	
System Complexity	Does the alternative significantly add to the complexity of existing systems?
Increased Operating Requirements	Additional requirements for operating wastewater systems by Waterloo Region.
Need for Additional Studies	Need for additional studies before alternative can be implemented.
Additional Approval Requirements	Additional approvals that will be required before alternative can be implemented.
Economic Environment	
Estimated Cost	Estimated capital cost in 2012 dollars.
Need for Property Acquisition	Need to acquire property to implement the alternative.

Information for each alternative was collected for each evaluation criterion. A comparative evaluation of the alternatives by evaluation criterion was then undertaken.

6.2 Evaluation of Alternatives

Table 6.2 presents the evaluation matrix for the evaluation of alternatives.

Table 6.2 Evaluation of Alternatives

Criteria	Alternative 1 "Do Nothing"	Alternative 2 Existing Systems Upgrades	Alternative 3 Construct New Pumping Station and Forcemain to Service New Development Areas
Impacts on Surface Water Resources	No change is anticipated over existing conditions.	Potential impacts on water resources during construction can be mitigated through standard construction best practices. No long term impacts on surface water resources are anticipated.	Potential impacts on water resources during construction can be mitigated through standard construction best practices. No long term impacts on surface water resources are anticipated.
Impacts on Terrestrial Resources	No change is anticipated over existing conditions.	Alternative will have minimal impact on terrestrial resources as existing sewer upgrades are located within existing road allowances.	Alternative will have minimal impact on terrestrial resources as new forcemain will be located within existing road allowances. New pumping station will be located within existing agricultural lands.
Impacts on Groundwater Resources	No change is anticipated over existing conditions.	Excessive groundwater is likely to be encountered during construction on Stanley Street due to proximity to the Nith River and Watson Pond.	Potential impacts on groundwater quality or quality during construction can be mitigated through standard construction best practices.
Impacts on Adjacent Land Owners	No change is anticipated over existing conditions.	Potential noise and visual distraction impacts associated with new pumping station can be mitigated.	Potential noise and visual distraction impacts associated with new pumping station can be mitigated.
Impacts During Construction (Noise, Odour, Dust)	No change is anticipated over existing conditions.	Significant traffic disruptions are anticipated on Stanley Street during construction. Stanley Street is a major road and construction would be located immediately upstream of the only road crossing of the Nith River in Ayr. Potential dust impacts can be mitigated through standard construction best practices No odour impacts are anticipated.	Traffic disruptions are anticipated on local rural roads including Nith Road and Brant Waterloo Road. Potential dust impacts can be mitigated through standard construction best practices. No odour impacts are anticipated.

Table 6.2 Evaluation of Alternatives

Criteria	Alternative 1 "Do Nothing"	Alternative 2 Existing Systems Upgrades	Alternative 3 Construct New Pumping Station and Forcemain to Service New Development Areas
Impact on Future Development	Alternative will not provide any servicing for future development.	Alternative will be sized to provide servicing for development up to 2031. Alternative will not have flexibility to provide servicing for potential development that occurs beyond 2031.	Alternative will be sized to provide servicing for development up to 2031. Alternative can be designed to provide flexibility for expansion to accommodate potential development that occurs beyond 2031.
Potential for Odour Impacts	No change is anticipated over existing conditions.	Potential for odour impacts at new pumping station can be mitigated through design.	Potential for odour impacts at new pumping station can be mitigated through design.
System Complexity	No change is anticipated over existing conditions.	System complexity will increase with addition of a new pumping station.	System complexity will increase with addition of a new pumping station.
Increased Operating Requirements	No change is anticipated over existing conditions.	Marginal increase over existing operating requirements for Waterloo Region with addition of one new pumping station.	Marginal increase over existing operating requirements for Waterloo Region with addition of one new pumping station.
Need for Additional Studies	No need for additional studies.	No need for additional studies.	No need for additional studies.
Approval Requirements	No additional approvals required.	Additional approvals required for new sewers, pumping station, and forcemain.	Additional approvals required for new sewers, pumping station, and forcemain.
Estimated Capital Cost	$0	$2,163,000	$1,958,000
Need for Property Acquisition	No need for property acquisition.	Property will be required for new pumping station.	Property will be required for new pumping station.

A review of the evaluation matrix identified the following trade-offs between alternatives:

- Alternative 3 will involve the construction of a new pumping station and forcemain along Brant Waterloo Road and Nith Road while Alternative 2 will involve construction on Swan and Stanley Streets. Major construction related impacts, such as traffic, noise, dust and visual intrusion, are predicted for Alternative 2 as the construction will occur within existing residential and commercial areas. The sanitary sewer improvements on Stanley Street in Alternative 2 will have major impacts during construction as the improvement is located within the Village Core. In contrast, Alternative 3 will consist of construction on rural gravel roads.
- There is the potential for constructability issues associated with a high groundwater table for the construction on Stanley Street in Alternative 2.

