MESP Servicing and Grading Report
4134 16th Avenue
Residential Development

Prepared for:
Sixteenth Land Holdings Inc.

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Project No.: 160622264

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Sign-off Sheet

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1.0 INTRODUCTION

1.1 PURPOSE

Sixteenth Land Holdings Inc. has retained Stantec Consulting Ltd. (Stantec) to prepare this Servicing and Grading Report (SGR) which is part of the overall Master Environmental and Servicing Plan (MESP) in support of an Official Plan Amendment ("OPA") application to permit the development of a residential community on the subject property.

The property is municipally known as 4134 16th Avenue, in the City of Markham, Region of York. The property is located in Part lots 16, 17 and 18, Concession 5. Except for an area adjacent to Kennedy Road, the balance of the property is currently used by its former owner York Downs Golf & Country Club for a golf course.

The current golf course use has been in operation since York Downs Golf & Country Club opened on site in the early 1970s. The current Official Plan designation of 'Private Open Space' for the areas outside of the valleylands reflects this historic golf course use.

Sixteenth Land Holdings Inc. intends to develop the property for a residential community and is submitting an OPA to redesignate the developable portion of the property from 'Private Open Space' to appropriate urban residential designations to permit the development of residential uses.

This report has been prepared in conjunction with the OPA application in support of the redesignation as proposed in the draft OPA and in the Planning Report (Gatzios Planning, August 2016 and revised October 2017). Please refer to the draft OPA and to the Planning Report for a description of the proposed Official Plan land use designations proposed for the property.

This report was submitted to the approval agencies in 2016 as noted earlier and comments received. This report and drawings have been updated to reflect the revised draft plans and address agencies comments.

This report describes the existing and proposed servicing and grading required to support the development application for the Subject Property.

1.2 STUDY AREA

The property is municipally known as 4134 16th. Avenue, in the City of Markham, Region of York. The property is located in Part lots 16, 17 and 18, Concession 5. Except for an area adjacent to Kennedy Road, the balance of the property is currently used by its former owner York Downs Golf & Country Club for a golf course.

The property is a total of 168.64 hectares (416.72 acres), and is located on the north side of 16th. Avenue, on the west side of Kennedy Road, and has a small amount of frontage onto the east side of Warden Avenue as well. There is existing residential development surrounding the property on all sides. The location of the Subject Property is illustrated on **Figure 1.1**.

Berczy Creek traverses the western portion of the property, and Bruce Creek traverses the property in a roughly north / south direction, bisecting the property into west and east tableland areas.

1.3 PREVIOUS STUDIES

The following approved studies/guidelines/documents were reviewed in preparation of this SGR:

- City of Markham Official Plan (1987), and City of Markham Official Plan 2014 (as partially approved October 30, 2015);
- City of Markham Stormwater Management Guidelines, October 2016;
- Erosion and Sediment Control Guidelines for Urban Construction, Toronto and Region Conservation Authority et al, December 2006;
- MMM Rouge River Watershed Hydrology Update (2001);
- TRCA Rouge River Watershed Plan (2007);
- TRCA Rouge River State of the Watershed Report (2007);
- TRCA Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines (2009);
- TRCA Low Impact Development Stormwater Management Planning and Design Guide (2010);
- TRCA Stormwater Management Criteria (2012);
- TRCA Living City Policy (2014);
- TRCA Crossing Guideline for Valley and Stream Corridors (2015);
- MOEE Hydrogeological Technical Information Requirements for Land Development Applications (April 1995);
- MOECC Stormwater Management Planning and Design Manual (2003);
- Geotechnical Engineering Design and Submission Requirements (TRCA, November 2007);
- MNR Technical Guide for River & Stream Systems: Erosion Hazard Limit (2002);
- Cosburn Patterson Mather Pond H Stormwater Management Report (1997);
- Stantec Stormwater Management Pond Certification & Assumption, York Downs Pond 'H' (2008);
- Cosburn Patterson Mather Angus Glen Village Stormwater Management Design Brief (1997) and detailed engineering servicing and grading plans (2000);
- Stantec Functional Servicing Report - Angus Glen East Village (Former School Block) (2012);
- Cosburn Patterson Mather Sanitary Trunk Servicing Drawings (May 1996);
- Stantec Functional Servicing Report (2006) and Stormwater Management Report for Deacon Lands (2007); and,
- Stantec Functional Servicing Report (2015) and Stormwater Management Report for Yorkton Lands (2016).

1.4 STUDY TEAM AND REPORT STRUCTURE

Tab 1 of the MESP provides full details of overall MESP report structure and consulting team. The SGR addresses municipal servicing and site grading, hydrology, hydraulics, Stormwater Management (SWM) and Low Impact Development (LID).

1.5 LAND OWNERSHIP AND PARTICIPATION

The entire property is owned by Sixteenth Land Holdings Inc., as illustrated on **Figure 1.2.**

1.6 PRE-CONSULTATION SUMMARY

Tab 1 of the MESP provides a summary of the pre-consultation for the MESP. The approved Terms of Reference for the overall MESP report are included in Appendix 1.

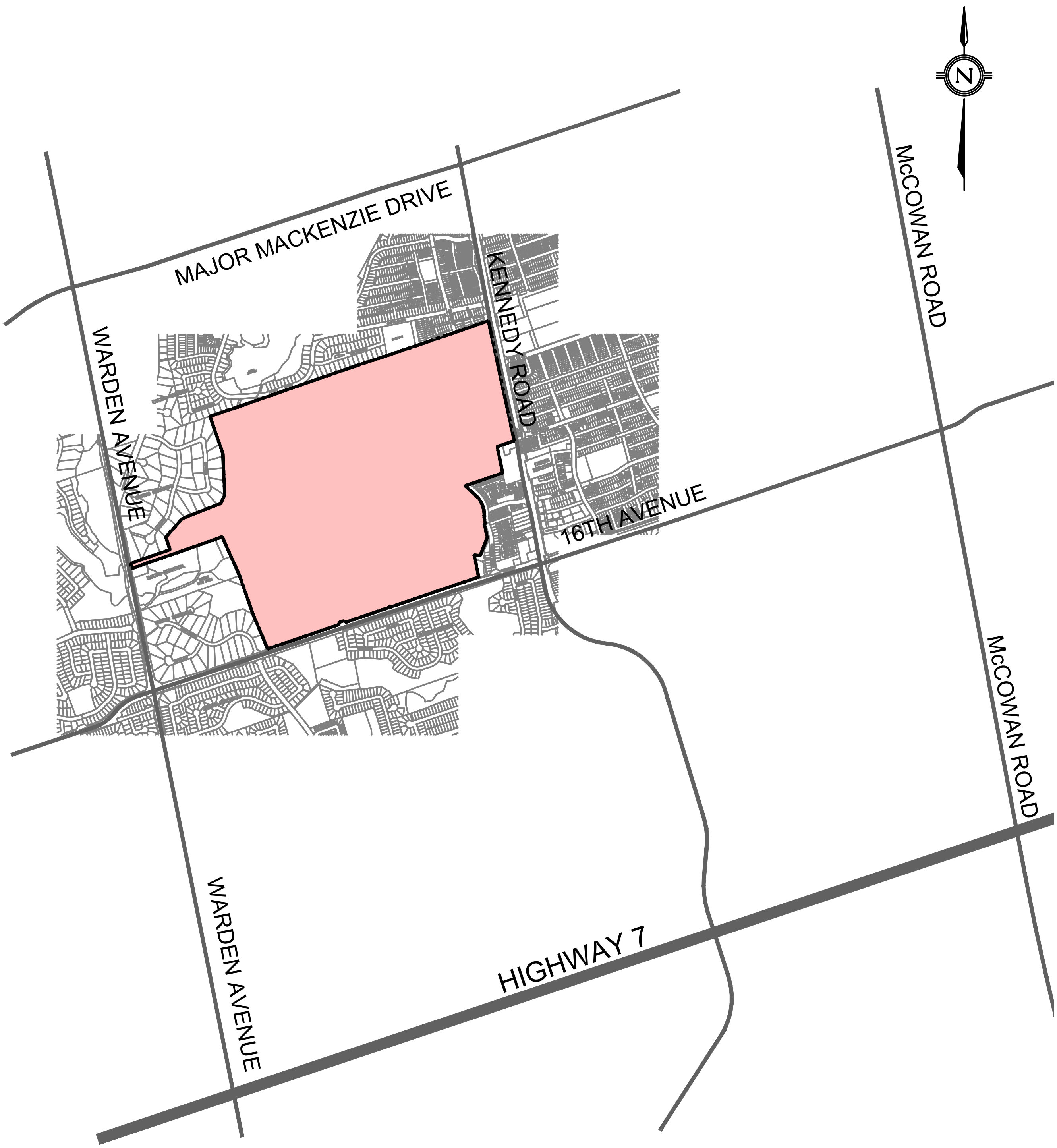
1.7 PROPOSED PLAN

The proposed residential development is detailed in the two draft plan of subdivision applications that accompany this OPA application. There is one draft plan of subdivision for the east portion of the property and one for the west portion of the property, both draft plans are dated September 2017. The west draft plan of subdivision contains the valleylands associated with both Berczy Creek and Bruce Creek. References in this report to the two draft plans or to specific lots / blocks within each, will include 'East' or 'West' to denote the appropriate area. **Figure 1.3** illustrates the development plan for the Subject Property.

The East draft plan of subdivision contains a mix of residential, open space blocks, elementary school block, parks, and SWM ponds.

The West draft plan of subdivision contains a mix of residential, mixed use, open space blocks, parks, and SWM ponds.

The OPA application was submitted in September 2016. The comments were received from the City of Markham on March 13, 2017 and May 10, 2017, Toronto and Regional Conservation Authority on May 10, 2017, Region of York on March 1, 2017 and a subsequent email from Region of York on May 10, 2017 and York Region District School Board on February 16, 2017. This report and drawings have been updated to reflect the revised draft plans and address agencies comments.



File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 1.1 – Location Plan.dwg – Revised by <Guerriero, Michael> , Wed, Oct 04, 2017 , 10:16 AM

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

NOT TO SCALE

Legend

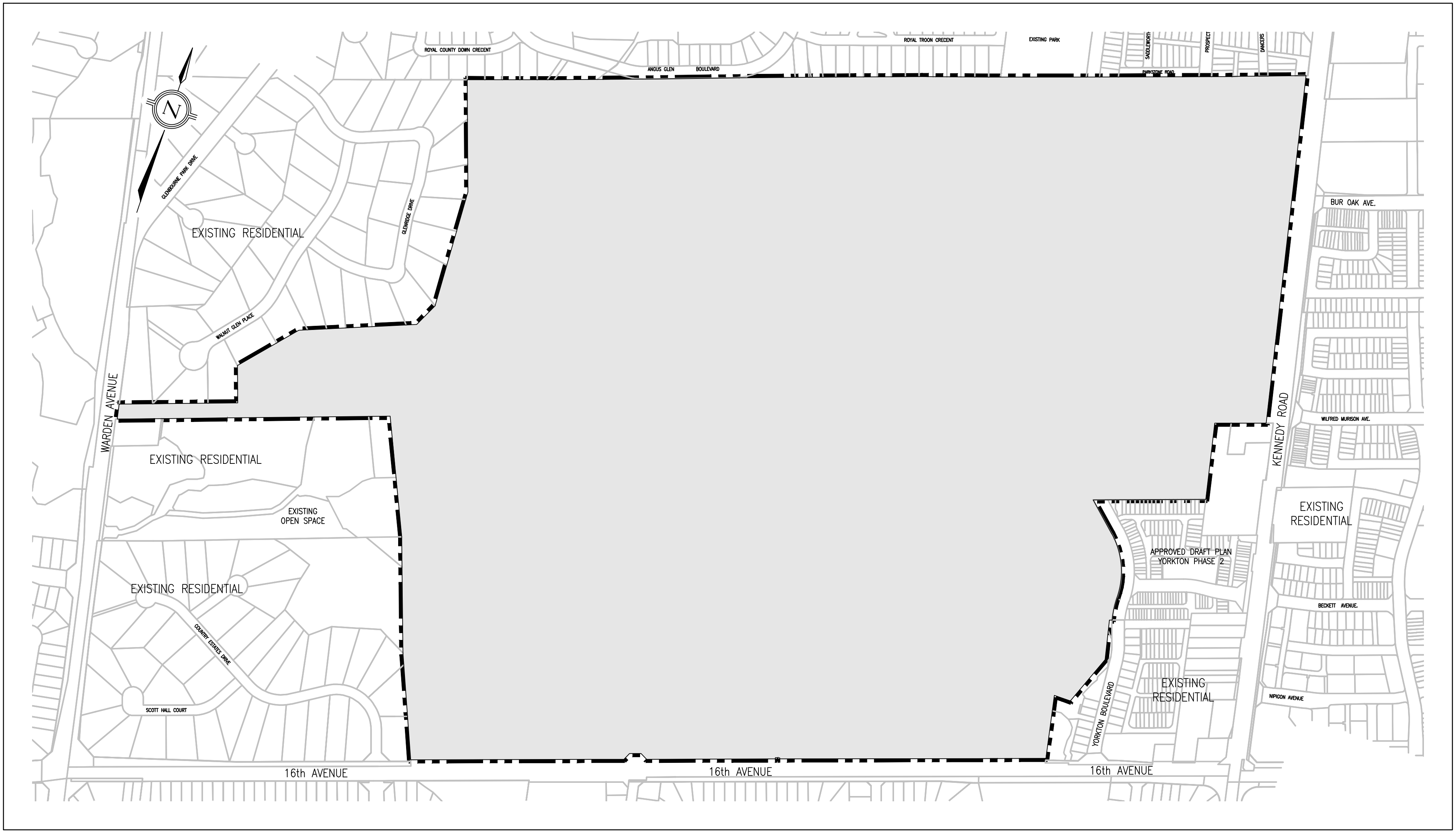
SUBJECT PROPERTY

MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.1

LOCATION PLAN
FOR SUBJECT PROPERTY

October 2017



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BEACON ENVIRONMENTAL

BURNSIDE

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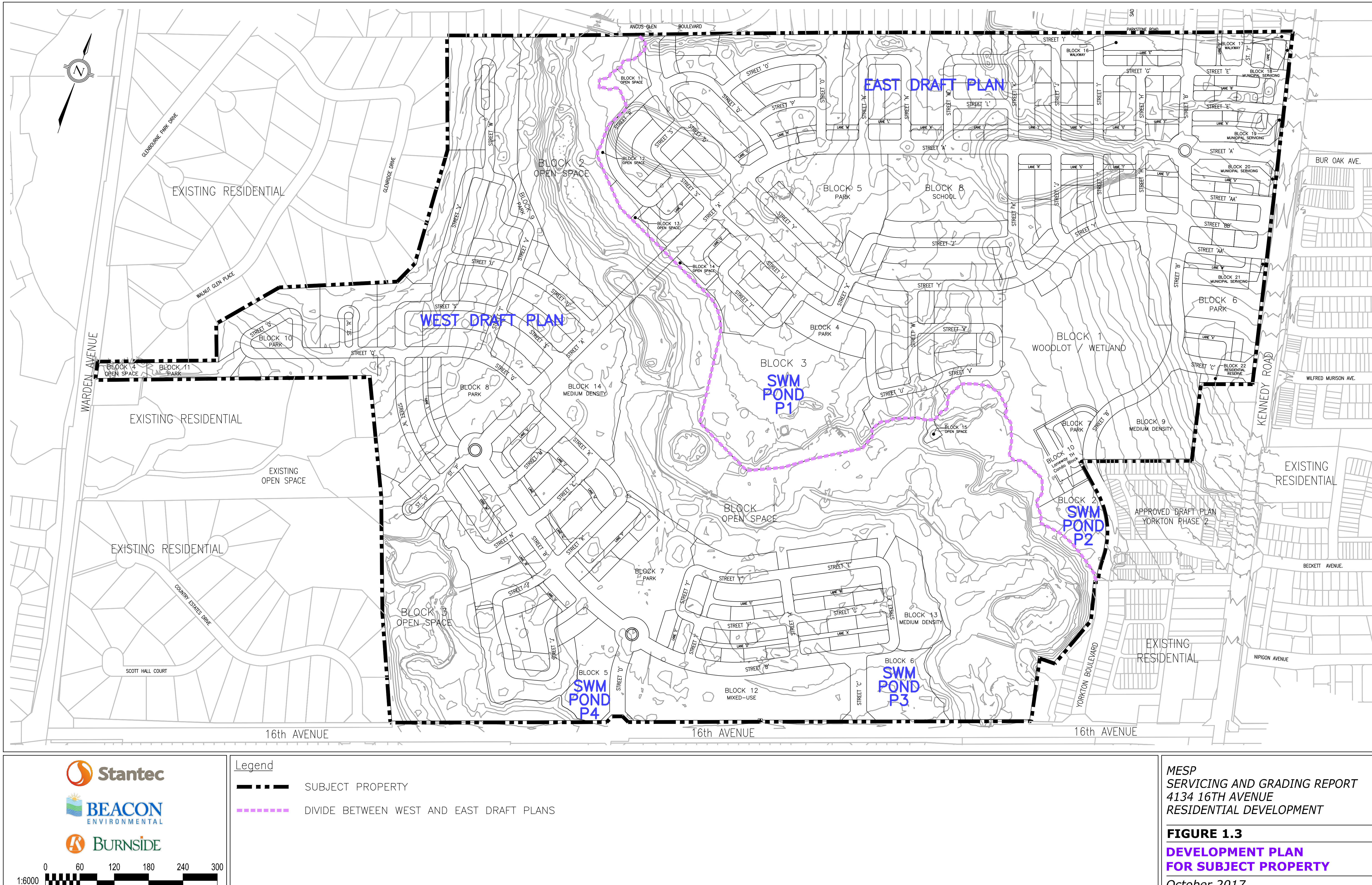
SIXTEENTH LAND HOLDINGS INC. (SUBJECT PROPERTY)

MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.2

LANDOWNERSHIP PLAN

October 2017



MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.3

DEVELOPMENT PLAN FOR SUBJECT PROPERTY

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files\[MESP]\Figure 1.3 - Development Plan.dwg - Revised by <Guerriero, Michael> , Wed, Oct 04, 2017 , 10:14 AM

2.0 STORMWATER SERVICING

2.1 STORMWATER MANAGEMENT CRITERIA

SWM criteria for the Subject Property have been established based on several background documents including:

- MMM Rouge River Watershed Hydrology Update (2001);
- MOECC Stormwater Management Planning and Design Manual (SWMPD) (2003);
- TRCA Low Impact Development Stormwater Management Planning and Design Guide (2010);
- TRCA Stormwater Management Criteria (2012); and,
- City of Markham Engineering Design Criteria March 2015.

2.1.1 Quality Control

In accordance with the 2003 MOECC SWMPD Manual and 2012 TRCA Stormwater Management Criteria, Enhanced Level of Protection is required for water quality. This requirement is consistent with City of Markham Design Criteria and Region of York policies.

The SWM facility design will follow the criteria in the Stormwater Management and Design Manual (MOE, 2003) and the Guidance for Development Activities in Redside Dace Protected Habitat (OMNRF, 2016). Thermal mitigation measures will be implemented in accordance with the guidelines, including best efforts to achieve several targets including discharge temperatures below 24°C, a dissolved oxygen concentrations of at least 7 mg/L and total suspended sediment levels less than 25 mg/L above background conditions.

2.1.2 Erosion Control

As noted in the 2012 TRCA Stormwater Management Criteria, consultation with TRCA staff is required to establish the erosion assessment methodology for the Subject Property. A meeting was held with TRCA staff, Beacon and Stantec on June 6, 2016 to discuss the field work done to date, the local and overall hydrology and the proposed erosion assessment. An agreed upon methodology was provided and is included in Appendix 1 of the overall MESP. Details of the erosion modeling and assessments completed for the Subject Property are provided in Section 2.7. The erosion assessment is being undertaken to assess the pre- and post-development erosion indices, the potential impacts, and recommend an appropriate erosion control volume for the SWM ponds.

2.1.3 Quantity Control

The 2012 TRCA Stormwater Management Criteria require that water quantity control be provided to protect downstream properties. Existing identified downstream Flood Damage Centres, are to be protected from flooding impacts due to upstream development.

The quantity control requirements from the 2012 TRCA Stormwater Management Criteria are as follows:

- Bruce Creek Upstream of 16th Avenue - Control post-development peak flows to pre-development peak flows for the 2 year through 100 year storm events; and,
- Berczy Creek Downstream of Warden Avenue - No flood control required (only extended detention).

2.1.4 Water Balance

The Subject Property is located within a Low Groundwater Recharge Area (LGRA) as described in the 2012 TRCA Stormwater Management Criteria. This guideline requires a "best effort made" approach to the maintenance of groundwater recharge. Additionally, there are natural features within the site that require individual feature based water balance assessments to ensure ecological form and hydrologic function are maintained.

2.1.5 Regional Storm Control

The 2012 TRCA Stormwater Management Criteria, TRCA's 2014 Living City Policies, and City of Markham's policies, require hydrologic analysis to assess impacts of development on Regional Storm event flows and if appropriate, provide mitigation to protect downstream properties and existing Flood Damage Centres.

2.2 BEST MANAGEMENT PRACTICES FOR STORMWATER

2.2.1 Evaluation of SWM & LID Practices

In accordance with the MOECC SWMPD, the City of Markham Official Plan and the Terms of Reference for the MESP, a screening and assessment of best management practices for stormwater was undertaken as detailed below.

2.2.1.1 Lot Level and Conveyance Controls

A review of the various lot level and conveyance controls or LID measures described in the *CVC/TRCA Low Impact Development Stormwater Management Planning and Design Guide (LID Guide)* was undertaken to assess and investigate the feasibility of implementing these strategies within the Subject Property on various land uses. This LID review and feasibility assessment will assist the preparation of the post development mitigation plan and water balance assessment.

Generally, the benefits of LID strategies include a reduction in water quantity or attenuation through infiltration, as well as an improvement in water quality through infiltration, or surface filtration through vegetation. LID also slows the flow of stormwater, often shifting the peaks of the runoff hydrograph by several hours. It should be noted that the existing soils within the Subject Property generally consist of Clayey Silt to Clayey Sand Till and Sandy Silt to Silty Sand mostly overlaying glacial till. In general, the soil contains clayey material near the surface and permit infiltration.

Below is the evaluation and summary of strategies presented in the LID Guide as well as a discussion of the conceptual feasibility of implementing these strategies within the Subject Property based on the current draft plan.

Rainwater Harvesting

Rainwater harvesting is the process of intercepting, diverting and storing rainfall in a cistern above or below ground and then using this water for irrigation or indoor non-potable water use. The benefits of rainwater harvesting include reducing stormwater runoff from frequent storm events, reducing municipal water demand, and reducing consumer water costs.

Rainwater harvesting for irrigation is recommended. Rainwater harvesting for indoor uses (such as greywater uses) would effectively remove water from the natural water cycle and is only recommended within the proposed development for high density residential blocks where other LID methods may not be feasible. Rain barrels can be located on private lands however the use and implementation cannot be enforced or guaranteed. As part of the strategy for the Subject Property rain barrels have not been accounted for on individual private lots. The use of rain barrels is recommended and information packages can be provided to each home owner on the benefits, proper use and implementation of rain barrels. Ultimately, the use of barrels would be at the discretion of the individual homeowners, and should be encouraged.

Green Roofs

Green roofs are contained landscaped areas which store water for evapotranspiration. These LID's are located on top of man-made structures, typically building rooftops or rooftops of parking structures. When rain water volumes exceed the storage capacity of a green roof, the water is conveyed to conventional building drainage systems. Benefits of green roofs include reduced stormwater runoff, improved energy efficiency, and reduced heat-island effect in urban areas.

The majority of the proposed development within the Subject Property consists of low, medium, and high density residential units that do not include housing forms with flat roofs. Green roofs have not been included in the strategy for the Subject Property but are recommended for further review on the high density build forms with flat roofs, if other recommended LID strategies are not feasible. In addition, the proposed school block could also implement a full or partial green roof. However, the school building type, form and function have not been finalized to confirm that green roofs are feasible.

Roof Downspout Disconnection

Roof downspout disconnection consists of directing rainwater collection downspouts to grassed or pervious areas instead of connecting directly to storm sewers. The pervious areas on residential subdivisions, are typically located adjacent to roof leaders and would convey runoff along overland flow paths such as side yard and rear yard swales located within private lots. The benefits of downspout disconnection include easy implementation, reduced stormwater runoff, and increased infiltration and evapotranspiration.

Roof downspout disconnection is recommended for single family residential lots within the Subject Property to direct roof runoff to pervious surfaces and overland flow paths such as side yard and rear yard swales to promote passive infiltration. Some of the medium and high density units will not have sufficient grassed or pervious areas within the lots to recommend implementation of downspout disconnection. These build forms will instead implement other LID measures.

Increased Topsoil Depths

Increased topsoil depth consists of layering additional topsoil on landscaped areas such as, individual lots, boulevards and parks to increase stormwater storage as well as increase infiltration and evapotranspiration. Following site pre-grading, most development sites have an excess of topsoil to be removed. Benefits of increasing topsoil depths include reducing runoff, increasing infiltration, and reducing the amount of topsoil hauled off-site, which decreases costs and energy consumption.

Following topsoil stripping of the site, there will be an abundance of topsoil which can be used. Therefore, this LID strategy is recommended for the Subject Property. Topsoil placement is recommended to be 300 mm within parks, 600 mm within boulevards, and 300mm within private lots.

Topsoil Amendments

Topsoil amendments consist of mixing high permeability materials like sand and gravel in with the existing the topsoil for reuse on the Subject Property. The amended topsoil mixture results in a soil mix with a lower percentage of silt and clays. In addition, the topsoil is also mixed with a suitable amount of compost to increase organic content, which improves plant growth and the soil characteristics. Amended topsoil is often added in an increased depth to further improve the performance. Benefits of amended top soil include, increased stormwater storage, increased infiltration and evapotranspiration, and stabilization against erosion.

Amended topsoil will be implemented where downspout disconnection is proposed to maximize infiltration benefits. Within the Subject Property topsoil amendments could occur in private backyards, as front yard areas are limited.

Soakaway Pits, Infiltration galleries and Chambers & Perforated Pipe Systems

Soakaway pits are stone-filled trenches that receive stormwater runoff from downspouts or swales, and store water to infiltrate over time, as no outlet is provided. Infiltration galleries are similar systems that contain an outlet to the storm sewer to drain runoff that is unable to infiltrate. Perforated pipes systems are stormwater conveyance systems that feature perforated pipes within a granular bed allowing the runoff to infiltrate into the native soil through the pipe wall as it is conveyed. The benefit of all these systems is infiltration. All of these measures require that water be collected from 'clean' surfaces or is pretreated prior to infiltration to prevent facilities from silting up.

The existing soils consist of Clayey Silt to Clayey Sand Till and Sandy Silt to Silty Sand mostly overlaying glacial till, with the groundwater table close to the surface in some areas. As such soakaway pits are not recommended in areas of high groundwater. Infiltration galleries with underdrains can be implemented in areas where appropriate separation from the groundwater table is provided. A perforated roof leader collector pipe (RLC) within the right of way below the road surface is recommended to infiltrate water where appropriate separation from the groundwater table is provided (minimum elevation difference of 1 m). Roofs from front draining lots and the medium and high density units will be directed to a perforated RLC.

Bioretention Facility

Bioretention facilities are engineered landscaped features located in depressed areas allowing runoff to pond thereby providing quality treatment, evapotranspiration and infiltration through a sand, soil, and organic filter medium. Bioretention facilities can be located adjacent to small parking areas, along single-loaded roads adjacent to valley/park/school frontages, or within cul-de-sac or enclaves with runoff from the adjacent road being directed to the facility via overland flow. Bioretention facilities would need to be located on public lands.

The Subject Property does have single-loaded roads adjacent to valley/park/school frontages as well as cul-de-sac or enclaves where bioretention facilities could be implemented with support from the City, as the ownership and maintenance responsibilities would ultimately reside with the City. This type of system will include subdrains to prevent surface ponding or overflow, which will connect to the storm sewer system. Bioretention facilities are recommended in these areas.

Vegetated Filter Strips

Vegetated filter strips are densely vegetated areas that treat runoff through sheet flow from adjacent impervious areas such as roadways or roofs. Similar to bioretention swales, vegetated filter strips provide quality treatment, evapotranspiration and passive infiltration. Vegetated filter strips are typically used for treatment or pre-treatment of stormwater runoff.

The standard urban right-of-ways proposed within the residential subdivision do not include roadside ditches or wide vegetated boulevards. Therefore, vegetated filter strips adjacent to roads are not proposed within the Subject Property. In areas where roof drainage is directed to the Valley system, the buffer blocks and the vegetation within them will function as a vegetated filter strip and provide some flow attenuation and additional TSS removal through filtration of water through the vegetation. It is anticipated that passive infiltration would occur within buffer areas and some evapotranspiration and water quality treatment would also be provided.

Permeable Pavement

Permeable pavers are pervious pavement systems consisting of an aggregate sub-base that allows runoff to seep into and be stored for eventual infiltration. A permeable paver system could be installed on driveways, which are sufficiently low traffic areas to avoid rapid clogging of the sub-base. Benefits of permeable pavers include reduced stormwater runoff, filtration and groundwater recharge.

Permeable pavers are substantially more costly than conventional asphalt driveways and some concerns associated with longevity remain prevalent. Permeable pavers or interlocking blocks have historically been market driven options that have been installed in selected residential areas, or by individual home owners. Permeable pavers are not recommended to meet the criteria for the Subject Property but could be implemented in the future.

Enhanced Grass Swales

Enhanced grass swales are vegetated open channels with varying slopes, check dams (if necessary), and vegetation designed to attenuate, convey, and treat runoff. Enhanced grass swales can be located within lots or adjacent to roadways. Benefits of enhanced grass swales include quality treatment, evapotranspiration and passive infiltration.

City lot grading standards require side and rear yard swales to convey storm water flows away from buildings. The majority of the lots within the Subject Property will have side and rear yard grass swales with varying slopes to accommodate lot drainage. These swales will not include check dams as these features would not be practical to install within private lots. Therefore, enhanced grass swales are recommended within the Subject Property, but without the check dams for added attenuation.

Dry Swales

Dry swales are similar to enhanced grassed swales but include an engineered soil media bed and may or may not include an underlying perforated pipe drainage system. Dry swales are designed to attenuate, convey, and treat runoff and can be located within lots or adjacent to roadways. Benefits of dry swales include quality treatment, evapotranspiration and infiltration.

Filtration requires flat slopes of roughly 1%. However, the proposed grades throughout the site are generally 2% or higher, which would limit the implementation or functionality. Therefore, dry swales are not recommended.

Rain Gardens

Rain gardens are gardens that have a slight depression and contain plants suited to the site, weather and climate. The benefits of a rain garden include the ability to filter water naturally, allowing rain water to soak into the ground. During large rain events rain gardens can capture water before it enters storm drains to reduce the amount of storage required within the storm network. Rain gardens can be implemented in all soils types to promote infiltration. Rain gardens function similarly to bioretention facilities, both of which are recommended.

2.2.1.2 End-of-Pipe Controls

End-of-Pipe controls are implemented at the end of the storm sewer pipe system after lot level and conveyance controls and include:

- Wet ponds - designed to provide quality treatment through settling of suspended solids into the permanent pool (typically 1.5 m to 3.0 m deep), and extended detention and quantity control within the active storage component.
- Wetlands - designed to provide quality treatment through settling of suspended solids into the forebay (typically 1 m deep) and shallow permanent pool (typically 0.15 m to 0.3 m deep), and extended detention and quantity control within the active storage component.
- Dry ponds - provide some quality treatment through retention time, and primarily provide extended detention and quantity control within the active storage component.

In order to satisfy the water quality requirements from the MOECC, and thermal mitigation requirements related to Redside Dace, wet ponds are recommended for the Subject Property.

2.2.2 Selection of Recommended SWM & LID Practices

The lot level, conveyance and end-of-pipe controls were evaluated based on the SWM criteria listed above regarding water quality, water quantity, erosion and water balance. In addition, the following Subject Property characteristics were also considered;

- Soils consist of Clayey Silt to Clayey Sand Till and Sandy Silt to Silty Sand mostly overlaying glacial till;
- Depth to groundwater generally ranges from 0.2 m to 6.0 m;
- Hydraulic conductivity ranges from 8.8×10^{-6} to 8.3×10^{-4} cm/s;
- Infiltration rates were evaluated to range from 50 mm to 135 mm for Clayey Silt to Clayey Sand Till and 200 mm to 360 mm for Sandy Silt to Silty Sand.

Based on the above, **Table 2.1** summarizes the SWM measures that are recommended for implementation within the Subject Property.

Table 2.1 Recommended SWM and LID Practices

SWM and LID Practice	Lot Level	Conveyance	End-Of-Pipe
Cisterns / Rain Barrels *	X		
Green Roofs *	X		
Downspout Disconnection with Increased Topsoil /Amended Soil	X		
Grassed Swales		X	
Vegetated Filter Strips		X	
Perforated Pipe		X	
Wet ponds			X
Bioretention Facilities / Rain Gardens			X
Infiltration Galleries			X

*Denotes recommended LID practices not currently accounted for in the mitigation strategy

2.2.2.1 LID Practices Proposed for Water Balance Mitigation Strategy

As summarized above, we have examined and assessed the functionality of each LID strategy. The proposed residential development of the Subject Property will increase runoff volumes and reduce infiltration when compared to existing conditions if no mitigation measures are implemented. The existing soils generally consist of Clayey Silt to Clayey Sand Till and Sandy Silt to Silty Sand mostly overlaying glacial till and do permit infiltration.

At this stage, LID strategies such as roof downspout disconnection, enhanced grass swales within lots, vegetated filter strips, and increased topsoil depths or amended topsoil are recommended for the Subject Property to promote passive infiltration and maintain existing conditions hydrologic characteristics. In addition, infiltration galleries, perforated pipe systems, bioretention facilities, are also proposed. All of the pre-screened LID strategies will be reviewed further at the detailed design stage for site specific feasibility and implementation recommendations.

The application and implementation of source, conveyance, and end-of-pipe LID strategies has been examined further as part of the *Hydrogeological Assessment and Water Balance Report*, prepared by R.J. Burnside Associates. The following BMPs are proposed for implementation as part of the water balance mitigation strategy assessed in the Hydrogeological report:

- Direction of residential roof downspouts to ground surface;
- Grassed swales in sideyards and backyards;
- Vegetated filter strips within buffer blocks behind residential lots;
- Enclave bioretention facilities;
- Infiltration facility;
- Infiltration galleries; and,
- Perforated roof leader collection (RLC) pipes within the right of way.

Additionally, 300 mm of topsoil or amended soils will be placed on all lots in order to maximize rainwater retention and infiltration, as well as 300 mm within parks and 600 mm within boulevards.

Cisterns/rain barrels are proposed on individual lots but were not accounted for in the water balance mitigation assessment as use of barrels would be at the discretion of the individual homeowners and cannot be guaranteed. Green roofs were also not accounted for in the assessment, and are recommended for further review if other recommended LID strategies are not feasible.

2.3 EXISTING DRAINAGE BOUNDARIES

The Subject Property is located within the Bruce Creek and Berczy Creek subcatchments which are both tributaries of the Rouge River. The approximate drainage boundary between the two subcatchments through the Subject Property is illustrated on **Figure 2.1.** The confluence of these two tributaries occurs just downstream, south of 16th Avenue at Node 868.

For the purposes of this report the existing drainage divide between the two subcatchments has been delineated based on the topographic survey provided by J.D Barnes. Generally, this drainage divide is similar to the subwatershed boundaries determined in the 2001 MMM Hydrology Update, both of which are illustrated on **Figure 2.2**. As a result of the revised existing drainage boundary delineation, the Berczy Creek subcatchment (201) has increased by 9.9 ha, which is approximately 5.0 % of the 196.5 ha drainage area. When compared to the cumulative drainage area of 3043.2 ha at the downstream flow node (Node 849), this 9.9 ha area equates to an increase of only 0.33 %. Similarly, the Bruce Creek subcatchment (210) area has decreased by 9.9 ha which is approximately 2.6 % of the 377.5 ha drainage area. When compared to the cumulative drainage area of 3551.7 ha at the downstream flow node (Node 867), this 9.9 ha area equates to a decrease of 0.28%. Although the change in the existing drainage divide appears to be large, the impact to the subcatchments and downstream flow nodes are relatively insignificant. As such, the subwatershed catchment areas within the 2001 MMM watershed model (VO2) are deemed to be acceptable and have remained unchanged for any analyses using this model.

Figure 2.2 illustrates the existing drainage divide between the two subcatchments delineated based on the topographic survey, the existing storm drainage boundaries and areas through the

Subject Property, the subwatershed drainage areas from the Subject Property, as well as external drainage areas and inputs locations. **Figure 2.3** illustrates in the existing external drainage areas and boundaries.

2.4 PROPOSED DRAINAGE BOUNDARIES

The proposed preliminary grading design of the site has been undertaken to maintain the existing drainage areas to Bruce and Berczy Creek to the extent possible and to minimize drainage diversions. The proposed development and drainage boundaries for the Subject Property are illustrated on **Figure 2.4**. A minor drainage diversion from Bruce Creek to Berczy Creek is proposed which is less than 0.5 ha. This diversion is considered negligible, as it is approximately 0.3% of the Berczy Creek subcatchment area (196.5 ha).

2.4.1 SWM Facilities Location Selection

Based on the existing drainage divides and sub-watersheds within the Subject Property, multiple end-of-pipe facilities are required. The number of facilities has been minimized with four (4) end-of-pipe wet pond facilities proposed within the development providing quality and quantity control, and one (1) end-of-pipe infiltration Facility providing quantity control. **Figure 2.4** illustrates the proposed pond and infiltration locations within the development plan. The following sections describe the general location and selection process for the proposed facilities.

2.4.1.1 SWM Pond 1

An existing SWM pond referred to as Pond H, is located within the north east corner of the Subject Property. This SWM pond was designed and constructed in 1997, and provides quality and quantity control for the north east portion of the Subject Property as well as an external existing residential area east of Kennedy Road (minor system area of 82.95 ha and major system area of 66.85 ha as illustrated on **Figure 2.3**). A copy of the design report for this pond as well as the drainage plan and modeling is included in **Appendix A**. As part of the development concept design process for the Subject Property the location of the existing pond was reviewed and determined to be problematic for existing road connectivity (Buroak extension to the west) and the overall neighborhood design. Therefore, the existing Pond H will be removed and relocated adjacent to the Bruce Creek valley corridor as SWM Pond 1. The drainage from the Subject Property east of Bruce (63.87ha) along with minor system area of 82.95 ha and major system area of 66.85 ha external drainage will be serviced by one consolidated facility, SWM Pond 1. The total minor system drainage area to SWM Pond 1 is 146.82ha, and major system area is 130.72ha. SWM pond 1 location was selected in the existing low lying area of the catchment, just west of a natural valley feature and is centrally located to minimize fill requirements.

2.4.1.2 SWM Pond 2

A second SWM Pond is proposed for the area east of the Bruce Creek Valley system to service areas that drain directly to the valley which are located south of the existing woodlot/wetland (Feature 1). SWM Pond 2 is located adjacent to Bruce Creek valley corridor, just west of the Yorkton Blvd extension. The pond will service 5.25 ha of the Subject Property as well as 6.59 ha of drainage from the existing Church Property along Kennedy Road, and the Yorkton Phase 2 development, for a total area of 11.84 ha. This pond will be conveniently located near to the existing Pond H outlet headwall within the valley. Once Pond H is removed and relocated, the existing outlet headwall can be used for SWM Pond 2.

It should be noted that SWM Pond 2 will replace the interim SWM pond located within an easement just north of SWM Pond 2. This interim pond was designed to service approximately the same drainage area. However, the ultimate SWM Pond 2 could not be constructed in the final location due to ongoing golf course operations.

2.4.1.3 SWM Pond 3

SWM Pond 3 is proposed on the west side of the Bruce Creek Valley system to service 22.8 ha that drain to the Bruce Creek. The SWM Pond is located at the downstream end of the catchment adjacent to the Bruce Creek Valley.

2.4.1.4 SWM Pond 4

SWM Pond 4 is proposed on the east side of the Berczy Creek Valley system to service the majority of the area (29.24 ha) that drains to Berczy Creek. The SWM Pond is located at the downstream end of the catchment near 16th Avenue.

2.4.1.5 Infiltration Facility 1

Infiltration Facility 1 is proposed within Berczy Creek subcatchment on the west side of the Subject Property. Under existing conditions, this area drains to the west directly to Berczy Creek valley adjacent to Warden Avenue. An infiltration facility is proposed in this area to service the small drainage area of 1.85 ha and provide extended detention storage only. The facility will have an underdrain connected to the storm sewer that outlets into SWM Pond 4. Major system flow for this area will be directed within the ROW to the east.

2.5 PROPOSED STORMWATER MANAGEMENT STRATEGY

Based on the above evaluation of SWM and LID practices, the recommended SWM strategies are described in detail as follows.

2.5.1 Low Impact Development Techniques

2.5.1.1 Extra Topsoil Depth & Amended Soils

An increase in the proposed topsoil depth on lots and other grassed areas, such as parks, and boulevards will be used to promote lot level infiltration (up to 0.3 m depth within lots and parks and 0.6 m within boulevards). The TRCA Sustainable Technologies Evaluation Program's (STEP) recent report titled Preserving and Restoring Healthy Soil: Best Practices for Urban Construction (2012) will be considered to the extent feasible at future design stages.

Amended soils are proposed within backyards of split lot grading with downspout disconnection.

2.5.1.2 Roof Leaders to Grassed Areas

Roof leaders will be discharged to grass areas to promote lot level infiltration, except where roof leaders are directly connected to perforated RLC or infiltration galleries as discussed below.

2.5.1.3 Lot Level Infiltration Facilities

To minimize the development impact on the site water balance, clean storm runoff from roof areas is proposed to be directed to infiltration galleries within parks, medium density blocks, mixed use blocks, or schools, where possible and with appropriate separation from the groundwater table.

The lot infiltration facilities will be sized in accordance with the MOECC Stormwater Management Planning and Design Manual (2003) as well as the TRCA Low-Impact Development Planning and Design Guide, including but not limited to:

- Infiltration galleries will be located a minimum of 4 m from building foundations;
- Overflow pipes will discharge to pervious areas that are a minimum 2 m from building foundations and slope away from building;
- Minimum 1.2 m frost cover will be provided above infiltration galleries;
- Infiltration galleries will be filled with 19 mm diameter clear stone with a 40% void space;
- Infiltration galleries will be wrapped in non-woven filter cloth;
- A perforated over-drain connected to the proposed storm sewer system is to be provided;
- Detention of water will be solely underground to prevent mosquito breeding;
- Bottom of the infiltration trench will be a minimum of 1 m above the seasonally high water table;
- Impervious drainage area to treatment facility ratio between 5:1 and 20:1;
- Maximum trench storage volume will be equivalent to 20 mm of runoff from the contributing roof areas;
- Infiltration galleries will be completed following house construction and installed at the time of sodding; and,
- Roof downspouts will be installed with a screened inlet pipe and integrated overflow pipe to splash pads in order to accommodate the City lot grading standards.

Typical detail and cross sections for the infiltration galleries, with overflow to storm sewer are provided on **Figure 2.5.**

The preliminary locations of the proposed infiltration galleries are provided in **Figure 2.13**.

2.5.1.4 Perforated Roof Leader Collectors (RLC)

Within some areas of the development, perforated RLC pipes are proposed to collect roof drainage and promote infiltration within the right-of-way below the road surface where appropriate vertical separation from the groundwater table is provided (>1 m). Typical detail and cross sections for the perforated RLC are provided on **Figure 2.5.** Refer to Section 2.9.3 for information on RLC locations.

2.5.1.5 Enclave Bioretention Facilities & Infiltration Facility

Bioretention facilities are proposed within enclave areas as part of the development. These facilities are designed to treat and then infiltrate the drainage from roofs, lots and road areas. The drainage enters the facility at the surface at curb cut locations and is filtered by the landscaping as well as the engineered sand, soil, and organic filter medium prior to infiltrating into the ground. By utilizing the bioretention feature in this way it will provide quality treatment, evapotranspiration and infiltration thereby reducing runoff. These facilities will have an underdrain that is connected to the storm sewer which outlet to the downstream SWM pond. A typical detail and cross section for enclave bioretention facilities is provided on **Figure 2.6.**

Proposed Infiltration Facility 1 will be designed to function the same way as the bioretention facilities with the underdrain connected to the storm sewer which outlets to downstream SWM pond 4. A typical detail and cross section for Infiltration Facility 1 are provided on **Figure 2.7.**

2.5.2 Stormwater Management Ponds

Section 2.2.2 recommended wet ponds be implemented to provide quality, quantity and erosion control for drainage to Bruce Creek and quality and erosion control for Berczy Creek. Details for the wet ponds are provided in Section 2.8.

2.5.2.1 Ponds Releasing to Redside Dace Habitat

Where SWM ponds outlet to Redside Dace habitat designated streams, the MNRF has indicated that temperature reduction of the storm pond outflows be considered. SWM ponds should provide permanent pool depths of 3.0 m to satisfy the temperature requirements. Should the 3.0m permanent pool not be feasible, the pond designs should consider the use of cooling trenches and low flow augmentation systems to mitigate temperature impacts on the receiving steam systems. A conceptual detail and cross section for the cooling trench and low flow augmentation systems is provided in **Appendix F**.

2.6 EVENT BASED HYDROLOGIC MODELING

2.6.1 VO2 Hydrology Modeling

The VO2 hydrology model for the Rouge River watershed was obtained from TRCA in 2016. This model is an updated version of the "Future Committed Development" (FC Development) scenario from the 2001 MMM Rouge River Hydrology Update. The FC Development scenario included all existing and approved developments incorporated into the Official Plans as of 2000, which will be referred to as the "FC Development" in this report. Therefore, subcatchments 201 (Berczy) and 210 (Bruce) included some development within each of the subcatchments (31% imperviousness for 201 and 19.6% imperviousness for 210) and a lumped SWM pond for Bruce creek for quantity control. For both subcatchments the Subject Property was modelled as open space.

Figure 2.1 illustrates a portion of the Rouge River Hydrology Model catchment boundaries, important downstream flow nodes, and the Subject Property.

Table 2.2 below summarizes the flows from the FC Development scenario for various storm events within the downstream nodes. Modeling output summary tables from the 2001 MMM Rouge River Hydrology Update are provided in **Appendix B1**.

Table 2.2 FC Development Flows at Downstream Nodes

Event	Node 867	Node 849	Node 868
Watershed	Bruce	Berczy	Confluence (just upstream of Too-Good Pond)
Cumulative Drainage Area (ha)	3551.7	3043.2	6594.9
2 year (m^3/s)	13.35	11.91	25.02
5 year (m^3/s)	21.00	19.91	40.44
25 year (m^3/s)	33.87	33.51	66.73
100 year (m^3/s)	46.96	46.18	92.71

2.6.2 Allowable Release Rates for SWM Ponds

Since the TRCA's hydrology modeling for Rouge River includes development and quantity control within the subcatchments of interest, it was not used for determining the pre development flows to set the allowable release rates for SWM Ponds. Instead, a standalone VO2 model with a single subcatchment (210 Bruce) was prepared using a rural NASHYD command with the pre-development conditions parameters taken from *Table A.2 in Appendix A of the 2001 MMM Hydrology Update*. Allowable unitary release rates were calculated for each storm event for this subcatchment. Then the allowable pond release rates were established based on the post development catchment area to each SWM pond. **Table 2.3** below summarizes the unitary allowable release rates and actual allowable release rates for the SWM Ponds within the Subject Property based on the proposed drainage areas. Allowable SWM pond release rates were only calculated for Bruce Creek ponds as these ponds require quantity control whereas Berczy Creek does not. VO2 Modeling and calculations are provided in **Appendix B2**.

Table 2.3 Allowable Release Rates for SWM Ponds

Event	Unit Release Rates ($m^3/s/ha$)	Pond 1 (m^3/s)	Pond 2 (m^3/s)	Pond 3 (m^3/s)	Pond 4* (m^3/s)
Watershed		Bruce	Bruce	Bruce	Berczy
Drainage Area (ha)		146.82(minor) 130.72 (major)	11.84	22.80	31.09
2 year	0.006	0.85	0.07	0.13	N/A
5 year	0.010	1.53	0.12	0.24	N/A
25 year	0.022	2.83	0.26	0.49	N/A
100 year	0.037	4.77	0.43	0.83	N/A

Note: * No quantity control requirements - only extended detention control is required for Pond 4

2.6.2.1 Quantity Control Requirements

The required quantity control volumes for the proposed ponds within Bruce Creek were determined through a hydrologic modeling exercise controlling post-development peak flows to pre-development peak flows for the 2 year through 100 year storm events. For determining the required storage volumes within the SWM Ponds, both the 12 hr AES storm and the 3 hour Markham design storm were analyzed. 12 hr AES storms were used for flow comparisons at downstream nodes, and the required storage volumes within the ponds were analyzed using the 3 hour Markham design storm.

2.6.3 Proposed Conditions Hydrology Modeling VO2

2.6.3.1 VO2 - 2 Year to 100 Year

Since the development proposal for the Subject Property intends to remove and replace both Pond H and the interim SWM pond, the inclusion of the existing external drainage areas and land uses in the hydrology modeling is essential. Therefore, the proposed conditions VO2 hydrology modeling was prepared by combining the TRCA's FC Development model with the approved models for Pond H and Interim SWM pond, and incorporating the proposed development of the Subject Property including the proposed land uses, drainage areas and four SWM Ponds. A detailed summary of the model setup is provided in **Appendix C**.

Figure 2.1 illustrates a portion of the Rouge River Hydrology Model VO2 catchment boundaries, important downstream flow nodes, and the Subject Property. **Figure 2.3** illustrates the existing external drainage boundaries. The proposed conditions drainage boundaries and areas for the Subject Property are illustrated on **Figure 2.4.**

Table 2.4 below summarizes the FC Development flows and Proposed Development flows for various storm events at the downstream flow nodes. VO2 Modeling is provided in **Appendix C1**.

Table 2.4 FC Development and Proposed Development Flows at Downstream Nodes

Node	Node 867		Node 849		Node 868	
Watershed	**Bruce**		**Berczy**		**Confluence**	
Drainage Area (ha)	**3551.7**		**3043.2**		**6594.9**	
Storm Event Flows (12 hr AES)	**FC (m^3/s)**	**PROP (m^3/s)**	**FC (m^3/s)**	**PROP (m^3/s)**	**FC (m^3/s)**	**PROP (m^3/s)**
2 year	13.35	13.21	11.91	11.83	25.02	24.85
5 year	21.00	20.52	19.91	19.80	40.44	39.87
25 year	33.87	33.07	33.51	33.35	66.73	65.83
100 year	46.96	46.10	46.18	46.04	92.71	91.48

As shown in the above table there are no increases to the storm event flows at the downstream flow nodes under the Proposed Development scenario when compared to the FC Development scenarios. Flows are reduced between 0.3% to 2.4% indicating the proposed SWM Ponds are providing adequate quantity control for the proposed development.

2.6.3.2 VO2 - Regional Storm Event

As described in Section 1 of the 2001 MMM Report, early hydrologic models were prepared to estimate peak flow rates for large storm events for input into hydraulic models to calculate flood elevations and delineate floodplain limits. The QHROUGE modeling summarized therein analyzed various development scenarios including committed future growth, medium future growth, high future growth and very high future growth.

> "Finally in 1997, development was determined to have exceeded the level predicted in the High Growth model scenario, and the flows from the Very High Growth model were used to determine Regional floodline elevation through most of the Rouge River watershed."

The Very High Growth model was a predictive model but was not viewed as an accurate representation of the development conditions within the watershed at that time. Therefore MMM, completed updates to the hydrologic modeling. This included analyzing and comparing flows from various development scenarios including Existing Conditions (as of May 2000), FC Development, and Complete Development. FC Development included all existing and approved developments incorporated into the Official Plans (as of 2000). The Complete Development utilized the FC Development scenario and assumed the undeveloped headwater areas would be developed with 50% imperviousness cover. Regional Storm peak flows for all three scenarios were compared to each other as well as the peak flows used to delineate Regional floodlines in Hec-2 or HEC-RAS.

In all three modeling scenarios, the Subject Property was modelled as open space. Therefore, impacts resulting from future development of these lands were not previously assessed. As such, the latest V02 model has been obtained from TRCA to complete this assessment and determine if downstream Regional storm event flows are impacted and if mitigation is warranted.

The model obtained from TRCA is an updated version of the FC Development scenario from the 2001 MMM report. Land use areas in sub-catchments 201 (Berczy) and 210 (Bruce) have been updated to reflect the existing development of the surrounding lands including Angus Glen (to the north of the Subject Property), Berczy Village (east of Kennedy), Deacon Lands (16th and Kennedy), to create a 2016 Development scenario. The impervious percentages for this assessment utilized the same values as FC Development scenario from the 2001 MMM report for consistency.

The 2016 Development scenario model was then updated to include the proposed development within the Subject Property to create a Proposed Development scenario. For this assessment, only the impervious percentages for the proposed development areas followed the latest City standards, the existing developed areas continued to utilize the same values as FC Development scenario. None of these scenarios include any SWM controls, as is typical during a Regional Storm assessment. Refer to **Appendix C2** for changes to input parameters including imperviousness calculations and modeling results. **Table 2.5** compares sub-catchment peak flows and downstream node peak flows from the Existing Conditions scenario from the 2001 MMM Hydrology Update, the 2016 Development scenario, and the Proposed Development scenario, as well as peak flows used within the hydraulic model (HEC-RAS) for floodplain mapping.

Table 2.5 Regional Flow Comparison for Sub-Catchments and Nodes to Hydraulic Modeling Flows

	MMM 2001 Hydrology Update		Stantec Modelled Flows		
Catchments/Nodes	**Existing Conditions (2000) m^3/s**	**Complete Development (Full Watershed Build Out) m^3/s**	**2016 Development m^3/s**	**Proposed Development m^3/s**	**Hydraulic Model Flow (HEC-RAS) m^3/s***
Catchment 201	14.7	14.7	14.7	15.9	N/A
Catchment 210	23.9	23.9	25.3	30.5	N/A
849	173.1	176.8	173.3	172.4	182.9
867	201.6	205.9	200.3	196.7	213.5
868	374.7	382.7	373.6	369.1	378.0

Note:

* HEC-RAS flows appear to generally reflect FC Development Scenario Flows from 2001 MMM Report

As shown in **Table 2.5** above, there are minor increases to the Regional storm event flows for the individual sub-catchments 210 and 201 with the development of the Subject Property. However, the time to peak for these individual subcatchments is occurring faster than the upstream drainage areas, allowing these flows to pass through ahead of the upstream peak flow, without adding to or increasing the main peak flow. This difference in peak timing is shown in Table 2.5 by comparing Proposed Development scenario flows to the Existing Conditions (2000) and 2016 Development flows at the downstream nodes. There is a decrease in peak flows ranging from 0.3% to 2.3% with the proposed development of the Subject Property. In addition, the Proposed Development scenario flows are less than the Complete Development flows from the 2001 analysis (which assumed the headwater areas would be developed with 50% imperviousness cover) at the downstream node locations. These peak flows are also less than the flows currently used within HEC-RAS modelling to delineate floodplain mapping for the Rouge River and the existing downstream Flood Damage Centres. Downstream areas are not impacted by the Regional storm flows, resulting from development within the Subject Property, therefore further mitigation measures (i.e. Regional quantity storage and/or downstream improvements) are not warranted or recommended.

2.6.4 Hydrology Modeling PCSWMM

Updates to the Rouge River watershed hydrologic and hydraulic models have been undertaken by AMEC Foster Wheeler on behalf of TRCA and City of Markham. The modeling was completed using PCSWMM in a continuous mode utilizing continuous precipitation data over a 55 year period. The simulated annual peak flows are extracted from the continuous simulation output with the frequency analyses completed using the Log Pearson Type III Distribution. Details regarding the model setup, calibration and simulated peak frequency flows can be found within the *May 2017 AMEC Foster Wheeler North Markham Future Urban Area Berczy, Brice, Eckardt, and Robinson Creeks, City of Markham, Phase 2: Subwatershed Impact Assessment Report*. In general, the flows analyzed within the PCSWMM model were less than the VO2 model at the same node locations within the Rouge River watershed.

As requested by City of Markham additional modeling using PCSWMM is being undertaken to ensure that the proposed development will not impact the downstream flood damage centres.

2.6.4.1 PCSWMM – 2 to 100 Year

The approved PCSWMM modeling was obtained from City of Markham for this assessment. PCSWMM can analyze flows in a continuous and event based mode. The assessment provided within this report was completed in an event based mode using the 3 hour Markham Modified AES design storm distribution (for sizing SWM Ponds).

The existing conditions model provided was updated to reflect the existing drainage areas for the Subject Property, Pond H and the external drainage areas and land uses that drain to it. The revised existing conditions model was then updated to incorporate the proposed development of the Subject Property including the proposed land uses, drainage areas and four SWM Ponds.

Table 2.6 below summarizes the Revised Existing Conditions and Proposed Development flows and waterlevels at the downstream nodes utilizing PCSWMM for various storm events. PCSWMM Modeling input and output information and schematics are provided in **Appendix D1**, with digital modeling provided in **Appendix L**.

Table 2.6 2 to 100 Year Storm PCSWMM Flow Comparison at Downstream Nodes

Node	Node 171		Node 171		Node J5720.94		Node J5720.94	
Watershed	Confluence		Confluence		Confluence		Confluence	
Drainage Area (ha)	6405		6407		13359		13361	
Storm Event Flows (12 hr AES)	Existing Flow (m^3/s)	Existing Water Level (m)	Proposed Flow (m^3/s)	Proposed Water Level (m)	Existing Flow (m^3/s)	Existing Water Level (m)	Proposed Flow (m^3/s)	Proposed Water Level (m)
2 year	5.19	173.59	5.02	173.59	21.51	169.86	21.56	169.87
5 year	13.69	173.81	14.19	173.82	43.17	170.11	43.62	170.11
25 year	38.84	174.17	39.32	174.17	87.59	170.52	88.22	170.52
100 year	62.02	174.38	62.94	174.38	135.31	170.97	136.25	170.97

As shown in the above table there are minor increases to the storm event flows at the downstream flow nodes under the Proposed Development scenario when compared to the

Existing Development scenario. Although flows are increased between 0.7% to 3.7% the corresponding waterlevels only increase by 0.01m which is negligible.

2.6.4.2 PCSWMM – Regional Storm Event

The approved PCSWMM modeling was obtained from City of Markham for this assessment analyzing the Regional Storm event, which included an existing conditions model and Future Urban Area (FUA) model.

The existing conditions Regional Storm model provided was run for comparison with the proposed conditions model. The proposed conditions model utilized the Regional Storm FUA model and revised it to reflect the proposed development and land uses for the Subject Property as well as external drainage areas and land uses that are conveyed through the site to the Valley. The proposed SWM Ponds within the Subject Property were not included in this model as is typical for ponds that do not provide Regional storm control.

Table 2.7 below summarizes the Existing and Proposed Development PCSWMM flows for the Regional Storm at the downstream flow nodes. PCSWMM Modeling input and output information and schematics are provided in **Appendix D2**, with digital modeling provided in **Appendix L**.

Table 2.7 Regional Storm PCSWMM Flow Comparison at Downstream Nodes

Node	Node 171		Node 171		Node J5720.94		Node J5720.94	
Watershed	Confluence		Confluence		Confluence		Confluence	
Drainage Area (ha)	6405		6407		13359		13361	
	Existing Flow (m^3/s)	Existing Water Level (m)	Proposed Flow (m^3/s)	Proposed Water Level (m)	Existing Flow (m^3/s)	Existing Water Level (m)	Proposed Flow (m^3/s)	Proposed Water Level (m)
Regional Storm	295.47	175.30	293.95	175.30	609.18	173.47	605.13	173.45

As shown in the above table there are no increases to the flows at the downstream flow nodes under the Proposed Development scenario when compared to the Existing Development scenario, and no increases to the waterlevels.

Both the VO2 and PCSWMM modeling confirm that the downstream areas are not impacted by the uncontrolled Regional storm flows, resulting from development within the Subject Property. Therefore, further mitigation measures (i.e. Regional quantity storage and/or downstream improvements) are not warranted or recommended.

2.7 EROSION IMPACTS MODELING

In accordance with the Terms of Reference, an erosion analysis is required to evaluate the potential effects of development on erosion within the existing creeks on the Subject Property and to determine the appropriate erosion control measures for implementation within SWM Ponds. An erosion modeling methodology was discussed with TRCA staff and agreed to for implementation for the Subject Property. The extended detention storage and detention times are considered acceptable if the erosion threshold exceedances under post development conditions are within 5% of existing conditions. The agreed upon terms of reference for the erosion modeling is provided in **Appendix E**.

2.7.1 Model Setup

As discussed with TRCA, the Subject Property is located in a unique area within the watershed with the individual Subcatchments 201 (Berczy Creek) and 210 (Bruce Creek). Located in the mid-reach zone of the overall watershed, timing of flow from the upstream area relative to the subject individual subcatchment surface runoff plays an important role in the stream flows and resulting hydraulics. The size of the subcatchments in relation to the upstream drainage areas is also an important factor. Subcatchment 201 is 196.5 ha which represents 6.5 % of the area at node 849(Berczy Creek). Subcatchment 210 is 377.5 ha which represents 10% of the area at node 867 (Bruce Creek). The Subject Property represents only a portion of each of the subcatchments, further reducing the impacts from development on the stream flows and hydraulics.

The erosion modeling takes the existing and post development hydrographs from specific nodes in the event based VO2 modeling and analyzes the data through a Matlab-based software program. This program uses representative surveyed cross-sections of the active (bankfull) channel to assess the exceedance of the erosion threshold for each creek. The method is essentially an abbreviated continuous model of threshold exceedance undertaken for a finite time series (i.e., length of time generated for the 25 mm, 30 mm and 35 mm discrete storm events).

The event based VO2 Model provided by TRCA was used for the existing condition model. Within this model both subcatchments are partially developed with one lumped quantity control SWM Pond within Bruce Creek. The hydrograph from nodes 849 (Berczy Creek) and 867 (Bruce Creek) were used to represent the downstream end of each subcatchment (both of which are located just south of 16th Avenue).

The post development model described in Section 2.6.3 was run for the 25 mm, 30 mm, and 35 mm 4 hour storms to assess flows for a range of smaller storms, as well as the 5 year, 25 year and 100 year 12 hour AES storms. The SWM Ponds within the Subject Property were modeled with erosion control storage for the runoff from a 25 mm 4 hour storm detained over 24, 48 and 72 hours. The hydrographs at nodes 849 and 867 were taken from ten of the eighteen (18) scenarios modeled, and are provided in **Appendix E1**. Next a base flow component was added to each of these hydrographs as described in the Beacon *Fluvial Geomorphology Report* and the resulting hydrographs analyzed through the Matlab-based software program, to assess exceedance of the erosion threshold for each of the creeks. For the purposes of the MESP, existing to post flow conditions will be considered a match if post-development hours of exceedance are within 5% of the existing condition.

2.7.2 Erosion Criteria

A detailed fluvial geomorphic field assessment was completed for the Subject Property to determine the erosion thresholds for Bruce Creek and Berczy Creek. The details of this assessment are described in the Beacon Fluvial Geomorphology Report. The erosion threshold identified for Berczy Creek is 6.5 N/m^2 and for Bruce Creek is 9.6 N/m^2.

2.7.3 Modelling Results

The Beacon *Fluvial Geomorphology Report* summarizes the Matlab-based erosion threshold exceedance modeling results.

As discussed above, the extended detention controls within the SWM ponds do not have a significant impact on the magnitude of Berczy Creek and Bruce Creek flows however, the length of the detention time does have an effect. Based on the modeled results the recommended detention time for the 25 mm 4 hour storm is 48 hours for Bruce Creek and Berczy Creek.

2.7.4 Summary of Erosion Threshold Analysis

Based on the modeling work completed, there will be an increase in the exceedance of the erosion thresholds if no erosion control measures are implemented. However, the exceedances can be reduced to within 5% of the existing conditions through the implementation of extended detention storage of runoff from a 25 mm 4 hour storm over 48 hours for both Bruce Creek and Berczy Creek. Exacerbation of existing rates of erosion is not anticipated to increase as a result of the proposed development based on the results of the analysis. Therefore, negative impacts to channel form and function are not expected as a result of the proposed development.

2.8 CONCEPTUAL DESIGNS OF PROPOSED SWM FACILITIES

2.8.1 SWM Pond Design Criteria

The preliminary pond designs have been based on the criteria taken from the City of Markham Engineering Design Criteria March 2015, 'Section E' – Storm Drainage and Stormwater Management, as listed below. Additionally, the ponds have been designed in accordance with all applicable criteria outlined in the MOECC SWM Manual, March 2003.

2.8.1.1 Safety Criteria

- **Pond depth:** Provide enhanced vegetative barriers and 3.0 m wide flat terraces at approximately mid-depth for ponds with total depths of 6.0 – 9.0 m. Terraces may be integrated with maintenance access roads.
- **Slope grades**: Slopes to be varied between 3:1 to 7:1, however 3:1 slopes shall be avoided in areas expected to have greater exposure to the public, otherwise consideration of enhanced vegetative barriers and / or terracing shall be required.
- **Tableland buffer**: Minimum 2.0 m wide buffer between top of the slope and the edge of the ROW or the edge of the pathway.
- **Water edge treatment**: 7:1 terrace at permanent pool edge, 3.0 m wide either side of permanent pool.
- **Vegetative barriers**: Ponds within residential areas shall be provided with enhanced vegetative barriers.
- **Signage:** All wet ponds must have the information / warning signage shown in the Standard Drawings.
- **Safety equipment**: Provide, in areas with greater exposure to public and, as required by the Director of Engineering.
- **Clay liner**: Provide a minimum of 1.0 m thick compacted clay liner extended to the permanent pool or the seasonal high groundwater lever (whichever is higher) + 0.5 m.
- **Chain link fence**: Provide a 1.5 m high black vinyl chain link perimeter fencing along the property lines of residential, commercial, industrial or institutional lands where they abut a SWM facility block. Gates along fences shall not be allowed.

2.8.1.2 Maintenance Criteria

- **Maintenance roads:** Roads shall be constructed on a granular base, covered with grass and minimum topsoil, 4.0 m wide within a 5.0 m "no shrub / tree" zone, 2% cross-fall, 10% gradient with maximum 15% gradient.
- **Access to pond inlet/outlet:** Create routes, accessible by personnel and maintenance vehicles, to top and bottom of inlet and outlet structures.
- **Access to sediment forebay**: Grade of ramp shall be 10% with maximum 15% gradient maintenance access above permanent pool.
- **Sediment forebay bottom treatment**: 4.0 m wide ramp of adequate bearing capacity shall continue to the bottom of the permanent pool.

- **Vegetation**: Vegetation shall be native species requiring minimal maintenance and suited to variations in water levels experienced in ponds (i.e., see MOE guidelines). For pond depths < 6.0 m, basic slope landscaping shall contain grasses and shrubs of adequate density to discourage public access and geese.

2.8.1.3 SWM Pond Cleanout

It is recommended that the SWM Pond cleanouts (i.e., sediment removal) be completed through dredging operations or similar methodologies. Therefore, the proposed SWM pond grading designs have not included sediment decant areas.

2.8.2 SWM Pond 1

The preliminary grading plan for SWM Pond 1 is shown in **Figure 2.8**. A portion of the grading design for SWM Pond 1 includes filling within the shallow fringe of the Regional Floodplain. The pond grading matches the existing grades along the limit of the proposed pond block. Refer to Section 7.2 for the details on the Regional Floodplain cut and fill assessment in support of this grading design.

The toe of the pond berm will be located partially within the Regional floodplain. A review of the expected velocities along the toe of slope are less than 1 m/s which will is acceptable to retain vegetation. The berm should be designed by the geotechnical engineer in accordance with the current dam design guidelines with a clay core centre. Details to be provided at detailed design.

Based on the ground water table data collected to date, the normal water level is below the groundwater therefore a pond liner will be required along with perimeter subdrains (to be connected to the pond outlet headwall). Since the permanent pool is already within the groundwater table, the full 3.0 m permanent pool depth will be provided to satisfy MNR guidelines for release to Redside Dace streams. For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

2.8.2.1 Outfall Location

SWM Pond 1 is proposed to outlet to Bruce Creek outside of the meander belt and 30m buffer (the RSD habitat area) as shown on **Figure 2.8**. The outlet is set above the 100 Year flood elevation. Erosion protection details will be provided at detailed design.

2.8.2.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is

22, 896 m^3 (for the minor system drainage area of 146.82 ha), and the provided permanent pool volume in the pond is 72,347 m^3. Calculations are provided in **Appendix F**.

2.8.2.3 Erosion Control

Based on the erosion modeling work completed in Section 2.7 and the Beacon *Fluvial Geomorphology Report*, the extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 1 the extended detention volume in the pond is 24,857 m^3. Calculations are provided in **Appendix F**.

2.8.2.4 Quantity Control

The stage-storage-discharge characteristics of Pond 1 are summarized in **Table 2.8**. Calculations are provided in **Appendix F** and supporting modeling is provided in **Appendix C.**

Table 2.8 SWM Pond 1 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	179.50	72,347	0.0
Ext. Det.	0.216	180.18 (unrouted)	24,857 (unrouted)	0.196 (routed) 0.216(unrouted)
2 Year	0.85	180.28	28,630	0.227
5 Year	1.53	180.61	41,329	1.149
25 Year	2.83	181.06	59,450	2.695
100 Year	4.77	181.51	77,832	4.675

2.8.3 SWM Pond 2

The preliminary grading plan for SWM Pond 2 is shown in **Figure 2.9**. This pond will form the ultimate location of the SWM pond as noted in Section 2.4.1.2. The proposed pond block and all grading is outside of all the constraining limits of development.

Based on the ground water table data collected to date, the normal water level is below the groundwater therefore a pond liner will be required along with perimeter subdrains (to be connected to the pond outlet headwall). Since the permanent pool is already within the groundwater table, the full 3.0 m permanent pool depth will be provided to satisfy MNR guidelines for release to Redside Dace streams. For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

2.8.3.1 Outfall Location

SWM Pond 2 is proposed to outlet to Bruce Creek through the existing outlet HW (originally constructed for Pond H) located within the valley as shown in **Figure 2.9**. No modifications to this existing headwall are proposed.

2.8.3.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 2,149m^3 (for the 11.84 ha area), and the provided permanent pool volume in the pond is 6,082 m^3. Calculations are provided in **Appendix F**.

2.8.3.3 Erosion Control

Based on the erosion modeling work completed in Section 2.7 and the Beacon *Fluvial Geomorphology Report*, the extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 2 the extended detention volume in the pond is 2,123 m^3. Calculations are provided in **Appendix F**.

2.8.3.4 Quantity Control

The stage-storage-discharge characteristics of Pond 2 are summarized in **Table 2.9**. Calculations are provided in **Appendix F** and supporting modeling is provided in **Appendix C.**

Table 2.9 SWM Pond 2 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	181.50	6,082	0.0
Ext. Det.	0.018	181.96 (unrouted)	2,123 (unrouted)	0.016(routed) 0.018(unrouted)
2 Year	0.07	181.98	2,225	0.017
5 Year	0.12	182.28	3,830	0.040
25 Year	0.26	182.54	5,246	0.164
100 Year	0.43	182.80	6,776	0.356

2.8.4 SWM Pond 3

The preliminary grading plan for SWM Pond 3 is shown in **Figure 2.10**. The proposed pond block and all grading is outside of all the constraining limits of development.

Based on the ground water table data collected to date, the normal water level is above the groundwater table. If the permanent pool depth (minimum of 1.5m) is shallow enough to avoid interception with the groundwater table then a cooling trench and low flow augmentation would be required to satisfy MNR guidelines for release to Redside Dace streams. Otherwise the full 3.0 m permanent pool depth will be provided along with a pond liner and perimeter subdrains (to be connected to the pond outlet headwall). For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

A portion of the drainage area to SWM Pond 3 is unable to flow overland to the pond, therefore 100 year capture is required to collect and convey the major system flow to the pond.

2.8.4.1 Outfall Location

SWM Pond 3 is proposed to outlet to Bruce Creek outside of the meander belt and 30m buffer (RSD habitat area) as shown on **Figure 2.10**. The outlet is below the 100 Year flood elevation. Erosion protection details will be provided at detailed design.

2.8.4.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 4,097 m^3 (for the 22.8 ha minor system area), and the provided permanent pool volume in the pond is 10,497 m^3. Calculations are provided in **Appendix F**.

2.8.4.3 Erosion Control

Based on the erosion modeling work completed in Section 2.7 and the Beacon *Fluvial Geomorphology Report*, the extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 3 the extended detention volume in the pond is 4,172 m^3. Calculations are provided in **Appendix F**.

2.8.4.4 Quantity Control

The stage-storage-discharge characteristics of Pond 3 are summarized in **Table 2.10**. Calculations are provided in **Appendix F** and supporting modeling is provided in **Appendix C.**

Table 2.10 SWM Pond 3 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Actual Discharge (m^3/s)
NWL	0.0	176.5	10,497	0.0
Ext. Det.	0.036	177.09(unrouted)	4,172 (unrouted)	0.033 (routed) 0.036 (unrouted)
2 Year	0.13	177.16	4,773	0.049
5 Year	0.24	177.43	6,888	0.177
25 Year	0.49	177.80	9,974	0.461
100 Year	0.83	178.15	13,002	0.768

2.8.5 SWM Pond 4

The preliminary grading plan for SWM Pond 4 is shown in **Figure 2.11**. The proposed pond block and all grading is outside of all the constraining limits of development.

Based on the ground water table data collected to date, the normal water level is below the groundwater; therefore, a pond liner will be required along with perimeter subdrains (to be connected to the pond outlet headwall). Since the permanent pool is already within the groundwater table, the full 3.0 m permanent pool depth will be provided to satisfy MNR guidelines for release to Redside Dace streams. For construction of the SWM Ponds, temporary dewatering may be required for pond earthworks and liner installation. If appropriate, pond liners may be required to be designed to counteract any uplift forces.

Due to grading constraints, a small drainage area from "Street D" West will be piped directly into the main cell. The catch basins connected to this localized sewer could be outfitted with CB shields to provide quality treatment before release into the main cell of Pond 4.

2.8.5.1 Outfall Location

SWM Pond 4 is proposed to outlet to Berczy Creek outside of the meander belt and 30m buffer (RSD habitat area) as shown on **Figure 2.11**. The outlet is located at the toe of existing slope below the Regional water level elevation. Erosion protection details will be provided at detailed design.

2.8.5.2 Quality Control

Quality control is provided by the permanent pool within the pond based on the MOECC Enhanced Level of Protection criteria (80% TSS removal). The required permanent pool volume is 4,718 m^3 (for the 29.24 ha minor system area), and the provided permanent pool volume in the pond is 5,561 m^3. Calculations are provided in **Appendix F**.

2.8.5.3 Erosion Control

Based on the erosion modeling work completed in Section 2.7 and the Beacon *Fluvial Geomorphology Report*, the extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Pond 4 the extended detention volume in the pond is 4,982 m^3. Calculations are provided in **Appendix F**.

2.8.5.4 Quantity Control

As noted above quantity control for Pond 4 is not required other than extended detention (erosion control). The stage-storage-discharge characteristics of Pond 4 are summarized in **Table 2.11**. Calculations are provided in **Appendix F.** Supporting modeling is provided in **Appendix C1** has lumped the drainage area to SWM Pond 4 and to Infiltration Facility 1 into one total catchment to calculate the total storage required**.** The extended detention volumes were then separated for each facility based on the appropriate drainage area.

Table 2.11 SWM Pond 4 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
NWL	0.0	178.5	5,561	0.0
Ext. Det.	0.046	179.53	5,298	0.046

2.8.6 Infiltration Facility 1

Proposed Infiltration Facility 1 will be designed to treat the drainage from roof, lot and road areas (1.85 ha). The drainage enters the facility at the surface at curb cut locations and is filtered (pre-treated) by the landscaping as well as the engineered sand, soil, and organic filter medium prior to infiltration into the ground or release into the underdrain and ultimately the storm sewer. The filter media can be removed and replaced as required. Additional pre-treatment measures could be investigated at detailed design. Typical detail and cross section for Infiltration Facility 1 are provided on **Figure 2.5.**

2.8.6.1 Quality Control

Since the facility is designed to infiltrate flow and filter the water through the bioretention media, it will be providing quality treatment. In accordance with the MOECC SWMPD infiltration facilities are not required to provide permanent pool storage.

2.8.6.2 Erosion Control

Based on the erosion modeling work completed in Section 2.7 and the Beacon *Fluvial Geomorphology Report*, the extended detention recommendation is for the detention of runoff from a 25 mm storm over 48 hours. For Infiltration Facility 1 the extended detention volume in the facility is 316 m^3. Calculations are provided in **Appendix F**.

2.8.6.3 Quantity Control

As noted above quantity control for Infiltration Facility 1 is not required other than extended detention (erosion control). The stage-storage-discharge characteristics of Infiltration Facility 1 are summarized in **Table 2.12**. Calculations are provided in **Appendix F.** Supporting modeling is provided in **Appendix C1** has lumped the drainage area to SWM Pond 4 and to Infiltration Facility 1 into one total catchment to calculate the total storage required**.** The extended detention volumes were then separated for each facility based on the appropriate drainage area.

Table 2.12 Infiltration Facility 1 Stage-Storage-Discharge Characteristics

Event	Allowable Discharge (m^3/s)	Stage (m)	Storage (m^3)	Discharge (m^3/s)
Extended Detention	0.003	N/A	316	0.003

2.9 STORM SEWER SYSTEM

2.9.1 Storm Sewer Design Criteria

Design of the minor system (storm sewers) will be in accordance with the City of Markham and MOECC criteria, including the following:

- Inlet control devices shall only be used to control flow into the sewer to reduce 100 year HGL;
- Storm sewers designed based on Rational Method;
- Runoff coefficients will be as per City standards;
- Minimum storm sewer size shall be 300mm diameter;
- Minimum sewer pipe velocity: 0.60 m/s;
- Maximum sewer pipe velocity: 3.70 m/s;

- Minimum grade of sewer: 0.3%;
- First leg of sewer minimum grade of 1.0% and maximum grade of 3.0%;
- Minimum depth of sewer: 2.50 m road Centreline and sewer obvert to allow sufficient depth for foundation drains;
- Minimum sewer cover 1.2m to provide frost protection;
- Sewers 675 mm diameter and larger may be radius pipes;
- Maximum manhole spacing:
    - sewers 600 mm diameter or less: 120 m
    - sewers 675 mm diameter or greater: 170 m
- Minimum size of Foundation Drain Collectors: 200 mm diameter.

2.9.2 Internal Storm Sewer System

As per City of Markham standards, storm sewers within the Subject Property will be sized to capture and convey runoff for storm events up to and including the 5 year storm event. The storm sewers will then direct this runoff to the SWM ponds.

Flows in excess of the 5 year storm event will be routed overland within the right-of-way (ROW) and other designated overland flow routes. There are several locations where a 100 year capture pipe is required to collect and convey major system flows to the appropriate SWM pond. 100 year capture is proposed in some areas of the Subject Property to preserve existing trees at the property limit or within future park blocks.

Storm sewers are generally 3.0 m deep and range in size from 300 mm diameter pipe up to a 2100 x 3600 mm concrete box.

Figure 2.12 illustrates the proposed storm sewer network for the Subject Property including proposed drainage area divides, SWM facilities, and 100 year pipes.

2.9.3 Foundation Drain & Roof Leader Collectors

A foundation drain collector (FDC) network is required in areas where the storm sewer is not sufficiently low enough for basement drain foundation connections by gravity. The proposed FDC will collect cool clean water which can be directly released into the valley system through stone trenches.

Perforated RLC pipes are proposed to collect roof drainage and promote infiltration within the right-of-way below the road surface where appropriate separation from the groundwater table is provided (1 m).

In one location, a perforated RLC pipe will outlet into an FDC pipe, and is referred to as an FDRLC. This pipe outlets to wetland stone reservoir within the old golf course irrigation pond, just south of the proposed road crossing of Bruce Creek Valley.

Separate RLC pipes are proposed to collect clean water from 47 roof fronts with an estimated area of 0.307 ha as well 1.48 ha of roof area from the School Block 8E and roofs within Block 9E and 10E. Drainage will be released to a proposed enhancement ‘Area E’ located west of Street “D” East. A flow dispersal mechanism will be installed at the outfall of the RLC pipe prior to release of the flow into the open space area.

One small separate RLC pipe is proposed to collect clean water from the front half of the roofs along Street ‘B’ East. Total estimated area of 0.54 ha will be released to the Woodlot/Wetland (Feature 1) located within Block 1 west of Street “B” East. A flow dispersal mechanism will be installed at the outfall of the RLC pipe prior to release of the flow into the open space area.

Figure 2.13 illustrates the proposed FDC, RLC, and FDRLC as well as outlet locations. **Figure 2.14** illustrates the proposed FDC outfall detail.

2.9.4 Woodlot/Wetland (Feature 1)

An existing woodlot/wetland (Feature 1) exists in the north east corner of the Subject Property. A description of the feature and its form and function are provided in the Beacon *Natural Environment Report / Environmental Impact Study*. **Figure 2.15** illustrates the staked feature with buffers, the area of the feature, and the existing external drainage area to the feature.

Development is proposed within the existing drainage area to this feature. To ensure that this feature continues to receive runoff and maintain its form and function, a feature based water balance assessment has been completed as described in Section 2.10.3. The proposed drainage boundaries to the feature are also shown on **Figure 2.15**.

2.9.5 Right-of-Way Overland Flow Conveyance and Major System Outlets

As noted above flow in excess of the 5 year storm will be routed overland within the ROW to SWM ponds or to designated overland flow route outlets. There are several locations where 100 year capture is required to collect major system flows and direct them to the appropriate SWM pond. Some of the proposed 100 year capture locations are proposed to allow for tree preservation along the property line or within future park blocks, reduce overall fill requirements within the site, and ensure the overland flow does not exceed the available ROW capacity. At detailed design, the inlet capture locations should be designed assuming 50% blockage of capture grates, and storm sewers be sized to convey the 100 year peak flow without surcharging.

Figure 2.16 illustrates the proposed SWM ponds, proposed drainage boundaries, 100 year capture locations, designated overland flow route outlets and contributing areas.

As noted in Section 2.8.4.4, the 100 year peak flow from 6.0 ha of the drainage area to SWM Pond 3 will captured and piped to the pond.

2.10 WATER BALANCE ASSESSMENT

2.10.1 Overall Pre-Development Water Balance

An overall water balance assessment for the Subject Property has been completed as part of the *Hydrogeological Assessment and Water Balance Report*, prepared by R.J. Burnside Associates. This report includes the pre-development water balance assessment and estimated the annual volumetric infiltration, evapotranspiration, and runoff. **Table 2.13** summarizes the pre-development annual water balance volumes by watershed.

Table 2.13 Pre-Development Annual Water Balance Summary

	Estimated Annual Infiltration Volume (m^3/yr)	Estimated Annual Runoff Volume (m^3/yr)	Estimated Annual Evapotranspiration Volume (m^3/yr)
West Draft Plan – Berczy Creek	42,500	58,400	222,600
West Draft Plan – Bruce Creek	59,100	94,700	305,000
East Draft Plan-Bruce Creek	81,200	137,900	423,700
Total	182,800	291,000	951,300

2.10.2 Overall Post-Development Water Balance

A post development water balance assessment without mitigation was analyzed in the *Hydrogeological Assessment and Water Balance Report* to determine the annual volumetric infiltration, evapotranspiration, and runoff. The results of this analysis are provided in **Table 2.14**.

Table 2.14 Post Development Annual Water Balance Summary Without Mitigation

	Estimated Annual Infiltration Volume (m^3/yr)	Estimated Annual Runoff Volume (m^3/yr)	Estimated Annual Evapotranspiration Volume (m^3/yr)
West Draft Plan – Berczy Creek	24,900	158,400	117,700
West Draft Plan – Bruce Creek	49,500	161,150	232,300
East Draft Plan-Bruce Creek	43,700	346,200	206,500
Total	118,100	666,100	556,500

The implementation of LIDs on the Subject Property will improve annual volumetric infiltration and evapotranspiration under development conditions, and minimize the surplus in runoff. The proposed LID mitigation plan was prepared and a water balance assessment completed. The proposed mitigation plan recommends directing approximately 7.83 ha of the total available roof area of the proposed development to surface LID's (increased top soil, amended top soil, sideyard and backyard swales) and 9.13 ha of the total available roof area to subsurface LID's (infiltration galleries and infiltration facilities, perforated RLC under roads and enclave bioretention). The results of this analysis are provided in **Table 2.15**.

Table 2.15 Post Development Annual Water Balance Summary With Mitigation

	Estimated Annual Infiltration Volume (m^3/yr)	Estimated Annual Runoff Volume (m^3/yr)	Estimated Annual Evapotranspiration Volume (m^3/yr)
West Draft Plan – Berczy Creek	55,500	127,900	117,700
West Draft Plan – Bruce Creek	80,700	130,400	232,200
East Draft Plan- Bruce Creek	61,900	327,300	207,200
Total	198,100	585,600	557,100

In summary, the proposed mitigation plan will infiltrate108% of the pre-development annual infiltration volume for the Subject Property (overall site wide water balance), which is broken down into an increase of 34% for the West Draft Plan and a decrease of 24% for the East Draft Plan. These results indicate that the proposed mitigation plan can satisfy the 'best efforts' approach to matching the targets.

The proposed LID mitigation plan recommends directing roof areas to surface and subsurface LID's. The *Hydrogeological Assessment and Water Balance Report* establishes a unit target by setting a required depth of rain to be captured from roof tops throughout the year and infiltrated to achieve the site wide water balance. **Table 2.16** summarizes the infiltration rate targets by land use from the *Hydrogeological Assessment and Water Balance Report*.

Table 2.16 Summary of Post-Development Infilration Targets

Land Use	Estimated Post-Development Infiltration Volume (mm/Imp ha/year)	Estimated Post-Development Infiltration Volume (mm/Imp ha/year)	Estimated Post-Development Infiltration per Available LID Roof Area (mm/Imp ha/event)
East Draft Plan			
Residential – Single Detached/Laneway Homes	106	2	8
Residential – Town Homes	110	2	25
Residential – Medium Density	113	2	4
School	110	2	6
West Draft Plan – Berczy Creek			
Residential – Single Detached/Laneway Homes	106	2	3
Residential – Town Homes or Laneway Homes	110	2	3
Mixed Use & Residential – Medium Density	113	2	2
West Draft Plan – Bruce Creek			
Residential – Single Detached/Laneway Homes	106	2	3
Residential – town Homes or Laneway Homes	110	2	9
Mixed Use & Residential – Medium Density	113	2	3

Figure 2.17 illustrates the post development water balance mitigation plan. This figure includes the layout of the perforated RLC pipes and infiltration galleries, and specifies which roofs are connected to these systems. In addition, the plan specifies lots where the roofs are directed to surface LIDs.

2.10.3 Woodlot/Wetland (Feature 1) Pre-Development Water Balance

Based on the available survey information, it appears that the wetland component of the feature is comprised of several small disconnected shallow depressions (hummocky in nature) on a slope at the west edge of the woodlot (Feature 1). In general, these depressions are approximately 25 m^2 each in area with depths ranging 0.1 to 0.3m, with a total overall estimated volume of 90 m^3 of surface storage. The majority of these shallow depression areas will hold some runoff which may infiltrate or evaporate. Once filled, any runoff will sheet flow west overtop of the adjacent golf course fairway. Some of the runoff from these shallow depression areas may drain through the existing 600 mm diameter concrete culvert under the access road for the existing trunk storm and sanitary pipes, and through the downstream tile drain located under the fairway.

A feature based annual water balance assessment was undertaken for the woodlot/wetland (Feature 1). This assessment calculated the annual volumetric infiltration, evapotranspiration, and runoff conditions under existing conditions based on the pre-development drainage area to the feature. The results are provided in provided in **Table 2.17**.

Table 2.17 Pre-Development Conditions Annual Water Balance Summary to Woodlot/Wetland (Feature 1)

	Woodlot/Wetland (Bruce Creek)
Total Estimated Annual Runoff Volume (m^3/yr)	8,700
Total Estimated Annual Evapotranspiration Volume (m^3/yr)	40,000
Total Estimated Annual Infiltration Volume (m^3/yr)	8,000

2.10.4 Woodlot/Wetland (Feature 1) Water Balance Mitigation

As discussed in Section 2.9.4.1, a portion of the existing external drainage boundary to the feature is to be developed into lots and roads, a post development water balance assessment was undertaken to ensure that surface runoff to the feature is maintained under the developed condition, and ensure infiltration total is maintained to the extent feasible.

A review of the monitoring data gathered in 2017 in the R.J Burnside Hydrogeological Report, indicates a small interflow (groundwater) contribution to this feature. Based on past discussions with TRCA staff, it was agreed that if groundwater contributions to this feature were found that a more detailed feature based water balance assessment may not be necessary as the feature was not solely surface fed. As such, the feature based water balance assessment previously completed as part of the 2016 MESP, is considered suitable and has been updated to reflect the revised draft plan and mitigation plan.

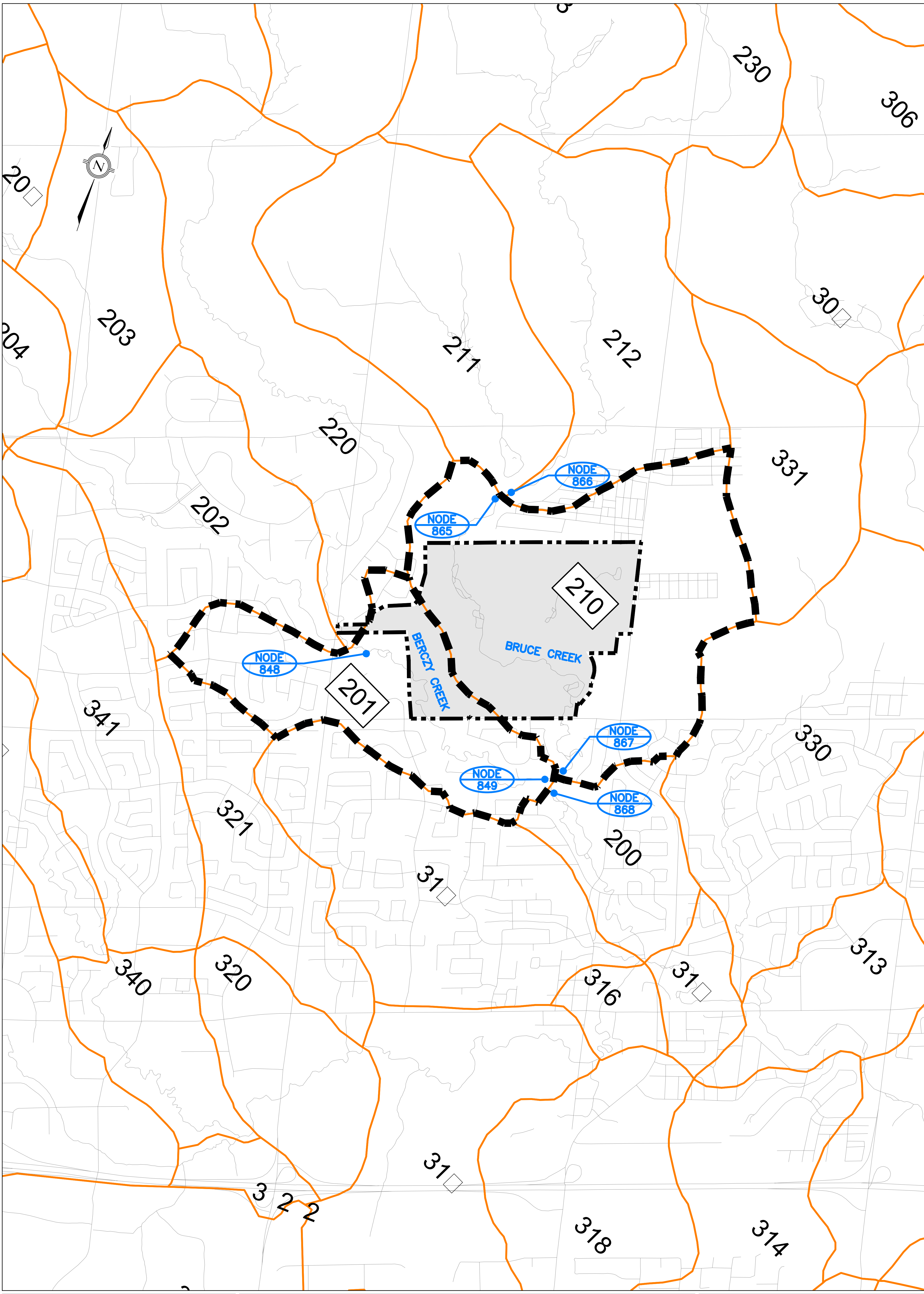
The proposed feature will be buffered (regulated buffers plus additional green space in some areas), allowing for additional infiltration and runoff from the buffers to be directed to the feature. Backyard drainage from lots adjacent to the woodlot/wetland (Feature 1) will sheet flow to the feature. In these select lots, the majority of the roof drainage will be directed to the surface where amended soils are proposed within the backyard, to improve infiltration and mimic interflow (groundwater) conditions. Lot and roof runoff will also sheet flow to the feature.

As discussed in Section 2.9.3 one small separate RLC pipe is proposed to collect clean water from the front half of roofs along Street 'B' East and release to the Woodlot/Wetland (Feature 1) where a flow dispersal mechanism will be installed at the outfall prior to release of the flow into the open space area. The existing and proposed drainage boundaries to the feature are shown on **Figure 2.14.** The results of the post development water balance assessment with mitigation along with the deficits and surplus are provided in **Table 2.18.**

Table 2.18 Post Development Conditions Annual Water Balance Summary with Mitigation to Woodlot/Wetland (Feature 1)

	Woodlot/Wetland (Bruce Creek)
Total Estimated Annual Runoff Volume (m^3/yr)	9,300
Total Estimated Annual Evapotranspiration Volume (m^3/yr)	31,900
Total Estimated Annual Infiltration Volume (m^3/yr)	7,800

In summary, the proposed mitigation plan is able to achieve 106% of the annual runoff volume and provide enough infiltration volume to maintain the pre-development volume to the feature minimizing impacts.



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 250 500 750 1000 1250
1:25000

Legend

SUBJECT PROPERTY

320 SUBCATCHMENT NODE ID

SUBCATCHMENT BOUNDARY

SUBCATCHMENT BOUNDARY OF INTEREST

NODE 867 FLOW NODE

MAPPING SOURCE:
SUBWATERSHED BOUNDARY MAPPING PROVIDED BY TRCA IN 2016.

