AREA SERVICING PLAN (2ND SUBMISSION)

December 2012

407 West Employment Area, North Oakville West

PREPARED FOR:

Bentall Kennedy

PREPARED BY:

MMM GROUP

D14-011-18

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1.0 Introduction

This Area Servicing Plan (ASP) has been prepared for Bentall Kennedy (Canada) LP on behalf of bcIMC Realty Corp., who have significant ownership in the 407 West Employment Area in North Oakville West. The 407 West Employment Area is the area bounded by Dundas Street on the south, Tremaine Road on the west, Highway 407 ETR on the north and Bronte Road on the east. This is an area identified for future urban development by the Regional Municipality of Halton (Region) and the Town of Oakville (Town) in Official Plan Amendment OPA 198. The majority of the Secondary Plan for North Oakville West (OPA 289) was approved by the OMB on December 4, 2009; there is an area of the lands which are still under appeal and generally consist of the lands between Bronte Road and the natural heritage area to the west of Bronte Road. The approved Secondary Plan requires the completion of the Master Servicing Plan to confirm infrastructure requirements.

This report has been prepared as a component of the North Oakville West Secondary Plan (NOWSP). This report is the work of MMM Group Limited (MMM), however, in certain instances as referenced in the report, utilizes research and input from other available sources. This report is intended to satisfy the Secondary Plan requirement for the preparation of a Master Servicing Plan. Subsequent to the approval of the North Oakville West Secondary Plan the Region has asked that the name Master Servicing Plan be replaced with Area Servicing Plan to avoid confusion with the Regional Water and Wastewater Master Plan. The Report has therefore been prepared to address the requirements of the Secondary Plan (Master Servicing Plan) and the Area Servicing Plan (ASP).

This report addresses the servicing issues by providing conceptual frameworks for the extension and development of water and wastewater systems. To facilitate orderly development of its infrastructure, the Region of Halton recently prepared an update to its Halton Water and Wastewater Master Plan. The Region's report entitled "Sustainable Halton Water and Wastewater Master Plan" – September 2011, has served as a starting point for the review of the Secondary Plan servicing requirements.

The purpose of this ASP is to apply the Region's proposed servicing concept to the specific Secondary Plan land use proposal and to suggest refinements that are required to each to facilitate orderly development. As noted above, this report satisfies the requirements in the approved Secondary Plan. It satisfies the requirements of the ASP Terms of Reference prepared by the Region of Halton.

The specific purposes of this report are to provide:

- Detailed information on proposed land uses.
- Detailed information on system demands (water) and flows (wastewater).
- A specific plan for implementing the Region's Master Plan in and around the 407 West Employment Area.
- A discussion of the impact that the proposed development of the 407 West Employment will have on planned Regional Infrastructure in terms of proposed capacity and timing.

1.1 Proposed Development

The 407 West Employment Area along with the Sixteen Hollow Area form the North Oakville West Secondary Plan. This study evaluates only the 407 West Employment Area. The study area contains, for the most part, proposed employment lands as well as a significant Natural Heritage System. The Land Use

Concept Plan, shown as Exhibit 1.1, was prepared by MMM based on more detailed study but is generally consistent with the NOWSP Master Plan. The total site area of the development lands and natural areas is approximately 251 hectares (620 ac). The total developable area is approximately 155 hectares (383 ac) or approximately 60% of the total site area.

To evaluate both vertical infrastructure (pumping stations, reservoirs, treatment plants) and linear infrastructure, the anticipated equivalent population values were considered. It is anticipated that the majority of the development in the study area will consist of employment uses, including General/Light Employment, Office Development and related Service/Commercial uses. The equivalent population for the proposed land use is 125 cap/ha. This value is based on the Equivalent Population Density for Light Industrial land use, as specified in the Halton Design Standards.

As noted in the Planning Rationale Report, for each of the criteria, the more conservative land use (commercial or industrial) has been used in the calculation for all development to allow for maximum flexibility for development of these lands and to ensure that all the future and existing infrastructure to be utilized by this development is adequate. This does not represent the anticipated development mix of commercial and industrial properties; this will not be determined until the detailed design stage. It should be noted that the more conservative land use (commercial or industrial) may differ depending on the criteria; therefore some calculations will assume all of the developable land is to be industrial and others will assume that all of the developable land is to be commercial.

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

LAND USE PLAN

HIGHWAY 407

TREMAINE ROAD

BRONTE ROAD

REGIONAL ROAD 25

DUNDAS STREET

AVENUE ONE

AVENUE TWO

AVENUE THREE

AVENUE FOUR

BURNHAMTHORPE ROAD

Future Employment

Natural Heritage System

SWM

Block P2-1 2.29 ha

Block P2-2 3.05 ha

Block P2-3 3.11 ha

Block P2-4 3.73 ha

Block P3 (E) 7.53 ha Existing Development

Block G6-1 2.85 ha

Block G6-2 3.41 ha

Block G6-3 1.75 ha

Block G6-4 2.82 ha

Block G6-5 2.64 ha

Block G6-6 2.84 ha

Block G3-3 1.21 ha

Block G5-1 1.73 ha

Block G5-2 2.30 ha

Block G5-3 2.70 ha

Block G7-1 1.96 ha

Block G7-2 2.33 ha

SWM 3.82 ha

SWM 1.62 ha

Block C2-1 2.29 ha

Block C2-2 0.67 ha

Block C2-3 2.19 ha

Block P7 (E) 2.43 ha Existing Development

LEGEND

- 407 WEST EMPLOYMENT AREA
- EXISTING PROPERTY LINE
- SUBJECT PROPERTY
- SERVICE AREA (SERVICE/RETAIL/OFFICE)
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- OPEN SPACE
- STORMWATER MANAGEMENT
- PLANNED 407 TRANSITWAY

SITE STATISTICS

TOTAL SITE AREA: 251.0 Ha
EMPLOYMENT AREA: 140.70 Ha
OPEN SPACE: 68.3 Ha
STORMWATER MANAGMENT AREA: 14.0 Ha
PLANNED 407 TRANSITWAY: 12.3 Ha
ROAD AREA: 15.7 Ha

FOR THE PURPOSES OF OUR CONCEPTUAL SERVICING ANALYSIS, CONSERVATIVE LAND USE ASSUMPTIONS HAVE BEEN MADE FOR THE ENTIRE 407 WEST EMPLOYMENT AREA

Scale

0 100 200 300 400 500m

Client

Bentall Kennedy

Prepared by

MMM GROUP

Date

DECEMBER 2012

Project No.

1409222.001

EXHIBIT 1.1

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1.2 Timing and Phasing

It is anticipated that the 407 West Employment Area will begin development in 2014 with occupancy in 2015. The development will likely be phased with the first phase adjacent to Dundas Street and future phases extending northward due to proximity to Regional Infrastructure.

1.3 Consultation with the Region of Halton

At the outset of this study, the Region of Halton was consulted with respect to its proposed infrastructure plans as generally set out in its report "Sustainable Halton Water and Wastewater Master Plan".

1.4 Interim Servicing

This Report has been prepared to provide the Region of Halton with a plan for the overall servicing of the 407 West Employment Area in a comprehensive fashion. The Region's Master Plan and investigations by the Study Team identify that there may be opportunities to service early stages of the Employment Area through interim measures, particularly along Dundas Street West.

Some of the major infrastructure required to service the 407 West Employment Lands have been identified as Development Charge (DC) funded projects. The majority of these projects will be completed in advance of development or occupancy of the 407 West Employment Lands, however, there may be the need for front-end funding for some regional projects or interim servicing to allow for development of the 407 West Employment Area for the initial phases of development.

If necessary to accommodate seamless development between phases, additional interim servicing should be investigated.

1.5 Report Organization

This Report has been organized as follows:

1.0 Introduction
This chapter defines the purpose of the report and describes the subject lands and the proposed development.

2.0 Water
This chapter reviews the proposed water infrastructure required to service the subject lands. The review applies the Halton Master Plan Concept to the 407 West Employment Area Land Use Plan and recommends refinements to the servicing plan.

3.0 Wastewater
This chapter reviews the proposed wastewater infrastructure required for the subject lands. The review applies the Halton Master Plan Concept to the 407 West Employment Area Land Use Plan and recommends refinements to the servicing plan.

4.0 Timing

This chapter discusses the timing requirements for regional water and wastewater projects to facilitate the development of the 407 West Employment Area.

2.0 Water

2.1 Region's Water & Wastewater Master Plan Update – September 2011

The Region's 'Sustainable Halton Water and Wastewater Master Plan' dated September 2011 set out a strategy for the long term and orderly development of the Region's infrastructure. This report was prepared in response to the new Growth Plan (ROPA 38) and Phasing (ROPA 39). In the case of water, this report addressed supply, pressure districts, storage and distribution. This report also addresses timing. It provided conceptual information on the location of proposed infrastructure; however, this is subject to more detailed review when considering the servicing corridors available through the road network that is proposed as part of the Land Use Plan for the 407 West Employment Area.

This ASP report has been prepared to develop on and complement the Region's plans by providing more specific information on how it can be implemented in the context of the specific plans for the 407 West Employment Area. Therefore, to provide appropriate context, the Region's Plan as it relates to the 407 West Employment Area is summarized in this section.

2.1.1 Supply

Historically, water supply for South Halton has come from three main sources; the Burlington Water Purification Plant, the Oakville Water Purification Plant, and wells within Milton (to service specific areas of Milton).

The 2002 Master Plan concluded that the long-term growth of Halton would require the construction in stages of a new water treatment plant that will have an ultimate capacity of 220 ML/d. The first stage of this new plant (Burloak) is now complete and commissioned.

This new supply is critical to meet the Region's medium and long-term growth projections for both the 407 West Employment Area and the Region as a whole.

2.1.2 Pressure Districts

The subject lands are located within the Oakville pressure district identified as Zone 3 or O-3. Zone 3 in Oakville includes all lands with an elevation of 128 to 166m. The zone boundary is generally parallel to Sixteen Mile Creek on the east, along Highway 407 to the north, along Tremaine Road to the west, and generally in between Upper Middle Road and the Q.E.W. to the south as shown on Exhibit 2.1.

Supply for Zone 3 is currently via a booster pumping station at Eighth Line and Upper Middle Road and the Kitchen Reservoir and Pump Station at Regional Road 25 and Upper Middle Road. Storage is provided at the Moore Reservoir on Sixth Line north of Burnhamthorpe Road (north of Dundas Street).

In the future, the supply to Zone 3 will be augmented via a 1200mm watermain connection on Dundas Street from 400m east of Bronte Road to Neyagawa Boulevard This supply will be connected to the existing Zone 3 water supply (Moore Reservoir on Sixth Line) via the existing 600mm watermain on Dundas Street connecting to the existing Sixth Line main which links the Eighth Line Water Booster Pumping Station

(WBPS) with the Moore Reservoir. The 407 West Employment lands will also receive supply from the Burlington Zone B3 via a 900mm watermain on Dundas Street from Appleby Line to Tremaine Road.

2.1.3 Storage

Storage for Oakville Zone 3 is currently provided at the R.J. Moore Reservoir on Sixth Line. Until 2002, Zone 3 also provided the storage for Zone 4, where it was pumped to Zone 4 on an as required basis. In 2002, an elevated storage tank was constructed in Zone 4 on Trafalgar Road north of Burnhamthorpe Road.

The existing storage available in Oakville Zone 3 and the Appleby and Headon reservoirs in Burlington which is connected to the supply system adjacent to the 407 West Employment Lands is sufficient for long term build-out of the 407 West Employment Area as well as all other lands serviced by Zone 3.

2.1.4 Distribution

Development in Oakville is currently serviced via a series of trunk watermains that connect sources of supply, pumping, and storage to a local distribution network.

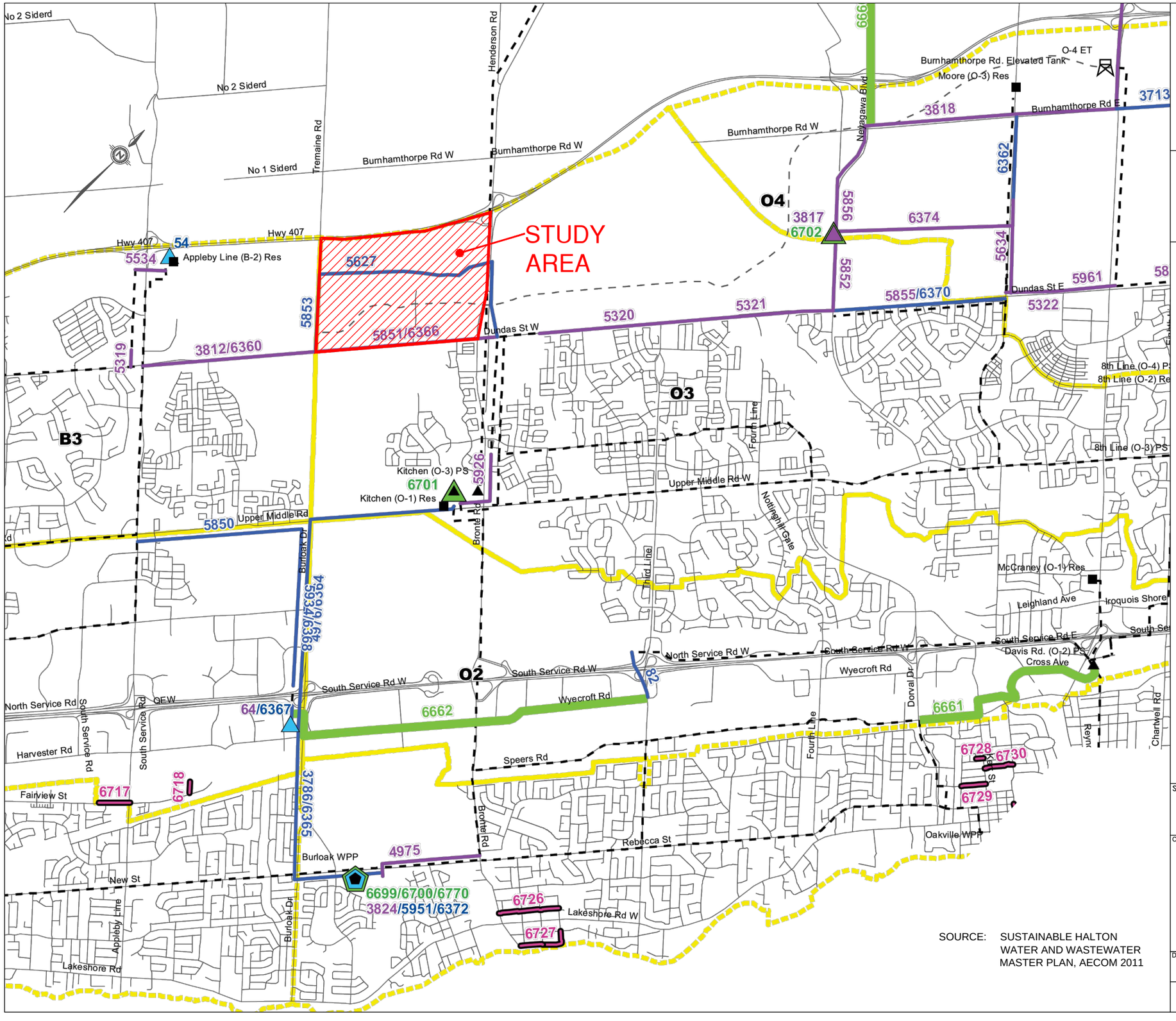
To support growth, the Region proposes a series of new trunk watermains that interconnect with and expand the existing system and connect to the new proposed sources of supply, pumping and storage as described above. The 407 West Employment Area will connect to the existing Zone 3 system at Dundas Street and Bronte Road, at Dundas Street and Tremaine Road where it connects to the Burlington Zone B3 system and internally through the 407 West Employment Area (Regional Project #5854) between Tremaine Road and Bronte Road. Water service will be distributed to the local network from the Dundas Street and the internal regional watermains.