- Alternative 3 will provide flexibility for the servicing of the Southwest Residential lands beyond 2031, as land can be acquired to permit future expansion of the pumping station. In addition, the design of the pumping station could allow for future expansion. In Alternative 2, a new wastewater collection system and pumping station would be required to service these lands beyond 2031.
- Alternative 2 will require modifications at the Rose Street Pumping Station to provide 132 L/s of pumping capacity. Under Alternative 3, a minor upgrade of the Rose Street Pump station will be required to provide 16 L/s of additional firm capacity.
- Alternative 3 is the lowest capital cost alternative.

7. PREFERRED ALTERNATIVE AND IMPLEMENTATION

The preferred alternative is Alternative 3 – Construct New Pumping Station and Forcemain to Service New Development Areas to provide wastewater servicing capacity to the Ayr to the year 2031. Figure 7.1 presents the location of identified infrastructure for this alternative. Table 7.1 provides the estimated cost and Class EA schedule for the elements of the preferred alternative.

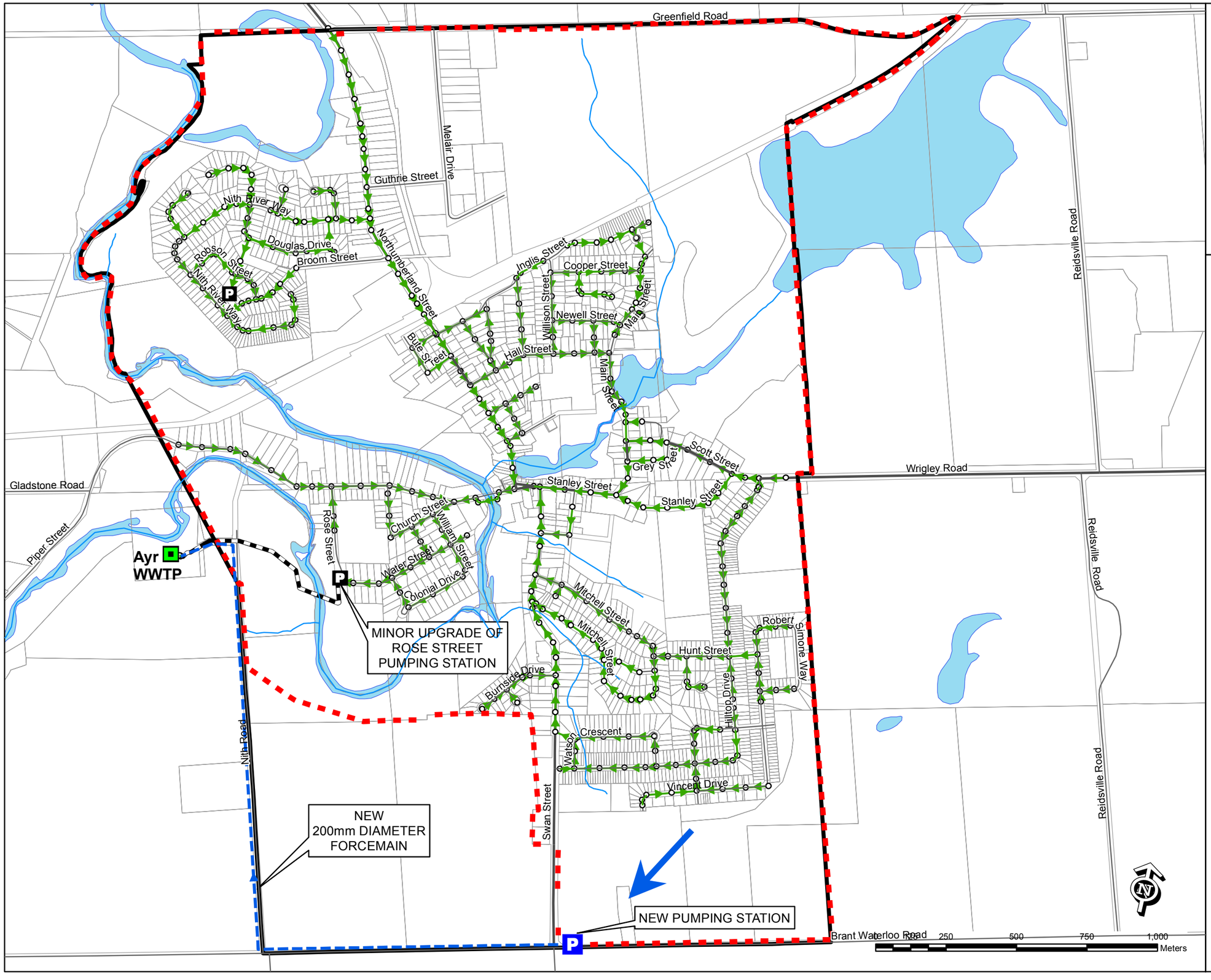
Table 7.1 Preferred Alternative

Required Infrastructure	Estimated Cost	Class EA Schedule	In-Service Requirement
New Pumping Station located at southeast corner of Brant Waterloo Road and Swan Street with a pumping capacity of 37 L/s.	$689,000	Schedule 'B'	2017
New forcemain on Brant Waterloo Road, Ninth Road, and Ayr WWTP property discharging directly to headworks of Ayr WWTP, 2500m of 200 mm diameter forcemain.	$878,000	Schedule 'B'	2017
Increase firm capacity of the Rose Street Pumping Station from 80 L/s to 96 L/s.	$100,000		2031
Sub-Total	$1,667,000		
Engineering and Contingencies	$392,000		
Estimated Cost	$1,958,000		

The total estimated cost of the preferred alternative is $1,958,000 including engineering and contingencies. Both the new pumping station as well as the new forcemain will require a Schedule 'B' Class EA be completed.

Both the new pumping station and new forcemain will be required to service growth beyond the development that is currently draft approved, registered, or unbuilt with building permits. Improvements of the Rose Street Pumping Station are not required until after 2017.

Figure 7.1
Preferred Alternative
Construct New
Pumping Station
and Forcemain
to Service Growth



- WWTP
- Existing Pumping Station
- Proposed Pumping Station
- Existing Manholes
- Existing Sanitary Sewers
- Existing Forcemain
- New Forcemain
- Study Area
- Urban Area Boundary
- Property Lines

8. PUBLIC, AGENCY, STAKEHOLDER, AND ABORIGINAL CONSULTATION