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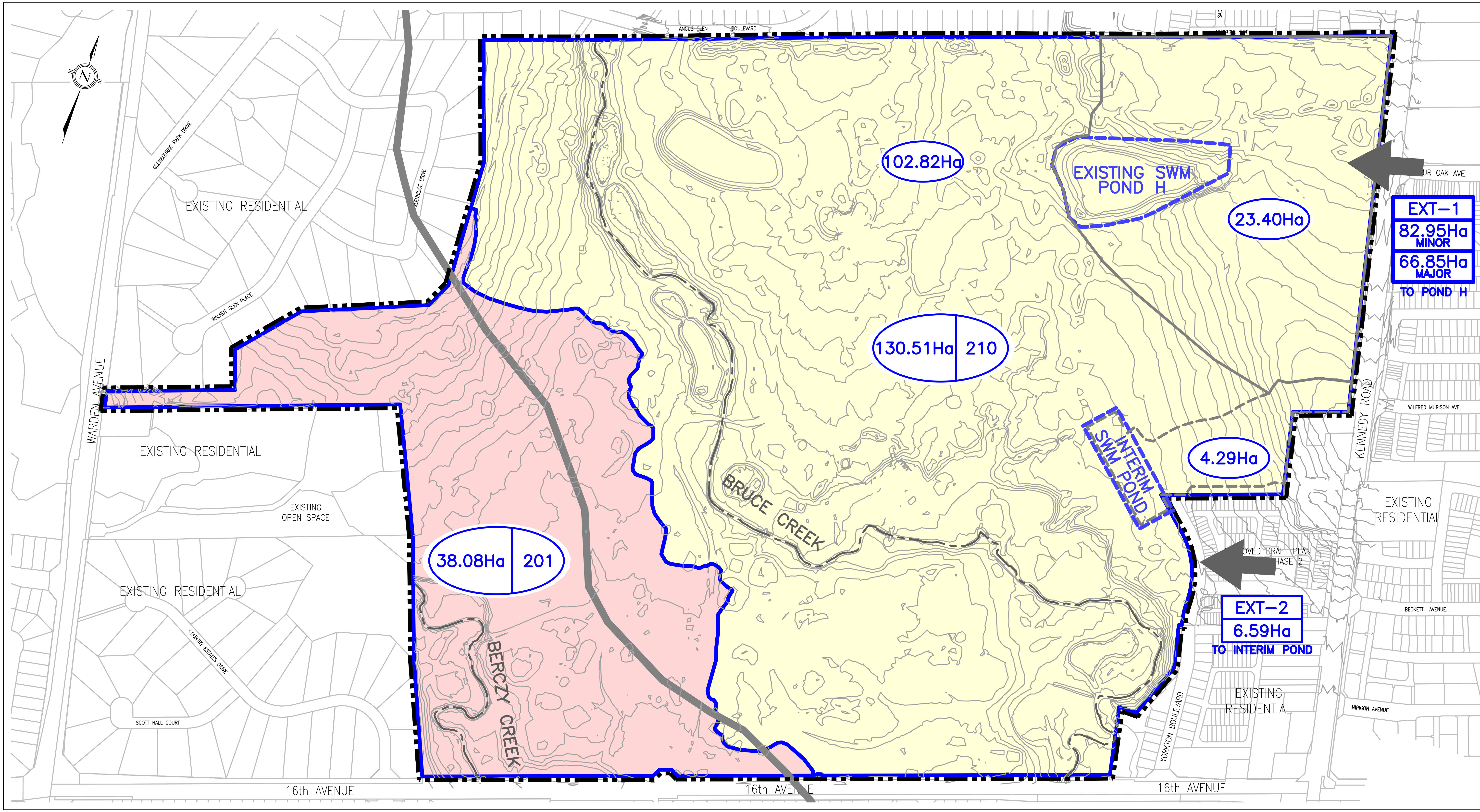
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 2.1

ROUGE RIVER HYDROLOGY MODEL (V02)
CATCHMENT BOUNDARIES & FLOW NODES

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.7 – Hydrology Catchment Boundaries and Flow Nodes.dwg – Revised by <Overholt, Alysse> – Wed, Oct 18, 2017 , 9:30 AM



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

1:6000 0 60 120 180 240 300

Legend

- SUBJECT PROPERTY
- EXISTING SUBWATERSHED DRAINAGE BOUNDARY
- EXISTING POND BLOCKS
- EXTERNAL FLOW
- EXT–1 82.95Ha TO POND H — EXTERNAL DRAINAGE AREA
- 130.5Ha 210 — SUBWATERSHED DRAINAGE AREA FROM SUBJECT PROPERTY; SUBWATERSHED ID
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO EXISTING POND H
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO INTERIM SWM POND
- 2001 MMM SUBWATERSHED DIVIDE
- 29.9Ha — SUBCATCHMENT DRAINAGE AREA

MESP
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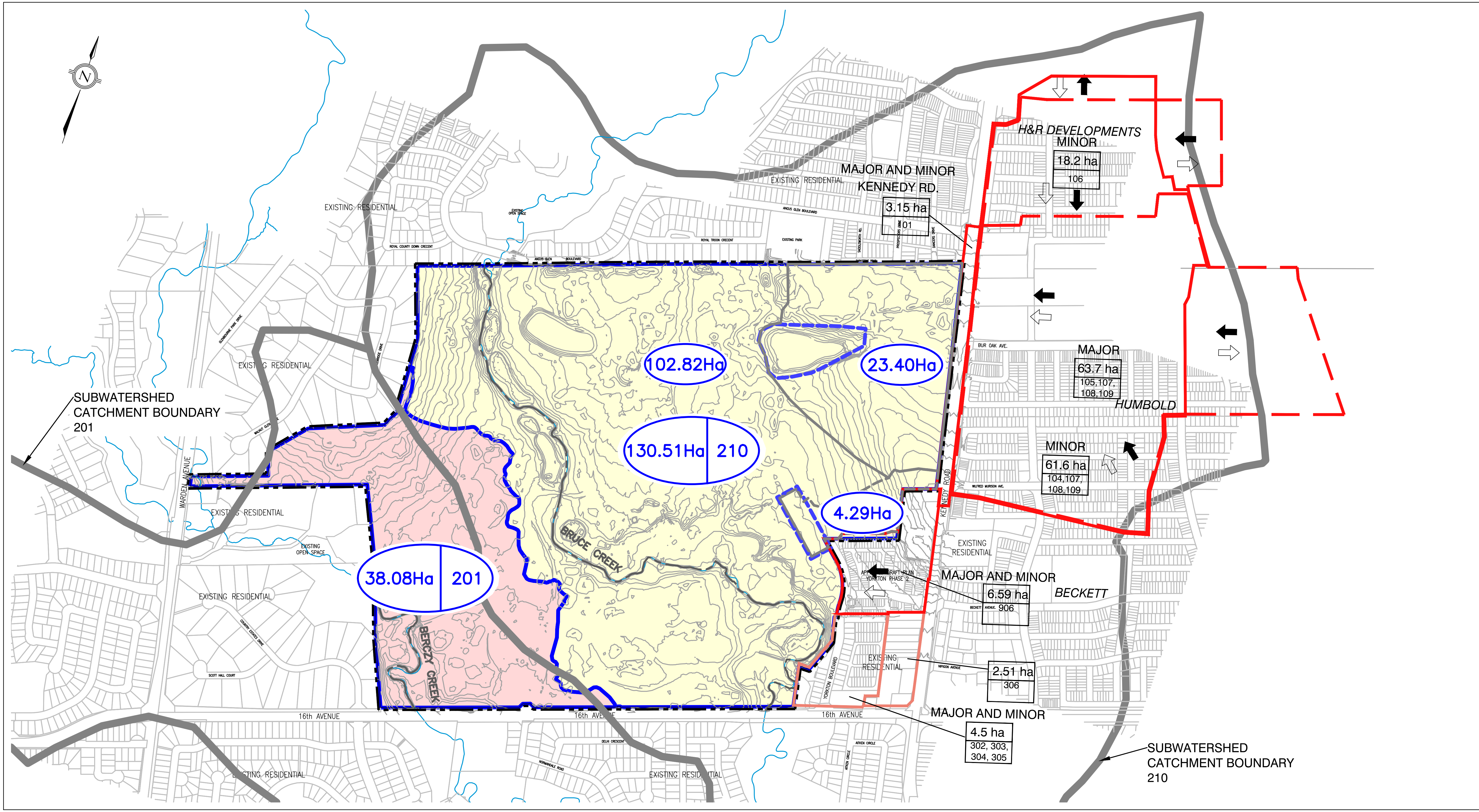
RESIDENTIAL DEVELOPMENT

FIGURE 2.2

EXISTING STORM DRAINAGE BOUNDARIES

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.1 to 2.2 – Storm.dwg – Revised by <Guerriero, Michael> , Wed, Oct 04, 2017 , 10:47 AM



Stantec
BEACON ENVIRONMENTAL
BURNSIDE
SCALE 1:10000

Legend

- SUBJECT PROPERTY
- EXISTING SUBWATERSHED DRAINAGE BOUNDARY
- EXISTING POND BLOCKS
- MINOR SYSTEM DRAINAGE FLOW ARROW
- MAJOR SYSTEM DRAINAGE FLOW ARROW
- 61.6 ha — EXTERNAL DRAINAGE AREA
- 104,107, 108,109 — VO2 CATCHMENT NUMBER
- 130.5Ha — SUBWATERSHED DRAINAGE AREA FROM SUBJECT PROPERTY
- 210 — SUBWATERSHED ID
- EXTERNAL DRAINAGE BOUNDARY
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO EXISTING POND H
- SUBJECT PROPERTY DRAINAGE BOUNDARY TO INTERIM SWM POND
- 2001 MMM SUBWATERSHED BOUNDARY
- DEACON & DEACON EXT. LANDS DRAINAGE AREA
- 29.9Ha — SUBCATCHMENT DRAINAGE AREA

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FIGURE 2.3

EXISTING EXTERNAL STORM DRAINAGE BOUNDARIES

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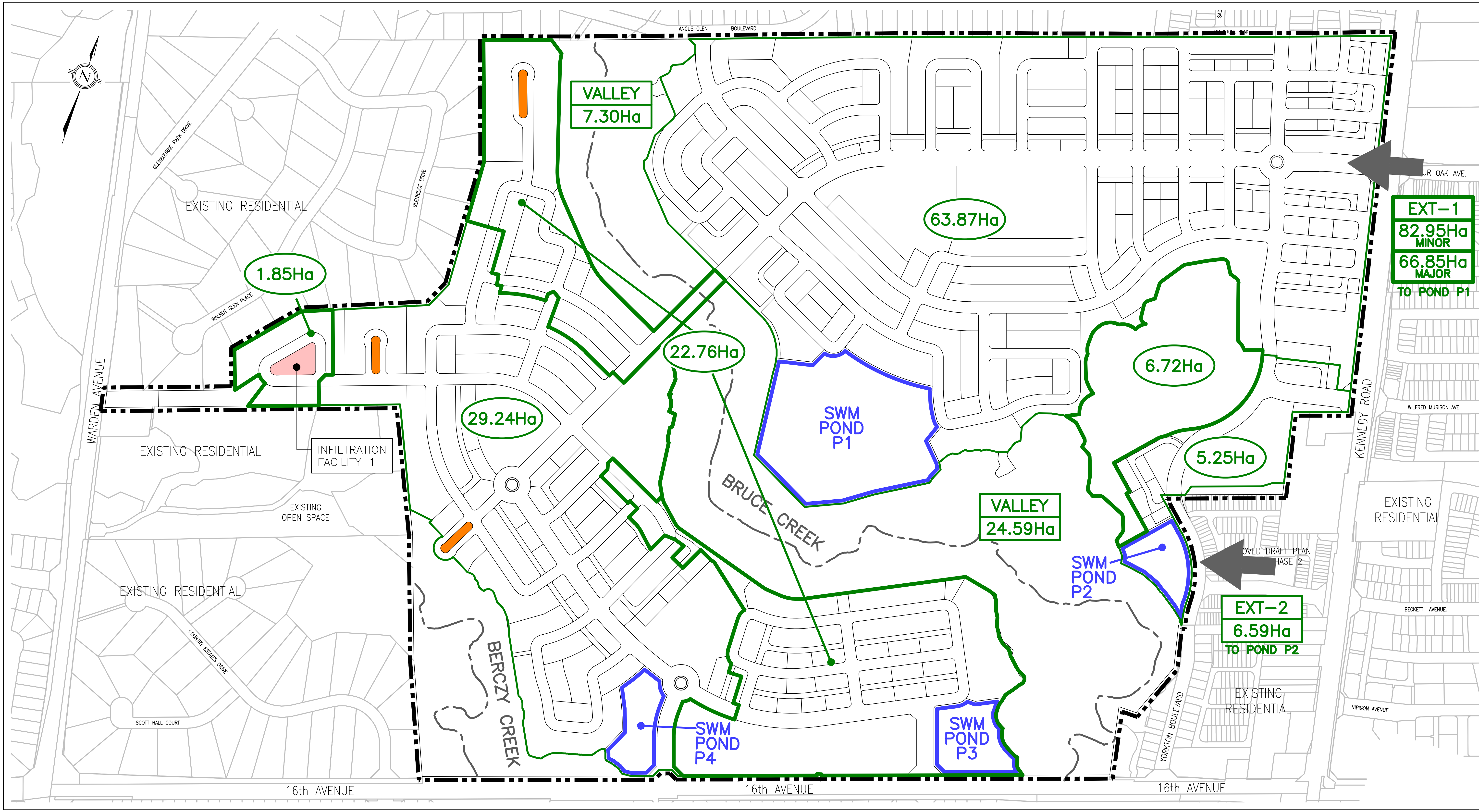
File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.1ext_Storm.dwg – Revised by <Guerriero, Michael>, Wed, Oct 04, 2017, 11:15 AM



Stantec

BEACON ENVIRONMENTAL

BURNSIDE

1:6000 0 60 120 180 240 300

Legend

SUBJECT PROPERTY

PROPOSED STORM DRAINAGE BOUNDARY

PROPOSED POND BLOCKS

EXTERNAL FLOW

INFILTRATION FACILITY 1

ENCLAVE BIORETENTION

VALLEY 24.59Ha — VALLEY DRAINAGE AREA

29.9Ha — DRAINAGE AREA

EXT–1 82.95Ha TO POND P1 — EXTERNAL DRAINAGE AREA

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FIGURE 2.4

PROPOSED STORM DRAINAGE BOUNDARIES

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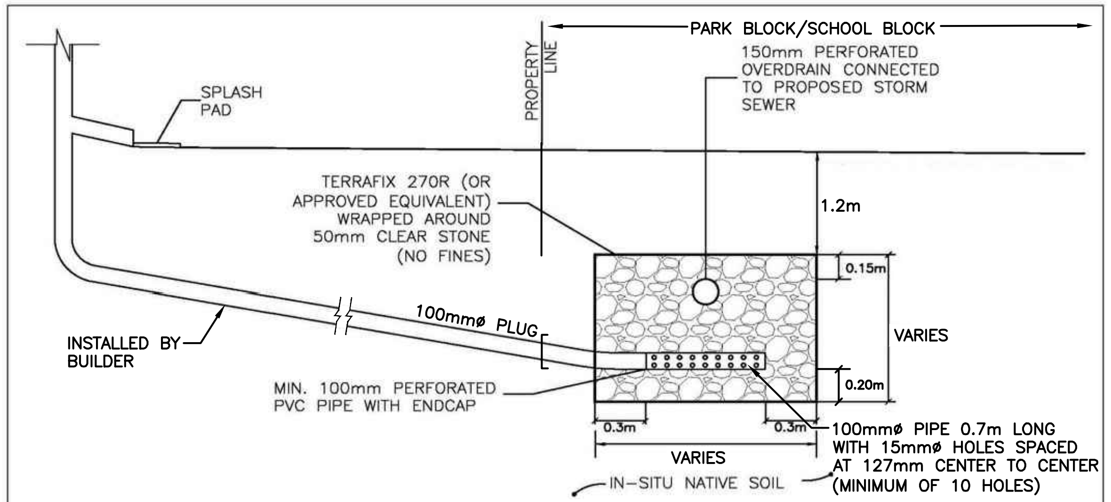
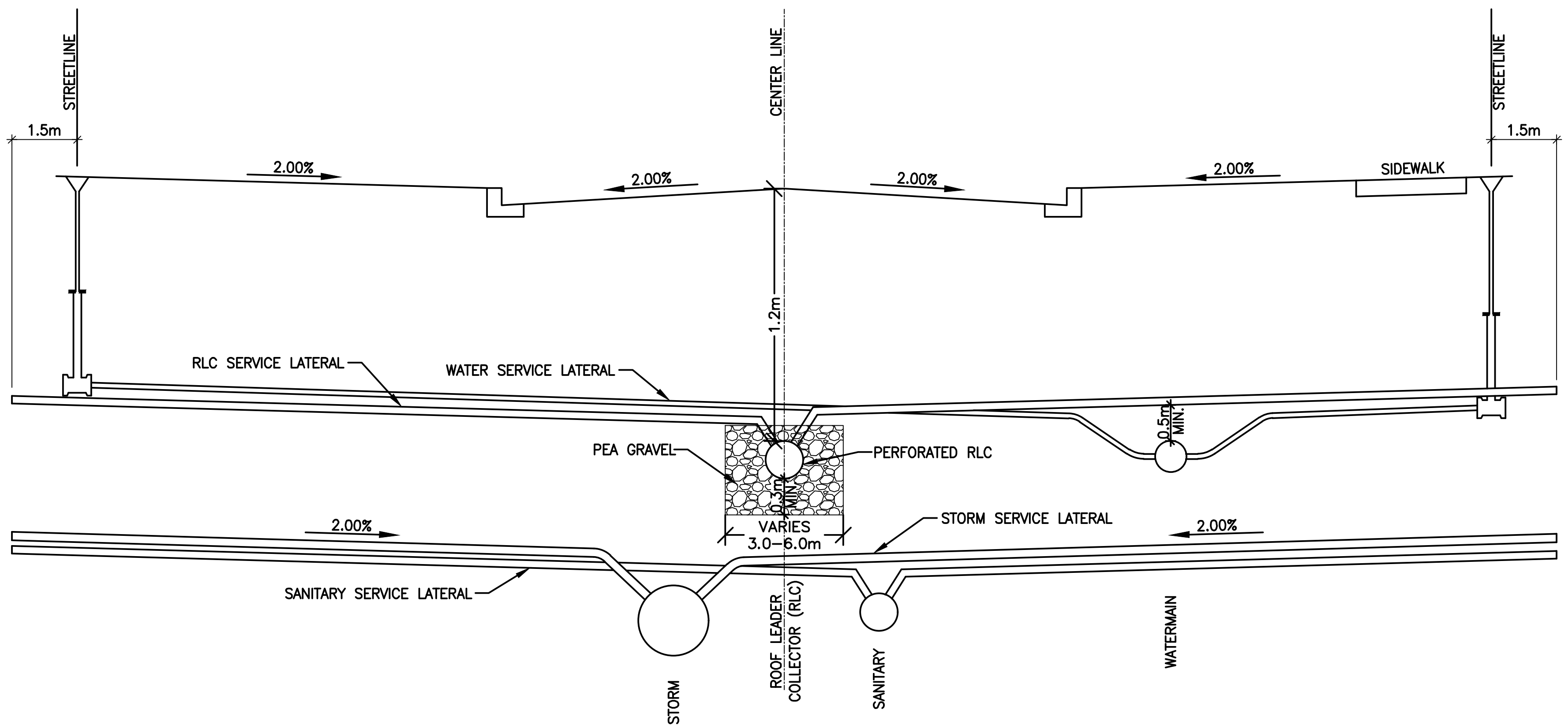
File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.1 to 2.2 - Storm.dwg - Revised by <Querriero, Michael> , Wed, Oct 04, 2017 , 11:04 AM



INFILTRATION GALLERY DETAIL

N.T.S.



PERFORATED RLC & TYPICAL SERVICE LATERALS

N.T.S.

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

Legend

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FIGURE 2.5

LOT LEVEL INFILTRATION & ROOF LEADER CONNECTION DETAILS

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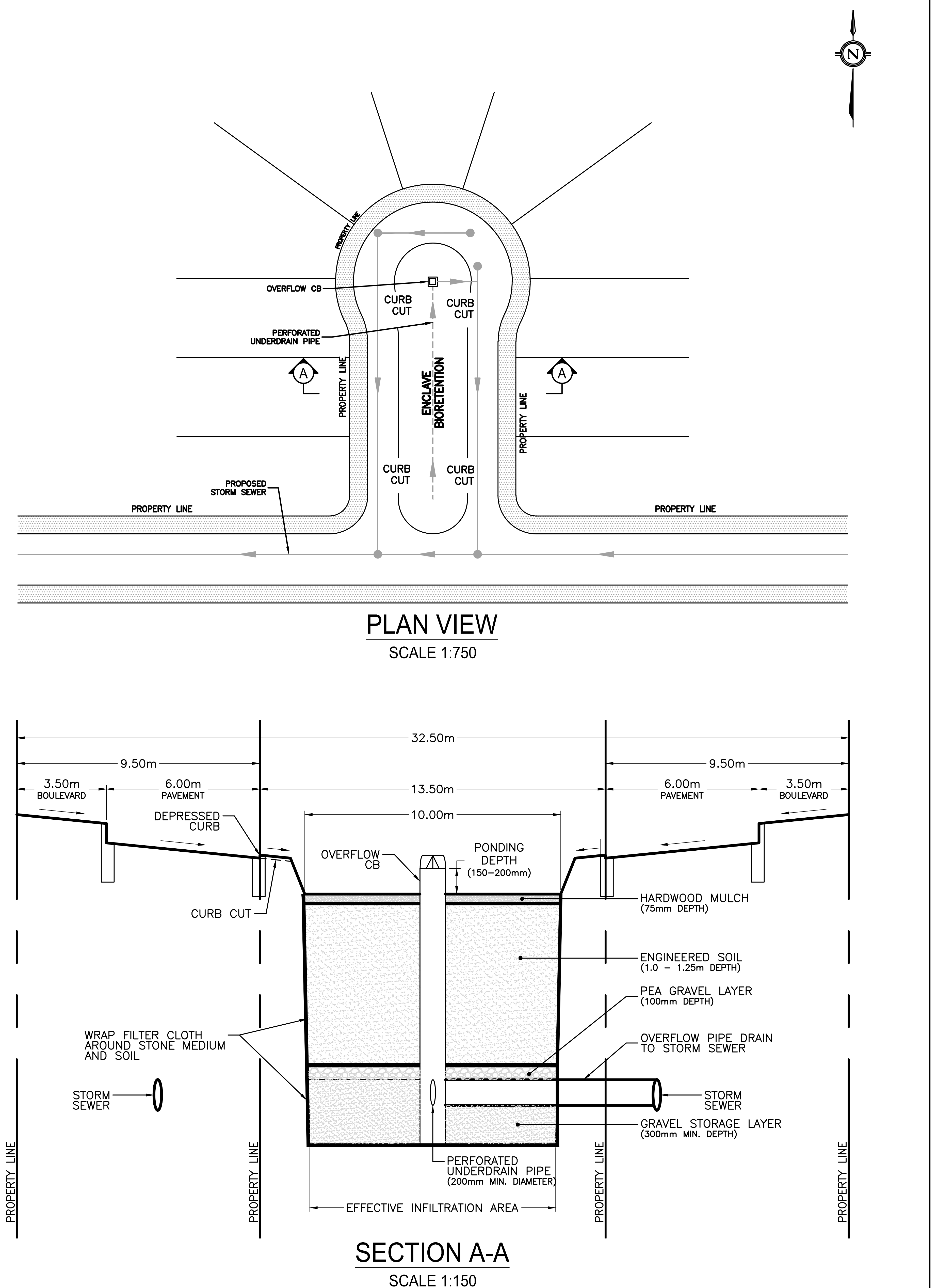

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

Legend

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FIGURE 2.6

ENCLAVE BIORETENTION DETAILS

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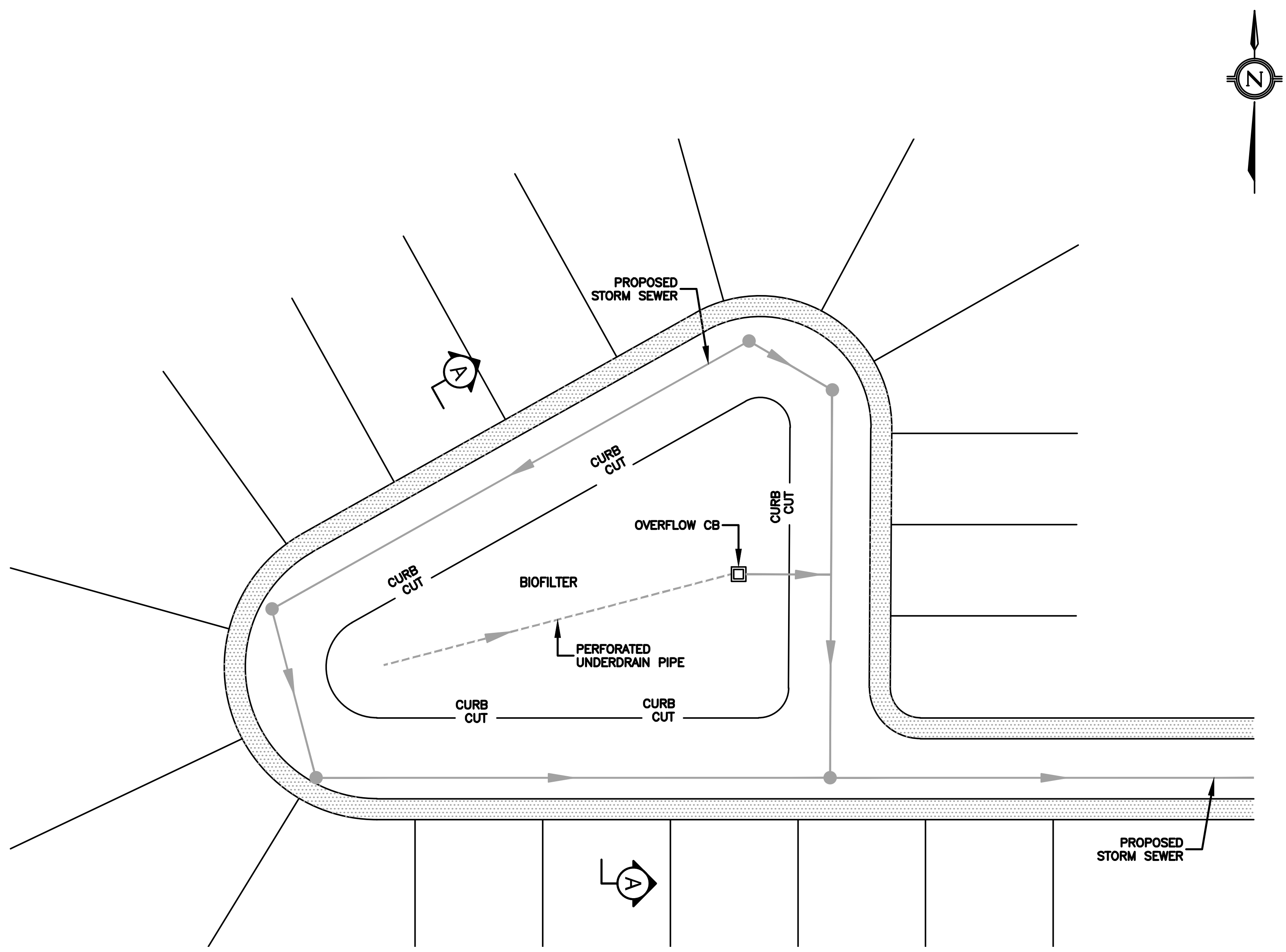
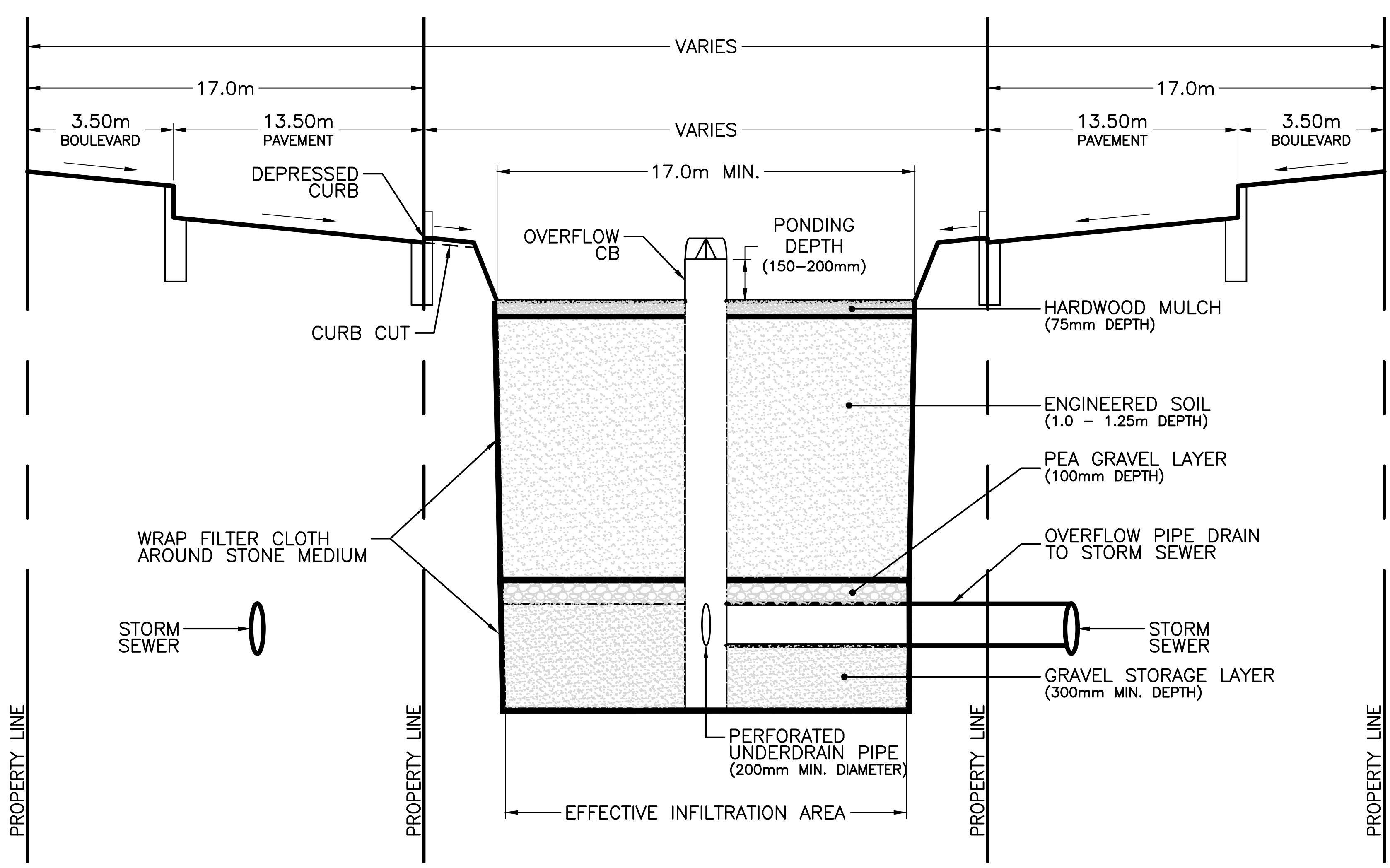
File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.4 to 2.5 – Enclave Details.dwg – Revised by <Guerriero, Michael> , Wed, Oct 04, 2017 , 11:24 AM



PLAN VIEW

SCALE 1:1000



SECTION A-A

NOT TO SCALE

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

Legend

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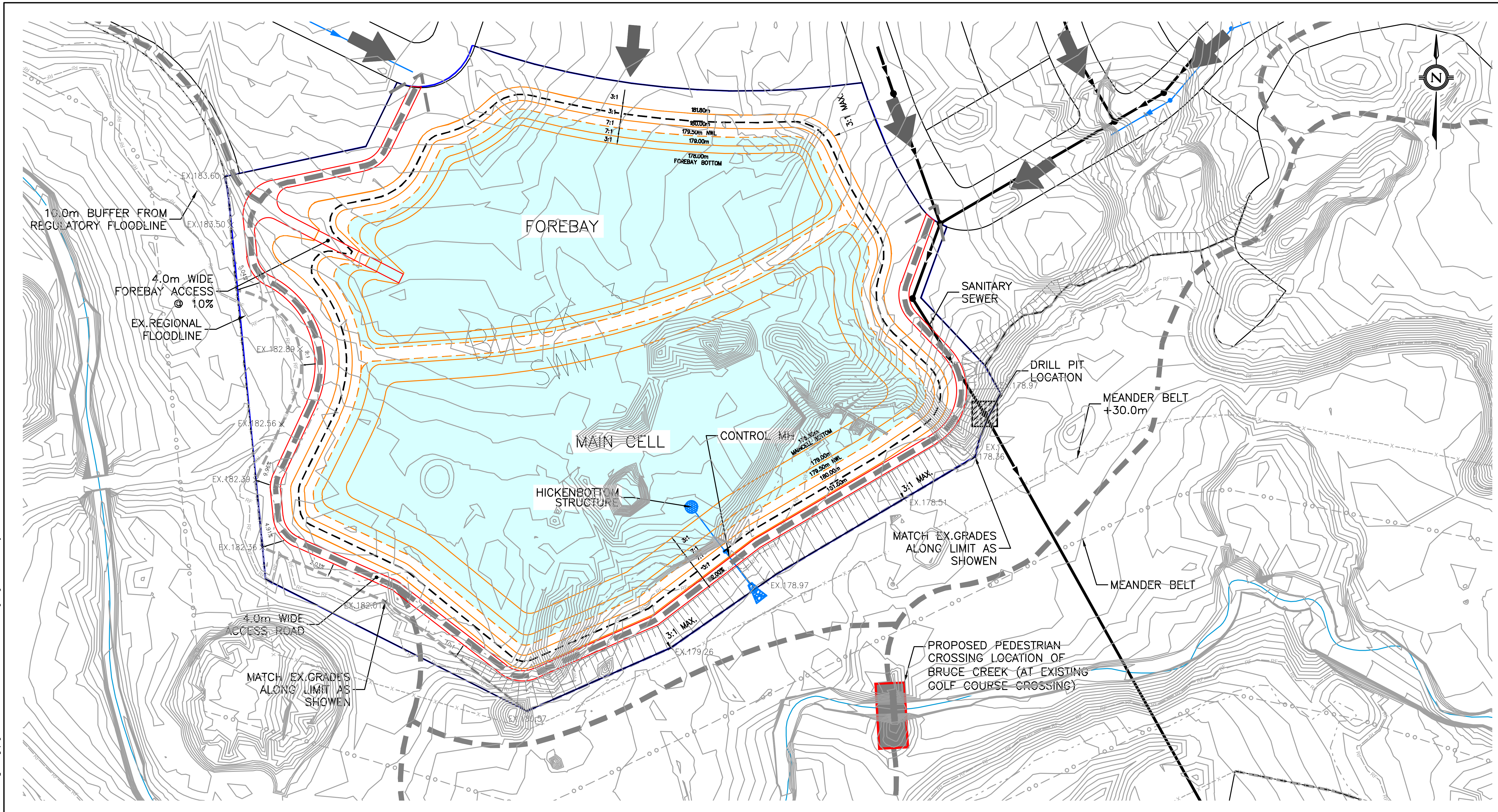
FIGURE 2.7

INFILTRATION FACILITY 1 DETAILS

October 2017



File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.8 to 2.11 – SWM Pond Grading.dwg – Revised by <Luk, James> , Fri, Oct 13, 2017 , 12:45 PM

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 15 30 45 60 75
1:1500

Legend

- POND BLOCK LIMIT
- SANITARY SEWER
- STORM SEWER
- PROPOSED SUBDRAIN
- EX.182.65 EXISTING ELEVATION
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- CONCEPTUAL TRAIL
- LIMIT OF GRADING (MATCH EXISTING GROUND)

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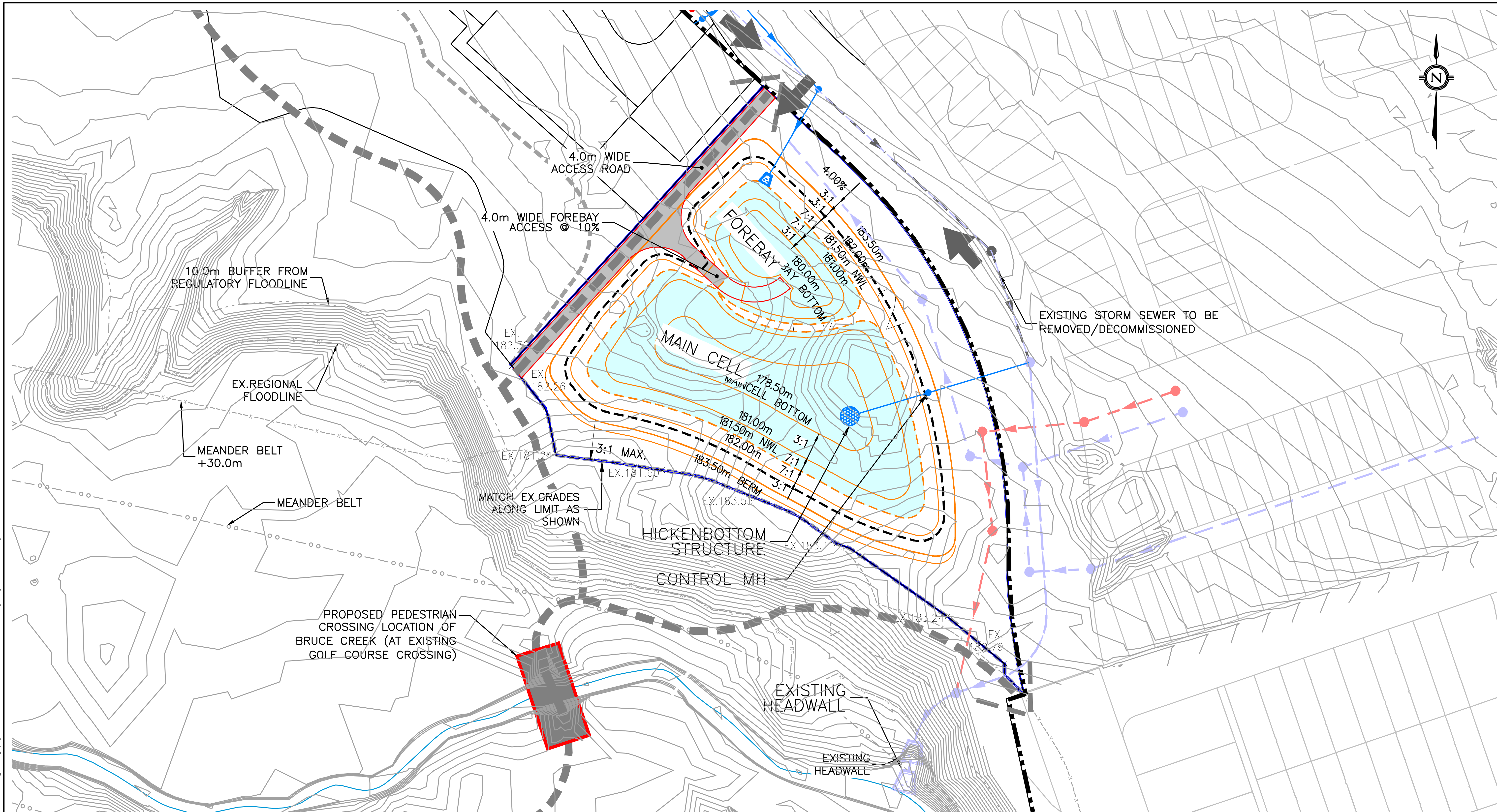
FIGURE 2.8

SWM POND P1
GRADING PLAN

October 2017



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

1:1000 0 10 20 30 40 50

Legend

- SUBJECT PROPERTY
- POND BLOCK LIMIT
- STORM SEWER
- EXISTING STORM SEWER (TO REMAIN)
- EXISTING FDC SEWER
- EX.182.65 EXISTING ELEVATION
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- PROPOSED SUBDRAIN
- CONCEPTUAL TRAIL
- LIMIT OF GRADING (MATCH EXISTING GROUND)

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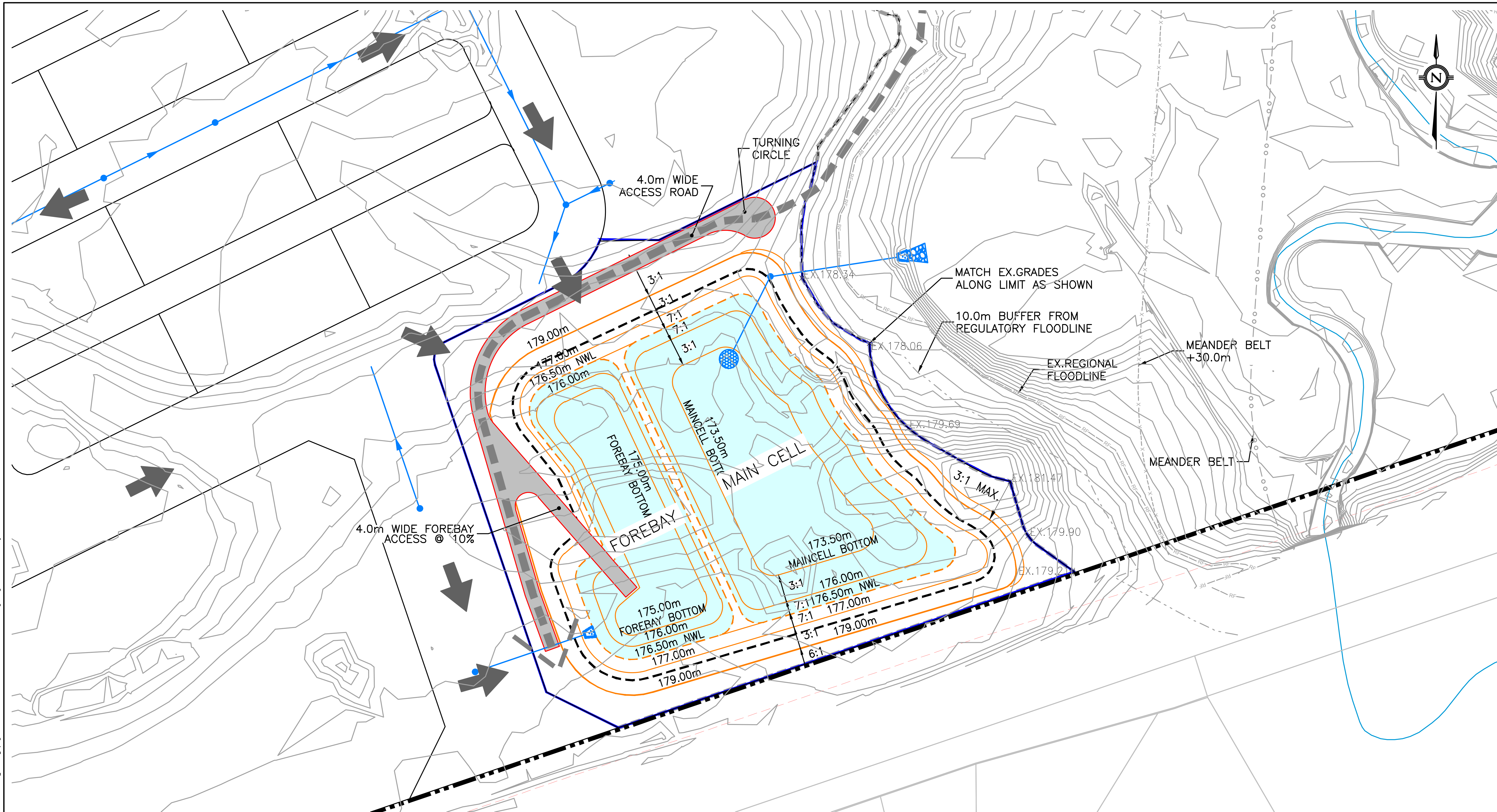
FIGURE 2.9

SWM POND P2
GRADING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.8 to 2.11 – SWM Pond Grading.dwg – Revised by <Luk, James> , Fri, Oct 13, 2017 , 12:45 PM



Legend

POND BLOCK LIMIT	PERMANENT POOL
STORM SEWER	ACCESS ROAD
PROPOSED SUBDRAIN	MAJOR OVERLAND FLOW DIRECTION
EX.182.65 EXISTING ELEVATION	CONCEPTUAL TRAIL
	LIMIT OF GRADING (MATCH EXISTING GROUND)

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 10 20 30 40 50
1:1000

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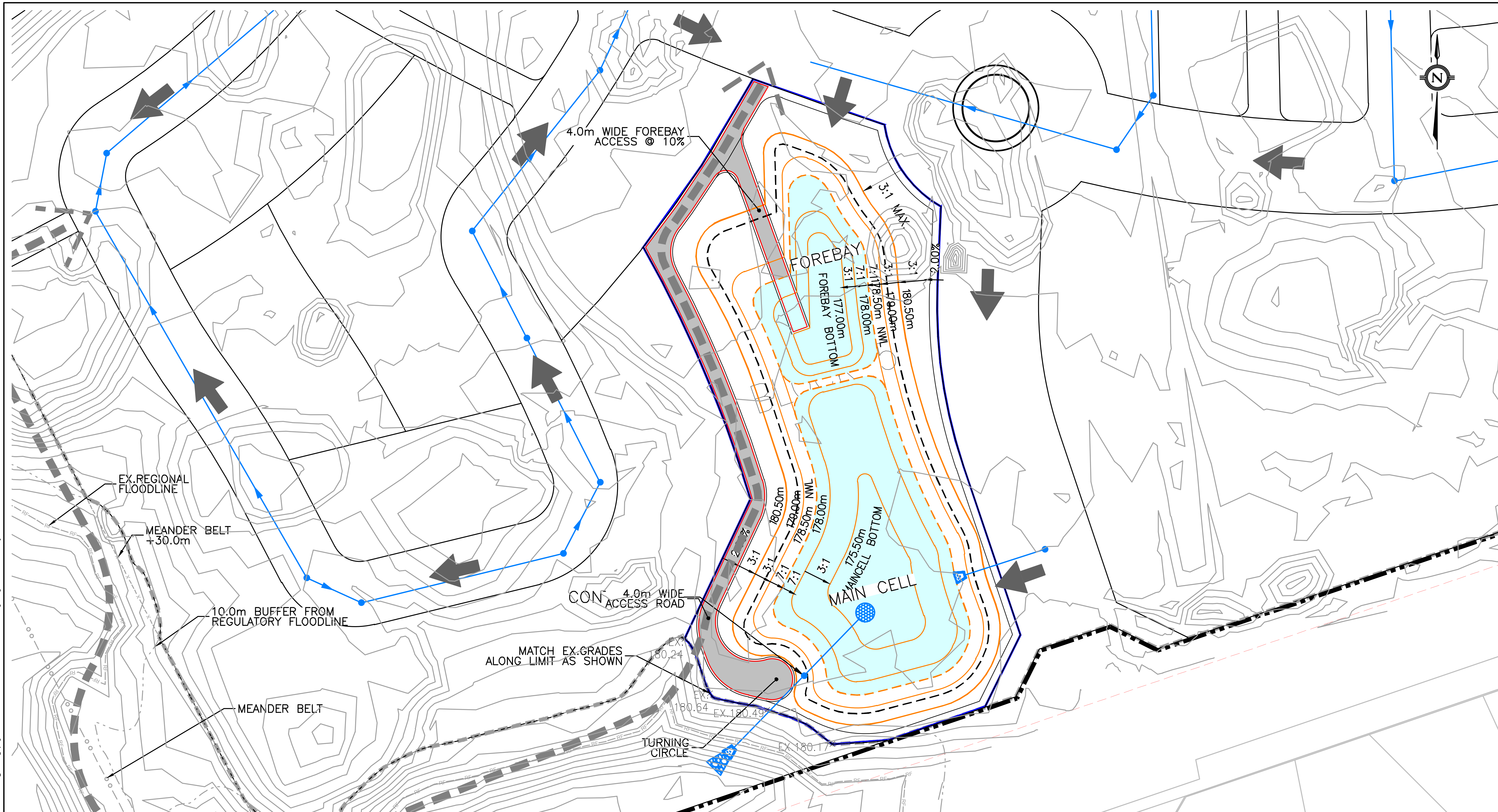
FIGURE 2.10

SWM POND P3
GRADING PLAN

October 2017



Stantec

BEACON ENVIRONMENTAL

BURNSIDE

0 10 20 30 40 50

1:1000

Legend

- SUBJECT PROPERTY
- POND BLOCK LIMIT
- STORM SEWER
- PROPOSED SUBDRAIN
- EX.182.65 EXISTING ELEVATION
- PERMANENT POOL
- ACCESS ROAD
- MAJOR OVERLAND FLOW DIRECTION
- CONCEPTUAL TRAIL
- LIMIT OF GRADING (MATCH EXISTING GROUND)

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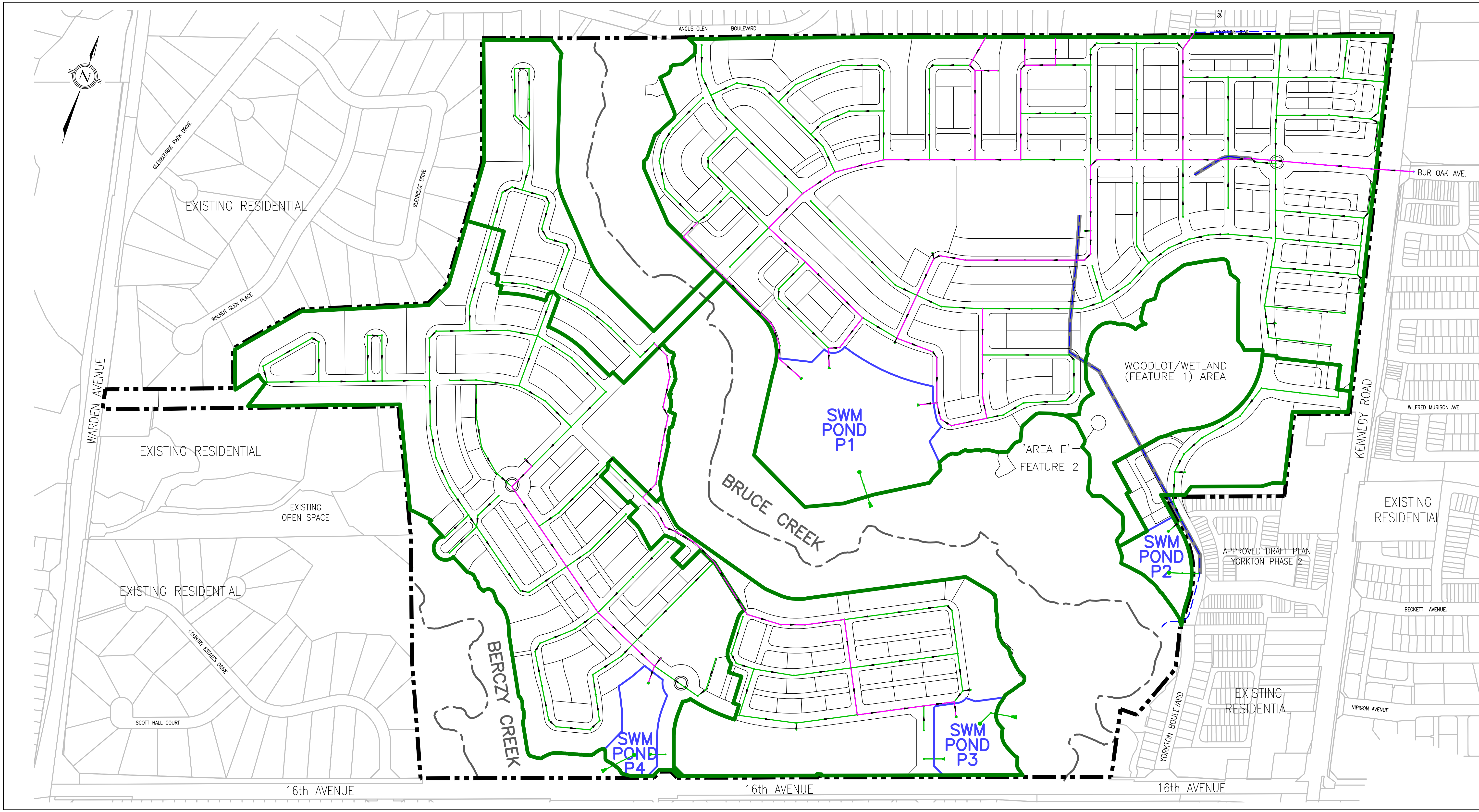
FIGURE 2.11

SWM POND P4
GRADING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.8 to 2.11 – SWM Pond Grading.dwg – Revised by <Luk, James> , Fri, Oct 13, 2017 , 12:46 PM



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 60 120 180 240 300
1:6000

Legend

SUBJECT PROPERTY	EXISTING STORM SEWER
PROPOSED STORM SEWER	EXISTING STORM TO BE REMOVED/DECOMMISSIONED
PROPOSED 100 YEAR STORM SEWER	PROPOSED STORM DRAINAGE BOUNDARY
PROPOSED HEADWALL	

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FIGURE 2.12

STORM SEWER NETWORK

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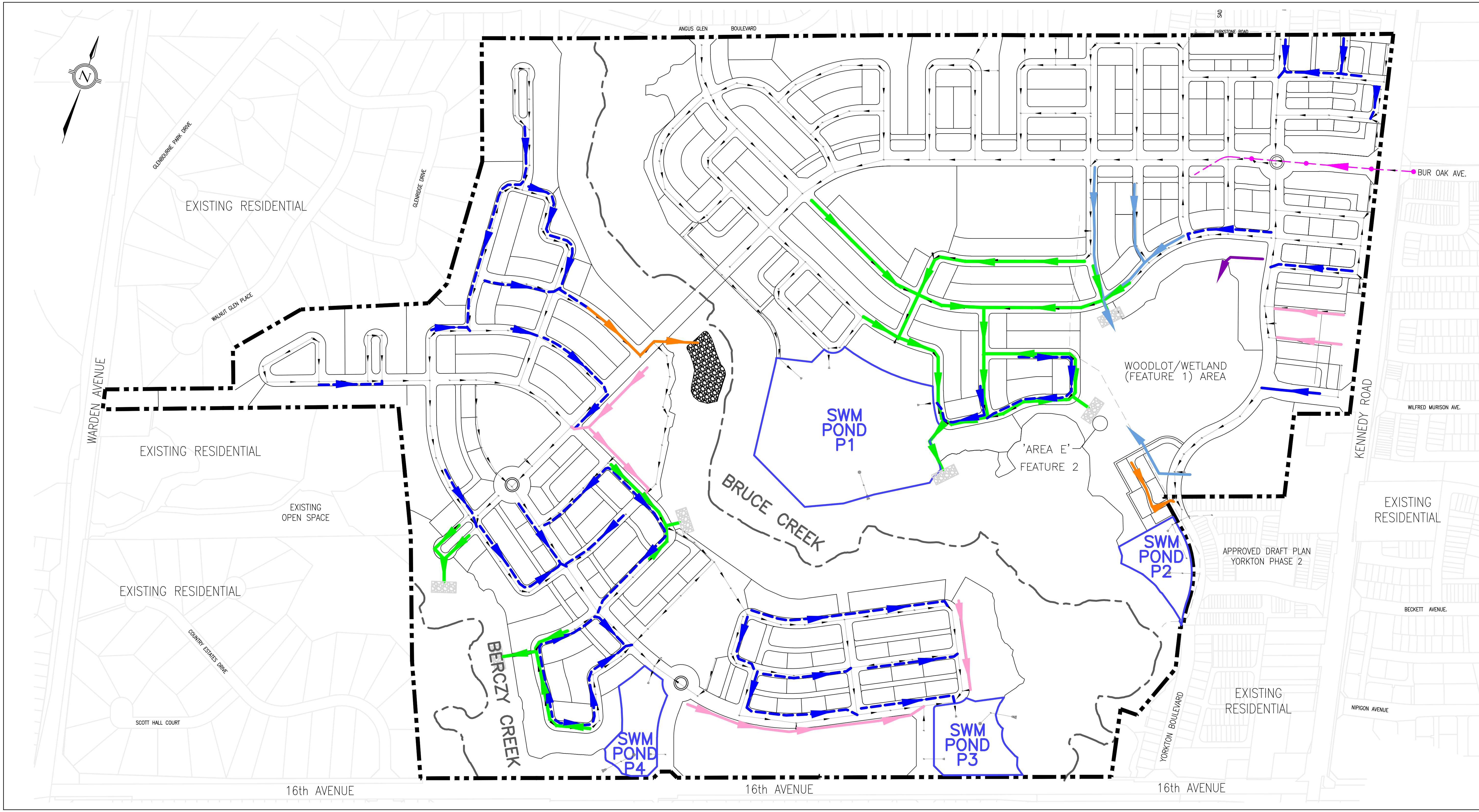
File: V:\01606\Active\160622264\Drawing\sheet_files\[MESP]\Figure 2.12 to 2.13 - Storm.dwg - Revised by <Guerriero, Michael> , Fri, Oct 06, 2017 , 12:11 PM



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 60 120 180 240 300
1:6000

Legend

SUBJECT PROPERTY
EXISITNG 100 YEAR STORM SEWER
PROPOSED STORM SEWER
WETLAND STONE RESERVOIR FOR FDRLC OUTLET
FDC OUTLET
PROPOSED RLC TO 'AREA E'
PROPOSED PERFORATED RLC
PROPOSED FDC
PROPOSED FDRLC
PROPOSED RLC TO WOODLOT/WETLAND FEATURE
PROPOSED INFILTRATION GALLERY

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FIGURE 2.13

FDC, RLC, FDRLC, INFILTRATION GALLERIES

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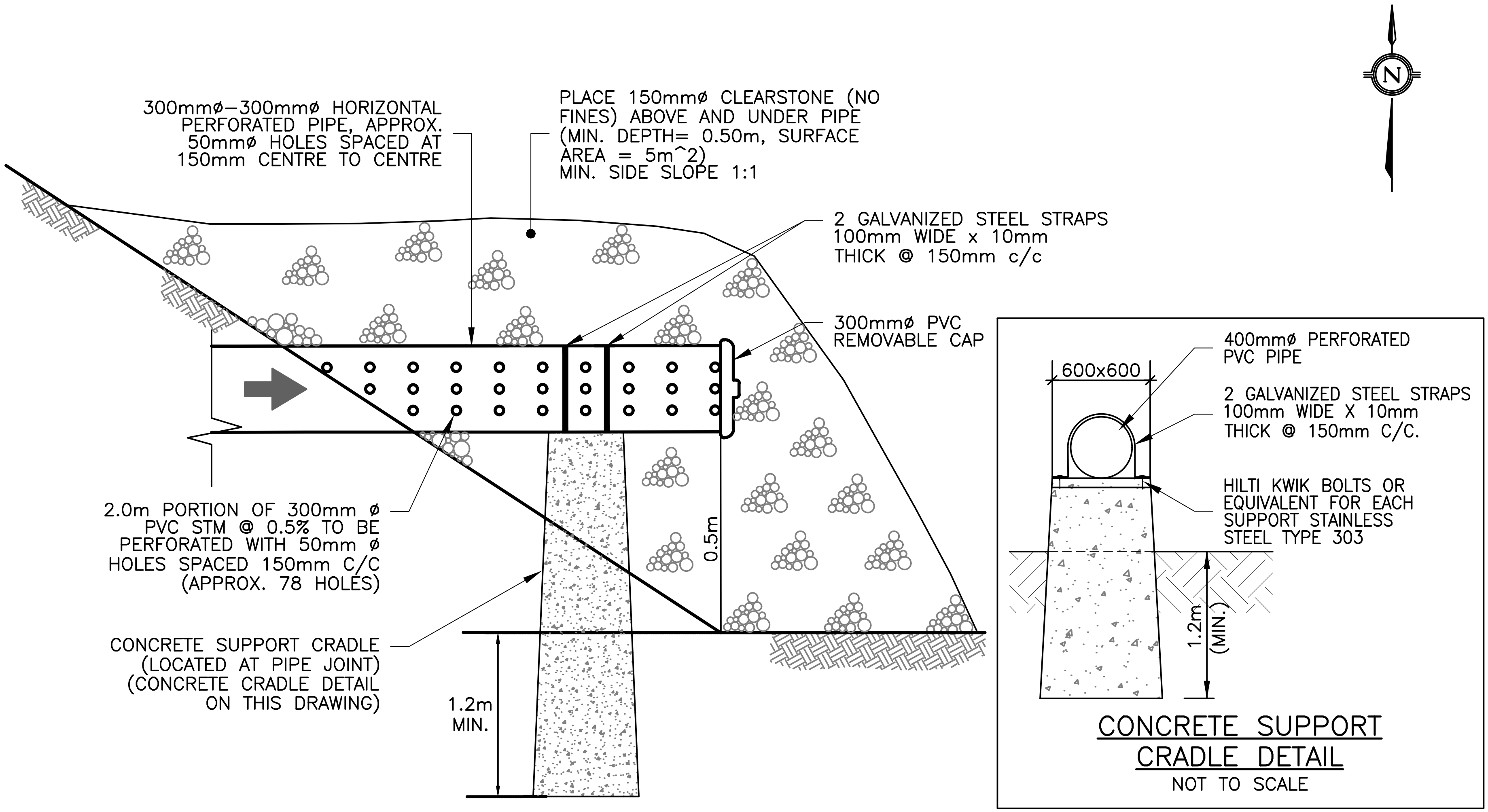
File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.12 to 2.13 - Storm.dwg - Revised by <Overholt, Alysse>, Fri, Oct 27, 2017, 9:50 AM



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BURNSIDE

NOT TO SCALE

Legend

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FIGURE 2.14

PROPOSED FDC OUTFALL DETAIL

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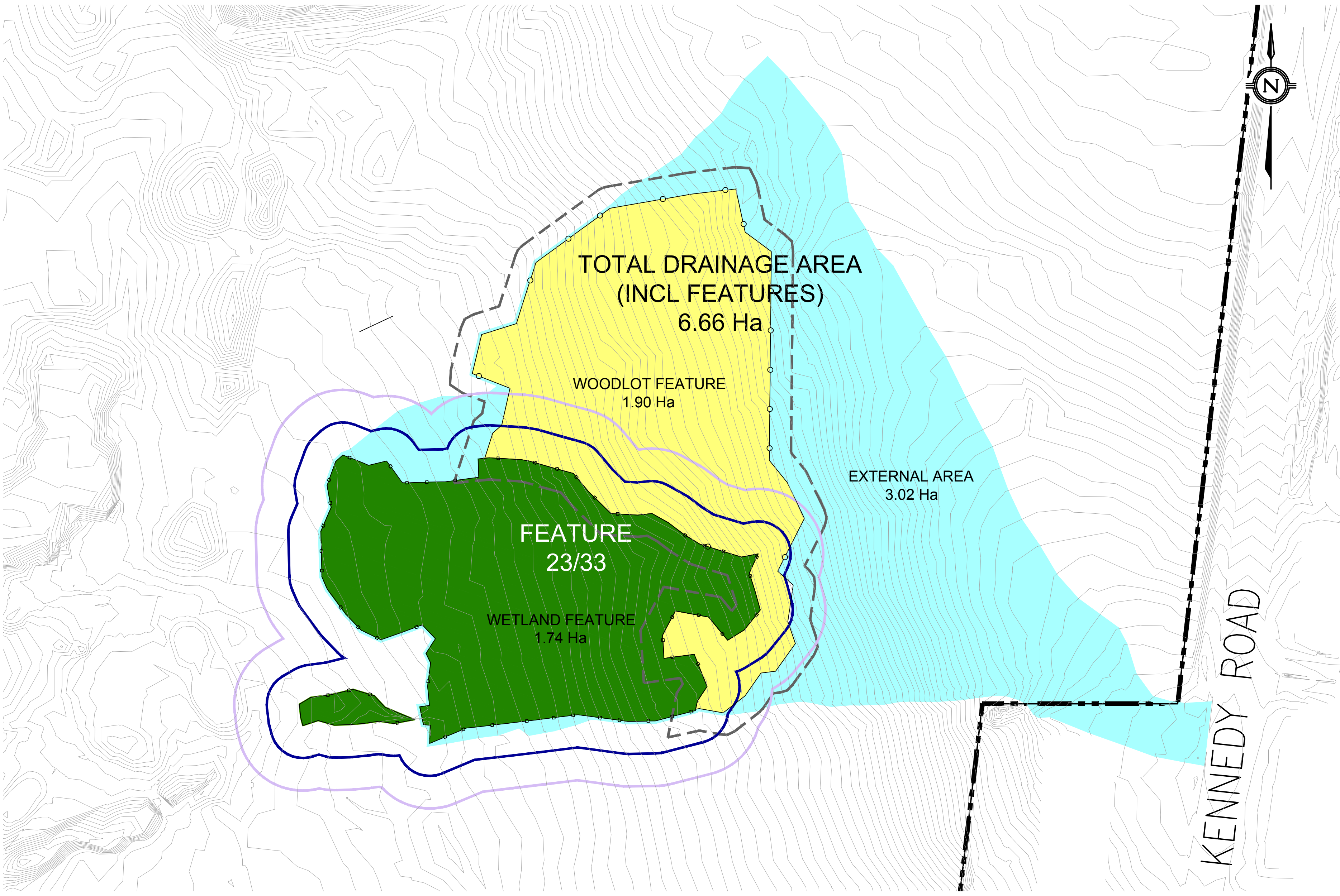

EXISTING DRAINAGE PLAN

PROPOSED DRAINAGE PLAN

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BEACON ENVIRONMENTAL
BURNSIDE

0 20 40 60 80 100
1:2000

Legend

- SUBJECT PROPERTY
- STAKED DRIPLINE
- STAKED WETLAND
- STAKED DRIPLINE +10.0m
- STAKED WETLAND +15.0m
- STAKED WETLAND +30.0m
- RLC TO WOODLOT/WETLAND FEATURE
- X HALF ROOF TO AMENDED SOIL
- WETLAND AREA
- EXISTING DRAINAGE AREA TO FEATURE
- WOODLOT AREA
- PROPOSED REAR LOT AREA TO FEATURE
- PROPOSED OPEN SPACE/ BUFFER TO FEATURE
- FULL ROOF TO WOODLOT/WETLAND FEATURE

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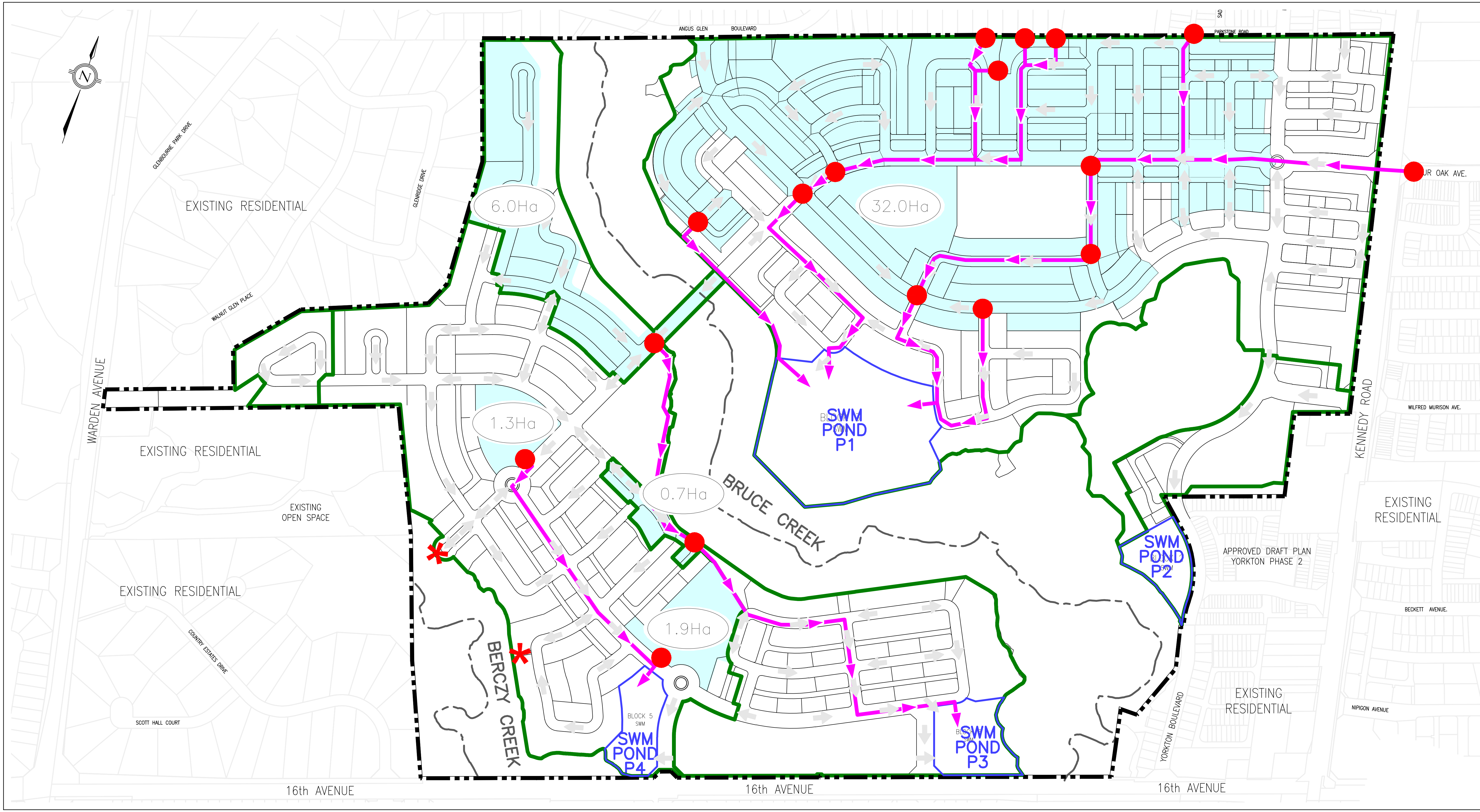
FIGURE 2.15

WOODLOT/WETLAND FEATURE 1 DRAINAGE PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.15 – Woodlot-Wetland Drainage Plan.dwg – Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 1:35 PM



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 60 120 180 240 300
1:6000

Legend

	SUBJECT PROPERTY		MAJOR OVERLAND FLOW DIRECTION
	PROPOSED 100 YEAR STORM SEWER	*	MAJOR SYSTEM OVERLAND FLOW ROUTE OUTLET
	PROPOSED STORM DRAINAGE BOUNDARY	●	100 YEAR CAPTURE LOCATION
	MAJOR SYSTEM DRAINAGE BOUNDARY	29.9Ha	MAJOR SYSTEM DRAINAGE AREA

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FIGURE 2.16

OVERLAND FLOW CONVEYANCE AND MAJOR SYSTEM OUTLETS

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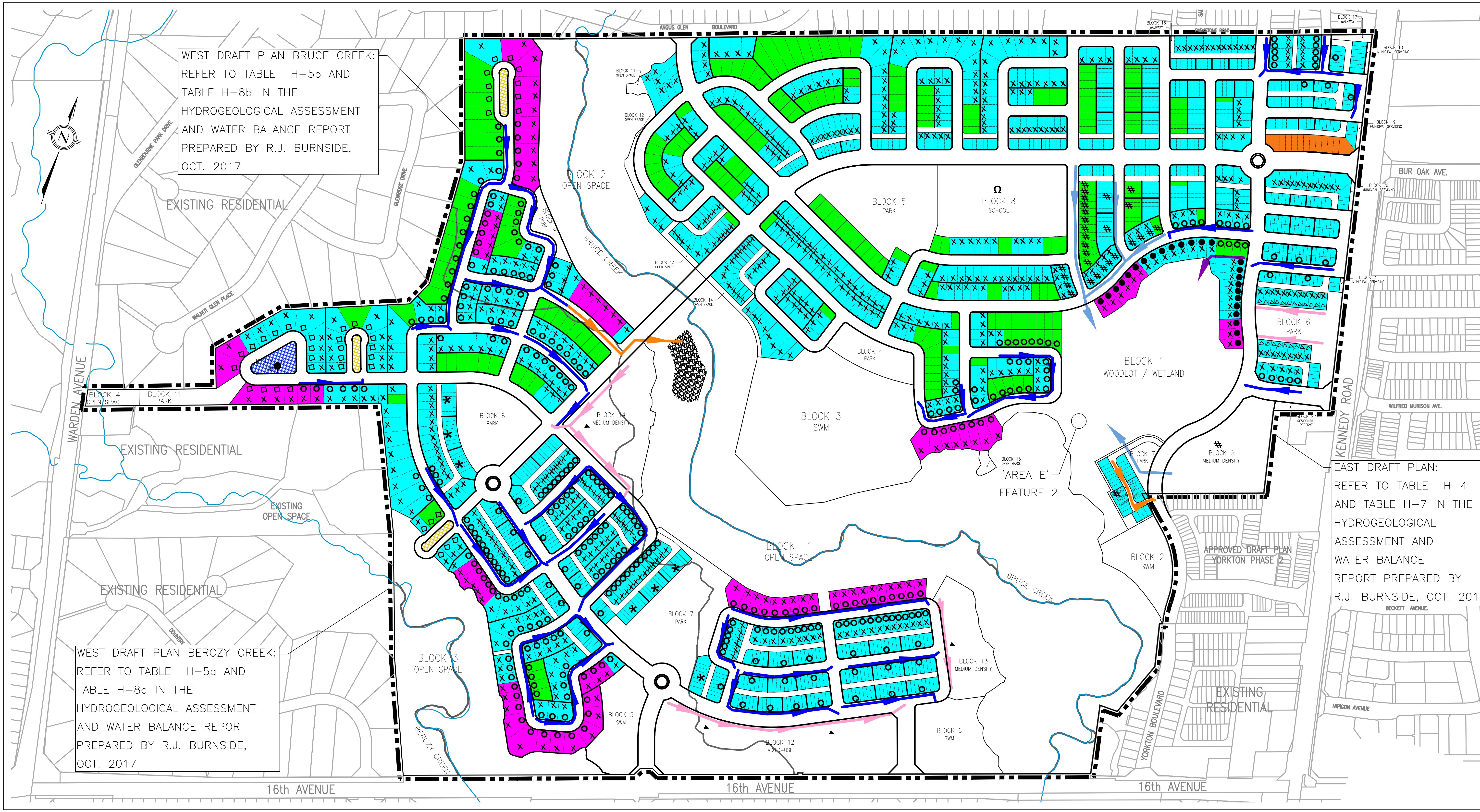
File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.16 - Overland Flow Conveyance.dwg - Revised by <Overholt, Alysse>, Wed, Oct 18, 2017, 9:37 AM



Legend

SUBJECT PROPERTY	DRAINAGE DIVIDE BRUCE CREEK AND BERCZY CREEK
PROPOSED SOLID RLC	BACK SPLIT
PROPOSED PERFORATED RLC	FRONT DRAIN
PROPOSED RLC TO WOODLOT/ WETLAND FEATURE	FRONT WALK
PROPOSED INFILTRATION GALLERY	WALKOUT
PROPOSED FDRLC	ENCLAVE BIORETENTION
WETLAND STONE RESERVOIR FOR FDRLC OUTLET	INFILTRATION FACILITY
	HALF ROOF TO SURFACE

- Ω FULL ROOF TO 'AREA E'
- # HALF ROOF TO 'AREA E'
- O HALF ROOF TO PERFORATED RLC
- □ HALF ROOF TO ENCLAVE BIORETENTION
- △ HALF ROOF TO INFILTRATION GALLERY
- ▲ FULL ROOF TO INFILTRATION GALLERY
- X HALF ROOF TO AMENDED SOILS
- ● FULL ROOF TO WOODLOT/WETLAND FEATURE

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BEACON ENVIRONMENTAL
BURNSIDE

1:6000 — 0 60 120 180 240 300

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FIGURE 2.17

POST DEVELOPMENT WATER BALANCE MITIGATION PLAN

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File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 2.17 - Post Development Water Balance Mitigation Plan.dwg — Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 1:01 PM

3.0 WATERMAIN DISTRIBUTION SYSTEM

3.1 EXISTING EXTERNAL WATERMAIN INFRASTRUCTURE

The subject property will be provided with municipal water supply from two (2) pressure districts, PD5 and PD6RD/RE.

The water supply is provided to the City of Markham watermains by way of connections to the York Region supply which is a Lake Ontario water based system.

There are existing watermains located on the boundary roads as follows:

16th Avenue	450 mm diameter
Bur Oak Avenue	300 mm diameter
Angus Glen Boulevard	300 mm diameter
Prospectors Drive	300 mm diameter
Yorkton Boulevard	300 mm diameter

Figure 3.1 illustrates the existing external watermain infrastructure.

3.2 WATER DESIGN CRITERIA

The water distribution system will be designed in accordance with the City of Markham's Design Criteria (2013) based on the following;

Design Demand

Watermains shall be sized to meet greater of either:

- Maximum day demand plus fire flow or
- Maximum hour demand

Fire Flow

Residential	min. 7,000l/min
Stacked townhouses	min. 10,000 l/min
Residential mid-rise, mixed use, school	min. 15,000 l/min

Population and Equivalent Population

Single family and semi-detached	4.0 ppu
Townhouses	3.8 ppu
Apartments	3.0 ppu
Schools	60 p/ha site area
Mixed uses	330 p/ha site area

Average Day Consumption Rates

Residential	365 l/c/d (litre/capita/day)

Peaking Factors	Residential	Non-Residential
Maximum Daily Demand	2.0	1.4
Maximum Hourly Demand (PM)	4.5	0.8
Maximum Hourly Demand (AM)	2.0	2.5
Minimum Hour	0.7	0.7

3.3 PROPOSED WATER DISTRIBUTION SYSTEM

A Water Distribution Analysis report was completed by WSP Canada Inc. dated July 21, 2016 and submitted to the City of Markham on September 2016. Comments were received on March 2017. The updated report by WSP is dated November 2017. All agencies comments are incorporated into the revised report which is provided in **Appendix G**. The water distribution analysis provides preliminary watermain sizing, PRV requirements and connection points to existing watermains in order to meet the City of Markham and MOEECC design criteria and demands.

As noted in Section 3.1, the subject property will be serviced by two (2) pressure districts.

The south western portion of the development will be serviced from PD5 with two (2) connections to 16th Avenue. A 300 mm diameter watermain connection to the existing 450 mm diameter watermain will be made at each of the proposed intersections with 16th Avenue.

The south eastern portion of the development will be serviced from PD5 with one (1) connection to Yorkton Boulevard; a 300 mm diameter watermain connection to the existing 300 mm diameter watermain will be made. Security of supply will be provided from a normally closed PRV from the PD6 RD/RE zone.

The northern portion of the development will be serviced from PD6 RD/RE, with connections to the existing systems at Angus Glen Boulevard, Prospectors Drive and Bur Oak Avenue. With the single east west connection within the development, the north western portion of the development will be supplied from two connection, therefore security of supply is provided from a normally closed check valve from PD5 to PD6RD/RE in the western portion of the development.

In response to the City of Markham's comments on the submission, the watermain layout has been revised to meet the City's requirement of redundancy of supply to PD6R which will be provided from PD6R instead of PD5. The previous analysis has the northwest area serviced by PD6R instead of PD5 due to elevations as PD5 pressure does not provide sufficient head to meet the minimum pressure criteria. In addition to the previous proposed watermain creek crossing at Street "A", a second crossing is now proposed north of Street A from Street "R" East to Street "V" West via trenchless crossing of the Bruce Creek.

The connection to the existing systems are as follows:

- A 300 mm diameter watermain connection to the existing 300 mm diameter watermain at Angus Glen Boulevard.
- A 150 mm diameter watermain connection to the existing 150 mm diameter watermain at Dancers Drive.
- A 300 mm diameter watermain connection to the existing 300 mm diameter watermain at Prospectors Drive (east side of the ROW).
- A 300mm diameter watermain connection to the existing 300 mm diameter watermain at the east side of the existing PRV chamber on Bur Oak Avenue on the east side of Kennedy Road.
- A 300mm diameter watermain connection to the existing 200mm diameter watermain at the interface of Street B and Yorkton Boulevard.
- A 300 mm diameter watermain connection to the existing 450 mm diameter watermain at the proposed intersections of Street C and 16th Avenue.
- A 200 mm diameter watermain connection to the existing 450 mm diameter watermain at the proposed intersections of Street D and 16th Avenue.
- Phase 1 of the project, part of the northern portion of the development noted previously, will be serviced from PD 6RD/RE and the connection to the existing watermains are as follows;
- A 300 mm diameter watermain connection to the existing 300 mm diameter watermain at Prospectors Drive (PD6 RD) and A 150 mm diameter watermain connection to the existing 150 mm diameter watermain at Dancers Drive.

- A 300 mm diameter watermain connection to the existing 300 mm diameter watermain at the east side of the existing PRV chamber on Bur Oak Avenue on the east side of Kennedy Road (PD6RE).

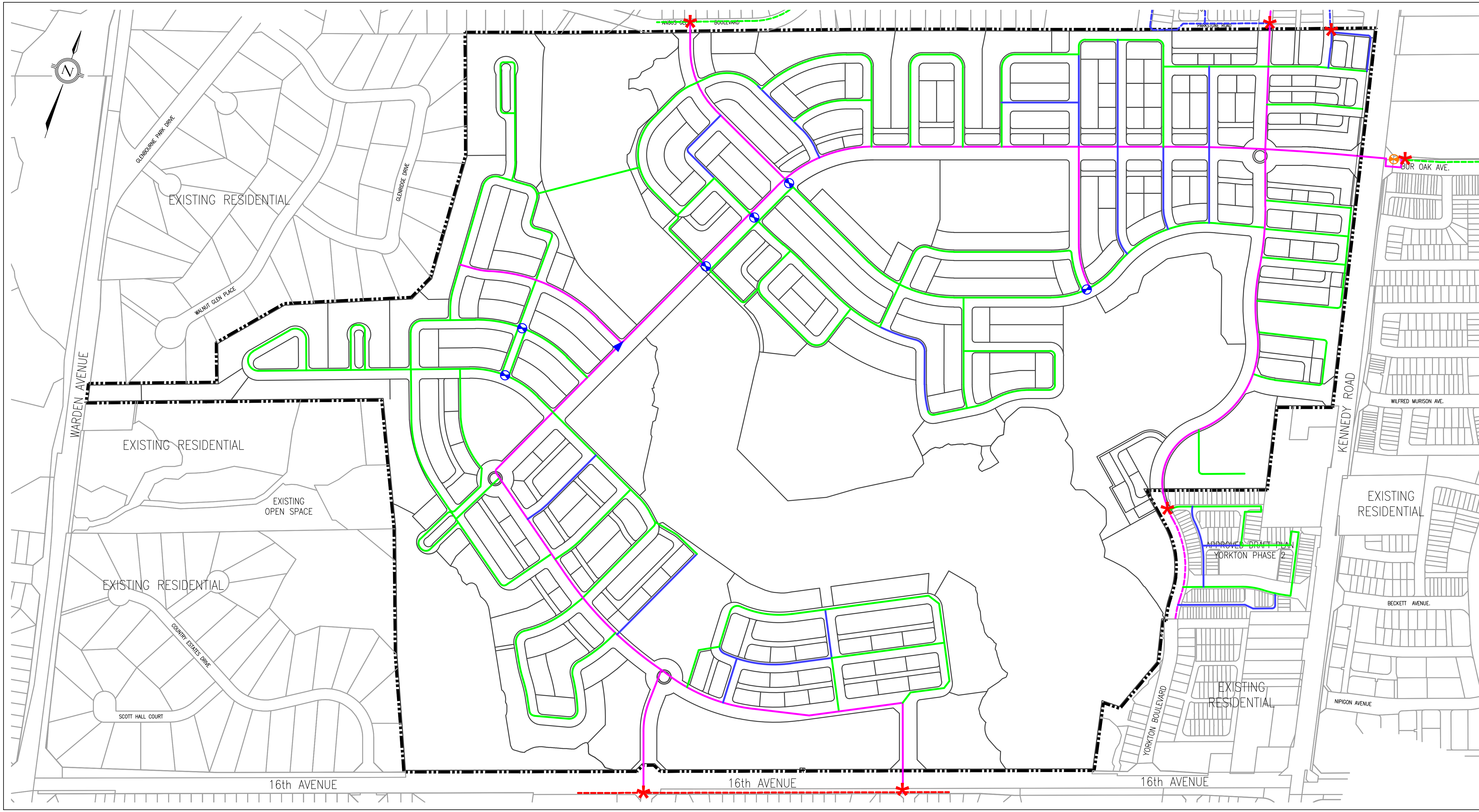
The PD6 RD and PR6 RE pressure districts will be consolidated during Phase 1 of the development.

It should be noted that based on the Water Distribution Analysis completed by WSP, individual Pressure Reducing Valves (PRV's) will be required in all areas serviced by PD6RD/RE. **Figure 3.2** illustrates the area of the development requiring individual PRV's.

PRV's will not be required within the PD5 service area as pressures are below the maximum limit prescribed by the Ontario Building Code to warrant individual PRV's.

Figure 3.1 illustrates the proposed watermain distribution system (proposed pipe sizes and layout), proposed pressure zone boundaries and connection points to existing infrastructure.

Refer to **Appendix G** for the WSP Watermain Distribution Analysis prepared by WSP.



File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 3.0-1 – Watermain Servicing Plan.dwg – Revised by <Guerriero, Michael>, Fri, Nov 03, 2017, 5:48 PM

Stantec

BEACON ENVIRONMENTAL

BURNSIDE

1:6000 — 0 60 120 180 240 300

Legend

	SUBJECT PROPERTY		PROPOSED 50mm WM		EXISTING PRESSURE REDUCING VALVE
	EXISTING 150mm WM		PROPOSED 150mm WM		PROPOSED PRESSURE REDUCING VALVE
	EXISTING 300mm WM		PROPOSED 200mm WM		PROPOSED CHECK VALVE
	EXISTING 450mm WM		PROPOSED 300mm WM	*	CONNECT TO EXISTING

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FIGURE 3.1

EAST DRAFT PLAN WATERMAIN DISTRIBUTION SYSTEM

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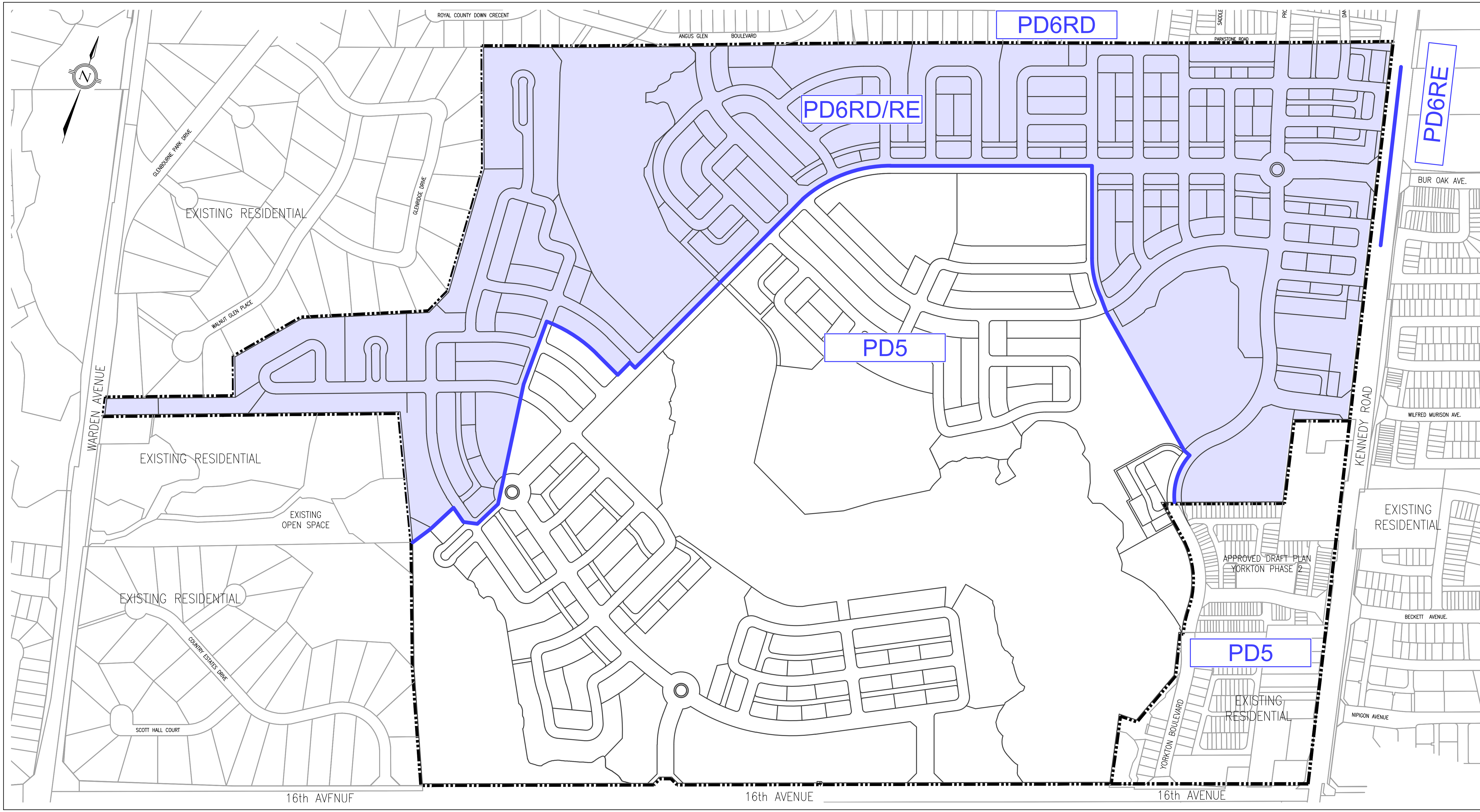

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BURNSIDE

0 60 120 180 240 300
1:6000

Legend

- SUBJECT PROPERTY
- PRESSURE ZONE DIVIDE
- PD6RD PRESSURE ZONE ID
- INDIVIDUAL LOT PRV'S REQUIRED

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FIGURE 3.2

WATERMAIN PRESSURE ZONES

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File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 3.0-1 – Watermain Servicing Plan.dwg – Revised by <Guerriero, Michael> , Fri, Nov 03, 2017 , 5:48 PM

4.0 WASTEWATER/SANITARY SERVICING

The proposed sanitary drainage system will be designed based on gravity flow, striving to minimize infiltration. Pumping stations, syphons and forcemains are not required to achieve the necessary sanitary drainage, and are not being considered for this development.

The proposed sanitary sewer design will consider the phased development of the Subject Property. Further information will be required to quantify the flows from areas external to the Subject Property i.e., the North Markham Future Urban Area (see section 4.4.2). Currently the external areas provided on **Figure 4.1** and **4.2** reflect the tributary areas taken from the York Downs Sanitary Sub-Trunk Drainage Plan (1996), but will need to be updated to reflect the preferred servicing alignment for servicing of the North Markham Future Urban Area if necessary.

Consideration will be given to the existing sanitary sewers on the property (York Downs Sanitary Sub-Trunk Sewer), with the intent of maintaining as much of this infrastructure as capacity allows in accordance with the City's design criteria and alignment. The existing infrastructure is depicted in **Figure 4.1**.

Generally, the North East portions of the Subject Property will have local sanitary sewers conveying flows from each lot to the existing 525 mmø sanitary sewer flowing west along Street 'A' East and the existing 750 mmø sanitary trunk sewer flowing south along Street 'K' East, west along Street 'Y" East and south in open area along lots 440 and 441 and connect to the existing 750mmø trunk sewer. The sanitary drainage would continue in its existing manner south down in open area and Street 'B' East, to Yorkton Blvd, eventually connecting to the existing 2100mmø YDSS sanitary trunk within the 16th Avenue ROW.

As indicated by **Figure 4.3**, the north portion of the Subject Property will have local sanitary sewer infrastructure conveying flows from each lot to a single point on the north side of Bruce Creek, in the vicinity of the east side of SWM Pond P1. The sanitary sewer system servicing the north portion of the lands will flow south, crossing below Bruce Creek, through a sewer installed by trenchless installation method, and connect to the sanitary sewer system servicing the lands on the south side of the creek.

The west side of the property, and lands south of Bruce Creek, will have a sanitary sewer system conveying flows generally south and eastward to the Street 'C' West intersection with 16th Avenue. The proposed sanitary sewer system configuration allows for the opportunity for one connection to the existing 2100mmø YDSS sanitary trunk along 16th Avenue at the south limit of the lands.

The proposed development is broken down into three (3) sanitary drainage areas, as illustrated on **Figure 4.2**. The first area is Phase 1 and is located in the North-East portion of the Subject Property, adjacent to Kennedy Road. This area of development has two (2) direct connections in the existing 525 mmø sanitary trunk sewer and the existing 750 mmø sanitary trunk sewer on Yorkton Blvd.

The second sanitary drainage area is the remaining development area east of Bruce Creek. To service this area a sanitary sewer creek crossing is required under Bruce Creek with connection to the southeastern portion of the Subject Property.

The third sanitary drainage area is the development area west of Bruce Creek.

The sanitary drainage from both the west and east development areas will then connect to the existing 2100 mmø YDSS sanitary trunk sewer on the north side of 16th Avenue, at Street 'C' West.

4.1 SANITARY DESIGN CRITERIA

The sanitary sewer will be designed in accordance with the City of Markham Design Criteria, April 2014 - Section D) and the MOECC's criteria. Including but not limited to:

- Residential Sanitary Generation Rate: 365 litres/capita/day
- Population Density
  - Single Family and Semi Detached: 4.0 Persons/Unit
  - Street Townhouses, Block Townhouses, and Stacked Townhouses: 3.8 Persons/Unit
  - Apartments: 3.0 Persons/Unit
  - Schools: 60 People/hectare or 180,000 L/Gross land area/day
  - Commercial: 100 People/hectare or 180,000 L/Gross land area/day
  - Parks and Recreation: 60 Persons/hectare
- Peaking Factor: Harmon (Minimum 1.5, Maximum 4.0)
- Infiltration Rate: 0.26 litres/second/hectare
- Minimum Pipe Size: 200mm
- Minimum Pipe Cover: 2.7m below centreline road elevation
- Maximum Full Flow Velocity: 3.65m/s
- Minimum Partially Full Velocity: 0.6m/s
- Minimum Slope: 1.0% (first leg)

4.2 ESTIMATED SANITARY FLOW GENERATION RATES

Based on the criteria above, the peak sanitary flow is calculated as follows:

$$Design\ Flow\ (Q) = \frac{M\ x\ q\ x\ P}{86.4} + \ I\ x\ A$$

Where: Q = Design Flows (l/s)

q = Average Daily Flows (365 l/ca/s)

I = Infiltration Contribution (0.26 l/s)

A = Gross Drainage Area (ha)

P = Population/1000

M = Peaking Factor = $1\ + \frac{14}{4+P^{0.5}}$

Where: p = Population in thousands

Since the sanitary flows and routing vary across the Subject Property in terms of destinations, population and additional flows to capture, calculations are presented in three parts, as previously noted.

1. Phase 1: Sanitary flows are conveyed to the existing 750 mmø sanitary sewer within Yorkton Boulevard.
2. East Bruce Creek: Sanitary flows are conveyed to a point on the north side of Bruce creek, eventually connecting to the 2100 mmø YDSS within 16th Avenue following a trenchless crossing of Bruce Creek.
3. West Bruce Creek: Sanitary flows are conveyed to the existing 2100 mmø YDSS in the 16th Avenue ROW.

Further information will be required to quantify the additional flows from the North Markham Future Urban Area including the existing residential lots immediately north, and the ultimate build out to the North West, if the City of Markham requires these areas to be conveyed to 16th Avenue. The North Markham Future Urban Area (FUA) is discussed further in Section 4.4.2 Special Study Area of this report.

For sanitary drainage areas, Phase 1 area is located in the northeast section of the Subject Property and is broken into two sections. The Phase 1 North area is approximately 14.3 ha in size, and Phase 1 South which is approximately 2.83 ha, as shown on **Figure 4.2**.

<u>Phase 1 - North East</u>: (13.52 ha)

Per City of Markham Design Criteria, the population for this section of the proposed development is shown in **Table 4.1**.

Table 4.1 Population for Phase 1 North

Type	# of Units	Hectares	Persons/Unit or Persons or L /Hectare /day	Population
Single Detached	109		4	436
Total Townhouses (street, blocked, stacked)	255		3.8	969
Mid - Rise Condominiums (Apartments)	0		3	
Mixed Use Residential (Apartments)	0		3	0
School	0	0	180,000	0
Parks and Recreation	1	1.039	60	62.34
Residential Reserve	1	0.087	86	8
Total Population				1476

Note:
Based on Gatzios Planning + Development Consultants Inc. Draft Plan Dated September 2017

Using the formula and criteria above:

Q = (1.47people x 365 l/ca/day x (1 + 14/ (4 + (1.47people)^0.5)))/86.4 + (0.26 l/s x 13.52ha)
Q = 22.97 l/s + 3.52 l/s
Q = 26.50 l/s

Phase 1 - South East: (3.55ha)

Per City of Markham Design Criteria, the population for this section of the proposed development is shown in **Table 4.2**.

Table 4.2 Population for Phase 1 South

Type	# of Units	Hectares	Persons/Unit or Persons/Hectare or Litre /Hectare/day	Population
Single Detached	0		4	0
Total Townhouses (street, blocked, stacked)	0		0	0
Medium Density – Multi Dwelling Units	145	1.908	3.8	551
Mid - Rise Condominiums (Apartments)	0		0	0
Mixed Use Residential (Apartments)	0		0	0
School	0	0	0	0
Parks and Recreation	0	0	0	0
Residential Reserve	0	0	0	0
Total Population				551

Note:
Based on Gatzios Planning + Development Consultants Inc. Draft Plan Dated September 2017

Using the formula and criteria above:

Q = (0.551people x 365 l/ca/day x (1 + 14/ (4 + (0.551people)0.5)))/86.4 + (0.26 l/s x 3.55ha)
Q = 9.20 l/s + 0.92 l/s
Q = 10.12 l/s

<u>East Bruce Creek</u>: (44.98 ha)

Per City of Markham Design Criteria, the population for this section of the proposed development is shown in **Table 4.3**.

Table 4.3 Population for East Bruce

Type	# of Units	Hectares	Persons/Unit or Persons/Hectare or Litre /Hectare/day	Population
Single Detached	617		4	2468
Total Townhouses (street, blocked, stacked)	234		3.8	889
Mid - Rise Condominiums (Apartments)	0		3	0
Mixed Use Residential (Apartments)	0		3	0
External Institutional	1	1.64	180,000	0
School	1	2.457	180,000	0
Parks and Rec	3	3.216	60	193
Residential Reserve	0	0	86	0
Total Population				3550

Note:
Based on Gatzios Planning + Development Consultants Inc. Draft Plan Dated September 2017

Using the formula and criteria above,

Q = (3.55 people x 365 l/ca/day x (1 + 14/ (4 + (3.55 people)^0.5)))/ 86.4 + (0.26 l/s x 40.88 ha)
Q = 50.68 l/s + 10.63 l/s
Q = 61.31 l/s

School flows = 180000/86400 x 2.457 = 5.11 l/s

External institutional = 180,000/86400 x 1.64 = 3.41 l/s

Net flow = 61.31 l/s + 5.11 l/s + 3.41 l/s

Q = 69.83 l/s

West Bruce Creek: (50.30 ha)

Per City of Markham Design Criteria, the population for this section of the proposed development is shown in **Table 4.4**.

Table 4.4 Population for West Bruce

Type	# of Units	Hectares	Persons/Unit or Persons/Hectare or Litre /Hectare/day	Population
Single Detached	360		4	1440
Total Townhouses (street, blocked, stacked)	281		3.8	1068
Mid - Rise Condominiums (Apartments)	265		3	795
Mixed Use Residential (Apartments)	210		3	630
School	0	0	60	0
Parks and Rec	5	4.468	60	269
Residential Reserve	0	0	86	0
Total Population				4202

Note:
Based on Gatzios Planning + Development Consultants Inc. Draft Plan Dated September 2017

Using the formula and criteria above,

Q = (4.20 people x 365 l/ca/day x (1 + 14/ (4 + (4.20 people)^0.5)))/ 86.4 + (0.26 l/s x 50.30 ha)
Q = 58.80 l/s + 13.08 l/s
Q = 71.88 l/s

4.3 INTERNAL SANITARY SEWER SYSTEM

Due to timing issues with the existing Golf Course operations and the location of the existing storm and sanitary sewer infrastructure, a specific sequence of development will be required. Therefore, the development will be phased.

For sanitary drainage areas, Phase 1 is broken into two sections. The Phase 1E North area is located in the northeast section of the Subject Property and is bordered between Kennedy Road to the east, the existing development to the north, and the existing woodlot (Feature 1) to the west and is approximately 13.52 ha in size. The Phase 1E South is bordered by the existing

Church land to the east, the existing woodlot (Feature 1) to the west, and the extension of the Yorkton (Kylemore) development to the south. This area is approximately 2.98 ha bringing the total development of Phase 1 to 16.50 ha, as shown on **Figure 4.2**. The phasing limits presented within this report could be expanded to the western limit of the non-course lands pending further review of the servicing and traffic.

4.3.1 Phase 1 North

Phase 1 North area will drain towards the existing 525 mmø sanitary trunk sewer located within Street 'A' East, as shown on **Figure 4.3** and **10.1**. The general depth of sewers to service these lands will be 3.2 m to 4 m deep (to invert).