2.1.5 Region's Timing and Development Charge Projects

Exhibit 2.2 summarizes the Region's proposed timing and cost (from the Sustainable Halton Water and Wastewater Master Plan) for the completion of the water system construction required to service the 407 West Employment Area and other interdependent areas of Oakville and Milton.

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

REGIONAL WATER PLAN



Legend

Existing Infrastructure
- Water Pumping Station
- Water Well
- Water Standpipe
- Water Reservoir
- Water Purification Plant
- Elevated Water Tower
- Existing Watermain
- Watermain

Previously Approved Infrastructure
- Water Pumping Station
- Water Well
- Water Purification Plant
- Water Reservoir

Proposed/Upgrade Infrastructure
- Water Pumping Station
- Water Well
- Water Purification Plant
- Water Reservoir
- Watermain
- Distribution-Built Boundary Watermain

Funded Infrastructure
- Water Pumping Station
- Water Reservoir
- Funded Project - Watermain (2008 MP Projects)
- Existing Interregional connections
- Existing Milton Groundwater Servicing
- Existing Central Milton Groundwater Service Area Boundary
- Water Pressure Zones
- Proposed Lake Base Service Area

SOURCE: SUSTAINABLE HALTON WATER AND WASTEWATER MASTER PLAN, AECOM 2011

Scale: NTS

Client: Bentall Kennedy

Prepared by: MMM GROUP

Date: DECEMBER 2012

Project No.: 1409222.001

EXHIBIT 2.1

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Exhibit 2.2 – Region's Water Projects

Project	Development Charge Cost	Region's ID #'s	Estimated In-Service Date
Supply			
Additional Zone 3 Pump at Washburn Reservoir	$770,000	6113	2015
Additional Zone 3 Capacity at Kitchen Reservoir	$2,025,000	3820	2015
Appleby Booster Pump Station	$10,274,000	54	2015
Sub-Total	**$13,069,000**		
Transmission			
900mm WM on Dundas Street - Appleby Line to Tremaine Road	$9,088,000	3812/6360	2013
1200mm WM on Dundas Street – Tremaine Road to Bronte Road	$6,794,000	5851/6366	2013
1200mm WM from Kitchen Res/BPS to Bronte Road and North to West Oak Trail	$2,794,000	5926	2012
Sub-Total	**$18,676,000**		
Local			
600mm WM on Tremaine Road - Dundas Street to approx. 950m North	$1,330,000	5853	w/ Development
600mm WM through North Oakville Lands - Tremaine Road to Bronte Road	$7,238,000	5627	w/ Development
Sub-Total	**$8,568,000**		
TOTAL	**$40,313,000**		

Projects and costs shown in Exhibit 2.2 have been taken from the Sustainable Halton Water and Wastewater Master Plan, and confirmed with the Region. Some of the works described will also provide service to other areas of Halton.

The infrastructure described above will be constructed on an as-required basis for each phase of development. For example, the 600mm watermain on Tremaine Road from Dundas Street to the proposed new East-West Road within the 407 West Employment Area will not be constructed until the proposed development plan proceeds. In many instances, works such as the treatment plants, storage, and pumping stations will be constructed incrementally. In the case of linear infrastructure, it will be extended incrementally to provide local service connectivity and looping.

2.2 Expected Water Demand

In this section, water demands under various conditions have been assessed using the design criteria that the Region has utilized in the Master Plan and supplemented with the Region's Design Criteria as required. To develop the estimated demands, the system design criteria is first set out and then applied to the proposed development statistics from Exhibit 1.1.

The flow demand, storage volume requirements, and pumping station capacities are similar to those used by the Region in developing the Master Plan. Any difference in the demand estimated in the Master Plan is due to an increase of undevelopable natural heritage areas throughout the 407 West Employment Area .

Exhibit 2.3 sets out the system unit demands. Exhibit 2.4 summarizes the Water System Design Criteria.

Exhibit 2.3 – System Unit Demands

	Residential L/cap/day	Commercial L/employee/day	Industrial L/employee/day	Institutional L/employee/day
Average Day Demand	330	213	302	74
Maximum Day Peaking Factor	1.9	1.9	1.9	1.9
Peak Hour Peaking Factor	3.00	3.00	3.00	3.00

Exhibit 2.4 – Water System Design Criteria

Component	Condition/Description	Criteria
Pumping Stations	With adequate zone storage available	Maximum day flow to zone and all subsequent zones
	Without adequate storage available	The greater of peak hour flow or maximum day plus fire to the zone and the maximum day flow to all subsequent higher zones
Storage	Balancing storage	25% of maximum day demand
	Fire storage	Largest expected fire zone (based on land use)
	Total	125% of Balancing + Fire (allows for 25% Emergency Storage)
Fire flow	Minimum flow (single family residential)	5,500 L/min for 2 hours @ minimum 140 kPa (20 psi)
	Minimum flow (industrial/commercial/institutional)	15,000 L/min for 3 hours @ minimum 140 Pa (20 psi)
System pressure	Normal operating conditions	280 kPa (40 psi) to 700 kPa (100 psi)

Exhibit 2.5 summarizes the projected demands under various conditions for the 407 West Employment Area at build-out by applying the above criteria to the development statistics described in Exhibit 1.1. Industrial land use demands have been applied to the entire site to provide a conservative estimate and to allow for flexibility with respect to the ultimate land use mix.

Exhibit 2.5 – Flow Demands: Linear Infrastructure (407 West Employment Area Land Use Plan Population Projections)

	Residential (ML/d)	Commercial (ML/d)	Industrial (ML/d)	Institutional (ML/d)	Total (ML/d)
Average Day Demand	0.0	0.0	5.3	0.0	5.3
Maximum Day	0.0	0.0	10.1	0.0	10.1
Peak Hour	0.0	0.0	16.0	0.0	16.0

The peak hour value was determined from the water model.

2.3 Region's Concept Plan Applied to the 407 West Employment Area

One of the important purposes of this report is to apply the Region's Master Plan Update water distribution concept to the approved North Oakville West Secondary Plan for the 407 West Employment Area . As stated at the outset of this Report, the Report's purpose is to adapt the Region's servicing concept to the approved Secondary Plan, not to modify it. As a result of this principle, and because the estimated demand based upon the approved Secondary Plan is similar to the demand assumed by the Region, no changes are recommended to the Region's proposed supply, pumping, or storage system network.

The development of a community plan has however created the opportunity, and in fact the need, for a 'plan specific' trunk water main distribution network to be developed to replace the generic one that the Region applied in the absence of a Secondary Plan.

The proposed ASP water distribution network is illustrated in Exhibit 2.6. To address environmental sensitivities and minimize impact, all mains are proposed to be located on existing or proposed road allowances.

The proposed ASP water distribution system is essentially the same as the distribution from the Region's Master Plan Update (MPU) with minor changes based on the outcome of land uses proposed by the approved Secondary Plan. The following key elements of the proposed distribution network that are the same as the Region's MPU water system include:

•The 1200mm PD3 supply main on Dundas Street from Bronte Road to Tremaine Road (Region Project # 5851/6366); and

•The 600mm PD3 watermain on Tremaine Road from Dundas Street to the proposed East-West Collector through the 407 West Employment Area (Region Project #5853).

Changes to the network to respond to the proposed Land Use Plan and road pattern include the following minor changes to the Region's MPU.

•A slight relocation of the east-west 600mm watermain to better match the proposed road alignment (Region Project # 5627).

Finally, to maintain required fire flows and adequate pressure during all phases of development, the local north-south watermains should connect to the 1200mm diameter watermain on Dundas Street.

The proposed changes to the distribution system will have no change to the development charge projects.

2.4 Water Distribution Modelling Analysis

The Region of Halton provided a copy of the Region's Water Distribution Model dated August 12, 2008 to assist MMM in modelling the proposed Area Servicing Plan watermain system. The following recommendations are based on the update of the Region's model to include the proposed ASP watermain system shown in Figure 2.6.

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

WATER DISTRIBUTION PLAN

HIGHWAY 407

TREMAINE ROAD

BRONTE ROAD

REGIONAL ROAD 25

DUNDAS STREET

AVENUE ONE

AVENUE TWO

AVENUE THREE

AVENUE FOUR

BURNHAMTHORPE ROAD

Future Employment

Natural Heritage System

Block P2-1 2.29 ha

Block P2-2 3.05 ha

Block P2-3 3.11 ha

Block P2-4 3.73 ha

Block P3 (E) 7.53 ha Existing Development

Block G6-1 2.85 ha

Block G6-2 3.41 ha

Block G6-3 1.75 ha

Block G6-4 2.82 ha

Block G6-5 2.64 ha

Block G6-6 2.84 ha

Block G3-3 1.21 ha

Block G5-1 1.73 ha

Block G5-2 2.30 ha

Block G5-3 2.70 ha

Block G7-1 1.96 ha

Block G7-2 2.33 ha

Block C2-1 2.29 ha

Block C2-2 0.87 ha

Block C2-3 2.19 ha

Block P7 (E) 2.43 ha Existing Development

SWM

SWM 3.82 ha

SWM 1.62 ha

PROPOSED 600Ø REGIONAL WATERMAIN

PROPOSED 300Ø LOCAL WATERMAIN

PROPOSED 300Ø REGIONAL WATERMAIN

PROPOSED 900Ø REGIONAL WATERMAIN

PROPOSED 1200Ø REGIONAL WATERMAIN

EXISTING 900Ø REGIONAL ZONE 5 WATERMAIN

LEGEND

- 407 WEST EMPLOYMENT AREA
- EXISTING PROPERTY LINE
- SUBJECT PROPERTY
- SERVICE AREA (SERVICE/RETAIL/OFFICE)
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- OPEN SPACE
- STORMWATER MANAGEMENT
- PLANNED 407 TRANSITWAY
- EXISTING REGIONAL WATERMAIN
- PROPOSED REGIONAL WATERMAIN
- PROPOSED LOCAL WATERMAIN
- FUTURE CULVERT CROSSING

FOR THE PURPOSES OF OUR CONCEPTUAL SERVICING ANALYSIS, CONSERVATIVE LAND USE ASSUMPTIONS HAVE BEEN MADE FOR THE ENTIRE 407 WEST EMPLOYMENT AREA

Scale 0 100 200 300 400 500m

Client: Bentall Kennedy

Prepared by: MMM GROUP

Date: DECEMBER 2012

Project No.: 1409222.001

EXHIBIT 2.6

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2.4.1 Water Distribution Modelling Results for Peak Hour and Maximum Day

The proposed ASP system was incorporated into the Region of Halton's Water Distribution Model to determine if the proposed ASP water system would be adequate to service the 407 West Employment Area. Exhibit 2.7 summarizes the results of the distribution modelling. Copies of the Peak Hour and Maximum Day model results have been included in Appendix A.

Exhibit 2.7 – Results of Water Distribution Modelling for Proposed ASP Water System

	Peak Hour	Maximum Day
Minimum HGL	190.20 m	196.16 m
Node for Minimum HGL	WJ-1152-O	NO-229,230,231,247,250,254
Maximum HGL	190.90 m	196.20 m
Node for Maximum HGL	NO-245,246,251,252, WJ-3114-O, & WJ-3116-O	NO-245,246,251,252,253, WJ-150-O, WJ3114-O, & WJ-3116-O
Minimum System Pressure (psi)	41.0 psi	48.59 psi
Node for Minimum System Pressure	NO-239	NO-239
Maximum System Pressure (psi)	62.41 psi	69.95 psi
Node for Maximum System Pressure	NO-252	NO-252

The results of the distribution modelling show that the proposed ASP water system will provide adequate flow and pressure to all locations in the ultimate development condition. It should be noted that the maximum headloss in the proposed system is only 0.08m during a maximum day demand and 0.18m during a peak hour demand. The low headloss in the overall system indicates that the watermains are adequately sized and that increasing the watermain sizes from the proposed 1200/600mm trunk watermains and the 300mm distribution watermains is not required.

During the initial phases of development, all attempts will be made to provide full looping of the internal water distribution systems; this may require interim or temporary watermains. In cases where looping is not possible, a regular flushing program will be required at all dead ends.

2.4.2 Water Distribution Modelling Results for Maximum Day plus Fire

The proposed ASP system was also modelled to determine if the proposed water distribution system could meet the Region's fire requirements of 5,500 L/minute for residential development and 15,000 L/minute for commercial/institutional/industrial development.