Public and agency consultation is an important component of the Class EA process. A vital component of the Master Plan process involved consultation with interested stakeholders, including regulatory and review agencies, the public and Aboriginals. The following outlines the public, agency, stakeholder and Aboriginal consultation that was undertaken during the Master Plan process.

8.1 Notifications

Members of the public and those on the project mailing list were provided with project notifications at key points in the Master Plan process. These notifications were also published in local newspapers. In addition, direct mail outs or e-mails of project notifications were sent to those on the project mailing list.

The following provides details on: the Notice of Commencement; the Notice of Public Information Centre (PIC); and the Notice of Completion.

8.1.1 Notice of Commencement

The Notice of Commencement for the Master Plan was placed in the following publications in Waterloo Region:

Publication	Date Notice of Commencement Published
Ayr News	Wednesday, June 20, 2012
Waterloo Region Record	Friday, June 22, 2012

Background information on the wastewater collection system in Ayr was provided along with information on the goal of the study, the Master Plan process and opportunities for public input. Questions or comments on the study were invited and contact information for the Region of Waterloo and the consulting team project managers was noted.

The Notice of Commencement newspaper advertisement is provided in Appendix E. This notice was also posted on the Region's website. In addition, a letter and attached Notice of Commencement were mailed to those on the project mailing list on June 12, 2012. An example of this letter is provided in Appendix E.

8.1.2 Notice of Public Information Centre

A PIC was held to provide an opportunity for members of the public to obtain information on the Master Plan process, the alternative solutions, the evaluation of these alternatives and the recommended preferred alternative. It was also an opportunity for members of the public to obtain responses to questions and provide comment and input to the study (see Section 8.2).

The PIC was held on Wednesday, November 7, 2012. The newspaper notice for the PIC is included in Appendix E. This notice was also posted on the Region’s web site.

The Notice of PIC was placed in the following publications in Waterloo Region:

Publication	Dates PIC Notice Published
Ayr News	Wednesday, October 31, 2012
Waterloo Region Record	Tuesday, October 23, 2012 Tuesday, October 30, 2012

In addition, a letter of notification of the PIC was e-mailed to those on the project mailing list on Tuesday, November 6, 2012. An example of this letter is provided in Appendix E.