It should be noted that the existing 525 mmø concrete sanitary sewer that traverses Phase 1 from east to west services an existing 45.6 ha development east of Kennedy Road. This existing sanitary sewer is 7 m to 8 m deep (to invert) and although it has capacity for the development of the Subject Property, it is too deep to be considered for local servicing, therefore a local sanitary sewer will be required to service lots fronting onto Street 'A' East.

At the proposed intersection of Street 'A' East & Street 'B' East an 1800 mmø "Dog House" manhole will be installed over the existing 525 mmø sanitary sewer. Local sewers from the north, south and the local sewer on Street 'A' East will then connect to this manhole. Three separate drop structures will be required. Once the manhole and drop structures are completed the top portion of the existing 525mmø pipe will be removed to allow a direct connection to the live 525 mmø sewer. This method of connection will minimize disruption to the existing live sewer. No by-pass pumping will be required. The proposed drop structures will be 200 mmø, providing an approximately 3 m drop to the obvert of the existing sewer.

4.3.2 Phase 1 South

All lands flow from east to west along Street 'C' East from Kennedy Road to proposed Yorkton Blvd. (Street 'B' East), which has existing sewers within it. There is an existing 750 mmø concrete sanitary trunk sewer and an existing 1200 mmø concrete storm sewer. The existing 750 mmø sanitary sewer is located on the east side of the right-of-way, this existing sanitary is 5 m deep (to invert) and to service this phase a connection to the existing MH10 is required. The existing 750 mmø sewer has design capacity for the area.

4.3.3 East Bruce Creek

This area cannot be developed, with the exception of Phase 1 lands, until the Golf Course operations cease. The east development area (59.69 ha) is bound by Phase 1 to the east, Bruce Creek to the west and south, and the existing residential development to the north as shown in **Figure 4.2**. The northern portion of the East Bruce Creek area will discharge to the existing 525 mmø sanitary on Street 'A' East and with nominal depths of 3.5 m (to invert). The East Bruce

Creek area south of Street 'A' East and north of the woodlot (Feature 1) will discharge into the existing 750 mmø sanitary sewer within the woodlot/wetland south of Street 'Y' East. The existing sanitary sewer is located on the east side of the right-of-way at a depth of 5.5 m (to invert). An 1800 mmø "Dog House" type manhole is proposed to be constructed over this sewer (between existing MH7 and MH8). The connections are to be completed by internal drop structures prior to the top portion of the live sewer being removed, and provide a direct connection from Street 'Y' East.

Lots facing Street 'K' East on the east side will be serviced by the 750mm trunk sewer. The west side of Street 'K' East is designated as an elementary school block and can be serviced by the 750mmø trunk sewer. The remainder of East Bruce Creek area shall drain to the low point adjacent to SWM Pond 1 on Street 'U' East. This is also where the proposed 2100 x 3600 mm concrete box storm sewer will enter the pond block. The sanitary sewer must pass under the storm and have an invert of 177.64 m, approximately 6.5 m deep. This sanitary sewer will cross under Bruce Creek to connect to the West Bruce Creek sanitary drainage area, as shown on **Figure 4.3**.

An investigation was undertaken to determine if the sanitary discharge from East Bruce Creek could connect to the existing 750 mmø trunk sewer on Street 'D' East, but it was determined that the required invert was approximately 2.35 m lower than that of the existing sanitary at the point of connection. Therefore, a crossing of Bruce Creek is the only feasible option. The proposed crossing will be completed by means of a trenchless construction method from lands within SWM Pond 1 block to the mid-rise residential block located at the east end of Street 'E' West located south of Bruce Creek.

4.3.4 West of Bruce Creek

The west draft plan area is bound by the existing development to the north and west, by Bruce Creek to the east, and 16th Avenue to the south. The 50.30 ha area drains generally from the north to the south east, with an approximate 16 m elevation change over roughly 1,400 m.

Due to the average overall fall of these lands of about 1.0%, the sanitary sewer design shall be at nominal depths ranging from 3.5 m to 4.5 m following the overall surface drainage pattern of the land. However due to the natural surface drainage divide between Bruce Creek and Berczy Creek, a portion of the north area must drain to the southeast, through the development to 16th Avenue.

A storm sewer connection from a portion of the north area to Pond 3 may require the sanitary sewer to be deeper in certain areas. The crossing of the natural drainage divide may also increase the overall depth of the sanitary sewer in the lower reaches to approximately 5.0 m.

It is intended to make one sanitary connection to the existing 2100 mmø sanitary trunk (YDSS), on the north side of 16th Avenue at the intersection with Normandale Road (Street 'C' West). It should be noted that the sanitary sewer from the lands east of Bruce Creek that cross under the creek shall also connect to the existing 2100 mmø sanitary trunk (YDSS) at this point. The creek crossing results in a sanitary sewer depth of approximately 7 m prior to the connection to the existing YDSS trunk sewer. The existing 2100 mmø sanitary trunk sewer is approximately 11 m deep (to invert). The proposed connection is designed to have a manhole adjacent to the existing trunk sanitary sewer with a direct connection into the live sanitary sewer, thus no interruption of existing flow is anticipated.

4.4 SANITARY TRUNK ALIGNMENT ALTERNATIVES

4.4.1 Alternative Crossing of the Bruce Creek

Different options and locations to cross Bruce Creek with a sanitary sewer were looked at during the preliminary design process. Crossing Bruce Creek further upstream near the proposed road crossing was reviewed. This option would require a deep sanitary sewer from the creek crossing south through the development to the 16th Avenue connection. The sewer depth would range from 6 m to 11 m deep due to grading constraints and the flow path through the Subject Property. Therefore, it is considered to be too deep for local servicing, and an additional upper local sanitary system would be required for general servicing. This is not an efficient design, and should future maintenance be required for the deep sewer system, the entire road allowance could be impacted.

Therefore, the preferred option was a crossing Bruce Creek from the natural low point on the east side to the natural low point on the west side, which is close to the 16th Avenue connection. This would minimize the amount of deep sewers and minimize the amount of local sanitary sewer systems, in order to provide local service connections.

4.4.2 Special Study Area

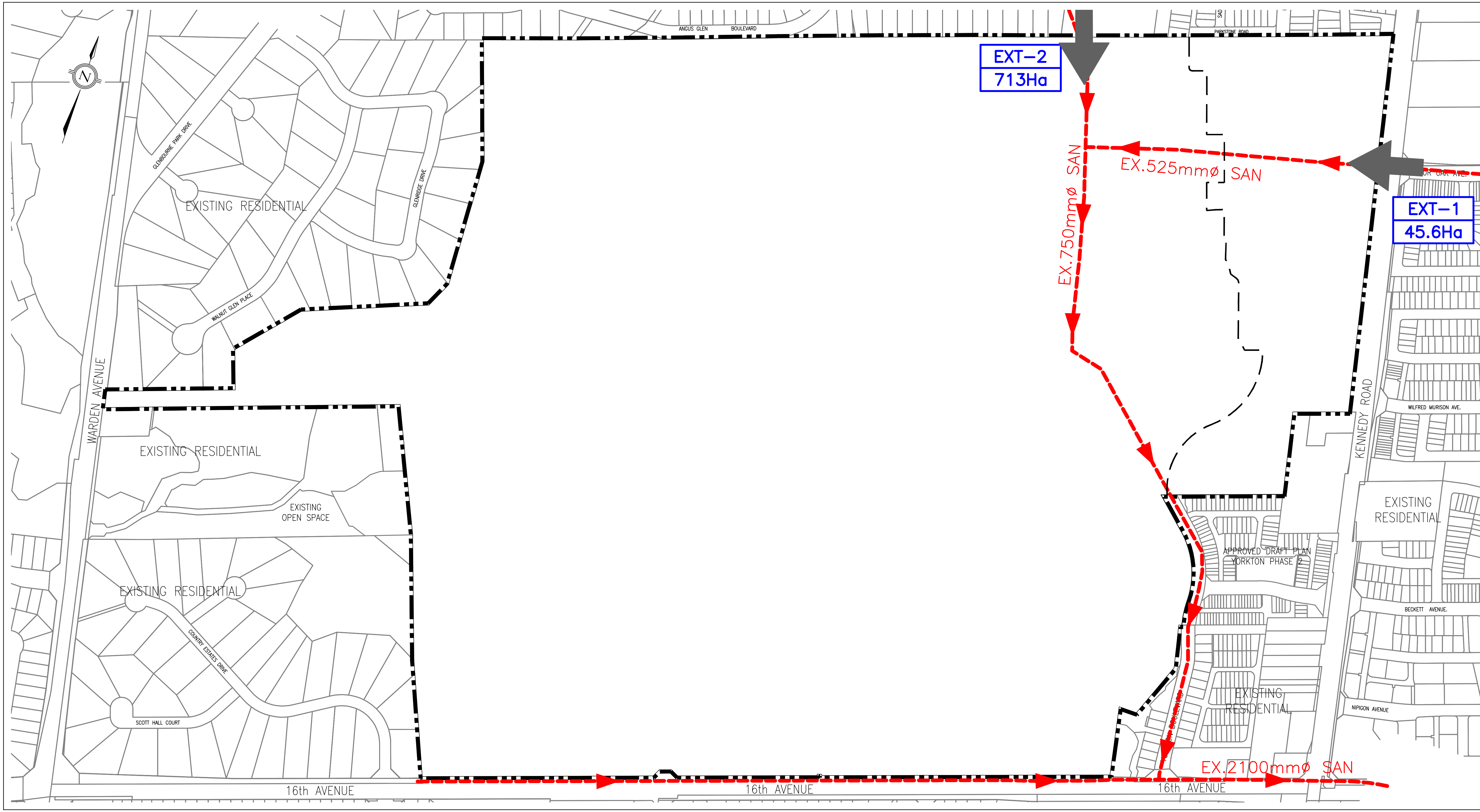
Markham's new Official Plan (2014) provides for future neighborhoods and employment uses to be developed in an area bordered by Major Mackenzie Drive to the south, the Hydro Corridor and Woodbine Avenue to the west, the northerly City limits and Elgin Mills Road to the north, and Robinson Creek to the east. These lands are known as the Future Urban Area (FUA)

The FUA covers approximately 1,288 hectares (3,180 acres). Refer to **Figure 4.4** by XCG Engineering – 2031 Servicing Alternatives.

There are several sanitary servicing options being investigated by the City of Markham. One of the alternatives would involve oversizing the proposed sanitary sewer system within the West Bruce Creek area. This option contemplates the elimination of an existing sanitary syphon system located at the Angus Glen Boulevard crossing of Bruce Creek. The existing sanitary sewer flows easterly into the existing 750 mmø trunk sanitary sewer within an easement that connects to

Yorkton Boulevard and ultimately connects into the 2100 mmø YDSS sanitary trunk sewer along 16th Avenue within Yorkton Boulevard (east of the Subject Property). This option requires access to the West Draft Plan area lands via private property. The Landowners have no control over these private lots. Therefore, this option is not being considered at this time.

Additional information will be required to determine the capacity of any sanitary sewers proposed through the West Bruce Creek area to accommodate flows from portions of the FUA.



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0 60 120 180 240 300
1:6000

Legend

SUBJECT PROPERTY
EXISTING SANITARY SEWER
EXTERNAL FLOW ARROW

EXT–1
45.6Ha

EXTERNAL DRAINAGE AREA

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FIGURE 4.1
EXISTING SANITARY PLAN

October 2017

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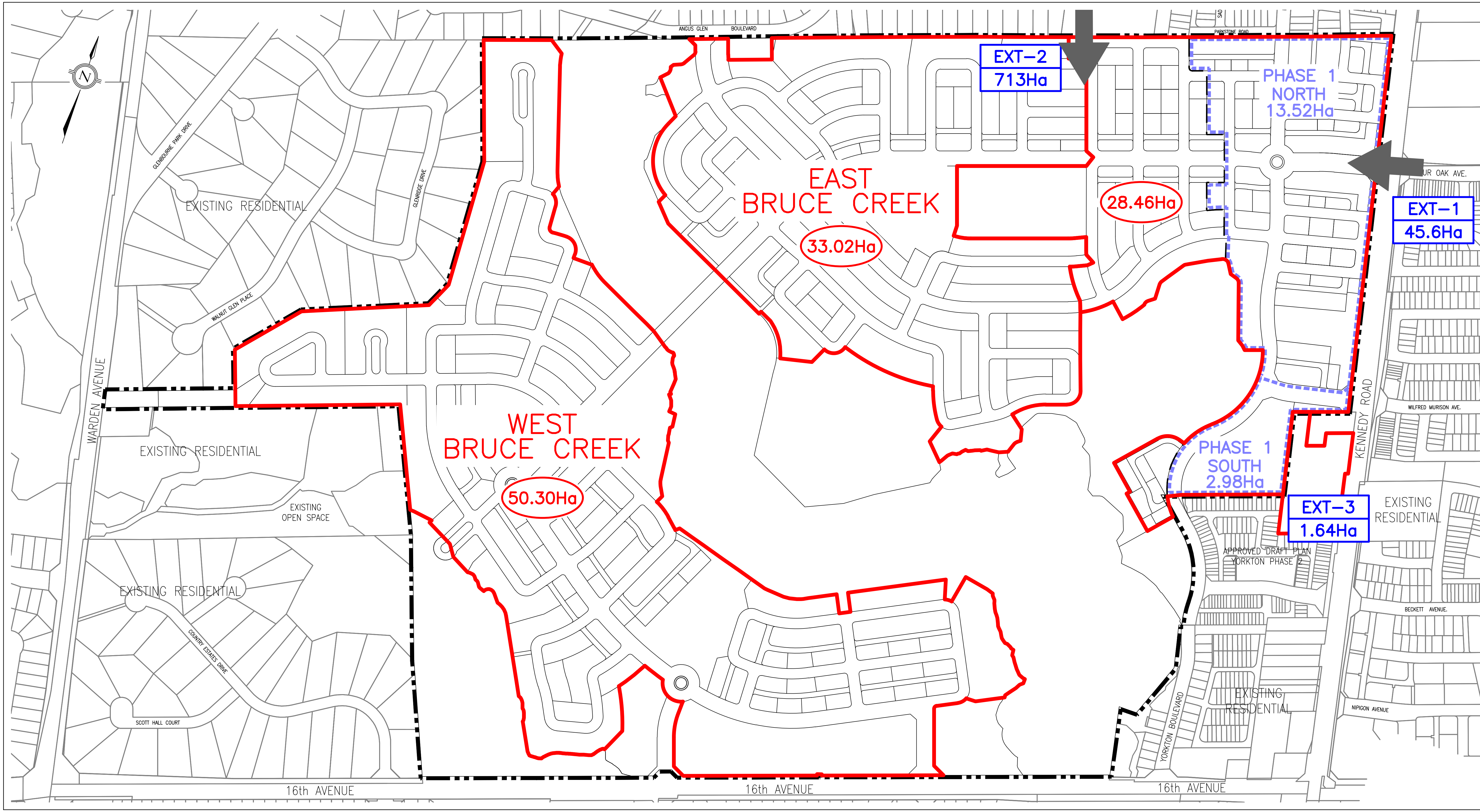

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Legend

- SUBJECT PROPERTY
- PHASE 1 BOUNDARY
- SANITARY DRAINAGE BOUNDARY
- EXTERNAL FLOW
- EXT–1 45.6Ha — EXTERNAL DRAINAGE AREA
- 34.28Ha — SANITARY DRAINAGE AREA

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FIGURE 4.2

SANITARY DRAINAGE PLAN

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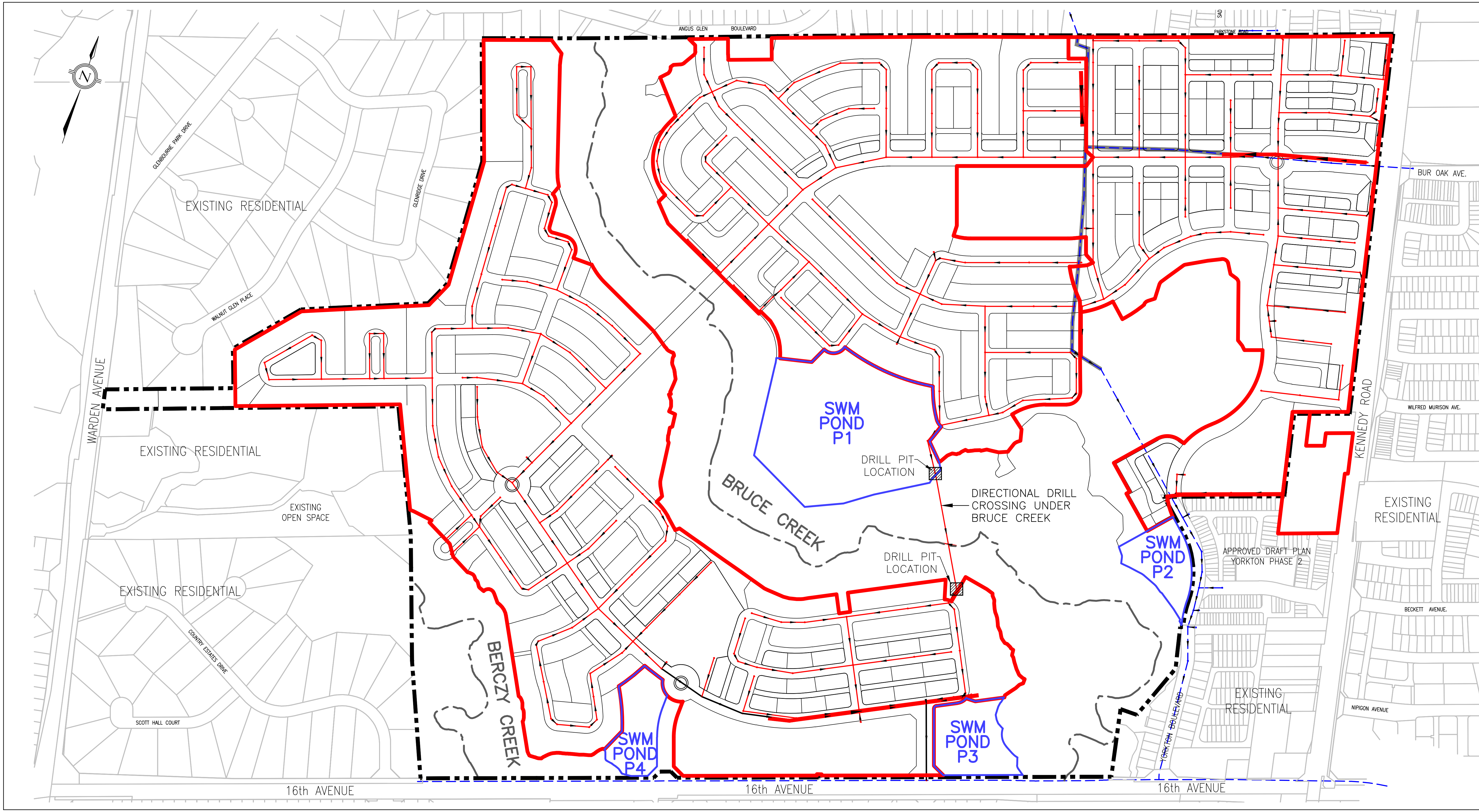

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 4.3 – Sanitary.dwg – Revised by <Guerriero, Michael> , Thu, Oct 05, 2017 , 2:54 PM

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0 60 120 180 240 300
1:6000

Legend

- SUBJECT PROPERTY
- PROPOSED SANITARY SEWER
- PROPOSED DUAL SANITARY SYSTEM
- EXISTING SANITARY SEWER
- EXISTING SANITARY TO BE REMOVED/DECOMISSIONED
- PROPOSED SANITARY DRAINAGE BOUNDARY

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FIGURE 4.3

PROPOSED SANITARY SEWER NETWORK

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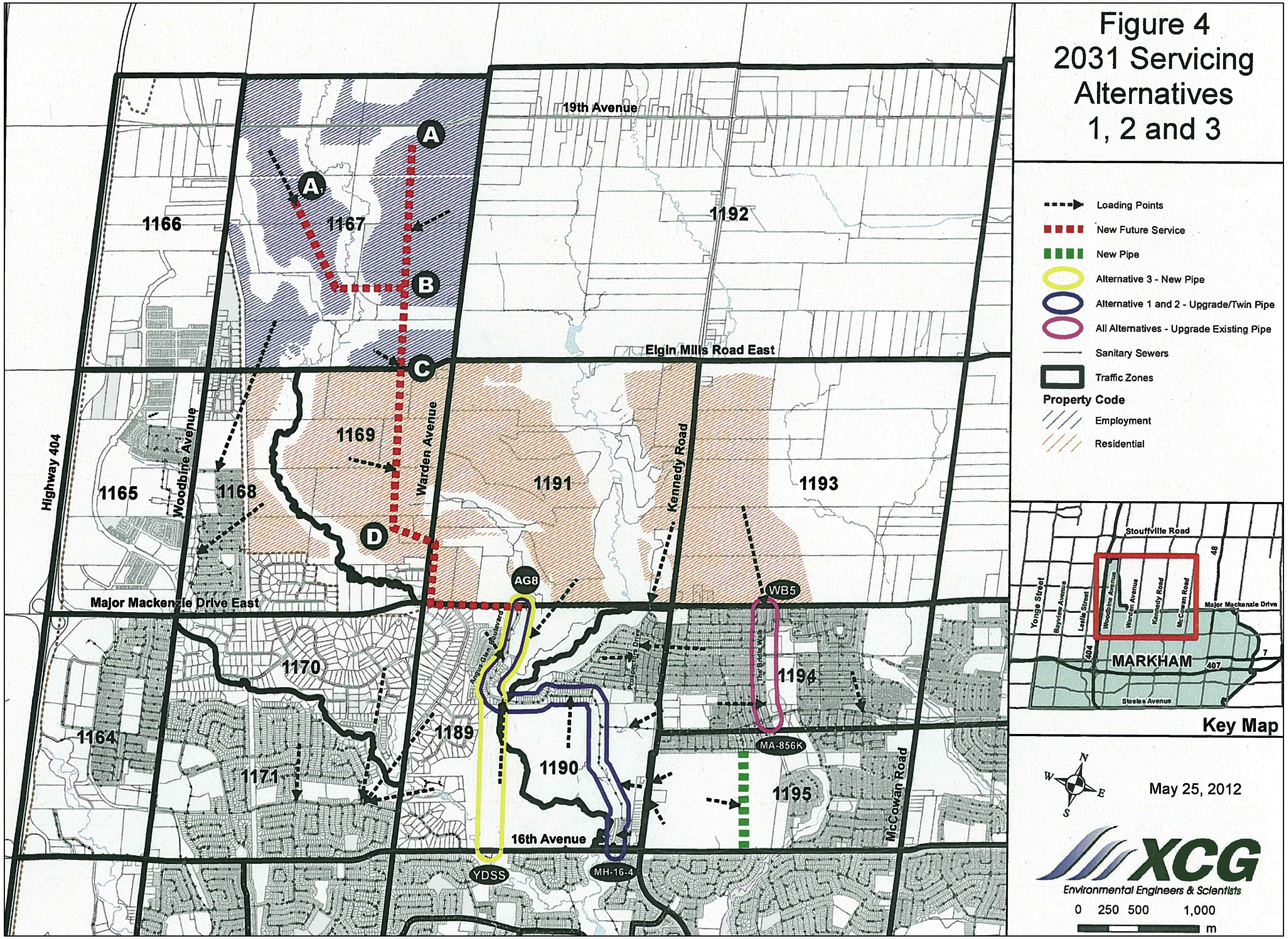

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FIGURE 4.4

FUTURE URBAN AREA PLAN

October 2017

5.0 PRELIMINARY GRADING DESIGN

5.1 CITY OF MARKHAM DESIGN CRITERIA

The proposed development of the subject property will be graded in accordance with the City of Markham criteria including the following:

Road Grades

- Minimum Centreline 0.7%
- Maximum Centreline 6.0%

Lot Grading Types and Specifications

- Front lot drainage
- Split lot drainage
- Walk-out/ Back-split
- Front-split
- Maximum grade between houses shall be 3:1
- Maximum of four (4) rear yards for 1.0 ha may drain to a single swale

Park Grading

1. Minimum slope 2%
2. Maximum slope 5%

The proposed Grading Plan, **Drawing 5.1**, was prepared for the subject property and the grading design is completed in a manner which will satisfy the following goals:

- The lands are graded in compliance with the City's Road and Lot Grading criteria;
- Considering the natural heritage features on the subject property, provisions will be made to minimize grading disturbances in the vicinity of the existing vegetation and natural heritage features identified for retention;
- Road grades are designed to match existing roads and adjacent lot grades at the periphery of the subject property;
- Match existing grades to minimize grading and cut/fill quantities and minimize changes to the surface hydrology and hydrogeology, where possible;
- Provide major overland flow routes for flows in excess of storm sewer capacity;
- Accommodate external flows from adjacent properties based on current land use;
- Maintain adequate cover over storm and sanitary sewers and watermains, where possible;
- Minimize the need for rear lot catch basins;
- Minimize the need for retaining walls; and,
- Achieve the SWM objectives for the subject property.

5.2 GRADING AND ROAD ALIGNMENT CONSTRAINTS

The Subject Property is constrained by several existing boundary conditions including existing roads, existing Bruce Creek and Berczy Creek valley features, existing natural features, and existing adjacent developments. The following sections provide more detail on the specific constraints.

5.2.1 Existing Boundary Roads and Adjacent Development

The Subject Property is bound to the north by Royal County Down Crescent, Angus Glen Boulevard, Royal Troon Crescent, Parkstone Road; to the east by Kennedy Road, Existing Church Site, Yorkton Boulevard; to the south by 16th Avenue; to the west by Glenburn Forest Way, Glenridge Drive, Walnut Glen Place. Refer to **Drawing 5.1** for the proposed grading plan.

<u>North Limit</u>

The proposed grading will match the existing rear yard grades for the lots fronting onto Royal County Down Crescent and Royal Troon Crescent. The proposed grading will match the existing edge of ROW grades for Angus Glen Boulevard and Parkstone Road. The proposed grading will match the existing grades at the property line with Angus Glen Boulevard Park.

<u>East Limit</u>

The proposed grading will match the existing edge of ROW grades for Kennedy Road and Yorkton Boulevard. The proposed grading will require a retaining wall along the eastern property limit with the Existing Church Site. Refer to cross section 1-1 on **Drawing 5.2** for the grading in this area.

<u>South Limit</u>

The proposed grading will match the existing edge of ROW grades for 16th Avenue.

<u>West Limit</u>

The proposed grading will match the existing rear yard grades for the lots fronting onto Glenburn Forest Way, Glenridge Drive, and Walnut Glen Place.

5.2.2 Valley Features and Grading in Natural Feature Buffers

The Subject Property is bounded by the Berczy Creek Valley feature to the west and bisected by the Bruce Creek Valley feature.

The proposed grading will generally match the existing grades along the Berczy Creek Valley feature limit with all grading occurring in the proposed lots or within open spaces blocks that will be dedicated as part of the valley system.

The proposed grading will generally match the existing grades along the Bruce Creek Valley feature limit with all grading occurring in the proposed lots or within open spaces blocks that will be dedicated as part of the valley system, with a following exceptions described below.

There are a few locations where the proposed grading adjacent to Bruce Creek Valley requires grading into buffers. The existing woodlot (Feature 2) within the Valley east of SWM pond 1 will require minor grading that might encroach into the buffer as shown on Section 2-2 on **Drawing 5.2.**

For window roads adjacent to the valley, the proposed grading will generally match the existing grades along the Bruce Creek Valley feature limit with all grading occurring in or within open spaces blocks that will be dedicated as part of the valley system, as shown on Sections 3-3 and 6-6 on **Drawing 5.2.**

Limited grading encroachments are required for the proposed road crossing of Bruce Creek and these are discussed in Section 6.

A portion of the proposed SWM pond 1 will encroach into the shallow fringe of the Regional Floodline portion of the Valley feature, but will match the existing grades along the Redside Dace Habitat limit (meander belt limit + 30m) and/or limit of the proposed SWM block.

A floodplain cut grading design will be implemented as described in Section 7.2 and shown in Section 4-4 and 5-5 **Drawing 5.2.** The cut grading would occur along the western valley bank south of the existing golf course driveway crossing that will also be removed.

The existing golf course irrigation ponds within the Bruce Creek Valley will be dewatered and filled with top soil to the match the existing waterline levels.

The existing woodlot/wetland (Feature 1) located east of Bruce Creek is surrounded by lots and road. The proposed grading around this feature will tie into existing ground at the buffer limit of the feature where possible. A l portion of the road along the east limit of this feature extends into the outer 15m buffer block along with some minor grading, as shown on **Figure 5.3**.

5.2.3 Site Grading Design

The conceptual grading design for the Subject Property as shown on **Drawing 5.1**, is provided to illustrate how the lands may be graded in compliance with the City's criteria. The proposed grading of the site will match the existing perimeter grades where possible. Proposed site grading is constrained by the existing boundary roads, adjacent development, valley systems, and natural heritage features. The overall site grading has been completed to retain these features while minimizing cut and fill operations. In addition, the grading design has replicated the existing subwatershed drainage boundary divide to the extent possible between Bruce Creek and Berczy Creek.

On the East Draft Plan, a 7.0m grading buffer is provided within the rear yards of Lots 92 on the north side of Street M and 130-136 on the north side of Street N, 153, and 182-191on the north side of Street O to preserve the existing trees along the rear lot lines. Similarly, on West Draft Plan a 10.0m grading buffer is provided within the rear yards of Lots 340-346 on the west side of Street N and a 4.0m grading buffer within the property line in the rear yards of Lots 350-360 on the south side of Street Q to preserve the existing trees along the rear lot lines. The proposed grading around perimeter of Park Blocks 5 on east draft plan and 7 and 8 on west draft plan will also match the existing grades to the extent possible to preserve the existing trees. If there is a grade differential then sloping will be provided.

Due to the grade differential of approximately 20 m across the Subject Property, earth cuts and fills of up to 4.0 m in depth are anticipated in various locations throughout the site in order to provide positive drainage for local services and to address topographic and environmental constraints. A major earthworks operation is anticipated due to the existing topography.

Various lot types needed to mimic the natural grade difference across the site while minimizing earthworks. The lot types are anticipated to be back splits, walkouts, front draining, and front walk-ups, as shown on **Figure 5.4.**

The road grades are also dictated by the depth of cover required over top of the sanitary and storm sewers, the cut/fill balance calculations for the site grading and maintenance of the major storm drainage overland flow route for the development to the storm water management facilities. The preliminary grading design and road profiles for the subdivision maintain the major storm water drainage flows within the subdivision with conveyance over the local road network and through dedicated overland flow routes to the SWM facilities located at the western and northeastern limits of the site.

Road grades at connections to existing roads are designed to ensure that offsite drainage is generally maintained external to the Subject Lands, and to maintain internal site drainage within the Subject Lands.

Final road, lot grading and earthworks including on-site soil management for the Subject Property will be determined at the detailed design stage for the lands as they proceed through the development approval process.

5.2.4 Slope Stability Considerations

A slope stability analysis along the west side of Bruce Creek has been completed by Golder Associates and is discussed in the Beacon *Natural Environment Report / Environmental Impact Study* Section 3.5.1. In addition, a slope stability and natural hazard evaluation along Berczy Creek has been completed by Golder Associates and is discussed in the Beacon *Natural Environment Report / Environmental Impact Study* Section 3.5.1.

5.2.1 Preservation of Native Soil

Preservation of Native soil is identified in the MESP Terms of Reference under future study requirements. Based on the proposed grading design and the cut fill calculations, the development requires fill. Quantities of fill material will be imported and this will help in retaining the native soil at site. To reduce the export of surplus top soil, extra depth of topsoil can be used where feasible. Recognizing the existing boundary conditions including the existing boundary roads, adjacent development, valley systems, and natural heritage features the overall site grading has been completed to retain these features while minimizing cut and fill operations. Additional options should be explored at the detail design stage to minimize the export of Native soil.

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BURNSIDE

1:1500 0 15 30 45 60 75

Legend

SUBJECT PROPERTY	PROPOSED TOPSOIL FILL WITHIN GOLF COURSE IRRIGATION PONDS	PROPOSED BACK SPLIT DRAIN LOT	PROPOSED FRONT WALKOUT LOT
LIMIT OF PROPOSED GRADING	PROPOSED 3:1 SLOPE	PROPOSED FRONT DRAINING LOT	PROPOSED REAR WALKOUT LOT
LIMIT OF OPTIONAL CUT GRADING DESIGN	PROPOSED DRAINAGE DIRECTION (2.0% – 30%)		
182.65 PROPOSED CENTRELINE ELEVATION			
0.70% PROPOSED CENTRELINE SLOPE			
182.65 EXISTING ELEVATION			

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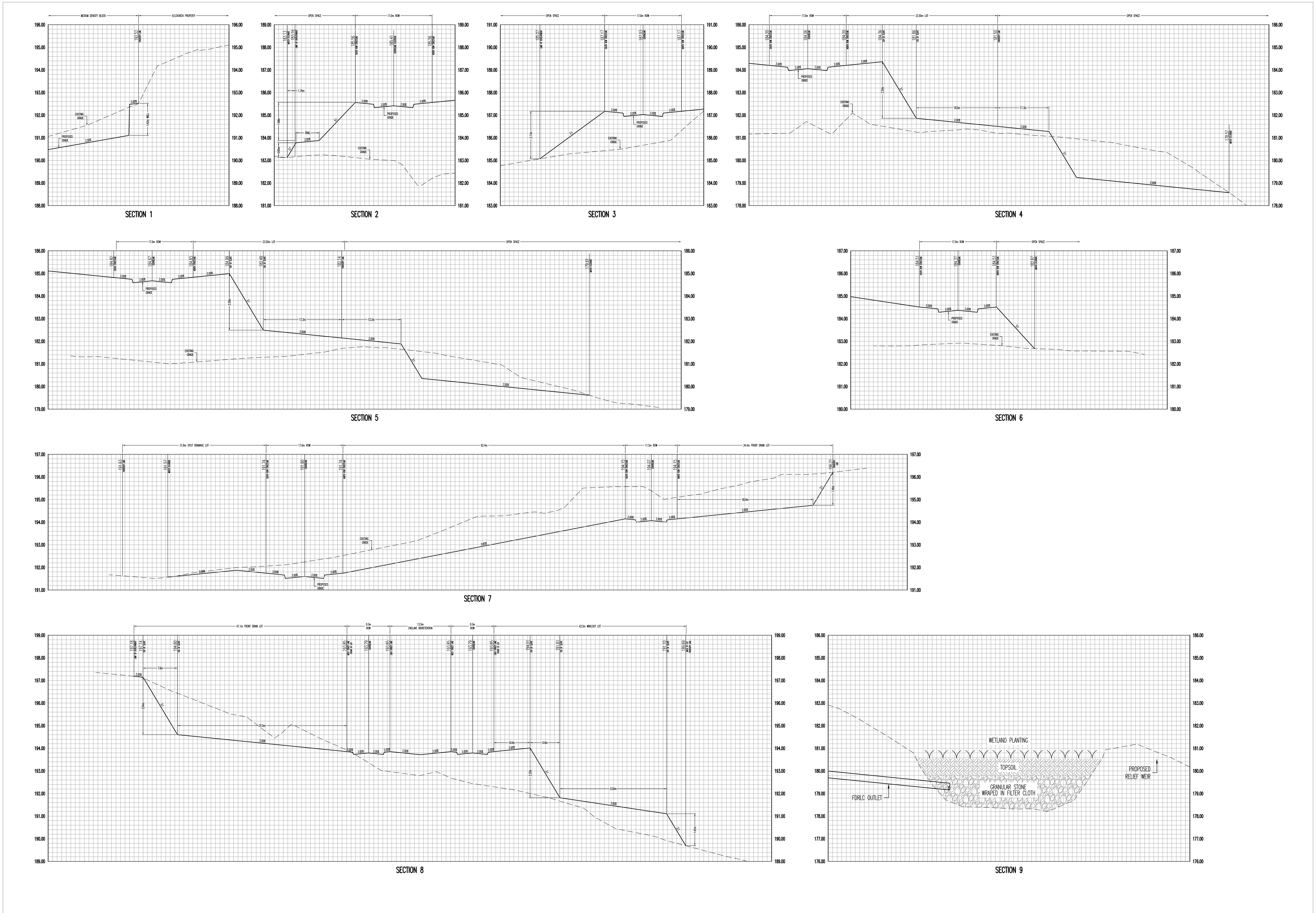
DRAWING 5.1

GRADING PLAN

August 2016

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Drawing 5.0 – Grading.dwg – Revised by <Luk, James> , Mon, Oct 30, 2017 , 1:56 PM



Legend

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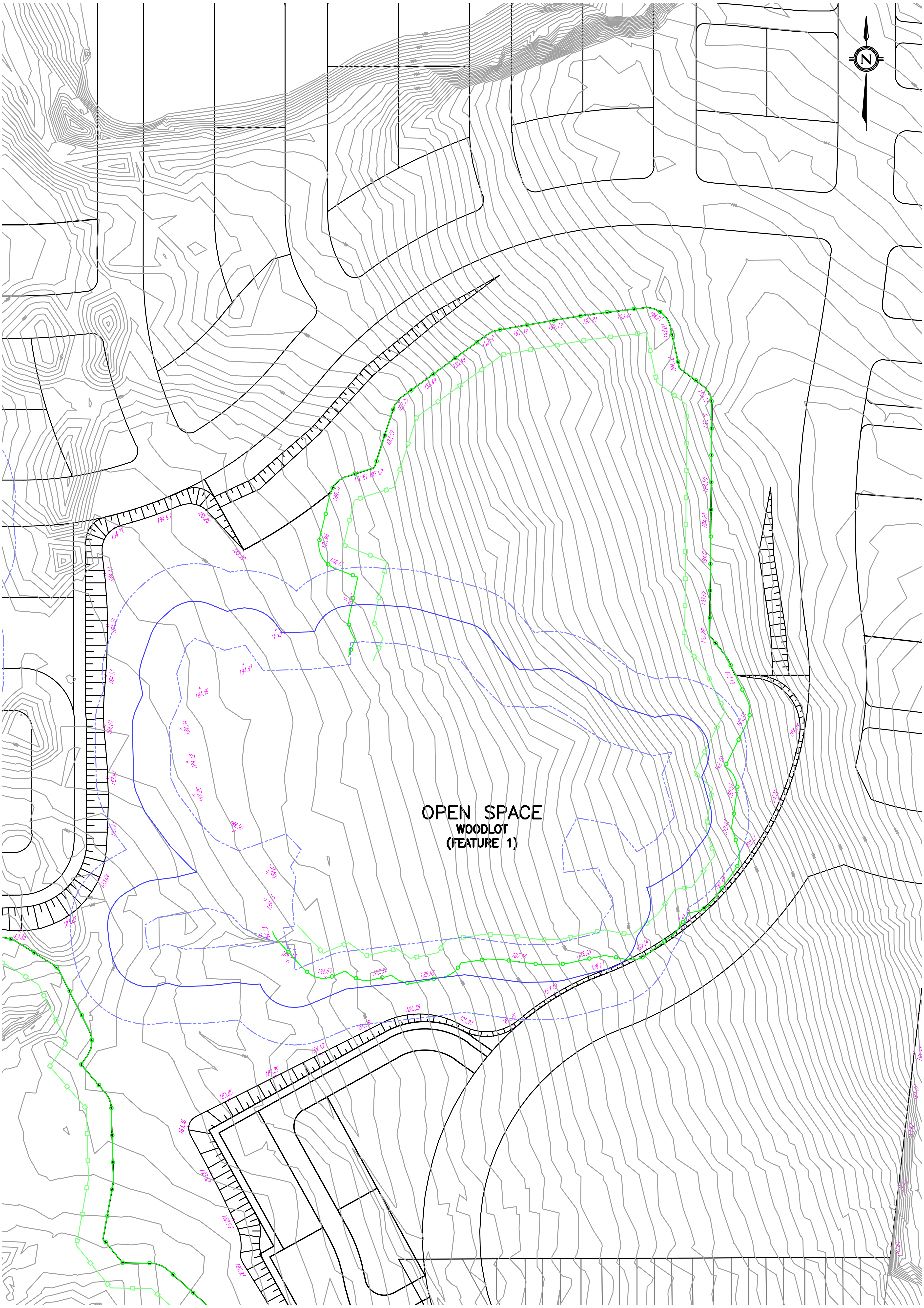
FIGURE 5.2

GRADING SECTIONS

October 2017



Legend

	STAKED DRIPLINE
	STAKED DRIPLINE +10.0m
	STAKED WETLAND
	STAKED WETLAND +15.0m
	STAKED WETLAND +30.0m
	PROPOSED 3:1 GRADING TO EXISTING GRADE

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BURNSIDE

0 15 30 45 60 75

1:1500

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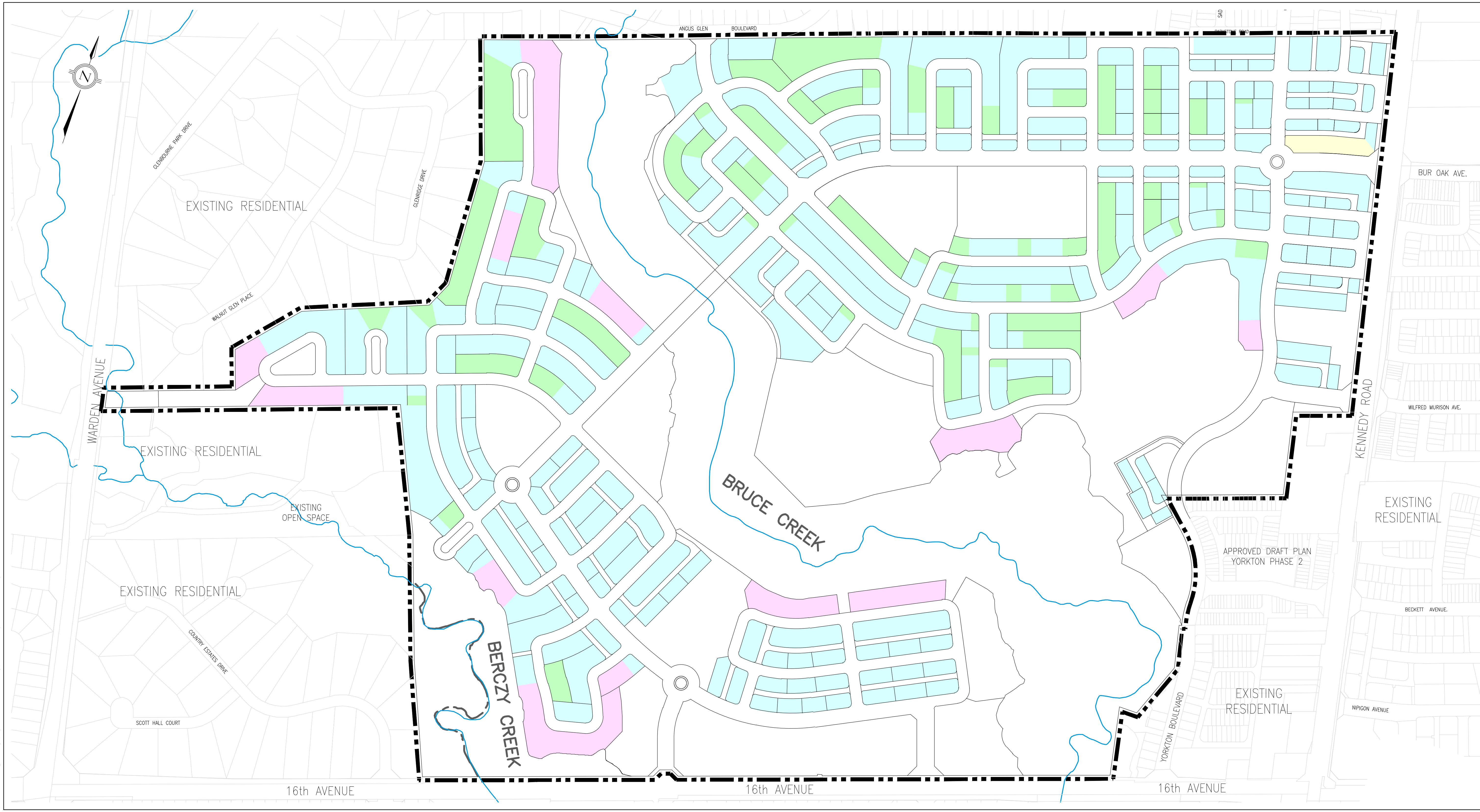
FIGURE 5.3

WOOD LOT
GRADING ENCROACHMENT

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 5.3 – Woodlot Encroachment.dwg – Revised by <Luk, James> , Mon, Oct 23, 2017 , 9:51 AM



Stantec

BEACON ENVIRONMENTAL

BURNSIDE

1:6000 — 0 60 120 180 240 300

Legend

SUBJECT PROPERTY

* POTENTIAL WALL or 3:1 SLOPE

BACK SPLIT

FRONT WALK

FRONT DRAIN

WALKOUT

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FIGURE 5.4

LOT TYPE PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 5.4 - Lot Type Plan.dwg - Revised by <Luk, James> , Fri, Oct 06, 2017 , 9:57 AM

6.0 RIGHT-OF-WAY STANDARDS

6.1 RIGHT-OF-WAY CROSS-SECTIONS

It is proposed that the current City of Markham standard road cross-sections (with the exception of the proposed Enclave Cul-De-Sac and Street F) be used for the development of the subject property including:

- 15.5m RESIDENTIAL LOCAL ROAD.
- 17.0 m RESIDENTIAL LOCAL ROAD [sidewalk one side – MARKHAM DRAWING MR3]
- 18.5 m RESIDENTIAL LOCAL ROAD [sidewalk both sides – MARKHAM DRAWING MR4]
- 23.0 m RESIDENTIAL COLLECTOR ROAD [one side parking and shared bike route – MARKHAM DRAWING MR6]
- 23.0 m RESIDENTIAL COLLECTOR ROAD [one side parking and bike lanes – Stantec detail]
- 24.5 m RESIDENTIAL COLLETOR ROAD [one side parking and bike lanes MARKHAM DRAWING MR7]32.5 m RESIDENTIAL ENCLAVE CUL-DE-SAC [bioretention island Stantec detail]
- 8.5 m and 10.0 m RESIDENTIAL LANE [MARKHAM DRAWING MR10]

Typical right-of-way sections are provided in **Appendix H**.

The design of the roadway geometrics at the following intersections will be undertaken by Poulos & Chung Limited (Transportation Consultants) and will be coordinated with the Region of York:

- STREET 'A' East and Kennedy Road
- STREET 'C' East and Kennedy Road
- STREET 'C' West and 16th Avenue
- STREET 'D' West and 16th Avenue

6.2 SIDEWALK & PRIMARY PEDESTRIAN/BICYCLE TRAIL NETWORK

The proposed sidewalk and trail network plan for pedestrian and cyclist routing is shown on **Figure 6.1**.

Legend

FIGURE SOURCE:
MBTW COMMUNITY DESIGN PLAN 2016

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FIGURE 6.1

SIDEWALK & TRAIL NETWORK

October 2017

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BURNSIDE

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 6.1 – Sidewalk & Trail Network.dwg – Revised by <Guerriero, Michael>, Tue, Oct 31, 2017, 9:47 AM

7.0 FLOODPLAIN HYDRAULICS

An existing and proposed conditions hydraulics assessment utilizing HEC-RAS 4.1.0 has been completed for both Bruce Creek and Berczy Creek and is summarized in the following sections.

7.1 EXISTING CONDITIONS

Existing floodplain mapping and modeling was obtained from TRCA for Bruce Creek and Berczy Creek within the Subject Property. Both creeks are tributaries of the Middle Rouge River contained within one model analyzed in HEC-RAS 4.1.0.

The HEC-RAS hydraulic model was used to establish the regulatory floodplain within the Subject Property and includes the major water crossings within the Subject Property (i.e., culvert crossings for 16th Avenue, and the main golf course crossing of Bruce Creek). Cross-section geometry was developed using ground survey data provided by J.D Barnes for the Subject Property. Road crossings were also field surveyed by J.D Barnes. For the Bruce Creek hydraulic modeling at 16th Avenue, survey data for the area east of the Subject Property was compiled from the Deacon Property topographic mapping (prepared by J.D Barnes) and the proposed grading design of the intersection of Yorkton Boulevard and 16th Avenue.

The existing ponds within the valley system associated with the golf course operations have been modelled assuming no available storage capacity exists below the surveyed waterline provided by J.D Barnes.

Hydraulic cross sections and locations were reviewed and are generally the same as the model provided by TRCA, however alignments were modified as appropriate for the updated topography, and additional cross sections were added as necessary. The Berczy Creek crossing at 16th Avenue was coded in as twin culverts, and the Bruce Creek crossing at 16th Avenue was modeled as a bridge in order to accurately reflect the culvert geometry.

Storm event flows within the HEC-RAS model were not modified from the values provided in the TRCA model. A review of the 2001 MMM Hydrology update noted that flows within the HEC-RAS modeling were typically higher than the hydrologic flows utilizing VO2. This statement holds true for both Bruce Creek and Berczy Creek within the Subject Property. **Table 7.1** below summarizes the flows in the HEC-RAS model and the 2001 MMM Hydrology flows (Complete Development Scenario) within Berczy Creek and Bruce Creek.

Table 7.1 Regional Storm Flow Comparison of Bruce Creek and Berczy

Watershed	HEC-RAS Flow (m^3/s)	VO2 Flow (m^3/s)
Bruce Creek	213.48	205.9
Berczy Creek	182.91	176.8

Manning's "n" values are consistent with standard *Manning's Roughness Coefficients for TRCA Watershed Hydraulic Modeling*. However, through much of the property a manning's 'n' of 0.05 was used in the original model to accurately reflects the ground cover of the golf course. This same value was used as the valley areas will maintain a similar ground cover where the floodplain extends. A summary of the Regional Storm water levels for Bruce Creek is provided in **Table 7.2** with the modeling output provided in **Appendix I** and for Berczy Creek is provided in **Table 7.3** with the modeling output provided in **Appendix J**. The corresponding cross section locations and mapped floodplains are reflected on **Drawing 7.1**. A digital copy of the existing conditions HEC-RAS model has also been included on CD within **Appendix L**.

Table 7.2 Regional Storm Flood Elevation Summary of Bruce Creek

Cross Section	Regional Flow (m^3/s)	Revised Existing Water Surface Elevation (m)
8212.01	213.48	185.77
7216.195	213.48	185.66
7216.19	213.48	184.78
7216.186	213.48	184.24
7216.183	213.48	184.15
7216.18	213.48	183.78
7216.175	213.48	183.6
7216.172	213.48	183.31
7216.171	213.48	183.26
7216.168	213.48	183.1
7216.165	213.48	183.01
7216.16	213.48	182.94
7216.145	213.48	Bridge (Golf Course)
7216.13	213.48	182.07
7216.128	213.48	182.09
7216.125	213.48	182.06
7216.123	213.48	181.99
7216.122	213.48	181.56
7216.121	213.48	181.27
7216.12	213.48	180.46
7216.115	213.48	179.91
7216.11	213.48	179.58
7216.105	213.48	179.01
7216.1	213.48	178.76

Table 7.2 Regional Storm Flood Elevation Summary of Bruce Creek

Cross Section	Regional Flow (m^3/s)	Revised Existing Water Surface Elevation (m)
7216.095	213.48	178.58
7216.09	213.48	178.49
7216.08	213.48	177.93
7216.075	213.48	177.92
7216.07	213.48	177.34
7216.065	213.48	177.47
7216.06	213.48	177.39
7216.045	213.48	Bridge (16th Ave)
7216.03	213.48	176.74

Table 7.3 Regional Storm Flood Elevation Summary of Berczy Creek

Cross Section	Regional Flow (m^3/s)	Revised Existing Water Surface Elevation (m)
7201.13	182.91	180.81
7201.125	182.91	180.56
7201.12	182.91	180.37
7201.11	182.91	179.79
7201.105	182.91	179.22
7201.1	182.91	179.29
7201.085	Bridge (16th Ave)	
7201.07	182.91	179.21

7.2 PROPOSED CONDITIONS

The updated existing conditions hydraulics modeling described in Section 7.1 has been updated to reflect the proposed development grading and servicing plan which includes:

- Proposed SWM Pond 1 located within the edges of the existing Regional Floodline;
- Proposed compensating cut grading;
- Proposed road crossing of Bruce Creek;
- Removal of existing golf course driveway crossing; and,
- Removal of existing golf course ponds within the valley system.

The proposed pedestrian crossing of Bruce Creek and Berczy Creek are in fact the existing golf course crossings of these creeks. Existing hydraulic modeling typically does not include small and/or temporary crossings within the model for Regulatory floodplain mapping purposes. Since the proposed development only requires pedestrian crossing of the creeks other than at the road locations, the existing golf course crossing locations are preferred as they will minimize disturbance and impacts to the natural environment. The pedestrian crossings have not been included in the proposed hydraulics model, which is consistent with the existing conditions hydraulic modeling as mentioned in Section 7.1.

The proposed conditions modeling assessment includes the SWM pond grading encroachment into the existing Regional Floodline. The proposed filling is located within the shallow fringe of the floodplain. The pond grading matches the existing grades along the Redside Dace Habitat limit (meander belt limit + 30m) and/or limit of the pond block. The proposed filling also is located within areas of continued disturbance for golf course operations (i.e., works yard, and golfing greens) as shown on **Figure 7.4**. To satisfy the TRCA Living City Policy (LCP) 8.12.2 an incremental cut and fill assessment has been included as part of the analysis to support the minor SWM Pond grading encroachment into the existing Regional Floodplain. The proposed compensating cut within the valley is necessary within the meander belt and the Redside Dace Habitat limit (meander belt limit + 30m) because the existing Regional Floodplain is off centre from the meander belt width. The majority of the proposed cut grading occurs within golf fairways and access roads (modified areas that will require re-naturalization as part of the overall compensation package for the development).

A summary of the existing and proposed Regional Storm water levels for Bruce Creek is provided in **Table 7.4** with the proposed conditions modeling output provided in **Appendix K**. The corresponding cross-section locations and proposed conditions floodplain limits are reflected on **Drawing 7.2**. A digital copy of the existing and proposed conditions HEC-RAS model has also been included on CD within **Appendix L**.

Table 7.4 Regional Storm Flood Elevation Summary of Bruce Creek

Regional Flow (m^3/s)	Cross Section	Revised Existing Water Surface Elevation (m)	Proposed Water Surface Elevation (m)	Elevation Difference (m)
213.48	8212.01	185.77	185.77	0
213.48	7216.195	185.66	185.66	0
213.48	7216.19	184.78	184.78	0
213.48	7216.186	184.24	184.52	0.28
213.48	7216.183	184.15	184.47	0.32
213.48	7216.18	183.78	184.33	0.55
213.48	7216.175	183.6	184.27	0.67
213.48	7216.172	183.31	184.25	0.94
213.48	7216.171	183.26	184.12	0.86

Table 7.4 Regional Storm Flood Elevation Summary of Bruce Creek

Regional Flow (m^3/s)	Cross Section	Revised Existing Water Surface Elevation (m)	Proposed Water Surface Elevation (m)	Elevation Difference (m)
213.48	7216.168	183.1	182.81	-0.29
213.48	7216.165	183.01	182.77	-0.24
213.48	7216.16	182.94	182.63	-0.31
213.48	7216.145	Bridge (Golf Course)	N/A	N/A
213.48	7216.13	182.07	182.14	0.07
213.48	7216.128	182.09	182.09	0
213.48	7216.125	182.06	182.06	0
213.48	7216.123	181.99	181.99	0
213.48	7216.122	181.56	181.56	0
213.48	7216.121	181.27	181.27	0
213.48	7216.12	180.46	180.44	-0.02
213.48	7216.115	179.91	179.91	0
213.48	7216.11	179.58	179.53	-0.05
213.48	7216.105	179.01	179.03	0.02
213.48	7216.1	178.76	178.76	0
213.48	7216.095	178.58	178.58	0
213.48	7216.09	178.49	178.49	0
213.48	7216.08	177.93	177.93	0
213.48	7216.075	177.92	177.92	0
213.48	7216.07	177.34	177.34	0
213.48	7216.065	177.47	177.47	0
213.48	7216.06	177.39	177.39	0
213.48	7216.045	Bridge (16th Ave)	Bridge (16th Ave)	
213.48	7216.03	176.74	176.74	0

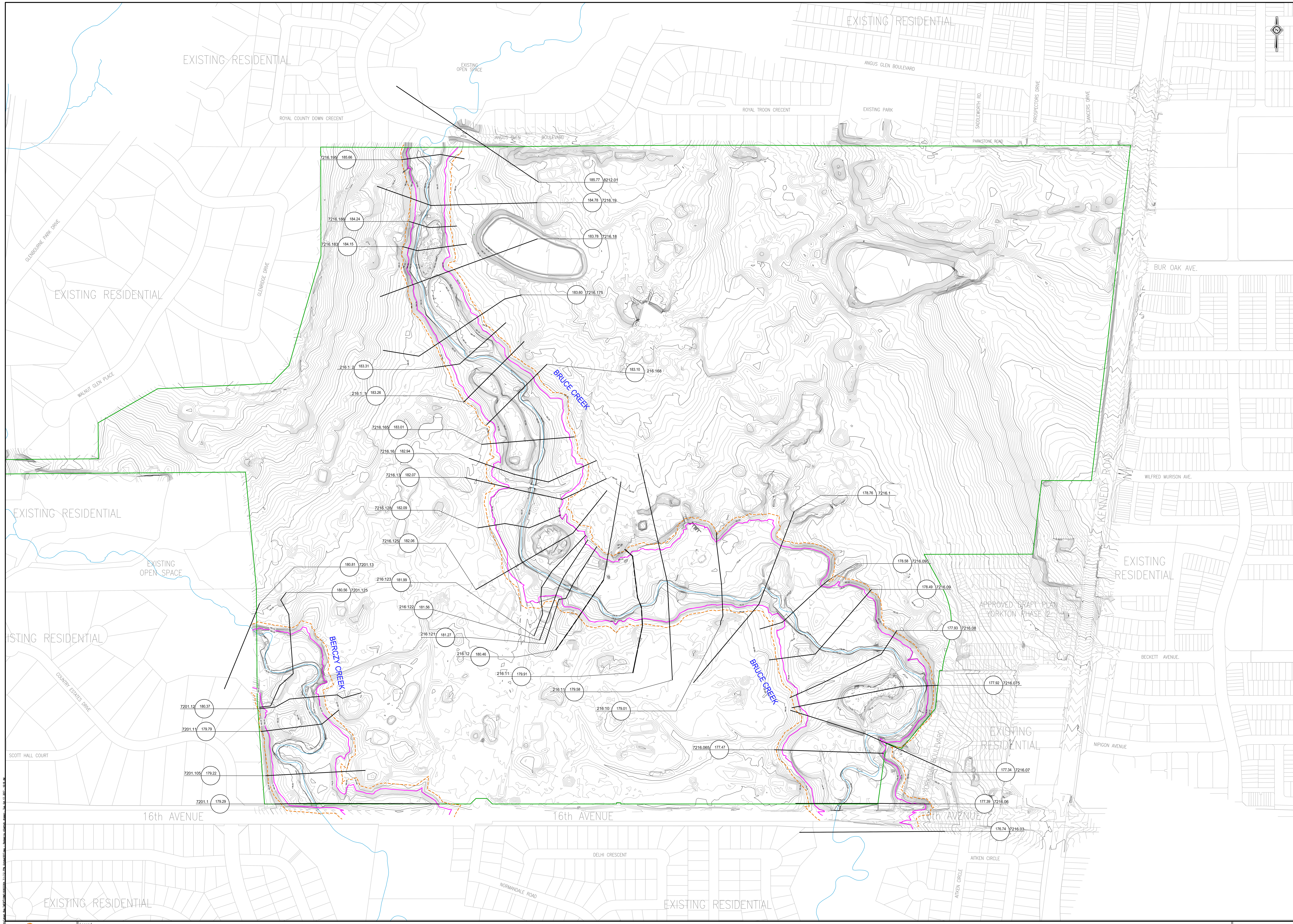
As shown in the above table, there are changes to the Regional storm flood elevations within the property however, there are no increases within upstream lands. The increases in Regional storm flood elevations upstream of the road crossing, are contained within the Bruce Creek Valley system as shown on **Drawing 7.2**. The proposed road and lots will be graded to ensure a minimum 0.3 m of freeboard is provided between the lots and the Regional flood elevation.

Drawing 7.3 illustrates the cross-section locations, proposed floodplain cut and fill assessment, and the proposed floodplain limits. **Figure 7.4** illustrates the limits of development with the proposed cut and fill areas overlaid on the air photo to show areas of impact and existing features. **Figure 7.5** provides a typical cross section for the proposed cut grading design along HEC-RAS section 7216.11.

An incremental floodplain cut and fill assessment was undertaken with results presented in **Table 7.5**. These results show that a total and incremental net cut volume can be provided.

Table 7.5 Incremental Floodplain Cut and Fill Assessment

Elevation (m)	Elevation (m)	Cut (m3)	Fill (m^3)	Net (m^3)
177.9	178.2	-5.5	0.27	-5.19
178.2	178.5	-122.2	43.59	-78.62
178.5	178.8	-414.9	371.96	-42.94
178.8	179.1	-621.5	586.69	-34.83
179.1	179.4	-507.9	346.38	-161.54
179.4	179.7	-472.2	194.49	-277.73
179.7	180.0	-612.5	102.32	-510.20
180.0	180.3	-429.7	28.83	-400.87
180.3	180.6	-80.1	7.51	-72.59
180.6	180.9	-1.3	0.21	-1.04
Total Volume =		-3,267.8	1,682.25	-1,585.55



Legend

	REGIONAL FLOODLINE
	REGIONAL FLOODLINE 10m BUFFER
	SUBJECT PROPERTY
183.00	EXISTING CONTOURS

REGIONAL FLOOD ELEVATION (m)
CROSS SECTION NUMBER — 7201.12 180.37
CROSS SECTION

1:2000 0 20 40 60 80 100

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FIGURE 7.1

EXISTING REGIONAL STORM
FLOODPLAIN MAPPING

October 2017

Legend

REGIONAL FLOODLINE

REGIONAL FLOODLINE 10m BUFFER

SUBJECT PROPERTY

PROPOSED CONTOURS

REGIONAL FLOOD ELEVATION (m)

CROSS SECTION NUMBER — 7201.12 180.37

CROSS SECTION

1:2000 0 20 40 60 80 100

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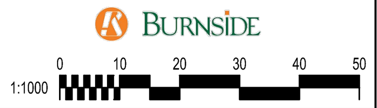
FIGURE 7.2

PROPOSED REGIONAL STORM FLOODPLAIN MAPPING

October 2017



Legend

PROPOSED REGIONAL FLOODLINE WITH NO CUT	SUBJECT PROPERTY
CROSS SECTION	LIMIT OF CUT
183.00 EXISTING CONTOURS	LIMIT OF FILL
PERMANENT POOL	0.07 DEPTH OF CUT
FILL IN EXISTING GOLF COURSE POND	0.08 DEPTH OF FILL
	LIMIT OF GRADING (MATCH EXISTING GROUND)

PROPOSED REGIONAL FLOOD ELEVATION (m)
CROSS SECTION NUMBER — 7201.12 180.37

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FIGURE 7.3

PROPOSED FLOODPLAIN CUT AND FILL FOR BRUCE CREEK

August 2016

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 7.3 – Proposed Regional Storm Floodplain Mapping for Bruce Creek.dwg – Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 2:55 PM

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 7.4 – Proposed Floodplain Cut and Fill Grading Limits for Bruce Creek.dwg – Revised by <Luk, James> , Fri, Oct 27, 2017 , 10:25 AM

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BURNSIDE

0 60 120 180 240 300

1:6000

Legend

SUBJECT PROPERTY

LIMITS OF GRADING

LIMITS OF CUT

LIMITS OF FILL

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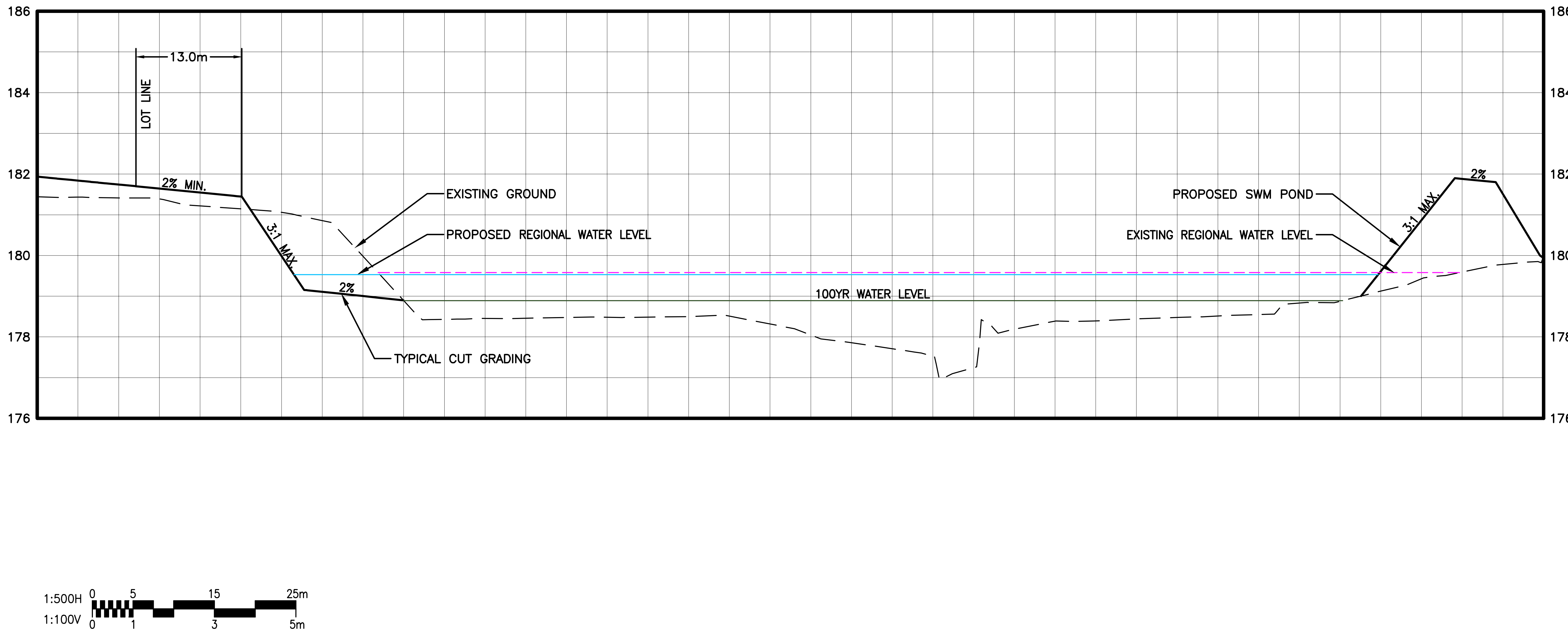
FIGURE 7.4

PROPOSED FLOODPLAIN CUT AND FILL GRADING LIMITS FOR BRUCE CREEK

October 2017



File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\SWM\160622264_7.5 – Typical Cut Grading Cross Section.dwg – Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 2:59 PM

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BURNSIDE

Legend

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FIGURE 7.5

TYPICAL CUT GRADING CROSS-SECTION

October 2017

8.0 PROPOSED CROSSINGS

Various crossings of the existing valley features are proposed as part of the development, the following sections discuss the details of each of the crossings proposed.

8.1 PROPOSED ROAD CROSSING OF BRUCE CREEK

A road crossing of Bruce Creek is required for connectivity and neighborhood structure as well as traffic flow described in the *Transportation Assessment Internal Roadway Network* prepared by Poulos & Chung.

A review of the 2015 TRCA Crossings Guideline for Valley and Stream Corridors was undertaken. This report stated that with respect to new road crossings, many aspects of the natural hazard and natural heritage objectives can be accomplished through proper siting of infrastructure. For example, crossings that are perpendicular to valley and stream corridor and crossings at the narrowest point along the corridor can reduce the impacts and construction costs. Minimize the total number of infrastructure crossings of valleys and wherever possible co-locate infrastructure.

For Natural hazards the objectives pertain to avoidance and mitigation of flood risk, geotechnical risk from slope stability and geomorphic risk from channel migration over time.

- Proposed crossing must not increase flood risk for design storm events up to and including the Regulatory storm event (Regional storm).
- Span the zone of potential future channel migration as defined by the meander belt. Alternative design supported by geomorphic studies may be supportable.

For Natural Heritage function the objectives relate to terrestrial and aquatic habitat and connectivity functions.

- Proposed crossing must avoid siting in locations of woodlots, wetland, seepage areas, and other sensitive habitats, avoid channel realignment, and permitting wildlife movement and fish passage.

Only one road crossing is proposed for the Subject Property. This crossing location has been selected in area that is relatively narrow and perpendicular to the valley corridor. The proposed road crossing location has avoided woodlots, wetlands, unstable slope areas, and known seepage areas. The proposed road crossing is an open span bridge permitting wildlife movement underneath and fish passage. The proposed road crossing has also avoided channel realignment. In addition, the proposed road crossing is co-located with the watermain crossing.

Based on the hydraulic analysis for the proposed crossing described below, the crossing has been designed to allow the Regional storm event to be conveyed without overtopping of the road surface.

Due to the wide meander belt width in this reach of the valley corridor it was not possible to span the meander belt width with one open span bridge section. Refer to the Beacon Geomorphic Assessment for additional studies to support the proposed design.

A preliminary road crossing design of Bruce Creek has been prepared and included in this report. This proposed crossing location and design will need to be reviewed, confirmed and refined in the future as part of the detailed design process. The preliminary road crossing design concept consists of a 40 m wide open span bridge section centered over the existing creek with typical road ROW and embankment grading for the approach section leading up to the open span section. **Figure 8.1** illustrates the proposed crossing design in plan and cross section.

8.1.1 Hydraulic Modelling

This preliminary crossing configuration was modeled in HEC RAS 4.1.0 to assess conveyance capacity and ensure minimal impacts to the Regional Storm flood elevations upstream of the proposed crossing. **Drawing 7.2** illustrates the proposed crossing and Regional Storm flood elevations. As shown in **Table 7.4** there are some increases to the Regional Storm flood elevations upstream of the proposed crossing, which are contained within the valley system as shown on **Drawing 7.2**. The proposed road and lots will be graded to ensure a minimum 0.3 m of freeboard is provided between the lots and the Regional Storm flood elevation.

8.2 PROPOSED MUNICIPAL SERVICING CROSSINGS OF BRUCE CREEK

8.2.1 Proposed Watermain Crossing

Two watermain crossings of Bruce Creek are proposed. The first proposed watermain crossing of Bruce Creek is located at the proposed road crossing location and will be by way of an insulated pipe suspended from the bridge structure, or a trenchless construction method. The second watermain crossing of the Bruce Creek is proposed north of the proposed Street "A" crossing from Street "R" East to Street "V" West via a trenchless construction method. The proposed watermain crossing options are shown on
Figure 8.1.

8.2.2 Proposed Trunk Sanitary Sewer

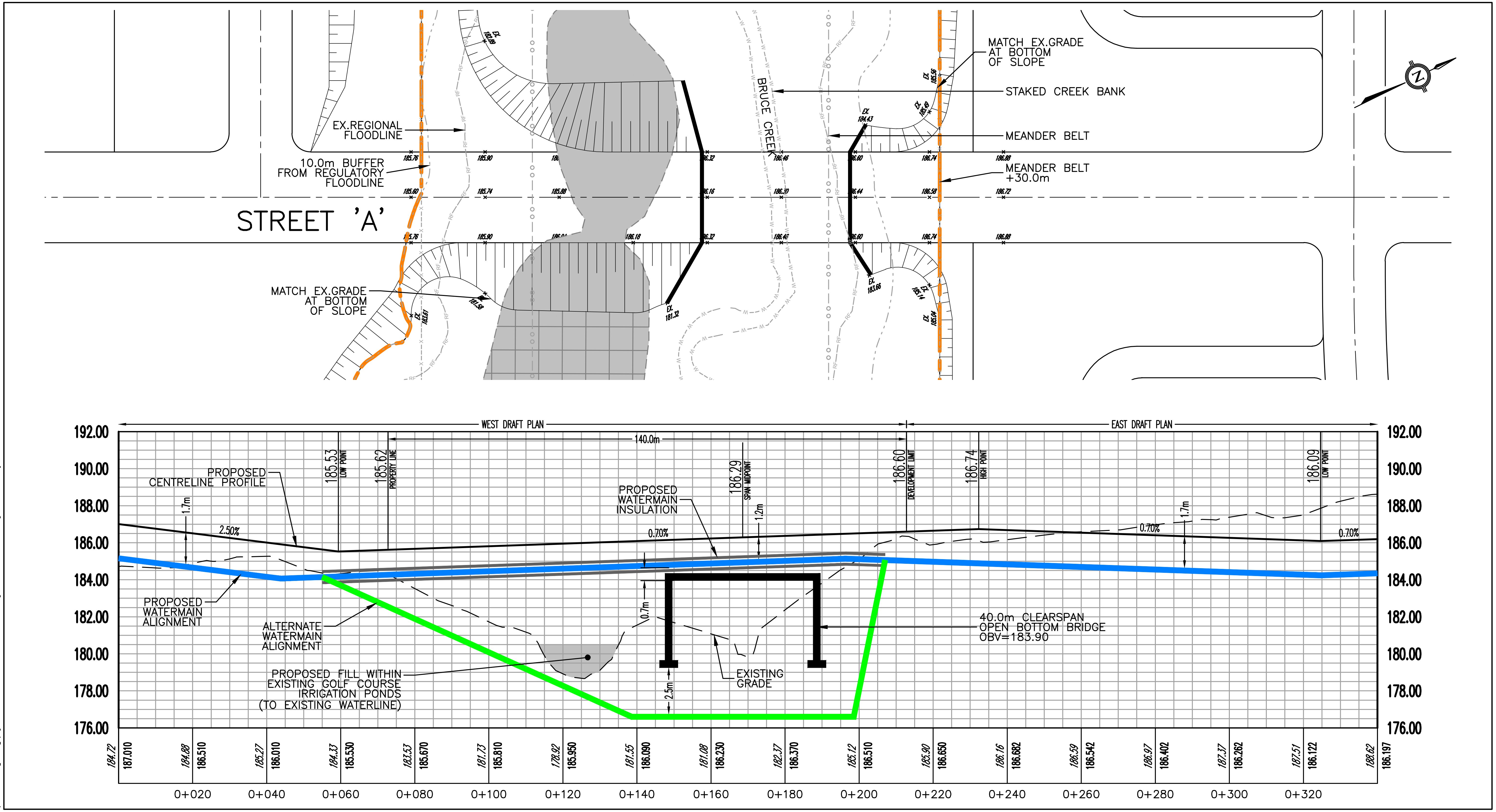
As noted in Section 4.0 a sanitary sewer is proposed to be extended below Bruce Creek through a trenchless construction method from SWM Pond 1 on the north side of Bruce Creek to a point on the south side of the creek, through an open space block onto Street 'E' West and Street 'C' West. This allows for the opportunity for one connection to the existing 2100 mmø YDSS sanitary trunk along 16th Avenue at the south limit of the Subject property. This sanitary sewer crossing under Bruce Creek is shown on **Figure 4.3,** and the proposed pipe and drill pit locations are also shown on **Figures 2.8 and 4.3**.

8.3 PROPOSED SERVICES WITHIN OPEN SPACE BLOCKS

Several storm sewers are proposed within a portion of Open Space Block 13 and 14 East. All of these pipes are located outside of the development limits. These pipes are shown on **Figure 2.12**.

8.4 ROAD CROSSING OF BERCZY CREEK

A possible road crossing of Berczy Creek and a connection to Warden Avenue at the west limit of the Subject Property, was reviewed and is not proposed as part of this development. The potential crossing location of Berczy Creek would involve the construction of the road through a wooded area, at the edge of the Berczy Creek valley, and would then require an open span bridge crossing of the Berczy Creek valley. In addition, the possible road connection to Warden Avenue is restricted to one location from the Subject Property within a 26 m wide strip. Further to the above constraints, any road linkage to Warden Avenue would likely result in a bridge connection at the existing bridge abutment at Warden Avenue, where Warden crosses over Berczy Creek Valley. Details regarding the review and assessment are included in the Background Report for the Lack of a Collector Road Connection to Warden Avenue dated June 2017.



1:1000 0 10 20 30 40 50

Legend

DEVELOPMENT LIMIT (GREATER OF ALL EXISTING CONSTRAINTS)

PROPOSED 3:1 GRADING TO EXISTING GRADE

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FIGURE 8.1

BRUCE CREEK ROAD CROSSING PLAN AND PROFILE

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9.0 UTILITIES

9.1 GAS

Enbridge Gas Distribution Inc. will be the natural gas provider for the proposed development. At this preliminary stage, Enbridge has only provided plans for general information on their existing network within the surrounding area. Further discussions and a formal application will be necessary for Enbridge to provide a detailed plan identifying their service to the overall proposed development and each individual lot. Typically, Enbridge provides service to lots at an offset of 0.6m from the property line. The existing natural Gas infrastructure is shown in **Figure 9.1**.

Existing infrastructure surrounding the Subject Property includes:

- A 6" line on the East side of Kennedy Road, running the entire depth of the property.
- A 4" line along 16th avenue spanning the East and West thirds of the property.
- A 4" line along Angus Glen Boulevard, running the entire length of the property.
- Various other distribution lines servicing each lot of the subdivisions in the surrounding areas.
- A service is also shown, branching off Warden Avenue, along Old Farm Lane Way. A 2" connection line is shown at the property limit along the West side.

9.2 HYDRO

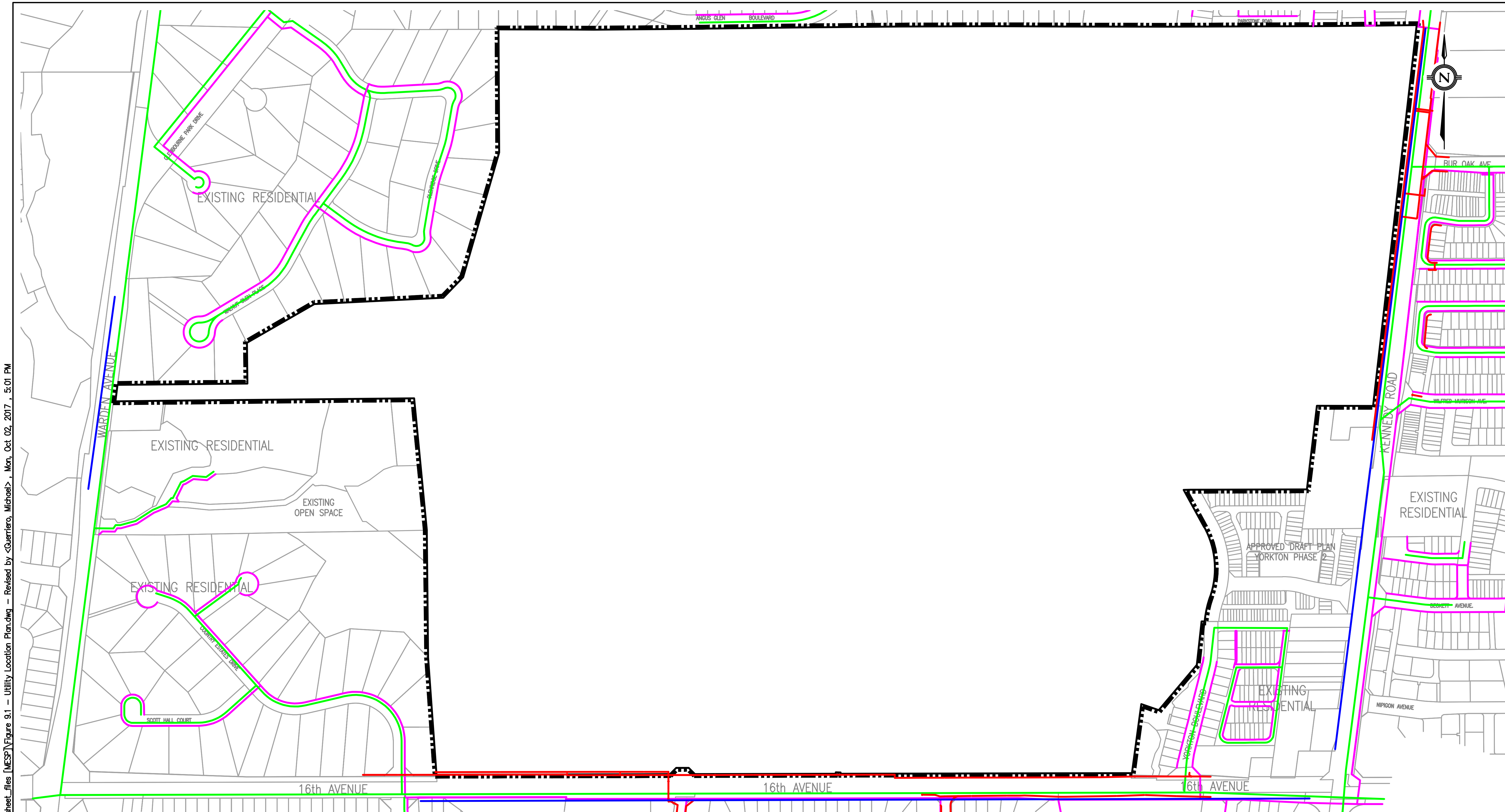
Hydro power is to be provided by PowerStream Inc. There is Existing hydro infrastructure surrounding the entire property, namely Primary overhead lines along, Warden Avenue, Kennedy Road, and 16th Avenue, each having multiple overhead transformers. There is also the existing power service provided to the York Downs Golf Course Club House through an underground servicing connecting from 16th Avenue; two underground transformers within the property support this service. Further coordination will be required with PowerStream Inc. to establish their service alignment of the proposed development. The existing infrastructure can be seen in **Figure 9.1**. There is also existing underground infrastructure that provides service to each of the lots to the north of the proposed development servicing the subdivision and lots of Glen Angus Boulevard.

9.3 BELL

Bell Canada will be the telephone service provider for the proposed development. Bell has indicated that there is existing buried cable infrastructure along the West side of Kennedy Road. Additionally, there are two buried cable lines along the north side of 16th Avenue. Although Bell was unable to provide information, it is assumed that there is an existing bell line fed into the property to the existing York Downs Golf Course Clubhouse. Coordination with Bell will be required to provide the exact conduit/buried line and pedestal layout that will support the proposed development. **Figure 9.1** shows the existing Bell Infrastructure.

9.4 CABLE

Rogers Communications is to be the cable provider within the proposed development. There is existing Rogers infrastructure in the surrounding areas. Both Warden Avenue and 16th Avenue have existing aerial lines, Kennedy Avenue has existing aerial and buried lines. There is also the existing buried line that extends of 16th Avenue, which currently feeds the York Downs Golf Course Club House; these are indicated in **Figure 9.1.** Rogers Communications has standard property line offsets of 1.75m on Regional roads and 2.3m on Town roads. Rogers has also indicated that Fibre Optic cable is present in the area of the proposed development. Exact connection points are to be established at a future date in coordination with Rogers Communications.



Stantec

1:6000

0 60 120 180 240 300

Legend

▬ · · ▬	SUBJECT PROPERTY
red line	BELL
magenta line	ENBRIDGE
green line	HYDRO (POWERSTREAM)
blue line	ROGERS

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FIGURE 9.1

EXISTING UTILITY LOCATION PLAN

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File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 9.1 – Utility Location Plan.dwg – Revised by <Guerriero, Michael> , Mon, Oct 02, 2017 , 5:01 PM

10.0 INFRASTRUCTURE AND DEVELOPMENT PHASING

As discussed in Section 1.7, the Phase 1 area will be the first area to be developed within the Subject Property as it is located on non-golf course lands and has existing services available as described below. Phase 1 is located in the northeast corner of the Subject Property adjacent to Kennedy Road. The phasing limits presented within this report could be expanded to the western limit of the non-course lands pending further review of the servicing and traffic.

10.1 WATER SUPPLY

As mentioned previously due to the timing issues and operations of the Golf Course and the resulting availability of land to be developed, the eastern portion of the subject lands, bounded by Kennedy Road and the woodlot/wetland (Feature 1), will be developed first as 'Phase 1'.

There is an existing watermain on Bur Oak on the east side of Kennedy Road (300 mmø) and an existing water main on Prospectors Drive (300 mmø), and an existing water main on Dancers Drive (150 mmø) within Phase 1 that can supply water in three locations. The connections at Bur Oak will require a PRV (pressure reducing valve).

In addition, there are also connection points at the north to Dancers Drive (150 mmø), Saddleworth Road (150 mmø), and Prospectors Drive (300 mmø). See **Figure 3.1**.

The balance of development of the Subject Lands would require a 300 mmø watermain connection to Angus Glen Boulevard as well as a 300 mmø watermain on Street 'A' East to be either suspended on the proposed Bruce Creek crossing or passing under the creek by trenchless construction method to supply water to the western development lands. Future connections would also be required to the 450 mmø watermain on the south side of 16th Avenue. A detailed water supply analysis is required to determine the actual size and treatment required at each connection to the existing watermains to provide proper watermain looping for supply of fireflow and domestic use. This detailed water system analysis has been completed by WSP and is attached as **Appendix G**.

10.2 SANITARY SERVICING

Phase 1 can be serviced by a direct connection to the existing 525 mmø sanitary sewer at the intersection of Street 'A' East and 'B' East. An additional connection to the existing sanitary sewer at Street 'B' East is also required.

For proposed lots fronting onto Parkstone Road, there is an existing sanitary pipe that can be utilized, and for the remaining, a new sanitary pipe will be required. The proposed pipe could drain into the existing pipe to the east, or drain to the west, through the easement block and ultimately into the sanitary sewer network within in Street "I" East.

Refer to **Figure 10.1** for sanitary phasing plan. Temporary sanitary sewers will be installed to allow all of Phase 1 to proceed. These services would require minor refinements to the grading and servicing presented within this report, and can be assessed in the future.
The balance of the Subject Property on the east side of Bruce Creek will require a sanitary sewer crossing under Bruce Creek with a connection to the existing 2100 mmø York Durham Sanitary Sewer (YDSS) on the north side of 16th Avenue.

Also, an existing 750 mmø sanitary sewer traverses the Subject Property conveying flows from the north through the Angus Glen Subdivision and beyond. Portions of the existing 750 mmø sanitary sewer within the lands east of Bruce Creek may require realignment to suit the proposed road layout, therefore bypass pumping or a doghouse manhole during relocation of the existing 750 mmø sanitary will be required. The extent of realignment and details will be provided at detailed design stage.

The Subject Property located west of Bruce Creek will connect to the proposed sanitary pipe that crosses under Bruce Creek prior to the 16th Avenue connection point into the 2100 mmø YDSS.

10.3 STORM SERVICING

The majority of Phase 1 will drain directly into the existing 2400 mm storm sewer on Street 'A' East. The existing 2400 mm pipe conveys the 100 year flow from lands east of Kennedy Road (minor system area of 82.95 ha and major system area of 66.85 ha) plus minor system flow from 23.4 ha of the proposed development adjacent to Kennedy Road into the existing SWM Pond (H) as shown on **Figure 2.2**. The southern portion of Phase 1 will drain to a proposed storm sewer on Street 'C' East. This pipe will convey flows to the interim SWM pond located within an easement just north of the future SWM Pond 2. This interim pond was designed to service drainage from 4134 16th Avenue. The existing interim SWM Pond can be removed once SWM Pond 2 and the storm pipe infrastructure are constructed. Refer to **Figure 10.2** for storm phasing plan.

Temporary storm sewers will be installed to allow all of Phase 1 to proceed. These services would require minor refinements to the grading and servicing presented within this report, and can be assessed in the future. Possible modifications could be undertaken to Pond H to expand the phasing limits shown.

Further development of the Subject Property, into the golf course lands, east of Bruce Creek will require the construction of SWM Pond 1 to service 146.82 ha drainage area (including the proposed development and existing external lands east of Kennedy). Existing SWM Pond H can be removed once SWM Pond 1 and the connecting storm pipe for the external lands are constructed. Refer to

In order to remove existing SWM Pond H, a proposed 2100 x 3600mm concrete box storm sewer needs to be constructed from the existing storm manhole 101 on Street 'A' East within the new road allowance to the proposed SWM Pond 1, approximately 750 m. The existing outflow pipe from Pond H will have to be maintained during construction of SWM Pond 1 and related storm pipes, but will be abandoned or removed at a later date. The extension of the external 100 year storm pipe storm pipe to SWM Pond 1 has been sized to capture and convey some of the storm flows from the Subject Property draining to SWM Pond 1. In addition, a foundation drain collector (FDC) is required to service the lower reaches of the development.

Lots fronting onto Parkstone Road will drain approximately half of the lot drainage towards the existing ROW. An assessment of the available capacity within the storm sewer should be undertaken prior to detailed design to confirm that the pipe and the downstream pond have the available capacity to accept additional drainage. If there is no capacity left, it may be possible to complete a drainage swap such that the front half of the proposed lots would drain to the existing sewer, and any storm sewers along the south boundary be redirected into the Subject Property. For the purposes of this report, the ponds and storm sewers within the proposed development have been sized to accommodate all drainage from these lots.

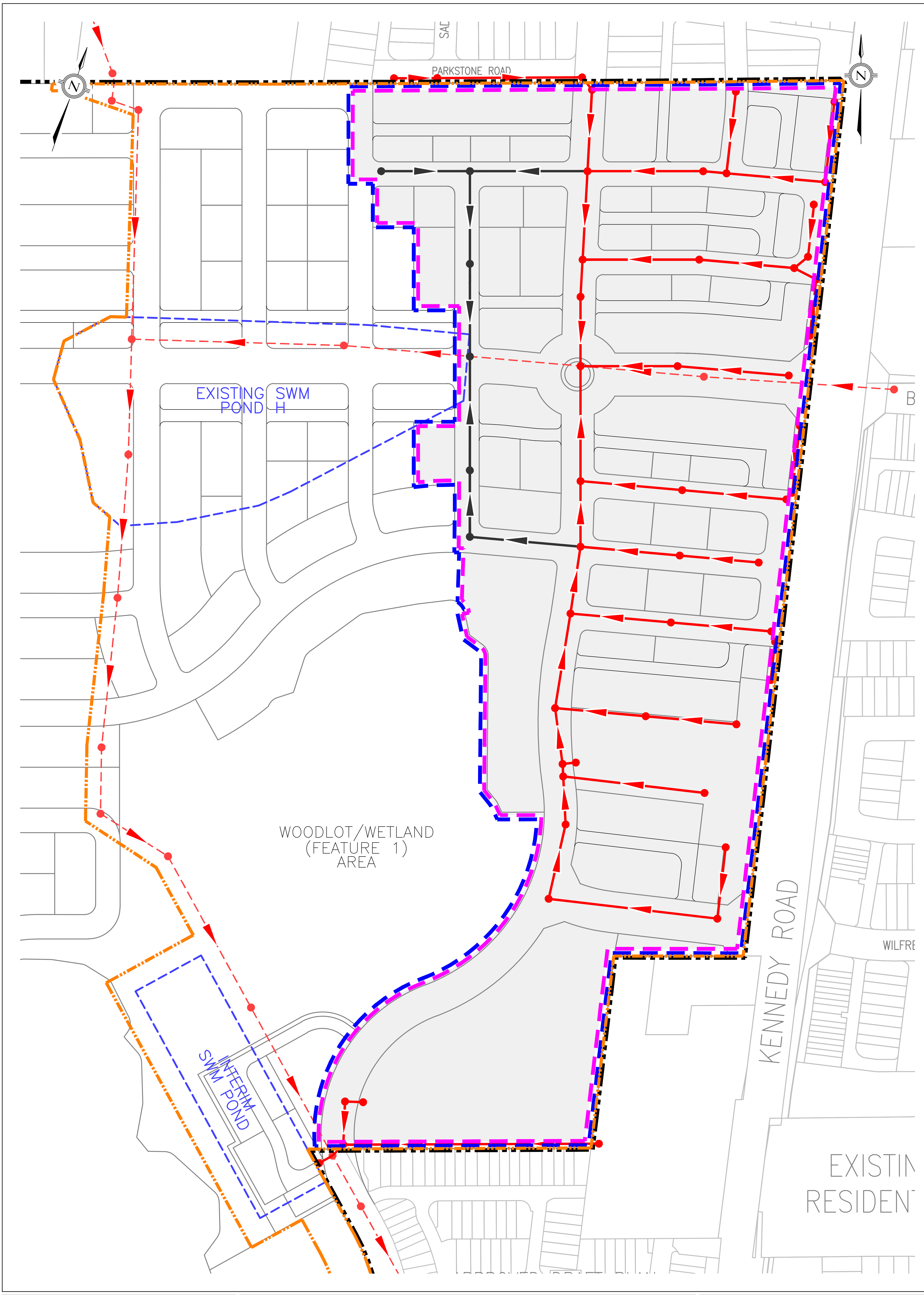
The development of the Subject Property west of Bruce Creek will drain to SWM Pond 3 (Bruce Creek) and SWM Pond 4 (Berczy Creek). A FDC is required to service a portion of the northern area of the development.

10.4 CONSTRUCTION PHASING AND STAGING

Beyond the Phase 1 area, construction phasing and staging will be dependent upon the end of golf course operations and completion of infrastructure. These include the connection of the trunk sanitary sewer to 16th Avenue, construction of the SWM ponds, and watermain connections to existing services on 16th Avenue and Yorkton Boulevard.

It is anticipated that the existing golf course driveway crossing of Bruce creek will remain in place until the proposed road crossing (bridge) of Bruce Creek is constructed. This existing crossing will also be used during earthworks operations to facilitate fill movement between the east and west developments. Proposed SWM ponds will be constructed early on in the earthworks phase and will function as ESC ponds during the earthworks and servicing phases of construction.

Intersection construction along 16th Avenue and Kennedy Road will be coordinated with the Region of York and City of Markham to minimize impacts to traffic.



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 25 50 75 100 125
1:2500

Legend

- SUBJECT PROPERTY
- PROPOSED SANITARY SEWER
- TEMPORARY SANITARY SEWER
- EXISTING SANITARY SEWER
- PHASE 1 LIMIT
- SERVICEABILITY LIMIT
- NON–GOLF COURSE LANDS

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FIGURE 10.1

SANITARY PHASING PLAN

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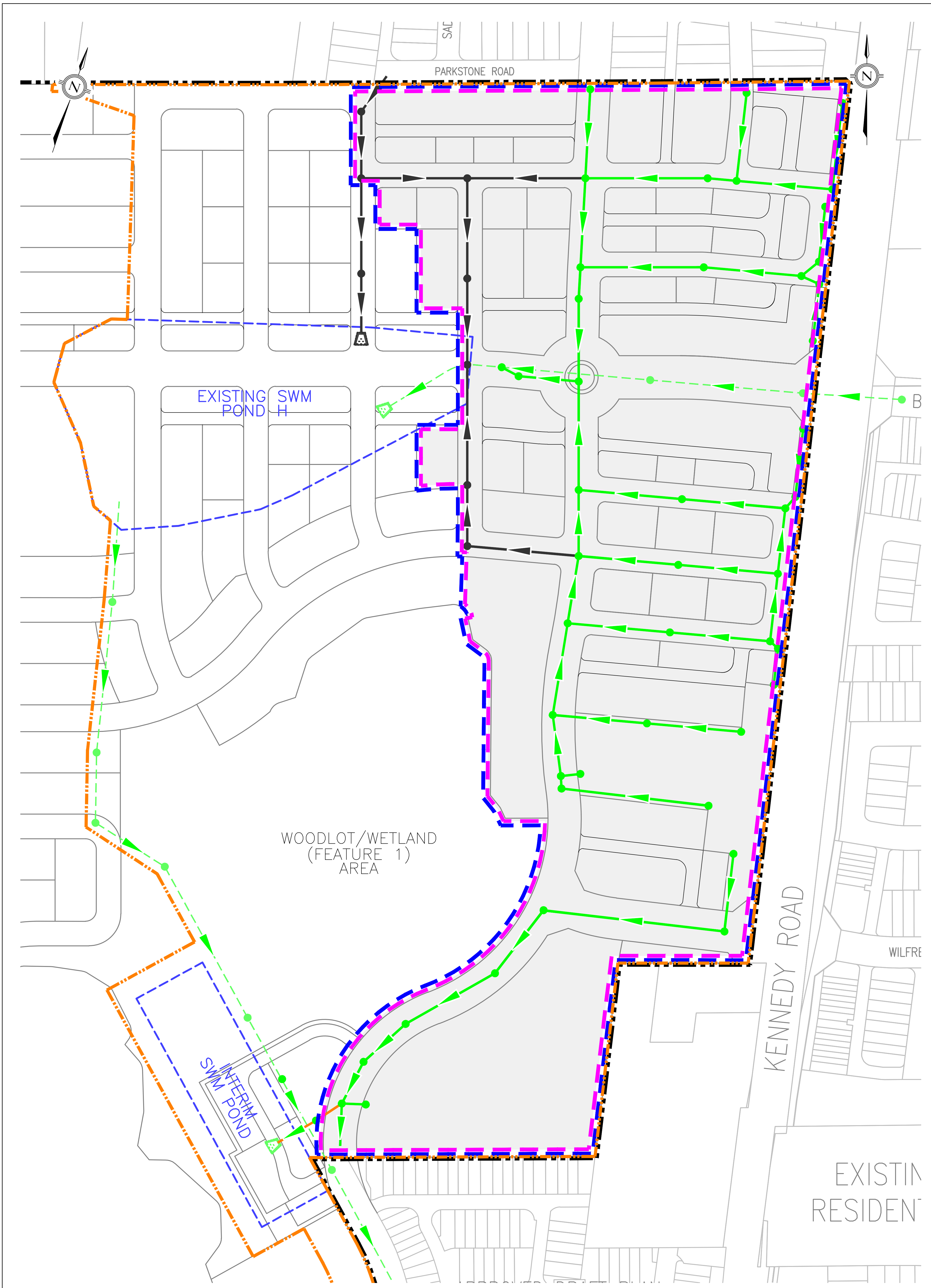
File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 10.1 to 10.2 - Phasing.dwg – Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 3:52 PM



Legend

SUBJECT PROPERTY	NON-GOLF COURSE LANDS
PROPOSED STORM SEWER	SERVICEABILITY LIMIT
TEMPORARY STORM SEWER	
INTERIM STORM SEWER	
EXISTING STORM SEWER	
PHASE 1 LIMIT	

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 25 50 75 100 125
1:2500

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FIGURE 10.2

STORM PHASING PLAN

October 2017

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 10.1 to 10.2 - Phasing.dwg - Revised by <Guerriero, Michael> , Mon, Oct 30, 2017 , 3:51 PM

11.0 PRELIMINARY EROSION AND SEDIMENT CONTROL

Prior to the initiation of any construction within the site, a comprehensive Erosion and Sediment Control program acceptable to the City of Markham, Region of York and the TRCA must be implemented. Appropriate drawings will be prepared at the detailed design stage and submitted to the Agencies for review and approval with supporting report and calculations. More details to be provided in the Functional Servicing and Stormwater Management Report.