The results of the maximum day plus fire modelling indicate that the fire flow of 15,000 L/minute (250L/s) at a residual pressure of 20 psi is available at all nodes within the 407 West Employment Area. Therefore, it can be concluded that the proposed ASP water system is adequately sized for the maximum day plus fire demands. All office towers and large scale industrial buildings will likely require boosters to provide proper fire protection, this needs to be evaluated at the detailed design stage.

2.5 Additional Design Considerations

2.5.1 Local Service Watermains

The 407 West Employment Area Land Use Plan proposes developments that front onto external roads such as Dundas Street, Tremaine Road, and Bronte Road where Regional DC watermains are proposed. These proposed developments will require water services and in some cases may require local watermains to service these developments. For example, local watermains are proposed on the north side of Dundas Street West to provide service to blocks that do not have internal road frontage. The ASP primarily addresses the watermain sizes for the transmission and major distribution watermains. Local distribution have been preliminarily sized in the study but will need to be addressed in more detail through the Functional Servicing Reports supporting the various Draft Plans of Subdivision and will be in accordance with the Region's published standards for water connections. Each proposed building will need to be evaluated at the detailed design stage to determine if a booster is required for that development to meet the water demand and fire service requirements.

2.5.2 Mitigation Measures for Single Feed Watermain Supplies

The ultimate water distribution is a well-designed network of interconnected watermains with multiple loops to ensure security and flexibility in servicing the full build out of the proposed Area Servicing Plan. While it is a priority to loop systems where possible and as soon as the opportunity is available, it will be necessary to service development areas with single feed watermains during various phases of development until the future watermain loops can be constructed. The phasing will likely move to the north from Dundas Street West, which may create circumstances where there are single feed dead end watermains. During the interim condition of single feed watermains, a regular flushing practice will be required to maintain water quality.

3.0 Wastewater

3.1 Region's Water & Wastewater Master Plan

In developing its Water and Wastewater Master Plan, the Region considered a wide variety of possible strategies to service the expected growth with respect to both treatment and conveyance. The conclusions of the Region's work with respect to treatment and conveyance (including conveyance options) as it affects the 407 West Employment Area are summarized in the following sections.

3.1.1 Treatment

Wastewater treatment for Oakville is provided at three Wastewater Treatment Plants (WWTP). These plants are Mid-Halton, Oakville South East, and Oakville South West. The recommended alternative in the Master Plan proposed that all wastewater treatment for growth in Oakville and Milton be at the Mid-Halton WWTP.

The first phase of Mid-Halton WWTP was constructed in 1991 with a rated capacity of20,000 m3/d. It was subsequently re-rated to 25,000m3/d. The Region completed an expansion of the plant to 50,000 m3/d in 2003 and has subsequently completed the next expansion to 75,000 m3/d in order to service anticipated growth within Milton and Oakville.

The Region has planned the Mid-Halton Wastewater plant and has sufficient land to allow it to be expanded in an orderly and predictable fashion. These expansions would be timed so that the capacity is available when required by development throughout the region. Expansion of capacity will trigger the need for various other changes or improvements such as biosolids handling and a new outfall (not required until growth beyond the Halton Urban Structure Plan (HUSP)).

3.1.2 Collection System

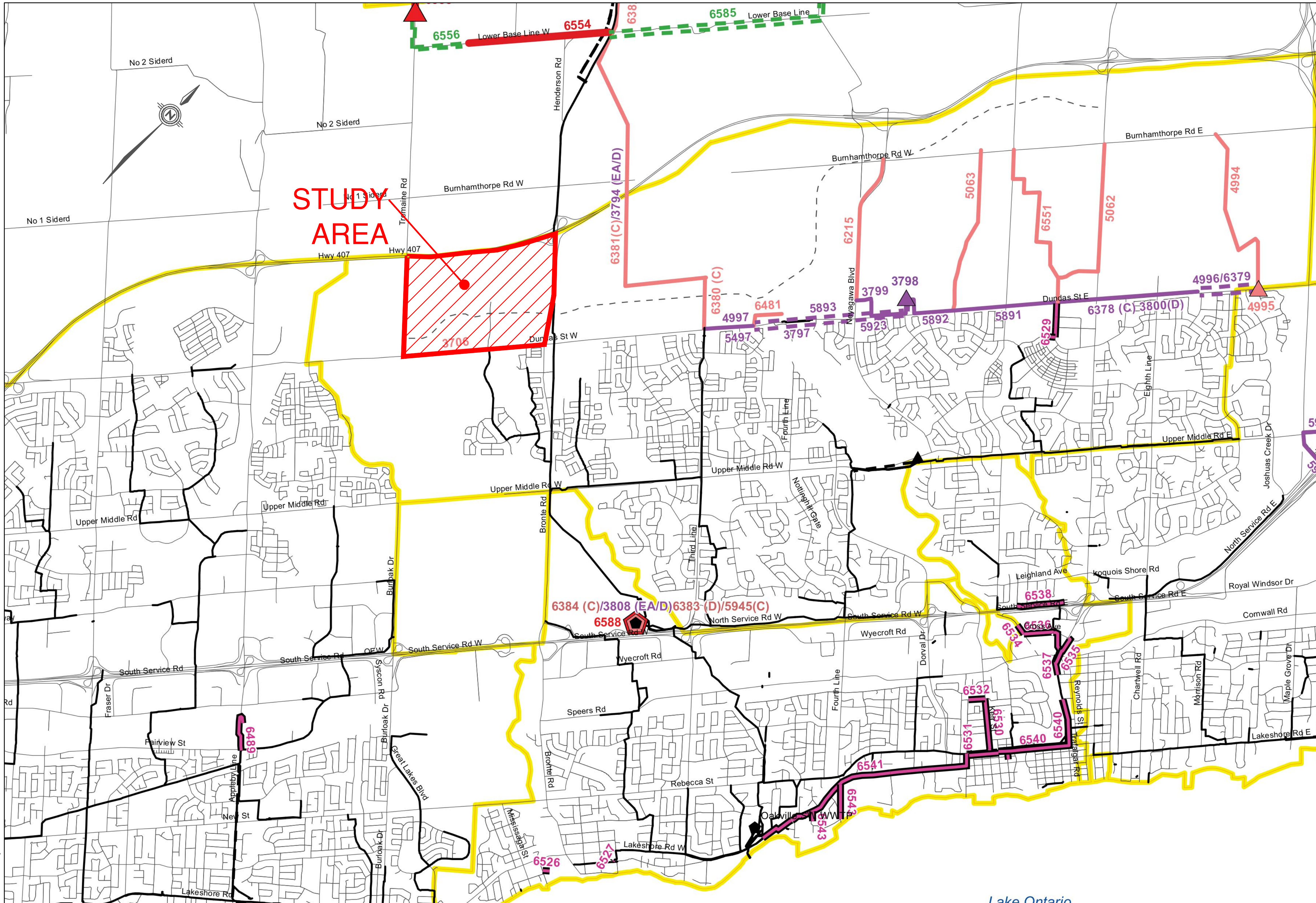
Exhibit 3.1 is a representation of the portion of the Region's proposed wastewater collection and pumping system that are intended to service the 407 West Employment Area, the lands to their east and a portion of the expected growth in Milton.

The 407 West Employment Area generally slopes from north to south and towards the centre of the lands, approximately 180m to the east of Colonel William Parkway at Dundas Street. The Master Plan provides for a series of local sewers that will drain from north to south connecting to a new Trunk Sewer System on Dundas Street. The Region's Master Plan does not show the sewers within the 407 West Employment Area. One of the purposes of this report is to apply the Master Plan concept to the Land Use Plan road and development scheme and recommend a specific plan for the sewer system. At Dundas Street, a trunk system which directs the flows to the existing system at Colonel William Parkway is proposed. The existing system will intercept flow and divert it south towards the Mid-Halton Plant in a manner that minimizes impact to the existing residents of the Town of Oakville.

More specifically, the lands to the west of the western natural heritage area and east of Tremaine Road will be conveyed south by an internal wastewater sewer along an internal Avenue Two to the Trunk Sewer on Dundas Street West which will then connect to the existing wastewater system at Colonel William Parkway.

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

REGIONAL WASTEWATER PLAN


STUDY AREA
3706
Lake Ontario
Oakville SW WWTP
ELIZABETH GARDEN PS
6556
6554
6585
6381(C)/3794 (EA/D)
6380 (C)
6481
4997
5497
3797
5893
3799
3798
5923
5892
5891
6529
6378 (C)-3800(D)
4996/6379
4995
6215
5063
6551
5062
4994
6384 (C)/3808 (EA/D)
6383 (D)/5945(C)
6588
6538
6536
6534
6537
6535
6532
6530
6531
6540
6541
6542
6543
6489
6526
6527
Hwy 407
Dundas St W
Dundas St E
Upper Middle Rd W
Upper Middle Rd E
Upper Middle Rd
South Service Rd W
South Service Rd E
North Service Rd W
North Service Rd E
Lakeshore Rd W
Lakeshore Rd E
Lakeshore Rd
Burnhamthorpe Rd W
Burnhamthorpe Rd E
Lower Base Line
Lower Base Line W
No 1 Siderd
No 2 Siderd
Tremaine Rd
Henderson Rd
Bronte Rd
Third Line
Fourth Line
Eighth Line
Neyagawa Blvd
Nottinghill Gate
Joshuas Creek Dr
Royal Windsor Dr
Cornwall Rd
Iroquois Shore Rd
Leighland Ave
Wyecroft Rd
Speers Rd
Rebecca St
Dorval Dr
Trafalgar Rd
Reynolds St
Chartwell Rd
Morrison Rd
Maple Grove Dr
Mississaga St
Burloak Dr
Great Lakes Blvd
Appleby Line
New St
Fairview St
Fraser Dr
Sycamore Rd

Legend

Existing Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Wastewater Main
- Wastewater Forcemain

Previously Approved Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Wastewater Main
- Distribution-Built Boundary Wastewater main

Proposed/Upgrade Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Proposed Alignment - Wastewater Main
- Wastewater Forcemain

Funded Infrastructure
- Wastewater Pumping Station
- Wastewater Treatment Plant
- Wastewater Main
- Wastewater Forcemain
- WWTP Drainage Area
- Proposed Lake Base Service Area

SOURCE: SUSTAINABLE HALTON WATER AND WASTEWATER MASTER PLAN, AECOM 2011

Scale: NTS

Client: Bentall Kennedy

Prepared by: MMM GROUP

Date: DECEMBER 2012

Project No. 1409222.001

EXHIBIT 3.1

The external area from the lands west of Tremaine Road can connect to the system at the future Burnhamthorpe Road, Avenue One or on Dundas Street West. The wastewater flows from the lands between the two natural heritage areas will be conveyed south along an internal Avenue Three and discharged to the existing wastewater system on the south side of Dundas Street at Colonel William Parkway. The lands east of the 14 Mile Creek NHS and west of Bronte Road will be conveyed south along Avenue Four and will connect to the Trunk Sewer on Dundas Street West which will then discharge to the existing system at the south side of Dundas Street at Colonel William Parkway. There is the possibility for the flows from a portion of these lands to discharge to the existing system at Valleyridge Drive; this would require extending the existing sewer to Dundas Street.

The Region of Halton has advised that the sewers on Valleyridge Drive were designed to accommodate an external area of 80 hectares with an equivalent population of 10,000 people. The trunk sewer and downstream system on Colonel William Parkway has been designed to accommodate an external area of 362 hectares and an equivalent residential population of 8,145 people. Please refer to the design calculations and drainage plan for the Bronte Creek Community completed by Stantec in Appendix B.

The existing system eventually discharges to the Mid-Halton WWTP and PS. No upgrades to the existing wastewater sewers are anticipated to accommodate future development. The need for a local or regional pumping station appears not to be required.

3.1.3 Region's Timing and Development Charge Projects

Exhibit 3.2 summarizes the Region's proposed timing for the completion of the wastewater construction related to the subject lands and in many cases also for other development areas, particularly areas in North Oakville East and Milton.

Exhibit 3.2 – Region's Wastewater Projects

Project	Development Charge Cost	Region's ID #'s	Estimated In-Service Date
Local			
600mm WWM on Dundas Street - Colonel William Parkway to approx. 900m West	$4,005,000	3706	2013
TOTAL	**$4,005,000**		

Projects and costs shown in Exhibit 3.2 have been taken from the Sustainable Halton Water and Wastewater Master Plan prepared by AECOM dated September 2011. The estimated project timing has been provided by the Region of Halton.

3.2 Expected Sewage Generation

In this section sewage generated in the 407 West Employment Area Land Use Plans has been assessed and compared to the Master Plan. The design criteria that the Region has utilized in the Master Plan are used in this analysis. To develop the estimated sewage generation, the system design criteria is first set out and then applied to the proposed development statistics from Exhibits 1.1.

The Region of Halton wastewater system criteria is as follows:

Exhibit 3.3 – Average Day Wastewater Flow

Land Use	Unit	Collection System	Treatment
Residential	L/cap/d	275	365
Commercial	m^3/ha/d	24.75	26.0
Industrial	m^3/ha/d	34.375	17.63
Institutional	m^3/ha/d	11.00	11.0

The modified Harmon Peaking Factor equation is used to determine the peak flows for the collection system. The average day wastewater flow criteria for wastewater treatment include an allowance for infiltration. An infiltration allowance of 0.286 L/s/ha is added to the peak system flows for designing the collection system.

The treatment capacity flow generated by the 407 West Employment Area is illustrated in Exhibit 3.4. Commercial land use demands have been applied to the entire site to provide a conservative estimate and to allow for flexibility with respect to the ultimate land use mix.

Exhibit 3.4 – Generated WWTP Flows: 407 West Employment Area Land Use Plan Projections

	Residential ML/d	Commercial ML/d	Industrial ML/d	Institutional ML/d	Total ML/d
Average Daily Flow	0.0	4.0	0.0	0.0	4.0

Pumping stations and sewers are designed based upon peak flows. Flows will increase as various sub-catchment areas are connected to the Trunk Sewer, only the connection from the existing manhole on Colonel William Parkway and the proposed manhole on Dundas Street West will accept the full flow from the catchment area. Exhibit 3.5, which follows, estimates the peak flow to the existing wastewater sewer on Colonel William Parkway. This is the full flow from the 407 West Employment Area.