8.1.3 Notice of Completion

The Notice of Completion was placed in the following publications in Waterloo Region:

Publication	Dates Notice of Completion Published
Ayr News	January 2, 2013 and January 9, 2013
Waterloo Region Record	December 28, 2012 and January 4, 2013

The Notice of Completion advised members of the public of the opportunity to review and provide comments on the Master Plan. A period of 45 calendar days was provided for the public review of the Master Plan. Contact information for Waterloo Region and consulting team Project Managers was noted. Copies of the Master Plan were available for review and comment at the Region of Waterloo Clerk's Office and the Township of North Dumfries Clerk's Office. The Notice of Completion newspaper advertisement is provided in Appendix E. This notice was also posted on the Region's website. In addition, a letter and attached Notice of Completion were mailed to those on the project contact list on December 21, 2012. An example of this letter is provided in Appendix E.

8.2 Public Information Centre

As noted in Section 8.1.2, a PIC was held to provide an opportunity for members of the public to obtain information on the Master Plan process, the alternative solutions, the evaluation of these alternatives and the recommended preferred alternative. It was also an opportunity for members of the public to obtain responses to questions and provide comment and input to the project. The PIC was held from 6:00 p.m. to 8:00 p.m. on Wednesday, November 7, 2012 at the North Dumfries Community Centre in Ayr, Ontario.

The PIC was a drop-in format with display boards available for viewing and an opportunity for one-on-one discussions with project team members. Members of the project team, including Waterloo Region and consultant representatives, were available to provide and discuss information on the Master Plan, and to receive public comments and input.

A Comment Sheet and Handout were available to attendees. The display boards provided information on:

- Study Objectives;
- Study Area;
- Existing Wastewater System;
- Growth to the Year 2031;

- Growth Beyond 2031;
- Growth Projections;
- Opportunities and Constraints;
- Alternatives (including Alternative 1 – "Do Nothing");
- Alternative 2 – Capacity Improvements in Existing Systems to Service New Development Areas;
- Alternative 3 – Construct New Pumping Station and Forcemains to Service New Development Areas;
- Evaluation Criteria;
- Evaluation of Alternatives;
- Recommended Preferred Alternative – Alternative 3;
- What Happens Next; and
- Invitation to Submit Comments and Contact Information (Waterloo Region and Consulting Team Project Managers).

The PIC materials were also posted on the Waterloo Region and Township of North Dumfries web sites.

Table 8.1 summarizes the comments received. A total of 14 people provided their name and contact information on the Attendance Sheet for the PIC. Attendees consisted primarily of local developers and consultants. One completed Comment Sheet was submitted, along with four e-mail comments.

Table 8.1 Summary of PIC Comments and Responses

Comment Received	Response to Comment
On behalf of my clients in Ayr, we would request that the option to build a new pumping station and forcemain to service new growth in the south end of Ayr be promoted as the logical option.	No response required, comment in agreement with recommended preferred alternative.
Attached a copy of the open house panel illustrating anticipated growth in Ayr to 2031 and highlighted the location of the draft approved "Roxshire Woods" residential subdivision. Please ensure this development and the anticipated numbers of new housing units are included in your analysis. In review of the alternatives, I support the recommended solution described as Alternative 3; it seems that this alternative would provide a long term solution to serve not only the lands east of Swan Street, but also the longer term lands on the west side of Swan Street.	No response required this draft approved plan of subdivision has been included in the growth projections.
[For Alternative 3] wants to confirm that the Swan Street sewer no longer needs upgrading to accommodate the future development on Hilltop. Have asked IBI Group to do an option or alternative to a future pumping station at the corner of Swan and Brant-Waterloo Road.	Region provided response on November 16, 2012 indicating the following: "Until the Master Plan is complete and has gone through a minimum 30 day review period, none of the preferred alternatives can be considered final. However, indeed you are correct that with the preferred Alternative 3, no upgrades will be required to the sanitary sewer on Swan Street".
Raise the grade of the land at the corner of Swan and Brant-Waterloo Rd. (North East quadrant of the study area); the land would then drain north to the existing detention storm water pond on the Hilltop property; then grade east to the Gillespie property and then south to the south end of the Gillespie farm lane (869 Brant-Waterloo Rd.) to a new pumping station. Intersect wastewater at the corner of Howard Marshall and Hilltop Dr. to drain south to the new pumping station. Ballantyne and Elliott land west of Swan St. could drain east and north onto the Swan St. sewer system.	No response required. Comments noted.