12.0 POTENTIAL DEVELOPMENT IMPACTS AND PROPOSED MITIGATION / ENHANCEMENTS

The Beacon *Natural Environment Report* / *Environmental Impact Study* discusses the development impacts and proposed mitigation and/or enhancements related to the following items:

- Cut and fill grading activities within Bruce Creek Valley;
- Road and servicing crossings of Bruce Creek Valley;
- Filling of existing golf course irrigation ponds within Bruce Creek Valley;
- Grading design adjacent to the existing woodlot within Bruce Creek Valley;
- Grading design into the buffer of the existing woodlot/wetland;
- Water balance to woodlot/wetland feature; and,
- Stormwater Management Plan in relation to Redside Dace.

13.0 MONITORING

There are several aspects of the Subject Property that will be monitored during and after construction. A summary of the Erosion and Sediment Control, SWM Facilities, and LID monitoring including the scope of work for the various stages is provided below.

13.1 TEMPORARY EROSION AND SEDIMENT CONTROL FACILITIES MONITORING

Detailed Erosion and Sediment Control Plans will be prepared in support of each draft plan or phases thereof, as well as a report providing calculations and a detailed monitoring/inspection program to be followed until the site is stabilized sufficiently to protect the surrounding natural features.

The following monitoring and record keeping will be required during active construction periods:

- All temporary erosion and sediment controls will be routinely inspected (minimum once a week) and maintained in proper working order;
- All temporary erosion and sediment controls will be inspected after each significant rainfall;
- All necessary repair works will be completed within 48 hours;
- A monthly monitoring report will be completed summarizing site visit outlined above.

During non-construction periods, the inspection of all temporary erosion and sediment control facilities is to be completed following periods of heavy rainfall (>10 mm).

13.2 SWM AND LID MONITORING

The following components of the SWM and LID infrastructure will require monitoring:

- SWM wet ponds
- Infiltration galleries within parks and blocks
- Bioretention enclaves
- Perforated RLC within ROW

13.2.1 Intent of SWM Monitoring Program

The intent of the SWM monitoring program is to ensure the facilities (ponds or LID's) have been constructed in accordance with the approved designs, and that they are operating as expected. The monitoring program is not intended to evaluate the effectiveness of the design criteria or the accuracy of modeling practices or calculations.

13.2.2 SWM Monitoring Program Stages

The various stages of development require different types of inspection, certification and monitoring each of which are generally described below. Additional details for each stage of development can be provided at detailed design.

1. Certification Prior to building permits/start of operation

All SWM Ponds, infiltration galleries, bioretention enclaves, and RLC's will require certification by the Engineer to ensure the facilities are constructed in accordance with the design prior to issuance of building permits and/or start of operation of the individual facility.

2. Certification Prior to lot grading completion

Topsoil placement depths will require certification by the Engineer to ensure lot grading is completed in accordance with the approved design prior to lot grading certification, and that the appropriate material (i.e., standard top soil or amended top soil) has been installed per the design.

3. SWM Facility Post Construction Monitoring

In accordance with the City of Markham's 2016 Stormwater Management Guidelines, a monitoring program is required for assumption. The monitoring program to verify SWM facility performance is required for 3 years following construction.

<u>Quantity Control</u>

Dataloggers with pressure transducers (vented) will be located in the SWM facility (inlet and outlet) to capture operating water level readings during storm events. This information will be downloaded and analyzed to show the hydraulic performance and will be used to show the drawdown of rainfall events and a rough estimate of the hydrograph. Available rainfall data should be used to determine approximate return period storm event for correlation to the operating waterlevels in the facility.

<u>Quality Control</u>

Water quality monitoring is intended to assess and confirm that SWM facilities are providing requisite treatment per the design standards and a comparison to the outflow to that in the receiving watercourse. Temperature monitoring and grab samples (for TSS, TP) should be taken at the inlet, outlet, and within the receiving stream upstream and downstream of the outfall. Three (3) water quality monitoring events per year should be undertaken, once per season (spring, summer fall). As part of the quality monitoring work seasonal visual inspections will be completed and inspection checklists completed.

In support of the SWM facility maintenance and assumption process required by the City, monitoring reports will be prepared and submitted for water quantity and water quality including seasonal inspections.

13.3 WATERCOURSE MONITORING

Watercourse monitoring is required as a condition of approval for new developments as noted in the City of Markham's 2016 Stormwater Management Guidelines. The watercourse monitoring program is required for 3 years.

13.3.1 Watercourse Monitoring Program

Temperature and flow monitoring as well as grab samples (such as TSS, TP, dissolved oxygen, pH, and salinity) should be taken at the upstream and downstream extents of the property within Bruce creek and Berczy Creek. Multiple wet weather and dry weather samples should be obtained each year with samples collected in each season (spring, summer fall) to characterize seasonal variations or trends. A watercourse monitoring report will be prepared and submitted to the City.

Appendix A EXISTING POND H DESIGN INFORMATION & YORKTON PHASE 2 INTEIRM POND DRAINAGE FIGURES

A.1 EXISTING POND H INFORMATION

Stormwater Management Pond
Design Brief

York Downs Stormwater Management Facility

Extended Detention/Quantity Pond (Pond H)

Town of Markham

August, 1997
(Revised: September, 1997)

PREPARED BY:

Cosburn Patterson Mather Limited
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Telephone No. (905) 474-0455
Fax No. (905) 474-9889

File No. 96426

PREPARED FOR:

Humbold Properties
1120 Finch Avenue West, Suite 100
North York, Ontario
M3J 3H7

Stormwater Management Pond Design Brief
Town of Markham

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1.0 INTRODUCTION

Cosburn Patterson Mather have been retained by Humbold Properties to complete detailed design drawings for the construction of the extended detention facility/quantity pond and associated appurtenances in support of the draft plan for Humbold Properties in the Town of Markham.

The stormwater management facility is located within the York Downs lands west of Kennedy Road, and midblock between Major Mackenzie Drive and 16th Avenue. It is bounded on the west by the York Downs Golf Course and Bruce Creek (see **Figure 2**).

This design brief has been prepared in accordance with the requirements of the *"Environmental and Stormwater Management Study, Berczy Village Secondary Plan, Town of Markham, June, 1996 (revised: March, 1997)"*, prepared by Cosburn Patterson Mather Limited in support of OPA 36 as well as the *"Environmental Management Plan for Urban Expansion Areas, Volume 5, Town of Markham, November 1994"* prepared by Cosburn Patterson Mather Limited.

2.0 CRITERIA

The *"Environmental Management Plan for Urban Expansion Areas, Volume 5, Town of Markham, November 1994"* and the "*Environmental and Stormwater Management Study, Berczy Village Secondary Plan, Town of Markham, June 1996, (revised: March, 1997)"* prepared by Cosburn Patterson Mather Limited established the stormwater control criteria, the pond location and the general stormwater management scheme. The conclusions of the report as related to the extended detention/quantity pond (referred to as Pond "H") include:

- SWM Pond "H" will be designed as a combined extended detention and water quantity control facility.

- To provide quality and erosion control, the extended detention storage requirements for Pond "H" is calculated from the runoff volume given by the 25 mm 4 hour storm, based on a weighted average impervious value of 55%. The extended detention release rates were based on the 48 hour total drain time. Based on a post development minor system drainage area of approximately 114.1 ha and OTTHYMO modelling, the required extended detention storage for Pond "H" is 19020 m^3.

- Pond "H" will be designed to control the post development flows to predevelopment levels for storms up to and including the 100 year storm. OTTHYMO modelling will be used to size the quantity storage in Pond "H".

- The permanent pool volume for Pond "H" will be sized as per the June 1994 MOEE guidelines based on Level 1 protection with total weighted site imperviousness drainage area of approximately 55 %. Based on the 114.1 ha drainage area to Pond "A", a permanent pool volume of approximately 17115 m^3 will be required.

- A sediment forebay, provided at the pond inlet, should be sized to have a maximum cleanout frequency of approximately 25 to 30 years. This cleanout frequency will occur when the ponds sediment removal efficiency has been reduced by 5%.

- The pond side slopes will not be steeper than 3:1 (H:V) but should, where possible, be varied between 3:1 and 7:1 to provide natural appearance. A shelf of gentler slopes, not greater than 5:1 should be provided for 3 m on either side of the normal water level for safety considerations.

- A 4.0 m wide maintenance access route will be provided to the sediment forebay for cleanout purposes from a local road with a maximum longitudinal slope of 10 % and a maximum crossfall of 2 %.

- In order to mitigate thermal impacts to the receiving watercourse, the following components will be incorporated into the design: a bottom draw outlet, two perforated subdrains outletting into a cooling trench, and a planting/landscaping strategy that shades the inlet and outlet.

3.0 POND H OPERATING CHARACTERISTICS

Pond "H" is an extended detention and quantity pond (100 year) with a 114.1 ha ultimate drainage area and a normal water level of 185.5 m. It is sized to accommodate runoff from a 4 hour duration 25 mm rainfall event to be released over 48 hours. Pond "A" will also attenuate the post development peak flows to predevelopment levels for storms up to and including the 100 year rainfall event.

Existing Drainage Scenario

As illustrated on **Figure 1**, a 19.4 ha area from the York Downs undeveloped lands and a 2.6 ha area from Kennedy Road is conveyed southwest into Bruce Creek. An additional 65.7 ha area from the northwest quadrant of the Berczy Village lands is conveyed west under Kennedy Road via a roadway culvert and ultimately into Bruce Creek (see **Appendix A** for OTTHYMO.89 output and flow chart for existing drainage scenario).

Post Development Drainage Scenario

As illustrated on **Figure 2**, under post development conditions, a minor system area of 88.1 ha consisting primarily of residential development drains from northwest Berczy Village to the York Downs stormwater management facility. The major system drainage area to the York Downs stormwater management facility is 69.1 ha from northwest Berczy Village which is also primarily residential. These major system flows are captured in the storm sewer prior to crossing Kennedy Road (see major system peak flow capture calculations using OTTSWM in **Appendix E**). In addition, major and minor system flows from a 2.6 ha area from the future developed Kennedy Road will be conveyed west into the York Downs stormwater managment facility. The potential future residential lands from the York Downs lands that will drain to the pond have a major and minor system area of 23.4 ha (see **Appendix A** for OTTHYMO.89 output and flow chart for drainage scenario).

Pond Inlet

Based on OTTHYMO modelling, the required storage volume for the 4 hour 25 mm rainfall is 19020 m^3 which occurs at a maximum depth of 1.36 m above the normal water level at an elevation of 186.86 m (see **Appendix B**).

The total storm sewer five year peak flow (minor system) for the 114.1 ha drainage area will be directed towards the pond via one storm sewer pipe. During the 100 year storm, the pond inlet pipe will convey the major (69.1 ha) and minor system (88.1 ha) flows from the area within northwest Berczy Village, the 25 year peak flows from the ultimate Kennedy Road design (2.6 ha) and the minor system flows from the future York Downs lands residential development (23.4 ha). The major system flows from the York Downs development and the flows in excess of the 25 year storm from the ultimate Kennedy Road design will be directed overland into Pond H.

Outlet Configuration

As shown on **Drawings 1, 2, 3 and 4**, the extended detention and quantity control outlet consists of a submerged perforated pipe, twin ditch inlet catchbasins and a structurally stable pond overflow berm.

Extended Detention Storage

The initial 1.36 m fluctuation within the pond (25 mm rainfall runoff) will outlet through the submerged perforated pipe. The 4.0 m perforated section of pipe will have approximately 450-50 mm diameter openings with a combined opening area of 0.88 m^2. The pond outlet will be controlled by a 275 mm diameter orifice located at the normal water elevation of 185.5 m on the upstream side of the precast ditch inlet catchbasin (OPSD 705.04 - Type A). The orifice is sized to discharge the maximum ponding volume of 19020 m^3 over a 48 hour period at a maximum flow of 0.18 m^3/s (see calculations in **Appendix C**).

Thermal impacts have been addressed in following three ways:

- A bottom draw outlet configuration, which draws water from the cooler areas located at the bottom of the pond, is utilized as recommended in the *"Environmental and Stormwater Management Study, Berczy Village Secondary Plan, Town of Markham, June, 1996, (revised: March, 1997)"*. It will minimize the thermal impacts associated with ponded water ultimately entering Bruce Creek via the pond outlet pipe.
- The normal water level will be shaded by the proposed landscaping to further minimize the thermal impacts associated with ponded water ultimately entering Bruce Creek.
- The design of the proposed stormwater management facility will incorporate two perforated subdrain systems surrounding the facility; one located beneath the permanent pool and the other located immediately beyond the extents of the maximum 100 year ponding elevation, with an invert elevation set at approximately 1.5 m below the proposed ground elevation. The subdrains, in combination, will be implemented to mitigate the impacts of the proposed stormwater management facility on increasing the existing downstream creek temperature and decreasing the baseflow to the creek. In addition, the perforated subdrains will outlet into a buried stone cooling trench located between the pond and the creek outlet to further ensure that the existing creek temperatures will be maintained.

Quantity Storage

Quantity control for the post development flows for the 2 to 100 year storms to predevelopment levels is provided by the combination of submerged perforated pipe with a 275 mm diameter orifice on the upstream end of the ditch inlet catchbasin (OPSD 705.04 - Type A), a 750 mm diameter orifice on the downstream side of the ditch inlet catchbasin at an invert of 184.6 m and a 2 m pond spillway berm at an elevation of 188.1 m.

For water levels up to approximately 186.86 m, the extended detention orifice controls the pond outlet flow rate. For water levels from 186.86 m to 188.1 m, the 750 mm orifice controls the pond outflow. Ponding elevations above 188.1 are controlled by the 750 mm diameter orifice and the 2 m pond outflow weir in combination. The flows conveyed from the pond outlet structure are ultimately conveyed to Bruce Creek. This pond outlet configuration results in pond release rates as provided on **Table 3.1**. Based on the Stage, Outflow, Storage Curve for Pond H, the pond release rates for the various return storms and their associated ponding elevations are illustrated on **Table 3.2.**

Table 3.1 - Comparison between Stage, Storage and Q_{out} for Pond H

Q_{out} (cms) (peak)	Storage (m^3)	Elevation (m)
0	0	185.5
0.18	19020	186.86
1.87	21296	187.0
2.06	29031	187.5
2.26	39648	188.1
3.56	47739	188.5
8.17	57853	189.0

Table 3.2 - Summary of Q_{out}, Storage and Elevation for Return Storms

Return Storm (year)	Q_{out} (cms) (Pond H)	Existing Targets (cms)	Storage (m^3)	Elevation (m)
2	0.85	1.16	19922	186.92
5	2.00	2.28	26588	187.32
25	2.53	4.15	41328	188.15
100	5.73	6.18	52500	188.70

Maintenance of Outlet Structure

Routine maintenance of the pond outlet structure will include manual clearing of floating debris and clearing any material collected on the outlet grate. The orifii are protected from blockage due to debris by the small openings provided in the perforated pipe and the ditch inlet grates. If required, access to the orifice is easily provided through the ditch inlet catchbasins. For maintenance purposes a gravity drain has been provided to drain the permanent pool to an elevation of 184.66 m. The remaining permanent pool must be pumped out.

Grading

To provide a natural appearance the proposed grading within the pond block will utilize slopes varying from 3:1 to 7:1 (horizontal to vertical). For public safety, 5:1 slopes are provided immediately above and below the normal water level of 185.5 m. The slopes in the permanent pool with the above exceptions will be graded with 4:1 slopes with minor localized variations in the vicinity of the outflow structure. The proposed pond grading is shown on **Drawing 1**.

Permanent Pool and Sediment Forebay

The sizing of the permanent pool is based on Level 1 protection with a total weighted site imperviousness of approximately 55% for areas draining to Pond "H". The total required permanent pool volume is 17115 m^3. The permanent pool has been designed with a length to width ratio of approximately 2:1.

A sediment forebay has been provided in the permanent pool at the pond inlet. It has been graded 2.0 m deep. The sediment forebay will have a cleanout frequency of 25 to 30 years. This cleanout frequency will occur when the pond's required sediment removal efficiency has been reduced by approximately 5%.

Maintenance Access

Maintenance access has been provided to the sediment forebay and pond outlet via 4.0 m wide access at a maximum grade of 10 %. The access roads will be constructed as per the details provided on **Drawing 5**. Maintenance trucks can enter the stormwater management facility via the existing driveway which is connected to Kennedy Road.

4.0 EROSION AND SEDIMENT CONTROL

The following erosion and sediment control measures will be installed and maintained during construction of the pond:

- A temporary sediment control fence will be placed prior to grading.

- All proposed open space areas will be restored with topsoil and vegetation as per the landscape restoration planting plan upon completion of grading.

All temporary erosion and sediment control measures will be routinely inspected and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable.

In conclusion, all reasonable measures will be taken to ensure the sediment transport to Bruce Creek is minimized both during and following construction.

5.0 PLANTINGS AND RESTORATION

The extended detention, quantity cell and outfall channel will be planted and restored in accordance with the *MOEE Stormwater Management Practices Planning and Design Manual, June 1994*. The selected plants and restoration material will stabilize graded areas disturbed during construction, provide aesthetic value and passive recreation opportunities, and maintain the quality of the existing ecosystems downstream of the site (see **Appendix D**).

STAGE DISCHARGE / STAGE STORAGE TABULATION

	1ST	2ND		
# OF ORIFICES	1	0		
ORIFICE Cd	0.62	0.62	START EL.	186.90
ORIFICE INV m	184.60	184.60	INCREMEN	0.10
ORIFICE DIA. mm	750	800	POND INV.	185.50
FIRST WEIR LENGTH m	2.00		1ST WEIR INV.	188.10
SECOND WEIR LENGTH	0.00		2ND WEIR INV.	200.00

TITLE : York Downs Pond

"Cd"= .62 (sharp edged orifice)
L= L'-.2*H to a maximum of .3 L
See tables from "Handbook of Hydraulics" Pg. 5-
for weir discharge coefficents
BW= See Fig 5-5 curve (3) for values
"Handbook of Hydraulics" Pg. 5-18

	ELEV. (m)	H-ONE @INV (m)	1st ORIFICE DISCHARGE (c.m.s.)	H-TWO @INV (m)	2nd ORIFICE DISCHARGE (c.m.s.)	1st WEIR HEAD (m)	1st WEIR LENGTH (m)	1st WEIR DIS-COEFF	1st WEIR KWT-COEF BW'	1st WEIR DISCHARGE (c.m.s.)	2nd WEIR HEAD (m)	2nd WEIR LENGTH (m)	2nd WEIR DIS-COEFF	2nd WEIR BKWT-CO BW"	2nd WEIR DISCHARGE (c.m.s.)	POND STORAGE (m3)	TOTAL ISCHARG (c.m.s.)	ELEV. (m)
	186.90	2.30	1.832	1.40	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	19700	1.832	186.90
	187.00	2.40	1.872	1.50	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	21296	1.872	187.00
	187.10	2.50	1.911	1.60	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	23015	1.911	187.10
	187.20	2.60	1.949	1.70	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	24734	1.949	187.20
	187.30	2.70	1.987	1.80	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	25593	1.987	187.30
	187.40	2.80	2.023	1.90	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	27312	2.023	187.40
	187.50	2.90	2.059	2.00	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	29031	2.059	187.50
	187.60	3.00	2.095	2.10	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	30750	2.095	187.60
	187.70	3.10	2.130	2.20	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	32468	2.130	187.70
	187.80	3.20	2.164	2.30	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	34187	2.164	187.80
	187.90	3.30	2.198	2.40	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	35906	2.198	187.90
	188.00	3.40	2.231	2.50	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	37625	2.231	188.00
2.0m	188.10	3.50	2.264	2.60	0.000	0.00	0.00	0.0	0.00	0.000	0.00	0.0	0.0	0.00	0.000	39648	2.264	188.10
weir	188.20	3.60	2.296	2.70	0.000	0.10	2.18	1.3	0.00	0.086	0.00	0.0	0.0	0.00	0.000	41670	2.382	188.20
@ 188.10m	188.30	3.70	2.328	2.80	0.000	0.20	2.36	1.5	0.00	0.317	0.00	0.0	0.0	0.00	0.000	43693	2.644	188.30
	188.40	3.80	2.359	2.90	0.000	0.30	2.54	1.6	0.00	0.668	0.00	0.0	0.0	0.00	0.000	45716	3.027	188.40
100yr	188.50	3.90	2.390	3.00	0.000	0.40	2.72	1.7	0.00	1.170	0.00	0.0	0.0	0.00	0.000	47739	3.560	188.50
OL →	188.60	4.00	2.421	3.10	0.000	0.50	2.90	1.8	0.00	1.820	0.00	0.0	0.0	0.00	0.000	49762	4.241	188.60
	188.70	4.10	2.451	3.20	0.000	0.60	3.08	1.8	0.00	2.591	0.00	0.0	0.0	0.00	0.000	51784	5.042	188.70
	188.80	4.20	2.481	3.30	0.000	0.70	3.26	1.8	0.00	3.475	0.00	0.0	0.0	0.00	0.000	53807	5.956	188.80
	188.90	4.30	2.510	3.40	0.000	0.80	3.44	1.8	0.00	4.480	0.00	0.0	0.0	0.00	0.000	55830	6.990	188.90
	189.00	4.40	2.539	3.50	0.000	0.90	3.62	1.8	0.00	5.625	0.00	0.0	0.0	0.00	0.000	57853	8.165	189.00
	189.10	4.50	2.568	3.60	0.000	1.00	3.80	1.8	0.00	6.916	0.00	0.0	0.0	0.00	0.000	57868	9.484	189.10
	189.20	4.60	2.597	3.70	0.000	1.10	3.98	1.8	0.00	8.357	0.00	0.0	0.0	0.00	0.000	57868	10.954	189.20
	189.30	4.70	2.625	3.80	0.000	1.20	4.16	1.8	0.00	9.953	0.00	0.0	0.0	0.00	0.000	57868	12.578	189.30
	189.40	4.80	2.653	3.90	0.000	1.30	4.34	1.8	0.00	11.708	0.00	0.0	0.0	0.00	0.000	57868	14.361	189.40
	189.50	4.90	2.680	4.00	0.000	1.40	4.52	1.8	0.00	13.627	0.00	0.0	0.0	0.00	0.000	57868	16.307	189.50

```
2
*************************************************************
*
*          PROJECT    : YORK DOWNS (IMMEDIATELY WEST OF KENNEDY)
*
*          WATERCOURSE: BRUCE CREEK
*
*          NUMBER     : 96426
*
*          DATE       : NOV 1997
*
*          AUTHOR     : NS
*
*          DESCRIPTION: POST DEVELOPMENT FLOW CALCULATIONS
*
*          STORM      : 2 TO 100 YR
*
*          DATA FILE  : YDPOST3.DAT
*
***************************************************************

START               0.0

***************************************************************
*                                                             *
* 25 mm STORM                                                 *
*                                                             *
***************************************************************
*
READ STORM          25MM4HR.STM
*
* YORK DOWNS NORTH ONLY (23.4 ha)
*
CALIB STANDHYD      ID=1 NHYD=102 DT=2 min AREA = 23.4 ha
                    XIMP=0.35 TIMP=0.55 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 395 m MNI=0.013 SCI=0 -1
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 52.89 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 594 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=4.76 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=2  NHYD=900  IDONE=1  IDTWO=4
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MAJOR SYSTEM)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA = 54.99 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 605 m MNI=0.013 SCI=0 -1
*
```



```
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=1  NHYD=501  CINLET=4.95 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=1  NHYD=900  IDONE=2  IDTWO=3
*
* BERCZY VILLAGE (INCL. H & R DEVELOPMENTS) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 18.2 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 348 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=1.64 cms  NINLET=1
                    MAJID=8  MINID=9
*
ADD HYD             ID=3  NHYD=900  IDONE=1  IDTWO=9
*
* BERCZY VILLAGE (HUMBOLD) (TOTAL DRAINAGE FROM SCHOOL BLOCK)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 5.56 ha
                    XIMP=0.50 TIMP=0.50 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 193 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=4  NHYD=900  IDONE=1  IDTWO=3
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - ROOFTOP (RELEASE RATE=42L/S/HA))
*
CALIB STANDHYD      ID=1 NHYD=104 DT=1 min AREA= 0.95 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 80 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=2 NHYD=802 IDIN=1
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.03              0.0005
                      0.04              0.0670
                                        -1
*
ADD HYD             ID=1  NHYD=900  IDONE=4  IDTWO=2
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - PARKING LOT (RELEASE RATE=180L/S/HA)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 2.20 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 121 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=3 NHYD=802 IDIN=2
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.35              0.0005
```

```
                      0.40              0.0620
                                        -1
*
ADD HYD             ID=2  NHYD=900  IDONE=3  IDTWO=1
*
* Flow to YD Pond from Kennedy Road (Ultimate Road design)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 3.15 ha
                    XIMP=0.61 TIMP=0.61 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=8.5 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 2.0 %
                    LGI= 720 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=3  NHYD=900  IDONE=2  IDTWO=1
*
* TOTAL FLOW TO YORK DOWNS STORMWATER MANAGEMENT FACILITY
*
ROUTE RESERVOIR     ID=1 NHYD=802 IDIN=3
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.17              1.7700  inch
                      1.87              2.1296
                      2.06              2.9031
                      2.26              3.9648
                      3.56              4.7739
                      8.17              5.7853
                      999.999           5.7854
                                        -1
*
***************************************************************
*                                                             *
* 2 YEAR STORM                                                *
*                                                             *
***************************************************************
*
MASS STORM          PTOT=29.16 mm SDT=15 min
                    MARKHAM.MST
*
* YORK DOWNS NORTH ONLY (23.4 ha)
*
CALIB STANDHYD      ID=1 NHYD=102 DT=2 min AREA = 23.4 ha
                    XIMP=0.35 TIMP=0.55 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 395 m MNI=0.013 SCI=0 -1
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 52.89 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 594 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=4.76 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=2  NHYD=900  IDONE=1  IDTWO=4
*
```



```
* BERCZY VILLAGE (INCL. HUMBOLD) (MAJOR SYSTEM)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA = 54.99 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 605 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=1  NHYD=501  CINLET=4.95 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=1  NHYD=900  IDONE=2  IDTWO=3
*
* BERCZY VILLAGE (INCL. H & R DEVELOPMENTS) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 18.2 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 348 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=1.64 cms  NINLET=1
                    MAJID=8  MINID=9
*
ADD HYD             ID=3  NHYD=900  IDONE=1  IDTWO=9
*
* BERCZY VILLAGE (HUMBOLD) (TOTAL DRAINAGE FROM SCHOOL BLOCK)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 5.56 ha
                    XIMP=0.50 TIMP=0.50 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 193 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=4  NHYD=900  IDONE=1  IDTWO=3
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - ROOFTOP (RELEASE RATE=42L/S/HA))
*
CALIB STANDHYD      ID=1 NHYD=104 DT=1 min AREA= 0.95 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 80 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=2 NHYD=802 IDIN=1
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.03              0.0005
                      0.04              0.0670
                                        -1
*
ADD HYD             ID=1  NHYD=900  IDONE=4  IDTWO=2
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - PARKING LOT (RELEASE RATE=180L/S/HA)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 2.20 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
```

```
                    LGI= 121 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=3 NHYD=802 IDIN=2
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.35              0.0005
                      0.40              0.0620
                                        -1
*
ADD HYD             ID=2  NHYD=900  IDONE=3  IDTWO=1
*
* Flow to YD Pond from Kennedy Road (Ultimate Road design)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 3.15 ha
                    XIMP=0.61 TIMP=0.61 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=8.5 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 2.0 %
                    LGI= 720 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=3  NHYD=900  IDONE=2  IDTWO=1
*
* TOTAL FLOW TO YORK DOWNS STORMWATER MANAGEMENT FACILITY
*
ROUTE RESERVOIR     ID=1 NHYD=802 IDIN=3
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.17              1.7700  inch
                      1.87              2.1296
                      2.06              2.9031
                      2.26              3.9648
                      3.56              4.7739
                      8.17              5.7853
                      999.999           5.7854
                                        -1
*
***************************************************************
*                                                             *
* 5 YEAR STORM                                                *
*                                                             *
***************************************************************
*
MASS STORM          PTOT=42 mm SDT=15 min
                    MARKHAM.MST
*
* YORK DOWNS NORTH ONLY (23.4 ha)
*
CALIB STANDHYD      ID=1 NHYD=102 DT=2 min AREA = 23.4 ha
                    XIMP=0.35 TIMP=0.55 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 395 m MNI=0.013 SCI=0 -1
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 52.89 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 594 m MNI=0.013 SCI=0 -1
*
```



```
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=4.76 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=2  NHYD=900  IDONE=1  IDTWO=4
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MAJOR SYSTEM)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA = 54.99 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 605 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=1  NHYD=501  CINLET=4.95 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=1  NHYD=900  IDONE=2  IDTWO=3
*
* BERCZY VILLAGE (INCL. H & R DEVELOPMENTS) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 18.2 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 348 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=1.64 cms  NINLET=1
                    MAJID=8  MINID=9
*
ADD HYD             ID=3  NHYD=900  IDONE=1  IDTWO=9
*
* BERCZY VILLAGE (HUMBOLD) (TOTAL DRAINAGE FROM SCHOOL BLOCK)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 5.56 ha
                    XIMP=0.50 TIMP=0.50 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 193 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=4  NHYD=900  IDONE=1  IDTWO=3
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - ROOFTOP (RELEASE RATE=42L/S/HA))
*
CALIB STANDHYD      ID=1 NHYD=104 DT=1 min AREA= 0.95 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 80 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=2 NHYD=802 IDIN=1
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.03              0.0005
                      0.04              0.0670
                                        -1
*
```

```
ADD HYD             ID=1  NHYD=900  IDONE=4  IDTWO=2
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - PARKING LOT (RELEASE RATE=180L/S/HA)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 2.20 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 121 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=3 NHYD=802 IDIN=2
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.35              0.0005
                      0.40              0.0620
                                        -1
*
ADD HYD             ID=2  NHYD=900  IDONE=3  IDTWO=1
*
* Flow to YD Pond from Kennedy Road (Ultimate Road design)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 3.15 ha
                    XIMP=0.61 TIMP=0.61 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=8.5 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 2.0 %
                    LGI= 720 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=3  NHYD=900  IDONE=2  IDTWO=1
*
* TOTAL FLOW TO YORK DOWNS STORMWATER MANAGEMENT FACILITY
*
ROUTE RESERVOIR     ID=1 NHYD=802 IDIN=3
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.17              1.7700  inch
                      1.87              2.1296
                      2.06              2.9031
                      2.26              3.9648
                      3.56              4.7739
                      8.17              5.7853
                      999.999           5.7854
                                        -1
*
***************************************************************
*                                                             *
* 25 YEAR STORM                                               *
*                                                             *
***************************************************************
*
MASS STORM          PTOT=61 mm SDT=15 min
                    MARKHAM.MST
*
* YORK DOWNS NORTH ONLY (23.4 ha)
*
CALIB STANDHYD      ID=1 NHYD=102 DT=2 min AREA = 23.4 ha
                    XIMP=0.35 TIMP=0.55 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 395 m MNI=0.013 SCI=0 -1
*
```



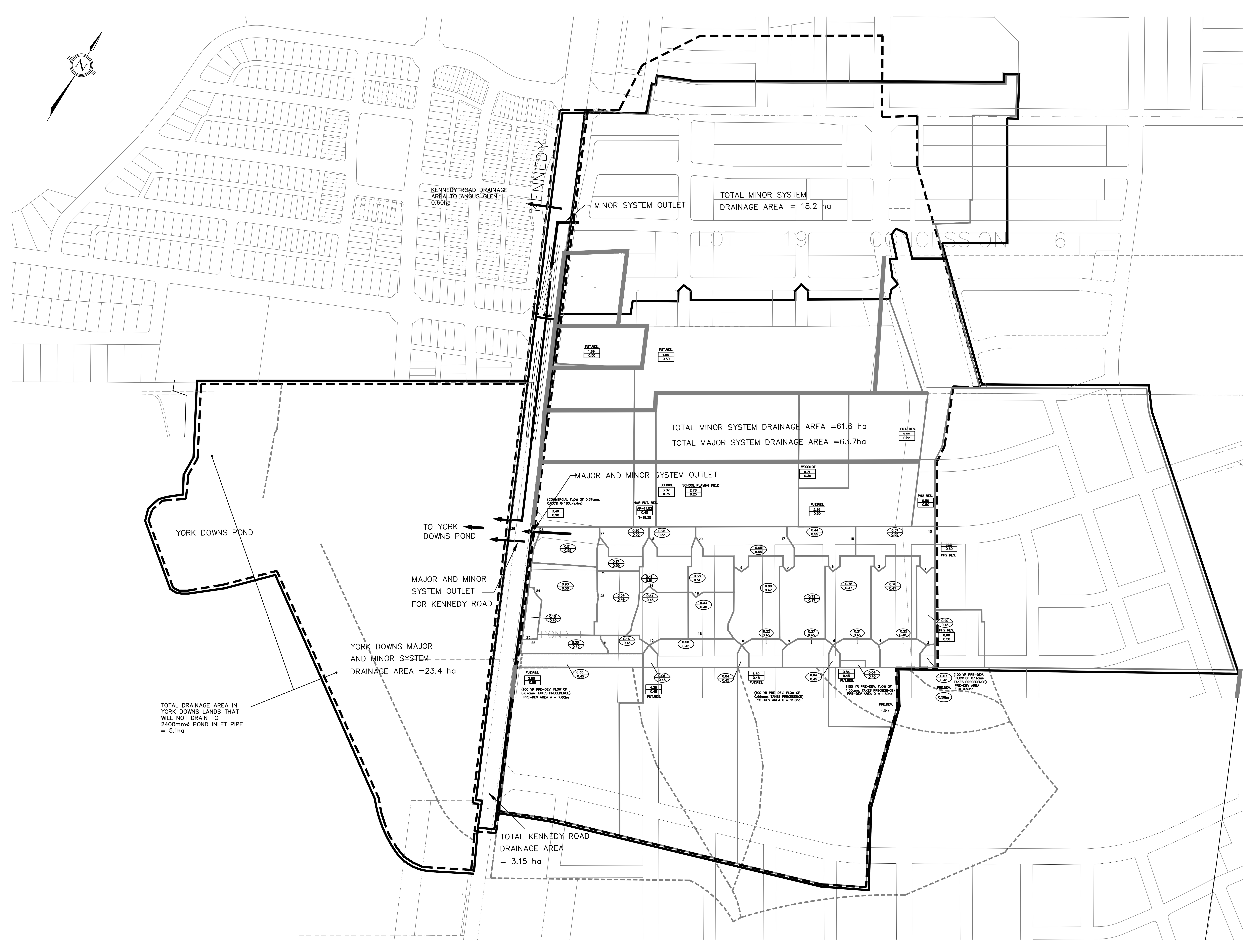
```
* BERCZY VILLAGE (INCL. HUMBOLD) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 52.89 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 594 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=4.76 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=2  NHYD=900  IDONE=1  IDTWO=4
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MAJOR SYSTEM)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA = 54.99 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 605 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=1  NHYD=501  CINLET=4.95 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=1  NHYD=900  IDONE=2  IDTWO=3
*
* BERCZY VILLAGE (INCL. H & R DEVELOPMENTS) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 18.2 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 348 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=1.64 cms  NINLET=1
                    MAJID=8  MINID=9
*
ADD HYD             ID=3  NHYD=900  IDONE=1  IDTWO=9
*
* BERCZY VILLAGE (HUMBOLD) (TOTAL DRAINAGE FROM SCHOOL BLOCK)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 5.56 ha
                    XIMP=0.50 TIMP=0.50 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 193 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=4  NHYD=900  IDONE=1  IDTWO=3
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - ROOFTOP (RELEASE RATE=42L/S/HA))
*
CALIB STANDHYD      ID=1 NHYD=104 DT=1 min AREA= 0.95 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 80 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=2 NHYD=802 IDIN=1
```

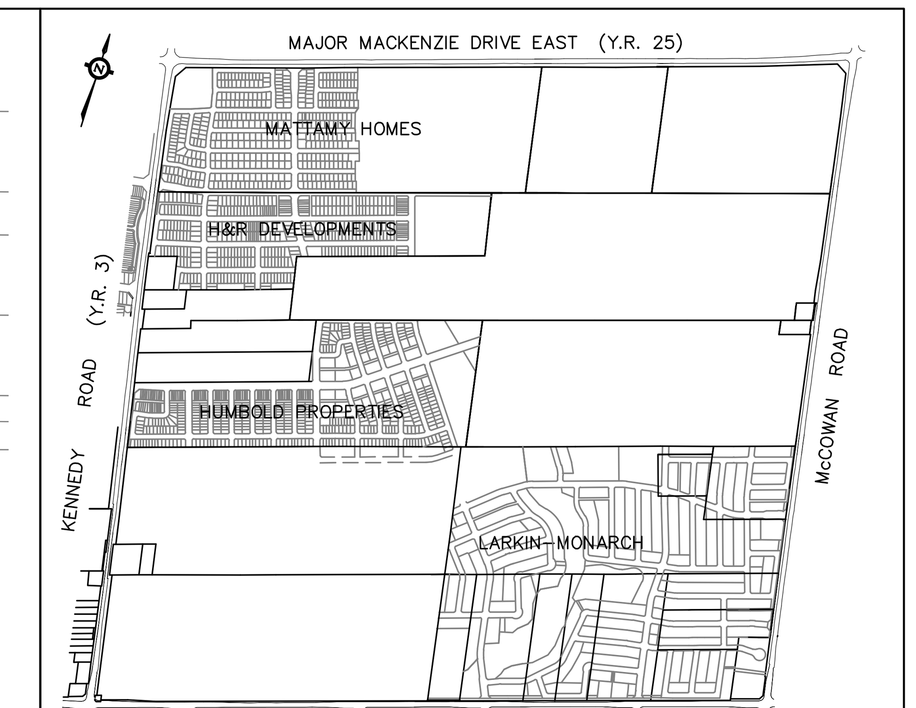
```
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.03              0.0005
                      0.04              0.0670
                                        -1
*
ADD HYD             ID=1  NHYD=900  IDONE=4  IDTWO=2
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - PARKING LOT (RELEASE RATE=180L/S/HA)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 2.20 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 121 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=3 NHYD=802 IDIN=2
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.35              0.0005
                      0.40              0.0620
                                        -1
*
ADD HYD             ID=2  NHYD=900  IDONE=3  IDTWO=1
*
* Flow to YD Pond from Kennedy Road (Ultimate Road design)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 3.15 ha
                    XIMP=0.61 TIMP=0.61 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=8.5 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 2.0 %
                    LGI= 720 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=3  NHYD=900  IDONE=2  IDTWO=1
*
* TOTAL FLOW TO YORK DOWNS STORMWATER MANAGEMENT FACILITY
*
ROUTE RESERVOIR     ID=1 NHYD=802 IDIN=3
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.17              1.7700  inch
                      1.87              2.1296
                      2.06              2.9031
                      2.26              3.9648
                      3.56              4.7739
                      8.17              5.7853
                      999.999           5.7854
                                        -1
*
***************************************************************
*                                                             *
* 100 YEAR STORM                                              *
*                                                             *
***************************************************************
*
MASS STORM          PTOT=80 mm SDT=15 min
                    MARKHAM.MST
*
```



```
* YORK DOWNS NORTH ONLY (23.4 ha)
*
CALIB STANDHYD      ID=1 NHYD=102 DT=2 min AREA = 23.4 ha
                    XIMP=0.35 TIMP=0.55 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 395 m MNI=0.013 SCI=0 -1
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 52.89 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 594 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=4.76 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=2  NHYD=900  IDONE=1  IDTWO=4
*
* BERCZY VILLAGE (INCL. HUMBOLD) (MAJOR SYSTEM)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA = 54.99 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 605 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=1  NHYD=501  CINLET=4.95 cms  NINLET=1
                    MAJID=3  MINID=4
*
ADD HYD             ID=1  NHYD=900  IDONE=2  IDTWO=3
*
* BERCZY VILLAGE (INCL. H & R DEVELOPMENTS) (MINOR SYSTEM)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 18.2 ha
                    XIMP=0.38 TIMP=0.56 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 348 m MNI=0.013 SCI=0 -1
*
* ESTIMATE MINOR SYSTEM CAPTURE IS 0.09 CMS/HA
*
COMPUTE DUHYD       ID=2  NHYD=501  CINLET=1.64 cms  NINLET=1
                    MAJID=8  MINID=9
*
ADD HYD             ID=3  NHYD=900  IDONE=1  IDTWO=9
*
* BERCZY VILLAGE (HUMBOLD) (TOTAL DRAINAGE FROM SCHOOL BLOCK)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 5.56 ha
                    XIMP=0.50 TIMP=0.50 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 193 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=4  NHYD=900  IDONE=1  IDTWO=3
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - ROOFTOP (RELEASE RATE=42L/S/HA))
```

```
*
CALIB STANDHYD      ID=1 NHYD=104 DT=1 min AREA= 0.95 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 80 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=2 NHYD=802 IDIN=1
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.03              0.0005
                      0.04              0.0670
                                        -1
*
ADD HYD             ID=1  NHYD=900  IDONE=4  IDTWO=2
*
* BERCZY VILLAGE (HUMBOLD) (COMMERCIAL - PARKING LOT (RELEASE RATE=180L/S/HA)
*
CALIB STANDHYD      ID=2 NHYD=104 DT=2 min AREA= 2.20 ha
                    XIMP=0.90 TIMP=0.90 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=40 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 1.0 %
                    LGI= 121 m MNI=0.013 SCI=0 -1
*
ROUTE RESERVOIR     ID=3 NHYD=802 IDIN=2
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.35              0.0005
                      0.40              0.0620
                                        -1
*
ADD HYD             ID=2  NHYD=900  IDONE=3  IDTWO=1
*
* Flow to YD Pond from Kennedy Road (Ultimate Road design)
*
CALIB STANDHYD      ID=1 NHYD=104 DT=2 min AREA= 3.15 ha
                    XIMP=0.61 TIMP=0.61 DWF=0 LOSS=2 CN=88 IA= 1.5 mm
                    SLPP=2.0 % LGP=8.5 m MNP=0.25 SCP=0 DPSI=1.0 mm SLPI= 2.0 %
                    LGI= 720 m MNI=0.013 SCI=0 -1
*
ADD HYD             ID=3  NHYD=900  IDONE=2  IDTWO=1
*
* TOTAL FLOW TO YORK DOWNS STORMWATER MANAGEMENT FACILITY
*
ROUTE RESERVOIR     ID=1 NHYD=802 IDIN=3
                    DISCHARGE         STORAGE
                     (CMS)             (HAM)
                      0.0               0.0
                      0.17              1.7700  inch
                      1.87              2.1296
                      2.06              2.9031
                      2.26              3.9648
                      3.56              4.7739
                      8.17              5.7853
                      999.999           5.7854
                                        -1
*
FINISH
→
```





KEY PLAN
N.T.S.

BENCHMARK: ELEV. 203.956

(R.M.Y. 77.203) ONE STOREY BRICK BUILDING (FORMERLY SCHOOL HOUSE) AT SOUTHWEST CORNER OF THE INTERSECTION OF KENNEDY RD. AND MAJOR MACKENZIE DR. TABLET SET HORIZONTALLY IN NORTH FACE OF NORTH WALL, 8.5m WEST OF NORTH EAST CORNER OF BUILDING, 45cm ABOVE CONCRETE FOUNDATION.

DISCRETIZED MINOR SYSTEM DRAINAGE BOUNDARY

0.22 — MINOR SYSTEM CATCHMENT AREA (ha)
0.45 — RUNOFF COEFFICIENT

4.00 — EXTERNAL MINOR SYSTEM CATCHMENT AREA (ha) TO HUMBOLD
0.45 — RUNOFF COEFFICIENT

EXISTING EXTERNAL DRAINAGE BOUNDARY

LUMPED MAJOR SYSTEM DRAINAGE BOUNDARY

LUMPED MINOR SYSTEM DRAINAGE BOUNDARY

No.	DESCRIPTION	DATE	BY

REVISIONS

MARKHAM

THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

YORK DOWNS
POND DRAINAGE PLAN

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R 4B9
TELEPHONE: (905) 474 – 0455

DESIGN BY: B.A.	CHECKED BY: H.W.	PROJECT No.
DRAWN BY: E.B.	CHECKED BY:	96426
SCALE : 1:2500	DATE: MARCH 1998	
		DRAWING No. 2

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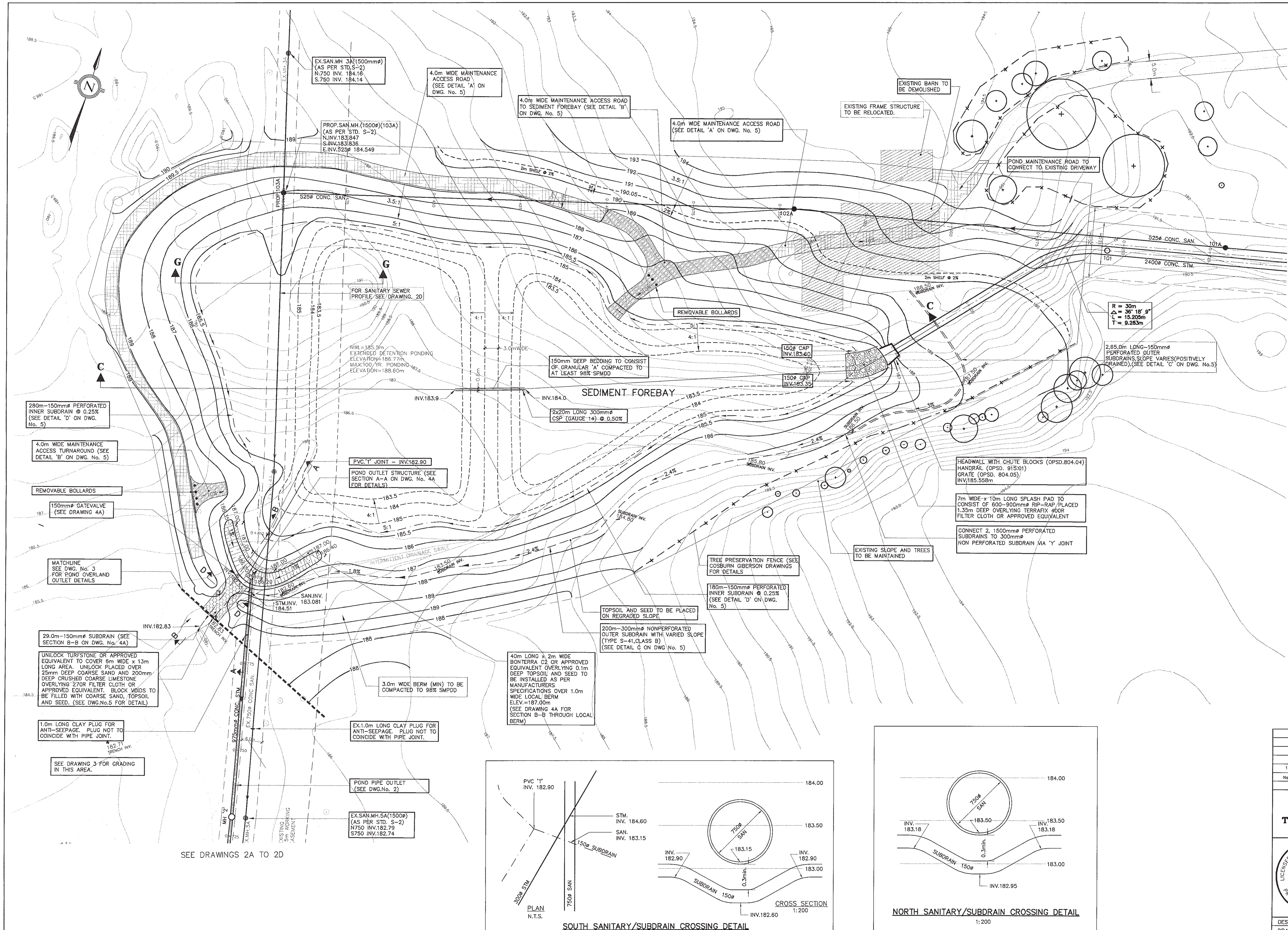
Town File# 2128



NOTE:

SLOPES OF 5:1 TO BE PROVIDED 0.5m ABOVE AND BELOW THE NORMAL WATER LEVEL (IE. 5m WIDE SHELF AT 5:1 SLOPE)

LEGEND:

OUTER SUBDRAIN (NON PERFORATED)
OUTER SUBDRAIN (PERFORATED)
SNOW FENCE
RIP-RAP
POND ACCESS ROAD USED FOR TURNAROUNDS EXTENDING INTO WATER (TURFSTONE) SEE DETAIL ON DWG.5)
POND ACCESS ROAD (LIMESTONE) (SEE DETAIL ON DWG.5)
191 EXISTING CONTOUR
191 PROPOSED CONTOUR
191 PROPOSED UNDERWATER CONTOUR

No.	DESCRIPTION	DATE	BY
1	REVISED SUBDRAIN DETAIL	09/FEB./98	N.S.

REVISIONS

MARKHAM

THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER N. SIMPSON PROVINCE OF ONTARIO

YORKDOWNS POND 'H'
PLAN VIEW

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905 474 - 0455

DESIGN BY:	N.S.	CHECKED BY:		PROJECT No.
DRAWN BY:	J.P.L.	CHECKED BY:	N.S.	96426
SCALE :	1:500	DATE:	OCTOBER 1997	

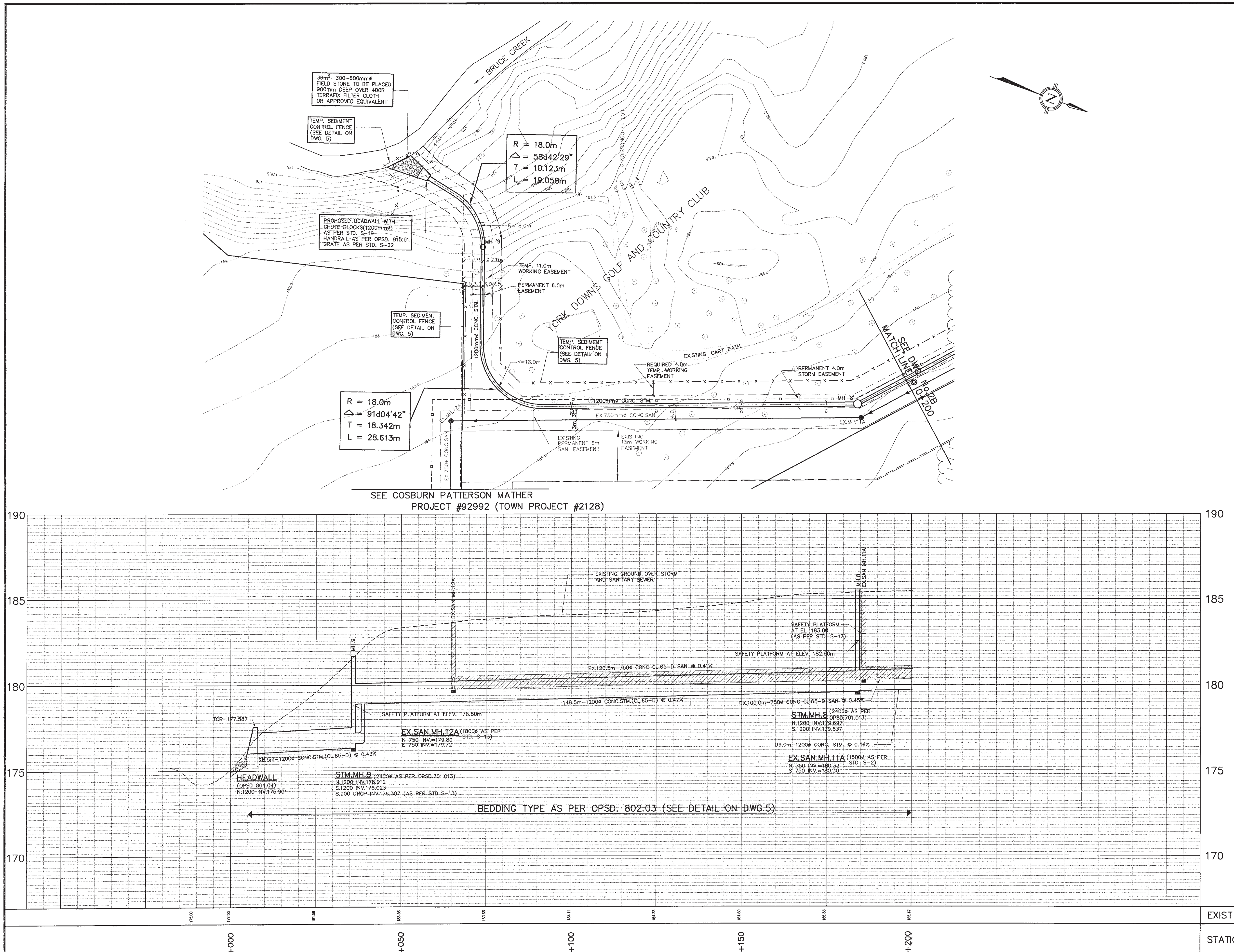
Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.
DWGS SIGNED BY A. BROWN JAN.30/98
Alan Brown, Director Of Engineering — Date

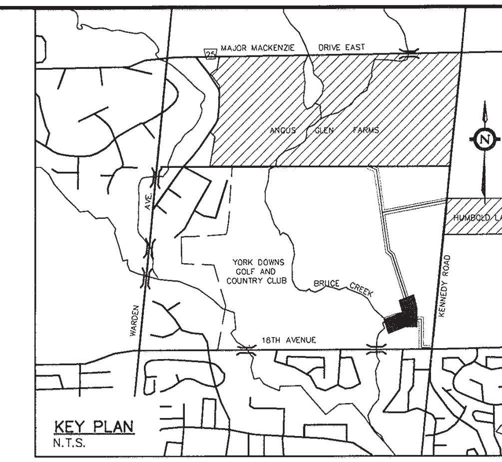
DRAWING No. 1

Drawing Name: X:\Trouble\96426\Dwgs\YORKDOWN\Outfall\426pond - Last Revised: Wed, Jan 07 1998 - 1:44pm

Town File# 2128

Town File# 2128





KEY PLAN
N.T.S.

BENCHMARK:

TOWN OF MARKHAM HORIZONTAL BENCH MARK #M-21-016
SITE BENCHMARK ELEVATION = 180.776
BRASS TABLET SET IN CONCRETE MONUMENT VERTICALLY FLUSH WITH GROUND AT SOUTH WEST CORNER OF INTERSECTION OF 16TH AVE. AND AITKEN CIRCLE, BEING 20.7m SOUTH OF EXISTING CENTERLINE OF 16TH AVE., 9.44m WEST OF CENTERLINE OF AITKEN CIRCLE AND 4.16m FROM THE CENTRAL COLUMN ON DAY LIGHTING.

NOTES

1. ALL WORK TO CONFORM WITH THE REGIONAL MUNICIPALITY OF YORK, TOWN OF MARKHAM AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
2. ALL CONCRETE CHAMBER MANHOLES SHALL BE PRECAST AS PER STD. S-1, S-2, AND S-3. BENCHING AS PER OPSD 1004.01.
3. ALL CONCRETE SEWER PIPES 300mm DIAMETER AND LARGER SHALL BE EQUAL TO C.S.A. SPECIFICATIONS A-257-2 REINFORCED CLASSES AS SPECIFIED (50-D, 65-D, 100-D, 140-D) OR LATEST AMENDMENT UNLESS OTHERWISE SPECIFIED.
4. SANITARY SEWER BEDDING TO BE AS STD. S-41, CLASS 'B', OR AS SPECIFIED. STORM SEWER BEDDING TO BE AS PER OPSD.802.03 (MODIFIED AS PER DWG.5)
5. ALL MANHOLE EXCAVATIONS TO BE BACKFILLED WITH GRANULAR 'B' COMPACTED TO 95% PROCTOR DENSITY.
6. 'MODULOC' OR APPROVED MANHOLE ADJUSTERS TO BE USED IN LIEU OF BRICKING.
7. ALL RESTORATIONS AND RELOCATIONS TO BE COMPLETED TO THE SATISFACTION OF THE TOWN OF MARKHAM DIRECTOR OF ENGINEERING AND THE REGION OF YORK.
8. FOR ALL CONSTRUCTION DETAILS NOT SHOWN ON PLANS, REFERENCE SHALL BE MADE TO THE DESIGN STANDARDS OF THE TOWN OF MARKHAM.
9. PROPOSED GRADES TO MATCH EXISTING GRADES.
10. MANHOLE TOPS TO MATCH EXISTING GROUND ELEVATIONS.
11. ALL MANHOLES NOT ON ROADWAYS TO BE BOLTED DOWN AND WATER TIGHT.(OPSD.401.03)
12. SIDES OF EXISTING SANITARY MANHOLES TO BE COMPLETELY EXCAVATED WHEN ADJACENT STORM SEWER IS INSTALLED, TO ENSURE STABILITY.

GENERAL REHABILITATION NOTES

1. REFER TO DRAWINGS BY COSBURN GIBERSON FOR TREE PRESERVATION DETAILS AND NOTES.
2. EXISTING TREES TO BE TRANSPLANTED SHALL BE TEMPORARILY STOCKPILED AND THEN RE-LOCATED TO RESTORED AREAS WITHIN WORKING EASEMENT UNDER ON SITE SUPERVISION OF LANDSCAPE ARCHITECT.
3. TREES TO BE TRANSPLANTED SHALL BE HEELED IN IMMEDIATELY AT A LOCATION TO BE DETERMINED BY GOLF COURSE STAFF AND LANDSCAPE ARCHITECT. CONTRACTOR SHALL WATER TREES SUFFICIENTLY OVER DURATION OF TEMPORARY HEELING IN PERIOD.
4. ALL TREES WHICH HAVE BEEN TRANSPLANTED BY TREE SPADE SHALL BE DEEP ROOT FERTILIZED WITH A 4-12-4 SLOW RELEASE LIQUID INJECTION BY A QUALIFIED TREE CARE SERVICE. EACH SPECIMEN SHALL RECEIVE A MINIMUM OF TWO APPLICATIONS AROUND DRIPLINE.
5. TREES IN CONSTRUCTION AREA TO BE REMOVED AS PER DIRECTION OF LANDSCAPE ARCHITECT.

LEGEND:

- OUTER SUBDRAIN (NON PERFORATED)
- OUTER SUBDRAIN (PERFORATED)
- SEDIMENT FENCE
- RIP-RAP
- POND ACCESS ROAD USED FOR TURNAROUNDS EXTENDING INTO WATER (TURFSTONE) SEE DETAIL ON DWG.5)
- POND ACCESS ROAD (LIMESTONE) (SEE DETAIL ON DWG.5)
- 191 EXISTING CONTOUR
- 191 PROPOSED CONTOUR
- 191 PROPOSED UNDERWATER CONTOUR
- SANITARY MANHOLE
- STORM MANHOLE

No.	DESCRIPTION	DATE	BY
6.	REVISED FOR "AS-BUILT"	JULY 10/98	N.S.
5.	DELETED KENNEDY SEWER & CHANGE MH29 TO TEE PER H&R REQUIREMENT	FEB. 23/98	D.A.K.
4.	ADDED MH29 BENCHING DETAIL	FEB. 09/98	N.S.
3.	REVISED MH SIZING FOR STM MH 4 & 5	FEB. 04/98	N.S.
2.	REVISED MH's TO MH TEES FOR MH 6 & 7	FEB. 04/98	N.S.
1.	ADDED RADIUSDETAILS, REVISED MH SIZING	FEB. 04/98	N.S.

REVISIONS

MARKHAM

THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER
N. SIMPSON
PROVINCE OF ONTARIO

YORK DOWNS
STORM OUTLET SEWER

EASEMENT ALIGNMENT
STA.0+000 TO STA.0+200

COSBURN PATTERSON MATHER LIMITED
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905) 474 - 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No. 96426
DRAWN BY: J.P.L.	CHECKED BY: N.S.	
SCALES: H= 1:500 V=1:100	DATE: OCTOBER 1997	

Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.

DWGS SIGNED BY A. BROWN — JAN.30/98
Alan Brown, Director Of Engineering — Date

DRAWING No. 2A

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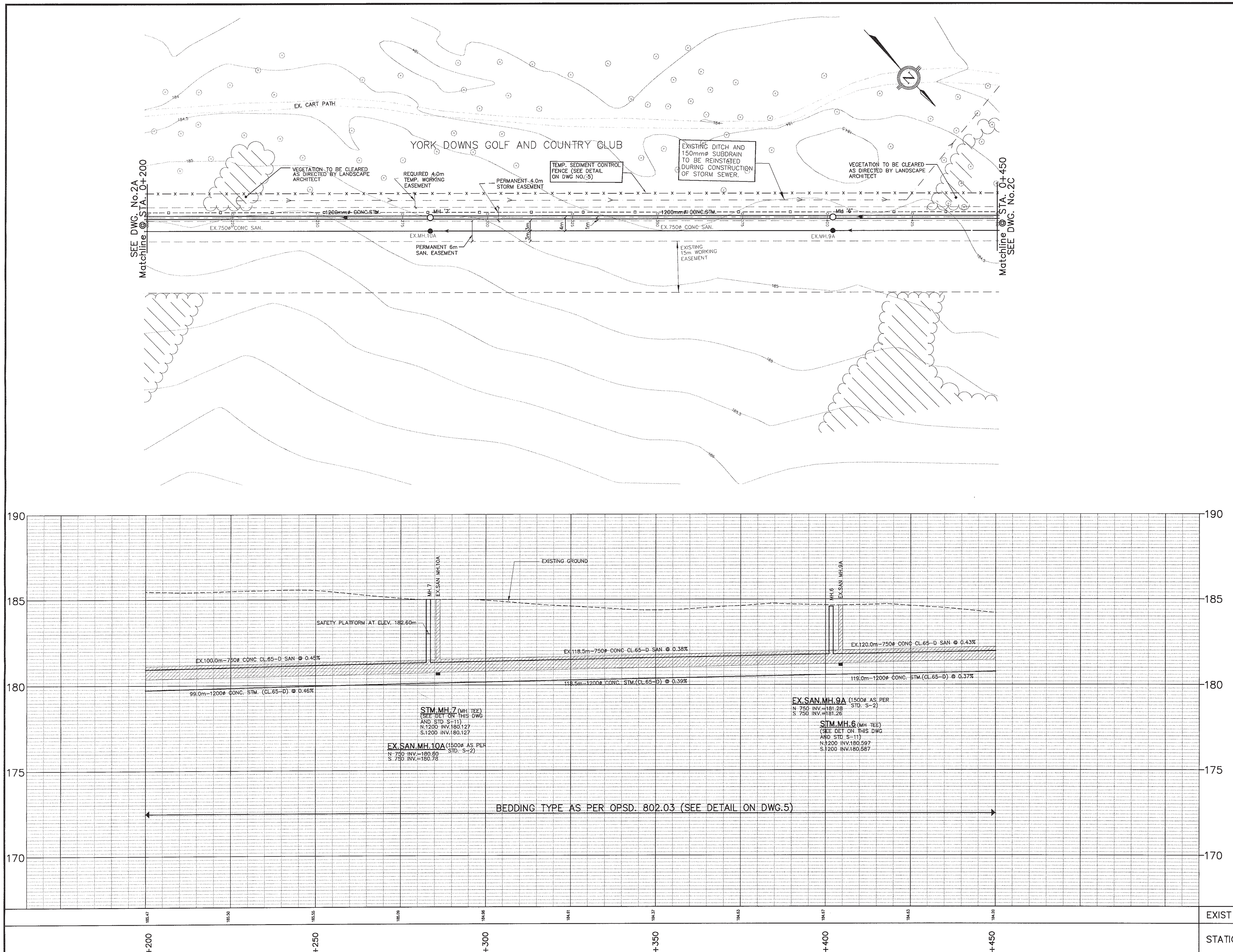
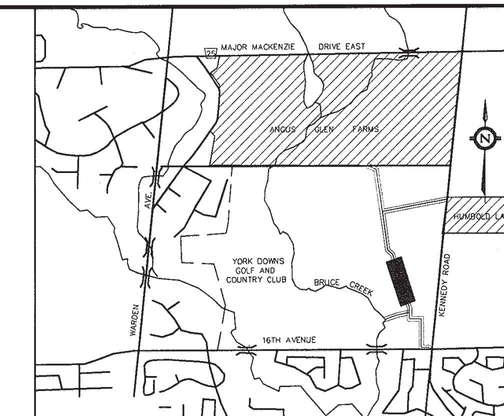
Town File# 2128

Town File# 2128





KEY PLAN
N.T.S.

BENCHMARK:

TOWN OF MARKHAM HORIZONTAL BENCH MARK #M-21-016
SITE BENCHMARK ELEVATION = 180.776
BRASS TABLET SET IN CONCRETE MONUMENT VERTICALLY FLUSH WITH GROUND AT SOUTH WEST CORNER OF INTERSECTION OF 16TH AVE. AND AITKEN CIRCLE, BEING 20.7m SOUTH OF EXISTING CENTERLINE OF 16TH AVE., 9.44m WEST OF CENTERLINE OF AITKEN CIRCLE AND 4.16m FROM THE CENTRAL COLUMN ON DAY LIGHTING.

NOTES

1. ALL WORK TO CONFORM WITH THE REGIONAL MUNICIPALITY OF YORK, TOWN OF MARKHAM AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
2. ALL CONCRETE CHAMBER MANHOLES SHALL BE PRECAST AS PER STD. S-1, S-2, AND S-3. BENCHING AS PER OPSD 1004.01.
3. ALL CONCRETE SEWER PIPES 300mm DIAMETER AND LARGER SHALL BE EQUAL TO C.S.A. SPECIFICATIONS A-257-2 REINFORCED CLASSES AS SPECIFIED (50-D, 65-D, 100-D, 140-D) OR LATEST AMENDMENT UNLESS OTHERWISE SPECIFIED.
4. SANITARY SEWER BEDDING TO BE AS STD. S-41, CLASS 'B', OR AS SPECIFIED. STORM SEWER BEDDING TO BE AS PER OPSD.802.03 (MODIFIED AS PER DWG.5)
5. ALL MANHOLE EXCAVATIONS TO BE BACKFILLED WITH GRANULAR 'B' COMPACTED TO 95% PROCTOR DENSITY.
6. 'MODULOC' OR APPROVED MANHOLE ADJUSTERS TO BE USED IN LIEU OF BRICKING.
7. ALL RESTORATIONS AND RELOCATIONS TO BE COMPLETED TO THE SATISFACTION OF THE TOWN OF MARKHAM DIRECTOR OF ENGINEERING AND THE REGION OF YORK.
8. FOR ALL CONSTRUCTION DETAILS NOT SHOWN ON PLANS, REFERENCE SHALL BE MADE TO THE DESIGN STANDARDS OF THE TOWN OF MARKHAM.
9. PROPOSED GRADES TO MATCH EXISTING GRADES.
10. MANHOLE TOPS TO MATCH EXISTING GROUND ELEVATIONS.
11. ALL MANHOLES NOT ON ROADWAYS TO BE BOLTED DOWN AND WATER TIGHT.(OPSD.401.03)
12. SIDES OF EXISTING SANITARY MANHOLES TO BE COMPLETELY EXCAVATED WHEN ADJACENT STORM SEWER IS INSTALLED, TO ENSURE STABILITY.

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3. TREES TO BE TRANSPLANTED SHALL BE HEELED IN IMMEDIATELY AT A LOCATION TO BE DETERMINED BY GOLF COURSE STAFF AND LANDSCAPE ARCHITECT. CONTRACTOR SHALL WATER TREES SUFFICIENTLY OVER DURATION OF TEMPORARY HEELING IN PERIOD.
4. ALL TREES WHICH HAVE BEEN TRANSPLANTED BY TREE SPADE SHALL BE DEEP ROOT FERTILIZED WITH A 4-12-4 SLOW RELEASE LIQUID INJECTION BY A QUALIFIED TREE CARE SERVICE. EACH SPECIMEN SHALL RECEIVE A MINIMUM OF TWO APPLICATIONS AROUND DRIPLINE.
5. TREES IN CONSTRUCTION AREA TO BE REMOVED AS PER DIRECTION OF LANDSCAPE ARCHITECT.

LEGEND:

- OUTER SUBDRAIN (NON PERFORATED)
- OUTER SUBDRAIN (PERFORATED)
- SEDIMENT FENCE
- RIP-RAP
- POND ACCESS ROAD USED FOR TURNAROUNDS EXTENDING INTO WATER (TURFSTONE) SEE DETAIL ON DWG.5)
- POND ACCESS ROAD (LIMESTONE) (SEE DETAIL ON DWG.5)
- 191 EXISTING CONTOUR
- 191 PROPOSED CONTOUR
- 191 PROPOSED UNDERWATER CONTOUR
- SANITARY MANHOLE
- STORM MANHOLE

No.	DESCRIPTION	DATE	BY
6.	REVISED FOR "AS-BUILT"	JULY 10/98	N.S.
5.	DELETED KENNEDY SEWER & CHANGE MH29 TO TEE PER H&R REQUIREMENT	FEB. 23/98	D.A.K.
4.	ADDED MH29 BENCHING DETAIL	FEB. 09/98	N.S.
3.	REVISED MH SIZING FOR STM MH 4 & 5	FEB. 04/98	N.S.
2.	REVISED MH's TO MH TEES FOR MH 6 & 7	FEB. 04/98	N.S.
1.	ADDED RADIUSDETAILS, REVISED MH SIZING	FEB. 04/98	N.S.

REVISIONS

MARKHAM

THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER
N. SIMPSON
PROVINCE OF ONTARIO

YORK DOWNS STORM OUTLET SEWER

EASEMENT ALIGNMENT STA.0+200 TO STA.0+450

COSBURN PATTERSON MATHER LIMITED
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905) 474 - 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No. 96426
DRAWN BY: J.P.L.	CHECKED BY: N.S.	
SCALES: H= 1:500 V=1:100	DATE: OCTOBER 1997	

Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.

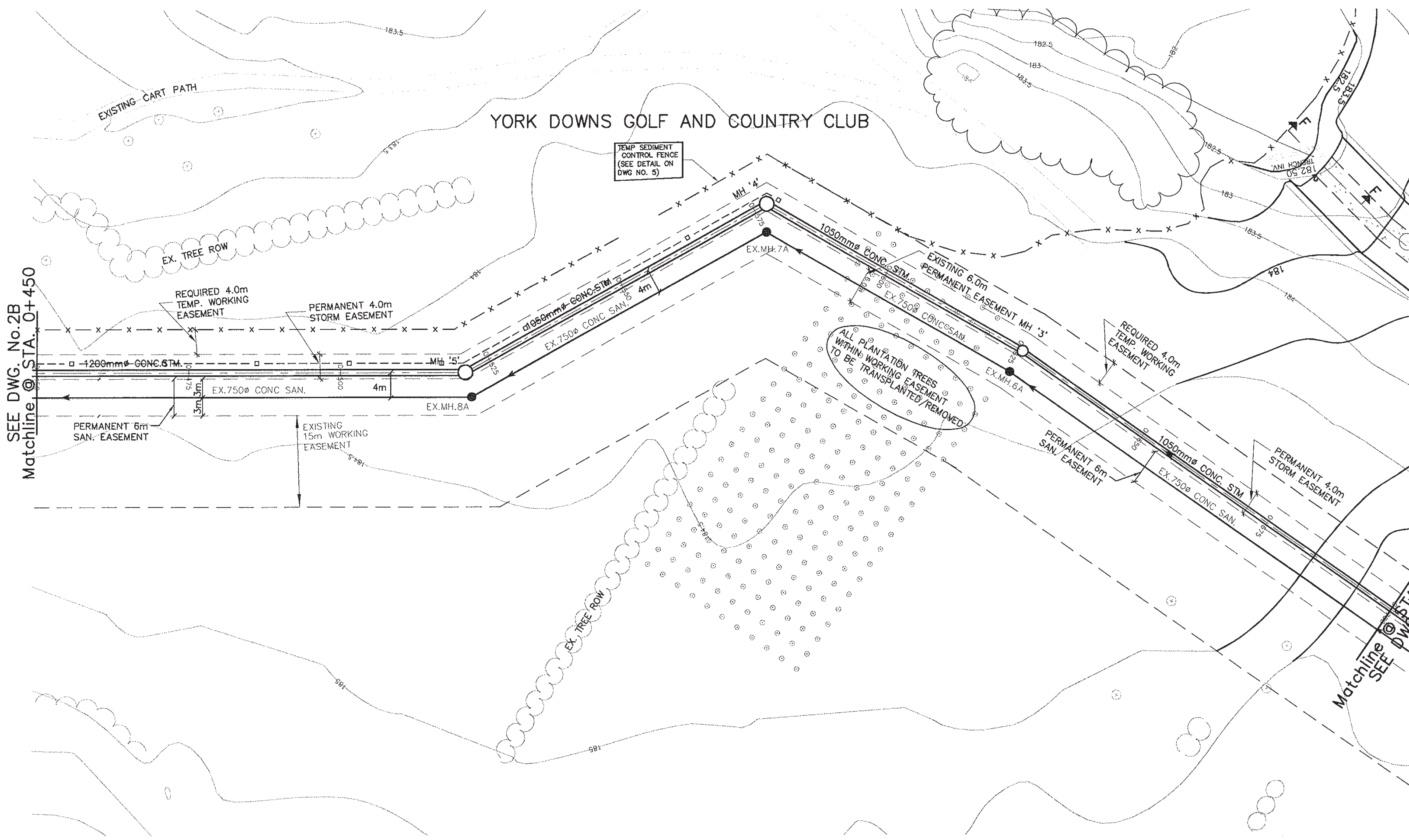
DWGS SIGNED BY A. BROWN — Alan Brown, Director Of Engineering
JAN.30/98 — Date

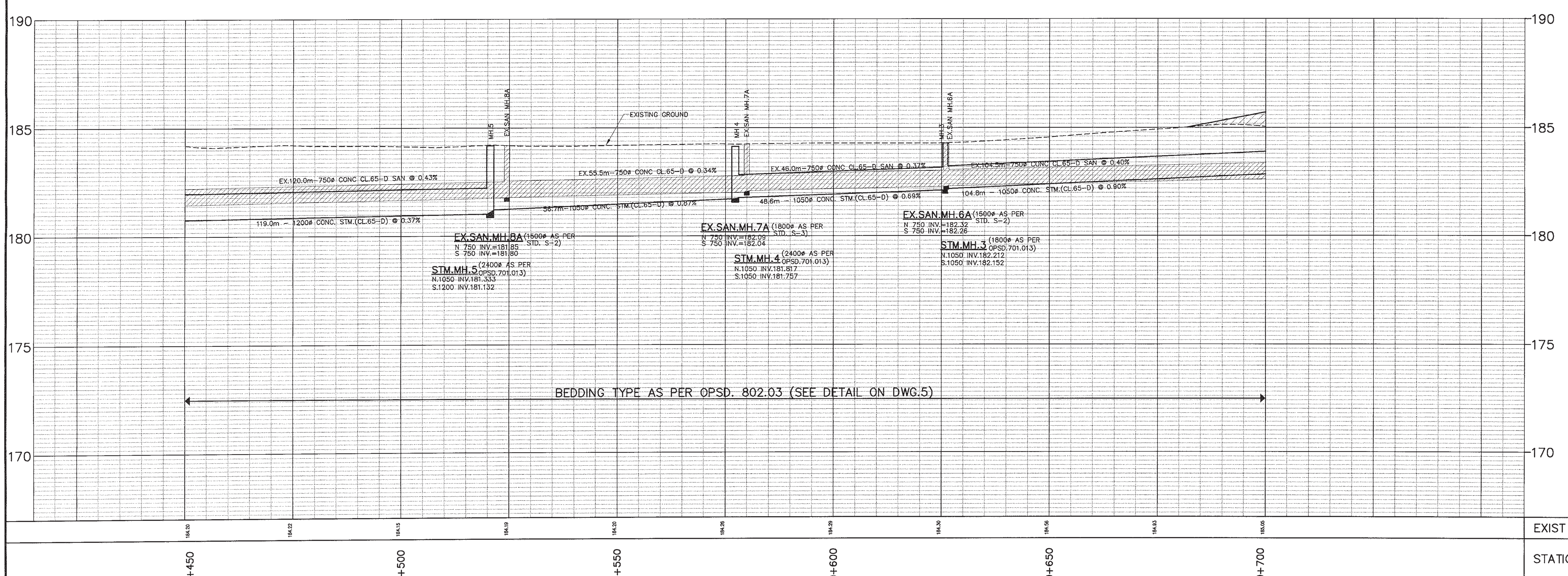
DRAWING No. 2B

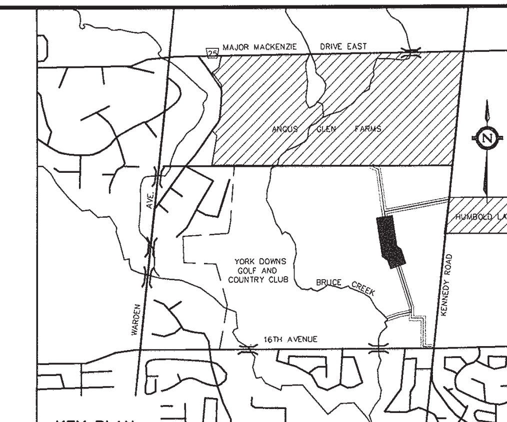
File: X:\Trouble\96426\Dwgs\YORKDOWN\Outfall\Asbuilt\426-pp2.dwg -- Last Revised: Fri, Jul 10 1998 -- 3:22pm

Town File# 2128

Town File# 2128







KEY PLAN
N.T.S.

BENCHMARK:

TOWN OF MARKHAM HORIZONTAL BENCH MARK #M-21-016
SITE BENCHMARK ELEVATION = 180.776
BRASS TABLET SET IN CONCRETE MONUMENT VERTICALLY FLUSH WITH GROUND AT SOUTH WEST CORNER OF INTERSECTION OF 16TH AVE. AND AITKEN CIRCLE, BEING 20.7m SOUTH OF EXISTING CENTERLINE OF 16TH AVE., 9.44m WEST OF CENTERLINE OF AITKEN CIRCLE AND 4.16m FROM THE CENTRAL COLUMN ON DAY LIGHTING.

NOTES

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4. ALL TREES WHICH HAVE BEEN TRANSPLANTED BY TREE SPADE SHALL BE DEEP ROOT FERTILIZED WITH A 4-12-4 SLOW RELEASE LIQUID INJECTION BY A QUALIFIED TREE CARE SERVICE. EACH SPECIMEN SHALL RECEIVE A MINIMUM OF TWO APPLICATIONS AROUND DRIPLINE.
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- SANITARY MANHOLE
- STORM MANHOLE

No.	DESCRIPTION	DATE	BY
6.	REVISED FOR "AS-BUILT"	JULY 10/98	N.S.
5.	DELETED KENNEDY SEWER & CHANGE MH29 TO TEE PER H&R REQUIREMENT	FEB. 23/98	D.A.K.
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3.	REVISED MH SIZING FOR STM MH 4 & 5	FEB. 04/98	N.S.
2.	REVISED MH's TO MH TEES FOR MH 6 & 7	FEB. 04/98	N.S.
1.	ADDED RADIUSDETAILS, REVISED MH SIZING	FEB. 04/98	N.S.

REVISIONS

MARKHAM

THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER
N. SIMPSON
PROVINCE OF ONTARIO

YORK DOWNS STORM OUTLET SEWER

EASEMENT ALIGNMENT STA.0+750 TO STA.1+000

COSBURN PATTERSON MATHER LIMITED
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905) 474 - 0455

DESIGN BY: N.S.
CHECKED BY:
DRAWN BY: J.P.L.
CHECKED BY: N.S.
SCALES: H= 1:500 V=1:100
DATE: OCTOBER 1997
PROJECT No. 96426

Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.

DWGS SIGNED BY A. BROWN
Alan Brown, Director Of Engineering
JAN.30/98
Date

DRAWING No. 2C

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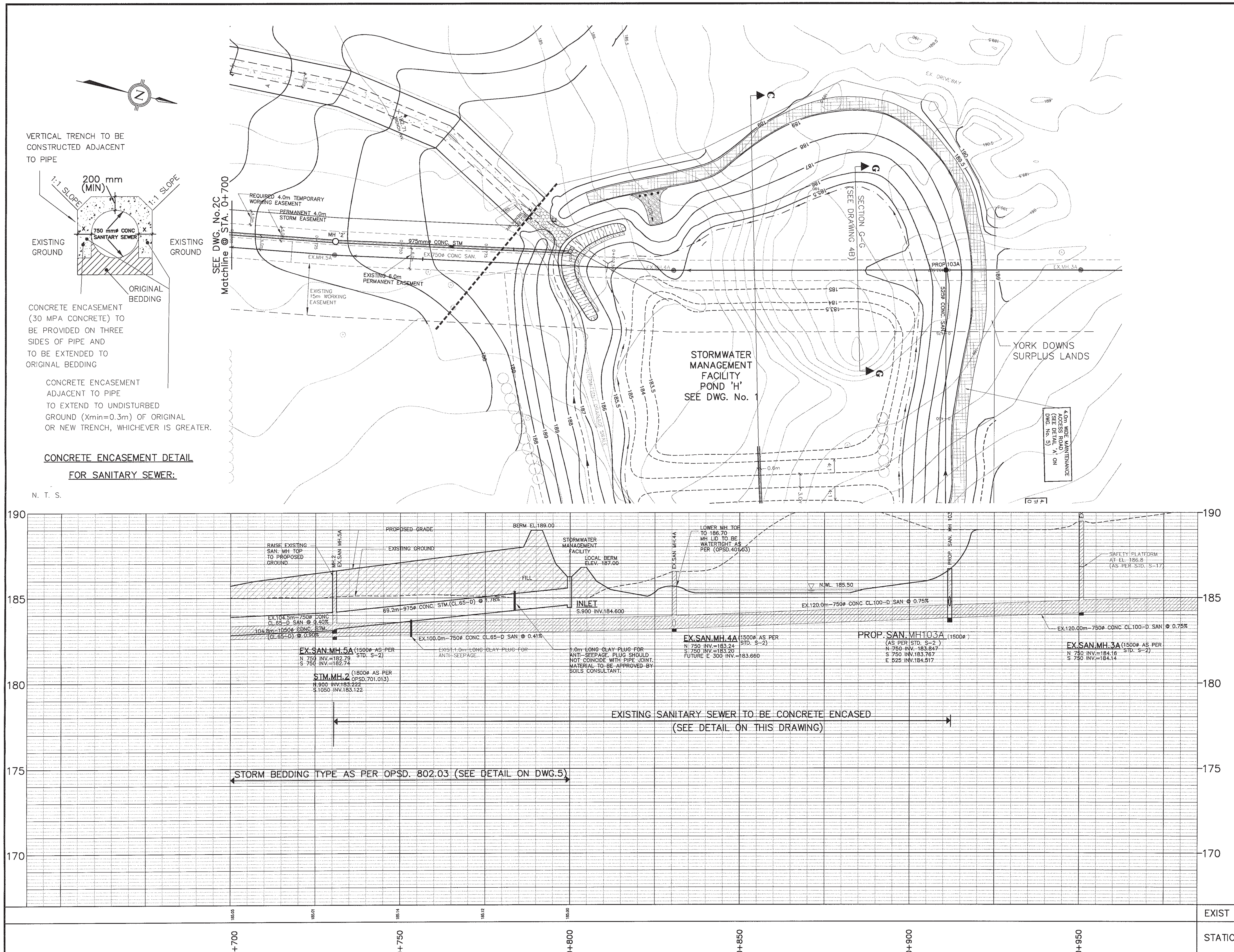
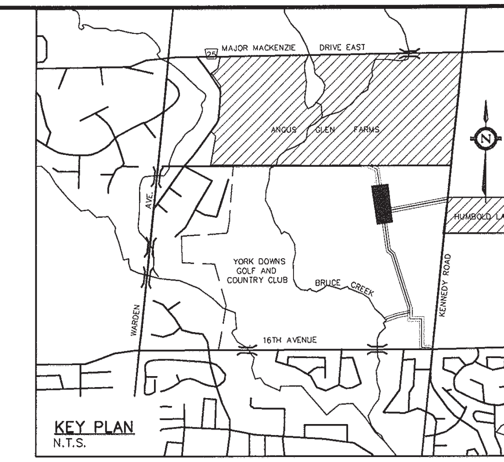
Town File# 2128

Town File# 2128





KEY PLAN
N.T.S.

BENCHMARK:

TOWN OF MARKHAM HORIZONTAL BENCH MARK #M-21-016
SITE BENCHMARK ELEVATION = 180.776
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No.	DESCRIPTION	DATE	BY
6.	REVISED FOR "AS-BUILT"	JULY 10/98	N.S.
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4.	ADDED MH29 BENCHING DETAIL	FEB. 09/98	N.S.
3.	REVISED MH SIZING FOR STM MH 4 & 5	FEB. 04/98	N.S.
2.	REVISED MH's TO MH TEES FOR MH 6 & 7	FEB. 04/98	N.S.
1.	ADDED RADIUSDETAILS, REVISED MH SIZING	FEB. 04/98	N.S.

REVISIONS

MARKHAM

THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER
N. SIMPSON
PROVINCE OF ONTARIO

YORK DOWNS STORM OUTLET SEWER

EASEMENT ALIGNMENT STA.0+700 TO STA.0+950

COSBURN PATTERSON MATHER LIMITED
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905) 474 - 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No. 96426
DRAWN BY: J.P.L.	CHECKED BY: N.S.	
SCALES: H= 1:500 V=1:100	DATE: OCTOBER 1997	

Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.
DWGS SIGNED BY A. BROWN — JAN.30/98
Alan Brown, Director Of Engineering — Date

DRAWING No. 2D

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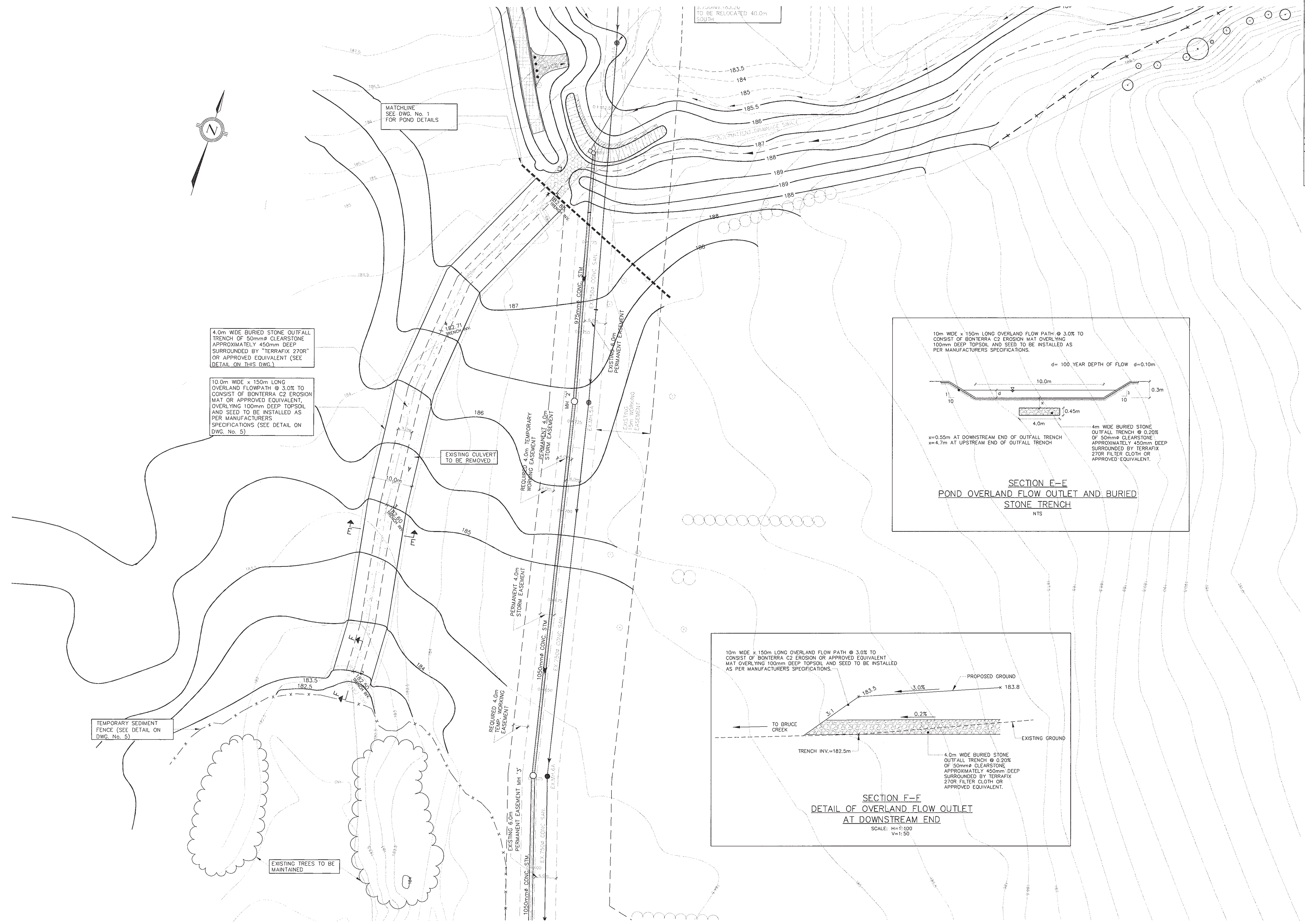
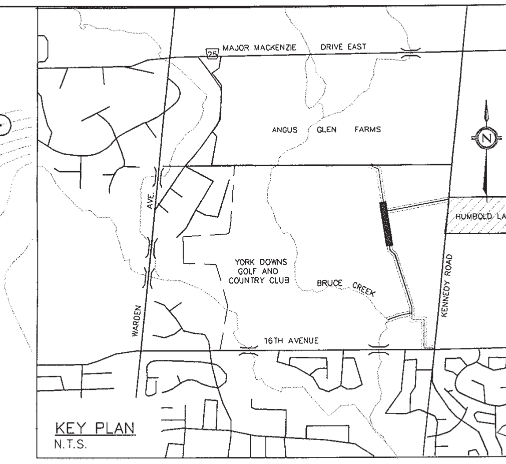
Town File# 2128

Town File# 2128





KEY PLAN
N.T.S.

BENCHMARK:

TOWN OF MARKHAM HORIZONTAL BENCH MARK #M-21-016
SITE BENCHMARK ELEVATION = 180.776
BRASS TABLET SET IN CONCRETE MONUMENT VERTICALLY FLUSH WITH GROUND AT SOUTH WEST CORNER OF INTERSECTION OF 16TH AVE. AND AITKEN CIRCLE, BEING 20.7m SOUTH OF EXISTING CENTERLINE OF 16TH AVE., 9.44m WEST OF CENTERLINE OF AITKEN CIRCLE AND 4.16m FROM THE CENTRAL COLUMN ON DAY LIGHTING.

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No.	DESCRIPTION	DATE	BY

REVISIONS

MARKHAM
THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

YORKDOWNS POND H
OVERLAND FLOW OUTLET

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905 474 - 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No.
DRAWN BY: J.P.L.	CHECKED BY: N.S.	96426
SCALE : 1:500	DATE: OCTOBER 1997	

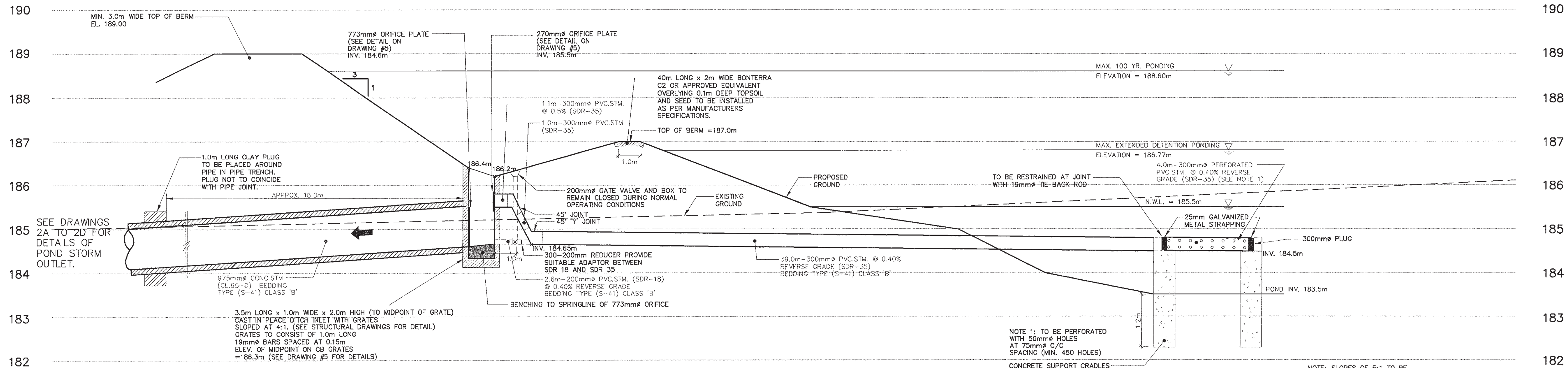
Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.
DWGS SIGNED ON JAN 30/98 BY A. BROWN
Alan Brown, Director Of Engineering — Date

DRAWING No.
3

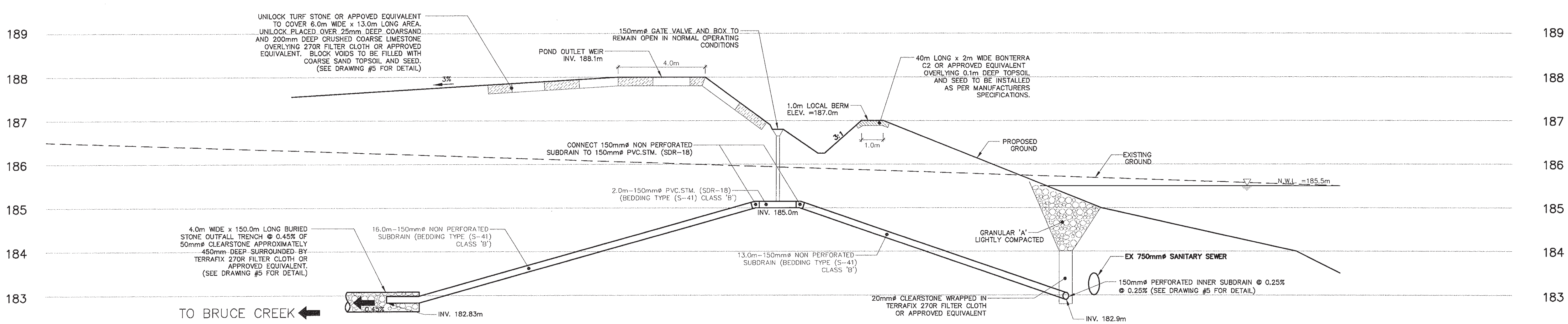
Drawing Name: X:\Trouble\96426\Dwgs\YORKDOWN\Outfall\420CHAN – Last Revised: Thu, Feb 12 1998 – 10:41am

TOWN FILE # 2128

TOWN FILE # 2128



SECTION A–A
EXTENDED DETENTION OULET
SCALE 1:100 (H)
1:50 (V)



SECTION B–B
PERFORATED SUBDRAIN
OUTLET DETAIL
SCALE 1:100 (H)
1:50 (V)

No.	DESCRIPTION	DATE	BY
1	REVISED INNER SUBDRAIN DETAIL	FEB 9/98	N.S.