The difference in the peak flows between the Region's projections and from those generated from the 407 West Employment Area Land Use Plan combined with the proposed increase in pipe slope in some instances will impact the sizing of the Dundas Street trunk sewer by one pipe size in some locations. Industrial land use demands have been applied to the entire site to provide a conservative estimate and to allow for flexibility with respect to the ultimate land use mix.

Exhibit 3.5 – Peak Generated Collection System at Colonel William Parkway Trunk Sewer: 407 West Employment Area Only

	Residential L/s	Commercial L/s	Industrial L/s	Institutional L/s	Total L/s
Average Flow	0.0	0.0	56.3	0.0	56.3
Peaking Factor	4.3	4.3	2.706	4.3	
K	0.80	0.80	0.80	0.80	0.80
Infiltration	0.0	0.0	45.5	0.0	45.5
Total	0.0	0.0	167.4	0.0	167.4

3.3 Region's Concept Plan Applied to the 407 West Employment Area

The proposed sewer system to service the 407 West Employment Area is described in this section. The system and the proposed drainage boundaries are illustrated on Exhibit 3.6.

Dundas Street Sewer

As discussed in Section 3.1, the Region proposes that all wastewater flows from the 407 West Employment Area drain to a trunk sewer system along Dundas Street. As plans were being developed for the 407 West Employment Area, alternative locations for this sewer were considered. At this stage it has been determined that Dundas Street would be a feasible alignment for the sewer.

The Master Plan recommends that the Dundas Street gravity sewer directing flows from the entire 407 West Area to the gravity sewer on Dundas Street and ultimately to the existing wastewater sewer on Colonel William Parkway. This study generally supports that conclusion.

A preliminary design has been undertaken for the trunk sewer on Dundas Street, which is presented on the attached drawings, P1-P15.

Internal Collection Systems

In order to convey wastewater drainage from the subject lands to the Dundas sewer collection system, various alternative system layouts were evaluated. The common elements of the system layouts were:

- all sewers are located on proposed road alignments; and
- all crossings of watercourses on natural features follow proposed road alignments.

A number of factors were considered that would influence the proposed alternatives. The factors include environmental features, existing topography, proposed road patterns, stormwater management facilities, and the relative ease of sewer construction.

While Exhibit 3.6 shows the preferred alignment for the internal sewers, there is flexibility in the location of these sewers and the corresponding drainage boundaries. The sizing of the Dundas Street sewer has

considered this flexibility and as such will allow the plan to evolve as it moves forward over time. The costs for local sewers are not considered to be DC recoverable.

A local or regional pumping station does not appear to be required.

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

WASTEWATER DRAINAGE PLAN

HIGHWAY 407

TREMAINE ROAD

BRONTE ROAD

REGIONAL ROAD 25

DUNDAS STREET

EXTERNAL BY OTHERS

AVENUE ONE

AVENUE TWO

AVENUE THREE

AVENUE FOUR

BURNHAMTHORPE ROAD

Future Employment

Natural Heritage System

SWM

Block P2-1 2.29 ha

Block P2-2 3.05 ha

Block P2-3 3.11 ha

Block P2-4 3.73 ha

Block P3 (E) 7.53 ha Existing Development

Block G6-6 2.84 ha

Block G6-5 2.64 ha

Block G6-4 2.82 ha

Block G6-3 1.75 ha

Block G6-2 3.41 ha

Block G6-1 2.85 ha

Block G5-3 1.21 ha

Block G5-2 2.30 ha

Block G5-1 1.73 ha

Block G7-1 1.96 ha

Block G7-2 2.33 ha

Block C2-1 2.29 ha

Block C2-2 0.87 ha

Block C2-3 2.19 ha

Block P7 (E) 2.43 ha Existing Development

MHA1 MHA2 MHA3 MHA4 MHA5 MHA6 MHA7 MHA8

MHB1 MHB2 MHB3 MHB4 MHB5 MHB6 MHB7 MHB8 MHB9 MHB10

MHC1 MHC2 MHC3 MHC4 MHC5 MHC6

MHD1 MHD2 MHD3 MHD4

MHE1 EX. MH9

300Ø SAN @ 0.5%

300Ø SAN @ 0.7%

300Ø SAN @ 1.0%

300Ø SAN @ 1.2%

300Ø SAN @ 2.0%

300Ø SAN @ 2.5%

300Ø SAN @ 0.5% (IF REQUIRED)

375Ø SAN @ 0.5%

450Ø SAN @ 0.5%

450Ø SAN @ 1.25%

525Ø SAN @ 0.5%

200Ø SAN @ 1.0%

56.0 / 2170

53.7 / 5820

60.0 / 6933

2.4 / 304

39.40 / 4533

13.0 / 715

LEGEND

- 407 WEST EMPLOYMENT AREA
- EXISTING PROPERTY LINE
- SUBJECT PROPERTY
- SERVICE AREA (SERVICE/RETAIL/OFFIC
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- OPEN SPACE
- STORMWATER MANAGEMENT
- PLANNED 407 TRANSITWAY
- SANITARY SEWER
- SANITARY MANHOLE
- SANITARY DRAINAGE BOUNDARY
- EX. SANITARY SEWER (B.O.)
- TRIBUTARY AREA (Ha) / TRIBUTARY POPULATION
- EXTERNAL TRIBUTARY AREA (Ha) / EXTERNAL TRIBUTARY POPULATION
- FUTURE CULVERT CROSSING
- EXISTING 825 Ø SAN

FOR THE PURPOSES OF OUR CONCEPTUAL SERVICING ANALYSIS, CONSERVATIVE LAND USE ASSUMPTIONS HAVE BEEN MADE FOR THE ENTIRE 407 WEST EMPLOYMENT AREA

Scale 0 100 200 300 400 500m

Client: Bentall Kennedy

Prepared by: MMM GROUP

Date: DECEMBER 2012

Project No.: 1409222.001

EXHIBIT 3.6

FILE NAME: x:\DIV10\14-09222\MUN\ASP-FS5 Exhibits\EX3.6-FIG8.2_Wastewater Drainage Plan.dwg_EX 3.6

External Drainage Areas

One other tributary area will connect to the Dundas Street trunk sewer.

The adjacent Tremaine-Dundas Secondary Plan Area, City of Burlington will discharge wastewater flows to the Dundas Trunk system at Tremaine Road. A Secondary Plan is currently being prepared for the area to determine the preferred land use concept. At present there are 3 land use options proposed which include approximately 56 hectares of developable land with an estimated equivalent population of 3,090 people. For the purpose of this study the most conservative option of entirely residential was used to evaluate the downstream wastewater sewer. Due to its shorter length and smaller tributary area it is considered to be a local sewer. This local sewer allows the Dundas Street trunk to be kept at a nominal depth. The wastewater flows generated by the Tremaine-Dundas Community are shown in Exhibit 3.7.

Exhibit 3.7 – Peak Generated Collection System Flows to Dundas Trunk Sewer: Tremaine-Dundas Community

	Residential L/S	Commercial L/S	Industrial L/S	Institutional L/S	Total L/S
Average Flow	6.9	0.0	0.0	0.0	6.9
Peaking Factor	3.56	4.3	4.3	4.3	
K	1.0	1.0	1.0	1.0	1.0
Infiltration	16.4	0.0	0.0	0.0	16.4
Total	41.0	0.0	0.0	0.0	41.0

The Region of Halton has expressed concerns relating to the servicing of the lands on the east side of Old Bronte Road, north of Dundas. This area includes approximately 13 hectares of existing residential development, currently serviced by septic systems. In servicing these lands in the future, it is expected that wastewater flows cannot be conveyed to the trunk sewer on Grand Oak Trail, as this would require a crossing of the Natural Heritage System to the east. As such, it is proposed to service this area with a new local wastewater sewer, connecting to the existing 825mm diameter wastewater sewer in Old Bronte Road, approximately 100m north of Dundas Street West. The wastewater flows generated by the existing Old Bronte Road residential development are shown in Exhibit 3.8.

Exhibit 3.8 – Peak Generated Collection System Flows to Existing Old Bronte Road Trunk Sewer – Existing Old Bronte Road Residential Development

	Residential L/S	Commercial L/S	Industrial L/S	Institutional L/S	Total L/S
Average Flow	2.3	0.0	0.0	0.0	2.3
Peaking Factor	3.89	4.3	4.3	4.3	
K	1.0	1.0	1.0	1.0	1.0
Infiltration	4.1	0.0	0.0	0.0	4.1
Total	12.9	0.0	0.0	0.0	12.9

It is expected that the Sixteen Hollow Lands to the east of the 407 West Employment Lands will be serviced by the existing wastewater sewer located at approximately Third Line and Dundas Street West and will not impact any of the sewers utilized by the 407 West Employment Lands.

3.4 Sewer Sizing and Technical Analysis

Flows and sewer sizes were developed using Regional design criteria. Detailed design sheets are provided in Appendix B. The existing system along Colonel William Parkway from Dundas Street West to the south limit of the Bronte Creek Community has been designed to accommodate 362 ha of development with an equivalent population of 8,145. The design sheet and drainage plan for the Bronte Creek Community are available in Appendix B.

The Bronte Creek Community design sheets have were used to assist with the analysis of the proposed development of the 407 West Employment lands. The proposed 407 West Employment Lands and the external contributor (Tremaine Neighbourhood) that contribute to the Colonel William Parkway collect from a total area of 213 hectares and an equivalent population of 19,759 people with a combined wastewater flow of approximately 204 L/s at the Colonel William Parkway and Dundas Street West manhole and 232 L/s at the south limit of the Bronte Creek Community. In contrast, the Bronte Creek Community analysis completed by Stantec shows a total flow contribution of approximately 180 L/s at the Colonel William Parkway and Dundas Street West manhole and 210 L/s at the south limit of the Bronte Creek Community. This does represent an increase of approximately 24 L/s at the Colonel William Parkway and Dundas Street West manhole, and 22 L/s at the south limit of the Bronte Creek Community; however, at no point is the capacity of any leg of sewer greater than 75%. It should also be noted that the wastewater generation values used for both the Tremaine Subdivision and the 407 West Employment Lands are the highest values possible. This wastewater analysis is truly a worst-case scenario.

Conceptual Plan-Profiles of the Wastewater Sewer design are provided in Appendix C
.

4.0 Timing

4.1 General

To accommodate planned long-term growth, effective timing and phasing of infrastructure construction is key in providing cost effectiveness, while ensuring that adequate capacity exists as it is required.

Fixed infrastructure such as plants and pumping stations may be constructed incrementally, typically in a modular format. By contrast, linear infrastructure such as pipes and manholes must be completed from point A to B, where B outlets to the treatment system or connects to the supply system.

4.2 Water

In this section, information is provided with respect to the water demands to assist the Region in timing the staging of its infrastructure construction. As noted earlier, for most elements, this information must be combined with similar information from other communities in the Region.

4.2.1 Demand

The water demand created by the North Oakville West Secondary Plan requires various elements of infrastructure to be in place. These elements are:

- Water Treatment
- Pumping Station(s)
- Storage
- Distribution

The capacity requirements of the water treatment and pumping systems are determined based on the maximum daily flow. The required water treatment and pumping system upgrades to facilitate development of the 407 West Employment Area is anticipated to be in place as part of the Phase 1 2008 Residential DC Project Program. Specifically, the following Once these projects are complete, the Region should confirm that no further upgrades to the treatment and pumping facilities are required for development of the 407 West Area as well as other communities within the Region of Halton.

4.2.2 Timing of Infrastructure Elements

In this section of the ASP, the timing of the various elements of the water system is generally discussed. In the case of many of the elements of the water infrastructure such as storage, pumping, and major distribution, it will be necessary for the Region to run their water model and to understand the timing of the development of other areas of the Region.

<u>Treatment</u>

- Many of the required projects to increase the supply are currently underway and are anticipated to be completed prior to development of the 407 West Employment Area.

Water Distribution (mains and pumping)

- The water distribution system for the 407 West Employment Area will require the construction of the regional trunk watermains (Region Project #s 5851 & 3812) along Dundas Street prior to development. These projects are part of the Dundas Street West Road Widening Project where the portion of the project between Bronte Road and Tremaine Road completion is anticipated in 2013, well in advance of the proposed 2015 occupancy of the first phase.
- The internal Zone 3 trunk watermains (Region Projects #s 5853 & 5627) will be constructed incrementally as part of the development as the 407 West Employment lands proceed.
- Appropriate major loops will form the backbone of an incrementally growing distribution system.

Storage

- It is anticipated that there is currently sufficient storage in Zone 3 to accommodate development of the 407 West Employment Area as well as full build-out of Zone 3.
- The need for storage is a function of the rate of development in the overall service area and should be reviewed by the Region on a regular basis to confirm that adequate storage remains available.
- The timing of storage system expansion must be determined in conjunction with the timing of distribution and pumping system capacity expansion. These elements can be implemented on a 'stepped' basis if required.

4.3 Wastewater

In this section, information is provided with respect to wastewater generation to assist the Region in timing the staging of its infrastructure construction. For some infrastructure, such as expansion to the Mid-Halton Plant, the need is a function of growth in all areas of Halton, including the 407 West Employment Area. For the others such as the Dundas Street sewer, it is a function exclusively of the timing of the development of the 407 West Employment Area.

4.3.1 System Flows

The wastewater generation developed by the Secondary Plan similarly requires various elements of infrastructure to be in place. These elements are:

- Wastewater Treatment
- Pumping
- Collection

The capacity requirements of the WWTP are determined based on the Average Daily Flow (including inflow and infiltration) while the pumping stations and collection systems are determined from the peak flow plus infiltration. The timing of flows generated from the 407 West Employment Area is considered generally in line with the projections of the Region. Any required upgrades to the WWTP are anticipated to be completed prior to development of the 407 West Employment Area.

4.3.2 Timing of Infrastructure Elements

In this section of the ASP, the timing of the various elements of the wastewater system is discussed. Unlike the water system, it is generally possible to predict infrastructure requirements based upon expected flows and the location of development.