Table 8.1 Summary of PIC Comments and Responses

Comment Received	Response to Comment
We generally support your proposed solution and our client is prepared to move forward with the necessary works to secure Draft Plan Approval of their lands. We are surprised to see a small gap between the costs for option 2 vs. 3 and would expect option 2 to be much more expensive with all the upgrades down Swan and Stanley Street in addition to the pumping station and forcemain. With the preferred solution showing a pumping station on the Hilltop Lands, how are the adjacent lands going to be serviced… sanitary trunk line?; will this additional cost for pipe size and depth be DC eligible?, cost shared? etc. What is the review and approval process moving forward to implement the preferred solution and who is the proponent? What is the anticipated timing of works? How is this preferred solution going to be funded? - Capital budget timing? Development charges adjustment for the entire Village of Ayr, etc. Timing of development applications and approval in relation to moving forward with implementing the preferred solution. Request a copy of the remaining technical memos. We wish to meet with you and your consultant to discuss the recommendations and the implementation of the study with the objective to clearly define responsibilities, process and timing. As well, we wish to discuss the option of an interim solution to accommodate phase through Swan Street prior to the preferred solution being implemented, with the ability to redirect the flows at a later time. Time is of the essence as our developers inventory is decreasing and believe an interim solution will allow them to maintain their momentum. In the mean time we request that you please provide your flow monitoring information such that we may gage the residual capacity and determine an appropriate number of units that can be accommodated with this interim solution. Noted availability for a meeting. Sent copy to Mayor Robert Deutschmann – requested attendance at meeting, if available.	Region of Waterloo provided an initial response on November 28, 2012. Region provided a copy of Technical Memorandum # 3 – Flow Monitoring Data Review. Response also confirmed a December 10, 2012 meeting to be held to discuss next steps. Region of Waterloo provided a more detailed response to comments noted on November 29, 2012 – this response is included in Appendix E.

Copies of the Comment Sheet, display boards and Handout are provided in Appendix E. Appendix E also contains the PIC Attendance Sheet, submitted Comment Sheets and other comments received after the PIC.

8.3 Project Mailing List and Web-site Postings

A project mailing list was also maintained throughout the Master Plan process. The mailing list was developed at the Notice of Commencement stage and names were added to the project mailing list in response to requests. A copy of the project mailing list is provided in Appendix E.

In addition, key project information such as notifications, PIC materials (i.e., display boards, comment sheet, handout) and the Master Plan Report were posted on the Region of Waterloo's web site and the Township of North Dumfries web site.

8.4 Agency and Stakeholder Consultation

Federal, provincial and municipal agencies were consulted during the course of the Master Plan process. The following agencies were included in the agency consultation for the project:

Federal

- Aboriginal Affairs and Northern Development Canada (AANDC) (formerly Indian and Northern Affairs Canada (INAC));

Provincial

- Ministry of Aboriginal Affairs;
- Ministry of the Environment;
- Ministry of Natural Resources;
- Ministry of Agriculture, Food and Rural Affairs;
- Ministry of Tourism and Culture;
- Ministry of Municipal Affairs and Housing;
- Ministry of Transportation;
- Grand River Conservation Authority;
- Infrastructure Ontario;

Municipal

- Township of North Dumfries (Mayor, Director of Public Works, CAO/Clerk, Economic Development Advisory Committee, Director of Planning); and
- Cambridge Chamber of Commerce – North Dumfries.

The following utilities were also included on the project mailing list and received project notifications: Hydro One Networks Inc.; Cambridge and North Dumfries Hydro Inc.; Rogers Cable; Bell Canada; Canadian Pacific Railway; CN Great Lakes; Union Gas; Enbridge Gas Distribution Inc.; and Ontario Power Generation Inc.

The Region of Waterloo Ecological and Environmental Advisory Committee and the Waterloo Federation of Agriculture also received project notifications. Additions to the mailing list were made upon request.

The project mailing list contains a complete list of agencies and stakeholders contacted during the Master Plan process, and is provided in Appendix E. Table 8.2 provides a summary of comments received from agencies and stakeholders, along with the response to these comments. Appendix E contains copies of correspondence received from agencies and stakeholders.

8.5 Aboriginal Consultation

8.5.1 Agency Contacts

The information for the agencies contacted regarding Aboriginal consultation is provided on the project mailing list included in Appendix E. In addition, all correspondence from these agencies is documented in Table 8.2 and included in Appendix E.

Indian and Northern Affairs Canada (INAC) (Specific Claims Branch, Comprehensive Claims Branch, Lands and Trusts Services, Litigation Management and Resolution Branch, and Financial Issues and Cost Sharing) and the Ontario Ministry of Aboriginal Affairs (MAA) were contacted and included on the project mailing list. These agencies were contacted to determine whether there were any land claims that have been submitted to the Government of Canada or the Government of Ontario that may be affected by projects resulting from the Master Plan process.