REVISIONS

MARKHAM
HE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER N. SIMPSON PROVINCE OF ONTARIO

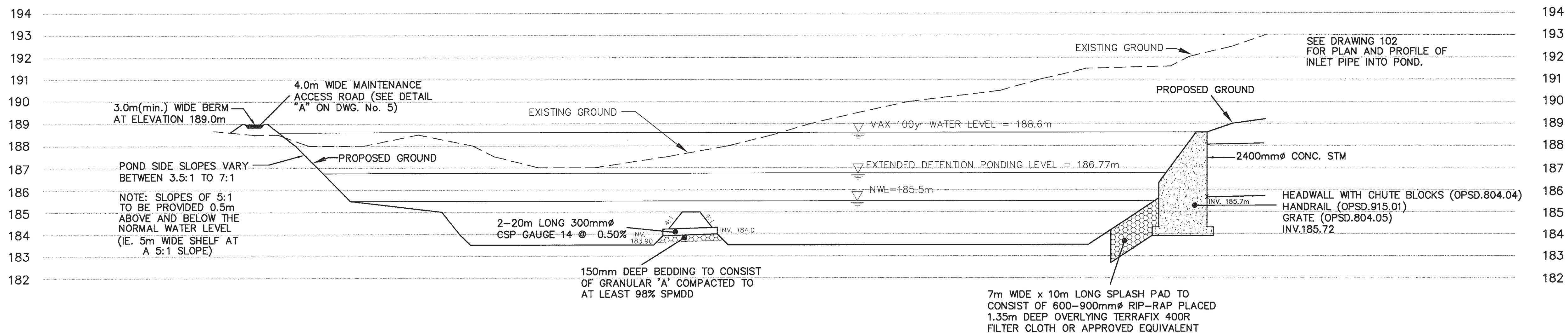
YORKDOWNS POND H
CROSS SECTIONS

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 201 MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905 474 - 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No. 96426
DRAWN BY: E.B.	CHECKED BY: D.S.M.	
SCALE : AS SHOWN	DATE: OCTOBER 1997	DRAWING No. 4A

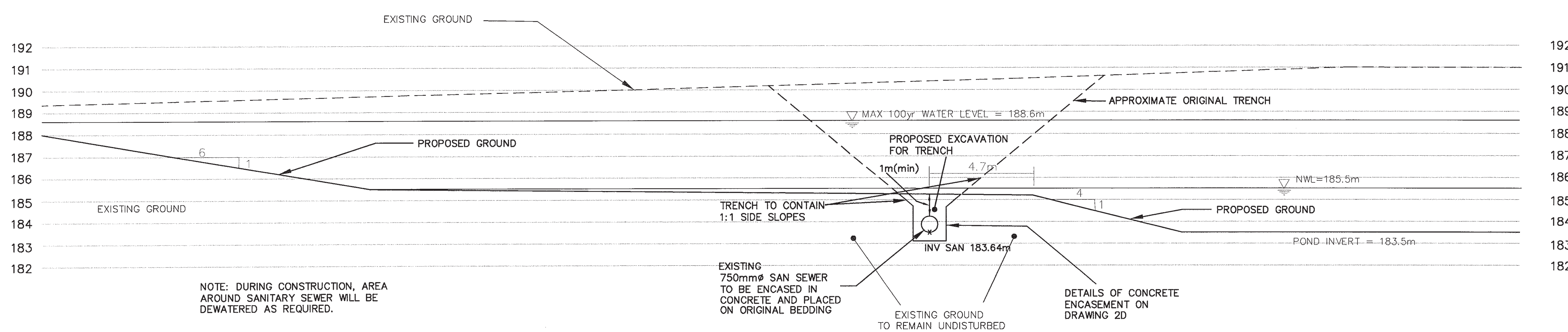
Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.
DWGS SIGNED ON JAN30/98 BY A. BROWN
Alan Brown, Director Of Engineering Date

TOWN FILE #2128



SECTION C–C
CROSS SECTION THROUGH LENGTH OF POND

SCALE 1:500 (H)
1:100 (V)



SECTION G–G
PROPOSED POND EXCAVATION IN VICINITY OF SANITARY SEWER

SCALE 1:100 (H)
1:100 (V)

No.	DESCRIPTION	DATE	BY
	REVISIONS		

MARKHAM
THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER — N. SIMPSON — PROVINCE OF ONTARIO

YORK DOWNS POND H
CROSS SECTIONS

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 201
MARKHAM, ONTARIO L3R-4B9
TELEPHONE: (905 474 – 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No. 96426
DRAWN BY: J.H.	CHECKED BY: D.S.M.	
SCALE : AS SHOWN	DATE: OCTOBER 1997	

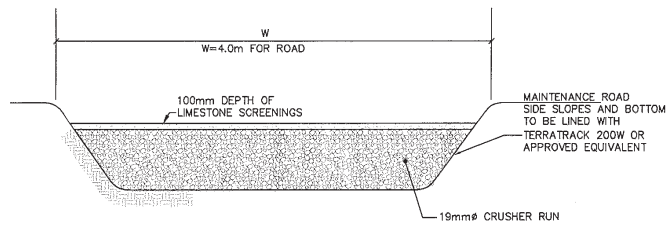
Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.
SIGNED ON JAN 30/98 BY A. BROWN
Alan Brown, Director Of Engineering — Date

DRAWING No. 4B

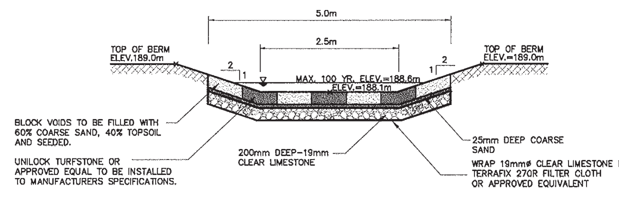
Drawing Name: X:\Trouble\96426\Dwgs\YORKDOWN\Outfall\PND-4B – Last Revised: Tue, Feb 10 1998 – 5:24pm

Town File# 2128

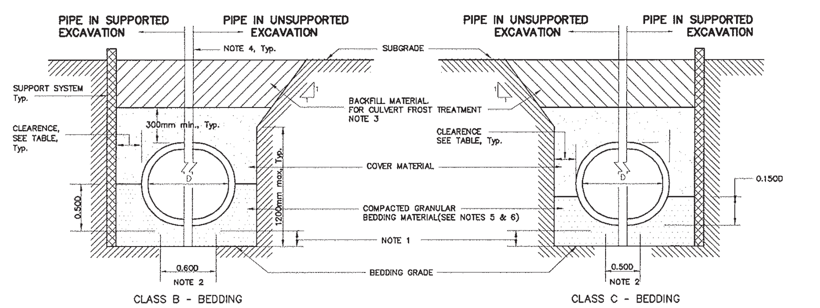
Town File# 2128



DETAIL A:
DETAIL FOR MAINTENANCE ACCESS ROAD
N.T.S.



SECTION D-D
CROSS-SECTION OF POND OVERFLOW WEIR
N.T.S.



BEDDING MATERIAL:

5. IN DAMP TO MOIST SOILS AND STABLE TILL DEPOSITS, BEDDING MATERIAL TO CONSIST OF GRANULAR 'A' MATERIAL COMPACTED TO A UNIFORM HIGH DENSITY. BEDDING CAN CONSIST OF 20mm UNIFORMLY GRADED CLEARSTONE IF BEDDING IS WRAPPED WITH TERRAFIX 270R OR APPROVED EQUIVALENT AND IF APPROVED BY GEOTECHNICAL ENGINEER.
6. IN WET AND UNSTABLE SOILS, CLASS 'A' CONCRETE CRADLE BEDDING MAY BE REQUIRED AS DIRECTED BY GEOTECHNICAL ENGINEER.

NOTES:

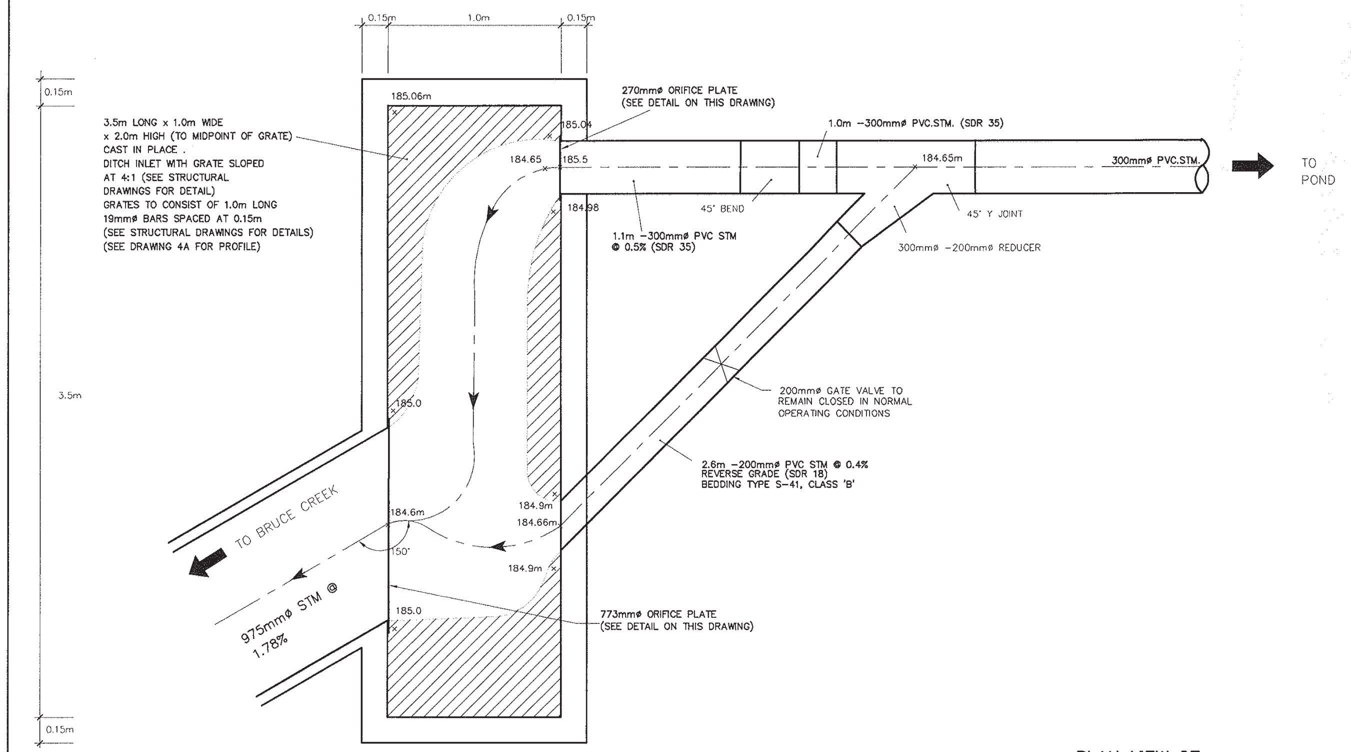
1. THE MINIMUM BEDDING DEPTH BELOW THE PIPE SHALL BE 0.15D. IN NO CASE SHALL THIS DIMENSION BE LESS THAN 150mm OR GREATER THAN 300mm.
2. THE PIPE BED SHALL BE SHAPED TO RECEIVE THE BOTTOM OF THE PIPE.
3. PIPE CULVERT FROST TREATMENT ACCORDING TO OPSD-803.030 AND 803.031.
4. CONDITION OF TRENCH IS SYMMETRICAL ABOUT CENTERLINE OF PIPE.
A. SOIL TYPES AS DEFINED IN THE HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
B. PROTECTION AGAINST HEAVY CONSTRUCTION EQUIPMENT ACCORDING TO OPSD-808.010
C. ALL DIMENSIONS ARE IN MILLIMETERS OR METERS UNLESS OTHERWISE SHOWN.

LEGEND:
D - INSIDE DIAMETER
OD - OUTSIDE DIAMETER

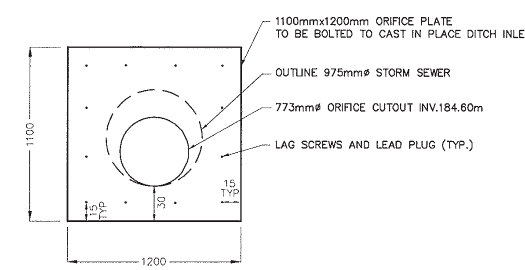
CLEARENCE TABLE

PIPE INSIDE DIAMETER mm	CLEARENCE mm
900 OR LESS	300
OVER 900	500

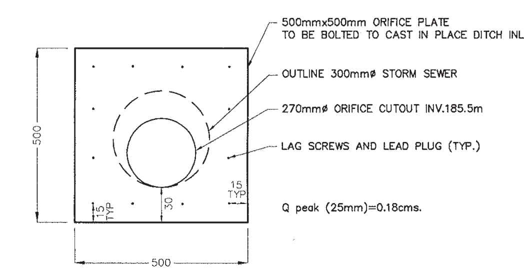
ONTARIO PROVINCIAL STANDARD DRAWING	Date 1996 09 15 Rev
RIGID PIPE BEDDING COVER AND BACKFILL TYPE 1 OR 2 SOIL-EARTH EXCAVATION	Date _____ OPSD - 802.030



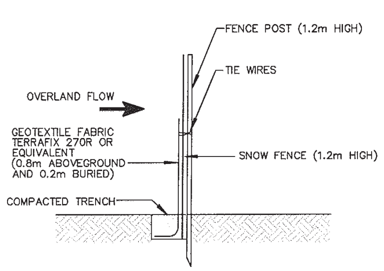
PLAN VIEW OF
POND OUTLET THROUGH DITCH INLET
SCALE: 1:20



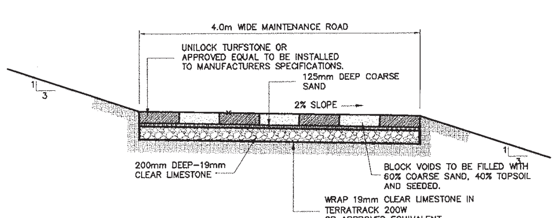
ORIFICE PLATE
(5 YR. OUTFLOW CONTROL)
(IN PRECAST DITCH INLET(TYPE 'A') AS PER STD. 705.04
N.T.S.



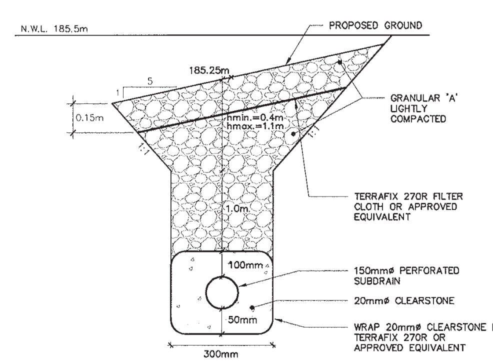
ORIFICE PLATE
(EXTENDED DETENTION OUTFLOW CONTROL)
(IN PRECAST DITCH INLET(TYPE 'A') AS PER STD. 705.04
N.T.S.



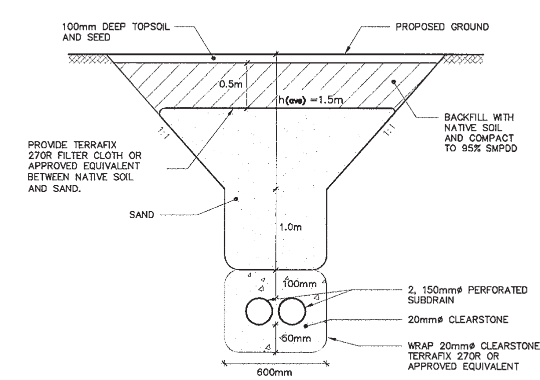
TEMPORARY SNOW FENCE/GEOTEXTILE
FABRIC SEDIMENTATION BARRIER
N.T.S.



DETAIL B:
MAINTENANCE ROAD ACCESS DETAIL
INTO POND SEDIMENT FOREBAY
AND TURNAROUND
N.T.S.



PERFORATED
150mmø SUBDRAIN AROUND
POND NORMAL WATER LEVEL
(DETAIL D)
N.T.S.



300mmø PERFORATED OUTER SUBDRAIN
AROUND PERIMETER OF POND
(DETAIL C)
N.T.S.

No.	DESCRIPTION	DATE	BY	APPROVED
1	REVISED SUBDRAIN DETAIL	FEB 9/98	N.S.	

REVISIONS

MARKHAM
THE CORPORATION OF THE TOWN OF MARKHAM
ENGINEERING DEPARTMENT

LICENSED PROFESSIONAL ENGINEER
N. SIMPSON
PROVINCE OF ONTARIO

YORKDOWNS POND H
DETAILS

COSBURN PATTERSON MATHER LTD.
CONSULTING ENGINEERS
7270 WOODBINE AVE., SUITE 300
MARKHAM, ONTARIO L3R 4B9
TELEPHONE: (905) 474 - 0455

DESIGN BY: N.S.	CHECKED BY:	PROJECT No.	
DRAWN BY: E.B.	CHECKED BY: D.S.M.	96.426	
SCALE : AS SHOWN	DATE: OCTOBER 1997		

Approved as to form in reliance upon the professional skill and ability of Cosburn Patterson Mather Ltd. Consulting Engineers as to design and specification.
DWGS SIGNED ON JAN30/98 BY TOWN
Alan Brown, Director Of Engineering — Date

DRAWING No.
5

TOWN FILE #2128

TOWN FILE #2128

Stantec Consulting Ltd.
300 - 7270 Woodbine Avenue
Markham ON L3R 4B9
Tel: (905) 474-0455 Fax: (905) 474-9889
stantec.com

Stantec

October 20, 2008
File: 606 75256

Town of Markham
101 Town Centre Blvd
Markham, ON, L3R 9W3

Attention: Mr. Kevin Young

Dear Sir:

Reference: Stormwater Management Pond Certification & Assumption
York Downs Pond 'H'
Town of Markham, Ontario

We are writing in support of Assumption by the Town of Markham for the York Downs Stormwater Management Pond (Pond 'H'). Pond 'H' is located west of Kennedy Road, and midblock between Major Mackenzie Drive and 16th Avenue. It is bounded on the west by the York Downs Golf Course and Bruce Creek. The purpose of the following letter is to provide a comparison between the detailed design and as-constructed conditions of Pond 'H'. The detailed pond design information is based on the approved Operations Design Brief for Auxiliary Water Supply York Downs Golf & Country Club October 2004 (Updated November 2004) and Functional Stormwater Management Plan Kylemore Homes Deacon Property Town of Markham November 2005 (Updated September 2006) prepared by Stantec Consulting Ltd. (**excerpt attached**).

Stantec Consulting has reviewed the as-constructed survey drawing (**attached**) provided by Krcmar Surveyors Ltd. (dated November 29, 2007) and supplemental survey information by Stantec Consulting Ltd. (September, 2008) for York Downs Pond 'H' in the Town of Markham. Based on the as-built information, we certify that Pond 'H' and its associated structures have been constructed in general conformance with the approved design. **Tables 1 & 2** provide a comparison summary between the design and as-constructed features and as-constructed stage/storage/discharge as per Town requirements.

We have also prepared an as-built versus design plan and profile drawing (**attached**) and completed the General Information Form (**attached**) as per Town requirements.

Reference: Stormwater Management Pond Certification & Assumption
York Downs Pond 'H'
Town of Markham, Ontario

Table 1: Comparison Between Design and As-Constructed Features for Pond 'H'.

Pond Structure	Design[1]	As-Built[3]
Inlet headwall invert (m)	185.56	185.56
Permanent Pool Level (m)	186.27[4]	186.27[4]
Forebay Bottom (m)	183.5	183.5[2]
Forebay Berm (m)	185	185.31[2]
Pond Bottom (m)	183.5	183.5[2]
Extended Detention Orifice Plate size (mm)	175	175
Extended Detention Orifice Plate invert (m)	185.5	185.71
DICB Orifice Plate size (mm)	773	773
DICB Orifice Plate invert (m)	184.6	184.61
Extended Detention Berm Elev. (m)	187.52	187.52[2]
Overflow Spillway invert (m)	188.4	188.55[2]
Overflow Spillway length (m)	3.00	1.8
Top of Berm	189.3	189.46
Side Slope	4:1 to 6:1	4:1 to 6:1
Access Road Slope	10:1 (max)	10:1 (max)

Note:
1. Functional Stormwater Management Plan Kylemore Homes Deacon Property Town of Markham, September 2006.
2. Based on average spot elevations.
3. Based on as-constructed survey November, 2007 and supplemental survey info September, 2008.
4. Controlled by pinch valve.

Reference: **Stormwater Management Pond Certification & Assumption**
York Downs Pond 'H'
Town of Markham, Ontario

Table 2: Stage/Storage/Outflow for Pond 'H'

Return Period (yr)	Target Flows[1] to Bruce Creek @ 16th Ave (m^3/s)	Design[1]				As-Built[2,3]			
		Pond Peak Flows (m^3/s)	Storage (m^3)	Elevation (m)	Total Flows at Bruce Creek (m^3/s)	Pond Peak Flows (m^3/s)	Storage (m^3)	Elevation (m)	Total Flows at Bruce Creek (m^3/s)
Permanent Pool	-	-	25,565 (required 15,953)	186.27	-	-	23,100	186.27	-
25mm	-	0.092	19,688 (required 17,700)	187.52	-	0.087	18,148	187.52	-
2	**1.68**	0.38	20,249	187.55	1.29	0.38	19,810	187.62	**1.33**
5	**3.23**	2.17	24,895	187.82	2.85	2.3	24,592	187.9	**2.93**
25	**5.83**	2.68	38,162	188.54	5.59	2.68	37,794	188.63	**5.71**
100	**8.61**	5.78	48,681	188.98	7.59	6.56	47,698	189.09	**7.67**

1. Functional Stormwater Management Plan Kylemore Homes Deacon Property Town of Markham November 2005 (Updated September, 2006)
2. Based on as-constructed survey November, 2007 and supplemental survey info September, 2008.
3. Based on Visual Otthymo 2.0 hydrological model output.

The as-constructed permanent pool volume of 23,100 m^3 exceeds the required volume of 15,953 m^3. The average pond bottom invert is 183.5 which provides a 2.77 m permanent pool depth.

Overall the active storage volumes, water levels and release rates for the pond are in general conformance with the approved design. The state/storage/discharge curve for the pond was updated with as-constructed information and reinserted into the Visual Otthymo 2.0 (VO2) hydrological model (for the Functional Stormwater Management Plan Kylemore Homes Deacon Property) to confirm the operating characteristics of the constructed pond as shown in **Table 2.**

Pond H was designed as a quality/quantity control facility. The 25mm event volume is detained for a period of 72 hours (extended detention) and post-development peak flows from 2 to 100 year storm event are controlled to match pre-development target flows at Bruce Creek.

The extended detention storage volume of 18,148 m^3 at an elevation of 187.52 is slightly higher than the required volume of 17,700 m^3. The extended detention flow is slightly lower than the design, however both the slight additional storage and lower flow provide additional extended detention volume and time which is considered beneficial.

The 100 year storage volume of 47,698 m^3 at an elevation of 189.09 is 2% less than the design volume of 48,681m^3 at an elevation of 188.98. The 100 year pond flow of 6.56 m^3/s is 13.5% higher than the pond design flow of 5.78 m^3/s. The reason for the lower volume and increased flow is that the as-constructed pond has slightly less volume than the design and therefore the 100 year water surface level is pushed slightly higher to 189.09. This slight increase in water level generates a higher flow through the outlet control structures (due to higher driving head). The as-constructed top of berm for the pond is at an elevation of 189.46, which provides 0.37 m of freeboard.

This increase in pond flow for the 100 year storm event is considered acceptable, as the design criteria for the Pond 'H' is to match the post-development peak flow to pre-development flow rates for Bruce Creek at 16th Avenue. **Table 2** compares the existing target peak flows in Bruce Creek at the 16th Avenue to the design and as-built flows. As shown in **Table 2**, the as-constructed flows for Bruce Creek at 16th Avenue are similar to the design flows and well below the targets.

We trust that the above information is satisfactory to the Town to proceed with assumption of Pond 'H'. If you have any questions or require additional information please contact our office.

Sincerely,

STANTEC CONSULTING LTD.

LICENSED PROFESSIONAL ENGINEER
P. G. THASE
Oct. 20, 2008
PROVINCE OF ONTARIO

Philip Thase, P.Eng.
Senior Water Resources Engineer
Tel: (905) 474-0455
Fax: (905) 474-9889
Philip.thase@stantec.com

Attachment: Functional Stormwater Management Plan Kylemore Homes Deacon Property (excerpt 7 pages) (also on CD)
As-constructed pond outlet design spreadsheet for stage/storage/discharge (also on CD)
Pond H as-constructed survey (Krcmar Surveyors Ltd.) (also on CD)
Pond H As-Built vs Design, plan view and cross-sections (also on CD)
Town of Markham General Information Form (also on CD)
Data CD

c. Soran J. Sito, Town of Markham
Stephen Ng, Madison Homes Limited
Walter Ottoborgo, H & R Developments

Reference: **Stormwater Management Pond Certification & Assumption**
York Downs Pond 'H'
Town of Markham, Ontario

Table 2: Stage/Storage/Outflow for Pond 'H'

Return Period (yr)	Target Flows[1] to Bruce Creek @ 16th Ave (m^3/s)	Design[1]				As-Built[2,3]			
		Pond Peak Flows (m^3/s)	Storage (m^3)	Elevation (m)	Total Flows[4] at Bruce Creek (m^3/s)	Pond Peak Flows (m^3/s)	Storage (m^3)	Elevation (m)	Total Flows at Bruce Creek (m^3/s)
Permanent Pool	-	-	25,565 (required 15,953)	186.27	-	-	23,100	186.27	-
25mm	-	0.092	19,688 (required 17,700)	187.52	-	0.087	18,148	187.52	-
2	**1.68**	0.38	20,249	187.55	1.3 (1.29)	0.38	19,810	187.62	**1.33**
5	**3.23**	2.17	24,895	187.82	2.84 (2.85)	2.2 (2.3)	24,786 (24,592)	187.91 (187.9)	**2.7** (2.93)
25	**5.83**	2.68	38,162	188.54	5.58 (5.59)	2.58 (2.68)	38,050 (37,794)	188.63 (188.63)	**5.44** (5.71)
100	**8.61**	5.78	48,681	188.98	7.6 (7.59)	6.55 (6.56)	47,841 (47,698)	189.1 (189.09)	**7.57** (7.67)

1. Functional Stormwater Management Plan Kylemore Homes Deacon Property Town of Markham November 2005 (Updated September, 2006)
2. Based on as-constructed survey November, 2007 and supplemental survey info September, 2008.
3. Based on Visual Otthymo 2.0 hydrological model output.
4. Proposed Stormwater Management Plan Kylemor Homes – Deacon Property Town of Markham, Plan of Subdivision Application SU 03 119813, March 2008
5. Values in parenthesis are as recorded in Pond 'H' certification and Assumption October 20, 2008 submission

MARKHAM

General Information Form

Facility Name	York Downs
Type	Pond H
Function	Extended Detention/ Quantity
Pond Type	Wet Pond
General Description	
Location Description	
Nearest Major Intersection	Kennedy Road & Major Mackenzie Drive
Municipal Address	Kennedy Road & Angus Glen Blvd
Easting	
Northing	
Access	From Kennedy Road
Driveway	At Inlet
Driveway Material	Gravel
Vehicle Turnaround	At outlet
Gate Present	N/A
Lock Present	N/A
Adjacent Land Use	Golf Course/Fields Agriculture

Additional Notes

NWL = 186.27 (Controlled by Pinch valve)
Outlet control Orifice = 175 mm
Orifice Plate Invert = 185.71
Overflow Weir = 188.55

Permanent Pool Volume
Required = 15,953 m^3
As-Built = 23,100 m^3

Extended Detention
Elevation = 187.52 m
Required Volume = 17,700 m^3
As-Built Volume = 18,148 m^3

100-year Elevation = 189.09
Flow = 6.56 m^3/s
100 year Volume = 47,698 m^3

Extended Detention - 100 Year Pond Outlet Design

Project Description:

AS-BUILT **York Downs Pond H**

Job Number: 60675256

Date: 3-Feb-2017

Note: Weir 1 (Extended Detention Berm) activates above elevation 187.52 m

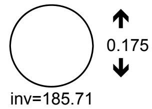
Start Elevation (m) 186.27 Weir 1 only controls flow between 187.52 - 187.77 when Weir 1 Q < Orifice 2 Q

Increment (m) 0.05

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Upstream Head (m)	Weir 1 Coefficient (Breadth=4.5)	Weir 1 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)		
186.27	0.045	0.000	0.00	0.00	0.000	186.27	0.045	0	0.0	-59.73	
186.32	0.048	0.000	0.00	0.00	0.000	186.32	0.048	641	3.8	-59.68	
186.37	0.050	0.000	0.00	0.00	0.000	186.37	0.050	1289	7.5	-59.63	
186.42	0.052	0.000	0.00	0.00	0.000	186.42	0.052	1944	11.1	-59.58	
186.47	0.054	0.000	0.00	0.00	0.000	186.47	0.054	2606	14.5	-59.53	
186.52	0.056	0.000	0.00	0.00	0.000	186.52	0.056	3275	17.9	-59.48	
186.57	0.058	0.000	0.00	0.00	0.000	186.57	0.058	3951	21.2	-59.43	
186.62	0.060	0.000	0.00	0.00	0.000	186.62	0.060	4635	24.4	-59.38	
186.67	0.062	0.000	0.00	0.00	0.000	186.67	0.062	5325	27.6	-59.33	
186.72	0.063	0.000	0.00	0.00	0.000	186.72	0.063	6022	30.7	-59.28	
186.77	0.065	0.000	0.00	0.00	0.000	186.77	0.065	6726	33.7	-59.23	
186.82	0.067	0.000	0.00	0.00	0.000	186.82	0.067	7437	36.7	-59.18	
186.87	0.068	0.000	0.00	0.00	0.000	186.87	0.068	8156	39.6	-59.13	
186.92	0.070	0.000	0.00	0.00	0.000	186.92	0.070	8881	42.6	-59.08	
186.97	0.072	0.000	0.00	0.00	0.000	186.97	0.072	9614	45.4	-59.03	
187.02	0.073	0.000	0.00	0.00	0.000	187.02	0.073	10353	48.3	-58.98	
187.07	0.075	0.000	0.00	0.00	0.000	187.07	0.075	11100	51.1	-58.93	
187.12	0.076	0.000	0.00	0.00	0.000	187.12	0.076	11854	53.9	-58.88	
187.17	0.077	0.000	0.00	0.00	0.000	187.17	0.077	12615	56.6	-58.83	
187.22	0.079	0.000	0.00	0.00	0.000	187.22	0.079	13383	59.4	-58.78	
187.27	0.080	0.000	0.00	0.00	0.000	187.27	0.080	14159	62.1	-58.73	
187.32	0.082	0.000	0.00	0.00	0.000	187.32	0.082	14942	64.8	-58.68	
187.37	0.083	0.000	0.00	0.00	0.000	187.37	0.083	15732	67.4	-58.63	
187.42	0.084	0.000	0.00	0.00	0.000	187.42	0.084	16530	70.1	-58.58	
187.47	0.085	0.000	0.00	0.00	0.000	187.47	0.085	17335	72.7	-58.53	
187.52	0.087	0.000	0.00	0.00	0.000	187.52	0.087	18148	75.3	-58.48	EXT DET
187.57	0.088	0.000	0.05	1.49	0.075	187.57	0.163	18968	77.2	-58.43	
187.62	0.089	0.000	0.10	1.49	0.283	187.62	0.372	19796	78.0	-58.38	2 YR WL
187.67	0.090	0.000	0.15	1.49	0.649	187.67	0.740	20632	78.5	-58.33	
187.72	0.092	0.000	0.20	1.49	1.199	187.72	1.291	21475	78.7	-58.28	
187.77	0.093	0.000	0.25	1.49	1.956	187.77	2.048	22326	78.8	-58.23	

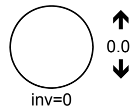
Control Structure Configuration:

Orifice 1 (Round Only)
Invert = 185.71 m
Size = 0.175 m
C= 0.62
Obvert = 185.885 m



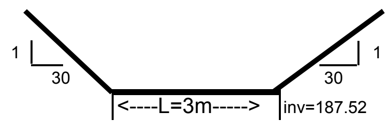
Note: Orfice plate was inverted
Orifice 1 controls flows up to
187.77 m

Orifice 2 (Round Only)
Invert = 0 m
Size = 0 m
C = 0
Obvert = 0 m



Note: Orifice 2 controls flows
above 187.77 m when
Weir 1 Q > Orifice 2 Q

Weir 1
Length = 3.0 m
Elevation = 187.52 m
Side Slp = 30
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)
Breadth = 4.5 m



Weir 1 only controls flow between
187.52 - 187.77 when
Weir 1 Q < Orifice 2 Q

<< select using pull down menu

Extended Detention - 100 Year Pond Outlet Design

Project Description:

AS-BUILT **York Downs Pond H**

Job Number: 60675256

Date: 3-Feb-2017

Note: Orifice 2 controls flows when Weir 1 Q > Orifice 2 Q above 187.77 m

Weir 2 (Overflow Spillway) activates above elevation 188.55

Start Elevation (m) 186.27

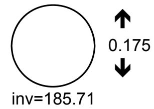
Increment (m) 0.05

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Upstream Head (m)	Weir 2 Coefficient (Breadth=4.5)	Weir 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)		
187.82	0.000	2.166	0.00	0.00	0.000	187.82	2.166	23139	0.8	-58.18	2.166
187.87	0.000	2.185	0.00	0.00	0.000	187.87	2.185	24002	0.9	-58.13	2.185
187.92	0.000	2.204	0.00	0.00	0.000	187.92	2.204	24874	1.0	-58.08	2.204
187.97	0.000	2.222	0.00	0.00	0.000	187.97	2.222	25753	1.1	-58.03	2.222
188.02	0.000	2.241	0.00	0.00	0.000	188.02	2.241	26640	1.2	-57.98	2.241
188.07	0.000	2.259	0.00	0.00	0.000	188.07	2.259	27536	1.3	-57.93	2.259
188.12	0.000	2.278	0.00	0.00	0.000	188.12	2.278	28439	1.4	-57.88	2.278
188.17	0.000	2.296	0.00	0.00	0.000	188.17	2.296	29350	1.5	-57.83	2.296
188.22	0.000	2.314	0.00	0.00	0.000	188.22	2.314	30269	1.7	-57.78	2.314
188.27	0.000	2.332	0.00	0.00	0.000	188.27	2.332	31197	1.8	-57.73	2.332
188.32	0.000	2.350	0.00	0.00	0.000	188.32	2.350	32132	1.9		2.350
188.37	0.000	2.367	0.00	0.00	0.000	188.37	2.367	33075	2.0		2.367
188.42	0.000	2.385	0.00	0.00	0.000	188.42	2.385	34026	2.1		2.385
188.47	0.000	2.402	0.00	0.00	0.000	188.47	2.402	34985	2.2		2.402
188.52	0.000	2.419	0.00	0.00	0.000	188.52	2.419	35953	2.3		2.419
188.57	0.000	2.436	0.02	1.49	0.008	188.57	2.445	36929	2.4		2.436
188.62	0.000	2.453	0.07	1.49	0.067	188.62	2.520	37914	2.5		2.453
188.67	0.000	2.470	0.12	1.49	0.177	188.67	2.647	38908	2.7		2.470
188.72	0.000	2.487	0.17	1.49	0.344	188.72	2.831	39911	2.8		2.487
188.77	0.000	2.504	0.22	1.49	0.574	188.77	3.078	40923	2.8		2.504
188.82	0.000	2.520	0.27	1.49	0.873	188.82	3.393	41945	2.9		2.520
188.87	0.000	2.537	0.32	1.45	1.212	188.87	3.748	42978	3.0		2.537
188.92	0.000	2.553	0.37	1.45	1.650	188.92	4.203	44020	3.1		2.553
188.97	0.000	2.569	0.42	1.46	2.184	188.97	4.753	45072	3.2		2.569
189.02	0.000	2.585	0.47	1.46	2.793	189.02	5.378	46138	3.2		2.585
189.07	0.000	2.601	0.52	1.45	3.467	189.07	6.068	47219	3.3		2.601
189.12	0.000	2.617	0.57	1.45	4.253	189.12	6.870	48316	3.3		2.617
189.17	0.000	2.633	0.62	1.45	5.136	189.17	7.769	49428	3.4		2.633
189.22	0.000	2.649	0.67	1.45	6.120	189.22	8.769	50557	3.4		2.649
189.27	0.000	2.664	0.72	1.45	7.207	189.27	9.872	51696	3.43		2.664

Event	Vol	Pipe Outflow	WL
5	24443	2.194	187.90
25	38286	2.460	188.64
100	47758	2.609	189.09

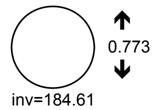
Control Structure Configuration:

Orifice 1	(Round Only)	
Invert =	185.71	m
Size =	0.175	m
C=	0.62	
Obvert =	185.885	m



Note: Orifice 1 controls flows up to 187.77 m

Orifice 2	(Round Only)	
Invert =	184.61	m
Size =	0.773	m
C =	0.62	
Obvert =	185.383	m



Orifice 2 controls flows above 187.77 m

Weir 2		
Length =	1.8	m
Elevation =	188.55	m
Side Slp =	8.8	
(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)		
Breadth =	4.5	m

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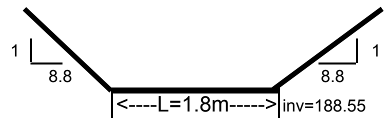

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FUNCTIONAL STORMWATER MANAGEMENT PLAN

KYLEMORE HOMES DEACON PROPERTY

TOWN OF MARKHAM

November 2005
(Updated September 2006)

Prepared for:

Kylemore Homes
10080 Kennedy Road
Markham, ON
L6C 1N9

Prepared by:
Stantec Consulting Limited
7270 Woodbine Avenue
Markham, Ontario
L3R 4B9

File No. 606 20762

1.0 Introduction

Stantec Consulting has been retained by Kylemore Homes to develop a stormwater management (SWM) servicing solution for the proposed development of the Deacon lands. The 4.5 ha subject site is located north of 16th Avenue, west of Kennedy Road and east of the Bruce Creek in the Town of Markham (refer to **Figure 1**).

The proposed development is a mixed-use community including low and medium density residential combined with a commercial area adjacent to 16th Avenue and park blocks along the east side of Bruce Creek. The site is situated within the Bruce Creek subwatershed and currently drains entirely to Bruce Creek. In addition, approximately 2.3 ha of external lands north of the Deacon site (owned by various others, including the York Downs Golf Course) presently drain into and through the subject site prior to discharging into Bruce Creek.

Previous stormwater management studies discussing the subject site are summarized as follows:

- "*Final Report on Environmental Management Plan (EMP) for Urban Expansion Areas, Cosburn Patterson Wardman, November 1994*"
    - This report identifies existing drainage patterns within Markham's Urban Expansion Areas and includes general recommendations with respect to future stormwater management controls to be implemented for the various subwatershed areas. The subject area was included in the analysis for Area 6 of the report and the recommendations for this area included a quality/quantity control and extended detention facility located in the southwest corner of the subject lands, adjacent to Bruce Creek (refer to **Attachment 1** for related excerpts from the report). The report also stated that "*any uncontrolled release of overland flows from this area should be compensated for in the design of the proposed pond to ensure that pre-development flow targets are met*".

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- "*Stormwater Management Pond Design Brief – York Downs Stormwater Management Facility – Extended Detention/Quantity Pond (Pond H), Cosburn Patterson Mather, September 1997*"

  - In conjunction with the development of a portion of the lands owned by Humbold Properties in Berczy Village, this design brief was prepared for the proposed SWM facility, located west of Berczy Village on the York Downs lands. This facility was designed to accommodate drainage from approximately 79.8 ha within Berczy Village, as well as approximately 23.4 ha of York Downs lands (see Figure 2 from the Pond H report in **Attachment 2**).
- "*Operations Design Brief for Auxiliary Water Supply, York Downs Golf & Country Club, Stantec Consulting Ltd., October 2004*"
  - This report includes various modifications to the York Downs SWM Pond H in order to provide supplemental water supply (using Pond H as a water source) to the York Downs Golf Course during the golfing season. The modifications to Pond H were analyzed using the original approved detailed hydrologic modelling (Otthymo 89) from the York Downs Pond (Pond H) design, importing it into the Visual Otthymo 2.0 (VO2) hydrologic model and modelling the existing and proposed conditions accordingly. In order to facilitate the auxiliary water supply while still respecting Pond H design criteria, the report specifies raising the normal water level of the York Downs Pond H from 185.50 m to 186.27 m by installing a pinch valve on the outlet pipe to Bruce Creek. As a result, the extended detention elevation increases from 186.77 m to 187.52 m and the 100-year water level increases from 188.60 m to 188.93 m. To maintain the functionality of the pond at these revised elevations and to maintain the 0.3 m of freeboard above the 100-year water level, the top of the pond was also raised from 189.00 m to 189.30 m and the extended detention berm was raised to 187.52 m.

In addition, stormwater control criteria have been established by complying with the following documents as well as satisfying Toronto Region Conservation Authority (TRCA) requirements.

- "*Stormwater Management Practices (SWMP) Planning and Design Manual, MOE, March 2003* ", and;
- "*Town of Markham, Engineering Department, Design Criteria and Standard Drawings, July 2003*".

2.0 Existing Conditions

Stantec Consulting has obtained a copy of the approved detailed hydrologic modelling (Otthymo 89) used in the design of the York Downs Pond (Pond H). The existing condition Otthymo 89 model was imported into the Visual Otthymo 2.0 (VO2) hydrologic model and was revised to include the area draining to Bruce Creek west of Kennedy Road and north of 16th Avenue. Refer to **Attachment 3** for model output and drainage schematics. A digital version of the existing condition model is enclosed on CD in **Attachment 3**. **Figures 2** and **3** illustrate the existing drainage boundaries.

The pre-development peak flows to Bruce Creek (at 16th Avenue) from the areas east of the creek and west of Kennedy Road (catchments 503 and 504 in **Figure 2**) are summarized in **Table 1**.

Table 1: Pre-Development (Target) Flows to Bruce Creek

Return Period (year)	Target Flows to Bruce Creek (m^3/s)
2	1.68
5	3.23
25	5.83
100	8.61

to Bruce Creek. Refer to **Drawing 3** in the Function Servicing Report (FSR) for details.

Major and minor system flows from the proposed park blocks adjacent to Bruce Creek will remain unchanged and drain directly to Bruce Creek via sheet flow.

3.4 QUALITY CONTROL

The stormwater quality control within the Deacon site will be provided by i) one oil/grit separator to effectively provide quality and spill control for the proposed commercial development and by ii) the forested wetland for the residential area.

The oil/grit separator sizing will be based on providing Enhanced (Level 1) protection (as per the MOE SWMP Planning and Design Manual, March 2003).

3.5 QUANTITY CONTROL

Further to the Auxiliary Water Supply report prepared in October 2004 by Stantec Consulting, the post development condition for the subject site was modelled using the hydrologic model from the October 2004 Auxiliary Water Supply report and modifying the model accordingly to meet TRCA requirements. In addition, the stage/storage/discharge characteristics of Pond H in the model were updated to reflect as-built conditions. Refer to **Attachment 5** for proposed Pond H operating characteristics. Refer to **Attachment 3** for VO2 model output and drainage schematics. A digital version of the model is enclosed on CD in **Attachment 3**. **Figure 5** illustrates the proposed drainage boundaries.

It has been assumed in the post development condition model that the York Downs Golf Course lands north of the subject site are not developed. If the York Downs Golf Course does decide to develop in the future, they must provide their own stormwater management controls to ensure target flows to the Bruce Creek at 16th Avenue are still being met.

Post development peak flows in Bruce Creek (at 16th Avenue) must be less than or equal to pre-development levels. The proposed post development peak flows to

Bruce Creek (at 16th Avenue) from the areas east of the creek are summarized in **Table 2**.

Table 2: Comparison Between Pre-Development and Post Development Peak Flows to Bruce Creek at 16th Avenue

Return Period (year)	Target Flows to Bruce Creek (m^3/s)	Post Development Peak Flows to Bruce Creek (m^3/s)
2	1.68	1.29
5	3.23	2.85
25	5.83	5.59
100	8.61	7.59

As shown in **Table 2**, the peak flows being conveyed to Bruce Creek in the post development condition are less than the pre-development peak flows for each storm event. The existing Pond H has been designed and constructed in such a way that it overcontrols the release rates for the storm events up to and including the 100-year storm. Quantity controls are therefore not required for the Deacon lands in order to meet pre-development target flows to Bruce Creek at 16th Avenue. Note that on-site quantity controls (to 180 L/s/ha) for the 0.6 ha commercial block have been provided for in the VO2 model.

3.6 EXTENDED DETENTION

Given the small size of the proposed site (4.5 ha), alternative erosion control measures have been established with the TRCA. A combination of the following erosion control mitigation measures is required in lieu of on-site erosion control.

- Increasing the extended detention time of Pond H to 72 hours while still meeting minimum orifice sizing criteria.
- Designing the outfall from the proposed Deacon lands storm system to minimize erosion impacts. This measure will be discussed further in the latter portion of this report.

Originally, Pond H was designed to provide erosion control by detaining the runoff from the 4-hour duration 25mm rainfall event from 106.35 ha (17,700 m^3) with a peak release rate of 0.18 m^3/s for 48 hours. The peak release rate was controlled via a

270 mm diameter orifice plate at the normal water level of 185.50 m. To achieve 72 hour extended detention time in Pond H, the peak release rate from the 4-hour 25mm rainfall event can be decreased (to $0.11m^3/s$) by replacing the 270 mm diameter orifice with a 175 mm diameter orifice (refer to **Attachment 6** for calculation). The extended detention calculations with the 175 mm diameter orifice plate size have been completed using a normal water level of 186.27m (as per the October 2004 Auxiliary Water Supply report). The resulting extended detention level of Pond H is 187.52m.

3.7 EROSION AND SEDIMENT CONTROL

3.7.1 General

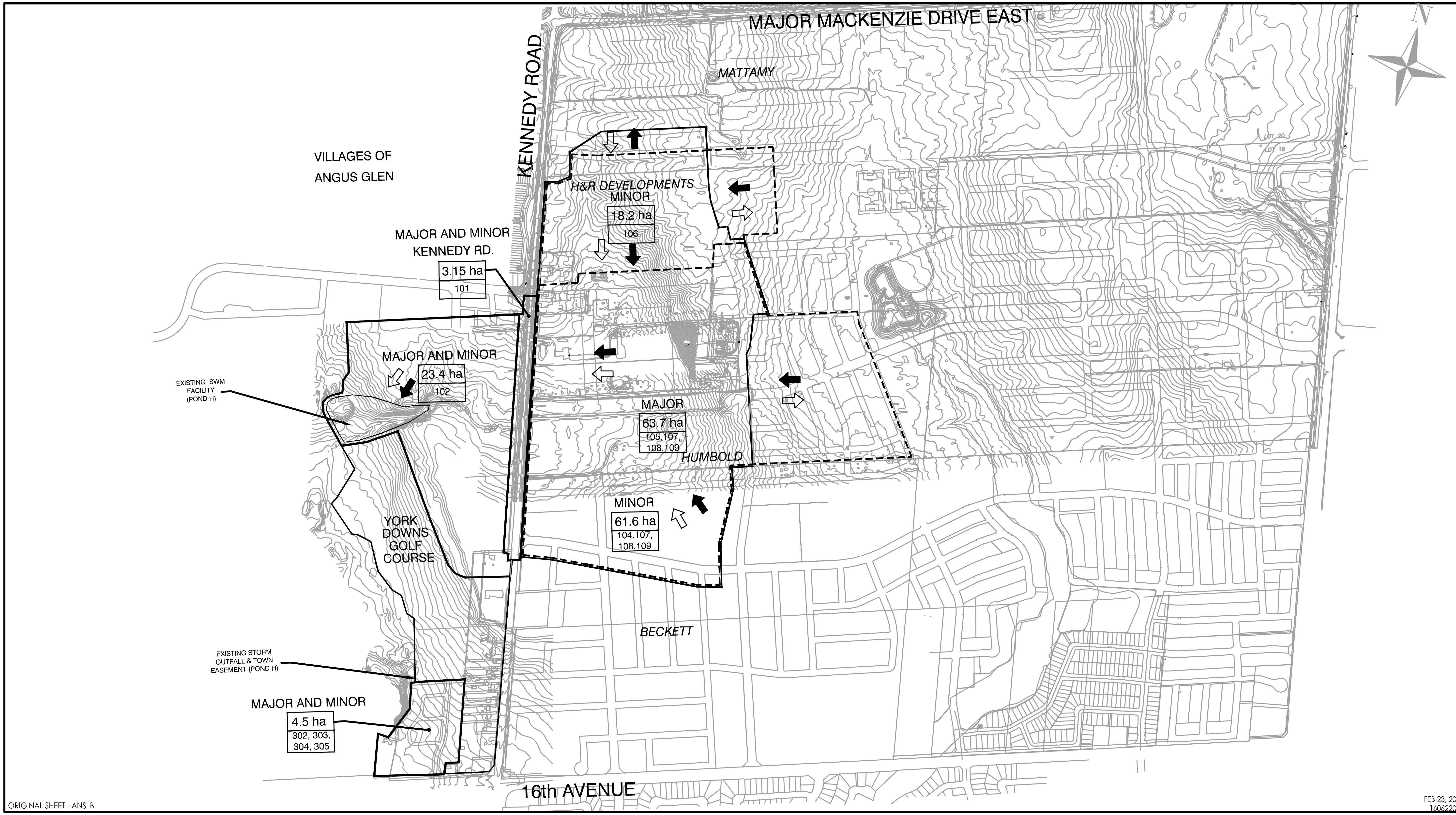
As part of the final (detailed) design process, a detailed erosion and sediment control plan will be prepared. The plan will be implemented prior to and throughout the construction phase. The plan is to be in place prior to any earthworks and to remain in place and be maintained for the duration of the development period. This will include the placement of temporary sediment control fencing, construction access mud mat and restoration of any disturbed areas with topsoil, seed and vegetation.

3.7.2 Outlet

3.7.2.1 Headwall Outlet

The minor system and 100 year rear lot catchbasin capture flows from the subject site and the minor system flows from the undeveloped 2.3 ha of external drainage area as well as the major system peak flows from 0.82 ha of residential area (and the major system flows from 0.39 ha of external drainage) will outlet via a headwall located just east of the existing driveway north of 16th Avenue. A plunge pool consisting of rip-rap overlaying filter cloth will be placed at the outfall structure to dissipate energy. In addition, the flows will be discharged through a porous stone weir prior to entering a forested wetland to diffuse flows and moderate velocities. The plunge pool will also serve as a sediment attenuation area to protect vegetation within the forested wetland. Stormwater will then flow through a forested wetland,

A.2 YORKTON PHASE 2 INTERIM SWM POND FIGURES



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2016/02/25 2:33 PM By: Ng, Timothy

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Markham, Ontario L3R 0B8
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Legend

- MINOR SYSTEM DRAINAGE BOUNDARY
- MAJOR SYSTEM DRAINAGE BOUNDARY
- 61.6 ha - DRAINAGE AREA
- 104,107, 108,109 - V02 CATCHMENT NUMBER
- MINOR SYSTEM DRAINAGE ARROW
- MAJOR SYSTEM DRAINAGE ARROW

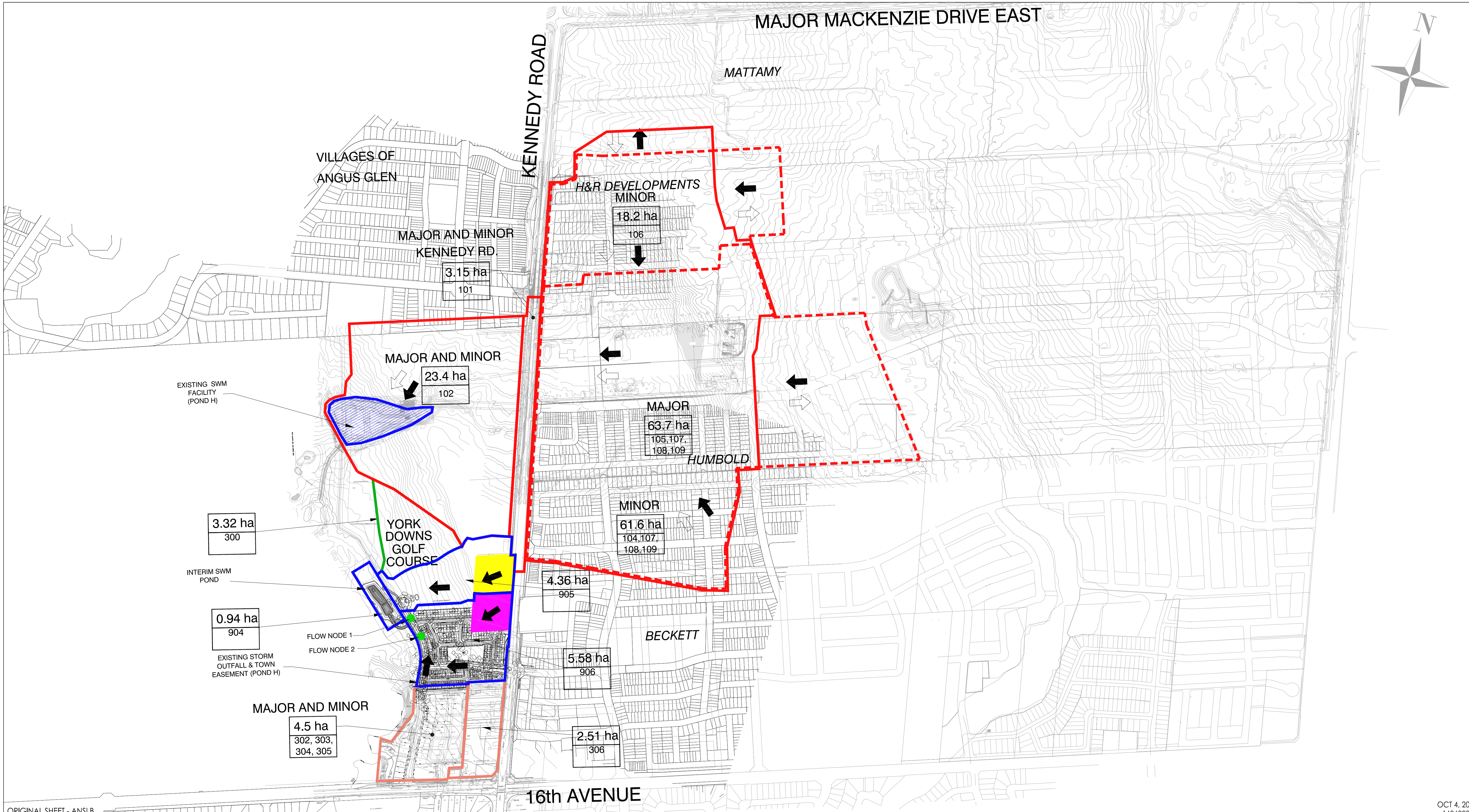
Notes

SCALE 1:10000

Client/Project
KYLEMORE YORKTON PHASE 2

Figure No.
3.0

Title
2007 POST DEVELOPMENT DRAINAGE PLAN



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2016/10/13 12:18 PM By: Overholt, Alysse

Legend

- MINOR SYSTEM DRAINAGE BOUNDARY TO POND H
- MAJOR SYSTEM DRAINAGE BOUNDARY TO POND H
- YORK DOWNS GOLF COURSE UNCONTROLLED AREA
- MAJOR and MINOR SYSTEM DRAINAGE BOUNDARY TO YORKTON INTERM POND
- YORKTON INTERIM POND DRAINAGE AREA: EXISTING RESIDENTIAL AREA ADJACENT TO KENNEDY ROAD
- YORKTON INTERIM POND DRAINAGE AREA: EXISTING CHURCH AND CEMETERY
- DEACON AND DEACON EXTERNAL LANDS DRAINAGE AREAS

Notes

SCALE 1:10000

- FLOW NODE
- 61.6 ha -DRAINAGE AREA
- 104,107, 108,109 -V02 CATCHMENT NUMBER
- MINOR SYSTEM DRAINAGE ARROW
- MAJOR SYSTEM DRAINAGE ARROW

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KYLEMORE YORKTON PHASE 2

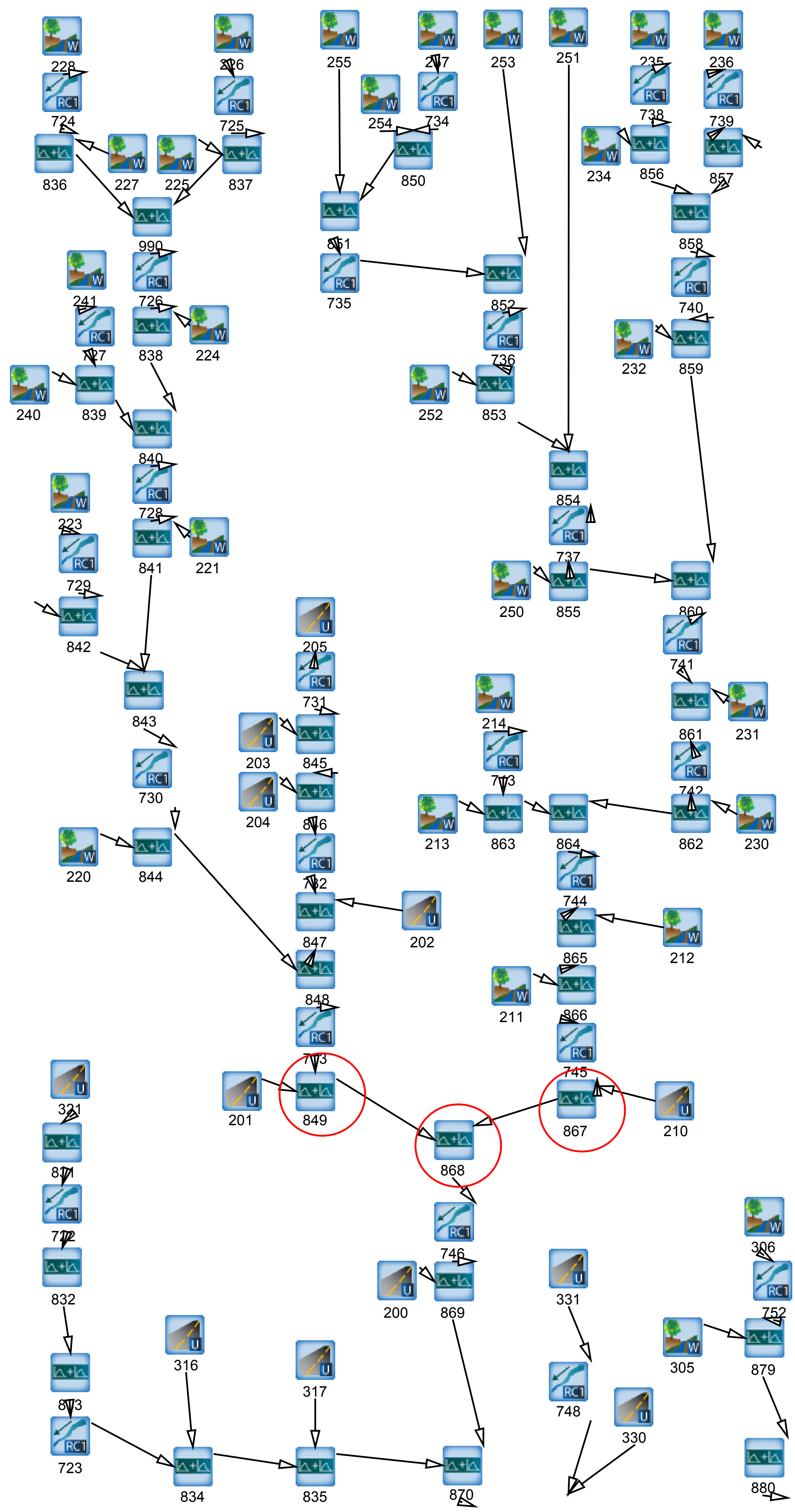
Figure No.
4.0

Title
2016 POST DEVELOPMENT DRAINAGE PLAN

Appendix B EXISTING AND CURRENT CONDITIONS HYDROLOGY MODELING

B.1 FC DEVELOPMENT CONDITIONS HYDROLOGY MODELING

Future Committed Development Model Schematic (Partial Screen Capture)



4134 16th Avenue Residential Development
Model Flow Summary

Project No. 160622264

FC Development Flow at Downstream Nodes			
Node	Node 867	Node 849	Node 868
Watershed	Bruce	Berczy	Confluence
Drainage Area (ha)	3551.7	3043.2	6594.9
Storm Event Flows	FC	FC	FC
	(m^3/s)	(m^3/s)	(m^3/s)
2 year	13.35	11.91	25.02
5 year	21.00	19.91	40.44
25 year	33.87	33.51	66.73
100 year	46.96	46.18	92.71

Note: FC = Future Committed Development model flows as taken from the MMM 2001 Rouge River Report

Flow Point	Drainage Area	Peak Flow Rate (m^3/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
839	436.7	3.75	3.93	10.07	4.10
840	1192.4	9.97	10.21	23.22	11.40
841	1519.1	7.78	8.00	16.35	8.60
842	454.8	2.46	2.49	9.49	
843	1973.9	9.86	9.95	25.27	11.00
844	2297.5	9.13	9.23	19.03	9.90
845	236.8	2.62	1.89	1.89	3.00
846	321.6	3.67	2.46	2.46	4.10
847	549.2	3.44	3.46	3.46	6.50
848	2846.7	11.71	11.97	21.96	13.30
849	3043.2	11.52	11.91	20.05	13.00
850	180.6	1.62	1.62	4.45	
851	553.6	4.92	4.92	13.72	
852	711.8	6.29	6.29	17.40	
853	852.1	7.72	7.72	19.63	
854	1025.2	9.47	9.47	24.27	
855	1293.0	10.57	10.57	25.44	
856	151.8	2.22	2.22	4.09	
857	138.1	1.26	1.26	3.38	
858	289.8	3.23	3.23	7.48	
859	488.1	4.18	4.18	9.14	
860	1781.1	14.74	14.74	34.58	15.90
861	1939.3	13.76	13.76	29.64	14.90
862	2119.6	10.64	10.64	21.00	10.60
863	484.0	4.16	4.16	10.72	
864	2603.6	13.05	13.05	25.10	10.40
865	2872.7	12.54	12.54	22.92	12.10
866	3174.1	13.60	13.60	24.69	13.10
867	3551.7	13.35	13.35	22.48	13.00
868	6594.9	24.33	25.02	40.91	25.60
869	6697.8	~~24.30~~	~~24.96~~	~~40.95~~	25.30
1200	6697.8	24.25	24.93	40.89	
870	13664.1	45.54	47.98	64.93	41.60
871	13717.8	43.87	46.27	64.00	41.30
872	526.3	~~7.52~~ 4.44	4.44	4.44	
873	14244.1	45.91	48.26	66.33	42.90
874	14368.1	46.26	48.62	66.70	43.00
875	14584.9	46.86	49.25	67.39	43.00
876	14853.1	43.52	45.65	62.58	37.00
877	15115.0	~~43.83~~	~~45.98~~	~~62.99~~	37.00
1311	15115.0	42.64	44.76	62.02	
878	15158.3	42.45	44.57	61.71	36.30
879	390.2	4.20	4.20	8.81	4.50
880	494.2	5.39	5.39	11.68	5.80
881	808.1	6.25	~~4.87~~	~~13.34~~	7.75
1303	808.1		4.86	12.46	
882	229.9	1.69	2.05	4.36	
1301	229.9		0.84	1.58	
883	1038.0	7.71	5.07	12.78	9.25
884	1377.2	~~7.73~~	~~7.76~~	~~12.64~~	10.74
1300	1377.2	7.63	6.36	12.25	
885	16535.5	44.61	47.09	65.20	38.10

Flow Point	Drainage Area	Peak Flow Rate (m^3/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
839	436.7	6.13	6.28	13.28	6.10
840	1192.4	16.15	16.40	32.36	16.90
841	1519.1	12.98	13.27	23.23	13.50
842	454.8	4.20	4.25	12.68	
843	1973.9	16.50	16.60	35.00	17.10
844	2297.5	15.78	15.93	26.34	15.50
845	236.8	4.28	2.87	2.87	4.40
846	321.6	6.03	3.65	3.65	6.10
847	549.2	6.34	5.19	5.19	9.00
848	2846.7	20.62	20.68	30.12	20.40
849	3043.2	19.73	19.91	28.83	19.50
850	180.6	2.65	2.65	5.95	
851	553.6	7.96	7.96	18.59	
852	711.8	10.36	10.36	23.28	
853	852.1	12.67	12.67	26.05	
854	1025.2	15.49	15.49	32.18	
855	1293.0	17.47	17.47	34.91	
856	151.8	3.65	3.65	5.46	
857	138.1	2.11	2.11	4.54	
858	289.8	5.49	5.49	10.00	
859	488.1	6.67	6.67	12.19	
860	1781.1	24.07	24.07	47.10	24.00
861	1939.3	22.37	22.37	40.18	22.20
862	2119.6	17.19	17.19	28.90	16.00
863	484.0	6.72	6.72	14.37	
864	2603.6	21.25	21.25	34.56	15.40
865	2872.7	19.88	19.88	31.78	17.90
866	3174.1	21.47	21.47	34.47	19.30
867	3551.7	21.00	21.00	32.06	18.40
868	6594.9	39.82	40.44	59.42	37.40
869	6697.8	~~39.84~~	~~40.48~~	~~59.40~~	37.10
1200	6697.8	39.78	40.42	59.39	
870	13664.1	71.80	74.18	94.86	61.30
871	13717.8	70.50	72.75	93.33	60.80
872	526.3	~~10.13~~ 8.34	8.34	8.34	
873	14244.1	73.71	75.75	96.76	62.90
874	14368.1	74.14	76.21	97.20	62.90
875	14584.9	75.09	77.19	98.25	63.00
876	14853.1	69.53	71.77	91.86	54.80
877	15115.0	~~69.96~~	~~72.23~~	~~92.39~~	54.80
1311	15115.0	69.03	71.40	91.53	
878	15158.3	68.73	71.12	91.31	53.40
879	390.2	6.76	6.76	12.07	6.90
880	494.2	8.68	8.68	15.89	8.80
881	808.1	10.12	~~7.94~~	~~18.51~~	10.46
1303	808.1		7.93	17.09	
882	229.9	2.94	3.36	5.87	
1301	229.9		1.90	2.70	
883	1038.0	12.58	9.70	18.99	12.62
884	1377.2	~~12.90~~	~~11.27~~	~~18.65~~	16.40
1300	1377.2	12.88	11.04	18.06	
885	16535.5	72.29	75.09	96.05	56.30

5 Year

Flow Point	Drainage Area	Peak Flow Rate (m^3/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
839	436.7	10.22	10.28	18.42	10.60
840	1192.4	27.46	27.47	46.18	28.50
841	1519.1	22.78	23.07	34.64	24.20
842	454.8	7.18	7.28	17.62	
843	1973.9	29.09	29.08	50.87	30.50
844	2297.5	27.16	27.26	38.43	27.60
845	236.8	7.02	4.35	4.35	7.60
846	321.6	10.01	5.56	5.56	10.60
847	549.2	8.78	7.40	7.40	14.60
848	2846.7	35.56	34.54	44.86	35.40
849	3043.2	33.69	33.51	44.30	33.40
850	180.6	4.47	4.47	8.43	
851	553.6	13.32	13.32	25.88	
852	711.8	17.26	17.26	31.75	
853	852.1	20.53	20.53	35.11	
854	1025.2	25.52	25.52	43.63	
855	1293.0	29.39	29.39	48.34	
856	151.8	6.14	6.14	7.67	
857	138.1	3.77	3.77	6.47	
858	289.8	9.55	9.55	14.14	
859	488.1	11.10	11.10	17.17	
860	1781.1	40.49	40.49	65.51	42.60
861	1939.3	37.63	37.63	56.90	38.70
862	2119.6	29.18	29.18	43.19	28.20
863	484.0	11.26	11.26	20.56	
864	2603.6	36.16	36.16	50.92	26.60
865	2872.7	32.86	32.86	48.48	30.90
866	3174.1	35.47	35.47	52.73	33.40
867	3551.7	33.87	33.87	48.73	30.40
868	6594.9	66.32	66.73	91.92	62.90
869	6697.8	~~66.16~~	~~66.62~~	~~91.72~~	62.10
1200	6697.8	66.13	66.60	91.72	
870	13664.1	118.72	120.57	145.18	105.60
871	13717.8	117.15	119.21	143.18	105.40
872	526.3	14.88	14.86	14.86	
873	14244.1	121.71	123.82	148.64	108.20
874	14368.1	121.97	124.13	149.23	107.90
875	14584.9	123.51	125.70	150.95	108.10
876	14853.1	115.00	117.31	141.46	94.40
877	15115.0	~~115.60~~	~~117.96~~	~~142.28~~	94.40
1311	15115.0	114.34	116.75	140.90	
878	15158.3	114.06	116.52	140.69	92.90
879	390.2	11.14	11.14	17.06	11.50
880	494.2	14.37	14.37	22.45	14.90
881	808.1	17.63	~~13.83~~	~~26.75~~	17.20
1303	808.1		13.69	24.94	
882	229.9	5.23	5.71	8.44	
1301	229.9		3.85	4.56	
883	1038.0	21.91	17.55	28.89	19.89
884	1377.2	~~22.72~~	~~20.39~~	~~27.81~~	27.26
1300	1377.2	22.66	19.90	27.53	
885	16535.5	119.31	122.73	148.61	97.70

Flow Point	Drainage Area	Peak Flow Rate (m³/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
839	436.7	13.66	13.76	22.45	14.90
840	1192.4	37.57	37.35	57.91	40.40
841	1519.1	32.07	32.36	42.05	36.00
842	454.8	10.06	10.18	22.35	
843	1973.9	40.91	40.73	64.40	45.30
844	2297.5	37.74	37.79	48.99	40.70
845	236.8	9.51	6.10	6.10	11.00
846	321.6	13.59	7.79	7.79	15.40
847	549.2	11.40	9.94	9.94	20.50
848	2846.7	48.45	47.60	58.33	51.70
849	3043.2	46.56	46.18	57.83	48.50
850	180.6	6.12	6.12	10.54	
851	553.6	18.20	18.20	32.19	
852	711.8	23.18	23.18	39.26	
853	852.1	27.08	27.08	43.51	
854	1025.2	33.82	33.82	54.15	
855	1293.0	40.06	40.06	60.20	
856	151.8	8.39	8.39	9.63	
857	138.1	5.30	5.30	8.08	
858	289.8	13.27	13.27	17.71	
859	488.1	15.23	15.23	21.55	
860	1781.1	55.29	55.29	81.75	62.20
861	1939.3	51.90	51.90	72.67	56.90
862	2119.6	41.03	41.03	56.63	42.70
863	484.0	15.33	15.33	25.48	
864	2603.6	50.66	50.66	67.26	40.90
865	2872.7	46.52	46.52	64.92	47.60
866	3174.1	50.23	50.23	70.70	51.10
867	3551.7	46.96	46.96	65.23	45.30
868	6594.9	92.35	92.71	122.31	92.80
869	6697.8	~~92.05~~	~~92.44~~	~~122.07~~	91.70
1200	6697.8	92.00	92.33	122.06	
870	13664.1	162.23	163.86	191.30	155.80
871	13717.8	159.62	161.39	189.13	155.50
872	526.3	18.88 18.32	18.32	18.32	
873	14244.1	164.78	167.52	196.50	159.20
874	14368.1	165.26	167.94	197.34	158.70
875	14584.9	167.08	169.81	199.35	159.00
876	14853.1	156.03	158.22	183.45	137.40
877	15115.0	~~156.82~~	~~159.01~~	~~184.74~~	137.40
1311	15115.0	155.48	157.84	183.41	
878	15158.3	155.13	157.58	183.22	135.50
879	390.2	15.07	15.07	21.43	16.90
880	494.2	19.43	19.43	28.29	21.90
881	808.1	23.20	~~19.50~~	~~34.40~~	25.51
1303	808.1		19.30	34.40	
882	229.9	7.31	8.11	10.70	
1301	229.9		5.74	6.40	
883	1038.0	29.23	24.99	39.32	29.16
884	1377.2	~~31.98~~	~~28.74~~	~~36.53~~	38.06
1300	1377.2	31.83	28.64	36.22	
885	16535.5	161.69	166.72	194.56	141.70

B.2 BRUCE CREEK SWM POND TARGET FLOW MODELING

Stantec

4134 16th Avenue Residential Development
Ponds 1 - 4 Model Summary Tables - V02

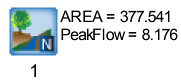
Project No. 160622264

Pro-Rated Flow Targets - Bruce Creek Ponds 1 - 3

Pond Location	Storm Event	Pre-Development Flow (cms)	Catchment 210 Drainage Area	Pre-Development Unitary Flow Target (cms/ha)	Post Development Drainage Area (ha)	Pro-Rated SWM Pond Allowable Release Rate (cms)	Modelling Notes	Sub-catchment Drainage Areas (ha)
POND 1 - Bruce East (North) - Includes Berczy Village and Kennedy Road Ext. Drainage	2	2.18		0.006	146.82	0.846	Bruce East (Forest Removed)	63.87
	5	3.94		0.010	146.82	1.532	Total Ext. Berczy Minor Drainage =	82.95
	25	8.18		0.022	130.72	2.831	Total Ext. Berczy Major Drainage =	66.85
	100	13.79		0.037	130.72	4.774		
POND 2 - Bruce East (South) - Includes Minto, Deacon and Yorkton Lands	2	2.18		0.006		0.068	Yorkton + External Areas =	6.59
	5	3.94	377.54	0.010	11.84	0.124	Remaining Phase 1 Lands to Pond 2	
	25	8.18		0.022		0.256	(including pond block area) =	5.25
	100	13.79		0.037		0.432		
POND 3 - Bruce West	2	2.18		0.006		0.131	Total Minor system Drainage =	21.90
	5	3.94		0.010	22.80	0.238		
	25	8.18		0.022		0.494	North catchment major flow to valley	
	100	13.79		0.037		0.833	North Major system Drainage Area =	6.67

Note: Targets are established based on flow generated from catchment 210 (377.54 ha) based on a NASHYD model command. There are no targets for Pond 4 as Berczy Creek does not require quantity control downstream of Warden Avenue per established criteria in Table 3-1 of the 2012 TRCA Stormwater Management Guidelines

Pre-Development Schematic – NASHYD Flow Target Establishment – Catchment 210



```
===========================================================================================================

      V    V   I    SSSSS  U   U    A    L
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M   M  O   O
       OOO      T      T    H   H    Y    M   M   OOO
```

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***** D E T A I L E D   O U T P U T *****

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  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: V:\01606\Active\16358D~1\Analysis\SWM\HYDROL~1\VO2EVE~1\Lumped Nashyd.out
  Summary filename: V:\01606\Active\16358D~1\Analysis\SWM\HYDROL~1\VO2EVE~1\Lumped Nashyd.sum
```

DATE: 8/18/2016   TIME: 2:16:39 PM

USER:

COMMENTS: ____

```
-----------------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************
```

100 Year Storm

```
--------------------
|    READ STORM    |    Filename: V:\01606\Active\16358D~1\Analysi
|                  |              s\SWM\HYDROL~1\VO2EVE~1\100Y12.STM
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

```
-------------------------------------------------------------------------------

--------------------
| CALIB            |
| NASHYD    (0001) |   Area    (ha)= 377.54   Curve Number   (CN)= 84.9
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.48

         NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.00	3.333	10.18	6.500	6.20	9.67	.89
.333	.45	3.500	15.05	6.667	6.20	9.83	.89
.500	.89	3.667	15.05	6.833	6.20	10.00	.89
.667	.89	3.833	15.05	7.000	6.20	10.17	.89
.833	.89	4.000	15.05	7.167	6.20	10.33	.89
1.000	.89	4.167	15.05	7.333	4.87	10.50	.89
1.167	.89	4.333	27.88	7.500	3.54	10.67	.89
1.333	.89	4.500	40.71	7.667	3.54	10.83	.89
1.500	.89	4.667	40.71	7.833	3.54	11.00	.89
1.667	.89	4.833	40.71	8.000	3.54	11.17	.89
1.833	.89	5.000	40.71	8.167	3.54	11.33	.89
2.000	.89	5.167	40.71	8.333	2.66	11.50	.89
2.167	.89	5.333	26.11	8.500	1.77	11.67	.89

2.333	3.10	5.500	11.51	8.667	1.77	11.83	.89
2.500	5.31	5.667	11.51	8.833	1.77	12.00	.89
2.667	5.31	5.833	11.51	9.000	1.77	12.17	.89
2.833	5.31	6.000	11.51	9.167	1.77	12.33	.44
3.000	5.31	6.167	11.51	9.333	1.33		
3.167	5.31	6.333	8.86	9.500	.89		

Unit Hyd Qpeak (cms)= 9.770

PEAK FLOW (cms)= 13.789 (i)
TIME TO PEAK (hrs)= 6.500
RUNOFF VOLUME (mm)= 54.219
TOTAL RAINFALL (mm)= 88.540
RUNOFF COEFFICIENT = .612

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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****************************
** SIMULATION NUMBER:   3 **
****************************
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2 Year Storm

```
--------------------
| MASS STORM       |     Filename: V:\01606\Active\16358D~1\Analysi
|                  |               s\SWM\HYDROL~1\VO2EVE~1\SCS12HII.MST
| Ptotal= 29.60 mm |     Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION
--------------------
```

Duration of storm = 12.00 hrs
Mass curve time step = 30.00 min
New Storm time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.30	3.25	1.18	6.25	15.98	9.25	1.18
.50	.59	3.50	1.18	6.50	5.33	9.50	1.18
.75	.59	3.75	1.18	6.75	3.85	9.75	.89
1.00	.59	4.00	1.18	7.00	2.37	10.00	.59
1.25	.59	4.25	1.48	7.25	2.07	10.25	.59
1.50	.59	4.50	1.78	7.50	1.78	10.50	.59
1.75	.59	4.75	2.07	7.75	1.78	10.75	.59
2.00	.59	5.00	2.37	8.00	1.78	11.00	.59
2.25	.89	5.25	2.96	8.25	1.48	11.25	.59
2.50	1.18	5.50	3.55	8.50	1.18	11.50	.59
2.75	1.18	5.75	15.10	8.75	1.18	11.75	.59
3.00	1.18	6.00	26.64	9.00	1.18	12.00	.59

```
--------------------
| CALIB            |
| NASHYD    (0001) |   Area    (ha)= 377.54   Curve Number   (CN)= 84.9
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.48
```

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.30	3.167	1.18	6.167	15.98	9.17	1.18
.333	.44	3.333	1.18	6.333	10.66	9.33	1.18
.500	.59	3.500	1.18	6.500	5.33	9.50	1.18
.667	.59	3.667	1.18	6.667	3.85	9.67	.89
.833	.59	3.833	1.18	6.833	3.11	9.83	.74
1.000	.59	4.000	1.18	7.000	2.37	10.00	.59
1.167	.59	4.167	1.48	7.167	2.07	10.17	.59
1.333	.59	4.333	1.63	7.333	1.92	10.33	.59
1.500	.59	4.500	1.78	7.500	1.78	10.50	.59
1.667	.59	4.667	2.07	7.667	1.78	10.67	.59
1.833	.59	4.833	2.22	7.833	1.78	10.83	.59
2.000	.59	5.000	2.37	8.000	1.78	11.00	.59
2.167	.89	5.167	2.96	8.167	1.48	11.17	.59
2.333	1.04	5.333	3.26	8.333	1.33	11.33	.59
2.500	1.18	5.500	3.55	8.500	1.18	11.50	.59
2.667	1.18	5.667	15.10	8.667	1.18	11.67	.59
2.833	1.18	5.833	20.87	8.833	1.18	11.83	.59
3.000	1.18	6.000	26.64	9.000	1.18	12.00	.59

Unit Hyd Qpeak (cms)= 9.770

PEAK FLOW (cms)= 2.175 (i)
TIME TO PEAK (hrs)= 7.667
RUNOFF VOLUME (mm)= 8.630
TOTAL RAINFALL (mm)= 29.526
RUNOFF COEFFICIENT = .292

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

--------------------
| MASS STORM         |    Filename: V:\01606\Active\16358D~1\Analysi
|                    |              s\SWM\HYDROL~1\VO2EVE~1\SCS12HII.MST
| Ptotal= 40.00 mm |    Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION
--------------------
                          Duration of storm     = 12.00 hrs
                          Mass curve time step = 30.00 min
                          New Storm time step  = 15.00 min
```

5 Year Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.40	3.25	1.60	6.25	21.60	9.25	1.60
.50	.80	3.50	1.60	6.50	7.20	9.50	1.60
.75	.80	3.75	1.60	6.75	5.20	9.75	1.20
1.00	.80	4.00	1.60	7.00	3.20	10.00	.80
1.25	.80	4.25	2.00	7.25	2.80	10.25	.80
1.50	.80	4.50	2.40	7.50	2.40	10.50	.80
1.75	.80	4.75	2.80	7.75	2.40	10.75	.80
2.00	.80	5.00	3.20	8.00	2.40	11.00	.80
2.25	1.20	5.25	4.00	8.25	2.00	11.25	.80
2.50	1.60	5.50	4.80	8.50	1.60	11.50	.80
2.75	1.60	5.75	20.40	8.75	1.60	11.75	.80
3.00	1.60	6.00	36.00	9.00	1.60	12.00	.80

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--------------------
| CALIB              |
| NASHYD    (0001) |   Area     (ha)= 377.54   Curve Number    (CN)= 84.9
|ID= 1 DT=10.0 min |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.48

        NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.40	3.167	1.60	6.167	21.60	9.17	1.60
.333	.60	3.333	1.60	6.333	14.40	9.33	1.60
.500	.80	3.500	1.60	6.500	7.20	9.50	1.60
.667	.80	3.667	1.60	6.667	5.20	9.67	1.20
.833	.80	3.833	1.60	6.833	4.20	9.83	1.00
1.000	.80	4.000	1.60	7.000	3.20	10.00	.80
1.167	.80	4.167	2.00	7.167	2.80	10.17	.80
1.333	.80	4.333	2.20	7.333	2.60	10.33	.80
1.500	.80	4.500	2.40	7.500	2.40	10.50	.80
1.667	.80	4.667	2.80	7.667	2.40	10.67	.80
1.833	.80	4.833	3.00	7.833	2.40	10.83	.80
2.000	.80	5.000	3.20	8.000	2.40	11.00	.80
2.167	1.20	5.167	4.00	8.167	2.00	11.17	.80
2.333	1.40	5.333	4.40	8.333	1.80	11.33	.80
2.500	1.60	5.500	4.80	8.500	1.60	11.50	.80
2.667	1.60	5.667	20.40	8.667	1.60	11.67	.80
2.833	1.60	5.833	28.20	8.833	1.60	11.83	.80
3.000	1.60	6.000	36.00	9.000	1.60	12.00	.80

```
    Unit Hyd Qpeak  (cms)=    9.770

    PEAK FLOW       (cms)=    3.939 (i)
    TIME TO PEAK    (hrs)=    7.667
    RUNOFF VOLUME    (mm)=   15.211
    TOTAL RAINFALL   (mm)=   39.900
    RUNOFF COEFFICIENT   =     .381

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************

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| MASS STORM         |    Filename: V:\01606\Active\16358D~1\Analysi
|                    |              s\SWM\HYDROL~1\VO2EVE~1\SCS12HII.MST
| Ptotal= 61.00 mm |    Comments: SCS 12 HOUR TYPE II STORM DISTRIBUTION
--------------------
                          Duration of storm     = 12.00 hrs
                          Mass curve time step = 30.00 min
                          New Storm time step  = 15.00 min
```

25 Year Storm

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

.25	.61	3.25	2.44	6.25	32.94	9.25	2.44
.50	1.22	3.50	2.44	6.50	10.98	9.50	2.44
.75	1.22	3.75	2.44	6.75	7.93	9.75	1.83
1.00	1.22	4.00	2.44	7.00	4.88	10.00	1.22
1.25	1.22	4.25	3.05	7.25	4.27	10.25	1.22
1.50	1.22	4.50	3.66	7.50	3.66	10.50	1.22
1.75	1.22	4.75	4.27	7.75	3.66	10.75	1.22
2.00	1.22	5.00	4.88	8.00	3.66	11.00	1.22
2.25	1.83	5.25	6.10	8.25	3.05	11.25	1.22
2.50	2.44	5.50	7.32	8.50	2.44	11.50	1.22
2.75	2.44	5.75	31.11	8.75	2.44	11.75	1.22
3.00	2.44	6.00	54.90	9.00	2.44	12.00	1.22

```
------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (0001)   |   Area     (ha)= 377.54   Curve Number   (CN)= 84.9
|ID= 1 DT=10.0 min   |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.48

        NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.61	3.167	2.44	6.167	32.94	9.17	2.44
.333	.92	3.333	2.44	6.333	21.96	9.33	2.44
.500	1.22	3.500	2.44	6.500	10.98	9.50	2.44
.667	1.22	3.667	2.44	6.667	7.93	9.67	1.83
.833	1.22	3.833	2.44	6.833	6.41	9.83	1.52
1.000	1.22	4.000	2.44	7.000	4.88	10.00	1.22
1.167	1.22	4.167	3.05	7.167	4.27	10.17	1.22
1.333	1.22	4.333	3.36	7.333	3.97	10.33	1.22
1.500	1.22	4.500	3.66	7.500	3.66	10.50	1.22
1.667	1.22	4.667	4.27	7.667	3.66	10.67	1.22
1.833	1.22	4.833	4.57	7.833	3.66	10.83	1.22
2.000	1.22	5.000	4.88	8.000	3.66	11.00	1.22
2.167	1.83	5.167	6.10	8.167	3.05	11.17	1.22
2.333	2.13	5.333	6.71	8.333	2.75	11.33	1.22
2.500	2.44	5.500	7.32	8.500	2.44	11.50	1.22
2.667	2.44	5.667	31.11	8.667	2.44	11.67	1.22
2.833	2.44	5.833	43.00	8.833	2.44	11.83	1.22
3.000	2.44	6.000	54.90	9.000	2.44	12.00	1.22

```
    Unit Hyd Qpeak  (cms)=   9.770

    PEAK FLOW       (cms)=   8.176 (i)
    TIME TO PEAK    (hrs)=   7.667
    RUNOFF VOLUME    (mm)=  30.873
    TOTAL RAINFALL   (mm)=  60.848
    RUNOFF COEFFICIENT   =    .507

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

------------------------------------------------------------------------------

 FINISH
=============================================================================================================
```

Rouge River Hydrologic Update
Table A.2 Model Parameters - Existing Conditions (May 2000)

Catchment ID	Area (ha)	% Impervious	CN (2)	Adjusted CN (2)	CN (3)	Adjusted CN (3)	Default Length (m)	Slope	Unadjusted		Adjusted	
									K (hr)	Tp (hr)	K (hr)	Tp (hr)
Beaver Creek												
354	312.606	0.450	84.7	91.6	93.5	96.4	1444	0.70%	1.368	1.159	0.279	0.603
353	67.733	0.538	84.9	93.1	93.6	97.0	672	2.02%	0.443	0.375	0.078	0.172
352	108.581	0.291	84.9	89.3	93.6	95.5	851	4.17%	0.372	0.315	0.135	0.207
351	326.614	0.557	84.9	93.3	93.6	97.2	1476	1.66%	0.903	0.766	0.157	0.342
350	428.584	0.571	83.0	92.7	92.6	96.8	1690	0.23%	2.793	2.367	0.485	1.039
323	410.000	0.510	71.8	86.2	86.1	93.2	1653	0.90%	1.262	1.069	0.229	0.510
322	28.289	0.120	62.1	66.7	79.6	82.0	434	0.28%	0.846	0.717	0.674	0.607
TOTAL	1682.407											
Robinson Creek												
306	182.279	0.000	84.9	84.9	93.6	93.6	1102	1.74%	0.704	0.597	0.704	0.597
305	207.939	0.000	84.9	84.9	93.6	93.6	1177	0.64%	1.222	1.036	1.222	1.036
304	103.980	0.000	84.9	84.9	93.6	93.6	833	1.89%	0.543	0.460	0.543	0.460
303	313.897	0.015	83.3	83.5	92.7	92.9	1447	0.42%	1.774	1.503	1.743	1.477
302	146.095	0.000	76.7	76.7	89.2	89.2	987	1.11%	0.807	0.684	0.807	0.684
301	83.814	0.000	76.7	76.7	89.2	89.2	748	1.11%	0.650	0.551	0.650	0.551
300	339.236	0.394	83.3	89.9	92.7	95.6	1504	0.86%	1.273	1.079	0.308	0.609
TOTAL	1377.240											
Applewood Creek												
342	88.473	0.498	84.9	92.4	93.6	96.8	768	1.14%	0.657	0.557	0.121	0.270
341	282.733	0.404	84.9	91.0	93.6	96.2	1373	1.49%	0.899	0.762	0.210	0.424
TOTAL	371.206											
Rouge ' A '												
144	115.702	0.000	83.6	83.6	92.9	92.9	878	3.30%	0.439	0.372	0.439	0.372
143	231.848	0.306	71.8	80.4	86.1	90.4	1243	1.23%	0.917	0.777	0.314	0.500
142	115.014	0.000	84.1	84.1	93.2	93.2	876	2.56%	0.484	0.410	0.484	0.410
141	233.042	0.399	73.4	84.0	87.2	92.3	1246	1.24%	0.915	0.776	0.217	0.435
140	46.623	0.396	75.6	85.3	88.5	93.0	558	0.82%	0.604	0.512	0.145	0.288
TOTAL	742.229											
Rouge ' B '												
132	84.168	0.023	76.3	76.8	88.9	89.1	749	1.63%	0.536	0.454	0.520	0.441
131	225.513	0.122	69.0	72.8	84.4	86.3	1226	1.86%	0.738	0.626	0.584	0.528
130	240.281	0.043	65.0	66.5	81.6	82.4	1266	0.89%	1.096	0.929	1.036	0.878
TOTAL	549.962											
Rouge ' C '												
121	271.671	0.020	69.2	69.8	84.5	84.8	1346					0.692

* MAKE SIMILAR ADJUSTMENTS/ REVISIONS AS TABLE A.1

REMOVE PARAMETERS

HAVE TO CORRECT VO2 MODEL.

Catchment ID	Area (ha)	% Impervious	CN (2)	Adjusted CN (2)	CN (3)	Adjusted CN (3)	Default Length (m)	Slope	Unadjusted		Adjusted	
									K (hr)	Tp (hr)	K (hr)	Tp (hr)
120	139.818	0.125	73.8	77.1	87.4	89.0	965	1.13%	0.787	0.667	0.614	0.561
TOTAL	411.489											
Berczy Creek												
241	129.789	0.007	80.4	80.5	91.2	91.3	930	0.73%	0.950	0.805	0.945	0.800
240	306.878	0.069	80.4	81.7	91.2	91.8	1430	0.68%	1.381	1.170	1.257	1.066
228	155.823	0.000	76.3	76.3	88.9	88.9	1019	1.83%	0.643	0.545	0.643	0.545
227	105.359	0.014	83.0	83.2	92.6	92.7	838	1.15%	0.698	0.592	0.687	0.582
226	63.480	0.000	82.5	82.5	92.3	92.3	651	1.80%	0.481	0.408	0.481	0.408
225	323.873	0.008	83.0	83.1	92.6	92.7	1469	1.15%	1.080	0.915	1.071	0.908
224	107.243	0.031	76.5	77.2	89.0	89.4	846	0.76%	0.861	0.730	0.827	0.701
223	116.889	0.031	80.6	81.2	91.3	91.6	883	2.33%	0.510	0.433	0.491	0.416
222	337.931	0.002	69.0	69.1	84.4	84.4	1501	0.68%	1.424	1.207	1.425	1.208
221	326.627	0.000	83.3	83.3	92.7	92.7	1476	0.59%	1.513	1.282	1.513	1.282
220	323.607	0.069	84.9	86.0	93.6	94.0	1469	0.61%	1.486	1.259	1.352	1.146
TOTAL	2297.499											
Carleton Creek												
205	75.222	0.000	81.2	81.2	91.6	91.6	708	2.96%	0.382	0.324	0.382	0.324
204	84.820	0.000	80.4	80.4	91.2	91.2	752	1.61%	0.544	0.461	0.544	0.461
203	161.590	0.052	81.2	82.1	91.6	92.1	1038	0.90%	0.932	0.790	0.870	0.737
202	227.564	0.235	80.4	85.0	91.2	93.3	1232	0.72%	1.188	1.007	0.559	0.720
201	196.533	0.310	80.1	86.3	91.1	93.8	1145	0.34%	1.630	1.381	0.549	0.884
200	102.932	0.358	70.8	81.2	85.5	90.7	828	0.41%	1.156	0.980	0.319	0.583
TOTAL	848.661											
Bruce Creek												
257	107.599	0.000	80.6	80.6	91.3	91.3	847	0.50%	1.073	0.909	1.073	0.909
255	373.085	0.007	78.6	78.8	90.2	90.3	1577	1.27%	1.087	0.921	1.079	0.915
254	72.961	0.017	80.6	81.0	91.3	91.5	697	2.10%	0.447	0.379	0.438	0.371
253	158.155	0.008	76.7	76.9	89.2	89.2	1027	2.75%	0.530	0.449	0.526	0.445
252	140.318	0.025	80.4	80.9	91.2	91.4	967	3.10%	0.475	0.402	0.460	0.390
251	173.059	0.017	76.5	76.9	89.0	89.2	1074	2.26%	0.603	0.511	0.591	0.501
250	267.808	0.004	80.1	80.2	91.1	91.1	1336	1.32%	0.937	0.794	0.934	0.792
236	108.560	0.000	76.7	76.7	89.2	89.2	851	2.03%	0.532	0.451	0.532	0.451
235	34.166	0.000	76.7	76.7	89.2	89.2	477	2.54%	0.303	0.257	0.303	0.257
234	117.586	0.182	78.2	82.1	90.0	91.8	885	3.02%	0.449	0.381	0.269	0.294
233	29.536	0.000	76.5	76.5	89.0	89.0	444	1.77%	0.343	0.291	0.343	0.291
232	198.271	0.001	82.5	82.5	92.3	92.3	1150	1.00%	0.955	0.810	0.957	0.811
231	158.187	0.005	76.7	76.8	89.2	89.2	1027	0.21%	1.933	1.638	1.926	1.632
230	180.329	0.011	83.0	83.2	92.6	92.7	1096	0.52%	1.279	1.084	1.264	1.071
214	143.040	0.000	79.4	79.4	90.7	90.7	977	0.95%	0.868	0.736	0.868	0.736
213	340.915	0.021	82.2	82.6	92.2	92.3	1508	0.86%	1.275	1.081	1.243	1.053

Catchment ID	Area (ha)	% Impervious	CN (2)	Adjusted CN (2)	CN (3)	Adjusted CN (3)	Default Length (m)	Slope	Unadjusted		Adjusted	
									K (hr)	Tp (hr)	K (hr)	Tp (hr)
212	269.175	0.064	84.9	85.9	93.6	94.0	1340	0.66%	1.335	1.131	1.224	1.038
211	301.380	0.000	84.9	84.9	93.6	93.6	1417	1.82%	0.838	0.710	0.838	0.710
210	377.541	0.196	84.9	87.9	93.6	94.9	1586	0.29%	2.299	1.949	1.293	1.476
TOTAL	3551.671											
Exhibition Creek												
633	88.805	0.002	80.4	80.4	91.2	91.2	769	0.64%	0.878	0.744	0.877	0.744
632	325.650	0.286	76.7	83.4	89.2	92.3	1473	0.80%	1.301	1.102	0.486	0.731
631	200.683	0.290	76.3	83.1	88.9	92.1	1157	1.37%	0.822	0.696	0.302	0.459
630	276.564	0.390	78.4	86.8	90.1	94.0	1358	1.12%	1.029	0.872	0.252	0.495
605	42.282	0.344	76.7	84.7	89.2	92.9	531	0.60%	0.678	0.575	0.198	0.350
TOTAL	933.984											
Rouge ' D '												
107	119.336	0.005	75.6	75.7	88.5	88.5	892	3.08%	0.470	0.398	0.469	0.397
106	242.164	0.065	71.1	73.0	85.7	86.7	1271	1.20%	0.944	0.800	0.865	0.733
105	339.344	0.023	71.8	72.4	86.1	86.4	1504	0.87%	1.267	1.074	1.231	1.043
104	115.980	0.019	81.2	81.5	91.6	91.8	879	3.64%	0.407	0.345	0.397	0.337
103	162.523	0.013	64.1	64.6	81.0	81.3	1041	2.86%	0.525	0.445	0.517	0.438
102	138.875	0.037	80.4	81.1	91.2	91.5	962	1.11%	0.790	0.669	0.753	0.638
101	145.071	0.014	79.4	79.7	90.7	90.8	983	0.81%	0.944	0.800	0.929	0.787
110	160.033	0.269	79.4	84.9	90.7	93.2	1033	1.63%	0.693	0.587	0.279	0.399
100	171.921	0.000	80.4	80.4	91.2	91.2	1071	0.58%	1.194	1.012	1.194	1.012
TOTAL	1595.247											
Morningside Creek												
618	111.195	0.450	76.7	87.2	89.2	94.0	861	0.49%	1.096	0.929	0.224	0.483
617	39.288	0.403	76.7	86.1	89.2	93.5	512	0.76%	0.584	0.495	0.137	0.276
616	101.387	0.607	76.7	90.9	89.2	95.7	822	0.62%	0.935	0.793	0.164	0.332
615	358.000	0.444	76.7	87.1	89.2	94.0	1545	0.79%	1.339	1.134	0.277	0.595
614	440.130	0.293	76.7	83.5	89.2	92.3	1713	0.65%	1.634	1.385	0.592	0.909
613	142.580	0.000	76.7	76.7	89.2	89.2	975	0.42%	1.320	1.119	1.320	1.119
612	195.888	0.294	76.7	83.6	89.2	92.3	1143	0.97%	0.968	0.820	0.348	0.537
610	791.820	0.454	62.3	79.4	79.7	88.9	2298	0.99%	1.646	1.395	0.333	0.721
TOTAL	2180.288											
Rouge ' E '												
621	105.630	0.358	76.7	85.1	89.2	93.0	839	1.20%	0.701	0.594	0.194	0.354
620	63.393	0.000	76.7	76.7	89.2	89.2	650	1.66%	0.476	0.403	0.476	0.403
604	285.770	0.291	75.8	82.9	88.6	91.9	1380	0.21%	2.435	2.063	0.888	1.357
603	202.691	0.051	73.8	75.2	87.4	88.1	1162	0.36%	1.616	1.370	1.510	1.280
601	552.245	0.052	70.8	72.3	85.5	86.2	1919	0.51%	2.002	1.697	1.868	1.583
600	822.238	0.209	65.1	72.4	81.7	85.5	2341	0.44%	2.501	2.120	1.323	1.574
TOTAL	1862.944											

matches model

matches model

78.7 in model.

Appendix C PROPOSED CONDITIONS VO2 HYDROLOGY MODELING (2-100 YEAR)

C.1 2-100 YEAR VO2 MODELING

Stantec

4134 16th Avenue VO2 Model Setup Summary

The proposed conditions VO2 hydrology modeling was prepared by combining various sources and is described below.

The TRCA's FC Development VO2 model was obtained and reviewed. The TRCA's FC Development VO2 Model was an updated version of the 2001 MMM Hydrology Update. The FC Development scenario included all existing and approved developments incorporated into the Official Plans as of 2000, (referred to as the "FC Development" in this report). This modeling utilized 12 hr AES storms.

In the FC Development model, the Subject Property is located partially within Subcatchment 210 (discharges to Bruce Creek) and 201(discharges to Berczy Creek) of the Rouge River. The Subject Property was modeled as undeveloped open space (0% impervious). Catchment 210 (Bruce) included a single SWM pond for quantity control.

The VO2 model for Subcatchment 210 was updated in 2017 to include an interim SWM Pond that was constructed for the adjacent Yorkton Phase 2 property.

The proposed development of the Subject Property changes the landuse in both Subcatchments 210 and 210 and incorporates 3 ponds discharging to Bruce Creek and 1 to Berczy Creek. As such, the FC Development model required updates to accurately represent the discharge rates at nodes downstream of the Subject Property.

Subcatchment 210 (Bruce Creek) was discretized utilizing the approved Yorkton Phase 2 VO2 modeling prepared for the interim SWM Pond (2017). This model included the Yorkton Phase 2 development with interim SWM Pond and the external drainage and landuses contributing to that pond; the existing Deacon development without controls; and the existing Pond H as-constructed condition including the existing drainage areas and landuses to Pond H. The proposed development within Subject Property was added into the model along with the proposed Bruce Creek Valley. Pond H and the interim SWM pond were removed and replaced by SWM Ponds 1, 2, and 3 discharging to Bruce Creek.

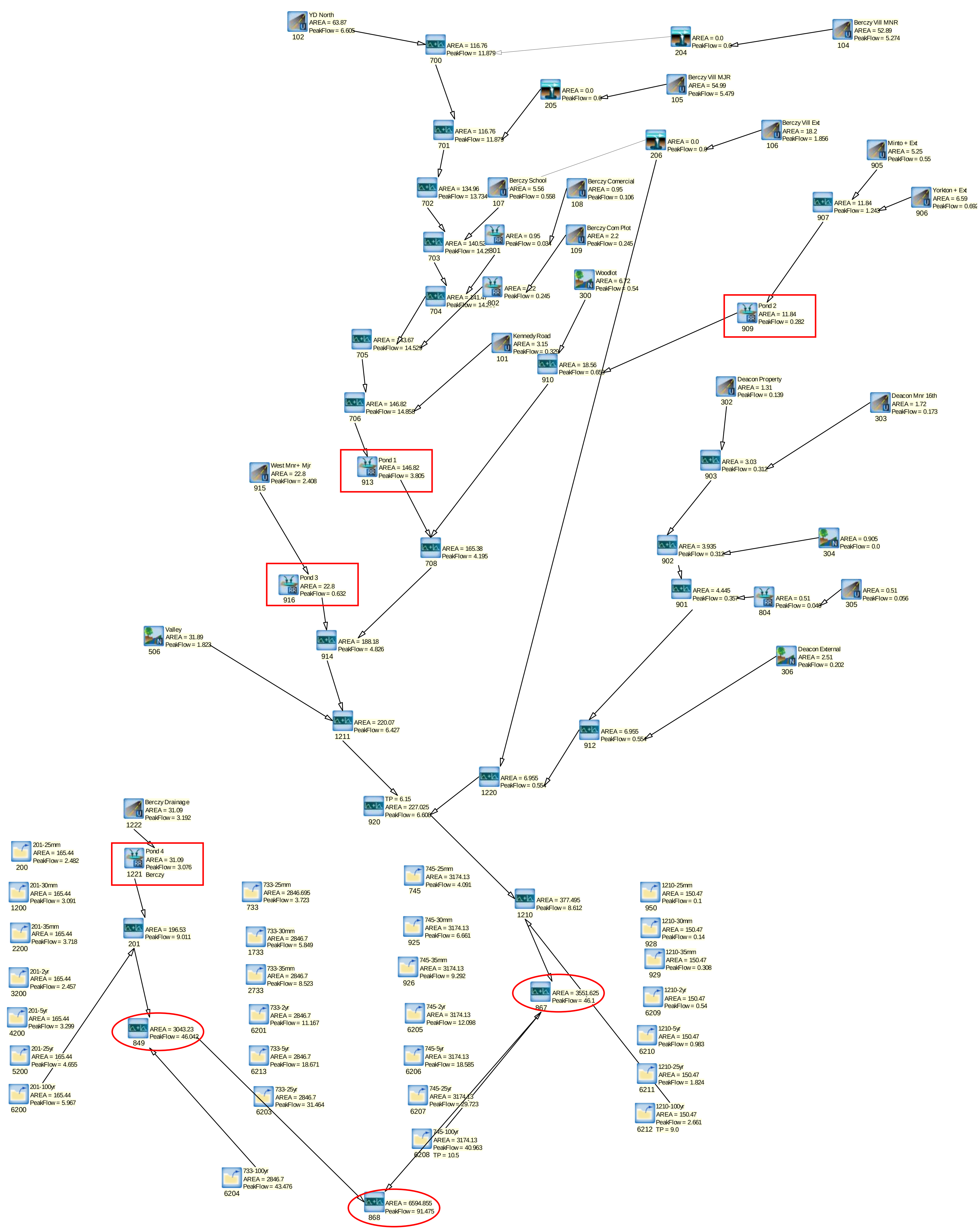
Upstream external flows from Bruce Creek were incorporated into the proposed conditions model by capturing hydrographs from Route Channel ID 745 in the original FC Development model adding them into the proposed conditions model using a readhyd command. The readhyd command was added to the flow node at the downstream end of the Subject Property at addhyd 867.

Since the Subject Property forms part, but not all of Subcatchment 210, flows from those areas of Subcatchment 210 outside of the Subject Property needed to be accounted for in the proposed model. To determine flows from the balance of Subcatchment 210 (approximately 150.47 ha of the original 377.55 ha; 40%), the original FC Development model was run and hydrographs from the node at the downstream end of the Subject Property (Route Reservoir ID 1210) were captured. These hydrographs were then prorated to represent the areas not modelled as part of the Subject Property Subcatchments (i.e., original hydrographs reduced by 60%). The prorated hydrographs were added to the downstream end of the Subject Property using a readhyd command at addhyd 1210.

A similar exercise was completed for Subcatchment 201 (Berczy Creek) with the proposed development being added into the model along with SWM Pond 4. As above, to determine flows from the existing developed areas for the balance of the Berczy Creek subcatchment 201 (approximately 165.44 ha), a prorated readhyd command was used. This readhyd command was developed using the stanhyd ID 201 from the TRCA's FC Development. These flows were then added to the discretized model to determine the updated flows from Subcatchment 201 at addhyd 201. Upstream external flows from Berczy Creek were incorporated using a readhyd command of Route Channel ID 733 taken from TRCA's FC Development model to determine flows at the downstream flow node (addhyd 849).

Flows from node 867 and 849 were added together to determine flows at the downstream node 868.

Post-Development Event Based Model Schematic



4134 16th Avenue Residential Development
Ponds 1 - 4 Model Summary Tables - V02

Model Inputs Ponds 1 - 4				
Sub-Catchment Location	**Drainage Area (ha)**	**Total Imperviousness**	**Ximp Model Value**	**Ximp Ratio**
Pond 1 (subject property area)	63.87	62%	40%	0.65
Pond 2*	5.25	70%	53%	0.76
Pond 3	22.80	70%	46%	0.65
Pond 4	31.09	61%	40%	0.65
Post-Dev Valley Lands	31.89			

*Lumped Timp/Ximp values shown in table. Values from individual catchments taken from Stantec Yorkton SWM Report, February, 2016

Model Major/Minor Drainage Split Summary and ReadHyd Area Calculation				
Pond	**Area Description**	**Tributary Area (ha) - Minor**	**Major Drainage**	*Difference*
Bruce Creek				
Pond 1	York Downs North	63.87	63.87	
	External Berczy (incl. Kennedy Road)	82.95	66.85	*16.1*
Pond 2	York Downs South	5.25	5.25	
	Yorkton/Ext. Church/Small Res	6.59	6.59	
Pond 3	York Downs West	22.80	22.80	
Uncontrolled Natural Areas within Development	Valley	31.89	31.89	
	Woodlot/Wetland Block	6.72	6.72	
External Area to 16th Avenue	Deacon Lands & External Commercial	7.01	7.01	
	TOTAL =	**227.08**	**210.98**	***16.1***
	Catchment 210 Total Area	377.55		
	Pro-Rated ReadHyd Area	**150.47**		
Berczy Creek				
Pond 4	Berczy Creek	31.09	*2.4 ha from NW corner adds to 28.69ha drainage area	
	Catchment 201 Total Area	196.53		
	Pro-Rated ReadHyd Area	**165.44**		

**Major System Drainage to Valley = 6.67
Pond 3 Major/Minor Split Area = 16.13

Stantec

Project Description: **4134 16th Avenue MESP/FSR**
Job Number: **160622264**
Date: **Oct-17**

VO2 Modeling Input Parameters

ID	Area (ha)	TIMP	XIMP	CN	Length of Flow Path (m)	Watershed Slope (%)	Watershed Slope (m/m)	[1]Uplands $V/(S^{0.5})$	Uplands TOC (min)	Tp (hr)[2]	Name	Outlet
Subject Site												
102	63.87	62%	40%	88							YD North	Pond 1
905	5.25	70%	53%	85							Mint + Ext	Pond 2
915	22.80	70%	46%	88							West Mnr+Mjr	Pond 3
506	31.89	NASHYD		88	1874	0.48	0.0048	6.1	73.9	0.83	Valley	Bruce Creek
300	6.72	NASHYD		88	330	4.77	0.0477	2.3	10.9	0.12	Woodlot	Bruce Creek
1222	31.09	61%	40%	88							Berczy Drainage	Pond 4
External[3]												
101	3.15	61%	61%	88							Kennedy Road	Pond 1
104[4]	52.89	56%	38%	88							Berczy Vill MNR	Pond 1
105[5]	54.99	56%	38%	88							Berczy Vill MJR	Pond 1
106	18.2	56%	38%	88							Berczy Vill Ext	Pond 1
107	5.56	50%	50%	88							Berczy School	Pond 1
108	0.95	90%	90%	88							Berczy Comercial	Pond 1
109	2.2	90%	90%	88							Berczy Com Plot	Pond 1
906	6.59	71%	53%	85							Yorkton + Ext	Pond 2
302	1.31	64%	54%	88							Deacon Property	Bruce Creek
303	1.72	43%	32%	88							Deacon Mnr 16th	Bruce Creek
304		NASHYD		88						0.006	Deacon Property	Bruce Creek
305	0.51	85%	85%	88							Deacon Property	Bruce Creek
306		NASHYD		88						0.116	Deacon External	Bruce Creek

[1]V/(S0.5) parameter determined based on landuse type per to the *NVCA Stormwater Technical Guide* (2013)

[2]Tp values calculated using the Uplands Method

[3]External catchment parameters are based on previously approved hydrology models for Pond H, the Deacon Property, and Yorkton Phase 2

[4]Catchment 104 represents only minor flows from Berczy Village

[5]Catchment 105 represents only major flows from Berczy Village

Stantec

4134 16th Avenue Residential Development
Model Flow Summary - V02

Project No. 160622264

FC Development and Proposed Development Flows at Downstream Nodes									
Node	**Node 867**			**Node 849**			**Node 868**		
Watershed	**Bruce**		**% Flow Difference**	**Berczy**		**% Flow Difference**	**Confluence**		**% Flow Difference**
Drainage Area (ha)	**3551.7**			**3043.2**			**6594.9**		
Storm Event Flows	**FC**	**PROP**		**FC**	**PROP**		**FC**	**PROP**	
	(m^3/s)	**(m^3/s)**		**(m^3/s)**	**(m^3/s)**		**(m^3/s)**	**(m^3/s)**	
2 year	13.35	13.21	-1.0%	11.91	11.83	-0.6%	25.02	24.85	-0.7%
5 year	21.00	20.52	-2.3%	19.91	19.80	-0.5%	40.44	39.87	-1.4%
25 year	33.87	33.07	-2.4%	33.51	33.35	-0.5%	66.73	65.83	-1.4%
100 year	46.96	46.10	-1.8%	46.18	46.04	-0.3%	92.71	91.48	-1.3%

Note: FC = Future Committed Development model flows as taken from the MMM 2001 Rouge River Report
All flows presented in the above table are for the AES 12-hour storm distribution