Treatment

- The Region has already identified a need for increased wastewater treatment capacity.
- The Region is proceeding with an EA for the next expansion of the Mid-Halton WWTP.
- The actual expansion of the Mid-Halton WWTP and the advancement of future expansions should continue to be a priority.

Collection and Pumping

- Construction of the Dundas Street trunk sewer (Region Project # 3706) is required early to facilitate the development of the 407 West Employment Area, this project is part of the Dundas Street West Road Widening project, which the completion of construction between Bronte Road and Tremaine Road is anticipated in 2013, well in advance of the proposed 2015 occupancy.
- No pumping is anticipated to be required for development of the 407 West Employment Area.
- The timing of the development collection system north from Dundas Street will be driven by the timing of development of the 407 West Employment Area.

5.0 Conclusions

5.1 General

- The proposed development is of a form and quantity similar to what was anticipated by The Region of Halton while completing its "Water and Wastewater Master Plan".
- This report provides the Region data to assist in determining the sizing of and timing of required regional infrastructure.
- The conclusions reached for servicing the 407 West Employment Area Land Use Plan in this ASP are consistent with the Region's Master Plan.

5.2 Water

- The construction of the PD3 watermains along Dundas Street is required for the development of this community, they are anticipated to be completed in 2013, well in advance of the proposed 2015 occupancy date.
- The local major water distribution system can be expanded incrementally.
- The development can occur on an incremental basis.

5.3 Wastewater

- The regional wastewater sewers can be provided in conjunction with the development of the 407 West Employment Area, they are anticipated to be completed in 2013, well in advance of the proposed 2015 occupancy date.
- There is an increase in the proposed wastewater flows from 407 West Employment Lands and contributing external lands to the Colonel William Parkway wastewater sewer compared to the Bronte Creek Community analysis, however all of the effected sewers remain below 75% of full flow capacity.
- Linear infrastructure can be constructed on an incremental basis as required for development of the 407 West Employment Area as well as external lands.

Appendix A | Water Modeling Results

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

WATER ANALYSIS PLAN

HIGHWAY 407

TREMAINE ROAD

BRONTE ROAD

REGIONAL ROAD 25

DUNDAS STREET

AVENUE ONE

AVENUE TWO

AVENUE THREE

AVENUE FOUR

BURNHAMTHORPE ROAD

Block P1 2.91 ha
Block P2-1 2.41 ha
Block P2-2 3.06 ha
Block P2-3 3.10 ha
Block P2-4 3.58 ha
Block P3 (E) 7.53 ha
Existing Development
Block P4 11.64 ha
Block P5 3.89 ha
Block P6 3.87 ha
Block P7 (E) 2.43 ha
Existing Development
Block P8 2.72 ha
Block G1-1 5.39 ha
Block G1-2 3.47 ha
Block G2-1 4.55 ha
Block G2-2 3.60 ha
Block G2-3 3.36 ha
Block G3-1 2.34 ha
Block G3-2 1.71 ha
Block G3-3 1.21 ha
Block G4 3.68 ha
Block G5-1 1.95 ha
Block G5-2 1.98 ha
Block G5-3 2.03 ha
Block G6-1 2.85 ha
Block G6-2 3.41 ha
Block G6-3 1.75 ha
Block G6-4 2.82 ha
Block G6-5 2.64 ha
Block G6-6 2.84 ha
Block G7-1 1.96 ha
Block G7-2 2.33 ha
Block G8 4.29 ha
Block G9 3.51 ha
Block G10 3.70 ha
Block G11 7.31 ha
Block G12 3.42 ha
Block C1 3.22 ha
Block C2-1 2.29 ha
Block C2-2 0.87 ha
Block C2-3 2.19 ha
Block C3 1.53 ha
Block C4 2.91 ha
Block C5 0.25 ha
Block C6 2.18 ha
SWM 2.70 ha
SWM 2.48 ha
SWM 1.98 ha
SWM 3.14 ha
SWM 2.37 ha
SWM 1.45 ha
Natural Heritage System
Natural Heritage System
Natural Heritage System
Natural Heritage System
Natural Heritage System
Natural Heritage System
Natural Heritage System

NO-227 NO-222 NO-223 NO-224 NO-248 NO-249 NO-225 NO-251 NO-245 NO-253 NO-246 NO-252 NO-254 NO-247 NO-228 NO-229 NO-230 NO-231 NO-234 NO-235 NO-236 NO-237 NO-238 NO-239 NO-240 NO-241 NO-250

WJ-3046-O WJ-3116-O WJ-1150-O WJ-3114-O WJ-70-O

WM-10406-O WM-10416-O WM-10408-O WM-10410-O WM-10412-O

NO-2069 NO-2070 NO-2082 NO-2096 NO-2081 NO-2080 NO-2094 NO-2095 NO-2083 NO-2090 NO-2088 NO-2098 NO-2102 NO-2103 NO-2089 NO-2104 NO-2099 NO-2097 NO-2093 NO-2077 NO-2091 NO-2068 NO-2076 NO-2075 NO-2065 NO-2066 NO-2067 NO-2073 NO-2092 NO-2064 NO-2071 NO-2072 NO-2100 NO-2101

LEGEND

- 407 WEST EMPLOYMENT AREA
- EXISTING PROPERTY LINE
- SUBJECT PROPERTY
- SERVICE AREA (SERVICE/RETAIL/OFFICE)
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- OPEN SPACE
- STORMWATER MANAGEMENT
- PLANNED 407 TRANSITWAY
- EXISTING REGIONAL WATERMAIN
- PROPOSED REGIONAL WATERMAIN
- PROPOSED LOCAL WATERMAIN
- WATER ANALYSIS NODE
- FUTURE CULVERT CROSSING

FOR THE PURPOSES OF OUR CONCEPTUAL SERVICING ANALYSIS, CONSERVATIVE LAND USE ASSUMPTIONS HAVE BEEN MADE FOR THE ENTIRE 407 WEST EMPLOYMENT AREA

Scale 0 100 200 300 400 500m

Client: Bentall Kennedy

Prepared by: MMM GROUP

Date: DECEMBER 2012

Project No.: 1409222.001

EXHIBIT A1

FILE NAME: X:\DIV10\14-09222\WUN\VASP-FSS Exhibits\VAPP A1-8.2_Water Analysis.dwg_EX A1

407 West Employment Lands
14-09222
Water Analysis
Maximum Daily Flow - Pipe Report

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)	Status	Total Forward Flow (ML)	Total Reverse Flow (ML)	Total Net Flow (ML)	Flow Reversal Count
NO-2064	NO-239	NO-238	201.06	600	120	26.99	0.1	0	0.02	Open				0
NO-2065	NO-238	NO-237	397.08	600	120	17.32	0.06	0	0.01	Open				0
NO-2066	NO-237	NO-236	177.95	300	120	3.18	0.04	0	0.01	Open				0
NO-2067	NO-236	NO-235	149.93	300	120	-5.96	0.08	0.01	0.04	Open				0
NO-2068	NO-237	NO-228	485.08	600	120	14.14	0.05	0	0.01	Open				0
NO-2069	NO-227	NO-250	456.73	600	120	19.89	0.07	0.01	0.01	Open				0
NO-2070	NO-222	NO-227	91.03	600	120	24.81	0.09	0	0.02	Open				0
NO-2071	NO-235	NO-240	179	300	120	-2.86	0.04	0	0.01	Open				0
NO-2072	NO-240	NO-241	137.52	300	120	-9.3	0.13	0.01	0.09	Open				0
NO-2073	NO-235	NO-234	259.63	300	120	-6.29	0.09	0.01	0.04	Open				0
NO-2075	NO-235	NO-230	667.9	300	120	3.2	0.05	0.01	0.01	Open				0
NO-2076	NO-228	NO-229	76.77	300	120	3.92	0.06	0	0.02	Open				0
NO-2077	NO-229	NO-230	145.77	300	120	-0.45	0.01	0	0	Open				0
NO-2078	NO-230	NO-231	261.63	300	120	-1.82	0.03	0	0	Open				0
NO-2080	NO-247	NO-224	357.76	300	120	-4.9	0.07	0.01	0.03	Open				0
NO-2081	NO-223	NO-224	197.08	300	120	-1.23	0.02	0	0	Open				0
NO-2082	NO-227	NO-223	180.27	300	120	4.92	0.07	0.01	0.03	Open				0
NO-2083	NO-224	NO-225	253.2	300	120	-6.44	0.09	0.01	0.05	Open				0
NO-2088	WJ-3116-O	NO-251	257.6	1,200.00	130	-7.95	0.01	0	0	Open				0
NO-2089	NO-246	NO-252	239.94	1,200.00	130	-37.43	0.03	0	0	Open				0
NO-2090	NO-225	NO-245	162.33	300	120	-12.3	0.17	0.02	0.15	Open				0
NO-2091	NO-231	NO-246	235.73	300	120	-12.63	0.18	0.04	0.16	Open				0
NO-2092	NO-234	WJ-3114-O	155.42	300	120	-11.16	0.16	0.02	0.13	Open				0
NO-2093	NO-230	NO-247	318.32	300	120	4.56	0.06	0.01	0.02	Open				0
NO-2094	NO-224	NO-248	122.04	300	120	0.31	0	0	0	Open				0
NO-2095	NO-249	NO-248	302.87	300	120	8.41	0.12	0.02	0.08	Open				0
NO-2096	NO-249	WJ-3046-O	417.52	600	120	31.46	0.11	0.01	0.03	Open				0
NO-2097	NO-250	NO-228	576.83	600	120	-3.97	0.01	0	0	Open				0
NO-2098	NO-251	NO-245	164.44	1,200.00	130	-7.95	0.01	0	0	Open				0
NO-2099	NO-252	WJ-1150-O	144.25	1,200.00	130	-37.43	0.03	0	0	Open				0
NO-2100	NO-239	NO-241	433.99	600.00	120	-26.99	0.1	0.01	0.02	Open				0
NO-2101	NO-241	WJ-70-O	444.61	600.00	120	-36.3	0.13	0.02	0.04	Open				0
NO-2102	NO-245	NO-253	370.30	300.00	120	1.14	0.02	0	0	Open				0
NO-2103	NO-253	NO-246	365.89	300.00	120	-1.41	0.02	0	0	Open				0
NO-2104	NO-246	NO-254	241.64	150.00	120	2.01	0.11	0.04	0.16	Open				0
WM-10406-O	WJ-3046-O	NO-222	137.39	600	120	31.46	0.11	0	0.03	Open				0
WM-10408-O	NO-245	NO-246	733.46	1,200.00	130	-21.39	0.02	0	0	Open				0
WM-10410-O	WJ-3114-O	WJ-1150-O	139.97	1,200.00	130	47.18	0.04	0	0	Open				0
WM-10416-O	WJ-3116-O	NO-249	294.55	600	120	39.87	0.14	0.01	0.05	Open				0

407 West Employment Lands
14-09222
Water Analysis
Maximum Daily Flow - Junction Report

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
NO-222	6.65	160	196.17	51.42
NO-223	6.16	159	196.17	52.83
NO-224	0	157.8	196.17	54.54
NO-225	5.85	152	196.18	62.8
NO-227	0	159.7	196.17	51.85
NO-228	6.25	152.4	196.17	62.22
NO-229	4.37	152	196.16	62.78
NO-230	0	151.3	196.16	63.78
NO-231	10.81	149	196.16	67.05
NO-234	4.86	153	196.18	61.39
NO-235	0	153.5	196.17	60.66
NO-236	9.14	155	196.17	58.52
NO-237	0	156	196.17	57.1
NO-238	9.67	157	196.17	55.69
NO-239	0	162	196.18	48.59
NO-240	6.44	155	196.17	58.53
NO-241	0	156	196.19	57.13
NO-245	0	153.8	196.2	60.28
NO-246	0	148	196.2	68.52
NO-247	9.46	153	196.16	61.35
NO-248	8.72	157	196.17	55.68
NO-249	0	158	196.19	54.29
NO-250	23.86	155	196.16	58.52
NO-251	0	154	196.2	59.99
NO-252	0	147	196.2	69.95
NO-253	2.55	151	196.2	64.26
NO-254	2.01	147	196.16	69.89
WJ-1150-O	0	152	196.2	62.84
WJ-3046-O	0	159	196.18	52.85
WJ-3114-O	0	152	196.2	62.84
WJ-3116-O	0	157	196.2	55.73