Notice of Commencement

The Notice of Commencement was sent to the following contacts on June 12, 2012:

Mr. Don Boswell, Senior Claims Analyst, Indian and Northern Affairs Canada (INAC) – Specific Claims Branch;

- Ms. Louise Trépanier, Director, Claims East of Manitoba, INAC – Comprehensive Claims Branch;
- Ms. Josée Beauregard, Litigation Team Leader, INAC – Eastern Litigation Directorate;
- Mr. Dale Pegg, Senior Policy Advisor, INAC – Consultation and Accommodation Unit;
- Mr. Sean Darcy, Manager, INAC – Assessment and Historical Research Directorate; and
- Mr. Martin Rukavina, Senior Policy Advisor, Aboriginal and Ministry Relations Branch, Ontario Ministry of Aboriginal Affairs.

The Notice of Commencement newspaper advertisement was also attached to these letters.

During the Master Plan process, INAC was renamed to Aboriginal Affairs and Northern Development Canada (AANDC). All references from this point forward are to AANDC.

Notice of Public Information Centre and Notice of Completion

The Notice of PIC and the Notice of Completion were also sent to AANDC and the Ontario Ministry of Aboriginal Affairs on November 6, 2012 and December 21,2012, respectively. These notices were sent to the Regional Subject Expert for Ontario in the Consultation and Accommodation Unit of AANDC, in accordance with current protocols for contacts with AANDC. This Unit was established to assist in the coordination of departmental responses to consultation-related queries within AANDC.

Table 8.2 Summary of Agency and Stakeholder Comments

Date	Contact	Comment	Response to Comment
Federal			
November 7, 2012	Allison Berman Regional Subject Expert for Ontario Consultation and Accommodation Unit Aboriginal Affairs and Northern Development Canada	As a rule, AANDC officials do not participate in environmental assessments that pertain to projects off-reserve, nor does the department track how other parties carry out their EA or consultation activities where no reserve lands or AANDC programs are involved. Therefore, in future, please omit AANDC officials from your public information notification for projects that do not intersect with reserve lands or engage AANDC programs.	Comments noted. No response required.
June 20, 2012	Allison Berman Regional Subject Expert for Ontario Consultation and Accommodation Unit Aboriginal Affairs and Northern Development Canada	Responding to request for information concerning consultation with Aboriginal and First Nation communities in the vicinity of the project. Provided the information regarding potentially affected Aboriginal communities: Aboriginal Community Information (contact information); Treaties, Claims and Negotiations; and Litigation. Provided information for First Nation communities within a 100 km radius of the project.	Comments noted. Information on Mississaugas of the Credit and Six Nations of the Grand River was provided by the Consultation and Accommodation Unit – these First Nations have been contacted by the Region. No response required.
Provincial			
November 7, 2012	Andrew Herreman Resource Planner Grand River Conservation Authority	Unable to attend Public Information Centre (PIC). Would request that any information being presented at the session be forwarded to our office to my attention. Also, please forward any other applicable reports, plans or additional information as it becomes available.	PIC information forwarded to GRCA on November 22, 2012.
November 7, 2012	Beth Brown Supervisor of Resource Planning Grand River Conservation Authority	Andrew Herreman will provide response. Please update your contact list to have Andrew Herreman as the only GRCA contact; he will circulate internally as needed.	Project contact list updated.

Table 8.2 Summary of Agency and Stakeholder Comments

Date	Contact	Comment	Response to Comment
September 10, 2012	Lisa Myslicki Environmental Advisor, Environmental Management Infrastructure Ontario (IO)	Negative environmental impacts associated with project design and construction should be avoided and/or appropriately mitigated in accordance with applicable regulations, best practices and MNR and MOE standards. Negative impacts to land holdings such as the taking of developable parcels of IO managed land or fragmentation of utility or transportation corridors should be avoided; if the potential for such impacts is present, you should contact the undersigned to discuss these issues at the earliest possible stage of your study. Should the proposed activities impact cultural heritage features on IO managed lands, a request to examine cultural heritage issues could be required. The purchase of IO owned or managed lands or disposal of rights and responsibilities (e.g., easement) for IO managed lands triggers the application of the Ministry of Infrastructure Ontario (MOI) Class EA. If the MOI Class EA is triggered, and deferral to another ministry's or agency's Class EA or individual EA is requested, the alternative EA will be subject to a critical review prior to approval for any signoff of a deferral by the proponent.	Comments noted. Will keep on project mailing list. No response required.
July 11, 2012	Beth Brown Supervisor of Resource Planning Grand River Conservation Authority	The study area contains numerous natural hazard and natural heritage features including the Nith River, Cedar Creek, tributaries of these watercourses, steep slopes and floodplain associated with these watercourses; also, provincially significant Roseville Swamp – Cedar Creek Wetland and Greenfield Swamp, and additional wetlands and allowances adjacent to these features. These features and their allowances are regulated under Ontario Regulation 150/06. Any future development within the regulated areas may require the issuance of a Development, Interference with Wetlands and Alterations to Shorelines and Watercourses permit from GRCA. Attached a copy of GRCA resource mapping for reference. based on the above, would ask that you forward any information	Comments noted. No response required.