```
====================================================================================================

      V    V   I    SSSSS  U   U    A    L
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO
```

2-100 Year AES Storms

Developed and Distributed by Clarifica Inc.

***** D E T A I L E D   O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
Output filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\V02 Event Modelling (Revised Pond H Model)\Event Based Discretized Mode
Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\V02 Event Modelling (Revised Pond H Model)\Event Based Discretized Mode

DATE: 10/6/2017 TIME: 7:43:52 AM

USER:

COMMENTS: ____

```
----------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   9 **
  ****************************
```

100-Year Storm

```
--------------------
|   READ STORM      |    Filename: V:\01606\Active\160622264
|                   |              \Analysis\SWM\Hydrology\
|                   |              V02 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm  |    Comments: 100yr/12hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

```
--------------------------------------------------------------------------------

--------------------
| CALIB             |
| STANDHYD  (1222)  |   Area     (ha)=  31.09
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  61.00   Dir. Conn.(%)=  40.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area      (ha)=      18.96        12.13
     Dep. Storage      (mm)=       1.00         1.50
     Average Slope      (%)=       1.00         2.00
     Length             (m)=     455.30        40.00
     Mannings n            =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	3.167	5.31	6.250	11.51	9.33	.89
.167	.00	3.250	5.31	6.333	6.20	9.42	.89
.250	.00	3.333	15.05	6.417	6.20	9.50	.89
.333	.89	3.417	15.05	6.500	6.20	9.58	.89
.417	.89	3.500	15.05	6.583	6.20	9.67	.89
.500	.89	3.583	15.05	6.667	6.20	9.75	.89
.583	.89	3.667	15.05	6.750	6.20	9.83	.89
.667	.89	3.750	15.05	6.833	6.20	9.92	.89
.750	.89	3.833	15.05	6.917	6.20	10.00	.89
.833	.89	3.917	15.05	7.000	6.20	10.08	.89
.917	.89	4.000	15.05	7.083	6.20	10.17	.89
1.000	.89	4.083	15.05	7.167	6.20	10.25	.89
1.083	.89	4.167	15.05	7.250	6.20	10.33	.89
1.167	.89	4.250	15.05	7.333	3.54	10.42	.89
1.250	.89	4.333	40.71	7.417	3.54	10.50	.89
1.333	.89	4.417	40.71	7.500	3.54	10.58	.89
1.417	.89	4.500	40.71	7.583	3.54	10.67	.89
1.500	.89	4.583	40.71	7.667	3.54	10.75	.89
1.583	.89	4.667	40.71	7.750	3.54	10.83	.89
1.667	.89	4.750	40.71	7.833	3.54	10.92	.89
1.750	.89	4.833	40.71	7.917	3.54	11.00	.89
1.833	.89	4.917	40.71	8.000	3.54	11.08	.89
1.917	.89	5.000	40.71	8.083	3.54	11.17	.89
2.000	.89	5.083	40.71	8.167	3.54	11.25	.89
2.083	.89	5.167	40.71	8.250	3.54	11.33	.89
2.167	.89	5.250	40.71	8.333	1.77	11.42	.89
2.250	.89	5.333	11.51	8.417	1.77	11.50	.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	.89
3.083	5.31	6.167	11.51	9.250	1.77		

```
Max.Eff.Inten.(mm/hr)=      40.71          57.78
           over (min)       10.00          20.00
Storage Coeff.  (min)=       9.09 (ii)     17.88 (ii)
Unit Hyd. Tpeak (min)=      10.00          20.00
Unit Hyd. peak  (cms)=        .12            .06
                                                       *TOTALS*
PEAK FLOW       (cms)=       1.40           1.79          3.192 (iii)
TIME TO PEAK    (hrs)=       5.25           5.25           5.25
RUNOFF VOLUME    (mm)=      87.54          69.66          76.81
TOTAL RAINFALL   (mm)=      88.54          88.54          88.54
RUNOFF COEFFICIENT   =        .99            .79            .87

   (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
        CN*  =  88.0    Ia = Dep. Storage  (Above)
  (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
        THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB             |
| NASHYD    (0506)  |   Area     (ha)=  31.89   Curve Number   (CN)= 88.0
|ID= 1 DT= 3.0 min  |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------    U.H. Tp(hrs)=    .83

       NOTE:  RAINFALL WAS TRANSFORMED TO   3.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.050	.00	3.150	5.31	6.250	11.51	9.35	.89
.100	.00	3.200	5.31	6.300	6.20	9.40	.89
.150	.00	3.250	5.31	6.350	6.20	9.45	.89
.200	.00	3.300	15.05	6.400	6.20	9.50	.89
.250	.00	3.350	15.05	6.450	6.20	9.55	.89

.300	.89	3.400	15.05	6.500	6.20	9.60	.89
.350	.89	3.450	15.05	6.550	6.20	9.65	.89
.400	.89	3.500	15.05	6.600	6.20	9.70	.89
.450	.89	3.550	15.05	6.650	6.20	9.75	.89
.500	.89	3.600	15.05	6.700	6.20	9.80	.89
.550	.89	3.650	15.05	6.750	6.20	9.85	.89
.600	.89	3.700	15.05	6.800	6.20	9.90	.89
.650	.89	3.750	15.05	6.850	6.20	9.95	.89
.700	.89	3.800	15.05	6.900	6.20	10.00	.89
.750	.89	3.850	15.05	6.950	6.20	10.05	.89
.800	.89	3.900	15.05	7.000	6.20	10.10	.89
.850	.89	3.950	15.05	7.050	6.20	10.15	.89
.900	.89	4.000	15.05	7.100	6.20	10.20	.89
.950	.89	4.050	15.05	7.150	6.20	10.25	.89
1.000	.89	4.100	15.05	7.200	6.20	10.30	.89
1.050	.89	4.150	15.05	7.250	6.20	10.35	.89
1.100	.89	4.200	15.05	7.300	3.54	10.40	.89
1.150	.89	4.250	15.05	7.350	3.54	10.45	.89
1.200	.89	4.300	40.71	7.400	3.54	10.50	.89
1.250	.89	4.350	40.71	7.450	3.54	10.55	.89
1.300	.89	4.400	40.71	7.500	3.54	10.60	.89
1.350	.89	4.450	40.71	7.550	3.54	10.65	.89
1.400	.89	4.500	40.71	7.600	3.54	10.70	.89
1.450	.89	4.550	40.71	7.650	3.54	10.75	.89
1.500	.89	4.600	40.71	7.700	3.54	10.80	.89
1.550	.89	4.650	40.71	7.750	3.54	10.85	.89
1.600	.89	4.700	40.71	7.800	3.54	10.90	.89
1.650	.89	4.750	40.71	7.850	3.54	10.95	.89
1.700	.89	4.800	40.71	7.900	3.54	11.00	.89
1.750	.89	4.850	40.71	7.950	3.54	11.05	.89
1.800	.89	4.900	40.71	8.000	3.54	11.10	.89
1.850	.89	4.950	40.71	8.050	3.54	11.15	.89
1.900	.89	5.000	40.71	8.100	3.54	11.20	.89
1.950	.89	5.050	40.71	8.150	3.54	11.25	.89
2.000	.89	5.100	40.71	8.200	3.54	11.30	.89
2.050	.89	5.150	40.71	8.250	3.54	11.35	.89
2.100	.89	5.200	40.71	8.300	1.77	11.40	.89
2.150	.89	5.250	40.71	8.350	1.77	11.45	.89
2.200	.89	5.300	11.51	8.400	1.77	11.50	.89
2.250	.89	5.350	11.51	8.450	1.77	11.55	.89
2.300	5.31	5.400	11.51	8.500	1.77	11.60	.89
2.350	5.31	5.450	11.51	8.550	1.77	11.65	.89
2.400	5.31	5.500	11.51	8.600	1.77	11.70	.89
2.450	5.31	5.550	11.51	8.650	1.77	11.75	.89
2.500	5.31	5.600	11.51	8.700	1.77	11.80	.89
2.550	5.31	5.650	11.51	8.750	1.77	11.85	.89
2.600	5.31	5.700	11.51	8.800	1.77	11.90	.89
2.650	5.31	5.750	11.51	8.850	1.77	11.95	.89
2.700	5.31	5.800	11.51	8.900	1.77	12.00	.89
2.750	5.31	5.850	11.51	8.950	1.77	12.05	.89
2.800	5.31	5.900	11.51	9.000	1.77	12.10	.89
2.850	5.31	5.950	11.51	9.050	1.77	12.15	.89
2.900	5.31	6.000	11.51	9.100	1.77	12.20	.89
2.950	5.31	6.050	11.51	9.150	1.77	12.25	.89
3.000	5.31	6.100	11.51	9.200	1.77		
3.050	5.31	6.150	11.51	9.250	1.77		
3.100	5.31	6.200	11.51	9.300	.89		

```
Unit Hyd Qpeak  (cms)=   1.468

PEAK FLOW       (cms)=   1.823 (i)
TIME TO PEAK    (hrs)=   5.750
RUNOFF VOLUME    (mm)=  59.055
TOTAL RAINFALL   (mm)=  88.540
RUNOFF COEFFICIENT   =    .667

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

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------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0109)   |   Area    (ha)=   2.20
|ID= 1 DT= 1.0 min   |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.98          .22
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     121.00        40.00
     Mannings n           =       .013         .250
```

NOTE: RAINFALL WAS TRANSFORMED TO   1.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.017	.00	3.083	5.31	6.150	11.51	9.22	1.77
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.050	.00	3.117	5.31	6.183	11.51	9.25	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	.89
.083	.00	3.150	5.31	6.217	11.51	9.28	.89
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.117	.00	3.183	5.31	6.250	11.50	9.32	.89
.133	.00	3.200	5.31	6.267	6.20	9.33	.89
.150	.00	3.217	5.31	6.283	6.20	9.35	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.183	.00	3.250	5.31	6.317	6.20	9.38	.89
.200	.00	3.267	15.05	6.333	6.20	9.40	.89
.217	.00	3.283	15.05	6.350	6.20	9.42	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.250	.00	3.317	15.05	6.383	6.20	9.45	.89
.267	.89	3.333	15.05	6.400	6.20	9.47	.89
.283	.89	3.350	15.05	6.417	6.20	9.48	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.317	.89	3.383	15.05	6.450	6.20	9.52	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.350	.89	3.417	15.05	6.483	6.20	9.55	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.383	.89	3.450	15.05	6.517	6.20	9.58	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.417	.89	3.483	15.05	6.550	6.20	9.62	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.450	.89	3.517	15.05	6.583	6.20	9.65	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.483	.89	3.550	15.05	6.617	6.20	9.68	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.517	.89	3.583	15.05	6.650	6.20	9.72	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.550	.89	3.617	15.05	6.683	6.20	9.75	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.583	.89	3.650	15.05	6.717	6.20	9.78	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.617	.89	3.683	15.05	6.750	6.20	9.82	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.650	.89	3.717	15.05	6.783	6.20	9.85	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.683	.89	3.750	15.05	6.817	6.20	9.88	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.717	.89	3.783	15.05	6.850	6.20	9.92	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.750	.89	3.817	15.05	6.883	6.20	9.95	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.783	.89	3.850	15.05	6.917	6.20	9.98	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.817	.89	3.883	15.05	6.950	6.20	10.02	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.850	.89	3.917	15.05	6.983	6.20	10.05	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.883	.89	3.950	15.05	7.017	6.20	10.08	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.917	.89	3.983	15.05	7.050	6.20	10.12	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.950	.89	4.017	15.05	7.083	6.20	10.15	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
.983	.89	4.050	15.05	7.117	6.20	10.18	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.017	.89	4.083	15.05	7.150	6.20	10.22	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.050	.89	4.117	15.05	7.183	6.20	10.25	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.083	.89	4.150	15.05	7.217	6.20	10.28	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.117	.89	4.183	15.05	7.250	6.19	10.32	.89
1.133	.89	4.200	15.05	7.267	3.54	10.33	.89
1.150	.89	4.217	15.05	7.283	3.54	10.35	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.183	.89	4.250	15.05	7.317	3.54	10.38	.89
1.200	.89	4.267	40.71	7.333	3.54	10.40	.89
1.217	.89	4.283	40.71	7.350	3.54	10.42	.89

1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.250	.89	4.317	40.71	7.383	3.54	10.45	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.283	.89	4.350	40.71	7.417	3.54	10.48	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.317	.89	4.383	40.71	7.450	3.54	10.52	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.350	.89	4.417	40.71	7.483	3.54	10.55	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.383	.89	4.450	40.71	7.517	3.54	10.58	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.417	.89	4.483	40.71	7.550	3.54	10.62	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.450	.89	4.517	40.71	7.583	3.54	10.65	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.483	.89	4.550	40.71	7.617	3.54	10.68	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.517	.89	4.583	40.71	7.650	3.54	10.72	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.550	.89	4.617	40.71	7.683	3.54	10.75	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.583	.89	4.650	40.71	7.717	3.54	10.78	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.617	.89	4.683	40.71	7.750	3.54	10.82	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.650	.89	4.717	40.71	7.783	3.54	10.85	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.683	.89	4.750	40.71	7.817	3.54	10.88	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.717	.89	4.783	40.71	7.850	3.54	10.92	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.750	.89	4.817	40.71	7.883	3.54	10.95	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.783	.89	4.850	40.71	7.917	3.54	10.98	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.817	.89	4.883	40.71	7.950	3.54	11.02	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.850	.89	4.917	40.71	7.983	3.54	11.05	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.883	.89	4.950	40.71	8.017	3.54	11.08	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.917	.89	4.983	40.71	8.050	3.54	11.12	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.950	.89	5.017	40.71	8.083	3.54	11.15	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
1.983	.89	5.050	40.71	8.117	3.54	11.18	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.017	.89	5.083	40.71	8.150	3.54	11.22	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.050	.89	5.117	40.71	8.183	3.54	11.25	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.083	.89	5.150	40.71	8.217	3.54	11.28	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.117	.89	5.183	40.71	8.250	3.54	11.32	.89
2.133	.89	5.200	40.71	8.267	1.77	11.33	.89
2.150	.89	5.217	40.71	8.283	1.77	11.35	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.183	.89	5.250	40.69	8.317	1.77	11.38	.89
2.200	.89	5.267	11.51	8.333	1.77	11.40	.89
2.217	.89	5.283	11.51	8.350	1.77	11.42	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.250	.89	5.317	11.51	8.383	1.77	11.45	.89
2.267	5.31	5.333	11.51	8.400	1.77	11.47	.89
2.283	5.31	5.350	11.51	8.417	1.77	11.48	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.317	5.31	5.383	11.51	8.450	1.77	11.52	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.350	5.31	5.417	11.51	8.483	1.77	11.55	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.383	5.31	5.450	11.51	8.517	1.77	11.58	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.417	5.31	5.483	11.51	8.550	1.77	11.62	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.450	5.31	5.517	11.51	8.583	1.77	11.65	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.483	5.31	5.550	11.51	8.617	1.77	11.68	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.517	5.31	5.583	11.51	8.650	1.77	11.72	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.550	5.31	5.617	11.51	8.683	1.77	11.75	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.583	5.31	5.650	11.51	8.717	1.77	11.78	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.617	5.31	5.683	11.51	8.750	1.77	11.82	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.650	5.31	5.717	11.51	8.783	1.77	11.85	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.683	5.31	5.750	11.51	8.817	1.77	11.88	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.717	5.31	5.783	11.51	8.850	1.77	11.92	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.750	5.31	5.817	11.51	8.883	1.77	11.95	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.783	5.31	5.850	11.51	8.917	1.77	11.98	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.817	5.31	5.883	11.51	8.950	1.77	12.02	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.850	5.31	5.917	11.51	8.983	1.77	12.05	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.883	5.31	5.950	11.51	9.017	1.77	12.08	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.917	5.31	5.983	11.51	9.050	1.77	12.12	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.950	5.31	6.017	11.51	9.083	1.77	12.15	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
2.983	5.31	6.050	11.51	9.117	1.77	12.18	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.017	5.31	6.083	11.51	9.150	1.77	12.22	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.050	5.31	6.117	11.51	9.183	1.77	12.25	.89
3.067	5.31	6.133	11.51	9.200	1.77		

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Max.Eff.Inten.(mm/hr)=      40.71        54.53
           over (min)        5.00         9.00
Storage Coeff.  (min)=       4.10 (ii)    8.30 (ii)
Unit Hyd. Tpeak (min)=       5.00         9.00
Unit Hyd. peak  (cms)=        .26          .13
                                                     *TOTALS*
PEAK FLOW       (cms)=        .22          .02          .245 (iii)
TIME TO PEAK    (hrs)=       5.23         5.25          5.25
RUNOFF VOLUME    (mm)=      87.54        62.25         85.01
TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
RUNOFF COEFFICIENT   =        .99          .70           .96


  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN* =  88.0    Ia = Dep. Storage  (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
| STANDHYD  (0107)   |   Area    (ha)=   5.56
|ID= 1 DT= 2.0 min   |   Total Imp(%)=  50.00   Dir. Conn.(%)=  50.00
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                              IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       2.78          2.78
    Dep. Storage     (mm)=       1.00          1.50
    Average Slope     (%)=       1.00          2.00
    Length            (m)=     193.00         40.00
    Mannings n           =       .013          .250

        NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	1.33
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.133	.00	3.200	5.31	6.267	8.86	9.33	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.200	.00	3.267	10.18	6.333	6.20	9.40	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.267	.45	3.333	15.05	6.400	6.20	9.47	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89

.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.133	.89	4.200	15.05	7.267	4.87	10.33	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.200	.89	4.267	27.88	7.333	3.54	10.40	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.133	.89	5.200	40.71	8.267	2.66	11.33	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.200	.89	5.267	26.11	8.333	1.77	11.40	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.267	3.10	5.333	11.51	8.400	1.77	11.47	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.067	5.31	6.133	11.51	9.200	1.77	12.27	.44

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Max.Eff.Inten.(mm/hr)=      40.71        34.83
           over (min)        6.00        18.00
Storage Coeff.  (min)=       5.43 (ii)   16.19 (ii)
Unit Hyd. Tpeak (min)=       6.00        18.00
Unit Hyd. peak  (cms)=        .20          .07
                                                     *TOTALS*
PEAK FLOW       (cms)=        .31          .25           .558 (iii)
TIME TO PEAK    (hrs)=       5.23         5.27          5.23
RUNOFF VOLUME    (mm)=      87.54        62.26         74.90
TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
RUNOFF COEFFICIENT   =        .99          .70           .85


  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN*  =  88.0    Ia = Dep. Storage  (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
| STANDHYD  (0102)   |   Area    (ha)=  63.87
|ID= 1 DT= 3.0 min   |   Total Imp(%)=  62.00   Dir. Conn.(%)=  40.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      39.60        24.27
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     395.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   3.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.050	.00	3.150	5.31	6.250	11.51	9.35	.89
.100	.00	3.200	5.31	6.300	6.20	9.40	.89
.150	.00	3.250	5.31	6.350	6.20	9.45	.89
.200	.00	3.300	15.05	6.400	6.20	9.50	.89
.250	.00	3.350	15.05	6.450	6.20	9.55	.89
.300	.89	3.400	15.05	6.500	6.20	9.60	.89
.350	.89	3.450	15.05	6.550	6.20	9.65	.89
.400	.89	3.500	15.05	6.600	6.20	9.70	.89
.450	.89	3.550	15.05	6.650	6.20	9.75	.89
.500	.89	3.600	15.05	6.700	6.20	9.80	.89
.550	.89	3.650	15.05	6.750	6.20	9.85	.89
.600	.89	3.700	15.05	6.800	6.20	9.90	.89
.650	.89	3.750	15.05	6.850	6.20	9.95	.89
.700	.89	3.800	15.05	6.900	6.20	10.00	.89
.750	.89	3.850	15.05	6.950	6.20	10.05	.89
.800	.89	3.900	15.05	7.000	6.20	10.10	.89
.850	.89	3.950	15.05	7.050	6.20	10.15	.89
.900	.89	4.000	15.05	7.100	6.20	10.20	.89
.950	.89	4.050	15.05	7.150	6.20	10.25	.89
1.000	.89	4.100	15.05	7.200	6.20	10.30	.89
1.050	.89	4.150	15.05	7.250	6.20	10.35	.89
1.100	.89	4.200	15.05	7.300	3.54	10.40	.89
1.150	.89	4.250	15.05	7.350	3.54	10.45	.89
1.200	.89	4.300	40.71	7.400	3.54	10.50	.89
1.250	.89	4.350	40.71	7.450	3.54	10.55	.89
1.300	.89	4.400	40.71	7.500	3.54	10.60	.89
1.350	.89	4.450	40.71	7.550	3.54	10.65	.89
1.400	.89	4.500	40.71	7.600	3.54	10.70	.89
1.450	.89	4.550	40.71	7.650	3.54	10.75	.89
1.500	.89	4.600	40.71	7.700	3.54	10.80	.89
1.550	.89	4.650	40.71	7.750	3.54	10.85	.89
1.600	.89	4.700	40.71	7.800	3.54	10.90	.89
1.650	.89	4.750	40.71	7.850	3.54	10.95	.89
1.700	.89	4.800	40.71	7.900	3.54	11.00	.89
1.750	.89	4.850	40.71	7.950	3.54	11.05	.89
1.800	.89	4.900	40.71	8.000	3.54	11.10	.89
1.850	.89	4.950	40.71	8.050	3.54	11.15	.89
1.900	.89	5.000	40.71	8.100	3.54	11.20	.89
1.950	.89	5.050	40.71	8.150	3.54	11.25	.89

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              2.000     .89 | 5.100   40.71 | 8.200    3.54 | 11.30     .89
              2.050     .89 | 5.150   40.71 | 8.250    3.54 | 11.35     .89
              2.100     .89 | 5.200   40.71 | 8.300    1.77 | 11.40     .89
              2.150     .89 | 5.250   40.71 | 8.350    1.77 | 11.45     .89
              2.200     .89 | 5.300   11.51 | 8.400    1.77 | 11.50     .89
              2.250     .89 | 5.350   11.51 | 8.450    1.77 | 11.55     .89
              2.300    5.31 | 5.400   11.51 | 8.500    1.77 | 11.60     .89
              2.350    5.31 | 5.450   11.51 | 8.550    1.77 | 11.65     .89
              2.400    5.31 | 5.500   11.51 | 8.600    1.77 | 11.70     .89
              2.450    5.31 | 5.550   11.51 | 8.650    1.77 | 11.75     .89
              2.500    5.31 | 5.600   11.51 | 8.700    1.77 | 11.80     .89
              2.550    5.31 | 5.650   11.51 | 8.750    1.77 | 11.85     .89
              2.600    5.31 | 5.700   11.51 | 8.800    1.77 | 11.90     .89
              2.650    5.31 | 5.750   11.51 | 8.850    1.77 | 11.95     .89
              2.700    5.31 | 5.800   11.51 | 8.900    1.77 | 12.00     .89
              2.750    5.31 | 5.850   11.51 | 8.950    1.77 | 12.05     .89
              2.800    5.31 | 5.900   11.51 | 9.000    1.77 | 12.10     .89
              2.850    5.31 | 5.950   11.51 | 9.050    1.77 | 12.15     .89
              2.900    5.31 | 6.000   11.51 | 9.100    1.77 | 12.20     .89
              2.950    5.31 | 6.050   11.51 | 9.150    1.77 | 12.25     .89
              3.000    5.31 | 6.100   11.51 | 9.200    1.77 |
              3.050    5.31 | 6.150   11.51 | 9.250    1.77 |
              3.100    5.31 | 6.200   11.51 | 9.300     .89 |

     Max.Eff.Inten.(mm/hr)=      40.71        59.40
              over (min)        9.00        18.00
     Storage Coeff.  (min)=       8.34 (ii)   17.04 (ii)
     Unit Hyd. Tpeak (min)=       9.00        18.00
     Unit Hyd. peak  (cms)=        .13          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.89         3.72          6.605 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54        70.05          77.04
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .79            .87


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
| STANDHYD  (0104) |   Area    (ha)=  52.89
|ID= 1 DT= 3.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  38.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.62        23.27
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     594.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        52.23
              over (min)       12.00        21.00
     Storage Coeff.  (min)=      10.66 (ii)   19.81 (ii)
     Unit Hyd. Tpeak (min)=      12.00        21.00
     Unit Hyd. peak  (cms)=        .10          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.26         3.02          5.274 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.30           5.25
     RUNOFF VOLUME    (mm)=      87.54        68.29          75.60
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .77            .85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
| STANDHYD  (0105) |   Area    (ha)=  54.99
|ID= 1 DT= 3.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  38.00
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                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      30.79        24.20
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     605.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        52.23
              over (min)       12.00        21.00
     Storage Coeff.  (min)=      10.78 (ii)   19.93 (ii)
     Unit Hyd. Tpeak (min)=      12.00        21.00
     Unit Hyd. peak  (cms)=        .10          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.35         3.14          5.479 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.30           5.25
     RUNOFF VOLUME    (mm)=      87.54        68.28          75.60
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .77            .85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
| STANDHYD  (0106) |   Area    (ha)=  18.20
|ID= 1 DT= 3.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  38.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.19         8.01
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     348.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        52.23
              over (min)        9.00        18.00
     Storage Coeff.  (min)=       7.73 (ii)   16.89 (ii)
     Unit Hyd. Tpeak (min)=       9.00        18.00
     Unit Hyd. peak  (cms)=        .14          .07
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .78         1.07          1.856 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54        68.28          75.60
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .77            .85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
| STANDHYD  (0108) |   Area    (ha)=    .95
|ID= 1 DT= 1.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .86          .10
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      80.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   1.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                   TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                    hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                   .017     .00 | 3.083    5.31 | 6.150   11.51 |  9.22    1.77
                   .033     .00 | 3.100    5.31 | 6.167   11.51 |  9.23    1.77
```

.050	.00	3.117	5.31	6.183	11.51	9.25	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	.89
.083	.00	3.150	5.31	6.217	11.51	9.28	.89
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.117	.00	3.183	5.31	6.250	11.50	9.32	.89
.133	.00	3.200	5.31	6.267	6.20	9.33	.89
.150	.00	3.217	5.31	6.283	6.20	9.35	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.183	.00	3.250	5.31	6.317	6.20	9.38	.89
.200	.00	3.267	15.05	6.333	6.20	9.40	.89
.217	.00	3.283	15.05	6.350	6.20	9.42	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.250	.00	3.317	15.05	6.383	6.20	9.45	.89
.267	.89	3.333	15.05	6.400	6.20	9.47	.89
.283	.89	3.350	15.05	6.417	6.20	9.48	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.317	.89	3.383	15.05	6.450	6.20	9.52	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.350	.89	3.417	15.05	6.483	6.20	9.55	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.383	.89	3.450	15.05	6.517	6.20	9.58	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.417	.89	3.483	15.05	6.550	6.20	9.62	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.450	.89	3.517	15.05	6.583	6.20	9.65	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.483	.89	3.550	15.05	6.617	6.20	9.68	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.517	.89	3.583	15.05	6.650	6.20	9.72	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.550	.89	3.617	15.05	6.683	6.20	9.75	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.583	.89	3.650	15.05	6.717	6.20	9.78	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.617	.89	3.683	15.05	6.750	6.20	9.82	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.650	.89	3.717	15.05	6.783	6.20	9.85	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.683	.89	3.750	15.05	6.817	6.20	9.88	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.717	.89	3.783	15.05	6.850	6.20	9.92	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.750	.89	3.817	15.05	6.883	6.20	9.95	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.783	.89	3.850	15.05	6.917	6.20	9.98	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.817	.89	3.883	15.05	6.950	6.20	10.02	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.850	.89	3.917	15.05	6.983	6.20	10.05	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.883	.89	3.950	15.05	7.017	6.20	10.08	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.917	.89	3.983	15.05	7.050	6.20	10.12	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.950	.89	4.017	15.05	7.083	6.20	10.15	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
.983	.89	4.050	15.05	7.117	6.20	10.18	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.017	.89	4.083	15.05	7.150	6.20	10.22	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.050	.89	4.117	15.05	7.183	6.20	10.25	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.083	.89	4.150	15.05	7.217	6.20	10.28	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.117	.89	4.183	15.05	7.250	6.19	10.32	.89
1.133	.89	4.200	15.05	7.267	3.54	10.33	.89
1.150	.89	4.217	15.05	7.283	3.54	10.35	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.183	.89	4.250	15.05	7.317	3.54	10.38	.89
1.200	.89	4.267	40.71	7.333	3.54	10.40	.89
1.217	.89	4.283	40.71	7.350	3.54	10.42	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.250	.89	4.317	40.71	7.383	3.54	10.45	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.283	.89	4.350	40.71	7.417	3.54	10.48	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.317	.89	4.383	40.71	7.450	3.54	10.52	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.350	.89	4.417	40.71	7.483	3.54	10.55	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89

1.383	.89	4.450	40.71	7.517	3.54	10.58	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.417	.89	4.483	40.71	7.550	3.54	10.62	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.450	.89	4.517	40.71	7.583	3.54	10.65	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.483	.89	4.550	40.71	7.617	3.54	10.68	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.517	.89	4.583	40.71	7.650	3.54	10.72	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.550	.89	4.617	40.71	7.683	3.54	10.75	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.583	.89	4.650	40.71	7.717	3.54	10.78	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.617	.89	4.683	40.71	7.750	3.54	10.82	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.650	.89	4.717	40.71	7.783	3.54	10.85	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.683	.89	4.750	40.71	7.817	3.54	10.88	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.717	.89	4.783	40.71	7.850	3.54	10.92	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.750	.89	4.817	40.71	7.883	3.54	10.95	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.783	.89	4.850	40.71	7.917	3.54	10.98	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.817	.89	4.883	40.71	7.950	3.54	11.02	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.850	.89	4.917	40.71	7.983	3.54	11.05	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.883	.89	4.950	40.71	8.017	3.54	11.08	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.917	.89	4.983	40.71	8.050	3.54	11.12	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.950	.89	5.017	40.71	8.083	3.54	11.15	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
1.983	.89	5.050	40.71	8.117	3.54	11.18	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.017	.89	5.083	40.71	8.150	3.54	11.22	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.050	.89	5.117	40.71	8.183	3.54	11.25	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.083	.89	5.150	40.71	8.217	3.54	11.28	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.117	.89	5.183	40.71	8.250	3.54	11.32	.89
2.133	.89	5.200	40.71	8.267	1.77	11.33	.89
2.150	.89	5.217	40.71	8.283	1.77	11.35	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.183	.89	5.250	40.69	8.317	1.77	11.38	.89
2.200	.89	5.267	11.51	8.333	1.77	11.40	.89
2.217	.89	5.283	11.51	8.350	1.77	11.42	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.250	.89	5.317	11.51	8.383	1.77	11.45	.89
2.267	5.31	5.333	11.51	8.400	1.77	11.47	.89
2.283	5.31	5.350	11.51	8.417	1.77	11.48	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.317	5.31	5.383	11.51	8.450	1.77	11.52	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.350	5.31	5.417	11.51	8.483	1.77	11.55	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.383	5.31	5.450	11.51	8.517	1.77	11.58	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.417	5.31	5.483	11.51	8.550	1.77	11.62	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.450	5.31	5.517	11.51	8.583	1.77	11.65	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.483	5.31	5.550	11.51	8.617	1.77	11.68	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.517	5.31	5.583	11.51	8.650	1.77	11.72	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.550	5.31	5.617	11.51	8.683	1.77	11.75	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.583	5.31	5.650	11.51	8.717	1.77	11.78	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.617	5.31	5.683	11.51	8.750	1.77	11.82	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.650	5.31	5.717	11.51	8.783	1.77	11.85	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.683	5.31	5.750	11.51	8.817	1.77	11.88	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89

2.717	5.31	5.783	11.51	8.850	1.77	11.92	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.750	5.31	5.817	11.51	8.883	1.77	11.95	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.783	5.31	5.850	11.51	8.917	1.77	11.98	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.817	5.31	5.883	11.51	8.950	1.77	12.02	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.850	5.31	5.917	11.51	8.983	1.77	12.05	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.883	5.31	5.950	11.51	9.017	1.77	12.08	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.917	5.31	5.983	11.51	9.050	1.77	12.12	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.950	5.31	6.017	11.51	9.083	1.77	12.15	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
2.983	5.31	6.050	11.51	9.117	1.77	12.18	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.017	5.31	6.083	11.51	9.150	1.77	12.22	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.050	5.31	6.117	11.51	9.183	1.77	12.25	.89
3.067	5.31	6.133	11.51	9.200	1.77		

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Max.Eff.Inten.(mm/hr)=      40.71        35.00
           over (min)        5.00         8.00
Storage Coeff.  (min)=       3.20 (ii)    7.40 (ii)
Unit Hyd. Tpeak (min)=       5.00         8.00
Unit Hyd. peak  (cms)=        .30          .15
                                                     *TOTALS*
PEAK FLOW       (cms)=        .10          .01          .106 (iii)
TIME TO PEAK    (hrs)=       5.00         5.25          5.25
RUNOFF VOLUME    (mm)=      87.54        62.26         85.01
TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
RUNOFF COEFFICIENT   =        .99          .70           .96


  (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN*  =  88.0    Ia = Dep. Storage  (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
      THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| CALIB              |
| STANDHYD  (0101)   |   Area    (ha)=   3.15
|ID= 1 DT= 2.0 min   |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.92          1.23
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       2.00          2.00
     Length            (m)=     720.00          8.50
     Mannings n           =       .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   2.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	1.33
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.133	.00	3.200	5.31	6.267	8.86	9.33	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.200	.00	3.267	10.18	6.333	6.20	9.40	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.267	.45	3.333	15.05	6.400	6.20	9.47	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.133	.89	4.200	15.05	7.267	4.87	10.33	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.200	.89	4.267	27.88	7.333	3.54	10.40	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.133	.89	5.200	40.71	8.267	2.66	11.33	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.200	.89	5.267	26.11	8.333	1.77	11.40	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.267	3.10	5.333	11.51	8.400	1.77	11.47	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.067	5.31	6.133	11.51	9.200	1.77	12.27	.44

```
Max.Eff.Inten.(mm/hr)=      40.71        34.92
           over (min)       10.00        14.00
Storage Coeff.  (min)=       9.72 (ii)   13.06 (ii)
Unit Hyd. Tpeak (min)=      10.00        14.00
Unit Hyd. peak  (cms)=        .12          .08
                                                    *TOTALS*
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     PEAK FLOW       (cms)=        .22          .11           .329 (iii)
     TIME TO PEAK    (hrs)=       5.23         5.27           5.23
     RUNOFF VOLUME    (mm)=      87.54        62.26          77.68
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .70            .88

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  88.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB             |
| NASHYD    (0300)  |   Area    (ha)=    6.72   Curve Number   (CN)= 88.0
|ID= 1 DT=10.0 min  |   Ia      (mm)=    1.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=     .12

     NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
             TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
              hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
             .167     .00 | 3.333   10.18 | 6.500    6.20 |  9.67     .89
             .333     .45 | 3.500   15.05 | 6.667    6.20 |  9.83     .89
             .500     .89 | 3.667   15.05 | 6.833    6.20 | 10.00     .89
             .667     .89 | 3.833   15.05 | 7.000    6.20 | 10.17     .89
             .833     .89 | 4.000   15.05 | 7.167    6.20 | 10.33     .89
            1.000     .89 | 4.167   15.05 | 7.333    4.87 | 10.50     .89
            1.167     .89 | 4.333   27.88 | 7.500    3.54 | 10.67     .89
            1.333     .89 | 4.500   40.71 | 7.667    3.54 | 10.83     .89
            1.500     .89 | 4.667   40.71 | 7.833    3.54 | 11.00     .89
            1.667     .89 | 4.833   40.71 | 8.000    3.54 | 11.17     .89
            1.833     .89 | 5.000   40.71 | 8.167    3.54 | 11.33     .89
            2.000     .89 | 5.167   40.71 | 8.333    2.66 | 11.50     .89
            2.167     .89 | 5.333   26.11 | 8.500    1.77 | 11.67     .89
            2.333    3.10 | 5.500   11.51 | 8.667    1.77 | 11.83     .89
            2.500    5.31 | 5.667   11.51 | 8.833    1.77 | 12.00     .89
            2.667    5.31 | 5.833   11.51 | 9.000    1.77 | 12.17     .89
            2.833    5.31 | 6.000   11.51 | 9.167    1.77 | 12.33     .44
            3.000    5.31 | 6.167   11.51 | 9.333    1.33 |
            3.167    5.31 | 6.333    8.86 | 9.500     .89 |

     Unit Hyd Qpeak  (cms)=   2.213

     PEAK FLOW       (cms)=    .540 (i)
     TIME TO PEAK    (hrs)=   5.167
     RUNOFF VOLUME    (mm)=  52.496
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =    .593

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB             |
| STANDHYD  (0905)  |   Area    (ha)=    5.25
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  53.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.67         1.58
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     187.10        40.00
     Mannings n           =       .013         .250

     NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
             TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
              hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
             .083     .00 | 3.167    5.31 | 6.250   11.51 |  9.33     .89
             .167     .00 | 3.250    5.31 | 6.333    6.20 |  9.42     .89
             .250     .00 | 3.333   15.05 | 6.417    6.20 |  9.50     .89
             .333     .89 | 3.417   15.05 | 6.500    6.20 |  9.58     .89
             .417     .89 | 3.500   15.05 | 6.583    6.20 |  9.67     .89
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             .500     .89 | 3.583   15.05 | 6.667    6.20 |  9.75     .89
             .583     .89 | 3.667   15.05 | 6.750    6.20 |  9.83     .89
             .667     .89 | 3.750   15.05 | 6.833    6.20 |  9.92     .89
             .750     .89 | 3.833   15.05 | 6.917    6.20 | 10.00     .89
             .833     .89 | 3.917   15.05 | 7.000    6.20 | 10.08     .89
             .917     .89 | 4.000   15.05 | 7.083    6.20 | 10.17     .89
            1.000     .89 | 4.083   15.05 | 7.167    6.20 | 10.25     .89
            1.083     .89 | 4.167   15.05 | 7.250    6.20 | 10.33     .89
            1.167     .89 | 4.250   15.05 | 7.333    3.54 | 10.42     .89
            1.250     .89 | 4.333   40.71 | 7.417    3.54 | 10.50     .89
            1.333     .89 | 4.417   40.71 | 7.500    3.54 | 10.58     .89
            1.417     .89 | 4.500   40.71 | 7.583    3.54 | 10.67     .89
            1.500     .89 | 4.583   40.71 | 7.667    3.54 | 10.75     .89
            1.583     .89 | 4.667   40.71 | 7.750    3.54 | 10.83     .89
            1.667     .89 | 4.750   40.71 | 7.833    3.54 | 10.92     .89
            1.750     .89 | 4.833   40.71 | 7.917    3.54 | 11.00     .89
            1.833     .89 | 4.917   40.71 | 8.000    3.54 | 11.08     .89
            1.917     .89 | 5.000   40.71 | 8.083    3.54 | 11.17     .89
            2.000     .89 | 5.083   40.71 | 8.167    3.54 | 11.25     .89
            2.083     .89 | 5.167   40.71 | 8.250    3.54 | 11.33     .89
            2.167     .89 | 5.250   40.71 | 8.333    1.77 | 11.42     .89
            2.250     .89 | 5.333   11.51 | 8.417    1.77 | 11.50     .89
            2.333    5.31 | 5.417   11.51 | 8.500    1.77 | 11.58     .89
            2.417    5.31 | 5.500   11.51 | 8.583    1.77 | 11.67     .89
            2.500    5.31 | 5.583   11.51 | 8.667    1.77 | 11.75     .89
            2.583    5.31 | 5.667   11.51 | 8.750    1.77 | 11.83     .89
            2.667    5.31 | 5.750   11.51 | 8.833    1.77 | 11.92     .89
            2.750    5.31 | 5.833   11.51 | 8.917    1.77 | 12.00     .89
            2.833    5.31 | 5.917   11.51 | 9.000    1.77 | 12.08     .89
            2.917    5.31 | 6.000   11.51 | 9.083    1.77 | 12.17     .89
            3.000    5.31 | 6.083   11.51 | 9.167    1.77 | 12.25     .89
            3.083    5.31 | 6.167   11.51 | 9.250    1.77 |

     Max.Eff.Inten.(mm/hr)=      40.71        56.89
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.33 (ii)   14.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .21          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .31          .24           .550 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54        66.02          77.42
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .75            .87

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
    (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB             |
| STANDHYD  (0906)  |   Area    (ha)=    6.59
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  71.00   Dir. Conn.(%)=  53.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.68         1.91
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     209.60        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        59.17
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.71 (ii)   14.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .20          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .39          .30           .692 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54        66.59          77.69
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .75            .88

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
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      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| CALIB              |
| STANDHYD  (0915)   |   Area    (ha)=  22.80
|ID= 1 DT= 5.0 min   |   Total Imp(%)=  70.00   Dir. Conn.(%)=  46.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      15.96         6.84
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     389.90        40.00
     Mannings n          =        .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        68.79
                over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.28 (ii)   16.48 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.19         1.22          2.408 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      87.54        71.93          79.11
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .81            .89


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| NASHYD    (0306)   |   Area    (ha)=   2.51   Curve Number   (CN)= 88.0
|ID= 1 DT=10.0 min   |   Ia      (mm)=   1.50   # of Linear Res.(N)= 3.00
--------------------     U.H. Tp(hrs)=    .12

         NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.00	3.333	10.18	6.500	6.20	9.67	.89
.333	.45	3.500	15.05	6.667	6.20	9.83	.89
.500	.89	3.667	15.05	6.833	6.20	10.00	.89
.667	.89	3.833	15.05	7.000	6.20	10.17	.89
.833	.89	4.000	15.05	7.167	6.20	10.33	.89
1.000	.89	4.167	15.05	7.333	4.87	10.50	.89
1.167	.89	4.333	27.88	7.500	3.54	10.67	.89
1.333	.89	4.500	40.71	7.667	3.54	10.83	.89
1.500	.89	4.667	40.71	7.833	3.54	11.00	.89
1.667	.89	4.833	40.71	8.000	3.54	11.17	.89
1.833	.89	5.000	40.71	8.167	3.54	11.33	.89
2.000	.89	5.167	40.71	8.333	2.66	11.50	.89
2.167	.89	5.333	26.11	8.500	1.77	11.67	.89
2.333	3.10	5.500	11.51	8.667	1.77	11.83	.89
2.500	5.31	5.667	11.51	8.833	1.77	12.00	.89
2.667	5.31	5.833	11.51	9.000	1.77	12.17	.89
2.833	5.31	6.000	11.51	9.167	1.77	12.33	.44
3.000	5.31	6.167	11.51	9.333	1.33		
3.167	5.31	6.333	8.86	9.500	.89		

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     Unit Hyd Qpeak  (cms)=    .826

     PEAK FLOW       (cms)=    .202 (i)
     TIME TO PEAK    (hrs)=   5.167
     RUNOFF VOLUME    (mm)=  52.496
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =    .593

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD  (0305)   |   Area    (ha)=    .51
|ID= 1 DT= 1.0 min   |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .43          .08
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.30        40.00
     Mannings n          =        .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   1.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.017	.00	3.083	5.31	6.150	11.51	9.22	1.77
.033	.00	3.100	5.31	6.167	11.51	9.23	1.77
.050	.00	3.117	5.31	6.183	11.51	9.25	1.77
.067	.00	3.133	5.31	6.200	11.51	9.27	.89
.083	.00	3.150	5.31	6.217	11.51	9.28	.89
.100	.00	3.167	5.31	6.233	11.51	9.30	.89
.117	.00	3.183	5.31	6.250	11.50	9.32	.89
.133	.00	3.200	5.31	6.267	6.20	9.33	.89
.150	.00	3.217	5.31	6.283	6.20	9.35	.89
.167	.00	3.233	5.31	6.300	6.20	9.37	.89
.183	.00	3.250	5.31	6.317	6.20	9.38	.89
.200	.00	3.267	15.05	6.333	6.20	9.40	.89
.217	.00	3.283	15.05	6.350	6.20	9.42	.89
.233	.00	3.300	15.05	6.367	6.20	9.43	.89
.250	.00	3.317	15.05	6.383	6.20	9.45	.89
.267	.89	3.333	15.05	6.400	6.20	9.47	.89
.283	.89	3.350	15.05	6.417	6.20	9.48	.89
.300	.89	3.367	15.05	6.433	6.20	9.50	.89
.317	.89	3.383	15.05	6.450	6.20	9.52	.89
.333	.89	3.400	15.05	6.467	6.20	9.53	.89
.350	.89	3.417	15.05	6.483	6.20	9.55	.89
.367	.89	3.433	15.05	6.500	6.20	9.57	.89
.383	.89	3.450	15.05	6.517	6.20	9.58	.89
.400	.89	3.467	15.05	6.533	6.20	9.60	.89
.417	.89	3.483	15.05	6.550	6.20	9.62	.89
.433	.89	3.500	15.05	6.567	6.20	9.63	.89
.450	.89	3.517	15.05	6.583	6.20	9.65	.89
.467	.89	3.533	15.05	6.600	6.20	9.67	.89
.483	.89	3.550	15.05	6.617	6.20	9.68	.89
.500	.89	3.567	15.05	6.633	6.20	9.70	.89
.517	.89	3.583	15.05	6.650	6.20	9.72	.89
.533	.89	3.600	15.05	6.667	6.20	9.73	.89
.550	.89	3.617	15.05	6.683	6.20	9.75	.89
.567	.89	3.633	15.05	6.700	6.20	9.77	.89
.583	.89	3.650	15.05	6.717	6.20	9.78	.89
.600	.89	3.667	15.05	6.733	6.20	9.80	.89
.617	.89	3.683	15.05	6.750	6.20	9.82	.89
.633	.89	3.700	15.05	6.767	6.20	9.83	.89
.650	.89	3.717	15.05	6.783	6.20	9.85	.89
.667	.89	3.733	15.05	6.800	6.20	9.87	.89
.683	.89	3.750	15.05	6.817	6.20	9.88	.89
.700	.89	3.767	15.05	6.833	6.20	9.90	.89
.717	.89	3.783	15.05	6.850	6.20	9.92	.89
.733	.89	3.800	15.05	6.867	6.20	9.93	.89
.750	.89	3.817	15.05	6.883	6.20	9.95	.89
.767	.89	3.833	15.05	6.900	6.20	9.97	.89
.783	.89	3.850	15.05	6.917	6.20	9.98	.89
.800	.89	3.867	15.05	6.933	6.20	10.00	.89
.817	.89	3.883	15.05	6.950	6.20	10.02	.89
.833	.89	3.900	15.05	6.967	6.20	10.03	.89
.850	.89	3.917	15.05	6.983	6.20	10.05	.89
.867	.89	3.933	15.05	7.000	6.20	10.07	.89
.883	.89	3.950	15.05	7.017	6.20	10.08	.89
.900	.89	3.967	15.05	7.033	6.20	10.10	.89
.917	.89	3.983	15.05	7.050	6.20	10.12	.89
.933	.89	4.000	15.05	7.067	6.20	10.13	.89
.950	.89	4.017	15.05	7.083	6.20	10.15	.89
.967	.89	4.033	15.05	7.100	6.20	10.17	.89
.983	.89	4.050	15.05	7.117	6.20	10.18	.89
1.000	.89	4.067	15.05	7.133	6.20	10.20	.89
1.017	.89	4.083	15.05	7.150	6.20	10.22	.89
1.033	.89	4.100	15.05	7.167	6.20	10.23	.89

1.050	.89	4.117	15.05	7.183	6.20	10.25	.89
1.067	.89	4.133	15.05	7.200	6.20	10.27	.89
1.083	.89	4.150	15.05	7.217	6.20	10.28	.89
1.100	.89	4.167	15.05	7.233	6.20	10.30	.89
1.117	.89	4.183	15.05	7.250	6.19	10.32	.89
1.133	.89	4.200	15.05	7.267	3.54	10.33	.89
1.150	.89	4.217	15.05	7.283	3.54	10.35	.89
1.167	.89	4.233	15.05	7.300	3.54	10.37	.89
1.183	.89	4.250	15.05	7.317	3.54	10.38	.89
1.200	.89	4.267	40.71	7.333	3.54	10.40	.89
1.217	.89	4.283	40.71	7.350	3.54	10.42	.89
1.233	.89	4.300	40.71	7.367	3.54	10.43	.89
1.250	.89	4.317	40.71	7.383	3.54	10.45	.89
1.267	.89	4.333	40.71	7.400	3.54	10.47	.89
1.283	.89	4.350	40.71	7.417	3.54	10.48	.89
1.300	.89	4.367	40.71	7.433	3.54	10.50	.89
1.317	.89	4.383	40.71	7.450	3.54	10.52	.89
1.333	.89	4.400	40.71	7.467	3.54	10.53	.89
1.350	.89	4.417	40.71	7.483	3.54	10.55	.89
1.367	.89	4.433	40.71	7.500	3.54	10.57	.89
1.383	.89	4.450	40.71	7.517	3.54	10.58	.89
1.400	.89	4.467	40.71	7.533	3.54	10.60	.89
1.417	.89	4.483	40.71	7.550	3.54	10.62	.89
1.433	.89	4.500	40.71	7.567	3.54	10.63	.89
1.450	.89	4.517	40.71	7.583	3.54	10.65	.89
1.467	.89	4.533	40.71	7.600	3.54	10.67	.89
1.483	.89	4.550	40.71	7.617	3.54	10.68	.89
1.500	.89	4.567	40.71	7.633	3.54	10.70	.89
1.517	.89	4.583	40.71	7.650	3.54	10.72	.89
1.533	.89	4.600	40.71	7.667	3.54	10.73	.89
1.550	.89	4.617	40.71	7.683	3.54	10.75	.89
1.567	.89	4.633	40.71	7.700	3.54	10.77	.89
1.583	.89	4.650	40.71	7.717	3.54	10.78	.89
1.600	.89	4.667	40.71	7.733	3.54	10.80	.89
1.617	.89	4.683	40.71	7.750	3.54	10.82	.89
1.633	.89	4.700	40.71	7.767	3.54	10.83	.89
1.650	.89	4.717	40.71	7.783	3.54	10.85	.89
1.667	.89	4.733	40.71	7.800	3.54	10.87	.89
1.683	.89	4.750	40.71	7.817	3.54	10.88	.89
1.700	.89	4.767	40.71	7.833	3.54	10.90	.89
1.717	.89	4.783	40.71	7.850	3.54	10.92	.89
1.733	.89	4.800	40.71	7.867	3.54	10.93	.89
1.750	.89	4.817	40.71	7.883	3.54	10.95	.89
1.767	.89	4.833	40.71	7.900	3.54	10.97	.89
1.783	.89	4.850	40.71	7.917	3.54	10.98	.89
1.800	.89	4.867	40.71	7.933	3.54	11.00	.89
1.817	.89	4.883	40.71	7.950	3.54	11.02	.89
1.833	.89	4.900	40.71	7.967	3.54	11.03	.89
1.850	.89	4.917	40.71	7.983	3.54	11.05	.89
1.867	.89	4.933	40.71	8.000	3.54	11.07	.89
1.883	.89	4.950	40.71	8.017	3.54	11.08	.89
1.900	.89	4.967	40.71	8.033	3.54	11.10	.89
1.917	.89	4.983	40.71	8.050	3.54	11.12	.89
1.933	.89	5.000	40.71	8.067	3.54	11.13	.89
1.950	.89	5.017	40.71	8.083	3.54	11.15	.89
1.967	.89	5.033	40.71	8.100	3.54	11.17	.89
1.983	.89	5.050	40.71	8.117	3.54	11.18	.89
2.000	.89	5.067	40.71	8.133	3.54	11.20	.89
2.017	.89	5.083	40.71	8.150	3.54	11.22	.89
2.033	.89	5.100	40.71	8.167	3.54	11.23	.89
2.050	.89	5.117	40.71	8.183	3.54	11.25	.89
2.067	.89	5.133	40.71	8.200	3.54	11.27	.89
2.083	.89	5.150	40.71	8.217	3.54	11.28	.89
2.100	.89	5.167	40.71	8.233	3.54	11.30	.89
2.117	.89	5.183	40.71	8.250	3.54	11.32	.89
2.133	.89	5.200	40.71	8.267	1.77	11.33	.89
2.150	.89	5.217	40.71	8.283	1.77	11.35	.89
2.167	.89	5.233	40.71	8.300	1.77	11.37	.89
2.183	.89	5.250	40.69	8.317	1.77	11.38	.89
2.200	.89	5.267	11.51	8.333	1.77	11.40	.89
2.217	.89	5.283	11.51	8.350	1.77	11.42	.89
2.233	.89	5.300	11.51	8.367	1.77	11.43	.89
2.250	.89	5.317	11.51	8.383	1.77	11.45	.89
2.267	5.31	5.333	11.51	8.400	1.77	11.47	.89
2.283	5.31	5.350	11.51	8.417	1.77	11.48	.89
2.300	5.31	5.367	11.51	8.433	1.77	11.50	.89
2.317	5.31	5.383	11.51	8.450	1.77	11.52	.89
2.333	5.31	5.400	11.51	8.467	1.77	11.53	.89
2.350	5.31	5.417	11.51	8.483	1.77	11.55	.89
2.367	5.31	5.433	11.51	8.500	1.77	11.57	.89

2.383	5.31	5.450	11.51	8.517	1.77	11.58	.89
2.400	5.31	5.467	11.51	8.533	1.77	11.60	.89
2.417	5.31	5.483	11.51	8.550	1.77	11.62	.89
2.433	5.31	5.500	11.51	8.567	1.77	11.63	.89
2.450	5.31	5.517	11.51	8.583	1.77	11.65	.89
2.467	5.31	5.533	11.51	8.600	1.77	11.67	.89
2.483	5.31	5.550	11.51	8.617	1.77	11.68	.89
2.500	5.31	5.567	11.51	8.633	1.77	11.70	.89
2.517	5.31	5.583	11.51	8.650	1.77	11.72	.89
2.533	5.31	5.600	11.51	8.667	1.77	11.73	.89
2.550	5.31	5.617	11.51	8.683	1.77	11.75	.89
2.567	5.31	5.633	11.51	8.700	1.77	11.77	.89
2.583	5.31	5.650	11.51	8.717	1.77	11.78	.89
2.600	5.31	5.667	11.51	8.733	1.77	11.80	.89
2.617	5.31	5.683	11.51	8.750	1.77	11.82	.89
2.633	5.31	5.700	11.51	8.767	1.77	11.83	.89
2.650	5.31	5.717	11.51	8.783	1.77	11.85	.89
2.667	5.31	5.733	11.51	8.800	1.77	11.87	.89
2.683	5.31	5.750	11.51	8.817	1.77	11.88	.89
2.700	5.31	5.767	11.51	8.833	1.77	11.90	.89
2.717	5.31	5.783	11.51	8.850	1.77	11.92	.89
2.733	5.31	5.800	11.51	8.867	1.77	11.93	.89
2.750	5.31	5.817	11.51	8.883	1.77	11.95	.89
2.767	5.31	5.833	11.51	8.900	1.77	11.97	.89
2.783	5.31	5.850	11.51	8.917	1.77	11.98	.89
2.800	5.31	5.867	11.51	8.933	1.77	12.00	.89
2.817	5.31	5.883	11.51	8.950	1.77	12.02	.89
2.833	5.31	5.900	11.51	8.967	1.77	12.03	.89
2.850	5.31	5.917	11.51	8.983	1.77	12.05	.89
2.867	5.31	5.933	11.51	9.000	1.77	12.07	.89
2.883	5.31	5.950	11.51	9.017	1.77	12.08	.89
2.900	5.31	5.967	11.51	9.033	1.77	12.10	.89
2.917	5.31	5.983	11.51	9.050	1.77	12.12	.89
2.933	5.31	6.000	11.51	9.067	1.77	12.13	.89
2.950	5.31	6.017	11.51	9.083	1.77	12.15	.89
2.967	5.31	6.033	11.51	9.100	1.77	12.17	.89
2.983	5.31	6.050	11.51	9.117	1.77	12.18	.89
3.000	5.31	6.067	11.51	9.133	1.77	12.20	.89
3.017	5.31	6.083	11.51	9.150	1.77	12.22	.89
3.033	5.31	6.100	11.51	9.167	1.77	12.23	.89
3.050	5.31	6.117	11.51	9.183	1.77	12.25	.89
3.067	5.31	6.133	11.51	9.200	1.77		

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     Max.Eff.Inten.(mm/hr)=      40.71        35.00
                over (min)        5.00         8.00
     Storage Coeff.  (min)=       2.65 (ii)    7.70 (ii)
     Unit Hyd. Tpeak (min)=       5.00         8.00
     Unit Hyd. peak  (cms)=        .33          .15
                                                          *TOTALS*
     PEAK FLOW       (cms)=        .05          .01           .056 (iii)
     TIME TO PEAK    (hrs)=       4.85         5.25          5.25
     RUNOFF VOLUME    (mm)=      87.54        62.26         83.74
     TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
     RUNOFF COEFFICIENT   =        .99          .70           .95


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

----------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0302)   |   Area    (ha)=   1.31
|ID= 1 DT= 1.0 min   |   Total Imp(%)=  64.00   Dir. Conn.(%)=  54.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .84          .47
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      93.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        46.77
                over (min)        5.00        13.00
     Storage Coeff.  (min)=       3.52 (ii)   12.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        13.00
     Unit Hyd. peak  (cms)=        .28          .09
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                                                               *TOTALS*
     PEAK FLOW       (cms)=        .08          .06           .139 (iii)
     TIME TO PEAK    (hrs)=       5.05         5.27           5.25
     RUNOFF VOLUME    (mm)=      87.54        66.67          77.94
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .75            .88

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| STANDHYD  (0303)  |   Area    (ha)=    1.72
|ID= 1 DT= 1.0 min  |   Total Imp(%)=  43.00   Dir. Conn.(%)=  32.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=        .74          .98
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     107.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      40.71        43.18
               over (min)        5.00        14.00
     Storage Coeff.  (min)=       3.81 (ii)   13.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        14.00
     Unit Hyd. peak  (cms)=        .27          .08
                                                               *TOTALS*
     PEAK FLOW       (cms)=        .06          .11           .173 (iii)
     TIME TO PEAK    (hrs)=       5.10         5.27           5.25
     RUNOFF VOLUME    (mm)=      87.54        65.49          72.54
     TOTAL RAINFALL   (mm)=      88.54        88.54          88.54
     RUNOFF COEFFICIENT   =        .99          .74            .82

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  88.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| CALIB              |
| NASHYD    (0304)  |   Area    (ha)=     .90   Curve Number   (CN)= 88.0
|ID= 1 DT=10.0 min  |   Ia      (mm)=    1.50   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=     .01

        NOTE:  RAINFALL WAS TRANSFORMED TO  10.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.167	.00	3.333	10.18	6.500	6.20	9.67	.89
.333	.45	3.500	15.05	6.667	6.20	9.83	.89
.500	.89	3.667	15.05	6.833	6.20	10.00	.89
.667	.89	3.833	15.05	7.000	6.20	10.17	.89
.833	.89	4.000	15.05	7.167	6.20	10.33	.89
1.000	.89	4.167	15.05	7.333	4.87	10.50	.89
1.167	.89	4.333	27.88	7.500	3.54	10.67	.89
1.333	.89	4.500	40.71	7.667	3.54	10.83	.89
1.500	.89	4.667	40.71	7.833	3.54	11.00	.89
1.667	.89	4.833	40.71	8.000	3.54	11.17	.89
1.833	.89	5.000	40.71	8.167	3.54	11.33	.89
2.000	.89	5.167	40.71	8.333	2.66	11.50	.89
2.167	.89	5.333	26.11	8.500	1.77	11.67	.89
2.333	3.10	5.500	11.51	8.667	1.77	11.83	.89
2.500	5.31	5.667	11.51	8.833	1.77	12.00	.89
2.667	5.31	5.833	11.51	9.000	1.77	12.17	.89
2.833	5.31	6.000	11.51	9.167	1.77	12.33	.44
3.000	5.31	6.167	11.51	9.333	1.33		
3.167	5.31	6.333	8.86	9.500	.89		

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     Unit Hyd Qpeak  (cms)=   5.761
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     PEAK FLOW       (cms)=    .000 (i)
     TIME TO PEAK    (hrs)=    .000
     RUNOFF VOLUME    (mm)=    .000
     TOTAL RAINFALL   (mm)=  88.540
     RUNOFF COEFFICIENT   =    .000

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| READ HYD  (0745) |   AREA       (ha)=3174.13
| DT=15.0 min      |   TPEAK     (hrs)=   7.00
--------------------   VOLUME     (mm)=   5.01
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
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TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.00	2.801	22.00	.531	33.00	.091	44.00	.011
.25	.000	11.25	2.708	22.25	.513	33.25	.088	44.25	.010
.50	.000	11.50	2.616	22.50	.496	33.50	.084	44.50	.010
.75	.000	11.75	2.510	22.75	.479	33.75	.080	44.75	.009
1.00	.000	12.00	2.393	23.00	.462	34.00	.076	45.00	.009
1.25	.000	12.25	2.285	23.25	.446	34.25	.073	45.25	.008
1.50	.011	12.50	2.185	23.50	.430	34.50	.070	45.50	.008
1.75	.054	12.75	2.093	23.75	.415	34.75	.067	45.75	.007
2.00	.141	13.00	2.008	24.00	.400	35.00	.064	46.00	.007
2.25	.270	13.25	1.922	24.25	.385	35.25	.061	46.25	.007
2.50	.420	13.50	1.833	24.50	.371	35.50	.058	46.50	.006
2.75	.572	13.75	1.746	24.75	.358	35.75	.055	46.75	.006
3.00	.765	14.00	1.666	25.00	.345	36.00	.053	47.00	.005
3.25	1.036	14.25	1.594	25.25	.332	36.25	.051	47.25	.005
3.50	1.365	14.50	1.527	25.50	.319	36.50	.048	47.50	.005
3.75	1.729	14.75	1.466	25.75	.307	36.75	.046	47.75	.005
4.00	2.114	15.00	1.409	26.00	.295	37.00	.044	48.00	.004
4.25	2.463	15.25	1.355	26.25	.284	37.25	.042	48.25	.004
4.50	2.751	15.50	1.304	26.50	.273	37.50	.040	48.50	.004
4.75	3.014	15.75	1.256	26.75	.263	37.75	.038	48.75	.003
5.00	3.249	16.00	1.211	27.00	.252	38.00	.036	49.00	.003
5.25	3.455	16.25	1.167	27.25	.242	38.25	.035	49.25	.003
5.50	3.632	16.50	1.126	27.50	.233	38.50	.033	49.50	.003
5.75	3.781	16.75	1.086	27.75	.224	38.75	.031	49.75	.003
6.00	3.902	17.00	1.048	28.00	.215	39.00	.030	50.00	.003
6.25	3.994	17.25	1.011	28.25	.206	39.25	.028	50.25	.002
6.50	4.054	17.50	.978	28.50	.198	39.50	.027	50.50	.002
6.75	4.083	17.75	.947	28.75	.190	39.75	.026	50.75	.002
7.00	4.091	18.00	.917	29.00	.182	40.00	.025	51.00	.002
7.25	4.082	18.25	.887	29.25	.175	40.25	.023	51.25	.002
7.50	4.061	18.50	.858	29.50	.168	40.50	.022	51.50	.002
7.75	4.018	18.75	.830	29.75	.161	40.75	.021	51.75	.002
8.00	3.950	19.00	.803	30.00	.154	41.00	.020	52.00	.002
8.25	3.867	19.25	.776	30.25	.148	41.25	.019	52.25	.001
8.50	3.777	19.50	.750	30.50	.141	41.50	.018	52.50	.001
8.75	3.683	19.75	.724	30.75	.136	41.75	.017	52.75	.001
9.00	3.587	20.00	.699	31.00	.130	42.00	.017	53.00	.001
9.25	3.488	20.25	.676	31.25	.124	42.25	.016	53.25	.001
9.50	3.389	20.50	.653	31.50	.119	42.50	.015	53.50	.001
9.75	3.288	20.75	.630	31.75	.114	42.75	.014	53.75	.001
10.00	3.189	21.00	.608	32.00	.109	43.00	.014	54.00	.000
10.25	3.090	21.25	.588	32.25	.104	43.25	.013		
10.50	2.993	21.50	.568	32.50	.100	43.50	.012		
10.75	2.896	21.75	.550	32.75	.096	43.75	.012		

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|    READ STORM     |     Filename: V:\01606\Active\160622264
|                   |               \Analysis\SWM\Hydrology\
|                   |               VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm  |     Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89

1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

| READ HYD (0925) | AREA (ha)=3174.13
| DT=15.0 min | TPEAK (hrs)= 6.75
VOLUME (mm)= 7.36

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.25	3.700	22.50	.591	33.75	.100	45.00	.012
.25	.000	11.50	3.536	22.75	.572	34.00	.096	45.25	.011
.50	.000	11.75	3.383	23.00	.553	34.25	.092	45.50	.011
.75	.000	12.00	3.240	23.25	.534	34.50	.088	45.75	.010
1.00	.000	12.25	3.104	23.50	.516	34.75	.084	46.00	.009
1.25	.000	12.50	2.976	23.75	.498	35.00	.080	46.25	.009
1.50	.018	12.75	2.855	24.00	.481	35.25	.077	46.50	.008
1.75	.090	13.00	2.731	24.25	.464	35.50	.073	46.75	.008
2.00	.242	13.25	2.595	24.50	.448	35.75	.070	47.00	.008
2.25	.448	13.50	2.460	24.75	.432	36.00	.067	47.25	.007
2.50	.683	13.75	2.338	25.00	.416	36.25	.064	47.50	.007
2.75	1.015	14.00	2.227	25.25	.401	36.50	.061	47.75	.006
3.00	1.501	14.25	2.126	25.50	.386	36.75	.058	48.00	.006
3.25	2.093	14.50	2.032	25.75	.372	37.00	.056	48.25	.006
3.50	2.703	14.75	1.942	26.00	.358	37.25	.053	48.50	.005
3.75	3.254	15.00	1.849	26.25	.345	37.50	.051	48.75	.005
4.00	3.807	15.25	1.756	26.50	.332	37.75	.048	49.00	.005
4.25	4.321	15.50	1.671	26.75	.320	38.00	.046	49.25	.004
4.50	4.772	15.75	1.594	27.00	.308	38.25	.044	49.50	.004
4.75	5.171	16.00	1.524	27.25	.296	38.50	.042	49.75	.004
5.00	5.528	16.25	1.459	27.50	.284	38.75	.040	50.00	.004
5.25	5.838	16.50	1.400	27.75	.273	39.00	.038	50.25	.003
5.50	6.099	16.75	1.344	28.00	.263	39.25	.036	50.50	.003
5.75	6.307	17.00	1.292	28.25	.253	39.50	.035	50.75	.003
6.00	6.467	17.25	1.242	28.50	.243	39.75	.033	51.00	.003
6.25	6.577	17.50	1.195	28.75	.233	40.00	.031	51.25	.003
6.50	6.642	17.75	1.151	29.00	.224	40.25	.030	51.50	.002
6.75	6.661	18.00	1.109	29.25	.215	40.50	.029	51.75	.002
7.00	6.610	18.25	1.068	29.50	.206	40.75	.027	52.00	.002
7.25	6.492	18.50	1.030	29.75	.198	41.00	.026	52.25	.002
7.50	6.345	18.75	.995	30.00	.190	41.25	.025	52.50	.002
7.75	6.185	19.00	.962	30.25	.182	41.50	.024	52.75	.002
8.00	6.020	19.25	.931	30.50	.175	41.75	.022	53.00	.002
8.25	5.850	19.50	.900	30.75	.168	42.00	.021	53.25	.002
8.50	5.679	19.75	.870	31.00	.161	42.25	.020	53.50	.001
8.75	5.505	20.00	.841	31.25	.154	42.50	.019	53.75	.001
9.00	5.330	20.25	.812	31.50	.148	42.75	.018	54.00	.001
9.25	5.155	20.50	.784	31.75	.141	43.00	.017	54.25	.001
9.50	4.982	20.75	.757	32.00	.136	43.25	.017	54.50	.001
9.75	4.796	21.00	.731	32.25	.130	43.50	.016	54.75	.001
10.00	4.597	21.25	.706	32.50	.124	43.75	.015	55.00	.001
10.25	4.402	21.50	.682	32.75	.119	44.00	.014	55.25	.001
10.50	4.217	21.75	.658	33.00	.114	44.25	.014	55.50	.000
10.75	4.042	22.00	.635	33.25	.109	44.50	.013		
11.00	3.871	22.25	.612	33.50	.104	44.75	.012		

| READ STORM | Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89

1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

| READ HYD (0926) | AREA (ha)=3174.13
| DT=15.0 min | TPEAK (hrs)= 7.00
VOLUME (mm)= 9.99

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.50	4.633	23.00	.635	34.50	.105	46.00	.012
.25	.000	11.75	4.401	23.25	.613	34.75	.100	46.25	.011
.50	.000	12.00	4.188	23.50	.591	35.00	.096	46.50	.011
.75	.000	12.25	3.991	23.75	.572	35.25	.092	46.75	.010
1.00	.000	12.50	3.797	24.00	.552	35.50	.088	47.00	.010
1.25	.000	12.75	3.606	24.25	.534	35.75	.084	47.25	.009
1.50	.028	13.00	3.429	24.50	.516	36.00	.080	47.50	.009
1.75	.139	13.25	3.268	24.75	.498	36.25	.077	47.75	.008
2.00	.368	13.50	3.117	25.00	.481	36.50	.073	48.00	.008
2.25	.669	13.75	2.977	25.25	.464	36.75	.070	48.25	.007
2.50	1.101	14.00	2.836	25.50	.447	37.00	.067	48.50	.007
2.75	1.774	14.25	2.685	25.75	.431	37.25	.064	48.75	.006
3.00	2.597	14.50	2.537	26.00	.416	37.50	.061	49.00	.006
3.25	3.395	14.75	2.404	26.25	.401	37.75	.058	49.25	.006
3.50	4.177	15.00	2.285	26.50	.386	38.00	.056	49.50	.005
3.75	4.920	15.25	2.175	26.75	.372	38.25	.053	49.75	.005
4.00	5.609	15.50	2.075	27.00	.358	38.50	.051	50.00	.005
4.25	6.288	15.75	1.983	27.25	.345	38.75	.048	50.25	.004
4.50	6.917	16.00	1.889	27.50	.332	39.00	.046	50.50	.004
4.75	7.432	16.25	1.792	27.75	.319	39.25	.044	50.75	.004
5.00	7.851	16.50	1.702	28.00	.307	39.50	.042	51.00	.004
5.25	8.221	16.75	1.620	28.25	.295	39.75	.040	51.25	.003
5.50	8.530	17.00	1.546	28.50	.284	40.00	.038	51.50	.003
5.75	8.780	17.25	1.478	28.75	.273	40.25	.037	51.75	.003
6.00	8.977	17.50	1.416	29.00	.263	40.50	.035	52.00	.003
6.25	9.126	17.75	1.358	29.25	.252	40.75	.033	52.25	.003
6.50	9.231	18.00	1.304	29.50	.242	41.00	.032	52.50	.002
6.75	9.288	18.25	1.253	29.75	.233	41.25	.030	52.75	.002
7.00	9.292	18.50	1.204	30.00	.224	41.50	.029	53.00	.002
7.25	9.238	18.75	1.159	30.25	.215	41.75	.027	53.25	.002
7.50	9.131	19.00	1.116	30.50	.206	42.00	.026	53.50	.002
7.75	8.978	19.25	1.074	30.75	.198	42.25	.025	53.75	.002
8.00	8.785	19.50	1.035	31.00	.190	42.50	.024	54.00	.002
8.25	8.561	19.75	1.000	31.25	.182	42.75	.023	54.25	.002
8.50	8.282	20.00	.967	31.50	.175	43.00	.021	54.50	.001
8.75	7.947	20.25	.934	31.75	.168	43.25	.020	54.75	.001
9.00	7.607	20.50	.903	32.00	.161	43.50	.019	55.00	.001
9.25	7.286	20.75	.873	32.25	.154	43.75	.018	55.25	.001
9.50	6.977	21.00	.843	32.50	.148	44.00	.018	55.50	.001
9.75	6.681	21.25	.814	32.75	.141	44.25	.017	55.75	.001
10.00	6.370	21.50	.786	33.00	.136	44.50	.016	56.00	.001
10.25	6.050	21.75	.759	33.25	.130	44.75	.015	56.25	.001
10.50	5.748	22.00	.732	33.50	.124	45.00	.014	56.50	.000
10.75	5.461	22.25	.707	33.75	.119	45.25	.014		
11.00	5.170	22.50	.683	34.00	.114	45.50	.013		
11.25	4.889	22.75	.659	34.25	.109	45.75	.012		

| READ STORM | Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89

1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (0950) |   AREA       (ha)= 150.47
| DT=15.0 min      |   TPEAK     (hrs)=  13.00
--------------------   VOLUME     (mm)=   9.79
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	36.00	.055	72.00	.012	108.00	.002	144.00	.000
.25	.000	36.25	.054	72.25	.012	108.25	.002	144.25	.000
.50	.001	36.50	.054	72.50	.012	108.50	.002	144.50	.000
.75	.002	36.75	.053	72.75	.011	108.75	.002	144.75	.000
1.00	.004	37.00	.053	73.00	.011	109.00	.002	145.00	.000
1.25	.006	37.25	.052	73.25	.011	109.25	.002	145.25	.000
1.50	.012	37.50	.051	73.50	.011	109.50	.002	145.50	.000
1.75	.023	37.75	.051	73.75	.011	109.75	.002	145.75	.000
2.00	.035	38.00	.051	74.00	.011	110.00	.002	146.00	.000
2.25	.046	38.25	.050	74.25	.010	110.25	.002	146.25	.000
2.50	.055	38.50	.049	74.50	.010	110.50	.002	146.50	.000
2.75	.061	38.75	.049	74.75	.010	110.75	.002	146.75	.000
3.00	.066	39.00	.049	75.00	.010	111.00	.002	147.00	.000
3.25	.071	39.25	.048	75.25	.010	111.25	.002	147.25	.000
3.50	.074	39.50	.047	75.50	.010	111.50	.002	147.50	.000
3.75	.077	39.75	.047	75.75	.010	111.75	.002	147.75	.000
4.00	.079	40.00	.047	76.00	.010	112.00	.002	148.00	.000
4.25	.081	40.25	.046	76.25	.010	112.25	.002	148.25	.000
4.50	.083	40.50	.046	76.50	.010	112.50	.002	148.50	.000
4.75	.084	40.75	.045	76.75	.010	112.75	.002	148.75	.000
5.00	.084	41.00	.045	77.00	.009	113.00	.002	149.00	.000
5.25	.084	41.25	.044	77.25	.009	113.25	.002	149.25	.000
5.50	.084	41.50	.044	77.50	.009	113.50	.002	149.50	.000
5.75	.085	41.75	.043	77.75	.009	113.75	.002	149.75	.000
6.00	.085	42.00	.043	78.00	.009	114.00	.002	150.00	.000
6.25	.085	42.25	.043	78.25	.009	114.25	.002	150.25	.000
6.50	.085	42.50	.042	78.50	.009	114.50	.002	150.50	.000
6.75	.086	42.75	.041	78.75	.009	114.75	.002	150.75	.000
7.00	.086	43.00	.041	79.00	.008	115.00	.002	151.00	.000
7.25	.086	43.25	.041	79.25	.008	115.25	.002	151.25	.000
7.50	.086	43.50	.040	79.50	.008	115.50	.002	151.50	.000
7.75	.087	43.75	.040	79.75	.008	115.75	.002	151.75	.000
8.00	.088	44.00	.039	80.00	.008	116.00	.002	152.00	.000
8.25	.088	44.25	.039	80.25	.008	116.25	.002	152.25	.000
8.50	.089	44.50	.039	80.50	.008	116.50	.002	152.50	.000
8.75	.090	44.75	.038	80.75	.008	116.75	.002	152.75	.000
9.00	.090	45.00	.038	81.00	.008	117.00	.002	153.00	.000
9.25	.091	45.25	.037	81.25	.008	117.25	.002	153.25	.000
9.50	.092	45.50	.037	81.50	.008	117.50	.002	153.50	.000
9.75	.093	45.75	.037	81.75	.008	117.75	.002	153.75	.000
10.00	.094	46.00	.036	82.00	.008	118.00	.002	154.00	.000
10.25	.094	46.25	.036	82.25	.008	118.25	.002	154.25	.000
10.50	.095	46.50	.035	82.50	.007	118.50	.002	154.50	.000
10.75	.096	46.75	.035	82.75	.007	118.75	.002	154.75	.000
11.00	.096	47.00	.035	83.00	.007	119.00	.002	155.00	.000
11.25	.097	47.25	.034	83.25	.007	119.25	.002	155.25	.000
11.50	.098	47.50	.034	83.50	.007	119.50	.002	155.50	.000
11.75	.098	47.75	.033	83.75	.007	119.75	.001	155.75	.000
12.00	.098	48.00	.033	84.00	.007	120.00	.001	156.00	.000
12.25	.099	48.25	.033	84.25	.007	120.25	.001	156.25	.000
12.50	.099	48.50	.033	84.50	.007	120.50	.001	156.50	.000
12.75	.099	48.75	.032	84.75	.007	120.75	.001	156.75	.000
13.00	.100	49.00	.032	85.00	.006	121.00	.001	157.00	.000
13.25	.100	49.25	.031	85.25	.006	121.25	.001	157.25	.000
13.50	.100	49.50	.031	85.50	.006	121.50	.001	157.50	.000
13.75	.100	49.75	.031	85.75	.006	121.75	.001	157.75	.000
14.00	.100	50.00	.031	86.00	.006	122.00	.001	158.00	.000
14.25	.100	50.25	.030	86.25	.006	122.25	.001	158.25	.000
14.50	.100	50.50	.030	86.50	.006	122.50	.001	158.50	.000
14.75	.100	50.75	.029	86.75	.006	122.75	.001	158.75	.000
15.00	.100	51.00	.029	87.00	.006	123.00	.001	159.00	.000
15.25	.100	51.25	.029	87.25	.006	123.25	.001	159.25	.000
15.50	.100	51.50	.029	87.50	.006	123.50	.001	159.50	.000
15.75	.100	51.75	.028	87.75	.006	123.75	.001	159.75	.000
16.00	.099	52.00	.028	88.00	.006	124.00	.001	160.00	.000
16.25	.099	52.25	.028	88.25	.006	124.25	.001	160.25	.000
16.50	.099	52.50	.027	88.50	.006	124.50	.001	160.50	.000
16.75	.099	52.75	.027	88.75	.006	124.75	.001	160.75	.000
17.00	.098	53.00	.027	89.00	.006	125.00	.001	161.00	.000
17.25	.098	53.25	.027	89.25	.006	125.25	.001	161.25	.000
17.50	.098	53.50	.026	89.50	.005	125.50	.001	161.50	.000
17.75	.097	53.75	.026	89.75	.005	125.75	.001	161.75	.000
18.00	.097	54.00	.026	90.00	.005	126.00	.001	162.00	.000
18.25	.096	54.25	.026	90.25	.005	126.25	.001	162.25	.000
18.50	.096	54.50	.025	90.50	.005	126.50	.001	162.50	.000
18.75	.096	54.75	.025	90.75	.005	126.75	.001	162.75	.000
19.00	.095	55.00	.025	91.00	.005	127.00	.001	163.00	.000
19.25	.095	55.25	.024	91.25	.005	127.25	.001	163.25	.000
19.50	.094	55.50	.024	91.50	.005	127.50	.001	163.50	.000
19.75	.094	55.75	.024	91.75	.005	127.75	.001	163.75	.000
20.00	.093	56.00	.024	92.00	.005	128.00	.001	164.00	.000
20.25	.093	56.25	.023	92.25	.005	128.25	.001	164.25	.000
20.50	.092	56.50	.023	92.50	.005	128.50	.001	164.50	.000
20.75	.092	56.75	.023	92.75	.005	128.75	.001	164.75	.000
21.00	.091	57.00	.023	93.00	.004	129.00	.001	165.00	.000
21.25	.090	57.25	.022	93.25	.004	129.25	.001	165.25	.000
21.50	.090	57.50	.022	93.50	.004	129.50	.001	165.50	.000
21.75	.090	57.75	.022	93.75	.004	129.75	.001	165.75	.000
22.00	.089	58.00	.022	94.00	.004	130.00	.001	166.00	.000
22.25	.088	58.25	.022	94.25	.004	130.25	.001	166.25	.000
22.50	.088	58.50	.021	94.50	.004	130.50	.001	166.50	.000
22.75	.087	58.75	.021	94.75	.004	130.75	.001	166.75	.000
23.00	.086	59.00	.021	95.00	.004	131.00	.001	167.00	.000
23.25	.086	59.25	.020	95.25	.004	131.25	.001	167.25	.000
23.50	.085	59.50	.020	95.50	.004	131.50	.001	167.50	.000
23.75	.085	59.75	.020	95.75	.004	131.75	.001	167.75	.000
24.00	.084	60.00	.020	96.00	.004	132.00	.001	168.00	.000
24.25	.083	60.25	.020	96.25	.004	132.25	.001	168.25	.000
24.50	.083	60.50	.019	96.50	.004	132.50	.001	168.50	.000
24.75	.082	60.75	.019	96.75	.004	132.75	.001	168.75	.000
25.00	.082	61.00	.019	97.00	.004	133.00	.001	169.00	.000
25.25	.081	61.25	.019	97.25	.004	133.25	.001	169.25	.000
25.50	.080	61.50	.018	97.50	.004	133.50	.001	169.50	.000
25.75	.080	61.75	.018	97.75	.004	133.75	.001	169.75	.000
26.00	.079	62.00	.018	98.00	.004	134.00	.001	170.00	.000
26.25	.079	62.25	.018	98.25	.004	134.25	.001	170.25	.000
26.50	.078	62.50	.018	98.50	.004	134.50	.001	170.50	.000
26.75	.077	62.75	.018	98.75	.004	134.75	.001	170.75	.000
27.00	.077	63.00	.017	99.00	.004	135.00	.001	171.00	.000
27.25	.076	63.25	.017	99.25	.004	135.25	.001	171.25	.000
27.50	.075	63.50	.017	99.50	.004	135.50	.001	171.50	.000
27.75	.075	63.75	.017	99.75	.004	135.75	.001	171.75	.000
28.00	.074	64.00	.017	100.00	.003	136.00	.001	172.00	.000
28.25	.073	64.25	.016	100.25	.003	136.25	.001	172.25	.000
28.50	.073	64.50	.016	100.50	.003	136.50	.001	172.50	.000
28.75	.072	64.75	.016	100.75	.003	136.75	.001	172.75	.000
29.00	.071	65.00	.016	101.00	.003	137.00	.001	173.00	.000
29.25	.071	65.25	.016	101.25	.003	137.25	.001	173.25	.000
29.50	.070	65.50	.016	101.50	.003	137.50	.001	173.50	.000
29.75	.069	65.75	.015	101.75	.003	137.75	.001	173.75	.000
30.00	.069	66.00	.015	102.00	.003	138.00	.001	174.00	.000
30.25	.068	66.25	.015	102.25	.003	138.25	.001	174.25	.000
30.50	.068	66.50	.015	102.50	.003	138.50	.001	174.50	.000
30.75	.067	66.75	.015	102.75	.003	138.75	.001	174.75	.000
31.00	.067	67.00	.014	103.00	.003	139.00	.000	175.00	.000
31.25	.066	67.25	.014	103.25	.003	139.25	.000	175.25	.000
31.50	.065	67.50	.014	103.50	.003	139.50	.000	175.50	.000
31.75	.065	67.75	.014	103.75	.003	139.75	.000	175.75	.000
32.00	.064	68.00	.014	104.00	.003	140.00	.000	176.00	.000
32.25	.063	68.25	.014	104.25	.003	140.25	.000	176.25	.000
32.50	.063	68.50	.014	104.50	.003	140.50	.000	176.50	.000
32.75	.062	68.75	.014	104.75	.003	140.75	.000	176.75	.000
33.00	.062	69.00	.013	105.00	.003	141.00	.000	177.00	.000
33.25	.061	69.25	.013	105.25	.003	141.25	.000	177.25	.000
33.50	.061	69.50	.013	105.50	.003	141.50	.000	177.50	.000
33.75	.060	69.75	.013	105.75	.003	141.75	.000	177.75	.000
34.00	.059	70.00	.013	106.00	.002	142.00	.000	178.00	.000

34.25	.059	70.25	.013	106.25	.002	142.25	.000	178.25	.000
34.50	.058	70.50	.012	106.50	.002	142.50	.000	178.50	.000
34.75	.057	70.75	.012	106.75	.002	142.75	.000	178.75	.000
35.00	.057	71.00	.012	107.00	.002	143.00	.000	179.00	.000
35.25	.057	71.25	.012	107.25	.002	143.25	.000		
35.50	.056	71.50	.012	107.50	.002	143.50	.000		
35.75	.055	71.75	.012	107.75	.002	143.75	.000		

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|    READ STORM    |     Filename: V:\01606\Active\160622264
|                  |               \Analysis\SWM\Hydrology\
|                  |               VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |     Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (0928) |   AREA      (ha)= 150.47
| DT=15.0 min      |   TPEAK    (hrs)=  13.75
--------------------   VOLUME    (mm)=  12.98
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	37.00	.069	74.00	.014	111.00	.003	148.00	.000
.25	.000	37.25	.068	74.25	.014	111.25	.002	148.25	.000
.50	.001	37.50	.067	74.50	.013	111.50	.002	148.50	.000
.75	.002	37.75	.067	74.75	.013	111.75	.002	148.75	.000
1.00	.004	38.00	.066	75.00	.013	112.00	.002	149.00	.000
1.25	.008	38.25	.065	75.25	.013	112.25	.002	149.25	.000
1.50	.014	38.50	.065	75.50	.013	112.50	.002	149.50	.000
1.75	.028	38.75	.064	75.75	.013	112.75	.002	149.75	.000
2.00	.044	39.00	.063	76.00	.012	113.00	.002	150.00	.000
2.25	.057	39.25	.063	76.25	.012	113.25	.002	150.25	.000
2.50	.067	39.50	.062	76.50	.012	113.50	.002	150.50	.000
2.75	.075	39.75	.061	76.75	.012	113.75	.002	150.75	.000
3.00	.081	40.00	.061	77.00	.012	114.00	.002	151.00	.000
3.25	.086	40.25	.060	77.25	.012	114.25	.002	151.25	.000
3.50	.090	40.50	.059	77.50	.012	114.50	.002	151.50	.000
3.75	.094	40.75	.059	77.75	.012	114.75	.002	151.75	.000
4.00	.097	41.00	.058	78.00	.012	115.00	.002	152.00	.000
4.25	.100	41.25	.057	78.25	.011	115.25	.002	152.25	.000
4.50	.102	41.50	.057	78.50	.011	115.50	.002	152.50	.000
4.75	.104	41.75	.056	78.75	.011	115.75	.002	152.75	.000
5.00	.105	42.00	.055	79.00	.011	116.00	.002	153.00	.000
5.25	.106	42.25	.055	79.25	.011	116.25	.002	153.25	.000
5.50	.106	42.50	.055	79.50	.011	116.50	.002	153.50	.000
5.75	.107	42.75	.054	79.75	.010	116.75	.002	153.75	.000
6.00	.108	43.00	.053	80.00	.010	117.00	.002	154.00	.000
6.25	.109	43.25	.053	80.25	.010	117.25	.002	154.25	.000
6.50	.110	43.50	.052	80.50	.010	117.50	.002	154.50	.000
6.75	.111	43.75	.051	80.75	.010	117.75	.002	154.75	.000
7.00	.112	44.00	.051	81.00	.010	118.00	.002	155.00	.000
7.25	.113	44.25	.051	81.25	.010	118.25	.002	155.25	.000
7.50	.115	44.50	.050	81.50	.010	118.50	.002	155.50	.000
7.75	.116	44.75	.049	81.75	.010	118.75	.002	155.75	.000
8.00	.118	45.00	.049	82.00	.010	119.00	.002	156.00	.000
8.25	.120	45.25	.048	82.25	.010	119.25	.002	156.25	.000
8.50	.121	45.50	.048	82.50	.009	119.50	.002	156.50	.000
8.75	.123	45.75	.047	82.75	.009	119.75	.002	156.75	.000
9.00	.125	46.00	.047	83.00	.009	120.00	.002	157.00	.000