407 West Employment Lands
14-09222
Water Analysis
Peak Daily Flow - Pipe Report

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)	Status	Total Forward Flow (ML)	Total Reverse Flow (ML)	Total Net Flow (ML)	Flow Reversal Count
NO-2064	NO-239	NO-238	201.06	600	120	43.06	0.15	0.01	0.05	Open				0
NO-2065	NO-238	NO-237	397.08	600	120	27.79	0.1	0.01	0.02	Open				0
NO-2066	NO-237	NO-236	177.95	300	120	4.95	0.07	0.01	0.03	Open				0
NO-2067	NO-236	NO-235	149.93	300	120	-9.48	0.13	0.01	0.09	Open				0
NO-2068	NO-237	NO-228	485.08	600	120	22.84	0.08	0.01	0.02	Open				0
NO-2069	NO-227	NO-250	456.73	600	120	30.92	0.11	0.01	0.03	Open				0
NO-2070	NO-222	NO-227	91.03	600	120	38.74	0.14	0	0.04	Open				0
NO-2071	NO-235	NO-240	179	300	120	-4.62	0.07	0	0.03	Open				0
NO-2072	NO-240	NO-241	137.52	300	120	-14.79	0.21	0.03	0.22	Open				0
NO-2073	NO-235	NO-234	259.63	300	120	-9.99	0.14	0.03	0.1	Open				0
NO-2075	NO-235	NO-230	667.9	300	120	5.14	0.07	0.02	0.03	Open				0
NO-2076	NO-228	NO-229	76.77	300	120	6.2	0.09	0	0.04	Open				0
NO-2077	NO-229	NO-230	145.77	300	120	-0.7	0.01	0	0	Open				0
NO-2078	NO-230	NO-231	261.63	300	120	-2.83	0.04	0	0.01	Open				0
NO-2080	NO-247	NO-224	357.76	300	120	-7.66	0.11	0.02	0.06	Open				0
NO-2081	NO-223	NO-224	197.08	300	120	-1.89	0.03	0	0	Open				0
NO-2082	NO-227	NO-223	180.27	300	120	7.83	0.11	0.01	0.07	Open				0
NO-2083	NO-224	NO-225	253.2	300	120	-10.12	0.14	0.03	0.11	Open				0
NO-2088	WJ-3116-O	NO-251	257.6	1,200.00	130	-33.03	0.03	0	0	Open				0
NO-2089	NO-246	NO-252	239.94	1,200.00	130	-79.49	0.07	0	0	Open				0
NO-2090	NO-225	NO-245	162.33	300	120	-19.36	0.27	0.06	0.36	Open				0
NO-2091	NO-231	NO-246	235.73	300	120	-19.9	0.28	0.09	0.37	Open				0
NO-2092	NO-234	WJ-3114-O	155.42	300	120	-17.67	0.25	0.05	0.3	Open				0
NO-2093	NO-230	NO-247	318.32	300	120	7.28	0.1	0.02	0.06	Open				0
NO-2094	NO-224	NO-248	122.04	300	120	0.56	0.01	0	0	Open				0
NO-2095	NO-249	NO-248	302.87	300	120	13.21	0.19	0.05	0.18	Open				0
NO-2096	NO-249	WJ-3046-O	417.52	600	120	49.24	0.17	0.03	0.07	Open				0
NO-2097	NO-250	NO-228	576.83	600	120	-6.76	0.02	0	0	Open				0
NO-2098	NO-251	NO-245	164.44	1,200.00	130	-33.03	0.03	0	0	Open				0
NO-2099	NO-252	WJ-1150-O	144.25	1,200.00	130	-79.49	0.07	0	0.01	Open				0
NO-2100	NO-239	NO-241	433.99	600.00	120	-43.06	0.15	0.02	0.05	Open				0
NO-2101	NO-241	WJ-70-O	444.61	600.00	120	-57.85	0.2	0.04	0.09	Open				0
NO-2102	NO-245	NO-253	370.30	300.00	120	1.52	0.02	0	0	Open				0
NO-2103	NO-253	NO-246	365.89	300.00	120	-2.5	0.04	0	0.01	Open				0
NO-2104	NO-246	NO-254	241.64	150.00	120	3.18	0.18	0.09	0.37	Open				0
WM-10406-O	WJ-3046-O	NO-222	137.39	600	120	49.24	0.17	0.01	0.07	Open				0
WM-10408-O	NO-245	NO-246	733.46	1,200.00	130	-53.9	0.05	0	0	Open				0
WM-10410-O	WJ-3114-O	WJ-1150-O	139.97	1,200.00	130	116.15	0.1	0	0.01	Open				0
WM-10416-O	WJ-3116-O	NO-249	294.55	600	120	62.46	0.22	0.03	0.11	Open				0

407 West Employment Lands
14-09222
Water Analysis
Peak Daily Flow - Junction Report

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
NO-222	10.5	160	190.83	43.82
NO-223	9.72	159	190.81	45.22
NO-224	0	157.8	190.81	46.93
NO-225	9.24	152	190.84	55.21
NO-227	0	159.7	190.82	44.24
NO-228	9.87	152.4	190.81	54.6
NO-229	6.9	152	190.81	55.17
NO-230	0	151.3	190.81	56.16
NO-231	17.07	149	190.81	59.44
NO-234	7.68	153	190.85	53.81
NO-235	0	153.5	190.83	53.06
NO-236	14.43	155	190.81	50.91
NO-237	0	156	190.82	49.5
NO-238	15.27	157	190.83	48.09
NO-239	0	162	190.84	41
NO-240	10.17	155	190.83	50.94
NO-241	0	156	190.86	49.56
NO-245	0	153.8	190.9	52.74
NO-246	0	148	190.9	60.98
NO-247	14.94	153	190.79	53.72
NO-248	13.77	157	190.81	48.07
NO-249	0	158	190.86	46.72
NO-250	37.68	155	190.81	50.91
NO-251	0	154	190.9	52.45
NO-252	0	147	190.9	62.41
NO-253	4.02	151	190.89	56.71
NO-254	3.18	147	190.81	62.28
WJ-1152-O	0	152	190.2	54.3
WJ-3046-O	0	159	190.84	45.26
WJ-3114-O	0	152	190.9	55.3
WJ-3116-O	0	157	190.9	48.19

407 West Employment Lands
14-09222
Water Analysis
Fire Flow Report

ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Available Flow @Hydrant (L/s)	Available Flow Pressure (psi)
NO-222	10.5	43.82	190.83	250	40.23	1,099.35	20.01
NO-223	9.72	45.22	190.81	250	38.27	601.29	20
NO-224	0	46.93	190.81	250	41.56	787.64	20.01
NO-225	9.24	55.21	190.84	250	48.54	755.51	20.01
NO-227	0	44.24	190.82	250	40.63	1,093.55	20.01
NO-228	9.87	54.6	190.81	250	50.89	1,309.27	20.02
NO-229	6.9	55.17	190.81	250	49.75	907.88	20.01
NO-230	0	56.16	190.81	250	50.84	931.07	20.01
NO-231	17.07	59.44	190.81	250	51.67	732.41	20.01
NO-234	7.68	53.81	190.85	250	47.4	753.1	20.01
NO-235	0	53.06	190.83	250	48.08	928.77	20.01
NO-236	14.43	50.91	190.81	250	44.33	720.98	20
NO-237	0	49.5	190.82	250	45.84	1,195.82	20.01
NO-238	15.27	48.09	190.83	250	44.45	1,177.61	20.01
NO-239	0	41	190.84	250	37.43	1,012.41	20.01
NO-240	10.17	50.94	190.83	250	44.78	752.07	20.01
NO-241	0	49.56	190.86	205	46.9	1,337.75	20.02
NO-245	0	52.74	190.9	250	49.96	1,719.11	20.03
NO-246	0	60.98	190.9	250	58.25	2,006.53	20.04
NO-247	14.94	53.72	190.79	250	43.69	554.22	20
NO-248	13.77	48.07	190.81	250	40.86	630.47	20
NO-249	0	46.72	190.86	250	43.5	1,298.18	20.02
NO-250	37.68	50.91	190.81	250	47.1	1,230.36	20.01
NO-251	0	52.45	190.9	250	49.66	1,703.51	20.03
NO-252	0	62.41	190.9	250	59.69	2,063.96	20.04
NO-253	4.02	56.71	190.89	250	47.9	608.22	20
NO-254	3.18	62.28	190.81	250	-358.87	72.80	20
WJ-1150-O	0	55.3	190.9	250	52.59	1,853.23	20.03
WJ-3046-O	0	45.26	190.84	250	41.72	1,139.51	20.01
WJ-3114-O	0	55.3	190.9	250	52.61	1,861.59	20.03
WJ-3116-O	0	48.19	190.9	250	45.39	1,558.75	20.02

407 West Employment Lands
14-09222
Water Analysis
Average Daily Flow - Junction Demands

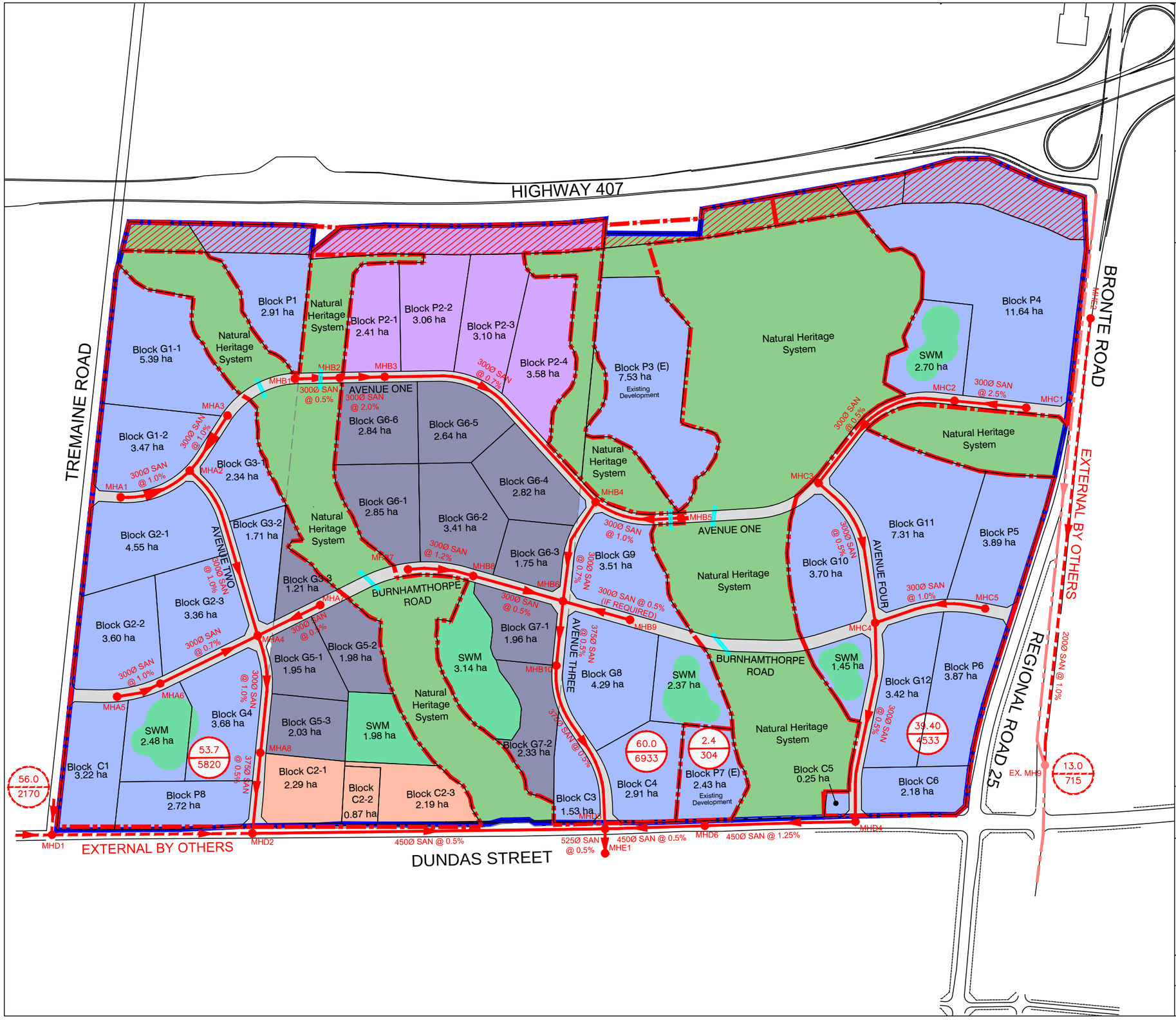
ID	Area (ha)	Demand (L/s)	Elevation (m)
NO-222	8.02	3.50	160.0
NO-223	7.41	3.24	159.0
NO-224	0.00	0.00	157.8
NO-225	7.04	3.08	152.0
NO-227	0.00	0.00	159.7
NO-228	7.53	3.29	152.4
NO-229	5.26	2.30	152.0
NO-230	0.00	0.00	151.3
NO-231	13.02	5.69	149.0
NO-234	5.85	2.56	153.0
NO-235	0.00	0.00	153.5
NO-236	11.01	4.81	155.0
NO-237	0.00	0.00	156.0
NO-238	11.64	5.09	157.0
NO-239	0.00	0.00	162.0
NO-240	7.76	3.39	155.0
NO-241	0.00	0.00	156.0
NO-245	0.00	0.00	153.8
NO-246	0.00	0.00	148.0
NO-247	11.40	4.98	153.0
NO-248	10.50	4.59	157.0
NO-249	0.00	0.00	158.0
NO-250	28.75	12.56	155.0
NO-251	0.00	0.00	154.0
NO-252	0.00	0.00	147.0
NO-253	3.06	1.34	151.0
NO-254	2.43	1.06	147.0
WJ-1150-O	0.00	0.00	152.0
WJ-3046-O	0.00	0.00	159.0
WJ-3114-O	0.00	0.00	151.5
WJ-3116-O	0.00	0.00	156.5

Demand Rate: 302 l/cap/day

Appendix B | Wastewater Drainage Plans and Design Sheets

AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

WASTEWATER ANALYSIS PLAN



LEGEND

- 407 WEST EMPLOYMENT AREA
- EXISTING PROPERTY LINE
- SUBJECT PROPERTY
- SERVICE AREA (SERVICE/RETAIL/OFFIC
- LIGHT EMPLOYMENT
- GENERAL EMPLOYMENT
- EMPLOYMENT (SPECIFIC USE TBD)
- OPEN SPACE
- STORMWATER MANAGEMENT
- PLANNED 407 TRANSITWAY
- SANITARY SEWER
- SANITARY MANHOLE
- SANITARY DRAINAGE BOUNDARY
- EX. SANITARY SEWER (B.O.)
- 39.40 / 4533 — TRIBUTARY AREA (Ha) / TRIBUTARY POPULATION
- 13.0 / 715 — EXTERNAL TRIBUTARY AREA (Ha) / EXTERNAL TRIBUTARY POPULATION
- FUTURE CULVERT CROSSING
- EXISTING 825 Ø SAN

FOR THE PURPOSES OF OUR CONCEPTUAL SERVICING ANALYSIS, CONSERVATIVE LAND USE ASSUMPTIONS HAVE BEEN MADE FOR THE ENTIRE 407 WEST EMPLOYMENT AREA

Scale 0 100 200 300 400 500m

Client: Bentall Kennedy

Prepared by: MMM GROUP

Date: DECEMBER 2012

Project No.: 1409222.001

EXHIBIT B1

FILE NAME: X:\DIV10\14-09222\MUN\ASP-FSS Exhibits\APP B1-8.1_Wastewater Analysis Plan.dwg_EX B1

THE REGIONAL MUNICIPALITY OF HALTON

SANITARY DESIGN SHEET

PROJECT No.: 14-09222
PROJECT NAME: 407 West Employment Area
CONSULTANT: MMM Group