Table 8.2 Summary of Agency and Stakeholder Comments

Date	Contact	Comment	Response to Comment
		pertaining to the EA as it becomes available; would like the opportunity to participate in the study process.	
June 27, 2012	Dwayne Evans Planner Municipal Services Office – Western Ministry of Municipal Affairs and Housing	This section directs decision-making bodies to be consistent with policy statements and conform with provincial plans issued under Section 3 of the Planning Act in exercising any authority that affects a planning matter. the current policy on land use planning matters for Ontario, and specific to the Township of North Dumfries, is the Provincial Policy Statement 2005 (PPS) and the Growth Plan. The Growth Plan provides policy direction for growth management in the Greater Golden Horseshoe; the Township of North Dumfries falls within the Growth Plan area. Based on our review of the above noted matter, it does not appear that Planning Act approvals are being sought. environmental assessment studies that examine municipal wastewater servicing should ensure that these systems are provided in a manner that: Are of an appropriate size and type to accommodate present and future requirements. Can be sustained by the water resources upon which the services rely. Are located and designed in accordance with provincial standards. Are financially viable and comply with all other regulatory requirements. Promote water conservation and water use efficiency. Protect human health and the natural environment. Additionally, you should ensure that the local Official Plan policies regarding municipal wastewater services are integrated into the short and long term wastewater servicing strategies that are developed.	No response required.
June 22, 2012	Barbara Slattery Environmental Assessment and	Stress the need for the master planning process to ensure that the public is kept well-informed as to the progress that is being made,	No response required.

Table 8.2 Summary of Agency and Stakeholder Comments

Date	Contact	Comment	Response to Comment
	Planning Coordinator West Central Regional Office	and that particular effort be made to ensure that information is readily available. It is becoming Ministry practice to require detailed documentation regarding the public consultation process that has been undertaken and the efforts made to address the public or agency concerns. Please keep in mind the range of other approvals and/or permits that may be required in order to implement the specific projects that are identified through the master planning process; it is crucial that these agencies are circulated so that their input is obtained and their issues are addressed. It is our expectation that the master planning process will: • address the key principles of successful EA; • address at least the first two phases of the MEA; • allow for an integrated process with other planning initiatives; • provide a strategic level assessment of various options to better address overall system needs and potential impacts and mitigation; • take a system-wide approach to planning which relates infrastructure either geographically or by a particular function; • recommend an infrastructure master plan which can be implemented through the implementation of separate projects; and • include a description of the specific projects including any other approvals that will be required. You are advised to provide notification directly to the Aboriginal communities who may be affected by the project and provide them with an opportunity to participate in any planned public consultation sessions and comment on the project.	
June 21, 2012	Paul Odom Surface Water Team Leader	Received Notice of Commencement letter. Indicated that the District Office would likely be involved for the plant and the sewershed and he would be involved from the	Region responded on June 21, 2012 clarifying that the scope of the study is the collection system expansion requirements

Table 8.2 Summary of Agency and Stakeholder Comments

Date	Contact	Comment	Response to Comment
	Ministry of the Environment West Central Region	outfall down the Nith River. Presupposed the study is in the initial phase of plant expansion. Consultant should be prepared to develop an assimilative capacity study and definition of the mixing zone. Noted contacts at MOE for future notifications.	related to growth and specifically not treatment plant capacity. Response noted that the Ayr Wastewater Treatment Plant was expanded in 2006 to account for the expected 2025 average daily flow; the Region's most current projection shows that there is capacity at the plant well beyond 2025. Clarified that the Notice of Completion for the Ayr Wastewater Treatment Capacity Expansion Class EA was issued on April 27, 2004.
Utilities			
July 5, 2012	Jane Zhang Transmission Lines Sustainment System Investment Asset Management Hydro One Networks Inc.	In our initial review, we can confirm that there are no Hydro One Transmission Facilities in the subject area. Please be advised that this is only a preliminary assessment based on current information. No further consultation is required if no changes are made to the current information.	No response required.
Public and Stakeholders			
June 22, 2012	Mary O'Connor (Gillespie) John Gillespie JOMAR Cattle Feeders Inc.	Appreciate receiving Notice of Commencement. The development of parts of our farm and neighbouring lands has been under our personal consideration, study and business for well over twenty years. We will plan on attending one of the open houses.	No response required.
June 21, 2012	Sam Head, President Dryden, Smith & Head Planning Consultants Ltd.	Would request that you give consideration to expanding your study limits to include lands north of Greenfield Road up to Greenfield Road West and include lands occupied by the Home Hardware store. These lands have the potential for future Commercial-Industrial development as part of the Northumberland Street development	Region of Waterloo provided the following response on July 11, 2012: "We will only look at servicing lands within the Country Side Line (CSL) boundary. The CSL boundary as shown on ROP Map 7 already includes lands