9.25	.126	46.25	.046	83.25	.009	120.25	.002	157.25	.000
9.50	.128	46.50	.046	83.50	.009	120.50	.002	157.50	.000
9.75	.129	46.75	.045	83.75	.009	120.75	.002	157.75	.000
10.00	.131	47.00	.045	84.00	.009	121.00	.002	158.00	.000
10.25	.132	47.25	.044	84.25	.009	121.25	.002	158.25	.000
10.50	.133	47.50	.044	84.50	.008	121.50	.002	158.50	.000
10.75	.134	47.75	.043	84.75	.008	121.75	.002	158.75	.000
11.00	.135	48.00	.043	85.00	.008	122.00	.002	159.00	.000
11.25	.136	48.25	.042	85.25	.008	122.25	.002	159.25	.000
11.50	.137	48.50	.042	85.50	.008	122.50	.002	159.50	.000
11.75	.137	48.75	.041	85.75	.008	122.75	.002	159.75	.000
12.00	.138	49.00	.041	86.00	.008	123.00	.002	160.00	.000
12.25	.138	49.25	.041	86.25	.008	123.25	.002	160.25	.000
12.50	.139	49.50	.040	86.50	.008	123.50	.002	160.50	.000
12.75	.139	49.75	.040	86.75	.008	123.75	.002	160.75	.000
13.00	.139	50.00	.039	87.00	.008	124.00	.002	161.00	.000
13.25	.139	50.25	.039	87.25	.008	124.25	.002	161.25	.000
13.50	.139	50.50	.038	87.50	.008	124.50	.002	161.50	.000
13.75	.140	50.75	.038	87.75	.007	124.75	.002	161.75	.000
14.00	.140	51.00	.037	88.00	.007	125.00	.002	162.00	.000
14.25	.139	51.25	.037	88.25	.007	125.25	.001	162.25	.000
14.50	.139	51.50	.037	88.50	.007	125.50	.001	162.50	.000
14.75	.139	51.75	.036	88.75	.007	125.75	.001	162.75	.000
15.00	.139	52.00	.036	89.00	.007	126.00	.001	163.00	.000
15.25	.139	52.25	.035	89.25	.007	126.25	.001	163.25	.000
15.50	.139	52.50	.035	89.50	.007	126.50	.001	163.50	.000
15.75	.138	52.75	.035	89.75	.007	126.75	.001	163.75	.000
16.00	.138	53.00	.034	90.00	.007	127.00	.001	164.00	.000
16.25	.137	53.25	.034	90.25	.007	127.25	.001	164.25	.000
16.50	.137	53.50	.033	90.50	.006	127.50	.001	164.50	.000
16.75	.136	53.75	.033	90.75	.006	127.75	.001	164.75	.000
17.00	.136	54.00	.033	91.00	.006	128.00	.001	165.00	.000
17.25	.136	54.25	.033	91.25	.006	128.25	.001	165.25	.000
17.50	.135	54.50	.032	91.50	.006	128.50	.001	165.50	.000
17.75	.134	54.75	.032	91.75	.006	128.75	.001	165.75	.000
18.00	.134	55.00	.031	92.00	.006	129.00	.001	166.00	.000
18.25	.133	55.25	.031	92.25	.006	129.25	.001	166.25	.000
18.50	.132	55.50	.031	92.50	.006	129.50	.001	166.50	.000
18.75	.132	55.75	.030	92.75	.006	129.75	.001	166.75	.000
19.00	.131	56.00	.030	93.00	.006	130.00	.001	167.00	.000
19.25	.130	56.25	.030	93.25	.006	130.25	.001	167.25	.000
19.50	.129	56.50	.029	93.50	.006	130.50	.001	167.50	.000
19.75	.128	56.75	.029	93.75	.006	130.75	.001	167.75	.000
20.00	.128	57.00	.029	94.00	.006	131.00	.001	168.00	.000
20.25	.127	57.25	.029	94.25	.006	131.25	.001	168.25	.000
20.50	.126	57.50	.028	94.50	.006	131.50	.001	168.50	.000
20.75	.125	57.75	.028	94.75	.006	131.75	.001	168.75	.000
21.00	.124	58.00	.027	95.00	.005	132.00	.001	169.00	.000
21.25	.123	58.25	.027	95.25	.005	132.25	.001	169.25	.000
21.50	.122	58.50	.027	95.50	.005	132.50	.001	169.50	.000
21.75	.122	58.75	.027	95.75	.005	132.75	.001	169.75	.000
22.00	.121	59.00	.026	96.00	.005	133.00	.001	170.00	.000
22.25	.120	59.25	.026	96.25	.005	133.25	.001	170.25	.000
22.50	.119	59.50	.026	96.50	.005	133.50	.001	170.50	.000
22.75	.118	59.75	.026	96.75	.005	133.75	.001	170.75	.000
23.00	.117	60.00	.025	97.00	.005	134.00	.001	171.00	.000
23.25	.116	60.25	.025	97.25	.005	134.25	.001	171.25	.000
23.50	.115	60.50	.025	97.50	.005	134.50	.001	171.50	.000
23.75	.114	60.75	.024	97.75	.005	134.75	.001	171.75	.000
24.00	.113	61.00	.024	98.00	.005	135.00	.001	172.00	.000
24.25	.112	61.25	.024	98.25	.005	135.25	.001	172.25	.000
24.50	.112	61.50	.024	98.50	.004	135.50	.001	172.50	.000
24.75	.110	61.75	.024	98.75	.004	135.75	.001	172.75	.000
25.00	.110	62.00	.023	99.00	.004	136.00	.001	173.00	.000
25.25	.109	62.25	.023	99.25	.004	136.25	.001	173.25	.000
25.50	.108	62.50	.023	99.50	.004	136.50	.001	173.50	.000
25.75	.107	62.75	.022	99.75	.004	136.75	.001	173.75	.000
26.00	.106	63.00	.022	100.00	.004	137.00	.001	174.00	.000
26.25	.105	63.25	.022	100.25	.004	137.25	.001	174.25	.000
26.50	.104	63.50	.022	100.50	.004	137.50	.001	174.50	.000
26.75	.103	63.75	.022	100.75	.004	137.75	.001	174.75	.000
27.00	.102	64.00	.021	101.00	.004	138.00	.001	175.00	.000
27.25	.101	64.25	.021	101.25	.004	138.25	.001	175.25	.000
27.50	.100	64.50	.021	101.50	.004	138.50	.001	175.50	.000
27.75	.099	64.75	.020	101.75	.004	138.75	.001	175.75	.000
28.00	.098	65.00	.020	102.00	.004	139.00	.001	176.00	.000
28.25	.098	65.25	.020	102.25	.004	139.25	.001	176.25	.000
28.50	.096	65.50	.020	102.50	.004	139.50	.001	176.50	.000
28.75	.096	65.75	.020	102.75	.004	139.75	.001	176.75	.000
29.00	.095	66.00	.020	103.00	.004	140.00	.001	177.00	.000

29.25	.094	66.25	.019	103.25	.004	140.25	.001	177.25	.000
29.50	.093	66.50	.019	103.50	.004	140.50	.001	177.50	.000
29.75	.092	66.75	.019	103.75	.004	140.75	.001	177.75	.000
30.00	.091	67.00	.018	104.00	.004	141.00	.001	178.00	.000
30.25	.090	67.25	.018	104.25	.004	141.25	.001	178.25	.000
30.50	.090	67.50	.018	104.50	.004	141.50	.001	178.50	.000
30.75	.088	67.75	.018	104.75	.004	141.75	.001	178.75	.000
31.00	.088	68.00	.018	105.00	.004	142.00	.001	179.00	.000
31.25	.087	68.25	.018	105.25	.003	142.25	.001	179.25	.000
31.50	.086	68.50	.017	105.50	.003	142.50	.001	179.50	.000
31.75	.085	68.75	.017	105.75	.003	142.75	.001	179.75	.000
32.00	.084	69.00	.017	106.00	.003	143.00	.001	180.00	.000
32.25	.084	69.25	.017	106.25	.003	143.25	.001	180.25	.000
32.50	.082	69.50	.017	106.50	.003	143.50	.001	180.50	.000
32.75	.082	69.75	.016	106.75	.003	143.75	.001	180.75	.000
33.00	.081	70.00	.016	107.00	.003	144.00	.001	181.00	.000
33.25	.080	70.25	.016	107.25	.003	144.25	.000	181.25	.000
33.50	.079	70.50	.016	107.50	.003	144.50	.000	181.50	.000
33.75	.079	70.75	.016	107.75	.003	144.75	.000	181.75	.000
34.00	.078	71.00	.016	108.00	.003	145.00	.000	182.00	.000
34.25	.077	71.25	.015	108.25	.003	145.25	.000	182.25	.000
34.50	.076	71.50	.015	108.50	.003	145.50	.000	182.50	.000
34.75	.075	71.75	.015	108.75	.003	145.75	.000	182.75	.000
35.00	.075	72.00	.015	109.00	.003	146.00	.000	183.00	.000
35.25	.074	72.25	.015	109.25	.003	146.25	.000	183.25	.000
35.50	.073	72.50	.014	109.50	.003	146.50	.000	183.50	.000
35.75	.073	72.75	.014	109.75	.003	146.75	.000	183.75	.000
36.00	.072	73.00	.014	110.00	.003	147.00	.000	184.00	.000
36.25	.071	73.25	.014	110.25	.003	147.25	.000	184.25	.000
36.50	.070	73.50	.014	110.50	.003	147.50	.000	184.50	.000
36.75	.069	73.75	.014	110.75	.003	147.75	.000		

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| READ STORM        |   Filename: V:\01606\Active\160622264
|                   |             \Analysis\SWM\Hydrology\
|                   |             VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm  |   Comments: 100yr/12hr
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (0929) |   AREA       (ha)= 150.47
| DT=15.0 min      |   TPEAK     (hrs)=  10.25
-------------------    VOLUME     (mm)=  16.43
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	37.75	.077	75.50	.015	113.25	.003	151.00	.000
.25	.000	38.00	.076	75.75	.014	113.50	.003	151.25	.000
.50	.001	38.25	.075	76.00	.014	113.75	.003	151.50	.000
.75	.003	38.50	.075	76.25	.014	114.00	.003	151.75	.000
1.00	.005	38.75	.074	76.50	.014	114.25	.003	152.00	.000
1.25	.009	39.00	.073	76.75	.014	114.50	.002	152.25	.000
1.50	.018	39.25	.072	77.00	.014	114.75	.002	152.50	.000
1.75	.034	39.50	.071	77.25	.014	115.00	.002	152.75	.000
2.00	.053	39.75	.071	77.50	.013	115.25	.002	153.00	.000
2.25	.069	40.00	.070	77.75	.013	115.50	.002	153.25	.000
2.50	.081	40.25	.069	78.00	.013	115.75	.002	153.50	.000
2.75	.090	40.50	.069	78.25	.013	116.00	.002	153.75	.000
3.00	.097	40.75	.068	78.50	.013	116.25	.002	154.00	.000
3.25	.103	41.00	.067	78.75	.013	116.50	.002	154.25	.000
3.50	.108	41.25	.066	79.00	.012	116.75	.002	154.50	.000
3.75	.113	41.50	.065	79.25	.012	117.00	.002	154.75	.000
4.00	.117	41.75	.065	79.50	.012	117.25	.002	155.00	.000
4.25	.120	42.00	.064	79.75	.012	117.50	.002	155.25	.000
4.50	.123	42.25	.063	80.00	.012	117.75	.002	155.50	.000
4.75	.126	42.50	.063	80.25	.012	118.00	.002	155.75	.000
5.00	.128	42.75	.062	80.50	.012	118.25	.002	156.00	.000
5.25	.129	43.00	.061	80.75	.012	118.50	.002	156.25	.000
5.50	.131	43.25	.061	81.00	.012	118.75	.002	156.50	.000
5.75	.133	43.50	.060	81.25	.011	119.00	.002	156.75	.000
6.00	.135	43.75	.059	81.50	.011	119.25	.002	157.00	.000
6.25	.137	44.00	.059	81.75	.011	119.50	.002	157.25	.000
6.50	.139	44.25	.058	82.00	.011	119.75	.002	157.50	.000
6.75	.141	44.50	.057	82.25	.011	120.00	.002	157.75	.000
7.00	.144	44.75	.057	82.50	.011	120.25	.002	158.00	.000
7.25	.147	45.00	.056	82.75	.010	120.50	.002	158.25	.000
7.50	.149	45.25	.056	83.00	.010	120.75	.002	158.50	.000
7.75	.152	45.50	.055	83.25	.010	121.00	.002	158.75	.000
8.00	.155	45.75	.055	83.50	.010	121.25	.002	159.00	.000
8.25	.158	46.00	.054	83.75	.010	121.50	.002	159.25	.000
8.50	.161	46.25	.053	84.00	.010	121.75	.002	159.50	.000
8.75	.163	46.50	.053	84.25	.010	122.00	.002	159.75	.000
9.00	.165	46.75	.052	84.50	.010	122.25	.002	160.00	.000
9.25	.182	47.00	.051	84.75	.010	122.50	.002	160.25	.000
9.50	.247	47.25	.051	85.00	.010	122.75	.002	160.50	.000
9.75	.283	47.50	.050	85.25	.010	123.00	.002	160.75	.000
10.00	.302	47.75	.050	85.50	.009	123.25	.002	161.00	.000
10.25	.308	48.00	.049	85.75	.009	123.50	.002	161.25	.000
10.50	.308	48.25	.049	86.00	.009	123.75	.002	161.50	.000
10.75	.302	48.50	.048	86.25	.009	124.00	.002	161.75	.000
11.00	.295	48.75	.048	86.50	.009	124.25	.002	162.00	.000
11.25	.285	49.00	.047	86.75	.009	124.50	.002	162.25	.000
11.50	.275	49.25	.047	87.00	.009	124.75	.002	162.50	.000
11.75	.265	49.50	.046	87.25	.009	125.00	.002	162.75	.000
12.00	.255	49.75	.046	87.50	.008	125.25	.002	163.00	.000
12.25	.244	50.00	.045	87.75	.008	125.50	.002	163.25	.000
12.50	.234	50.25	.045	88.00	.008	125.75	.002	163.50	.000
12.75	.225	50.50	.044	88.25	.008	126.00	.002	163.75	.000
13.00	.215	50.75	.044	88.50	.008	126.25	.002	164.00	.000
13.25	.206	51.00	.043	88.75	.008	126.50	.002	164.25	.000
13.50	.198	51.25	.043	89.00	.008	126.75	.002	164.50	.000
13.75	.189	51.50	.042	89.25	.008	127.00	.002	164.75	.000
14.00	.181	51.75	.042	89.50	.008	127.25	.002	165.00	.000
14.25	.174	52.00	.041	89.75	.008	127.50	.002	165.25	.000
14.50	.167	52.25	.041	90.00	.008	127.75	.002	165.50	.000
14.75	.167	52.50	.040	90.25	.008	128.00	.002	165.75	.000
15.00	.167	52.75	.040	90.50	.008	128.25	.001	166.00	.000
15.25	.167	53.00	.039	90.75	.008	128.50	.001	166.25	.000
15.50	.166	53.25	.039	91.00	.007	128.75	.001	166.50	.000
15.75	.166	53.50	.039	91.25	.007	129.00	.001	166.75	.000
16.00	.165	53.75	.038	91.50	.007	129.25	.001	167.00	.000
16.25	.165	54.00	.038	91.75	.007	129.50	.001	167.25	.000
16.50	.164	54.25	.037	92.00	.007	129.75	.001	167.50	.000
16.75	.163	54.50	.037	92.25	.007	130.00	.001	167.75	.000
17.00	.163	54.75	.037	92.50	.007	130.25	.001	168.00	.000
17.25	.162	55.00	.036	92.75	.007	130.50	.001	168.25	.000
17.50	.161	55.25	.036	93.00	.007	130.75	.001	168.50	.000
17.75	.160	55.50	.035	93.25	.007	131.00	.001	168.75	.000
18.00	.159	55.75	.035	93.50	.006	131.25	.001	169.00	.000
18.25	.159	56.00	.035	93.75	.006	131.50	.001	169.25	.000
18.50	.157	56.25	.034	94.00	.006	131.75	.001	169.50	.000
18.75	.157	56.50	.034	94.25	.006	132.00	.001	169.75	.000
19.00	.156	56.75	.033	94.50	.006	132.25	.001	170.00	.000
19.25	.155	57.00	.033	94.75	.006	132.50	.001	170.25	.000
19.50	.154	57.25	.033	95.00	.006	132.75	.001	170.50	.000
19.75	.153	57.50	.032	95.25	.006	133.00	.001	170.75	.000
20.00	.152	57.75	.032	95.50	.006	133.25	.001	171.00	.000
20.25	.151	58.00	.031	95.75	.006	133.50	.001	171.25	.000
20.50	.149	58.25	.031	96.00	.006	133.75	.001	171.50	.000
20.75	.149	58.50	.031	96.25	.006	134.00	.001	171.75	.000
21.00	.147	58.75	.031	96.50	.006	134.25	.001	172.00	.000
21.25	.146	59.00	.030	96.75	.006	134.50	.001	172.25	.000
21.50	.145	59.25	.030	97.00	.006	134.75	.001	172.50	.000
21.75	.144	59.50	.029	97.25	.006	135.00	.001	172.75	.000
22.00	.143	59.75	.029	97.50	.006	135.25	.001	173.00	.000
22.25	.142	60.00	.029	97.75	.006	135.50	.001	173.25	.000
22.50	.141	60.25	.029	98.00	.005	135.75	.001	173.50	.000
22.75	.139	60.50	.028	98.25	.005	136.00	.001	173.75	.000
23.00	.138	60.75	.028	98.50	.005	136.25	.001	174.00	.000

23.25	.137	61.00	.028	98.75	.005	136.50	.001	174.25	.000
23.50	.136	61.25	.027	99.00	.005	136.75	.001	174.50	.000
23.75	.135	61.50	.027	99.25	.005	137.00	.001	174.75	.000
24.00	.134	61.75	.027	99.50	.005	137.25	.001	175.00	.000
24.25	.133	62.00	.027	99.75	.005	137.50	.001	175.25	.000
24.50	.132	62.25	.026	100.00	.005	137.75	.001	175.50	.000
24.75	.130	62.50	.026	100.25	.005	138.00	.001	175.75	.000
25.00	.129	62.75	.026	100.50	.005	138.25	.001	176.00	.000
25.25	.128	63.00	.026	100.75	.005	138.50	.001	176.25	.000
25.50	.127	63.25	.025	101.00	.005	138.75	.001	176.50	.000
25.75	.126	63.50	.025	101.25	.005	139.00	.001	176.75	.000
26.00	.124	63.75	.025	101.50	.004	139.25	.001	177.00	.000
26.25	.123	64.00	.024	101.75	.004	139.50	.001	177.25	.000
26.50	.122	64.25	.024	102.00	.004	139.75	.001	177.50	.000
26.75	.121	64.50	.024	102.25	.004	140.00	.001	177.75	.000
27.00	.120	64.75	.024	102.50	.004	140.25	.001	178.00	.000
27.25	.119	65.00	.023	102.75	.004	140.50	.001	178.25	.000
27.50	.118	65.25	.023	103.00	.004	140.75	.001	178.50	.000
27.75	.116	65.50	.023	103.25	.004	141.00	.001	178.75	.000
28.00	.115	65.75	.022	103.50	.004	141.25	.001	179.00	.000
28.25	.114	66.00	.022	103.75	.004	141.50	.001	179.25	.000
28.50	.113	66.25	.022	104.00	.004	141.75	.001	179.50	.000
28.75	.112	66.50	.022	104.25	.004	142.00	.001	179.75	.000
29.00	.111	66.75	.022	104.50	.004	142.25	.001	180.00	.000
29.25	.110	67.00	.021	104.75	.004	142.50	.001	180.25	.000
29.50	.109	67.25	.021	105.00	.004	142.75	.001	180.50	.000
29.75	.108	67.50	.021	105.25	.004	143.00	.001	180.75	.000
30.00	.106	67.75	.021	105.50	.004	143.25	.001	181.00	.000
30.25	.106	68.00	.020	105.75	.004	143.50	.001	181.25	.000
30.50	.104	68.25	.020	106.00	.004	143.75	.001	181.50	.000
30.75	.103	68.50	.020	106.25	.004	144.00	.001	181.75	.000
31.00	.102	68.75	.020	106.50	.004	144.25	.001	182.00	.000
31.25	.101	69.00	.020	106.75	.004	144.50	.001	182.25	.000
31.50	.100	69.25	.019	107.00	.004	144.75	.001	182.50	.000
31.75	.099	69.50	.019	107.25	.004	145.00	.001	182.75	.000
32.00	.098	69.75	.019	107.50	.004	145.25	.001	183.00	.000
32.25	.097	70.00	.019	107.75	.004	145.50	.001	183.25	.000
32.50	.096	70.25	.018	108.00	.004	145.75	.001	183.50	.000
32.75	.095	70.50	.018	108.25	.004	146.00	.001	183.75	.000
33.00	.094	70.75	.018	108.50	.003	146.25	.001	184.00	.000
33.25	.093	71.00	.018	108.75	.003	146.50	.001	184.25	.000
33.50	.092	71.25	.018	109.00	.003	146.75	.001	184.50	.000
33.75	.091	71.50	.018	109.25	.003	147.00	.001	184.75	.000
34.00	.090	71.75	.017	109.50	.003	147.25	.001	185.00	.000
34.25	.089	72.00	.017	109.75	.003	147.50	.000	185.25	.000
34.50	.088	72.25	.017	110.00	.003	147.75	.000	185.50	.000
34.75	.088	72.50	.017	110.25	.003	148.00	.000	185.75	.000
35.00	.086	72.75	.016	110.50	.003	148.25	.000	186.00	.000
35.25	.086	73.00	.016	110.75	.003	148.50	.000	186.25	.000
35.50	.085	73.25	.016	111.00	.003	148.75	.000	186.50	.000
35.75	.084	73.50	.016	111.25	.003	149.00	.000	186.75	.000
36.00	.083	73.75	.016	111.50	.003	149.25	.000	187.00	.000
36.25	.082	74.00	.016	111.75	.003	149.50	.000	187.25	.000
36.50	.081	74.25	.016	112.00	.003	149.75	.000	187.50	.000
36.75	.081	74.50	.015	112.25	.003	150.00	.000		
37.00	.080	74.75	.015	112.50	.003	150.25	.000		
37.25	.079	75.00	.015	112.75	.003	150.50	.000		
37.50	.078	75.25	.015	113.00	.003	150.75	.000		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (0200)
DT=15.0 min

AREA (ha)= 165.44
TPEAK (hrs)= 1.75
VOLUME (mm)= 11.03

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	12.00	.095	24.00	.016	36.00	.003	48.00	.001
.25	.044	12.25	.092	24.25	.015	36.25	.003	48.25	.000
.50	.148	12.50	.088	24.50	.014	36.50	.003	48.50	.000
.75	.249	12.75	.085	24.75	.014	36.75	.003	48.75	.000
1.00	.350	13.00	.082	25.00	.013	37.00	.003	49.00	.000
1.25	.526	13.25	.079	25.25	.013	37.25	.003	49.25	.000
1.50	1.498	13.50	.076	25.50	.013	37.50	.002	49.50	.000
1.75	2.482	13.75	.073	25.75	.012	37.75	.002	49.75	.000
2.00	2.017	14.00	.071	26.00	.012	38.00	.002	50.00	.000
2.25	1.533	14.25	.068	26.25	.011	38.25	.002	50.25	.000
2.50	1.165	14.50	.066	26.50	.011	38.50	.002	50.50	.000
2.75	.910	14.75	.063	26.75	.010	38.75	.002	50.75	.000
3.00	.734	15.00	.061	27.00	.010	39.00	.002	51.00	.000
3.25	.614	15.25	.059	27.25	.010	39.25	.002	51.25	.000
3.50	.529	15.50	.056	27.50	.009	39.50	.002	51.50	.000
3.75	.471	15.75	.055	27.75	.009	39.75	.002	51.75	.000
4.00	.428	16.00	.052	28.00	.008	40.00	.002	52.00	.000
4.25	.346	16.25	.051	28.25	.008	40.25	.002	52.25	.000
4.50	.225	16.50	.049	28.50	.008	40.50	.002	52.50	.000
4.75	.157	16.75	.047	28.75	.008	40.75	.002	52.75	.000
5.00	.121	17.00	.045	29.00	.008	41.00	.001	53.00	.000
5.25	.103	17.25	.044	29.25	.008	41.25	.001	53.25	.000
5.50	.095	17.50	.042	29.50	.007	41.50	.001	53.50	.000
5.75	.093	17.75	.040	29.75	.007	41.75	.001	53.75	.000
6.00	.093	18.00	.039	30.00	.007	42.00	.001	54.00	.000
6.25	.097	18.25	.037	30.25	.006	42.25	.001	54.25	.000
6.50	.101	18.50	.036	30.50	.006	42.50	.001	54.50	.000
6.75	.106	18.75	.035	30.75	.006	42.75	.001	54.75	.000
7.00	.111	19.00	.034	31.00	.006	43.00	.001	55.00	.000
7.25	.116	19.25	.032	31.25	.005	43.25	.001	55.25	.000
7.50	.122	19.50	.031	31.50	.005	43.50	.001	55.50	.000
7.75	.127	19.75	.029	31.75	.005	43.75	.001	55.75	.000
8.00	.133	20.00	.029	32.00	.005	44.00	.001	56.00	.000
8.25	.136	20.25	.028	32.25	.004	44.25	.001	56.25	.000
8.50	.137	20.50	.027	32.50	.004	44.50	.001	56.50	.000
8.75	.137	20.75	.025	32.75	.004	44.75	.001	56.75	.000
9.00	.136	21.00	.024	33.00	.004	45.00	.001	57.00	.000
9.25	.135	21.25	.024	33.25	.004	45.25	.001	57.25	.000
9.50	.133	21.50	.023	33.50	.004	45.50	.001	57.50	.000
9.75	.130	21.75	.022	33.75	.003	45.75	.001	57.75	.000
10.00	.127	22.00	.021	34.00	.003	46.00	.001	58.00	.000
10.25	.124	22.25	.020	34.25	.003	46.25	.001	58.25	.000
10.50	.120	22.50	.019	34.50	.003	46.50	.001	58.50	.000
10.75	.115	22.75	.019	34.75	.003	46.75	.001	58.75	.000
11.00	.111	23.00	.019	35.00	.003	47.00	.001	59.00	.000
11.25	.107	23.25	.018	35.25	.003	47.25	.001		
11.50	.103	23.50	.017	35.50	.003	47.50	.001		
11.75	.099	23.75	.016	35.75	.003	47.75	.001		

READ STORM

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89

2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (0733) |   AREA       (ha)=2846.70
| DT=15.0 min      |   TPEAK     (hrs)=   6.75
--------------------   VOLUME     (mm)=   6.37
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
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TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	40.75	.119	81.50	.015	122.25	.004	163.00	.001
.25	.000	41.00	.116	81.75	.015	122.50	.003	163.25	.001
.50	.000	41.25	.114	82.00	.014	122.75	.003	163.50	.001
.75	.001	41.50	.111	82.25	.014	123.00	.003	163.75	.001
1.00	.003	41.75	.109	82.50	.014	123.25	.003	164.00	.001
1.25	.006	42.00	.107	82.75	.014	123.50	.003	164.25	.001
1.50	.018	42.25	.105	83.00	.014	123.75	.003	164.50	.001
1.75	.054	42.50	.103	83.25	.014	124.00	.003	164.75	.001
2.00	.129	42.75	.101	83.50	.014	124.25	.003	165.00	.001
2.25	.252	43.00	.099	83.75	.014	124.50	.003	165.25	.001
2.50	.420	43.25	.097	84.00	.013	124.75	.003	165.50	.001
2.75	.620	43.50	.095	84.25	.013	125.00	.003	165.75	.001
3.00	.841	43.75	.093	84.50	.013	125.25	.003	166.00	.001
3.25	1.131	44.00	.091	84.75	.013	125.50	.003	166.25	.001
3.50	1.474	44.25	.090	85.00	.013	125.75	.003	166.50	.001
3.75	1.829	44.50	.088	85.25	.013	126.00	.003	166.75	.001
4.00	2.193	44.75	.087	85.50	.013	126.25	.003	167.00	.001
4.25	2.499	45.00	.085	85.75	.013	126.50	.003	167.25	.001
4.50	2.736	45.25	.083	86.00	.012	126.75	.003	167.50	.001
4.75	2.953	45.50	.082	86.25	.012	127.00	.003	167.75	.001
5.00	3.157	45.75	.081	86.50	.012	127.25	.003	168.00	.001
5.25	3.333	46.00	.079	86.75	.012	127.50	.003	168.25	.001
5.50	3.475	46.25	.078	87.00	.012	127.75	.003	168.50	.001
5.75	3.582	46.50	.076	87.25	.012	128.00	.003	168.75	.001
6.00	3.655	46.75	.075	87.50	.012	128.25	.003	169.00	.001
6.25	3.701	47.00	.074	87.75	.012	128.50	.003	169.25	.001
6.50	3.722	47.25	.073	88.00	.012	128.75	.003	169.50	.001
6.75	3.723	47.50	.071	88.25	.011	129.00	.003	169.75	.001
7.00	3.704	47.75	.070	88.50	.011	129.25	.003	170.00	.001
7.25	3.679	48.00	.069	88.75	.011	129.50	.003	170.25	.001
7.50	3.639	48.25	.068	89.00	.011	129.75	.003	170.50	.001
7.75	3.581	48.50	.067	89.25	.011	130.00	.003	170.75	.001
8.00	3.517	48.75	.066	89.50	.011	130.25	.003	171.00	.001
8.25	3.448	49.00	.065	89.75	.011	130.50	.003	171.25	.001
8.50	3.377	49.25	.064	90.00	.011	130.75	.003	171.50	.001
8.75	3.304	49.50	.063	90.25	.011	131.00	.003	171.75	.001
9.00	3.230	49.75	.062	90.50	.011	131.25	.003	172.00	.001
9.25	3.155	50.00	.061	90.75	.010	131.50	.003	172.25	.001
9.50	3.079	50.25	.060	91.00	.010	131.75	.003	172.50	.001
9.75	3.005	50.50	.059	91.25	.010	132.00	.003	172.75	.001
10.00	2.932	50.75	.058	91.50	.010	132.25	.003	173.00	.001
10.25	2.861	51.00	.057	91.75	.010	132.50	.003	173.25	.001
10.50	2.792	51.25	.057	92.00	.010	132.75	.002	173.50	.001
10.75	2.723	51.50	.056	92.25	.010	133.00	.002	173.75	.001
11.00	2.656	51.75	.055	92.50	.010	133.25	.002	174.00	.001
11.25	2.591	52.00	.054	92.75	.010	133.50	.002	174.25	.001
11.50	2.526	52.25	.053	93.00	.010	133.75	.002	174.50	.001
11.75	2.463	52.50	.052	93.25	.010	134.00	.002	174.75	.001
12.00	2.401	52.75	.052	93.50	.009	134.25	.002	175.00	.001
12.25	2.336	53.00	.051	93.75	.009	134.50	.002	175.25	.001
12.50	2.264	53.25	.050	94.00	.009	134.75	.002	175.50	.001
12.75	2.193	53.50	.049	94.25	.009	135.00	.002	175.75	.001
13.00	2.127	53.75	.049	94.50	.009	135.25	.002	176.00	.001
13.25	2.064	54.00	.048	94.75	.009	135.50	.002	176.25	.001
13.50	2.005	54.25	.047	95.00	.009	135.75	.002	176.50	.001
13.75	1.942	54.50	.047	95.25	.009	136.00	.002	176.75	.001
14.00	1.877	54.75	.046	95.50	.009	136.25	.002	177.00	.001
14.25	1.817	55.00	.046	95.75	.009	136.50	.002	177.25	.001
14.50	1.761	55.25	.045	96.00	.009	136.75	.002	177.50	.001
14.75	1.709	55.50	.044	96.25	.009	137.00	.002	177.75	.001
15.00	1.661	55.75	.044	96.50	.009	137.25	.002	178.00	.001
15.25	1.616	56.00	.043	96.75	.008	137.50	.002	178.25	.001
15.50	1.572	56.25	.043	97.00	.008	137.75	.002	178.50	.001
15.75	1.531	56.50	.042	97.25	.008	138.00	.002	178.75	.001
16.00	1.492	56.75	.042	97.50	.008	138.25	.002	179.00	.001
16.25	1.454	57.00	.041	97.75	.008	138.50	.002	179.25	.001
16.50	1.417	57.25	.041	98.00	.008	138.75	.002	179.50	.001
16.75	1.381	57.50	.040	98.25	.008	139.00	.002	179.75	.001
17.00	1.347	57.75	.040	98.50	.008	139.25	.002	180.00	.001
17.25	1.313	58.00	.039	98.75	.008	139.50	.002	180.25	.001
17.50	1.280	58.25	.039	99.00	.008	139.75	.002	180.50	.001
17.75	1.249	58.50	.038	99.25	.008	140.00	.002	180.75	.001
18.00	1.218	58.75	.038	99.50	.008	140.25	.002	181.00	.001
18.25	1.188	59.00	.037	99.75	.008	140.50	.002	181.25	.001
18.50	1.158	59.25	.037	100.00	.008	140.75	.002	181.50	.001
18.75	1.130	59.50	.037	100.25	.008	141.00	.002	181.75	.001
19.00	1.102	59.75	.036	100.50	.007	141.25	.002	182.00	.001
19.25	1.075	60.00	.036	100.75	.007	141.50	.002	182.25	.001
19.50	1.048	60.25	.035	101.00	.007	141.75	.002	182.50	.001
19.75	1.022	60.50	.035	101.25	.007	142.00	.002	182.75	.001
20.00	.996	60.75	.034	101.50	.007	142.25	.002	183.00	.001
20.25	.971	61.00	.034	101.75	.007	142.50	.002	183.25	.001
20.50	.947	61.25	.034	102.00	.007	142.75	.002	183.50	.001
20.75	.923	61.50	.033	102.25	.007	143.00	.002	183.75	.001
21.00	.900	61.75	.033	102.50	.007	143.25	.002	184.00	.001
21.25	.877	62.00	.033	102.75	.007	143.50	.002	184.25	.001
21.50	.855	62.25	.032	103.00	.007	143.75	.002	184.50	.001
21.75	.833	62.50	.032	103.25	.007	144.00	.002	184.75	.001
22.00	.812	62.75	.032	103.50	.007	144.25	.002	185.00	.001
22.25	.791	63.00	.031	103.75	.007	144.50	.002	185.25	.001
22.50	.771	63.25	.031	104.00	.007	144.75	.002	185.50	.001
22.75	.751	63.50	.031	104.25	.007	145.00	.002	185.75	.001
23.00	.732	63.75	.030	104.50	.006	145.25	.002	186.00	.001
23.25	.714	64.00	.030	104.75	.006	145.50	.002	186.25	.001
23.50	.697	64.25	.030	105.00	.006	145.75	.002	186.50	.001
23.75	.680	64.50	.029	105.25	.006	146.00	.002	186.75	.001
24.00	.663	64.75	.029	105.50	.006	146.25	.002	187.00	.001
24.25	.646	65.00	.029	105.75	.006	146.50	.002	187.25	.001
24.50	.630	65.25	.028	106.00	.006	146.75	.002	187.50	.001
24.75	.613	65.50	.028	106.25	.006	147.00	.002	187.75	.000
25.00	.598	65.75	.028	106.50	.006	147.25	.002	188.00	.000
25.25	.582	66.00	.027	106.75	.006	147.50	.002	188.25	.000
25.50	.567	66.25	.027	107.00	.006	147.75	.002	188.50	.000
25.75	.553	66.50	.027	107.25	.006	148.00	.002	188.75	.000
26.00	.539	66.75	.027	107.50	.006	148.25	.002	189.00	.000
26.25	.525	67.00	.026	107.75	.006	148.50	.002	189.25	.000
26.50	.512	67.25	.026	108.00	.006	148.75	.002	189.50	.000
26.75	.499	67.50	.026	108.25	.006	149.00	.002	189.75	.000
27.00	.486	67.75	.025	108.50	.006	149.25	.002	190.00	.000
27.25	.473	68.00	.025	108.75	.006	149.50	.002	190.25	.000
27.50	.461	68.25	.025	109.00	.006	149.75	.002	190.50	.000
27.75	.449	68.50	.025	109.25	.006	150.00	.001	190.75	.000
28.00	.437	68.75	.024	109.50	.005	150.25	.001	191.00	.000
28.25	.425	69.00	.024	109.75	.005	150.50	.001	191.25	.000
28.50	.414	69.25	.024	110.00	.005	150.75	.001	191.50	.000
28.75	.402	69.50	.024	110.25	.005	151.00	.001	191.75	.000
29.00	.391	69.75	.023	110.50	.005	151.25	.001	192.00	.000
29.25	.381	70.00	.023	110.75	.005	151.50	.001	192.25	.000
29.50	.370	70.25	.023	111.00	.005	151.75	.001	192.50	.000
29.75	.360	70.50	.023	111.25	.005	152.00	.001	192.75	.000
30.00	.351	70.75	.022	111.50	.005	152.25	.001	193.00	.000
30.25	.341	71.00	.022	111.75	.005	152.50	.001	193.25	.000
30.50	.332	71.25	.022	112.00	.005	152.75	.001	193.50	.000
30.75	.323	71.50	.022	112.25	.005	153.00	.001	193.75	.000
31.00	.314	71.75	.022	112.50	.005	153.25	.001	194.00	.000
31.25	.305	72.00	.021	112.75	.005	153.50	.001	194.25	.000
31.50	.297	72.25	.021	113.00	.005	153.75	.001	194.50	.000
31.75	.289	72.50	.021	113.25	.005	154.00	.001	194.75	.000
32.00	.281	72.75	.021	113.50	.005	154.25	.001	195.00	.000
32.25	.274	73.00	.021	113.75	.005	154.50	.001	195.25	.000
32.50	.266	73.25	.020	114.00	.005	154.75	.001	195.50	.000
32.75	.259	73.50	.020	114.25	.005	155.00	.001	195.75	.000
33.00	.252	73.75	.020	114.50	.005	155.25	.001	196.00	.000
33.25	.246	74.00	.020	114.75	.005	155.50	.001	196.25	.000
33.50	.239	74.25	.020	115.00	.005	155.75	.001	196.50	.000
33.75	.233	74.50	.019	115.25	.005	156.00	.001	196.75	.000
34.00	.227	74.75	.019	115.50	.005	156.25	.001	197.00	.000
34.25	.221	75.00	.019	115.75	.004	156.50	.001	197.25	.000
34.50	.215	75.25	.019	116.00	.004	156.75	.001	197.50	.000
34.75	.210	75.50	.019	116.25	.004	157.00	.001	197.75	.000
35.00	.204	75.75	.018	116.50	.004	157.25	.001	198.00	.000
35.25	.199	76.00	.018	116.75	.004	157.50	.001	198.25	.000

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  35.50    .194 | 76.25    .018 |117.00    .004 |157.75    .001 |198.50    .000
  35.75    .189 | 76.50    .018 |117.25    .004 |158.00    .001 |198.75    .000
  36.00    .184 | 76.75    .018 |117.50    .004 |158.25    .001 |199.00    .000
  36.25    .180 | 77.00    .018 |117.75    .004 |158.50    .001 |199.25    .000
  36.50    .175 | 77.25    .017 |118.00    .004 |158.75    .001 |199.50    .000
  36.75    .171 | 77.50    .017 |118.25    .004 |159.00    .001 |199.75    .000
  37.00    .167 | 77.75    .017 |118.50    .004 |159.25    .001 |200.00    .000
  37.25    .163 | 78.00    .017 |118.75    .004 |159.50    .001 |200.25    .000
  37.50    .159 | 78.25    .017 |119.00    .004 |159.75    .001 |200.50    .000
  37.75    .155 | 78.50    .017 |119.25    .004 |160.00    .001 |200.75    .000
  38.00    .152 | 78.75    .016 |119.50    .004 |160.25    .001 |201.00    .000
  38.25    .148 | 79.00    .016 |119.75    .004 |160.50    .001 |201.25    .000
  38.50    .145 | 79.25    .016 |120.00    .004 |160.75    .001 |201.50    .000
  38.75    .142 | 79.50    .016 |120.25    .004 |161.00    .001 |201.75    .000
  39.00    .138 | 79.75    .016 |120.50    .004 |161.25    .001 |202.00    .000
  39.25    .135 | 80.00    .016 |120.75    .004 |161.50    .001 |202.25    .000
  39.50    .132 | 80.25    .015 |121.00    .004 |161.75    .001 |
  39.75    .129 | 80.50    .015 |121.25    .004 |162.00    .001 |
  40.00    .127 | 80.75    .015 |121.50    .004 |162.25    .001 |
  40.25    .124 | 81.00    .015 |121.75    .004 |162.50    .001 |
  40.50    .121 | 81.25    .015 |122.00    .004 |162.75    .001 |
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|   READ STORM     |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
--------------------
                 TIME     RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs    mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25      .00 |  3.50   15.05 |  6.75    6.20 | 10.00     .89
                  .50      .89 |  3.75   15.05 |  7.00    6.20 | 10.25     .89
                  .75      .89 |  4.00   15.05 |  7.25    6.20 | 10.50     .89
                 1.00      .89 |  4.25   15.05 |  7.50    3.54 | 10.75     .89
                 1.25      .89 |  4.50   40.71 |  7.75    3.54 | 11.00     .89
                 1.50      .89 |  4.75   40.71 |  8.00    3.54 | 11.25     .89
                 1.75      .89 |  5.00   40.71 |  8.25    3.54 | 11.50     .89
                 2.00      .89 |  5.25   40.71 |  8.50    1.77 | 11.75     .89
                 2.25      .89 |  5.50   11.51 |  8.75    1.77 | 12.00     .89
                 2.50     5.31 |  5.75   11.51 |  9.00    1.77 | 12.25     .89
                 2.75     5.31 |  6.00   11.51 |  9.25    1.77 |
                 3.00     5.31 |  6.25   11.51 |  9.50     .89 |
                 3.25     5.31 |  6.50    6.20 |  9.75     .89 |

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| READ HYD  (1200) |   AREA       (ha)= 165.44
| DT=15.0 min      |   TPEAK     (hrs)=   1.75
--------------------   VOLUME     (mm)=  14.15
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:

  TIME     FLOW |  TIME    FLOW |  TIME    FLOW |  TIME    FLOW |  TIME    FLOW
   hrs      cms |   hrs     cms |   hrs     cms |   hrs     cms |   hrs     cms
   .00     .000 | 11.00    .152 | 22.00    .022 | 33.00    .003 | 44.00    .001
   .25     .057 | 11.25    .145 | 22.25    .021 | 33.25    .003 | 44.25    .001
   .50     .190 | 11.50    .138 | 22.50    .020 | 33.50    .003 | 44.50    .000
   .75     .312 | 11.75    .132 | 22.75    .019 | 33.75    .003 | 44.75    .000
  1.00     .434 | 12.00    .127 | 23.00    .019 | 34.00    .003 | 45.00    .000
  1.25     .650 | 12.25    .121 | 23.25    .018 | 34.25    .003 | 45.25    .000
  1.50    1.864 | 12.50    .116 | 23.50    .017 | 34.50    .003 | 45.50    .000
  1.75    3.091 | 12.75    .111 | 23.75    .016 | 34.75    .003 | 45.75    .000
  2.00    2.456 | 13.00    .106 | 24.00    .015 | 35.00    .003 | 46.00    .000
  2.25    1.833 | 13.25    .102 | 24.25    .014 | 35.25    .002 | 46.25    .000
  2.50    1.378 | 13.50    .098 | 24.50    .014 | 35.50    .002 | 46.50    .000
  2.75    1.074 | 13.75    .093 | 24.75    .013 | 35.75    .002 | 46.75    .000
  3.00     .869 | 14.00    .089 | 25.00    .013 | 36.00    .002 | 47.00    .000
  3.25     .735 | 14.25    .085 | 25.25    .013 | 36.25    .002 | 47.25    .000
  3.50     .644 | 14.50    .082 | 25.50    .012 | 36.50    .002 | 47.50    .000
  3.75     .583 | 14.75    .078 | 25.75    .011 | 36.75    .002 | 47.75    .000
  4.00     .540 | 15.00    .075 | 26.00    .011 | 37.00    .002 | 48.00    .000
  4.25     .447 | 15.25    .072 | 26.25    .010 | 37.25    .002 | 48.25    .000
  4.50     .301 | 15.50    .068 | 26.50    .010 | 37.50    .002 | 48.50    .000
  4.75     .227 | 15.75    .066 | 26.75    .009 | 37.75    .002 | 48.75    .000
  5.00     .192 | 16.00    .062 | 27.00    .009 | 38.00    .002 | 49.00    .000
  5.25     .178 | 16.25    .060 | 27.25    .008 | 38.25    .001 | 49.25    .000
  5.50     .175 | 16.50    .057 | 27.50    .008 | 38.50    .001 | 49.50    .000
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   5.75    .178 | 16.75    .055 | 27.75    .008 | 38.75    .001 | 49.75    .000
   6.00    .186 | 17.00    .052 | 28.00    .008 | 39.00    .001 | 50.00    .000
   6.25    .195 | 17.25    .051 | 28.25    .008 | 39.25    .001 | 50.25    .000
   6.50    .205 | 17.50    .048 | 28.50    .007 | 39.50    .001 | 50.50    .000
   6.75    .215 | 17.75    .046 | 28.75    .007 | 39.75    .001 | 50.75    .000
   7.00    .227 | 18.00    .044 | 29.00    .007 | 40.00    .001 | 51.00    .000
   7.25    .232 | 18.25    .042 | 29.25    .006 | 40.25    .001 | 51.25    .000
   7.50    .234 | 18.50    .040 | 29.50    .006 | 40.50    .001 | 51.50    .000
   7.75    .234 | 18.75    .039 | 29.75    .006 | 40.75    .001 | 51.75    .000
   8.00    .231 | 19.00    .037 | 30.00    .005 | 41.00    .001 | 52.00    .000
   8.25    .228 | 19.25    .035 | 30.25    .005 | 41.25    .001 | 52.25    .000
   8.50    .224 | 19.50    .034 | 30.50    .005 | 41.50    .001 | 52.50    .000
   8.75    .218 | 19.75    .032 | 30.75    .005 | 41.75    .001 | 52.75    .000
   9.00    .212 | 20.00    .031 | 31.00    .004 | 42.00    .001 | 53.00    .000
   9.25    .205 | 20.25    .029 | 31.25    .004 | 42.25    .001 | 53.25    .000
   9.50    .197 | 20.50    .029 | 31.50    .004 | 42.50    .001 | 53.50    .000
   9.75    .189 | 20.75    .027 | 31.75    .004 | 42.75    .001 |
  10.00    .180 | 21.00    .026 | 32.00    .003 | 43.00    .001 |
  10.25    .173 | 21.25    .024 | 32.25    .003 | 43.25    .001 |
  10.50    .165 | 21.50    .024 | 32.50    .003 | 43.50    .001 |
  10.75    .158 | 21.75    .023 | 32.75    .003 | 43.75    .001 |
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|   READ STORM     |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
--------------------
                 TIME     RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                  hrs    mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .25      .00 |  3.50   15.05 |  6.75    6.20 | 10.00     .89
                  .50      .89 |  3.75   15.05 |  7.00    6.20 | 10.25     .89
                  .75      .89 |  4.00   15.05 |  7.25    6.20 | 10.50     .89
                 1.00      .89 |  4.25   15.05 |  7.50    3.54 | 10.75     .89
                 1.25      .89 |  4.50   40.71 |  7.75    3.54 | 11.00     .89
                 1.50      .89 |  4.75   40.71 |  8.00    3.54 | 11.25     .89
                 1.75      .89 |  5.00   40.71 |  8.25    3.54 | 11.50     .89
                 2.00      .89 |  5.25   40.71 |  8.50    1.77 | 11.75     .89
                 2.25      .89 |  5.50   11.51 |  8.75    1.77 | 12.00     .89
                 2.50     5.31 |  5.75   11.51 |  9.00    1.77 | 12.25     .89
                 2.75     5.31 |  6.00   11.51 |  9.25    1.77 |
                 3.00     5.31 |  6.25   11.51 |  9.50     .89 |
                 3.25     5.31 |  6.50    6.20 |  9.75     .89 |

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| READ HYD  (1733) |   AREA       (ha)=2846.70
| DT=15.0 min      |   TPEAK     (hrs)=   6.50
--------------------   VOLUME     (mm)=   8.91
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:

  TIME     FLOW |  TIME    FLOW |  TIME    FLOW |  TIME    FLOW |  TIME    FLOW
   hrs      cms |   hrs     cms |   hrs     cms |   hrs     cms |   hrs     cms
   .00     .000 | 40.75    .129 | 81.50    .015 |122.25    .004 |163.00    .001
   .25     .000 | 41.00    .126 | 81.75    .015 |122.50    .004 |163.25    .001
   .50     .001 | 41.25    .123 | 82.00    .015 |122.75    .003 |163.50    .001
   .75     .002 | 41.50    .120 | 82.25    .014 |123.00    .003 |163.75    .001
  1.00     .004 | 41.75    .118 | 82.50    .014 |123.25    .003 |164.00    .001
  1.25     .008 | 42.00    .115 | 82.75    .014 |123.50    .003 |164.25    .001
  1.50     .025 | 42.25    .113 | 83.00    .014 |123.75    .003 |164.50    .001
  1.75     .080 | 42.50    .110 | 83.25    .014 |124.00    .003 |164.75    .001
  2.00     .198 | 42.75    .108 | 83.50    .014 |124.25    .003 |165.00    .001
  2.25     .401 | 43.00    .106 | 83.75    .014 |124.50    .003 |165.25    .001
  2.50     .779 | 43.25    .103 | 84.00    .013 |124.75    .003 |165.50    .001
  2.75    1.227 | 43.50    .101 | 84.25    .013 |125.00    .003 |165.75    .001
  3.00    1.679 | 43.75    .099 | 84.50    .013 |125.25    .003 |166.00    .001
  3.25    2.240 | 44.00    .097 | 84.75    .013 |125.50    .003 |166.25    .001
  3.50    2.738 | 44.25    .095 | 85.00    .013 |125.75    .003 |166.50    .001
  3.75    3.207 | 44.50    .093 | 85.25    .013 |126.00    .003 |166.75    .001
  4.00    3.693 | 44.75    .092 | 85.50    .013 |126.25    .003 |167.00    .001
  4.25    4.173 | 45.00    .090 | 85.75    .013 |126.50    .003 |167.25    .001
  4.50    4.582 | 45.25    .088 | 86.00    .013 |126.75    .003 |167.50    .001
  4.75    4.917 | 45.50    .087 | 86.25    .012 |127.00    .003 |167.75    .001
  5.00    5.192 | 45.75    .085 | 86.50    .012 |127.25    .003 |168.00    .001
  5.25    5.416 | 46.00    .083 | 86.75    .012 |127.50    .003 |168.25    .001
  5.50    5.590 | 46.25    .082 | 87.00    .012 |127.75    .003 |168.50    .001
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5.75	5.715	46.50	.080	87.25	.012	128.00	.003	168.75	.001
6.00	5.797	46.75	.079	87.50	.012	128.25	.003	169.00	.001
6.25	5.840	47.00	.077	87.75	.012	128.50	.003	169.25	.001
6.50	5.849	47.25	.076	88.00	.012	128.75	.003	169.50	.001
6.75	5.831	47.50	.075	88.25	.012	129.00	.003	169.75	.001
7.00	5.789	47.75	.073	88.50	.011	129.25	.003	170.00	.001
7.25	5.726	48.00	.072	88.75	.011	129.50	.003	170.25	.001
7.50	5.643	48.25	.071	89.00	.011	129.75	.003	170.50	.001
7.75	5.548	48.50	.070	89.25	.011	130.00	.003	170.75	.001
8.00	5.442	48.75	.069	89.50	.011	130.25	.003	171.00	.001
8.25	5.328	49.00	.067	89.75	.011	130.50	.003	171.25	.001
8.50	5.203	49.25	.066	90.00	.011	130.75	.003	171.50	.001
8.75	5.067	49.50	.065	90.25	.011	131.00	.003	171.75	.001
9.00	4.917	49.75	.064	90.50	.011	131.25	.003	172.00	.001
9.25	4.755	50.00	.063	90.75	.011	131.50	.003	172.25	.001
9.50	4.591	50.25	.062	91.00	.010	131.75	.003	172.50	.001
9.75	4.435	50.50	.061	91.25	.010	132.00	.003	172.75	.001
10.00	4.281	50.75	.060	91.50	.010	132.25	.003	173.00	.001
10.25	4.125	51.00	.059	91.75	.010	132.50	.003	173.25	.001
10.50	3.970	51.25	.058	92.00	.010	132.75	.002	173.50	.001
10.75	3.822	51.50	.057	92.25	.010	133.00	.002	173.75	.001
11.00	3.681	51.75	.057	92.50	.010	133.25	.002	174.00	.001
11.25	3.551	52.00	.056	92.75	.010	133.50	.002	174.25	.001
11.50	3.429	52.25	.055	93.00	.010	133.75	.002	174.50	.001
11.75	3.315	52.50	.054	93.25	.010	134.00	.002	174.75	.001
12.00	3.207	52.75	.053	93.50	.010	134.25	.002	175.00	.001
12.25	3.104	53.00	.052	93.75	.009	134.50	.002	175.25	.001
12.50	3.006	53.25	.052	94.00	.009	134.75	.002	175.50	.001
12.75	2.913	53.50	.051	94.25	.009	135.00	.002	175.75	.001
13.00	2.823	53.75	.050	94.50	.009	135.25	.002	176.00	.001
13.25	2.737	54.00	.049	94.75	.009	135.50	.002	176.25	.001
13.50	2.654	54.25	.049	95.00	.009	135.75	.002	176.50	.001
13.75	2.575	54.50	.048	95.25	.009	136.00	.002	176.75	.001
14.00	2.498	54.75	.047	95.50	.009	136.25	.002	177.00	.001
14.25	2.420	55.00	.047	95.75	.009	136.50	.002	177.25	.001
14.50	2.336	55.25	.046	96.00	.009	136.75	.002	177.50	.001
14.75	2.251	55.50	.045	96.25	.009	137.00	.002	177.75	.001
15.00	2.173	55.75	.045	96.50	.009	137.25	.002	178.00	.001
15.25	2.100	56.00	.044	96.75	.008	137.50	.002	178.25	.001
15.50	2.033	56.25	.043	97.00	.008	137.75	.002	178.50	.001
15.75	1.966	56.50	.043	97.25	.008	138.00	.002	178.75	.001
16.00	1.896	56.75	.042	97.50	.008	138.25	.002	179.00	.001
16.25	1.828	57.00	.042	97.75	.008	138.50	.002	179.25	.001
16.50	1.765	57.25	.041	98.00	.008	138.75	.002	179.50	.001
16.75	1.707	57.50	.041	98.25	.008	139.00	.002	179.75	.001
17.00	1.654	57.75	.040	98.50	.008	139.25	.002	180.00	.001
17.25	1.604	58.00	.040	98.75	.008	139.50	.002	180.25	.001
17.50	1.557	58.25	.039	99.00	.008	139.75	.002	180.50	.001
17.75	1.513	58.50	.039	99.25	.008	140.00	.002	180.75	.001
18.00	1.470	58.75	.038	99.50	.008	140.25	.002	181.00	.001
18.25	1.430	59.00	.038	99.75	.008	140.50	.002	181.25	.001
18.50	1.391	59.25	.037	100.00	.008	140.75	.002	181.50	.001
18.75	1.353	59.50	.037	100.25	.008	141.00	.002	181.75	.001
19.00	1.317	59.75	.036	100.50	.007	141.25	.002	182.00	.001
19.25	1.282	60.00	.036	100.75	.007	141.50	.002	182.25	.001
19.50	1.248	60.25	.036	101.00	.007	141.75	.002	182.50	.001
19.75	1.215	60.50	.035	101.25	.007	142.00	.002	182.75	.001
20.00	1.183	60.75	.035	101.50	.007	142.25	.002	183.00	.001
20.25	1.152	61.00	.034	101.75	.007	142.50	.002	183.25	.001
20.50	1.122	61.25	.034	102.00	.007	142.75	.002	183.50	.001
20.75	1.093	61.50	.034	102.25	.007	143.00	.002	183.75	.001
21.00	1.064	61.75	.033	102.50	.007	143.25	.002	184.00	.001
21.25	1.037	62.00	.033	102.75	.007	143.50	.002	184.25	.001
21.50	1.009	62.25	.033	103.00	.007	143.75	.002	184.50	.001
21.75	.983	62.50	.032	103.25	.007	144.00	.002	184.75	.001
22.00	.957	62.75	.032	103.50	.007	144.25	.002	185.00	.001
22.25	.932	63.00	.031	103.75	.007	144.50	.002	185.25	.001
22.50	.908	63.25	.031	104.00	.007	144.75	.002	185.50	.001
22.75	.884	63.50	.031	104.25	.007	145.00	.002	185.75	.001
23.00	.860	63.75	.030	104.50	.007	145.25	.002	186.00	.001
23.25	.838	64.00	.030	104.75	.006	145.50	.002	186.25	.001
23.50	.815	64.25	.030	105.00	.006	145.75	.002	186.50	.001
23.75	.794	64.50	.029	105.25	.006	146.00	.002	186.75	.001
24.00	.772	64.75	.029	105.50	.006	146.25	.002	187.00	.001
24.25	.752	65.00	.029	105.75	.006	146.50	.002	187.25	.001
24.50	.733	65.25	.029	106.00	.006	146.75	.002	187.50	.001
24.75	.714	65.50	.028	106.25	.006	147.00	.002	187.75	.000
25.00	.696	65.75	.028	106.50	.006	147.25	.002	188.00	.000
25.25	.679	66.00	.028	106.75	.006	147.50	.002	188.25	.000
25.50	.661	66.25	.027	107.00	.006	147.75	.002	188.50	.000

25.75	.644	66.50	.027	107.25	.006	148.00	.002	188.75	.000
26.00	.627	66.75	.027	107.50	.006	148.25	.002	189.00	.000
26.25	.610	67.00	.026	107.75	.006	148.50	.002	189.25	.000
26.50	.594	67.25	.026	108.00	.006	148.75	.002	189.50	.000
26.75	.578	67.50	.026	108.25	.006	149.00	.002	189.75	.000
27.00	.562	67.75	.026	108.50	.006	149.25	.002	190.00	.000
27.25	.548	68.00	.025	108.75	.006	149.50	.002	190.25	.000
27.50	.534	68.25	.025	109.00	.006	149.75	.002	190.50	.000
27.75	.520	68.50	.025	109.25	.006	150.00	.001	190.75	.000
28.00	.506	68.75	.025	109.50	.006	150.25	.001	191.00	.000
28.25	.493	69.00	.024	109.75	.005	150.50	.001	191.25	.000
28.50	.480	69.25	.024	110.00	.005	150.75	.001	191.50	.000
28.75	.467	69.50	.024	110.25	.005	151.00	.001	191.75	.000
29.00	.454	69.75	.024	110.50	.005	151.25	.001	192.00	.000
29.25	.442	70.00	.023	110.75	.005	151.50	.001	192.25	.000
29.50	.429	70.25	.023	111.00	.005	151.75	.001	192.50	.000
29.75	.418	70.50	.023	111.25	.005	152.00	.001	192.75	.000
30.00	.406	70.75	.023	111.50	.005	152.25	.001	193.00	.000
30.25	.395	71.00	.022	111.75	.005	152.50	.001	193.25	.000
30.50	.384	71.25	.022	112.00	.005	152.75	.001	193.50	.000
30.75	.373	71.50	.022	112.25	.005	153.00	.001	193.75	.000
31.00	.362	71.75	.022	112.50	.005	153.25	.001	194.00	.000
31.25	.352	72.00	.022	112.75	.005	153.50	.001	194.25	.000
31.50	.342	72.25	.021	113.00	.005	153.75	.001	194.50	.000
31.75	.333	72.50	.021	113.25	.005	154.00	.001	194.75	.000
32.00	.323	72.75	.021	113.50	.005	154.25	.001	195.00	.000
32.25	.314	73.00	.021	113.75	.005	154.50	.001	195.25	.000
32.50	.306	73.25	.020	114.00	.005	154.75	.001	195.50	.000
32.75	.297	73.50	.020	114.25	.005	155.00	.001	195.75	.000
33.00	.289	73.75	.020	114.50	.005	155.25	.001	196.00	.000
33.25	.281	74.00	.020	114.75	.005	155.50	.001	196.25	.000
33.50	.273	74.25	.020	115.00	.005	155.75	.001	196.50	.000
33.75	.265	74.50	.019	115.25	.005	156.00	.001	196.75	.000
34.00	.258	74.75	.019	115.50	.005	156.25	.001	197.00	.000
34.25	.251	75.00	.019	115.75	.004	156.50	.001	197.25	.000
34.50	.244	75.25	.019	116.00	.004	156.75	.001	197.50	.000
34.75	.237	75.50	.019	116.25	.004	157.00	.001	197.75	.000
35.00	.231	75.75	.019	116.50	.004	157.25	.001	198.00	.000
35.25	.225	76.00	.018	116.75	.004	157.50	.001	198.25	.000
35.50	.219	76.25	.018	117.00	.004	157.75	.001	198.50	.000
35.75	.213	76.50	.018	117.25	.004	158.00	.001	198.75	.000
36.00	.207	76.75	.018	117.50	.004	158.25	.001	199.00	.000
36.25	.202	77.00	.018	117.75	.004	158.50	.001	199.25	.000
36.50	.196	77.25	.017	118.00	.004	158.75	.001	199.50	.000
36.75	.191	77.50	.017	118.25	.004	159.00	.001	199.75	.000
37.00	.186	77.75	.017	118.50	.004	159.25	.001	200.00	.000
37.25	.182	78.00	.017	118.75	.004	159.50	.001	200.25	.000
37.50	.177	78.25	.017	119.00	.004	159.75	.001	200.50	.000
37.75	.172	78.50	.017	119.25	.004	160.00	.001	200.75	.000
38.00	.168	78.75	.016	119.50	.004	160.25	.001	201.00	.000
38.25	.164	79.00	.016	119.75	.004	160.50	.001	201.25	.000
38.50	.160	79.25	.016	120.00	.004	160.75	.001	201.50	.000
38.75	.156	79.50	.016	120.25	.004	161.00	.001	201.75	.000
39.00	.152	79.75	.016	120.50	.004	161.25	.001	202.00	.000
39.25	.149	80.00	.016	120.75	.004	161.50	.001	202.25	.000
39.50	.145	80.25	.016	121.00	.004	161.75	.001		
39.75	.142	80.50	.015	121.25	.004	162.00	.001		
40.00	.138	80.75	.015	121.50	.004	162.25	.001		
40.25	.135	81.00	.015	121.75	.004	162.50	.001		
40.50	.132	81.25	.015	122.00	.004	162.75	.001		

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|    READ STORM    |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89

2.75	5.31	6.00	11.51	9.25	1.77
3.00	5.31	6.25	11.51	9.50	.89
3.25	5.31	6.50	6.20	9.75	.89

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| READ HYD  (2200) |   AREA       (ha)= 165.44
| DT=15.0 min      |   TPEAK     (hrs)=   1.75
--------------------   VOLUME     (mm)=  17.48
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
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TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW
hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
.00	.000	10.00	.228	20.00	.031	30.00	.004	40.00	.001
.25	.071	10.25	.217	20.25	.029	30.25	.004	40.25	.001
.50	.234	10.50	.206	20.50	.028	30.50	.003	40.50	.001
.75	.376	10.75	.196	20.75	.026	30.75	.003	40.75	.001
1.00	.519	11.00	.187	21.00	.025	31.00	.003	41.00	.001
1.25	.774	11.25	.178	21.25	.024	31.25	.003	41.25	.001
1.50	2.241	11.50	.169	21.50	.023	31.50	.003	41.50	.000
1.75	3.718	11.75	.161	21.75	.022	31.75	.003	41.75	.000
2.00	2.899	12.00	.153	22.00	.021	32.00	.003	42.00	.000
2.25	2.133	12.25	.146	22.25	.019	32.25	.003	42.25	.000
2.50	1.593	12.50	.138	22.50	.019	32.50	.003	42.50	.000
2.75	1.243	12.75	.131	22.75	.018	32.75	.003	42.75	.000
3.00	1.016	13.00	.125	23.00	.017	33.00	.003	43.00	.000
3.25	.872	13.25	.119	23.25	.016	33.25	.003	43.25	.000
3.50	.777	13.50	.113	23.50	.015	33.50	.002	43.50	.000
3.75	.716	13.75	.108	23.75	.014	33.75	.002	43.75	.000
4.00	.678	14.00	.103	24.00	.013	34.00	.002	44.00	.000
4.25	.576	14.25	.098	24.25	.013	34.25	.002	44.25	.000
4.50	.411	14.50	.093	24.50	.013	34.50	.002	44.50	.000
4.75	.333	14.75	.088	24.75	.012	34.75	.002	44.75	.000
5.00	.301	15.00	.084	25.00	.011	35.00	.002	45.00	.000
5.25	.295	15.25	.080	25.25	.011	35.25	.002	45.25	.000
5.50	.301	15.50	.076	25.50	.010	35.50	.002	45.50	.000
5.75	.313	15.75	.072	25.75	.010	35.75	.002	45.75	.000
6.00	.330	16.00	.068	26.00	.009	36.00	.001	46.00	.000
6.25	.348	16.25	.066	26.25	.008	36.25	.001	46.25	.000
6.50	.356	16.50	.062	26.50	.008	36.50	.001	46.50	.000
6.75	.358	16.75	.059	26.75	.008	36.75	.001	46.75	.000
7.00	.357	17.00	.056	27.00	.008	37.00	.001	47.00	.000
7.25	.353	17.25	.053	27.25	.008	37.25	.001	47.25	.000
7.50	.347	17.50	.051	27.50	.007	37.50	.001	47.50	.000
7.75	.339	17.75	.048	27.75	.007	37.75	.001	47.75	.000
8.00	.329	18.00	.046	28.00	.006	38.00	.001	48.00	.000
8.25	.318	18.25	.044	28.25	.006	38.25	.001	48.25	.000
8.50	.306	18.50	.041	28.50	.006	38.50	.001	48.50	.000
8.75	.293	18.75	.040	28.75	.005	38.75	.001	48.75	.000
9.00	.279	19.00	.038	29.00	.005	39.00	.001	49.00	.000
9.25	.265	19.25	.036	29.25	.005	39.25	.001	49.25	.000
9.50	.252	19.50	.034	29.50	.004	39.50	.001	49.50	.000
9.75	.240	19.75	.032	29.75	.004	39.75	.001		

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|    READ STORM    |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
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TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (2733) |   AREA       (ha)=2846.70
| DT=15.0 min      |   TPEAK     (hrs)=   6.25
--------------------   VOLUME     (mm)=  11.71
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
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TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW
hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
.00	.000	40.75	.138	81.50	.015	122.25	.004	163.00	.001
.25	.000	41.00	.134	81.75	.015	122.50	.003	163.25	.001
.50	.001	41.25	.131	82.00	.015	122.75	.003	163.50	.001
.75	.002	41.50	.128	82.25	.014	123.00	.003	163.75	.001
1.00	.005	41.75	.125	82.50	.014	123.25	.003	164.00	.001
1.25	.010	42.00	.122	82.75	.014	123.50	.003	164.25	.001
1.50	.033	42.25	.119	83.00	.014	123.75	.003	164.50	.001
1.75	.111	42.50	.117	83.25	.014	124.00	.003	164.75	.001
2.00	.328	42.75	.114	83.50	.014	124.25	.003	165.00	.001
2.25	.841	43.00	.112	83.75	.014	124.50	.003	165.25	.001
2.50	1.416	43.25	.109	84.00	.013	124.75	.003	165.50	.001
2.75	2.043	43.50	.107	84.25	.013	125.00	.003	165.75	.001
3.00	2.793	43.75	.104	84.50	.013	125.25	.003	166.00	.001
3.25	3.424	44.00	.102	84.75	.013	125.50	.003	166.25	.001
3.50	4.164	44.25	.100	85.00	.013	125.75	.003	166.50	.001
3.75	4.880	44.50	.098	85.25	.013	126.00	.003	166.75	.001
4.00	5.549	44.75	.096	85.50	.013	126.25	.003	167.00	.001
4.25	6.134	45.00	.094	85.75	.013	126.50	.003	167.25	.001
4.50	6.657	45.25	.092	86.00	.012	126.75	.003	167.50	.001
4.75	7.128	45.50	.090	86.25	.012	127.00	.003	167.75	.001
5.00	7.550	45.75	.088	86.50	.012	127.25	.003	168.00	.001
5.25	7.902	46.00	.087	86.75	.012	127.50	.003	168.25	.001
5.50	8.167	46.25	.085	87.00	.012	127.75	.003	168.50	.001
5.75	8.349	46.50	.083	87.25	.012	128.00	.003	168.75	.001
6.00	8.467	46.75	.082	87.50	.012	128.25	.003	169.00	.001
6.25	8.523	47.00	.080	87.75	.012	128.50	.003	169.25	.001
6.50	8.520	47.25	.079	88.00	.012	128.75	.003	169.50	.001
6.75	8.465	47.50	.077	88.25	.012	129.00	.003	169.75	.001
7.00	8.364	47.75	.076	88.50	.011	129.25	.003	170.00	.001
7.25	8.208	48.00	.075	88.75	.011	129.50	.003	170.25	.001
7.50	8.004	48.25	.073	89.00	.011	129.75	.003	170.50	.001
7.75	7.783	48.50	.072	89.25	.011	130.00	.003	170.75	.001
8.00	7.545	48.75	.071	89.50	.011	130.25	.003	171.00	.001
8.25	7.295	49.00	.069	89.75	.011	130.50	.003	171.25	.001
8.50	7.049	49.25	.068	90.00	.011	130.75	.003	171.50	.001
8.75	6.810	49.50	.067	90.25	.011	131.00	.003	171.75	.001
9.00	6.580	49.75	.066	90.50	.011	131.25	.003	172.00	.001
9.25	6.358	50.00	.065	90.75	.011	131.50	.003	172.25	.001
9.50	6.143	50.25	.064	91.00	.010	131.75	.003	172.50	.001
9.75	5.930	50.50	.063	91.25	.010	132.00	.003	172.75	.001
10.00	5.716	50.75	.062	91.50	.010	132.25	.003	173.00	.001
10.25	5.505	51.00	.061	91.75	.010	132.50	.002	173.25	.001
10.50	5.300	51.25	.060	92.00	.010	132.75	.002	173.50	.001
10.75	5.086	51.50	.059	92.25	.010	133.00	.002	173.75	.001
11.00	4.868	51.75	.058	92.50	.010	133.25	.002	174.00	.001
11.25	4.668	52.00	.057	92.75	.010	133.50	.002	174.25	.001
11.50	4.480	52.25	.056	93.00	.010	133.75	.002	174.50	.001
11.75	4.300	52.50	.055	93.25	.010	134.00	.002	174.75	.001
12.00	4.122	52.75	.054	93.50	.010	134.25	.002	175.00	.001
12.25	3.948	53.00	.053	93.75	.009	134.50	.002	175.25	.001
12.50	3.787	53.25	.053	94.00	.009	134.75	.002	175.50	.001
12.75	3.638	53.50	.052	94.25	.009	135.00	.002	175.75	.001
13.00	3.500	53.75	.051	94.50	.009	135.25	.002	176.00	.001
13.25	3.373	54.00	.050	94.75	.009	135.50	.002	176.25	.001
13.50	3.252	54.25	.050	95.00	.009	135.75	.002	176.50	.001
13.75	3.138	54.50	.049	95.25	.009	136.00	.002	176.75	.001
14.00	3.031	54.75	.048	95.50	.009	136.25	.002	177.00	.001
14.25	2.929	55.00	.047	95.75	.009	136.50	.002	177.25	.001
14.50	2.831	55.25	.047	96.00	.009	136.75	.002	177.50	.001
14.75	2.739	55.50	.046	96.25	.009	137.00	.002	177.75	.001
15.00	2.650	55.75	.045	96.50	.009	137.25	.002	178.00	.001
15.25	2.565	56.00	.045	96.75	.008	137.50	.002	178.25	.001
15.50	2.483	56.25	.044	97.00	.008	137.75	.002	178.50	.001
15.75	2.394	56.50	.043	97.25	.008	138.00	.002	178.75	.001
16.00	2.301	56.75	.043	97.50	.008	138.25	.002	179.00	.001
16.25	2.215	57.00	.042	97.75	.008	138.50	.002	179.25	.001
16.50	2.136	57.25	.042	98.00	.008	138.75	.002	179.50	.001
16.75	2.063	57.50	.041	98.25	.008	139.00	.002	179.75	.001

17.00	1.995	57.75	.041	98.50	.008	139.25	.002	180.00	.001
17.25	1.922	58.00	.040	98.75	.008	139.50	.002	180.25	.001
17.50	1.849	58.25	.039	99.00	.008	139.75	.002	180.50	.001
17.75	1.782	58.50	.039	99.25	.008	140.00	.002	180.75	.001
18.00	1.720	58.75	.039	99.50	.008	140.25	.002	181.00	.001
18.25	1.663	59.00	.038	99.75	.008	140.50	.002	181.25	.001
18.50	1.610	59.25	.038	100.00	.008	140.75	.002	181.50	.001
18.75	1.560	59.50	.037	100.25	.008	141.00	.002	181.75	.001
19.00	1.514	59.75	.037	100.50	.007	141.25	.002	182.00	.001
19.25	1.470	60.00	.036	100.75	.007	141.50	.002	182.25	.001
19.50	1.427	60.25	.036	101.00	.007	141.75	.002	182.50	.001
19.75	1.387	60.50	.035	101.25	.007	142.00	.002	182.75	.001
20.00	1.348	60.75	.035	101.50	.007	142.25	.002	183.00	.001
20.25	1.311	61.00	.035	101.75	.007	142.50	.002	183.25	.001
20.50	1.274	61.25	.034	102.00	.007	142.75	.002	183.50	.001
20.75	1.239	61.50	.034	102.25	.007	143.00	.002	183.75	.001
21.00	1.206	61.75	.033	102.50	.007	143.25	.002	184.00	.001
21.25	1.173	62.00	.033	102.75	.007	143.50	.002	184.25	.001
21.50	1.141	62.25	.033	103.00	.007	143.75	.002	184.50	.001
21.75	1.111	62.50	.032	103.25	.007	144.00	.002	184.75	.001
22.00	1.081	62.75	.032	103.50	.007	144.25	.002	185.00	.001
22.25	1.052	63.00	.031	103.75	.007	144.50	.002	185.25	.001
22.50	1.024	63.25	.031	104.00	.007	144.75	.002	185.50	.001
22.75	.996	63.50	.031	104.25	.007	145.00	.002	185.75	.001
23.00	.970	63.75	.030	104.50	.007	145.25	.002	186.00	.001
23.25	.944	64.00	.030	104.75	.006	145.50	.002	186.25	.001
23.50	.918	64.25	.030	105.00	.006	145.75	.002	186.50	.001
23.75	.894	64.50	.029	105.25	.006	146.00	.002	186.75	.001
24.00	.869	64.75	.029	105.50	.006	146.25	.002	187.00	.001
24.25	.846	65.00	.029	105.75	.006	146.50	.002	187.25	.001
24.50	.823	65.25	.029	106.00	.006	146.75	.002	187.50	.001
24.75	.801	65.50	.028	106.25	.006	147.00	.002	187.75	.000
25.00	.779	65.75	.028	106.50	.006	147.25	.002	188.00	.000
25.25	.758	66.00	.028	106.75	.006	147.50	.002	188.25	.000
25.50	.738	66.25	.027	107.00	.006	147.75	.002	188.50	.000
25.75	.719	66.50	.027	107.25	.006	148.00	.002	188.75	.000
26.00	.700	66.75	.027	107.50	.006	148.25	.002	189.00	.000
26.25	.683	67.00	.026	107.75	.006	148.50	.002	189.25	.000
26.50	.665	67.25	.026	108.00	.006	148.75	.002	189.50	.000
26.75	.647	67.50	.026	108.25	.006	149.00	.002	189.75	.000
27.00	.629	67.75	.026	108.50	.006	149.25	.002	190.00	.000
27.25	.612	68.00	.025	108.75	.006	149.50	.002	190.25	.000
27.50	.595	68.25	.025	109.00	.006	149.75	.002	190.50	.000
27.75	.579	68.50	.025	109.25	.006	150.00	.001	190.75	.000
28.00	.563	68.75	.025	109.50	.006	150.25	.001	191.00	.000
28.25	.548	69.00	.024	109.75	.005	150.50	.001	191.25	.000
28.50	.534	69.25	.024	110.00	.005	150.75	.001	191.50	.000
28.75	.520	69.50	.024	110.25	.005	151.00	.001	191.75	.000
29.00	.506	69.75	.024	110.50	.005	151.25	.001	192.00	.000
29.25	.492	70.00	.023	110.75	.005	151.50	.001	192.25	.000
29.50	.479	70.25	.023	111.00	.005	151.75	.001	192.50	.000
29.75	.466	70.50	.023	111.25	.005	152.00	.001	192.75	.000
30.00	.453	70.75	.023	111.50	.005	152.25	.001	193.00	.000
30.25	.440	71.00	.022	111.75	.005	152.50	.001	193.25	.000
30.50	.428	71.25	.022	112.00	.005	152.75	.001	193.50	.000
30.75	.416	71.50	.022	112.25	.005	153.00	.001	193.75	.000
31.00	.404	71.75	.022	112.50	.005	153.25	.001	194.00	.000
31.25	.393	72.00	.021	112.75	.005	153.50	.001	194.25	.000
31.50	.381	72.25	.021	113.00	.005	153.75	.001	194.50	.000
31.75	.371	72.50	.021	113.25	.005	154.00	.001	194.75	.000
32.00	.360	72.75	.021	113.50	.005	154.25	.001	195.00	.000
32.25	.350	73.00	.021	113.75	.005	154.50	.001	195.25	.000
32.50	.340	73.25	.020	114.00	.005	154.75	.001	195.50	.000
32.75	.330	73.50	.020	114.25	.005	155.00	.001	195.75	.000
33.00	.320	73.75	.020	114.50	.005	155.25	.001	196.00	.000
33.25	.311	74.00	.020	114.75	.005	155.50	.001	196.25	.000
33.50	.302	74.25	.020	115.00	.005	155.75	.001	196.50	.000
33.75	.294	74.50	.019	115.25	.005	156.00	.001	196.75	.000
34.00	.285	74.75	.019	115.50	.005	156.25	.001	197.00	.000
34.25	.277	75.00	.019	115.75	.004	156.50	.001	197.25	.000
34.50	.269	75.25	.019	116.00	.004	156.75	.001	197.50	.000
34.75	.262	75.50	.019	116.25	.004	157.00	.001	197.75	.000
35.00	.254	75.75	.018	116.50	.004	157.25	.001	198.00	.000
35.25	.247	76.00	.018	116.75	.004	157.50	.001	198.25	.000
35.50	.240	76.25	.018	117.00	.004	157.75	.001	198.50	.000
35.75	.234	76.50	.018	117.25	.004	158.00	.001	198.75	.000
36.00	.227	76.75	.018	117.50	.004	158.25	.001	199.00	.000
36.25	.221	77.00	.018	117.75	.004	158.50	.001	199.25	.000
36.50	.215	77.25	.017	118.00	.004	158.75	.001	199.50	.000
36.75	.209	77.50	.017	118.25	.004	159.00	.001	199.75	.000
37.00	.203	77.75	.017	118.50	.004	159.25	.001	200.00	.000
37.25	.198	78.00	.017	118.75	.004	159.50	.001	200.25	.000
37.50	.193	78.25	.017	119.00	.004	159.75	.001	200.50	.000
37.75	.187	78.50	.017	119.25	.004	160.00	.001	200.75	.000
38.00	.182	78.75	.016	119.50	.004	160.25	.001	201.00	.000
38.25	.178	79.00	.016	119.75	.004	160.50	.001	201.25	.000
38.50	.173	79.25	.016	120.00	.004	160.75	.001	201.50	.000
38.75	.169	79.50	.016	120.25	.004	161.00	.001	201.75	.000
39.00	.164	79.75	.016	120.50	.004	161.25	.001	202.00	.000
39.25	.160	80.00	.016	120.75	.004	161.50	.001	202.25	.000
39.50	.156	80.25	.016	121.00	.004	161.75	.001		
39.75	.152	80.50	.015	121.25	.004	162.00	.001		
40.00	.148	80.75	.015	121.50	.004	162.25	.001		
40.25	.145	81.00	.015	121.75	.004	162.50	.001		
40.50	.141	81.25	.015	122.00	.004	162.75	.001		

READ STORM

Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (3200)
DT=15.0 min

AREA (ha)= 165.44
TPEAK (hrs)= 5.25
VOLUME (mm)= 22.41

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	11.25	.494	22.50	.058	33.75	.006	45.00	.001
.25	.000	11.50	.484	22.75	.056	34.00	.006	45.25	.001
.50	.001	11.75	.473	23.00	.052	34.25	.005	45.50	.001
.75	.011	12.00	.461	23.25	.050	34.50	.005	45.75	.001
1.00	.030	12.25	.449	23.50	.047	34.75	.005	46.00	.001
1.25	.042	12.50	.427	23.75	.045	35.00	.004	46.25	.001
1.50	.049	12.75	.394	24.00	.043	35.25	.004	46.50	.001
1.75	.054	13.00	.370	24.25	.040	35.50	.004	46.75	.001
2.00	.056	13.25	.349	24.50	.039	35.75	.004	47.00	.000
2.25	.057	13.50	.332	24.75	.037	36.00	.003	47.25	.000
2.50	.109	13.75	.317	25.00	.035	36.25	.003	47.50	.000
2.75	.209	14.00	.303	25.25	.034	36.50	.003	47.75	.000
3.00	.269	14.25	.290	25.50	.032	36.75	.003	48.00	.000
3.25	.305	14.50	.278	25.75	.030	37.00	.003	48.25	.000
3.50	.436	14.75	.266	26.00	.029	37.25	.003	48.50	.000
3.75	.668	15.00	.254	26.25	.027	37.50	.003	48.75	.000
4.00	.807	15.25	.244	26.50	.026	37.75	.003	49.00	.000
4.25	.891	15.50	.233	26.75	.024	38.00	.003	49.25	.000
4.50	1.234	15.75	.223	27.00	.024	38.25	.003	49.50	.000
4.75	1.848	16.00	.214	27.25	.022	38.50	.003	49.75	.000
5.00	2.222	16.25	.204	27.50	.021	38.75	.003	50.00	.000
5.25	2.457	16.50	.194	27.75	.020	39.00	.002	50.25	.000
5.50	2.276	16.75	.185	28.00	.019	39.25	.002	50.50	.000
5.75	1.717	17.00	.177	28.25	.019	39.50	.002	50.75	.000
6.00	1.389	17.25	.168	28.50	.017	39.75	.002	51.00	.000
6.25	1.201	17.50	.160	28.75	.016	40.00	.002	51.25	.000
6.50	1.038	17.75	.152	29.00	.016	40.25	.002	51.50	.000
6.75	.866	18.00	.144	29.25	.015	40.50	.002	51.75	.000
7.00	.773	18.25	.137	29.50	.014	40.75	.002	52.00	.000

7.25	.726	18.50	.130	29.75	.013	41.00	.002	52.25	.000
7.50	.680	18.75	.124	30.00	.013	41.25	.002	52.50	.000
7.75	.620	19.00	.118	30.25	.012	41.50	.001	52.75	.000
8.00	.595	19.25	.112	30.50	.012	41.75	.001	53.00	.000
8.25	.591	19.50	.107	30.75	.011	42.00	.001	53.25	.000
8.50	.579	19.75	.101	31.00	.010	42.25	.001	53.50	.000
8.75	.556	20.00	.096	31.25	.010	42.50	.001	53.75	.000
9.00	.551	20.25	.092	31.50	.009	42.75	.001	54.00	.000
9.25	.558	20.50	.087	31.75	.009	43.00	.001	54.25	.000
9.50	.559	20.75	.082	32.00	.008	43.25	.001	54.50	.000
9.75	.548	21.00	.078	32.25	.008	43.50	.001	54.75	.000
10.00	.540	21.25	.075	32.50	.008	43.75	.001	55.00	.000
10.25	.530	21.50	.071	32.75	.008	44.00	.001		
10.50	.522	21.75	.067	33.00	.007	44.25	.001		
10.75	.513	22.00	.064	33.25	.007	44.50	.001		
11.00	.504	22.25	.061	33.50	.006	44.75	.001		

READ STORM

Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (4200)
DT=15.0 min

AREA (ha)= 165.44
TPEAK (hrs)= 5.25
VOLUME (mm)= 31.76

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	10.00	.912	20.00	.105	30.00	.009	40.00	.001
.25	.000	10.25	.883	20.25	.098	30.25	.008	40.25	.001
.50	.003	10.50	.855	20.50	.093	30.50	.008	40.50	.001
.75	.021	10.75	.829	20.75	.088	30.75	.008	40.75	.001
1.00	.045	11.00	.803	21.00	.082	31.00	.008	41.00	.001
1.25	.059	11.25	.776	21.25	.077	31.25	.007	41.25	.001
1.50	.067	11.50	.749	21.50	.073	31.50	.007	41.50	.001
1.75	.071	11.75	.722	21.75	.069	31.75	.006	41.75	.001
2.00	.073	12.00	.696	22.00	.065	32.00	.006	42.00	.001
2.25	.075	12.25	.670	22.25	.061	32.25	.005	42.25	.001
2.50	.145	12.50	.631	22.50	.057	32.50	.005	42.50	.001
2.75	.283	12.75	.577	22.75	.054	32.75	.005	42.75	.000
3.00	.361	13.00	.537	23.00	.051	33.00	.004	43.00	.000
3.25	.406	13.25	.504	23.25	.048	33.25	.004	43.25	.000
3.50	.583	13.50	.475	23.50	.045	33.50	.004	43.50	.000
3.75	.900	13.75	.450	23.75	.042	33.75	.003	43.75	.000
4.00	1.082	14.00	.426	24.00	.040	34.00	.003	44.00	.000
4.25	1.188	14.25	.405	24.25	.037	34.25	.003	44.25	.000
4.50	1.653	14.50	.384	24.50	.035	34.50	.003	44.50	.000
4.75	2.499	14.75	.364	24.75	.033	34.75	.003	44.75	.000
5.00	2.996	15.00	.346	25.00	.031	35.00	.003	45.00	.000
5.25	3.299	15.25	.328	25.25	.029	35.25	.003	45.25	.000
5.50	3.035	15.50	.311	25.50	.028	35.50	.003	45.50	.000
5.75	2.255	15.75	.294	25.75	.026	35.75	.003	45.75	.000
6.00	1.833	16.00	.278	26.00	.024	36.00	.003	46.00	.000
6.25	1.616	16.25	.262	26.25	.023	36.25	.002	46.25	.000
6.50	1.433	16.50	.246	26.50	.022	36.50	.002	46.50	.000
6.75	1.233	16.75	.231	26.75	.020	36.75	.002	46.75	.000

7.00	1.144	17.00	.218	27.00	.019	37.00	.002	47.00	.000
7.25	1.118	17.25	.205	27.25	.018	37.25	.002	47.25	.000
7.50	1.087	17.50	.193	27.50	.017	37.50	.002	47.50	.000
7.75	1.035	17.75	.182	27.75	.016	37.75	.002	47.75	.000
8.00	1.030	18.00	.171	28.00	.015	38.00	.002	48.00	.000
8.25	1.051	18.25	.161	28.25	.014	38.25	.001	48.25	.000
8.50	1.058	18.50	.152	28.50	.013	38.50	.001	48.50	.000
8.75	1.035	18.75	.142	28.75	.013	38.75	.001	48.75	.000
9.00	1.028	19.00	.134	29.00	.012	39.00	.001	49.00	.000
9.25	1.019	19.25	.126	29.25	.011	39.25	.001	49.25	.000
9.50	.988	19.50	.119	29.50	.010	39.50	.001	49.50	.000
9.75	.944	19.75	.112	29.75	.010	39.75	.001		

READ STORM

Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (5200)
DT=15.0 min

AREA (ha)= 165.44
TPEAK (hrs)= 5.25
VOLUME (mm)= 46.99

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	9.00	1.801	18.00	.183	27.00	.013	36.00	.001
.25	.000	9.25	1.741	18.25	.170	27.25	.012	36.25	.001
.50	.009	9.50	1.664	18.50	.157	27.50	.011	36.50	.001
.75	.038	9.75	1.566	18.75	.146	27.75	.010	36.75	.001
1.00	.069	10.00	1.487	19.00	.136	28.00	.009	37.00	.001
1.25	.085	10.25	1.419	19.25	.126	28.25	.009	37.25	.001
1.50	.094	10.50	1.355	19.50	.117	28.50	.008	37.50	.001
1.75	.098	10.75	1.293	19.75	.109	28.75	.008	37.75	.001
2.00	.101	11.00	1.233	20.00	.101	29.00	.007	38.00	.001
2.25	.103	11.25	1.175	20.25	.094	29.25	.007	38.25	.001
2.50	.203	11.50	1.119	20.50	.088	29.50	.006	38.50	.001
2.75	.402	11.75	1.063	20.75	.081	29.75	.006	38.75	.000
3.00	.507	12.00	1.011	21.00	.076	30.00	.005	39.00	.000
3.25	.563	12.25	.960	21.25	.070	30.25	.005	39.25	.000
3.50	.810	12.50	.893	21.50	.065	30.50	.004	39.50	.000
3.75	1.266	12.75	.807	21.75	.061	30.75	.004	39.75	.000
4.00	1.511	13.00	.742	22.00	.056	31.00	.004	40.00	.000
4.25	1.648	13.25	.690	22.25	.052	31.25	.003	40.25	.000
4.50	2.314	13.50	.646	22.50	.049	31.50	.003	40.50	.000
4.75	3.542	13.75	.605	22.75	.045	31.75	.003	40.75	.000
5.00	4.235	14.00	.568	23.00	.042	32.00	.003	41.00	.000
5.25	4.655	14.25	.534	23.25	.039	32.25	.003	41.25	.000
5.50	4.271	14.50	.501	23.50	.036	32.50	.003	41.50	.000
5.75	3.158	14.75	.470	23.75	.034	32.75	.003	41.75	.000
6.00	2.624	15.00	.439	24.00	.031	33.00	.003	42.00	.000
6.25	2.400	15.25	.411	24.25	.029	33.25	.002	42.25	.000
6.50	2.222	15.50	.382	24.50	.027	33.50	.002	42.50	.000
6.75	2.015	15.75	.355	24.75	.025	33.75	.002	42.75	.000
7.00	1.966	16.00	.330	25.00	.023	34.00	.002	43.00	.000
7.25	2.001	16.25	.306	25.25	.022	34.25	.002	43.25	.000
7.50	2.016	16.50	.285	25.50	.020	34.50	.002	43.50	.000
7.75	1.990	16.75	.264	25.75	.019	34.75	.002	43.75	.000

8.00	2.006	17.00	.246	26.00	.017	35.00	.001	44.00	.000
8.25	2.026	17.25	.228	26.25	.016	35.25	.001	44.25	.000
8.50	1.987	17.50	.212	26.50	.015	35.50	.001		
8.75	1.877	17.75	.197	26.75	.013	35.75	.001		

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|    READ STORM    |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (6201) |   AREA       (ha)=2846.70
| DT=15.0 min      |   TPEAK     (hrs)=  10.00
--------------------   VOLUME     (mm)=  16.00
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Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	41.75	.218	83.50	.017	125.25	.004	167.00	.001
.25	.000	42.00	.212	83.75	.017	125.50	.004	167.25	.001
.50	.000	42.25	.207	84.00	.017	125.75	.004	167.50	.001
.75	.000	42.50	.201	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.196	84.50	.016	126.25	.004	168.00	.001
1.25	.000	43.00	.190	84.75	.016	126.50	.004	168.25	.001
1.50	.000	43.25	.185	85.00	.016	126.75	.004	168.50	.001
1.75	.001	43.50	.180	85.25	.016	127.00	.004	168.75	.001
2.00	.002	43.75	.176	85.50	.016	127.25	.004	169.00	.001
2.25	.002	44.00	.171	85.75	.015	127.50	.004	169.25	.001
2.50	.003	44.25	.167	86.00	.015	127.75	.004	169.50	.001
2.75	.005	44.50	.162	86.25	.015	128.00	.003	169.75	.001
3.00	.007	44.75	.158	86.50	.015	128.25	.003	170.00	.001
3.25	.010	45.00	.154	86.75	.015	128.50	.003	170.25	.001
3.50	.014	45.25	.150	87.00	.015	128.75	.003	170.50	.001
3.75	.020	45.50	.147	87.25	.015	129.00	.003	170.75	.001
4.00	.029	45.75	.143	87.50	.014	129.25	.003	171.00	.001
4.25	.045	46.00	.140	87.75	.014	129.50	.003	171.25	.001
4.50	.075	46.25	.136	88.00	.014	129.75	.003	171.50	.001
4.75	.137	46.50	.133	88.25	.014	130.00	.003	171.75	.001
5.00	.264	46.75	.130	88.50	.014	130.25	.003	172.00	.001
5.25	.493	47.00	.127	88.75	.014	130.50	.003	172.25	.001
5.50	1.034	47.25	.124	89.00	.014	130.75	.003	172.50	.001
5.75	1.909	47.50	.121	89.25	.014	131.00	.003	172.75	.001
6.00	2.842	47.75	.118	89.50	.013	131.25	.003	173.00	.001
6.25	3.755	48.00	.116	89.75	.013	131.50	.003	173.25	.001
6.50	4.639	48.25	.113	90.00	.013	131.75	.003	173.50	.001
6.75	5.507	48.50	.111	90.25	.013	132.00	.003	173.75	.001
7.00	6.273	48.75	.108	90.50	.013	132.25	.003	174.00	.001
7.25	7.047	49.00	.106	90.75	.013	132.50	.003	174.25	.001
7.50	7.802	49.25	.104	91.00	.013	132.75	.003	174.50	.001
7.75	8.480	49.50	.101	91.25	.013	133.00	.003	174.75	.001
8.00	9.043	49.75	.099	91.50	.012	133.25	.003	175.00	.001
8.25	9.544	50.00	.097	91.75	.012	133.50	.003	175.25	.001
8.50	9.983	50.25	.095	92.00	.012	133.75	.003	175.50	.001
8.75	10.351	50.50	.093	92.25	.012	134.00	.003	175.75	.001
9.00	10.646	50.75	.091	92.50	.012	134.25	.003	176.00	.001
9.25	10.873	51.00	.090	92.75	.012	134.50	.003	176.25	.001
9.50	11.034	51.25	.088	93.00	.012	134.75	.003	176.50	.001
9.75	11.129	51.50	.086	93.25	.012	135.00	.003	176.75	.001
10.00	11.167	51.75	.084	93.50	.012	135.25	.003	177.00	.001
10.25	11.153	52.00	.083	93.75	.011	135.50	.003	177.25	.001
10.50	11.093	52.25	.081	94.00	.011	135.75	.003	177.50	.001
10.75	10.991	52.50	.080	94.25	.011	136.00	.003	177.75	.001
11.00	10.853	52.75	.078	94.50	.011	136.25	.003	178.00	.001
11.25	10.685	53.00	.077	94.75	.011	136.50	.003	178.25	.001
11.50	10.486	53.25	.075	95.00	.011	136.75	.003	178.50	.001
11.75	10.265	53.50	.074	95.25	.011	137.00	.003	178.75	.001
12.00	10.028	53.75	.073	95.50	.011	137.25	.003	179.00	.001
12.25	9.780	54.00	.071	95.75	.011	137.50	.003	179.25	.001
12.50	9.521	54.25	.070	96.00	.011	137.75	.003	179.50	.001
12.75	9.249	54.50	.069	96.25	.010	138.00	.002	179.75	.001
13.00	8.951	54.75	.068	96.50	.010	138.25	.002	180.00	.001
13.25	8.620	55.00	.067	96.75	.010	138.50	.002	180.25	.001
13.50	8.280	55.25	.066	97.00	.010	138.75	.002	180.50	.001
13.75	7.953	55.50	.064	97.25	.010	139.00	.002	180.75	.001
14.00	7.633	55.75	.063	97.50	.010	139.25	.002	181.00	.001
14.25	7.312	56.00	.062	97.75	.010	139.50	.002	181.25	.001
14.50	7.000	56.25	.061	98.00	.010	139.75	.002	181.50	.001
14.75	6.708	56.50	.060	98.25	.010	140.00	.002	181.75	.001
15.00	6.434	56.75	.059	98.50	.010	140.25	.002	182.00	.001
15.25	6.171	57.00	.058	98.75	.010	140.50	.002	182.25	.001
15.50	5.917	57.25	.057	99.00	.009	140.75	.002	182.50	.001
15.75	5.670	57.50	.057	99.25	.009	141.00	.002	182.75	.001
16.00	5.436	57.75	.056	99.50	.009	141.25	.002	183.00	.001
16.25	5.198	58.00	.055	99.75	.009	141.50	.002	183.25	.001
16.50	4.961	58.25	.054	100.00	.009	141.75	.002	183.50	.001
16.75	4.741	58.50	.053	100.25	.009	142.00	.002	183.75	.001
17.00	4.539	58.75	.052	100.50	.009	142.25	.002	184.00	.001
17.25	4.350	59.00	.052	100.75	.009	142.50	.002	184.25	.001
17.50	4.163	59.25	.051	101.00	.009	142.75	.002	184.50	.001
17.75	3.979	59.50	.050	101.25	.009	143.00	.002	184.75	.001
18.00	3.809	59.75	.049	101.50	.009	143.25	.002	185.00	.001
18.25	3.653	60.00	.049	101.75	.009	143.50	.002	185.25	.001
18.50	3.509	60.25	.048	102.00	.009	143.75	.002	185.50	.001
18.75	3.376	60.50	.047	102.25	.008	144.00	.002	185.75	.001
19.00	3.251	60.75	.046	102.50	.008	144.25	.002	186.00	.001
19.25	3.134	61.00	.046	102.75	.008	144.50	.002	186.25	.001
19.50	3.024	61.25	.045	103.00	.008	144.75	.002	186.50	.001
19.75	2.919	61.50	.044	103.25	.008	145.00	.002	186.75	.001
20.00	2.820	61.75	.044	103.50	.008	145.25	.002	187.00	.001
20.25	2.726	62.00	.043	103.75	.008	145.50	.002	187.25	.001
20.50	2.636	62.25	.043	104.00	.008	145.75	.002	187.50	.001
20.75	2.550	62.50	.042	104.25	.008	146.00	.002	187.75	.001
21.00	2.463	62.75	.041	104.50	.008	146.25	.002	188.00	.001
21.25	2.370	63.00	.041	104.75	.008	146.50	.002	188.25	.001
21.50	2.278	63.25	.040	105.00	.008	146.75	.002	188.50	.001
21.75	2.193	63.50	.040	105.25	.008	147.00	.002	188.75	.001
22.00	2.115	63.75	.039	105.50	.008	147.25	.002	189.00	.001
22.25	2.044	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	1.973	64.25	.038	106.00	.007	147.75	.002	189.50	.001
22.75	1.899	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	1.827	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	1.760	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	1.700	65.25	.037	107.00	.007	148.75	.002	190.50	.001
23.75	1.644	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	1.592	65.75	.036	107.50	.007	149.25	.002	191.00	.001
24.25	1.543	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	1.497	66.25	.035	108.00	.007	149.75	.002	191.50	.001
24.75	1.453	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	1.411	66.75	.034	108.50	.007	150.25	.002	192.00	.001
25.25	1.371	67.00	.034	108.75	.007	150.50	.002	192.25	.001
25.50	1.333	67.25	.033	109.00	.007	150.75	.002	192.50	.001
25.75	1.296	67.50	.033	109.25	.007	151.00	.002	192.75	.001
26.00	1.260	67.75	.032	109.50	.007	151.25	.002	193.00	.000
26.25	1.225	68.00	.032	109.75	.007	151.50	.002	193.25	.000
26.50	1.192	68.25	.032	110.00	.006	151.75	.002	193.50	.000
26.75	1.159	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.128	68.75	.031	110.50	.006	152.25	.002	194.00	.000
27.25	1.098	69.00	.031	110.75	.006	152.50	.002	194.25	.000
27.50	1.068	69.25	.030	111.00	.006	152.75	.002	194.50	.000
27.75	1.039	69.50	.030	111.25	.006	153.00	.002	194.75	.000
28.00	1.012	69.75	.030	111.50	.006	153.25	.002	195.00	.000
28.25	.984	70.00	.029	111.75	.006	153.50	.002	195.25	.000
28.50	.958	70.25	.029	112.00	.006	153.75	.002	195.50	.000
28.75	.932	70.50	.029	112.25	.006	154.00	.002	195.75	.000
29.00	.907	70.75	.028	112.50	.006	154.25	.002	196.00	.000
29.25	.882	71.00	.028	112.75	.006	154.50	.002	196.25	.000
29.50	.859	71.25	.028	113.00	.006	154.75	.002	196.50	.000
29.75	.835	71.50	.028	113.25	.006	155.00	.002	196.75	.000