DATE PRINTED: 11-Dec-12
DATE REVISED: 11-Dec-12
DESIGNED BY: SW
CHECKED BY: AW

Street	Manhole From	Manhole To	Length in metres	Tributary Area (Hectares) Increment Res.	Comm.	Ind.	Inst.	Road	Total	Accumulated Res.	Comm.	Ind.	Inst.	Road	Total	Tributary Population Increment Res.	Comm.	Ind.	Inst.	Total	Accumulated Res.	Comm.	Ind.	Inst.	Total	Q Average L/s	K Average	Peaking Factor M	Q Peak Dry L/s	Total Infil-tration L/s	Q Total L/s	SEWER Size (mm)	Slope (m/m)	Q (L/s)	V (m/s) Full Flow	V (m/s) Act. Flow	REMARKS
Avenue 1-Avenue 2-Burnhamthorpe Road-Dundas Street																																				
Block G1-2	PLUG	A1				3.47			3.47			3.47			3.47			434		434			434		434												
Avenue 1	A1	A2	140			0.00		0.31	0.31			3.47		0.31	3.78			0		0			434		434	1.381	0.80	4.005	4.42	1.08	5.50	300	0.010	96.701	1.37		
Block G1-1	PLUG	A3				5.39			5.39			5.39			5.39			674		674			674		674												
Avenue 1	A3	A2	140			0.00		0.31	0.31			5.39		0.31	5.70			0		0			674		674	2.144	0.80	3.904	6.70	1.63	8.33	300	0.010	96.701	1.37		
Block G2-1	PLUG	A2				4.55			4.55			4.55			4.55			569		569			569		569												
Block G3-1	PLUG	A2				2.34			2.34			2.34			2.34			293		293			293		293												
Block G3-2	PLUG	A2				1.71			1.71			1.71			1.71			214		214			214		214												
Avenue 2	A2	A4	380			0.00		0.84	0.84			17.46		1.45	18.91			0		0			2183		2183	6.947	0.80	3.556	19.76	5.41	25.17	300	0.010	96.701	1.37		
Block G2-2	PLUG	A5				3.60			3.60			3.60			3.60			450		450			450		450												
Block C1	PLUG	A5				3.22			3.22			3.22			3.22			403		403			403		403												
Burnhamthorpe Road	A5	A6	35			0.00		0.35	0.35			6.82		0.35	7.17			0		0			853		853	2.713	0.80	3.844	8.34	2.05	10.39	300	0.010	96.701	1.37		
Block G2-3	PLUG	A6				3.36			3.36			3.36			3.36			420		420			420		420												
Burnhamthorpe Road	A6	A4	225			0.00		0.59	0.59			10.18		0.94	11.12			0		0			1273		1273	4.050	0.80	3.730	12.09	3.18	15.27	300	0.007	80.906	1.14		
Block G3-3	PLUG	A7				1.21			1.21			1.21			1.21			151		151			151		151												
Block G5-2	PLUG	A7				1.98			1.98			1.98			1.98			248		248			248		248												
Burnhamthorpe Road	A7	A4	145			0.00		0.38	0.38			3.19		0.38	3.57			0		0			399		399	1.269	0.80	4.023	4.08	1.02	5.10	300	0.005	68.378	0.97		
Block G5-1	PLUG	A4				1.95			1.95			1.95			1.95			244		244			244		244												
Block G5-3	PLUG	A4				2.03			2.03			2.03			2.03			254		254			254		254												
Avenue 2	A4	A8	250			0.00		0.55	0.55			34.81		3.32	38.13			0		0			4351		4351	13.849	0.80	3.300	36.57	10.90	47.47	300	0.010	96.701	1.37		
Block G4	PLUG	A8				3.68			3.68			3.68			3.68			460		460			460		460												
Block C2-1	PLUG	A8				2.29			2.29			2.29			2.29			286		286			286		286												
Block P8	PLUG	A8				2.72			2.72			2.72			2.72			340		340			340		340												
Avenue 2	A8	D2	170			0.00		0.37	0.37			43.50		3.69	47.19			0		0			5438		5438	17.307	0.80	3.211	44.46	13.50	57.95	375	0.005	123.977	1.12		
External 1	TO	D1		56.00		0.00			56.00	56.00					56.00	2170				2170	2170				2170											
Dundads Street	D1	D2	420			0.00		1.26	1.26	56.00		0.00		1.26	57.26			0		0	2170		0		2170	6.907	1.00	3.558	24.57	16.38	40.95	450	0.005	201.600	1.27		
															0.00																					
Block C2-2	PLUG	D2				0.87			0.87			0.87			0.87			109		109			109		109												
Block C2-3	PLUG	D2				2.19			2.19			2.19			2.19			274		274			274		274												
Dundas Street	D2	D3	735			0.00		2.21	2.21	56.00		46.56		7.15	109.71			0		0	2170		5820		7990	25.431	0.91	3.051	70.54	31.38	101.92	450	0.005	201.600	1.27		
															0.00																					

THE REGIONAL MUNICIPALITY OF HALTON

SANITARY DESIGN SHEET

PROJECT No.: 14-09222
PROJECT NAME: 407 West Employment Area
CONSULTANT: MMM Group

DATE PRINTED: 11-Dec-12
DATE REVISED: 11-Dec-12
DESIGNED BY: SW
CHECKED BY: AW

Street	Manhole From	Manhole To	Length in metres	Tributary Area (Hectares) Increment Res.	Comm.	Ind.	Inst.	Road	Total	Accumulated Res.	Comm.	Ind.	Inst.	Road	Total	Tributary Population Increment Res.	Comm.	Ind.	Inst.	Total	Accumulated Res.	Comm.	Ind.	Inst.	Total	Q Average L/s	K Average	Peaking Factor M	Q Peak Dry L/s	Total Infil-tration L/s	Q Total L/s	SEWER Size (mm)	Slope (m/m)	Q (L/s)	V (m/s) Full Flow	V (m/s) Act. Flow	REMARKS
Avenue 1-Avenue 3-Burnhamthorpe Road																																				
Block P1	PLUG	B1				2.91			2.91			2.91			2.91			364		364			364		364												
Avenue 1	B1	B2	95			0.00		0.21	0.21			2.91		0.21	3.12			0		0			364		364	1.158	0.80	4.041	3.74	0.89	4.64	300	0.005	68.378	0.97		
Avenue 1	B2	B3	95			0.00		0.21	0.21			2.91		0.42	3.33			0		0			364		364	1.158	0.80	4.041	3.74	0.95	4.70	300	0.020	136.756	1.93		
Block P2-1	PLUG	B3				2.29			2.41			2.29			2.29			286		286			286		286											
Block P2-2	PLUG	B3				3.05			3.06			3.05			3.05			381		381			381		381											
Block P2-3	PLUG	B3				3.11			3.11			3.11			3.11			389		389			389		389											
Block P2-4	PLUG	B3				3.73			3.58			3.73			3.73			466		466			466		466											
Block G6-5	PLUG	B3				2.64			2.64			2.64			2.64			330		330			330		330											
Block G6-6	PLUG	B3				2.84			2.84			2.84			2.84			355		355			355		355											
Avenue 1	B3	B4	550			0.00		1.21	1.21			20.57		1.63	22.20			0		0			2571		2571	8.184	0.80	3.498	22.90	6.35	29.25	300	0.007	80.906	1.14		
Block P3	PLUG	B5				7.53			7.53			7.53			7.53			941		941			941		941											
Avenue 1	B5	B4	185			0.00		0.41	0.41			7.53		0.41	7.94			0		0			941		941	2.996	0.80	3.817	9.15	2.27	11.42	300	0.010	96.701	1.37		
Block G6-4	PLUG	B4				2.82			2.82			2.82			2.82			353		353			353		353											
Block G9	PLUG	B4				3.51			3.51			3.51			3.51			439		439			439		439											
Avenue 3	B4	B6	225			0.00		0.50	0.50			34.43		2.53	36.96			0		0			4304		4304	13.698	0.80	3.305	36.21	10.57	46.79	300	0.007	80.906	1.14		
Block G6-1	PLUG	B7				2.85			2.85			2.85			2.85			356		356			356		356											
Burnhamthorpe Road	B7	B8	145			0.00		0.38	0.38			2.85		0.38	3.23			0		0			356		356	1.134	0.80	4.046	3.67	0.92	4.59	300	0.012	105.930	1.50		
Block G6-2	PLUG	B8				3.41			3.41			3.41			3.41			426		426			426		426											
Block G6-3	PLUG	B8				1.75			1.75			1.75			1.75			219		219			219		219											
Burnhamthorpe Road	B8	B6	195			0.00		0.51	0.51			8.01		0.88	8.89			0		0			1001		1001	3.187	0.80	3.800	9.69	2.54	12.23	300	0.005	68.378	0.97		
Block G7-1	PLUG	B6				1.96			1.96			1.96			1.96			245		245			245		245											
Avenue 3	B6	B10	135			0.00		0.30	0.30			44.40		3.71	48.11			0		0			5550		5550	17.665	0.80	3.203	45.26	13.76	59.02	375	0.005	123.977	1.12		
Block G7-2	PLUG	B10				2.33			2.33			2.33			2.33			291		291			291		291											
Block G8	PLUG	B10				4.29			4.29			4.29			4.29			536		536			536		536											
Block C3	PLUG	B10				1.53			1.53			1.53			1.53			191		191			191		191											
Block C4	PLUG	B10				2.91			2.91			2.91			2.91			364		364			364		364											
Avenue 3	B10	D3	365			0.00		0.80	0.80			55.46		4.51	59.97			0		0	0		6933		6933	22.065	0.80	3.111	54.91	17.15	72.06	375	0.005	123.977	1.12		
Avenue One-Avenue Four-Burnhamthorpe Road-Dundas Street																																				
Block P4	PLUG	C1				11.64			11.64			11.64			11.64			1455		1455			1455		1455											
Avenue 1	C1	C2	150			0.00		0.33	0.33			11.64		0.33	11.97			0		0			1455		1455	4.631	0.80	3.689	13.67	3.42	17.09	300	0.025	152.897	2.16		
Avenue 1	C2	C3	95			0.00		0.21	0.21			11.64		0.54	12.18			0		0			1455		1455	4.631	0.80	3.689	13.67	3.48	17.15	300	0.005	68.378	0.97		
Block G10	PLUG	C3				3.70			3.70			3.70			3.70			463		463			463		463											
Block G11	PLUG	C3				7.31			7.31			7.31			7.31			914		914			914		914											
Avenue 4	C3	C4	330			0.00		0.86	0.86			22.65		1.40	24.05			0		0			2831		2831	9.012	0.80	3.464	24.97	6.88	31.85	300	0.005	68.378	0.97		
Block P5	PLUG	C5				3.89			3.89			3.89			3.89			486		486			486		486											
Block P6	PLUG	C5				3.87			3.87			3.87			3.87			484		484			484		484											
Burnhamthorpe Road	C5	C4	235			0.00		0.61	0.61			7.76		0.61	8.37			0		0			970		970	3.087	0.80	3.808	9.41	2.39	11.80	300	0.010	96.701	1.37		
Block G12	PLUG	C4				3.42			3.42			3.42			3.42			428		428			428		428											
Block C5	PLUG	C4				0.25			0.25			0.25			0.25			31		31			31		31											
Block C6	PLUG	C4				2.18			2.18			2.18			2.18			273		273			273		273											
Avenue 4	C4	D4	420			0.00		1.09	1.09			36.26		3.10	39.36			0		0			4533		4533	14.426	0.80	3.284	37.90	11.26	49.16	300	0.005	68.378	0.97		
Dundas Street	D4	D6	315			0.00		0.95	0.95			36.26	0.00	4.05	40.31			0		0			4533		4533	14.426	0.80	3.284	37.90	11.53	49.43	450	0.013	318.758	2.00		
Block P7	PLUG	D6				2.43			2.43			2.43			2.43			304		304			304		304											
Dundas Street	D6	D3	210			0.00		0.63	0.63			38.69	0.00	4.68	43.37			0		0			4836		4836	15.393	0.80	3.258	40.13	12.40	52.53	450	0.005	201.600	1.27		
Colonel William Parkway	D3	E1	55			0.00		0.14	0.14	56.00	0.00	140.71	0.00	16.49	213.20			0		0	2170	0	17589	0	19759	62.890	0.86	2.658	143.23	60.97	204.21	525	0.005	304.100	1.40		