Table 8.2 Summary of Agency and Stakeholder Comments

Date	Contact	Comment	Response to Comment
		area and should be included for future sanitary sewer connections.	southwest of Ayr that are located beyond the Township Urban Area Boundary shown on ROP Map 3e and are currently designated Prime Agricultural Area. These are lands that in the 1995 ROPP would have been designated Future Township Urban Area".

8.5.2 Responses to Agency Contacts

8.5.2.1 Notice of Commencement

One response to the Notice of Commencement mailing was received from AANDC. A June 20, 2012 e-mail was forwarded to the Region by Ms. Allison Berman, Regional Expert for Ontario, Consultation and Accommodation Unit. In her response, Ms. Berman provided information on: potentially affected Aboriginal communities; community contacts; treaties, claims and negotiations; and litigation. These comments are noted in Table 8.2 and the AANDC e-mail is included in Appendix E.

8.5.2.2 Notice of PIC

One response to the Notice of PIC mailing was received from Ms. Allison Berman, Regional Expert for Ontario, Consultation and Accommodation Unit, AANDC. Ms. Berman noted that, "as a rule, AANDC officials do not participate in environmental assessments that pertain to projects off-reserve, nor does the department track how other parties carry out their environmental assessment or consultation activities where no reserve lands or AANDC programs are involved. Therefore, in future, please omit AANDC officials from your public information notification projects that do not intersect with reserve lands or engage AANDC programs". These comments are noted in Table 8.2 and the AANDC e-mail is included in Appendix E.

8.5.3 Aboriginal Contacts

All project notices, including the Notice of Commencement (June 12, 2012), Notice of PIC (November 6, 2012) and Notice of Completion (December 21, 2012), were sent to the following First Nations:

- Mississaugas of the New Credit;
- Six Nations of the Grand River (Director and Manager – Lands and Resources Department); and
- Six Nations Haudenosaunee Confederacy Council.

The contact information for these First Nations is provided on the project mailing list included in Appendix E. In addition, all correspondence to these First Nations is included in Appendix E.

No responses were received from these First Nations during the Master Plan process.

9. RECOMMENDATIONS

The following are recommendations from the Ayr Wastewater Servicing Master Plan:

1. The Region should initiate a Schedule 'B' Class EA for a new pumping station and a new forcemain to service growth in the Southeast Residential (settlement area and non-settlement area). This Class EA could potentially be integrated with the Planning Act approvals process for these proposed residential developments. The detailed design of the infrastructure could also be completed concurrently with the Class EA.
2. The Region should continue to evaluate capacity needs at the Ayr WWTP and Rose Street Pumping Station and revisit the timing of a required expansion at the Ayr WWTP.
3. The Region should complete a survey of basement elevations on Stanley Street between Swan Street and Northumberland Street. Should the results indicate an increased risk of flooding at the properties, the Region should consider a range of measures to mitigate the risk.

10. REFERENCES

Ministry of the Environment, Design Guidelines for Sewage Works, 2008.

Region of Waterloo, Class EA Project File Ayr Wastewater Treatment Capacity Increase, October 2000.

Region of Waterloo, Environmental Study Report for Ayr Wastewater Treatment Capacity Expansion, April 2004.

Region of Waterloo, Wastewater Treatment Master Plan, August 2007.

Region of Waterloo, Design Guidelines and Supplemental Specifications for Municipal Services, Part B Design Guidlines, January 2012.

Region of Waterloo, Water and Wastewater Monitoring Report, April 2012.

SRM Associates, Wastewater System Capacity Review, Community of Ayr Wastewater System. July 2001.

TQI Inc., Sanitary Sewer Flow Monitoring and Analysis in Swan Street Area of Ayr, March 2008.