THE REGIONAL MUNICIPALITY OF HALTON

SANITARY DESIGN SHEET

PROJECT No.: 14-09222

PROJECT NAME: 407 West Employment Area

CONSULTANT: MMM Group

DATE PRINTED: 11-Dec-12

DATE REVISED: 11-Dec-12

DESIGNED BY: SW

CHECKED BY: AW

Street	Manhole From	Manhole To	Length in metres	Tributary Area (Hectares) Increment Res.	Comm.	Ind.	Inst.	Road	Total	Accumulated Res.	Comm.	Ind.	Inst.	Road	Total	Tributary Population Increment Res.	Comm.	Ind.	Inst.	Total	Accumulated Res.	Comm.	Ind.	Inst.	Total	Q Average L/s	K Average	Peaking Factor M	Q Peak Dry L/s	Total Infil-tration L/s	Q Total L/s	SEWER Size (mm)	Slope (m/m)	Q (L/s)	V (m/s) Full Flow	V (m/s) Act. Flow	REMARKS
Existing - By Others																																				
Colonel William Parkway	*E1*	*23A*		*0.00*					*0.00*	*56.00*	*0.00*	*140.71*	*0.00*	*16.49*	*213.20*	*0*				*0*	*2170*	*0*	*17589*	*0*	*19759*	*62.890*	*0.86*	*2.658*	*143.23*	*60.97*	*204.21*	*600*	*0.017*	800.573	2.83		
Colonel William Parkway	*23A*	*22A*		*0.09*					*0.09*	*56.09*	*0.00*	*140.71*	*0.00*	*16.49*	*213.29*	*0*				*0*	*2170*	*0*	*17589*	*0*	*19759*	*62.890*	*0.86*	*2.658*	*143.24*	*61.00*	*204.24*	*600*	*0.017*	800.573	2.83		
Colonel William Parkway	*22A*	*21A*		*0.11*					*0.11*	*56.20*	*0.00*	*140.71*	*0.00*	*16.49*	*213.40*	*0*				*0*	*2170*	*0*	*17589*	*0*	*19759*	*62.890*	*0.86*	*2.658*	*143.26*	*61.03*	*204.29*	*600*	*0.017*	800.573	2.83		
Fut. Phase 6	*Plug 4*	*20A*		*4.88*					*4.88*	*4.88*	*0.00*	*0.00*	*0.00*	*0.00*	*4.88*	*659*				*659*	*659*	*0*	*0*	*0*	*659*	*2.098*	*1.00*	*3.910*	*8.20*	*1.40*	*9.60*	*200*	*0.005*	23.192	0.74		
Colonel William Parkway	*21A*	*20A*		*0.08*					*0.08*	*56.28*	*0.00*	*140.71*	*0.00*	*16.49*	*213.48*	*0*				*0*	*2170*	*0*	*17589*	*0*	*19759*	*62.890*	*0.86*	*2.658*	*143.27*	*61.05*	*204.32*	*600*	*0.017*	800.573	2.83		
Colonel William Parkway	*20A*	*19A*		*0.00*					*0.00*	*61.16*	*0.00*	*140.71*	*0.00*	*16.49*	*218.36*	*0*				*0*	*2829*	*0*	*17589*	*0*	*20418*	*64.987*	*0.86*	*2.643*	*147.84*	*62.45*	*210.29*	*600*	*0.004*	363.254	1.28		
Colonel William Parkway	*19A*	*18A*		*0.00*					*0.00*	*61.16*	*0.00*	*140.71*	*0.00*	*16.49*	*218.36*	*0*				*0*	*2829*	*0*	*17589*	*0*	*20418*	*64.987*	*0.86*	*2.643*	*147.84*	*62.45*	*210.29*	*600*	*0.004*	363.254	1.28		
Colonel William Parkway	*18A*	*17A*		*0.00*					*0.00*	*61.16*	*0.00*	*140.71*	*0.00*	*16.49*	*218.36*	*0*				*0*	*2829*	*0*	*17589*	*0*	*20418*	*64.987*	*0.86*	*2.643*	*147.84*	*62.45*	*210.29*	*600*	*0.004*	363.254	1.28		
Colonel William Parkway	*17A*	*16A*		*0.00*					*0.00*	*61.16*	*0.00*	*140.71*	*0.00*	*16.49*	*218.36*	*0*				*0*	*2829*	*0*	*17589*	*0*	*20418*	*64.987*	*0.86*	*2.643*	*147.84*	*62.45*	*210.29*	*600*	*0.004*	363.254	1.28		
Fut. Phase 5B	*Plug 3*	*148A*		*8.84*					*8.84*	*8.84*	*0.00*	*0.00*	*0.00*	*0.00*	*8.84*	*796*				*796*	*796*	*0*	*0*	*0*	*796*	*2.534*	*1.00*	*3.862*	*9.78*	*2.53*	*12.31*	*200*	*0.005*	23.192	0.74		
Colonel William Parkway	*148A*	*147A*		*0.59*					*0.59*	*9.43*	*0.00*	*0.00*	*0.00*	*0.00*	*9.43*	*32*				*32*	*828*	*0*	*0*	*0*	*828*	*2.635*	*1.00*	*3.851*	*10.15*	*2.70*	*12.85*	*200*	*0.005*	23.192	0.74		
Colonel William Parkway	*147A*	*141A*		*0.34*					*0.34*	*9.77*	*0.00*	*0.00*	*0.00*	*0.00*	*9.77*	*19*				*19*	*847*	*0*	*0*	*0*	*847*	*2.696*	*1.00*	*3.845*	*10.37*	*2.79*	*13.16*	*200*	*0.005*	23.192	0.74		
Street A	*145A*	*144A*		*0.76*					*0.76*	*0.76*	*0.00*	*0.00*	*0.00*	*0.00*	*0.76*	*42*				*42*	*42*	*0*	*0*	*0*	*42*	*0.134*	*1.00*	*4.329*	*0.58*	*0.22*	*0.80*	*200*	*0.012*	35.929	1.14		
Street A	*144A*	*143A*		*0.73*					*0.73*	*1.49*	*0.00*	*0.00*	*0.00*	*0.00*	*1.49*	*40*				*40*	*82*	*0*	*0*	*0*	*82*	*0.261*	*1.00*	*4.266*	*1.11*	*0.43*	*1.54*	*200*	*0.014*	38.808	1.24		
Street A	*143A*	*142A*		*0.19*					*0.19*	*1.68*	*0.00*	*0.00*	*0.00*	*0.00*	*1.68*	*10*				*10*	*92*	*0*	*0*	*0*	*92*	*0.293*	*1.00*	*4.253*	*1.25*	*0.48*	*1.73*	*200*	*0.015*	40.170	1.28		
Street A	*142A*	*141A*		*0.37*					*0.37*	*2.05*	*0.00*	*0.00*	*0.00*	*0.00*	*2.05*	*20*				*20*	*112*	*0*	*0*	*0*	*112*	*0.356*	*1.00*	*4.230*	*1.51*	*0.59*	*2.09*	*200*	*0.030*	56.809	1.81		
Colonel William Parkway	*141A*	*16A*		*0.00*					*0.00*	*11.82*	*0.00*	*0.00*	*0.00*	*0.00*	*11.82*	*0*				*0*	*959*	*0*	*0*	*0*	*959*	*3.052*	*1.00*	*3.812*	*11.63*	*3.38*	*15.02*	*250*	*0.005*	42.050	0.86		
Colonel William Parkway	*16A*	*15A*		*0.00*					*0.00*	*72.98*	*0.00*	*140.71*	*0.00*	*16.49*	*230.18*	*0*				*0*	*3788*	*0*	*17589*	*0*	*21377*	*68.039*	*0.87*	*2.623*	*154.99*	*65.83*	*220.82*	*600*	*0.004*	363.254	1.28		
Colonel William Parkway	*15A*	*14A*		*0.00*					*0.00*	*72.98*	*0.00*	*140.71*	*0.00*	*16.49*	*230.18*	*0*				*0*	*3788*	*0*	*17589*	*0*	*21377*	*68.039*	*0.87*	*2.623*	*154.99*	*65.83*	*220.82*	*600*	*0.004*	363.254	1.28		
Colonel William Parkway	*14A*	*13A*		*0.00*					*0.00*	*72.98*	*0.00*	*140.71*	*0.00*	*16.49*	*230.18*	*0*				*0*	*3788*	*0*	*17589*	*0*	*21377*	*68.039*	*0.87*	*2.623*	*154.99*	*65.83*	*220.82*	*600*	*0.004*	363.254	1.28		
Colonel William Parkway	*13A*	*Ex. 11A*		*0.00*					*0.00*	*72.98*	*0.00*	*140.71*	*0.00*	*16.49*	*230.18*	*0*				*0*	*3788*	*0*	*17589*	*0*	*21377*	*68.039*	*0.87*	*2.623*	*154.99*	*65.83*	*220.82*	*600*	*0.003*	341.867	1.21		
Fut. Phase 5A	*Plug 2*	*106A*		*7.30*					*7.30*	*7.30*	*0.00*	*0.00*	*0.00*	*0.00*	*7.30*	*548*				*548*	*548*	*0*	*0*	*0*	*548*	*1.744*	*1.00*	*3.953*	*6.90*	*2.09*	*8.98*	*200*	*0.004*	20.744	0.66		
Street A	*118A*	*117A*		*0.34*					*0.34*	*0.34*	*0.00*	*0.00*	*0.00*	*0.00*	*0.34*	*19*				*19*	*19*	*0*	*0*	*0*	*19*	*0.060*	*1.00*	*4.383*	*0.27*	*0.10*	*0.36*	*200*	*0.018*	44.004	1.40		
Street A	*117A*	*116A*		*0.23*					*0.23*	*0.57*	*0.00*	*0.00*	*0.00*	*0.00*	*0.57*	*13*				*13*	*32*	*0*	*0*	*0*	*32*	*0.102*	*1.00*	*4.350*	*0.44*	*0.16*	*0.61*	*200*	*0.011*	34.399	1.09		
Street A	*116A*	*115A*		*0.75*					*0.75*	*1.32*	*0.00*	*0.00*	*0.00*	*0.00*	*1.32*	*41*				*41*	*73*	*0*	*0*	*0*	*73*	*0.232*	*1.00*	*4.279*	*0.99*	*0.38*	*1.37*	*200*	*0.012*	35.929	1.14		
Street A	*115A*	*114A*		*0.65*					*0.65*	*1.97*	*0.00*	*0.00*	*0.00*	*0.00*	*1.97*	*36*				*36*	*109*	*0*	*0*	*0*	*109*	*0.347*	*1.00*	*4.233*	*1.47*	*0.56*	*2.03*	*200*	*0.013*	37.396	1.19		
Street A	*114A*	*113A*		*0.47*					*0.47*	*2.44*	*0.00*	*0.00*	*0.00*	*0.00*	*2.44*	*26*				*26*	*135*	*0*	*0*	*0*	*135*	*0.430*	*1.00*	*4.206*	*1.81*	*0.70*	*2.50*	*200*	*0.011*	34.399	1.09		
Street A	*113A*	*112A*		*0.24*					*0.24*	*2.68*	*0.00*	*0.00*	*0.00*	*0.00*	*2.68*	*13*				*13*	*148*	*0*	*0*	*0*	*148*	*0.471*	*1.00*	*4.193*	*1.98*	*0.77*	*2.74*	*200*	*0.012*	35.929	1.14		
Street A	*112A*	*111A*		*0.18*					*0.18*	*2.86*	*0.00*	*0.00*	*0.00*	*0.00*	*2.86*	*10*				*10*	*158*	*0*	*0*	*0*	*158*	*0.503*	*1.00*	*4.184*	*2.10*	*0.82*	*2.92*	*200*	*0.010*	32.798	1.04		
Street A	*111A*	*106A*		*0.22*					*0.22*	*3.08*	*0.00*	*0.00*	*0.00*	*0.00*	*3.08*	*12*				*12*	*170*	*0*	*0*	*0*	*170*	*0.541*	*1.00*	*4.173*	*2.26*	*0.88*	*3.14*	*200*	*0.025*	51.859	1.65		
Fut. Phase 5A	*Plug 1*	*106A*		*1.97*					*1.97*	*1.97*	*0.00*	*0.00*	*0.00*	*0.00*	*1.97*	*108*				*108*	*108*	*0*	*0*	*0*	*108*	*0.344*	*1.00*	*4.234*	*1.46*	*0.56*	*2.02*	*200*	*0.032*	58.672	1.87		
Street B	*106A*	*101A*		*0.18*					*0.18*	*12.53*	*0.00*	*0.00*	*0.00*	*0.00*	*12.53*	*0*				*0*	*826*	*0*	*0*	*0*	*826*	*2.629*	*1.00*	*3.852*	*10.13*	*3.58*	*13.71*	*200*	*0.004*	20.744	0.66		
Colonel William Parkway	*104A*	*103A*		*0.98*					*0.98*	*0.98*	*0.00*	*0.00*	*0.00*	*0.00*	*0.98*	*54*				*54*	*54*	*0*	*0*	*0*	*54*	*0.172*	*1.00*	*4.308*	*0.74*	*0.28*	*1.02*	*200*	*0.011*	34.399	1.09		
Colonel William Parkway	*103A*	*102A*		*0.33*					*0.33*	*1.31*	*0.00*	*0.00*	*0.00*	*0.00*	*1.31*	*18*				*18*	*72*	*0*	*0*	*0*	*72*	*0.229*	*1.00*	*4.280*	*0.98*	*0.37*	*1.36*	*200*	*0.010*	32.798	1.04		
Colonel William Parkway	*102A*	*101A*		*0.15*					*0.15*	*1.46*	*0.00*	*0.00*	*0.00*	*0.00*	*1.46*	*8*				*8*	*80*	*0*	*0*	*0*	*80*	*0.255*	*1.00*	*4.269*	*1.09*	*0.42*	*1.50*	*200*	*0.010*	32.798	1.04		
Colonel William Parkway	*101A*	*100A*		*0.19*					*0.19*	*14.18*	*0.00*	*0.00*	*0.00*	*0.00*	*14.18*	*10*				*10*	*916*	*0*	*0*	*0*	*916*	*2.916*	*1.00*	*3.824*	*11.15*	*4.06*	*15.21*	*200*	*0.004*	20.744	0.66		
Colonel William Parkway	*100A*	*Ex. 12A*		*0.41*					*0.41*	*14.59*	*0.00*	*0.00*	*0.00*	*0.00*	*14.59*	*23*				*23*	*939*	*0*	*0*	*0*	*939*	*2.989*	*1.00*	*3.817*	*11.41*	*4.17*	*15.58*	*200*	*0.005*	22.959	0.73		
Colonel William Parkway	*Ex. 12A*	*Ex. 11A*		*0.00*					*0.00*	*14.59*	*0.00*	*0.00*	*0.00*	*0.00*	*14.59*	*0*				*0*	*939*	*0*	*0*	*0*	*939*	*2.989*	*1.00*	*3.817*	*11.41*	*4.17*	*15.58*	*200*	*0.009*	31.288	1.00		
Colonel William Parkway	*Ex. 11A*	*Ex. 10A*		*0.00*					*0.00*	*87.57*	*0.00*	*140.71*	*0.00*	*16.49*	*244.77*	*0*				*0*	*4727*	*0*	*17589*	*0*	*22316*	*71.028*	*0.88*	*2.605*	*162.20*	*70.00*	*232.21*	*600*	*0.006*	455.363	1.61		
Old Bronte Road External - By Others																																				
External 2	TO	E2		13.00					13.00	13.00					13.00	715				1635	715				715											
Old Bronte Road	E2	EX. MH9	415			0.00		1.25	1.25	13.00		0.00	0.00	1.25	14.25				0	0	715				715	2.276	1.00	3.889	8.85	4.07	12.93	200	0.010	32.798	1.04		

Existing Sewer built by others

External Sewer to be built by others

Appendix C | Conceptual Plan-Profiles