30.00	.813	71.75	.027	113.50	.006	155.25	.002	197.00	.000
30.25	.790	72.00	.027	113.75	.006	155.50	.001	197.25	.000
30.50	.769	72.25	.027	114.00	.006	155.75	.001	197.50	.000
30.75	.748	72.50	.026	114.25	.006	156.00	.001	197.75	.000
31.00	.729	72.75	.026	114.50	.006	156.25	.001	198.00	.000
31.25	.710	73.00	.026	114.75	.006	156.50	.001	198.25	.000
31.50	.692	73.25	.026	115.00	.005	156.75	.001	198.50	.000
31.75	.674	73.50	.025	115.25	.005	157.00	.001	198.75	.000
32.00	.656	73.75	.025	115.50	.005	157.25	.001	199.00	.000
32.25	.639	74.00	.025	115.75	.005	157.50	.001	199.25	.000
32.50	.621	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.604	74.50	.024	116.25	.005	158.00	.001	199.75	.000
33.00	.588	74.75	.024	116.50	.005	158.25	.001	200.00	.000
33.25	.571	75.00	.024	116.75	.005	158.50	.001	200.25	.000
33.50	.556	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.542	75.50	.023	117.25	.005	159.00	.001	200.75	.000
34.00	.527	75.75	.023	117.50	.005	159.25	.001	201.00	.000
34.25	.513	76.00	.023	117.75	.005	159.50	.001	201.25	.000
34.50	.499	76.25	.023	118.00	.005	159.75	.001	201.50	.000
34.75	.486	76.50	.022	118.25	.005	160.00	.001	201.75	.000
35.00	.473	76.75	.022	118.50	.005	160.25	.001	202.00	.000
35.25	.460	77.00	.022	118.75	.005	160.50	.001	202.25	.000
35.50	.447	77.25	.022	119.00	.005	160.75	.001	202.50	.000
35.75	.434	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.422	77.75	.021	119.50	.005	161.25	.001	203.00	.000
36.25	.410	78.00	.021	119.75	.005	161.50	.001	203.25	.000
36.50	.399	78.25	.021	120.00	.005	161.75	.001	203.50	.000
36.75	.387	78.50	.021	120.25	.005	162.00	.001	203.75	.000
37.00	.376	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.366	79.00	.020	120.75	.005	162.50	.001	204.25	.000
37.50	.355	79.25	.020	121.00	.004	162.75	.001	204.50	.000
37.75	.345	79.50	.020	121.25	.004	163.00	.001	204.75	.000
38.00	.335	79.75	.020	121.50	.004	163.25	.001	205.00	.000
38.25	.326	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.316	80.25	.019	122.00	.004	163.75	.001	205.50	.000
38.75	.307	80.50	.019	122.25	.004	164.00	.001	205.75	.000
39.00	.298	80.75	.019	122.50	.004	164.25	.001	206.00	.000
39.25	.290	81.00	.019	122.75	.004	164.50	.001	206.25	.000
39.50	.282	81.25	.018	123.00	.004	164.75	.001	206.50	.000
39.75	.274	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.266	81.75	.018	123.50	.004	165.25	.001	207.00	.000
40.25	.258	82.00	.018	123.75	.004	165.50	.001	207.25	.000
40.50	.251	82.25	.018	124.00	.004	165.75	.001	207.50	.000
40.75	.244	82.50	.018	124.25	.004	166.00	.001		
41.00	.237	82.75	.017	124.50	.004	166.25	.001		
41.25	.231	83.00	.017	124.75	.004	166.50	.001		
41.50	.224	83.25	.017	125.00	.004	166.75	.001		

READ STORM	Filename: V:\01606\Active\160622264
	\Analysis\SWM\Hydrology\
	VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6203)	AREA (ha)=2846.70
DT=15.0 min	TPEAK (hrs)= 9.50
	VOLUME (mm)= 38.51

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	41.75	.286	83.50	.016	125.25	.004	167.00	.001
.25	.000	42.00	.277	83.75	.016	125.50	.004	167.25	.001
.50	.000	42.25	.269	84.00	.016	125.75	.004	167.50	.001
.75	.000	42.50	.261	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.253	84.50	.016	126.25	.004	168.00	.001
1.25	.001	43.00	.246	84.75	.016	126.50	.004	168.25	.001
1.50	.001	43.25	.238	85.00	.016	126.75	.004	168.50	.001
1.75	.002	43.50	.231	85.25	.015	127.00	.004	168.75	.001
2.00	.004	43.75	.224	85.50	.015	127.25	.004	169.00	.001
2.25	.005	44.00	.218	85.75	.015	127.50	.003	169.25	.001
2.50	.008	44.25	.212	86.00	.015	127.75	.003	169.50	.001
2.75	.011	44.50	.205	86.25	.015	128.00	.003	169.75	.001
3.00	.015	44.75	.199	86.50	.015	128.25	.003	170.00	.001
3.25	.021	45.00	.194	86.75	.015	128.50	.003	170.25	.001
3.50	.030	45.25	.188	87.00	.014	128.75	.003	170.50	.001
3.75	.048	45.50	.183	87.25	.014	129.00	.003	170.75	.001
4.00	.084	45.75	.178	87.50	.014	129.25	.003	171.00	.001
4.25	.149	46.00	.173	87.75	.014	129.50	.003	171.25	.001
4.50	.278	46.25	.168	88.00	.014	129.75	.003	171.50	.001
4.75	.829	46.50	.163	88.25	.014	130.00	.003	171.75	.001
5.00	2.121	46.75	.159	88.50	.014	130.25	.003	172.00	.001
5.25	4.022	47.00	.154	88.75	.014	130.50	.003	172.25	.001
5.50	6.106	47.25	.150	89.00	.013	130.75	.003	172.50	.001
5.75	8.212	47.50	.146	89.25	.013	131.00	.003	172.75	.001
6.00	10.393	47.75	.142	89.50	.013	131.25	.003	173.00	.001
6.25	12.636	48.00	.138	89.75	.013	131.50	.003	173.25	.001
6.50	15.001	48.25	.135	90.00	.013	131.75	.003	173.50	.001
6.75	17.305	48.50	.131	90.25	.013	132.00	.003	173.75	.001
7.00	19.507	48.75	.128	90.50	.013	132.25	.003	174.00	.001
7.25	21.638	49.00	.125	90.75	.013	132.50	.003	174.25	.001
7.50	23.625	49.25	.121	91.00	.012	132.75	.003	174.50	.001
7.75	25.424	49.50	.118	91.25	.012	133.00	.003	174.75	.001
8.00	27.019	49.75	.115	91.50	.012	133.25	.003	175.00	.001
8.25	28.384	50.00	.113	91.75	.012	133.50	.003	175.25	.001
8.50	29.494	50.25	.110	92.00	.012	133.75	.003	175.50	.001
8.75	30.344	50.50	.107	92.25	.012	134.00	.003	175.75	.001
9.00	30.945	50.75	.105	92.50	.012	134.25	.003	176.00	.001
9.25	31.312	51.00	.102	92.75	.012	134.50	.003	176.25	.001
9.50	31.464	51.25	.100	93.00	.012	134.75	.003	176.50	.001
9.75	31.416	51.50	.097	93.25	.011	135.00	.003	176.75	.001
10.00	31.193	51.75	.095	93.50	.011	135.25	.003	177.00	.001
10.25	30.827	52.00	.093	93.75	.011	135.50	.003	177.25	.001
10.50	30.340	52.25	.091	94.00	.011	135.75	.003	177.50	.001
10.75	29.746	52.50	.089	94.25	.011	136.00	.003	177.75	.001
11.00	29.070	52.75	.087	94.50	.011	136.25	.003	178.00	.001
11.25	28.325	53.00	.085	94.75	.011	136.50	.003	178.25	.001
11.50	27.510	53.25	.083	95.00	.011	136.75	.003	178.50	.001
11.75	26.642	53.50	.081	95.25	.011	137.00	.003	178.75	.001
12.00	25.750	53.75	.080	95.50	.011	137.25	.003	179.00	.001
12.25	24.837	54.00	.078	95.75	.010	137.50	.003	179.25	.001
12.50	23.935	54.25	.076	96.00	.010	137.75	.002	179.50	.001
12.75	23.016	54.50	.075	96.25	.010	138.00	.002	179.75	.001
13.00	22.106	54.75	.073	96.50	.010	138.25	.002	180.00	.001
13.25	21.184	55.00	.072	96.75	.010	138.50	.002	180.25	.001
13.50	20.268	55.25	.070	97.00	.010	138.75	.002	180.50	.001
13.75	19.363	55.50	.069	97.25	.010	139.00	.002	180.75	.001
14.00	18.451	55.75	.068	97.50	.010	139.25	.002	181.00	.001
14.25	17.530	56.00	.066	97.75	.010	139.50	.002	181.25	.001
14.50	16.635	56.25	.065	98.00	.010	139.75	.002	181.50	.001
14.75	15.781	56.50	.064	98.25	.010	140.00	.002	181.75	.001
15.00	14.959	56.75	.063	98.50	.009	140.25	.002	182.00	.001
15.25	14.151	57.00	.062	98.75	.009	140.50	.002	182.25	.001
15.50	13.363	57.25	.061	99.00	.009	140.75	.002	182.50	.001
15.75	12.624	57.50	.059	99.25	.009	141.00	.002	182.75	.001
16.00	11.938	57.75	.058	99.50	.009	141.25	.002	183.00	.001
16.25	11.303	58.00	.057	99.75	.009	141.50	.002	183.25	.001
16.50	10.711	58.25	.056	100.00	.009	141.75	.002	183.50	.001
16.75	10.148	58.50	.055	100.25	.009	142.00	.002	183.75	.001
17.00	9.578	58.75	.054	100.50	.009	142.25	.002	184.00	.001
17.25	9.024	59.00	.053	100.75	.009	142.50	.002	184.25	.001
17.50	8.522	59.25	.053	101.00	.009	142.75	.002	184.50	.001
17.75	8.065	59.50	.052	101.25	.009	143.00	.002	184.75	.001
18.00	7.643	59.75	.051	101.50	.008	143.25	.002	185.00	.001
18.25	7.236	60.00	.050	101.75	.008	143.50	.002	185.25	.001
18.50	6.844	60.25	.049	102.00	.008	143.75	.002	185.50	.001
18.75	6.483	60.50	.048	102.25	.008	144.00	.002	185.75	.001
19.00	6.152	60.75	.048	102.50	.008	144.25	.002	186.00	.001

19.25	5.849	61.00	.047	102.75	.008	144.50	.002	186.25	.001
19.50	5.566	61.25	.046	103.00	.008	144.75	.002	186.50	.001
19.75	5.288	61.50	.045	103.25	.008	145.00	.002	186.75	.001
20.00	5.022	61.75	.045	103.50	.008	145.25	.002	187.00	.001
20.25	4.782	62.00	.044	103.75	.008	145.50	.002	187.25	.001
20.50	4.564	62.25	.043	104.00	.008	145.75	.002	187.50	.001
20.75	4.363	62.50	.043	104.25	.008	146.00	.002	187.75	.001
21.00	4.164	62.75	.042	104.50	.008	146.25	.002	188.00	.001
21.25	3.967	63.00	.042	104.75	.008	146.50	.002	188.25	.001
21.50	3.785	63.25	.041	105.00	.008	146.75	.002	188.50	.001
21.75	3.618	63.50	.040	105.25	.008	147.00	.002	188.75	.001
22.00	3.465	63.75	.040	105.50	.007	147.25	.002	189.00	.001
22.25	3.325	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	3.193	64.25	.038	106.00	.007	147.75	.002	189.50	.001
22.75	3.070	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	2.954	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	2.844	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	2.741	65.25	.036	107.00	.007	148.75	.002	190.50	.001
23.75	2.643	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	2.549	65.75	.035	107.50	.007	149.25	.002	191.00	.001
24.25	2.448	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	2.344	66.25	.034	108.00	.007	149.75	.002	191.50	.001
24.75	2.248	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	2.160	66.75	.034	108.50	.007	150.25	.002	192.00	.001
25.25	2.080	67.00	.033	108.75	.007	150.50	.002	192.25	.001
25.50	2.006	67.25	.033	109.00	.007	150.75	.002	192.50	.001
25.75	1.929	67.50	.032	109.25	.007	151.00	.002	192.75	.001
26.00	1.851	67.75	.032	109.50	.007	151.25	.002	193.00	.000
26.25	1.777	68.00	.031	109.75	.006	151.50	.002	193.25	.000
26.50	1.711	68.25	.031	110.00	.006	151.75	.002	193.50	.000
26.75	1.650	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.594	68.75	.030	110.50	.006	152.25	.002	194.00	.000
27.25	1.542	69.00	.030	110.75	.006	152.50	.002	194.25	.000
27.50	1.493	69.25	.030	111.00	.006	152.75	.002	194.50	.000
27.75	1.447	69.50	.029	111.25	.006	153.00	.002	194.75	.000
28.00	1.403	69.75	.029	111.50	.006	153.25	.002	195.00	.000
28.25	1.361	70.00	.029	111.75	.006	153.50	.002	195.25	.000
28.50	1.321	70.25	.028	112.00	.006	153.75	.002	195.50	.000
28.75	1.282	70.50	.028	112.25	.006	154.00	.002	195.75	.000
29.00	1.245	70.75	.028	112.50	.006	154.25	.002	196.00	.000
29.25	1.209	71.00	.027	112.75	.006	154.50	.002	196.25	.000
29.50	1.174	71.25	.027	113.00	.006	154.75	.002	196.50	.000
29.75	1.141	71.50	.027	113.25	.006	155.00	.002	196.75	.000
30.00	1.109	71.75	.027	113.50	.006	155.25	.001	197.00	.000
30.25	1.077	72.00	.026	113.75	.006	155.50	.001	197.25	.000
30.50	1.047	72.25	.026	114.00	.006	155.75	.001	197.50	.000
30.75	1.018	72.50	.026	114.25	.006	156.00	.001	197.75	.000
31.00	.989	72.75	.025	114.50	.006	156.25	.001	198.00	.000
31.25	.962	73.00	.025	114.75	.005	156.50	.001	198.25	.000
31.50	.935	73.25	.025	115.00	.005	156.75	.001	198.50	.000
31.75	.909	73.50	.025	115.25	.005	157.00	.001	198.75	.000
32.00	.883	73.75	.024	115.50	.005	157.25	.001	199.00	.000
32.25	.859	74.00	.024	115.75	.005	157.50	.001	199.25	.000
32.50	.834	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.811	74.50	.024	116.25	.005	158.00	.001	199.75	.000
33.00	.788	74.75	.023	116.50	.005	158.25	.001	200.00	.000
33.25	.766	75.00	.023	116.75	.005	158.50	.001	200.25	.000
33.50	.745	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.725	75.50	.023	117.25	.005	159.00	.001	200.75	.000
34.00	.706	75.75	.022	117.50	.005	159.25	.001	201.00	.000
34.25	.687	76.00	.022	117.75	.005	159.50	.001	201.25	.000
34.50	.669	76.25	.022	118.00	.005	159.75	.001	201.50	.000
34.75	.650	76.50	.022	118.25	.005	160.00	.001	201.75	.000
35.00	.632	76.75	.022	118.50	.005	160.25	.001	202.00	.000
35.25	.614	77.00	.021	118.75	.005	160.50	.001	202.25	.000
35.50	.597	77.25	.021	119.00	.005	160.75	.001	202.50	.000
35.75	.580	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.563	77.75	.021	119.50	.005	161.25	.001	203.00	.000
36.25	.548	78.00	.020	119.75	.005	161.50	.001	203.25	.000
36.50	.533	78.25	.020	120.00	.005	161.75	.001	203.50	.000
36.75	.518	78.50	.020	120.25	.005	162.00	.001	203.75	.000
37.00	.504	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.490	79.00	.020	120.75	.004	162.50	.001	204.25	.000
37.50	.476	79.25	.019	121.00	.004	162.75	.001	204.50	.000
37.75	.462	79.50	.019	121.25	.004	163.00	.001	204.75	.000
38.00	.449	79.75	.019	121.50	.004	163.25	.001	205.00	.000
38.25	.436	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.423	80.25	.019	122.00	.004	163.75	.001	205.50	.000
38.75	.411	80.50	.019	122.25	.004	164.00	.001	205.75	.000
39.00	.399	80.75	.018	122.50	.004	164.25	.001	206.00	.000
39.25	.387	81.00	.018	122.75	.004	164.50	.001	206.25	.000
39.50	.376	81.25	.018	123.00	.004	164.75	.001	206.50	.000
39.75	.365	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.354	81.75	.018	123.50	.004	165.25	.001	207.00	.000
40.25	.343	82.00	.017	123.75	.004	165.50	.001	207.25	.000
40.50	.333	82.25	.017	124.00	.004	165.75	.001	207.50	.000
40.75	.323	82.50	.017	124.25	.004	166.00	.001		
41.00	.313	82.75	.017	124.50	.004	166.25	.001		
41.25	.304	83.00	.017	124.75	.004	166.50	.001		
41.50	.295	83.25	.017	125.00	.004	166.75	.001		

READ STORM

Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6205) | AREA (ha)=3174.13
DT=15.0 min | TPEAK (hrs)= 11.00
VOLUME (mm)= 14.09

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	12.50	11.134	25.00	1.009	37.50	.157	50.00	.016
.25	.000	12.75	10.839	25.25	.976	37.75	.151	50.25	.015
.50	.000	13.00	10.511	25.50	.943	38.00	.144	50.50	.014
.75	.000	13.25	10.158	25.75	.912	38.25	.138	50.75	.014
1.00	.000	13.50	9.787	26.00	.881	38.50	.133	51.00	.013
1.25	.000	13.75	9.376	26.25	.851	38.75	.127	51.25	.012
1.50	.000	14.00	8.910	26.50	.822	39.00	.122	51.50	.012
1.75	.000	14.25	8.440	26.75	.794	39.25	.117	51.75	.011
2.00	.000	14.50	8.003	27.00	.767	39.50	.112	52.00	.010
2.25	.000	14.75	7.595	27.25	.740	39.75	.107	52.25	.010
2.50	.000	15.00	7.216	27.50	.714	40.00	.102	52.50	.009
2.75	.000	15.25	6.860	27.75	.689	40.25	.098	52.75	.009
3.00	.000	15.50	6.511	28.00	.666	40.50	.094	53.00	.008
3.25	.000	15.75	6.156	28.25	.643	40.75	.090	53.25	.008
3.50	.000	16.00	5.802	28.50	.620	41.00	.086	53.50	.008
3.75	.001	16.25	5.454	28.75	.598	41.25	.082	53.75	.007
4.00	.004	16.50	5.129	29.00	.578	41.50	.079	54.00	.007
4.25	.013	16.75	4.837	29.25	.559	41.75	.075	54.25	.006
4.50	.040	17.00	4.576	29.50	.540	42.00	.072	54.50	.006
4.75	.110	17.25	4.339	29.75	.522	42.25	.069	54.75	.005
5.00	.267	17.50	4.122	30.00	.504	42.50	.066	55.00	.005
5.25	.541	17.75	3.919	30.25	.487	42.75	.063	55.25	.005
5.50	.973	18.00	3.719	30.50	.470	43.00	.060	55.50	.005
5.75	1.669	18.25	3.527	30.75	.453	43.25	.057	55.75	.004
6.00	2.613	18.50	3.352	31.00	.437	43.50	.055	56.00	.004
6.25	3.611	18.75	3.190	31.25	.421	43.75	.052	56.25	.004
6.50	4.580	19.00	3.040	31.50	.406	44.00	.050	56.50	.004
6.75	5.488	19.25	2.894	31.75	.392	44.25	.048	56.75	.003
7.00	6.347	19.50	2.738	32.00	.377	44.50	.045	57.00	.003
7.25	7.142	19.75	2.583	32.25	.363	44.75	.043	57.25	.003
7.50	7.811	20.00	2.445	32.50	.350	45.00	.041	57.50	.003
7.75	8.410	20.25	2.321	32.75	.337	45.25	.039	57.75	.003
8.00	8.976	20.50	2.208	33.00	.324	45.50	.038	58.00	.002
8.25	9.497	20.75	2.105	33.25	.312	45.75	.036	58.25	.002

8.50	9.971	21.00	2.010	33.50	.300	46.00	.034	58.50	.002
8.75	10.397	21.25	1.916	33.75	.289	46.25	.033	58.75	.002
9.00	10.775	21.50	1.820	34.00	.278	46.50	.031	59.00	.002
9.25	11.105	21.75	1.727	34.25	.267	46.75	.030	59.25	.002
9.50	11.388	22.00	1.643	34.50	.257	47.00	.028	59.50	.002
9.75	11.623	22.25	1.566	34.75	.247	47.25	.027	59.75	.002
10.00	11.812	22.50	1.497	35.00	.237	47.50	.026	60.00	.001
10.25	11.950	22.75	1.433	35.25	.228	47.75	.024	60.25	.001
10.50	12.047	23.00	1.373	35.50	.219	48.00	.023	60.50	.001
10.75	12.095	23.25	1.318	35.75	.210	48.25	.022	60.75	.001
11.00	12.098	23.50	1.266	36.00	.202	48.50	.021	61.00	.001
11.25	12.053	23.75	1.217	36.25	.193	48.75	.020	61.25	.001
11.50	11.957	24.00	1.171	36.50	.186	49.00	.019	61.50	.001
11.75	11.818	24.25	1.127	36.75	.178	49.25	.018	61.75	.001
12.00	11.627	24.50	1.086	37.00	.171	49.50	.017	62.00	.000
12.25	11.398	24.75	1.046	37.25	.164	49.75	.016		

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|    READ STORM     |    Filename: V:\01606\Active\160622264
|                   |              \Analysis\SWM\Hydrology\
|                   |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm  |    Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (6206) |   AREA       (ha)=3174.13
| DT=15.0 min      |   TPEAK     (hrs)=  11.25
--------------------   VOLUME     (mm)=  22.21
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	13.00	17.276	26.00	1.082	39.00	.156	52.00	.014
.25	.000	13.25	16.910	26.25	1.042	39.25	.149	52.25	.014
.50	.000	13.50	16.492	26.50	1.006	39.50	.143	52.50	.013
.75	.000	13.75	15.977	26.75	.972	39.75	.137	52.75	.012
1.00	.000	14.00	15.387	27.00	.939	40.00	.131	53.00	.012
1.25	.000	14.25	14.781	27.25	.907	40.25	.126	53.25	.011
1.50	.000	14.50	14.165	27.50	.876	40.50	.121	53.50	.011
1.75	.000	14.75	13.538	27.75	.846	40.75	.116	53.75	.010
2.00	.000	15.00	12.904	28.00	.816	41.00	.111	54.00	.010
2.25	.000	15.25	12.267	28.25	.788	41.25	.106	54.25	.009
2.50	.000	15.50	11.586	28.50	.760	41.50	.102	54.50	.009
2.75	.000	15.75	10.836	28.75	.734	41.75	.097	54.75	.008
3.00	.000	16.00	10.108	29.00	.708	42.00	.093	55.00	.008
3.25	.000	16.25	9.450	29.25	.683	42.25	.089	55.25	.007
3.50	.000	16.50	8.850	29.50	.660	42.50	.085	55.50	.007
3.75	.004	16.75	8.299	29.75	.636	42.75	.082	55.75	.006
4.00	.015	17.00	7.792	30.00	.613	43.00	.078	56.00	.006
4.25	.040	17.25	7.325	30.25	.592	43.25	.075	56.25	.006
4.50	.100	17.50	6.880	30.50	.572	43.50	.071	56.50	.005
4.75	.252	17.75	6.419	30.75	.553	43.75	.068	56.75	.005
5.00	.555	18.00	5.952	31.00	.535	44.00	.065	57.00	.005
5.25	1.117	18.25	5.524	31.25	.516	44.25	.062	57.25	.004
5.50	2.165	18.50	5.151	31.50	.499	44.50	.060	57.50	.004
5.75	3.630	18.75	4.825	31.75	.481	44.75	.057	57.75	.004
6.00	5.115	19.00	4.535	32.00	.464	45.00	.054	58.00	.004
6.25	6.588	19.25	4.274	32.25	.448	45.25	.052	58.25	.003
6.50	7.916	19.50	4.037	32.50	.432	45.50	.050	58.50	.003
6.75	9.053	19.75	3.810	32.75	.417	45.75	.047	58.75	.003

7.00	10.138	20.00	3.591	33.00	.402	46.00	.045	59.00	.003
7.25	11.155	20.25	3.391	33.25	.387	46.25	.043	59.25	.003
7.50	12.095	20.50	3.208	33.50	.373	46.50	.041	59.50	.002
7.75	12.960	20.75	3.023	33.75	.359	46.75	.039	59.75	.002
8.00	13.759	21.00	2.834	34.00	.346	47.00	.038	60.00	.002
8.25	14.501	21.25	2.663	34.25	.333	47.25	.036	60.25	.002
8.50	15.185	21.50	2.512	34.50	.321	47.50	.034	60.50	.002
8.75	15.807	21.75	2.377	34.75	.309	47.75	.033	60.75	.002
9.00	16.365	22.00	2.255	35.00	.297	48.00	.031	61.00	.002
9.25	16.858	22.25	2.144	35.25	.286	48.25	.030	61.25	.002
9.50	17.286	22.50	2.043	35.50	.275	48.50	.028	61.50	.002
9.75	17.649	22.75	1.947	35.75	.264	48.75	.027	61.75	.001
10.00	17.947	23.00	1.848	36.00	.254	49.00	.026	62.00	.001
10.25	18.178	23.25	1.750	36.25	.244	49.25	.025	62.25	.001
10.50	18.372	23.50	1.660	36.50	.234	49.50	.023	62.50	.001
10.75	18.497	23.75	1.579	36.75	.225	49.75	.022	62.75	.001
11.00	18.558	24.00	1.506	37.00	.216	50.00	.021	63.00	.001
11.25	18.585	24.25	1.439	37.25	.208	50.25	.020	63.25	.001
11.50	18.543	24.50	1.378	37.50	.199	50.50	.019	63.50	.000
11.75	18.439	24.75	1.321	37.75	.191	50.75	.018		
12.00	18.299	25.00	1.267	38.00	.184	51.00	.017		
12.25	18.101	25.25	1.217	38.25	.176	51.25	.017		
12.50	17.867	25.50	1.170	38.50	.169	51.50	.016		
12.75	17.605	25.75	1.125	38.75	.162	51.75	.015		

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|    READ STORM     |    Filename: V:\01606\Active\160622264
|                   |              \Analysis\SWM\Hydrology\
|                   |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm  |    Comments: 100yr/12hr
--------------------
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (6207) |   AREA       (ha)=3174.13
| DT=15.0 min      |   TPEAK     (hrs)=  11.00
--------------------   VOLUME     (mm)=  36.01
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	13.25	26.719	26.50	1.285	39.75	.178	53.00	.016
.25	.000	13.50	26.099	26.75	1.232	40.00	.171	53.25	.016
.50	.000	13.75	25.473	27.00	1.183	40.25	.164	53.50	.015
.75	.000	14.00	24.801	27.25	1.137	40.50	.157	53.75	.014
1.00	.000	14.25	24.078	27.50	1.093	40.75	.151	54.00	.014
1.25	.000	14.50	23.314	27.75	1.052	41.00	.145	54.25	.013
1.50	.000	14.75	22.515	28.00	1.015	41.25	.139	54.50	.012
1.75	.000	15.00	21.676	28.25	.980	41.50	.133	54.75	.012
2.00	.000	15.25	20.781	28.50	.946	41.75	.128	55.00	.011
2.25	.000	15.50	19.802	28.75	.913	42.00	.122	55.25	.011
2.50	.000	15.75	18.832	29.00	.882	42.25	.117	55.50	.010
2.75	.000	16.00	17.913	29.25	.851	42.50	.112	55.75	.010
3.00	.000	16.25	16.994	29.50	.821	42.75	.108	56.00	.009
3.25	.000	16.50	16.087	29.75	.792	43.00	.103	56.25	.009
3.50	.003	16.75	15.192	30.00	.764	43.25	.099	56.50	.008
3.75	.015	17.00	14.313	30.25	.737	43.50	.095	56.75	.008
4.00	.047	17.25	13.352	30.50	.711	43.75	.091	57.00	.007
4.25	.113	17.50	12.371	30.75	.686	44.00	.087	57.25	.007
4.50	.262	17.75	11.480	31.00	.662	44.25	.083	57.50	.006
4.75	.583	18.00	10.650	31.25	.639	44.50	.079	57.75	.006

5.00	1.255	18.25	9.888	31.50	.616	44.75	.076	58.00	.006
5.25	2.612	18.50	9.194	31.75	.594	45.00	.073	58.25	.005
5.50	4.641	18.75	8.561	32.00	.574	45.25	.070	58.50	.005
5.75	6.933	19.00	7.966	32.25	.555	45.50	.067	58.75	.005
6.00	9.158	19.25	7.390	32.50	.536	45.75	.064	59.00	.004
6.25	11.133	19.50	6.854	32.75	.518	46.00	.061	59.25	.004
6.50	12.992	19.75	6.350	33.00	.500	46.25	.058	59.50	.004
6.75	14.685	20.00	5.866	33.25	.483	46.50	.056	59.75	.004
7.00	16.258	20.25	5.429	33.50	.466	46.75	.053	60.00	.003
7.25	17.739	20.50	5.046	33.75	.450	47.00	.051	60.25	.003
7.50	19.161	20.75	4.710	34.00	.434	47.25	.049	60.50	.003
7.75	20.564	21.00	4.411	34.25	.418	47.50	.046	60.75	.003
8.00	21.950	21.25	4.142	34.50	.403	47.75	.044	61.00	.003
8.25	23.269	21.50	3.893	34.75	.389	48.00	.042	61.25	.002
8.50	24.471	21.75	3.655	35.00	.375	48.25	.040	61.50	.002
8.75	25.545	22.00	3.432	35.25	.361	48.50	.039	61.75	.002
9.00	26.492	22.25	3.205	35.50	.348	48.75	.037	62.00	.002
9.25	27.306	22.50	2.982	35.75	.335	49.00	.035	62.25	.002
9.50	27.987	22.75	2.788	36.00	.322	49.25	.034	62.50	.002
9.75	28.532	23.00	2.619	36.25	.310	49.50	.032	62.75	.002
10.00	28.954	23.25	2.469	36.50	.299	49.75	.031	63.00	.002
10.25	29.263	23.50	2.335	36.75	.287	50.00	.029	63.25	.001
10.50	29.511	23.75	2.214	37.00	.276	50.25	.028	63.50	.001
10.75	29.671	24.00	2.103	37.25	.266	50.50	.027	63.75	.001
11.00	29.723	24.25	2.003	37.50	.256	50.75	.025	64.00	.001
11.25	29.700	24.50	1.903	37.75	.246	51.00	.024	64.25	.001
11.50	29.576	24.75	1.800	38.00	.236	51.25	.023	64.50	.001
11.75	29.382	25.00	1.704	38.25	.227	51.50	.022	64.75	.001
12.00	29.100	25.25	1.616	38.50	.218	51.75	.021	65.00	.001
12.25	28.756	25.50	1.538	38.75	.210	52.00	.020	65.25	.000
12.50	28.358	25.75	1.466	39.00	.201	52.25	.019		
12.75	27.873	26.00	1.401	39.25	.193	52.50	.018		
13.00	27.326	26.25	1.341	39.50	.186	52.75	.017		

READ STORM | Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6209) | AREA (ha)= 150.47
DT=15.0 min | TPEAK (hrs)= 12.00
VOLUME (mm)= 21.57

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.75	.094	77.50	.017	116.25	.003	155.00	.000
.25	.000	39.00	.094	77.75	.017	116.50	.003	155.25	.000
.50	.000	39.25	.092	78.00	.017	116.75	.003	155.50	.000
.75	.000	39.50	.092	78.25	.017	117.00	.003	155.75	.000
1.00	.000	39.75	.090	78.50	.016	117.25	.003	156.00	.000
1.25	.000	40.00	.090	78.75	.016	117.50	.003	156.25	.000
1.50	.001	40.25	.089	79.00	.016	117.75	.003	156.50	.000
1.75	.001	40.50	.088	79.25	.016	118.00	.003	156.75	.000
2.00	.001	40.75	.087	79.50	.016	118.25	.003	157.00	.000
2.25	.002	41.00	.086	79.75	.016	118.50	.003	157.25	.000
2.50	.002	41.25	.085	80.00	.016	118.75	.003	157.50	.000

2.75	.003	41.50	.084	80.25	.015	119.00	.003	157.75	.000
3.00	.004	41.75	.083	80.50	.015	119.25	.003	158.00	.000
3.25	.006	42.00	.082	80.75	.015	119.50	.003	158.25	.000
3.50	.008	42.25	.082	81.00	.015	119.75	.003	158.50	.000
3.75	.011	42.50	.081	81.25	.015	120.00	.003	158.75	.000
4.00	.015	42.75	.080	81.50	.014	120.25	.002	159.00	.000
4.25	.020	43.00	.079	81.75	.014	120.50	.002	159.25	.000
4.50	.026	43.25	.078	82.00	.014	120.75	.002	159.50	.000
4.75	.035	43.50	.077	82.25	.014	121.00	.002	159.75	.000
5.00	.047	43.75	.077	82.50	.014	121.25	.002	160.00	.000
5.25	.060	44.00	.076	82.75	.014	121.50	.002	160.25	.000
5.50	.074	44.25	.075	83.00	.014	121.75	.002	160.50	.000
5.75	.086	44.50	.074	83.25	.013	122.00	.002	160.75	.000
6.00	.096	44.75	.073	83.50	.013	122.25	.002	161.00	.000
6.25	.104	45.00	.073	83.75	.013	122.50	.002	161.25	.000
6.50	.111	45.25	.072	84.00	.013	122.75	.002	161.50	.000
6.75	.117	45.50	.071	84.25	.013	123.00	.002	161.75	.000
7.00	.122	45.75	.070	84.50	.013	123.25	.002	162.00	.000
7.25	.127	46.00	.069	84.75	.012	123.50	.002	162.25	.000
7.50	.131	46.25	.069	85.00	.012	123.75	.002	162.50	.000
7.75	.135	46.50	.068	85.25	.012	124.00	.002	162.75	.000
8.00	.139	46.75	.067	85.50	.012	124.25	.002	163.00	.000
8.25	.142	47.00	.067	85.75	.012	124.50	.002	163.25	.000
8.50	.146	47.25	.066	86.00	.012	124.75	.002	163.50	.000
8.75	.149	47.50	.065	86.25	.012	125.00	.002	163.75	.000
9.00	.153	47.75	.064	86.50	.012	125.25	.002	164.00	.000
9.25	.157	48.00	.064	86.75	.012	125.50	.002	164.25	.000
9.50	.160	48.25	.063	87.00	.011	125.75	.002	164.50	.000
9.75	.164	48.50	.062	87.25	.011	126.00	.002	164.75	.000
10.00	.174	48.75	.061	87.50	.011	126.25	.002	165.00	.000
10.25	.301	49.00	.061	87.75	.011	126.50	.002	165.25	.000
10.50	.387	49.25	.060	88.00	.011	126.75	.002	165.50	.000
10.75	.446	49.50	.059	88.25	.011	127.00	.002	165.75	.000
11.00	.487	49.75	.059	88.50	.011	127.25	.002	166.00	.000
11.25	.514	50.00	.058	88.75	.010	127.50	.002	166.25	.000
11.50	.529	50.25	.058	89.00	.010	127.75	.002	166.50	.000
11.75	.537	50.50	.057	89.25	.010	128.00	.002	166.75	.000
12.00	.540	50.75	.056	89.50	.010	128.25	.002	167.00	.000
12.25	.538	51.00	.056	89.75	.010	128.50	.002	167.25	.000
12.50	.533	51.25	.055	90.00	.010	128.75	.002	167.50	.000
12.75	.523	51.50	.055	90.25	.010	129.00	.002	167.75	.000
13.00	.510	51.75	.054	90.50	.010	129.25	.002	168.00	.000
13.25	.495	52.00	.053	90.75	.010	129.50	.002	168.25	.000
13.50	.479	52.25	.053	91.00	.010	129.75	.002	168.50	.000
13.75	.464	52.50	.052	91.25	.009	130.00	.002	168.75	.000
14.00	.448	52.75	.052	91.50	.009	130.25	.002	169.00	.000
14.25	.433	53.00	.051	91.75	.009	130.50	.002	169.25	.000
14.50	.419	53.25	.051	92.00	.009	130.75	.002	169.50	.000
14.75	.405	53.50	.050	92.25	.009	131.00	.002	169.75	.000
15.00	.390	53.75	.049	92.50	.009	131.25	.002	170.00	.000
15.25	.377	54.00	.049	92.75	.009	131.50	.002	170.25	.000
15.50	.363	54.25	.048	93.00	.009	131.75	.002	170.50	.000
15.75	.350	54.50	.048	93.25	.008	132.00	.002	170.75	.000
16.00	.338	54.75	.047	93.50	.008	132.25	.002	171.00	.000
16.25	.326	55.00	.047	93.75	.008	132.50	.002	171.25	.000
16.50	.314	55.25	.046	94.00	.008	132.75	.002	171.50	.000
16.75	.302	55.50	.046	94.25	.008	133.00	.002	171.75	.000
17.00	.291	55.75	.045	94.50	.008	133.25	.002	172.00	.000
17.25	.280	56.00	.045	94.75	.008	133.50	.002	172.25	.000
17.50	.269	56.25	.044	95.00	.008	133.75	.002	172.50	.000
17.75	.258	56.50	.044	95.25	.008	134.00	.002	172.75	.000
18.00	.248	56.75	.043	95.50	.008	134.25	.001	173.00	.000
18.25	.238	57.00	.043	95.75	.008	134.50	.001	173.25	.000
18.50	.228	57.25	.042	96.00	.008	134.75	.001	173.50	.000
18.75	.219	57.50	.042	96.25	.008	135.00	.001	173.75	.000
19.00	.210	57.75	.041	96.50	.008	135.25	.001	174.00	.000
19.25	.201	58.00	.041	96.75	.007	135.50	.001	174.25	.000
19.50	.192	58.25	.041	97.00	.007	135.75	.001	174.50	.000
19.75	.184	58.50	.040	97.25	.007	136.00	.001	174.75	.000
20.00	.177	58.75	.039	97.50	.007	136.25	.001	175.00	.000
20.25	.169	59.00	.039	97.75	.007	136.50	.001	175.25	.000
20.50	.167	59.25	.039	98.00	.007	136.75	.001	175.50	.000
20.75	.167	59.50	.038	98.25	.007	137.00	.001	175.75	.000
21.00	.167	59.75	.038	98.50	.007	137.25	.001	176.00	.000
21.25	.166	60.00	.037	98.75	.007	137.50	.001	176.25	.000
21.50	.166	60.25	.037	99.00	.007	137.75	.001	176.50	.000
21.75	.165	60.50	.037	99.25	.006	138.00	.001	176.75	.000
22.00	.165	60.75	.036	99.50	.006	138.25	.001	177.00	.000
22.25	.164	61.00	.036	99.75	.006	138.50	.001	177.25	.000
22.50	.163	61.25	.035	100.00	.006	138.75	.001	177.50	.000

22.75	.163	61.50	.035	100.25	.006	139.00	.001	177.75	.000
23.00	.162	61.75	.035	100.50	.006	139.25	.001	178.00	.000
23.25	.161	62.00	.034	100.75	.006	139.50	.001	178.25	.000
23.50	.161	62.25	.034	101.00	.006	139.75	.001	178.50	.000
23.75	.160	62.50	.033	101.25	.006	140.00	.001	178.75	.000
24.00	.159	62.75	.033	101.50	.006	140.25	.001	179.00	.000
24.25	.158	63.00	.033	101.75	.006	140.50	.001	179.25	.000
24.50	.157	63.25	.032	102.00	.006	140.75	.001	179.50	.000
24.75	.156	63.50	.032	102.25	.006	141.00	.001	179.75	.000
25.00	.155	63.75	.032	102.50	.006	141.25	.001	180.00	.000
25.25	.154	64.00	.031	102.75	.006	141.50	.001	180.25	.000
25.50	.153	64.25	.031	103.00	.006	141.75	.001	180.50	.000
25.75	.152	64.50	.031	103.25	.006	142.00	.001	180.75	.000
26.00	.151	64.75	.030	103.50	.006	142.25	.001	181.00	.000
26.25	.150	65.00	.030	103.75	.005	142.50	.001	181.25	.000
26.50	.149	65.25	.030	104.00	.005	142.75	.001	181.50	.000
26.75	.148	65.50	.029	104.25	.005	143.00	.001	181.75	.000
27.00	.147	65.75	.029	104.50	.005	143.25	.001	182.00	.000
27.25	.145	66.00	.029	104.75	.005	143.50	.001	182.25	.000
27.50	.144	66.25	.028	105.00	.005	143.75	.001	182.50	.000
27.75	.143	66.50	.028	105.25	.005	144.00	.001	182.75	.000
28.00	.142	66.75	.028	105.50	.005	144.25	.001	183.00	.000
28.25	.141	67.00	.027	105.75	.005	144.50	.001	183.25	.000
28.50	.140	67.25	.027	106.00	.005	144.75	.001	183.50	.000
28.75	.139	67.50	.027	106.25	.005	145.00	.001	183.75	.000
29.00	.137	67.75	.027	106.50	.005	145.25	.001	184.00	.000
29.25	.136	68.00	.026	106.75	.005	145.50	.001	184.25	.000
29.50	.135	68.25	.026	107.00	.005	145.75	.001	184.50	.000
29.75	.134	68.50	.026	107.25	.005	146.00	.001	184.75	.000
30.00	.133	68.75	.026	107.50	.004	146.25	.001	185.00	.000
30.25	.132	69.00	.025	107.75	.004	146.50	.001	185.25	.000
30.50	.131	69.25	.025	108.00	.004	146.75	.001	185.50	.000
30.75	.130	69.50	.025	108.25	.004	147.00	.001	185.75	.000
31.00	.128	69.75	.024	108.50	.004	147.25	.001	186.00	.000
31.25	.127	70.00	.024	108.75	.004	147.50	.001	186.25	.000
31.50	.126	70.25	.024	109.00	.004	147.75	.001	186.50	.000
31.75	.125	70.50	.024	109.25	.004	148.00	.001	186.75	.000
32.00	.124	70.75	.023	109.50	.004	148.25	.001	187.00	.000
32.25	.122	71.00	.023	109.75	.004	148.50	.001	187.25	.000
32.50	.121	71.25	.023	110.00	.004	148.75	.001	187.50	.000
32.75	.120	71.50	.022	110.25	.004	149.00	.001	187.75	.000
33.00	.119	71.75	.022	110.50	.004	149.25	.001	188.00	.000
33.25	.118	72.00	.022	110.75	.004	149.50	.001	188.25	.000
33.50	.117	72.25	.022	111.00	.004	149.75	.001	188.50	.000
33.75	.116	72.50	.022	111.25	.004	150.00	.001	188.75	.000
34.00	.114	72.75	.021	111.50	.004	150.25	.001	189.00	.000
34.25	.113	73.00	.021	111.75	.004	150.50	.001	189.25	.000
34.50	.112	73.25	.021	112.00	.004	150.75	.001	189.50	.000
34.75	.111	73.50	.021	112.25	.004	151.00	.001	189.75	.000
35.00	.110	73.75	.020	112.50	.004	151.25	.001	190.00	.000
35.25	.109	74.00	.020	112.75	.004	151.50	.001	190.25	.000
35.50	.108	74.25	.020	113.00	.004	151.75	.001	190.50	.000
35.75	.107	74.50	.020	113.25	.004	152.00	.001	190.75	.000
36.00	.106	74.75	.020	113.50	.004	152.25	.001	191.00	.000
36.25	.105	75.00	.019	113.75	.004	152.50	.001	191.25	.000
36.50	.104	75.25	.019	114.00	.004	152.75	.001	191.50	.000
36.75	.102	75.50	.019	114.25	.003	153.00	.001	191.75	.000
37.00	.102	75.75	.019	114.50	.003	153.25	.000	192.00	.000
37.25	.100	76.00	.018	114.75	.003	153.50	.000	192.25	.000
37.50	.100	76.25	.018	115.00	.003	153.75	.000	192.50	.000
37.75	.098	76.50	.018	115.25	.003	154.00	.000	192.75	.000
38.00	.098	76.75	.018	115.50	.003	154.25	.000	193.00	.000
38.25	.096	77.00	.018	115.75	.003	154.50	.000	193.25	.000
38.50	.096	77.25	.018	116.00	.003	154.75	.000		

READ STORM

Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6210)
DT=15.0 min

AREA (ha)= 150.47
TPEAK (hrs)= 10.25
VOLUME (mm)= 31.33

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.75	.093	77.50	.017	116.25	.003	155.00	.000
.25	.000	39.00	.092	77.75	.017	116.50	.003	155.25	.000
.50	.000	39.25	.091	78.00	.016	116.75	.003	155.50	.000
.75	.000	39.50	.090	78.25	.016	117.00	.003	155.75	.000
1.00	.000	39.75	.090	78.50	.016	117.25	.003	156.00	.000
1.25	.000	40.00	.088	78.75	.016	117.50	.003	156.25	.000
1.50	.001	40.25	.088	79.00	.016	117.75	.003	156.50	.000
1.75	.001	40.50	.086	79.25	.016	118.00	.003	156.75	.000
2.00	.002	40.75	.086	79.50	.016	118.25	.003	157.00	.000
2.25	.002	41.00	.085	79.75	.015	118.50	.003	157.25	.000
2.50	.003	41.25	.084	80.00	.015	118.75	.003	157.50	.000
2.75	.004	41.50	.083	80.25	.015	119.00	.003	157.75	.000
3.00	.006	41.75	.082	80.50	.015	119.25	.003	158.00	.000
3.25	.008	42.00	.081	80.75	.015	119.50	.003	158.25	.000
3.50	.011	42.25	.081	81.00	.014	119.75	.002	158.50	.000
3.75	.015	42.50	.079	81.25	.014	120.00	.002	158.75	.000
4.00	.021	42.75	.079	81.50	.014	120.25	.002	159.00	.000
4.25	.027	43.00	.078	81.75	.014	120.50	.002	159.25	.000
4.50	.035	43.25	.077	82.00	.014	120.75	.002	159.50	.000
4.75	.047	43.50	.076	82.25	.014	121.00	.002	159.75	.000
5.00	.063	43.75	.075	82.50	.014	121.25	.002	160.00	.000
5.25	.082	44.00	.075	82.75	.013	121.50	.002	160.25	.000
5.50	.100	44.25	.074	83.00	.013	121.75	.002	160.50	.000
5.75	.117	44.50	.073	83.25	.013	122.00	.002	160.75	.000
6.00	.130	44.75	.072	83.50	.013	122.25	.002	161.00	.000
6.25	.141	45.00	.071	83.75	.013	122.50	.002	161.25	.000
6.50	.151	45.25	.071	84.00	.013	122.75	.002	161.50	.000
6.75	.160	45.50	.070	84.25	.012	123.00	.002	161.75	.000
7.00	.198	45.75	.069	84.50	.012	123.25	.002	162.00	.000
7.25	.438	46.00	.068	84.75	.012	123.50	.002	162.25	.000
7.50	.588	46.25	.067	85.00	.012	123.75	.002	162.50	.000
7.75	.680	46.50	.067	85.25	.012	124.00	.002	162.75	.000
8.00	.738	46.75	.066	85.50	.012	124.25	.002	163.00	.000
8.25	.782	47.00	.065	85.75	.012	124.50	.002	163.25	.000
8.50	.820	47.25	.065	86.00	.012	124.75	.002	163.50	.000
8.75	.851	47.50	.064	86.25	.012	125.00	.002	163.75	.000
9.00	.879	47.75	.063	86.50	.011	125.25	.002	164.00	.000
9.25	.908	48.00	.063	86.75	.011	125.50	.002	164.25	.000
9.50	.936	48.25	.062	87.00	.011	125.75	.002	164.50	.000
9.75	.960	48.50	.061	87.25	.011	126.00	.002	164.75	.000
10.00	.976	48.75	.061	87.50	.011	126.25	.002	165.00	.000
10.25	.983	49.00	.060	87.75	.011	126.50	.002	165.25	.000
10.50	.983	49.25	.059	88.00	.011	126.75	.002	165.50	.000
10.75	.976	49.50	.059	88.25	.010	127.00	.002	165.75	.000
11.00	.965	49.75	.058	88.50	.010	127.25	.002	166.00	.000
11.25	.951	50.00	.057	88.75	.010	127.50	.002	166.25	.000
11.50	.933	50.25	.057	89.00	.010	127.75	.002	166.50	.000
11.75	.913	50.50	.056	89.25	.010	128.00	.002	166.75	.000
12.00	.892	50.75	.055	89.50	.010	128.25	.002	167.00	.000
12.25	.869	51.00	.055	89.75	.010	128.50	.002	167.25	.000
12.50	.843	51.25	.054	90.00	.010	128.75	.002	167.50	.000
12.75	.813	51.50	.053	90.25	.010	129.00	.002	167.75	.000
13.00	.781	51.75	.053	90.50	.010	129.25	.002	168.00	.000
13.25	.747	52.00	.052	90.75	.009	129.50	.002	168.25	.000
13.50	.715	52.25	.052	91.00	.009	129.75	.002	168.50	.000
13.75	.684	52.50	.051	91.25	.009	130.00	.002	168.75	.000
14.00	.655	52.75	.051	91.50	.009	130.25	.002	169.00	.000
14.25	.627	53.00	.050	91.75	.009	130.50	.002	169.25	.000
14.50	.599	53.25	.049	92.00	.009	130.75	.002	169.50	.000
14.75	.573	53.50	.049	92.25	.009	131.00	.002	169.75	.000

15.00	.548	53.75	.049	92.50	.009	131.25	.002	170.00	.000
15.25	.524	54.00	.048	92.75	.008	131.50	.002	170.25	.000
15.50	.501	54.25	.047	93.00	.008	131.75	.002	170.50	.000
15.75	.479	54.50	.047	93.25	.008	132.00	.002	170.75	.000
16.00	.458	54.75	.046	93.50	.008	132.25	.002	171.00	.000
16.25	.438	55.00	.046	93.75	.008	132.50	.002	171.25	.000
16.50	.418	55.25	.045	94.00	.008	132.75	.002	171.50	.000
16.75	.399	55.50	.045	94.25	.008	133.00	.002	171.75	.000
17.00	.380	55.75	.044	94.50	.008	133.25	.002	172.00	.000
17.25	.362	56.00	.044	94.75	.008	133.50	.002	172.25	.000
17.50	.344	56.25	.043	95.00	.008	133.75	.001	172.50	.000
17.75	.327	56.50	.043	95.25	.008	134.00	.001	172.75	.000
18.00	.311	56.75	.042	95.50	.008	134.25	.001	173.00	.000
18.25	.296	57.00	.042	95.75	.008	134.50	.001	173.25	.000
18.50	.281	57.25	.041	96.00	.008	134.75	.001	173.50	.000
18.75	.267	57.50	.041	96.25	.007	135.00	.001	173.75	.000
19.00	.253	57.75	.041	96.50	.007	135.25	.001	174.00	.000
19.25	.241	58.00	.040	96.75	.007	135.50	.001	174.25	.000
19.50	.228	58.25	.040	97.00	.007	135.75	.001	174.50	.000
19.75	.217	58.50	.039	97.25	.007	136.00	.001	174.75	.000
20.00	.206	58.75	.039	97.50	.007	136.25	.001	175.00	.000
20.25	.196	59.00	.038	97.75	.007	136.50	.001	175.25	.000
20.50	.186	59.25	.038	98.00	.007	136.75	.001	175.50	.000
20.75	.177	59.50	.037	98.25	.007	137.00	.001	175.75	.000
21.00	.167	59.75	.037	98.50	.007	137.25	.001	176.00	.000
21.25	.167	60.00	.037	98.75	.006	137.50	.001	176.25	.000
21.50	.167	60.25	.036	99.00	.006	137.75	.001	176.50	.000
21.75	.167	60.50	.036	99.25	.006	138.00	.001	176.75	.000
22.00	.166	60.75	.035	99.50	.006	138.25	.001	177.00	.000
22.25	.165	61.00	.035	99.75	.006	138.50	.001	177.25	.000
22.50	.165	61.25	.035	100.00	.006	138.75	.001	177.50	.000
22.75	.164	61.50	.034	100.25	.006	139.00	.001	177.75	.000
23.00	.163	61.75	.034	100.50	.006	139.25	.001	178.00	.000
23.25	.163	62.00	.033	100.75	.006	139.50	.001	178.25	.000
23.50	.162	62.25	.033	101.00	.006	139.75	.001	178.50	.000
23.75	.161	62.50	.033	101.25	.006	140.00	.001	178.75	.000
24.00	.160	62.75	.033	101.50	.006	140.25	.001	179.00	.000
24.25	.159	63.00	.032	101.75	.006	140.50	.001	179.25	.000
24.50	.158	63.25	.032	102.00	.006	140.75	.001	179.50	.000
24.75	.157	63.50	.031	102.25	.006	141.00	.001	179.75	.000
25.00	.156	63.75	.031	102.50	.006	141.25	.001	180.00	.000
25.25	.155	64.00	.031	102.75	.006	141.50	.001	180.25	.000
25.50	.154	64.25	.030	103.00	.006	141.75	.001	180.50	.000
25.75	.153	64.50	.030	103.25	.005	142.00	.001	180.75	.000
26.00	.152	64.75	.030	103.50	.005	142.25	.001	181.00	.000
26.25	.151	65.00	.029	103.75	.005	142.50	.001	181.25	.000
26.50	.150	65.25	.029	104.00	.005	142.75	.001	181.50	.000
26.75	.149	65.50	.029	104.25	.005	143.00	.001	181.75	.000
27.00	.147	65.75	.028	104.50	.005	143.25	.001	182.00	.000
27.25	.146	66.00	.028	104.75	.005	143.50	.001	182.25	.000
27.50	.145	66.25	.028	105.00	.005	143.75	.001	182.50	.000
27.75	.144	66.50	.027	105.25	.005	144.00	.001	182.75	.000
28.00	.143	66.75	.027	105.50	.005	144.25	.001	183.00	.000
28.25	.141	67.00	.027	105.75	.005	144.50	.001	183.25	.000
28.50	.140	67.25	.027	106.00	.005	144.75	.001	183.50	.000
28.75	.139	67.50	.026	106.25	.005	145.00	.001	183.75	.000
29.00	.138	67.75	.026	106.50	.005	145.25	.001	184.00	.000
29.25	.137	68.00	.026	106.75	.005	145.50	.001	184.25	.000
29.50	.136	68.25	.026	107.00	.004	145.75	.001	184.50	.000
29.75	.134	68.50	.025	107.25	.004	146.00	.001	184.75	.000
30.00	.133	68.75	.025	107.50	.004	146.25	.001	185.00	.000
30.25	.132	69.00	.025	107.75	.004	146.50	.001	185.25	.000
30.50	.131	69.25	.024	108.00	.004	146.75	.001	185.50	.000
30.75	.130	69.50	.024	108.25	.004	147.00	.001	185.75	.000
31.00	.128	69.75	.024	108.50	.004	147.25	.001	186.00	.000
31.25	.127	70.00	.024	108.75	.004	147.50	.001	186.25	.000
31.50	.126	70.25	.023	109.00	.004	147.75	.001	186.50	.000
31.75	.125	70.50	.023	109.25	.004	148.00	.001	186.75	.000
32.00	.123	70.75	.023	109.50	.004	148.25	.001	187.00	.000
32.25	.122	71.00	.022	109.75	.004	148.50	.001	187.25	.000
32.50	.121	71.25	.022	110.00	.004	148.75	.001	187.50	.000
32.75	.120	71.50	.022	110.25	.004	149.00	.001	187.75	.000
33.00	.119	71.75	.022	110.50	.004	149.25	.001	188.00	.000
33.25	.118	72.00	.022	110.75	.004	149.50	.001	188.25	.000
33.50	.116	72.25	.021	111.00	.004	149.75	.001	188.50	.000
33.75	.115	72.50	.021	111.25	.004	150.00	.001	188.75	.000
34.00	.114	72.75	.021	111.50	.004	150.25	.001	189.00	.000
34.25	.113	73.00	.021	111.75	.004	150.50	.001	189.25	.000
34.50	.112	73.25	.020	112.00	.004	150.75	.001	189.50	.000
34.75	.110	73.50	.020	112.25	.004	151.00	.001	189.75	.000
35.00	.109	73.75	.020	112.50	.004	151.25	.001	190.00	.000
35.25	.108	74.00	.020	112.75	.004	151.50	.001	190.25	.000
35.50	.107	74.25	.020	113.00	.004	151.75	.001	190.50	.000
35.75	.106	74.50	.019	113.25	.004	152.00	.001	190.75	.000
36.00	.105	74.75	.019	113.50	.004	152.25	.001	191.00	.000
36.25	.104	75.00	.019	113.75	.003	152.50	.001	191.25	.000
36.50	.103	75.25	.019	114.00	.003	152.75	.000	191.50	.000
36.75	.102	75.50	.018	114.25	.003	153.00	.000	191.75	.000
37.00	.100	75.75	.018	114.50	.003	153.25	.000	192.00	.000
37.25	.100	76.00	.018	114.75	.003	153.50	.000	192.25	.000
37.50	.098	76.25	.018	115.00	.003	153.75	.000	192.50	.000
37.75	.098	76.50	.018	115.25	.003	154.00	.000	192.75	.000
38.00	.096	76.75	.018	115.50	.003	154.25	.000		
38.25	.095	77.00	.017	115.75	.003	154.50	.000		
38.50	.094	77.25	.017	116.00	.003	154.75	.000		

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|   READ STORM     |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (6211) |   AREA      (ha)= 150.47
| DT=15.0 min      |   TPEAK     (hrs)=   9.50
--------------------   VOLUME     (mm)=  47.16
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.50	.092	77.00	.017	115.50	.003	154.00	.000
.25	.000	38.75	.091	77.25	.016	115.75	.003	154.25	.000
.50	.000	39.00	.090	77.50	.016	116.00	.003	154.50	.000
.75	.000	39.25	.089	77.75	.016	116.25	.003	154.75	.000
1.00	.000	39.50	.088	78.00	.016	116.50	.003	155.00	.000
1.25	.001	39.75	.087	78.25	.016	116.75	.003	155.25	.000
1.50	.002	40.00	.086	78.50	.016	117.00	.003	155.50	.000
1.75	.002	40.25	.085	78.75	.016	117.25	.003	155.75	.000
2.00	.002	40.50	.084	79.00	.015	117.50	.003	156.00	.000
2.25	.003	40.75	.083	79.25	.015	117.75	.003	156.25	.000
2.50	.004	41.00	.082	79.50	.015	118.00	.003	156.50	.000
2.75	.006	41.25	.081	79.75	.015	118.25	.003	156.75	.000
3.00	.008	41.50	.081	80.00	.015	118.50	.003	157.00	.000
3.25	.012	41.75	.080	80.25	.014	118.75	.003	157.25	.000
3.50	.016	42.00	.079	80.50	.014	119.00	.002	157.50	.000
3.75	.021	42.25	.078	80.75	.014	119.25	.002	157.75	.000
4.00	.029	42.50	.077	81.00	.014	119.50	.002	158.00	.000
4.25	.039	42.75	.076	81.25	.014	119.75	.002	158.25	.000
4.50	.050	43.00	.075	81.50	.014	120.00	.002	158.50	.000
4.75	.067	43.25	.075	81.75	.014	120.25	.002	158.75	.000
5.00	.090	43.50	.074	82.00	.013	120.50	.002	159.00	.000
5.25	.116	43.75	.073	82.25	.013	120.75	.002	159.25	.000
5.50	.143	44.00	.072	82.50	.013	121.00	.002	159.50	.000
5.75	.167	44.25	.071	82.75	.013	121.25	.002	159.75	.000
6.00	.792	44.50	.071	83.00	.013	121.50	.002	160.00	.000
6.25	1.133	44.75	.070	83.25	.013	121.75	.002	160.25	.000
6.50	1.315	45.00	.069	83.50	.012	122.00	.002	160.50	.000
6.75	1.401	45.25	.068	83.75	.012	122.25	.002	160.75	.000
7.00	1.438	45.50	.067	84.00	.012	122.50	.002	161.00	.000

7.25	1.468	45.75	.067	84.25	.012	122.75	.002	161.25	.000
7.50	1.503	46.00	.066	84.50	.012	123.00	.002	161.50	.000
7.75	1.539	46.25	.065	84.75	.012	123.25	.002	161.75	.000
8.00	1.578	46.50	.065	85.00	.012	123.50	.002	162.00	.000
8.25	1.629	46.75	.064	85.25	.012	123.75	.002	162.25	.000
8.50	1.687	47.00	.063	85.50	.012	124.00	.002	162.50	.000
8.75	1.741	47.25	.063	85.75	.011	124.25	.002	162.75	.000
9.00	1.784	47.50	.062	86.00	.011	124.50	.002	163.00	.000
9.25	1.814	47.75	.061	86.25	.011	124.75	.002	163.25	.000
9.50	1.824	48.00	.061	86.50	.011	125.00	.002	163.50	.000
9.75	1.814	48.25	.060	86.75	.011	125.25	.002	163.75	.000
10.00	1.788	48.50	.059	87.00	.011	125.50	.002	164.00	.000
10.25	1.752	48.75	.059	87.25	.011	125.75	.002	164.25	.000
10.50	1.710	49.00	.058	87.50	.010	126.00	.002	164.50	.000
10.75	1.663	49.25	.057	87.75	.010	126.25	.002	164.75	.000
11.00	1.613	49.50	.057	88.00	.010	126.50	.002	165.00	.000
11.25	1.561	49.75	.056	88.25	.010	126.75	.002	165.25	.000
11.50	1.507	50.00	.055	88.50	.010	127.00	.002	165.50	.000
11.75	1.452	50.25	.055	88.75	.010	127.25	.002	165.75	.000
12.00	1.397	50.50	.054	89.00	.010	127.50	.002	166.00	.000
12.25	1.342	50.75	.053	89.25	.010	127.75	.002	166.25	.000
12.50	1.286	51.00	.053	89.50	.010	128.00	.002	166.50	.000
12.75	1.225	51.25	.052	89.75	.010	128.25	.002	166.75	.000
13.00	1.162	51.50	.052	90.00	.009	128.50	.002	167.00	.000
13.25	1.100	51.75	.051	90.25	.009	128.75	.002	167.25	.000
13.50	1.041	52.00	.051	90.50	.009	129.00	.002	167.50	.000
13.75	.985	52.25	.050	90.75	.009	129.25	.002	167.75	.000
14.00	.933	52.50	.049	91.00	.009	129.50	.002	168.00	.000
14.25	.883	52.75	.049	91.25	.009	129.75	.002	168.25	.000
14.50	.837	53.00	.049	91.50	.009	130.00	.002	168.50	.000
14.75	.793	53.25	.048	91.75	.009	130.25	.002	168.75	.000
15.00	.751	53.50	.047	92.00	.008	130.50	.002	169.00	.000
15.25	.712	53.75	.047	92.25	.008	130.75	.002	169.25	.000
15.50	.675	54.00	.046	92.50	.008	131.00	.002	169.50	.000
15.75	.639	54.25	.046	92.75	.008	131.25	.002	169.75	.000
16.00	.604	54.50	.045	93.00	.008	131.50	.002	170.00	.000
16.25	.571	54.75	.045	93.25	.008	131.75	.002	170.25	.000
16.50	.538	55.00	.044	93.50	.008	132.00	.002	170.50	.000
16.75	.507	55.25	.044	93.75	.008	132.25	.002	170.75	.000
17.00	.477	55.50	.043	94.00	.008	132.50	.002	171.00	.000
17.25	.450	55.75	.043	94.25	.008	132.75	.002	171.25	.000
17.50	.423	56.00	.042	94.50	.008	133.00	.001	171.50	.000
17.75	.397	56.25	.042	94.75	.008	133.25	.001	171.75	.000
18.00	.374	56.50	.041	95.00	.008	133.50	.001	172.00	.000
18.25	.352	56.75	.041	95.25	.008	133.75	.001	172.25	.000
18.50	.330	57.00	.041	95.50	.007	134.00	.001	172.50	.000
18.75	.310	57.25	.040	95.75	.007	134.25	.001	172.75	.000
19.00	.292	57.50	.039	96.00	.007	134.50	.001	173.00	.000
19.25	.274	57.75	.039	96.25	.007	134.75	.001	173.25	.000
19.50	.258	58.00	.039	96.50	.007	135.00	.001	173.50	.000
19.75	.242	58.25	.038	96.75	.007	135.25	.001	173.75	.000
20.00	.228	58.50	.038	97.00	.007	135.50	.001	174.00	.000
20.25	.214	58.75	.037	97.25	.007	135.75	.001	174.25	.000
20.50	.201	59.00	.037	97.50	.007	136.00	.001	174.50	.000
20.75	.189	59.25	.037	97.75	.007	136.25	.001	174.75	.000
21.00	.178	59.50	.036	98.00	.006	136.50	.001	175.00	.000
21.25	.167	59.75	.036	98.25	.006	136.75	.001	175.25	.000
21.50	.167	60.00	.035	98.50	.006	137.00	.001	175.50	.000
21.75	.167	60.25	.035	98.75	.006	137.25	.001	175.75	.000
22.00	.166	60.50	.035	99.00	.006	137.50	.001	176.00	.000
22.25	.166	60.75	.034	99.25	.006	137.75	.001	176.25	.000
22.50	.165	61.00	.034	99.50	.006	138.00	.001	176.50	.000
22.75	.164	61.25	.033	99.75	.006	138.25	.001	176.75	.000
23.00	.163	61.50	.033	100.00	.006	138.50	.001	177.00	.000
23.25	.163	61.75	.033	100.25	.006	138.75	.001	177.25	.000
23.50	.162	62.00	.032	100.50	.006	139.00	.001	177.50	.000
23.75	.161	62.25	.032	100.75	.006	139.25	.001	177.75	.000
24.00	.160	62.50	.032	101.00	.006	139.50	.001	178.00	.000
24.25	.159	62.75	.031	101.25	.006	139.75	.001	178.25	.000
24.50	.158	63.00	.031	101.50	.006	140.00	.001	178.50	.000
24.75	.157	63.25	.031	101.75	.006	140.25	.001	178.75	.000
25.00	.156	63.50	.030	102.00	.006	140.50	.001	179.00	.000
25.25	.155	63.75	.030	102.25	.006	140.75	.001	179.25	.000
25.50	.153	64.00	.030	102.50	.005	141.00	.001	179.50	.000
25.75	.153	64.25	.029	102.75	.005	141.25	.001	179.75	.000
26.00	.151	64.50	.029	103.00	.005	141.50	.001	180.00	.000
26.25	.150	64.75	.029	103.25	.005	141.75	.001	180.25	.000
26.50	.149	65.00	.028	103.50	.005	142.00	.001	180.50	.000
26.75	.147	65.25	.028	103.75	.005	142.25	.001	180.75	.000
27.00	.146	65.50	.028	104.00	.005	142.50	.001	181.00	.000
27.25	.145	65.75	.027	104.25	.005	142.75	.001	181.25	.000
27.50	.144	66.00	.027	104.50	.005	143.00	.001	181.50	.000
27.75	.143	66.25	.027	104.75	.005	143.25	.001	181.75	.000
28.00	.141	66.50	.027	105.00	.005	143.50	.001	182.00	.000
28.25	.140	66.75	.026	105.25	.005	143.75	.001	182.25	.000
28.50	.139	67.00	.026	105.50	.005	144.00	.001	182.50	.000
28.75	.137	67.25	.026	105.75	.005	144.25	.001	182.75	.000
29.00	.136	67.50	.026	106.00	.005	144.50	.001	183.00	.000
29.25	.135	67.75	.025	106.25	.004	144.75	.001	183.25	.000
29.50	.134	68.00	.025	106.50	.004	145.00	.001	183.50	.000
29.75	.132	68.25	.025	106.75	.004	145.25	.001	183.75	.000
30.00	.131	68.50	.024	107.00	.004	145.50	.001	184.00	.000
30.25	.130	68.75	.024	107.25	.004	145.75	.001	184.25	.000
30.50	.129	69.00	.024	107.50	.004	146.00	.001	184.50	.000
30.75	.127	69.25	.024	107.75	.004	146.25	.001	184.75	.000
31.00	.126	69.50	.023	108.00	.004	146.50	.001	185.00	.000
31.25	.125	69.75	.023	108.25	.004	146.75	.001	185.25	.000
31.50	.124	70.00	.023	108.50	.004	147.00	.001	185.50	.000
31.75	.122	70.25	.022	108.75	.004	147.25	.001	185.75	.000
32.00	.121	70.50	.022	109.00	.004	147.50	.001	186.00	.000
32.25	.120	70.75	.022	109.25	.004	147.75	.001	186.25	.000
32.50	.119	71.00	.022	109.50	.004	148.00	.001	186.50	.000
32.75	.118	71.25	.022	109.75	.004	148.25	.001	186.75	.000
33.00	.116	71.50	.021	110.00	.004	148.50	.001	187.00	.000
33.25	.115	71.75	.021	110.25	.004	148.75	.001	187.25	.000
33.50	.114	72.00	.021	110.50	.004	149.00	.001	187.50	.000
33.75	.113	72.25	.021	110.75	.004	149.25	.001	187.75	.000
34.00	.112	72.50	.020	111.00	.004	149.50	.001	188.00	.000
34.25	.110	72.75	.020	111.25	.004	149.75	.001	188.25	.000
34.50	.109	73.00	.020	111.50	.004	150.00	.001	188.50	.000
34.75	.108	73.25	.020	111.75	.004	150.25	.001	188.75	.000
35.00	.107	73.50	.020	112.00	.004	150.50	.001	189.00	.000
35.25	.106	73.75	.019	112.25	.004	150.75	.001	189.25	.000
35.50	.104	74.00	.019	112.50	.004	151.00	.001	189.50	.000
35.75	.104	74.25	.019	112.75	.004	151.25	.001	189.75	.000
36.00	.102	74.50	.019	113.00	.003	151.50	.001	190.00	.000
36.25	.101	74.75	.018	113.25	.003	151.75	.001	190.25	.000
36.50	.100	75.00	.018	113.50	.003	152.00	.000	190.50	.000
36.75	.099	75.25	.018	113.75	.003	152.25	.000	190.75	.000
37.00	.098	75.50	.018	114.00	.003	152.50	.000	191.00	.000
37.25	.097	75.75	.018	114.25	.003	152.75	.000	191.25	.000
37.50	.096	76.00	.018	114.50	.003	153.00	.000	191.50	.000
37.75	.095	76.25	.017	114.75	.003	153.25	.000	191.75	.000
38.00	.094	76.50	.017	115.00	.003	153.50	.000	192.00	.000
38.25	.093	76.75	.017	115.25	.003	153.75	.000		

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|   READ STORM     |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm |    Comments: 100yr/12hr
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

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| READ HYD  (6204) |   AREA       (ha)=2846.70
| DT=15.0 min      |   TPEAK     (hrs)=   9.50
--------------------   VOLUME     (mm)=  51.01
  Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
  Comments:
```

TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW

hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
.00	.000	41.75	.312	83.50	.016	125.25	.004	167.00	.001
.25	.000	42.00	.303	83.75	.016	125.50	.004	167.25	.001
.50	.000	42.25	.293	84.00	.016	125.75	.004	167.50	.001
.75	.000	42.50	.285	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.276	84.50	.016	126.25	.004	168.00	.001
1.25	.001	43.00	.268	84.75	.016	126.50	.004	168.25	.001
1.50	.002	43.25	.259	85.00	.015	126.75	.004	168.50	.001
1.75	.003	43.50	.252	85.25	.015	127.00	.004	168.75	.001
2.00	.005	43.75	.244	85.50	.015	127.25	.003	169.00	.001
2.25	.007	44.00	.237	85.75	.015	127.50	.003	169.25	.001
2.50	.010	44.25	.230	86.00	.015	127.75	.003	169.50	.001
2.75	.014	44.50	.223	86.25	.015	128.00	.003	169.75	.001
3.00	.019	44.75	.216	86.50	.015	128.25	.003	170.00	.001
3.25	.027	45.00	.210	86.75	.014	128.50	.003	170.25	.001
3.50	.040	45.25	.204	87.00	.014	128.75	.003	170.50	.001
3.75	.068	45.50	.198	87.25	.014	129.00	.003	170.75	.001
4.00	.125	45.75	.192	87.50	.014	129.25	.003	171.00	.001
4.25	.233	46.00	.186	87.75	.014	129.50	.003	171.25	.001
4.50	.561	46.25	.181	88.00	.014	129.75	.003	171.50	.001
4.75	1.618	46.50	.176	88.25	.014	130.00	.003	171.75	.001
5.00	3.645	46.75	.171	88.50	.014	130.25	.003	172.00	.001
5.25	6.226	47.00	.166	88.75	.013	130.50	.003	172.25	.001
5.50	9.013	47.25	.161	89.00	.013	130.75	.003	172.50	.001
5.75	11.783	47.50	.156	89.25	.013	131.00	.003	172.75	.001
6.00	14.764	47.75	.152	89.50	.013	131.25	.003	173.00	.001
6.25	17.954	48.00	.148	89.75	.013	131.50	.003	173.25	.001
6.50	21.172	48.25	.144	90.00	.013	131.75	.003	173.50	.001
6.75	24.399	48.50	.140	90.25	.013	132.00	.003	173.75	.001
7.00	27.575	48.75	.136	90.50	.013	132.25	.003	174.00	.001
7.25	30.634	49.00	.132	90.75	.012	132.50	.003	174.25	.001
7.50	33.455	49.25	.129	91.00	.012	132.75	.003	174.50	.001
7.75	35.957	49.50	.125	91.25	.012	133.00	.003	174.75	.001
8.00	38.116	49.75	.122	91.50	.012	133.25	.003	175.00	.001
8.25	39.926	50.00	.119	91.75	.012	133.50	.003	175.25	.001
8.50	41.359	50.25	.116	92.00	.012	133.75	.003	175.50	.001
8.75	42.397	50.50	.113	92.25	.012	134.00	.003	175.75	.001
9.00	43.074	50.75	.110	92.50	.012	134.25	.003	176.00	.001
9.25	43.427	51.00	.107	92.75	.012	134.50	.003	176.25	.001
9.50	43.476	51.25	.105	93.00	.011	134.75	.003	176.50	.001
9.75	43.245	51.50	.102	93.25	.011	135.00	.003	176.75	.001
10.00	42.774	51.75	.100	93.50	.011	135.25	.003	177.00	.001
10.25	42.103	52.00	.097	93.75	.011	135.50	.003	177.25	.001
10.50	41.265	52.25	.095	94.00	.011	135.75	.003	177.50	.001
10.75	40.283	52.50	.093	94.25	.011	136.00	.003	177.75	.001
11.00	39.191	52.75	.091	94.50	.011	136.25	.003	178.00	.001
11.25	38.019	53.00	.088	94.75	.011	136.50	.003	178.25	.001
11.50	36.796	53.25	.086	95.00	.011	136.75	.003	178.50	.001
11.75	35.547	53.50	.085	95.25	.011	137.00	.003	178.75	.001
12.00	34.278	53.75	.083	95.50	.010	137.25	.003	179.00	.001
12.25	33.005	54.00	.081	95.75	.010	137.50	.003	179.25	.001
12.50	31.723	54.25	.079	96.00	.010	137.75	.002	179.50	.001
12.75	30.425	54.50	.077	96.25	.010	138.00	.002	179.75	.001
13.00	29.110	54.75	.076	96.50	.010	138.25	.002	180.00	.001
13.25	27.805	55.00	.074	96.75	.010	138.50	.002	180.25	.001
13.50	26.517	55.25	.073	97.00	.010	138.75	.002	180.50	.001
13.75	25.258	55.50	.071	97.25	.010	139.00	.002	180.75	.001
14.00	24.032	55.75	.070	97.50	.010	139.25	.002	181.00	.001
14.25	22.841	56.00	.068	97.75	.010	139.50	.002	181.25	.001
14.50	21.680	56.25	.067	98.00	.010	139.75	.002	181.50	.001
14.75	20.554	56.50	.066	98.25	.009	140.00	.002	181.75	.001
15.00	19.442	56.75	.064	98.50	.009	140.25	.002	182.00	.001
15.25	18.332	57.00	.063	98.75	.009	140.50	.002	182.25	.001
15.50	17.264	57.25	.062	99.00	.009	140.75	.002	182.50	.001
15.75	16.262	57.50	.061	99.25	.009	141.00	.002	182.75	.001
16.00	15.317	57.75	.060	99.50	.009	141.25	.002	183.00	.001
16.25	14.420	58.00	.058	99.75	.009	141.50	.002	183.25	.001
16.50	13.559	58.25	.057	100.00	.009	141.75	.002	183.50	.001
16.75	12.751	58.50	.056	100.25	.009	142.00	.002	183.75	.001
17.00	12.011	58.75	.055	100.50	.009	142.25	.002	184.00	.001
17.25	11.333	59.00	.054	100.75	.009	142.50	.002	184.25	.001
17.50	10.708	59.25	.053	101.00	.009	142.75	.002	184.50	.001
17.75	10.105	59.50	.052	101.25	.009	143.00	.002	184.75	.001
18.00	9.510	59.75	.051	101.50	.008	143.25	.002	185.00	.001
18.25	8.955	60.00	.051	101.75	.008	143.50	.002	185.25	.001
18.50	8.455	60.25	.050	102.00	.008	143.75	.002	185.50	.001
18.75	8.001	60.50	.049	102.25	.008	144.00	.002	185.75	.001
19.00	7.577	60.75	.048	102.50	.008	144.25	.002	186.00	.001
19.25	7.165	61.00	.047	102.75	.008	144.50	.002	186.25	.001
19.50	6.771	61.25	.047	103.00	.008	144.75	.002	186.50	.001

19.75	6.410	61.50	.046	103.25	.008	145.00	.002	186.75	.001
20.00	6.080	61.75	.045	103.50	.008	145.25	.002	187.00	.001
20.25	5.778	62.00	.044	103.75	.008	145.50	.002	187.25	.001
20.50	5.489	62.25	.044	104.00	.008	145.75	.002	187.50	.001
20.75	5.207	62.50	.043	104.25	.008	146.00	.002	187.75	.001
21.00	4.945	62.75	.042	104.50	.008	146.25	.002	188.00	.001
21.25	4.709	63.00	.042	104.75	.008	146.50	.002	188.25	.001
21.50	4.494	63.25	.041	105.00	.008	146.75	.002	188.50	.001
21.75	4.291	63.50	.040	105.25	.007	147.00	.002	188.75	.001
22.00	4.090	63.75	.040	105.50	.007	147.25	.002	189.00	.001
22.25	3.897	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	3.718	64.25	.039	106.00	.007	147.75	.002	189.50	.001
22.75	3.554	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	3.405	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	3.265	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	3.135	65.25	.036	107.00	.007	148.75	.002	190.50	.001
23.75	3.014	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	2.899	65.75	.035	107.50	.007	149.25	.002	191.00	.001
24.25	2.791	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	2.689	66.25	.034	108.00	.007	149.75	.002	191.50	.001
24.75	2.592	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	2.492	66.75	.033	108.50	.007	150.25	.002	192.00	.001
25.25	2.386	67.00	.033	108.75	.007	150.50	.002	192.25	.001
25.50	2.286	67.25	.032	109.00	.007	150.75	.002	192.50	.001
25.75	2.194	67.50	.032	109.25	.007	151.00	.002	192.75	.001
26.00	2.110	67.75	.032	109.50	.006	151.25	.002	193.00	.000
26.25	2.034	68.00	.031	109.75	.006	151.50	.002	193.25	.000
26.50	1.957	68.25	.031	110.00	.006	151.75	.002	193.50	.000
26.75	1.877	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.802	68.75	.030	110.50	.006	152.25	.002	194.00	.000
27.25	1.732	69.00	.030	110.75	.006	152.50	.002	194.25	.000
27.50	1.669	69.25	.029	111.00	.006	152.75	.002	194.50	.000
27.75	1.611	69.50	.029	111.25	.006	153.00	.002	194.75	.000
28.00	1.557	69.75	.029	111.50	.006	153.25	.002	195.00	.000
28.25	1.507	70.00	.028	111.75	.006	153.50	.002	195.25	.000
28.50	1.460	70.25	.028	112.00	.006	153.75	.002	195.50	.000
28.75	1.415	70.50	.028	112.25	.006	154.00	.002	195.75	.000
29.00	1.372	70.75	.027	112.50	.006	154.25	.002	196.00	.000
29.25	1.331	71.00	.027	112.75	.006	154.50	.002	196.25	.000
29.50	1.292	71.25	.027	113.00	.006	154.75	.002	196.50	.000
29.75	1.254	71.50	.027	113.25	.006	155.00	.002	196.75	.000
30.00	1.217	71.75	.026	113.50	.006	155.25	.001	197.00	.000
30.25	1.182	72.00	.026	113.75	.006	155.50	.001	197.25	.000
30.50	1.148	72.25	.026	114.00	.006	155.75	.001	197.50	.000
30.75	1.115	72.50	.025	114.25	.006	156.00	.001	197.75	.000
31.00	1.084	72.75	.025	114.50	.005	156.25	.001	198.00	.000
31.25	1.053	73.00	.025	114.75	.005	156.50	.001	198.25	.000
31.50	1.024	73.25	.025	115.00	.005	156.75	.001	198.50	.000
31.75	.995	73.50	.024	115.25	.005	157.00	.001	198.75	.000
32.00	.967	73.75	.024	115.50	.005	157.25	.001	199.00	.000
32.25	.940	74.00	.024	115.75	.005	157.50	.001	199.25	.000
32.50	.913	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.888	74.50	.023	116.25	.005	158.00	.001	199.75	.000
33.00	.863	74.75	.023	116.50	.005	158.25	.001	200.00	.000
33.25	.838	75.00	.023	116.75	.005	158.50	.001	200.25	.000
33.50	.814	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.791	75.50	.022	117.25	.005	159.00	.001	200.75	.000
34.00	.769	75.75	.022	117.50	.005	159.25	.001	201.00	.000
34.25	.748	76.00	.022	117.75	.005	159.50	.001	201.25	.000
34.50	.728	76.25	.022	118.00	.005	159.75	.001	201.50	.000
34.75	.708	76.50	.021	118.25	.005	160.00	.001	201.75	.000
35.00	.689	76.75	.021	118.50	.005	160.25	.001	202.00	.000
35.25	.671	77.00	.021	118.75	.005	160.50	.001	202.25	.000
35.50	.652	77.25	.021	119.00	.005	160.75	.001	202.50	.000
35.75	.634	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.616	77.75	.020	119.50	.005	161.25	.001	203.00	.000
36.25	.598	78.00	.020	119.75	.005	161.50	.001	203.25	.000
36.50	.581	78.25	.020	120.00	.005	161.75	.001	203.50	.000
36.75	.565	78.50	.020	120.25	.005	162.00	.001	203.75	.000
37.00	.549	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.534	79.00	.019	120.75	.004	162.50	.001	204.25	.000
37.50	.519	79.25	.019	121.00	.004	162.75	.001	204.50	.000
37.75	.505	79.50	.019	121.25	.004	163.00	.001	204.75	.000
38.00	.490	79.75	.019	121.50	.004	163.25	.001	205.00	.000
38.25	.476	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.463	80.25	.018	122.00	.004	163.75	.001	205.50	.000
38.75	.449	80.50	.018	122.25	.004	164.00	.001	205.75	.000
39.00	.436	80.75	.018	122.50	.004	164.25	.001	206.00	.000
39.25	.423	81.00	.018	122.75	.004	164.50	.001	206.25	.000
39.50	.411	81.25	.018	123.00	.004	164.75	.001	206.50	.000

39.75	.399	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.387	81.75	.017	123.50	.004	165.25	.001	207.00	.000
40.25	.375	82.00	.017	123.75	.004	165.50	.001	207.25	.000
40.50	.364	82.25	.017	124.00	.004	165.75	.001	207.50	.000
40.75	.353	82.50	.017	124.25	.004	166.00	.001		
41.00	.342	82.75	.017	124.50	.004	166.25	.001		
41.25	.332	83.00	.017	124.75	.004	166.50	.001		
41.50	.322	83.25	.016	125.00	.004	166.75	.001		

READ STORM | Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6200) | AREA (ha)= 165.44

DT=15.0 min | TPEAK (hrs)= 5.25

VOLUME (mm)= 60.21

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	8.50	2.667	17.00	.259	25.50	.015	34.00	.001
.25	.000	8.75	2.544	17.25	.239	25.75	.014	34.25	.001
.50	.035	9.00	2.445	17.50	.220	26.00	.013	34.50	.001
.75	.081	9.25	2.352	17.75	.202	26.25	.012	34.75	.001
1.00	.104	9.50	2.195	18.00	.186	26.50	.011	35.00	.001
1.25	.115	9.75	2.071	18.25	.172	26.75	.010	35.25	.001
1.50	.121	10.00	1.965	18.50	.157	27.00	.009	35.50	.001
1.75	.124	10.25	1.864	18.75	.145	27.25	.008	35.75	.001
2.00	.125	10.50	1.767	19.00	.134	27.50	.008	36.00	.001
2.25	.126	10.75	1.673	19.25	.123	27.75	.008	36.25	.001
2.50	.439	11.00	1.585	19.50	.113	28.00	.007	36.50	.000
2.75	.597	11.25	1.498	19.75	.104	28.25	.006	36.75	.000
3.00	.676	11.50	1.414	20.00	.096	28.50	.006	37.00	.000
3.25	.715	11.75	1.334	20.25	.088	28.75	.005	37.25	.000
3.50	1.428	12.00	1.260	20.50	.082	29.00	.005	37.50	.000
3.75	1.791	12.25	1.189	20.75	.075	29.25	.004	37.75	.000
4.00	1.983	12.50	1.060	21.00	.069	29.50	.004	38.00	.000
4.25	2.092	12.75	.965	21.25	.063	29.75	.003	38.25	.000
4.50	3.996	13.00	.890	21.50	.058	30.00	.003	38.50	.000
4.75	5.005	13.25	.826	21.75	.054	30.25	.003	38.75	.000
5.00	5.584	13.50	.769	22.00	.050	30.50	.003	39.00	.000
5.25	5.967	13.75	.718	22.25	.045	30.75	.003	39.25	.000
5.50	4.177	14.00	.671	22.50	.042	31.00	.003	39.50	.000
5.75	3.366	14.25	.625	22.75	.039	31.25	.003	39.75	.000
6.00	3.052	14.50	.583	23.00	.035	31.50	.003	40.00	.000
6.25	2.995	14.75	.541	23.25	.033	31.75	.002	40.25	.000
6.50	2.691	15.00	.502	23.50	.030	32.00	.002	40.50	.000
6.75	2.637	15.25	.464	23.75	.028	32.25	.002	40.75	.000
7.00	2.707	15.50	.427	24.00	.025	32.50	.002	41.00	.000
7.25	2.835	15.75	.393	24.25	.024	32.75	.002	41.25	.000
7.50	2.798	16.00	.361	24.50	.022	33.00	.002		
7.75	2.826	16.25	.333	24.75	.020	33.25	.001		
8.00	2.854	16.50	.306	25.00	.019	33.50	.001		
8.25	2.850	16.75	.282	25.25	.017	33.75	.001		

READ STORM | Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST

Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6208) | AREA (ha)=3174.13

DT=15.0 min | TPEAK (hrs)= 10.50

VOLUME (mm)= 48.33

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	13.50	33.456	27.00	1.384	40.50	.185	54.00	.017
.25	.000	13.75	32.478	27.25	1.324	40.75	.177	54.25	.016
.50	.000	14.00	31.519	27.50	1.269	41.00	.170	54.50	.015
.75	.000	14.25	30.583	27.75	1.217	41.25	.163	54.75	.014
1.00	.000	14.50	29.647	28.00	1.169	41.50	.157	55.00	.014
1.25	.000	14.75	28.732	28.25	1.123	41.75	.150	55.25	.013
1.50	.000	15.00	27.797	28.50	1.079	42.00	.144	55.50	.012
1.75	.000	15.25	26.822	28.75	1.040	42.25	.138	55.75	.012
2.00	.000	15.50	25.819	29.00	1.004	42.50	.133	56.00	.011
2.25	.000	15.75	24.782	29.25	.969	42.75	.127	56.25	.011
2.50	.000	16.00	23.705	29.50	.936	43.00	.122	56.50	.010
2.75	.000	16.25	22.553	29.75	.903	43.25	.117	56.75	.010
3.00	.000	16.50	21.333	30.00	.871	43.50	.112	57.00	.009
3.25	.001	16.75	20.117	30.25	.841	43.75	.107	57.25	.009
3.50	.007	17.00	19.007	30.50	.811	44.00	.103	57.50	.008
3.75	.031	17.25	17.978	30.75	.783	44.25	.099	57.75	.008
4.00	.090	17.50	16.959	31.00	.755	44.50	.094	58.00	.007
4.25	.213	17.75	15.960	31.25	.728	44.75	.090	58.25	.007
4.50	.461	18.00	14.928	31.50	.703	45.00	.087	58.50	.007
4.75	.993	18.25	13.844	31.75	.679	45.25	.083	58.75	.006
5.00	2.180	18.50	12.810	32.00	.655	45.50	.079	59.00	.006
5.25	4.282	18.75	11.874	32.25	.631	45.75	.076	59.25	.005
5.50	6.983	19.00	11.000	32.50	.609	46.00	.073	59.50	.005
5.75	9.898	19.25	10.188	32.75	.588	46.25	.070	59.75	.005
6.00	12.631	19.50	9.449	33.00	.568	46.50	.067	60.00	.004
6.25	15.243	19.75	8.776	33.25	.549	46.75	.064	60.25	.004
6.50	17.642	20.00	8.123	33.50	.531	47.00	.061	60.50	.004
6.75	19.869	20.25	7.503	33.75	.513	47.25	.058	60.75	.004
7.00	22.090	20.50	6.950	34.00	.495	47.50	.056	61.00	.003
7.25	24.379	20.75	6.438	34.25	.478	47.75	.053	61.25	.003
7.50	26.607	21.00	5.944	34.50	.462	48.00	.051	61.50	.003
7.75	28.732	21.25	5.489	34.75	.445	48.25	.049	61.75	.003
8.00	30.732	21.50	5.092	35.00	.430	48.50	.047	62.00	.003
8.25	32.608	21.75	4.743	35.25	.414	48.75	.044	62.25	.003
8.50	34.433	22.00	4.433	35.50	.400	49.00	.043	62.50	.002
8.75	36.136	22.25	4.156	35.75	.385	49.25	.041	62.75	.002
9.00	37.579	22.50	3.900	36.00	.371	49.50	.039	63.00	.002
9.25	38.753	22.75	3.656	36.25	.358	49.75	.037	63.25	.002
9.50	39.668	23.00	3.411	36.50	.345	50.00	.035	63.50	.002
9.75	40.329	23.25	3.167	36.75	.332	50.25	.034	63.75	.002
10.00	40.753	23.50	2.948	37.00	.320	50.50	.032	64.00	.002
10.25	40.957	23.75	2.758	37.25	.308	50.75	.031	64.25	.002
10.50	40.963	24.00	2.592	37.50	.296	51.00	.029	64.50	.001
10.75	40.794	24.25	2.444	37.75	.285	51.25	.028	64.75	.001
11.00	40.477	24.50	2.311	38.00	.274	51.50	.027	65.00	.001
11.25	40.046	24.75	2.191	38.25	.264	51.75	.026	65.25	.001

11.50	39.521	25.00	2.081	38.50	.254	52.00	.024	65.50	.001
11.75	38.908	25.25	1.982	38.75	.244	52.25	.023	65.75	.001
12.00	38.213	25.50	1.880	39.00	.235	52.50	.022	66.00	.001
12.25	37.509	25.75	1.777	39.25	.225	52.75	.021	66.25	.000
12.50	36.815	26.00	1.682	39.50	.217	53.00	.020		
12.75	36.072	26.25	1.596	39.75	.208	53.25	.019		
13.00	35.259	26.50	1.518	40.00	.200	53.50	.018		
13.25	34.386	26.75	1.448	40.25	.192	53.75	.017		

| READ STORM | | Filename: V:\01606\Active\160622264
| | \Analysis\SWM\Hydrology\
| | VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 88.54 mm | Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

| READ HYD (6212) | AREA (ha)= 150.47
| DT=15.0 min | TPEAK (hrs)= 9.00
VOLUME (mm)= 60.86

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	38.50	.089	77.00	.016	115.50	.003	154.00	.000
.25	.000	38.75	.088	77.25	.016	115.75	.003	154.25	.000
.50	.000	39.00	.088	77.50	.016	116.00	.003	154.50	.000
.75	.000	39.25	.086	77.75	.016	116.25	.003	154.75	.000
1.00	.001	39.50	.086	78.00	.016	116.50	.003	155.00	.000
1.25	.001	39.75	.084	78.25	.015	116.75	.003	155.25	.000
1.50	.002	40.00	.084	78.50	.015	117.00	.003	155.50	.000
1.75	.002	40.25	.083	78.75	.015	117.25	.003	155.75	.000
2.00	.003	40.50	.082	79.00	.015	117.50	.003	156.00	.000
2.25	.004	40.75	.081	79.25	.015	117.75	.003	156.25	.000
2.50	.005	41.00	.080	79.50	.014	118.00	.003	156.50	.000
2.75	.007	41.25	.079	79.75	.014	118.25	.002	156.75	.000
3.00	.010	41.50	.079	80.00	.014	118.50	.002	157.00	.000
3.25	.014	41.75	.078	80.25	.014	118.75	.002	157.25	.000
3.50	.019	42.00	.077	80.50	.014	119.00	.002	157.50	.000
3.75	.027	42.25	.076	80.75	.014	119.25	.002	157.75	.000
4.00	.037	42.50	.075	81.00	.014	119.50	.002	158.00	.000
4.25	.048	42.75	.074	81.25	.014	119.75	.002	158.25	.000
4.50	.063	43.00	.073	81.50	.013	120.00	.002	158.50	.000
4.75	.084	43.25	.073	81.75	.013	120.25	.002	158.75	.000
5.00	.113	43.50	.072	82.00	.013	120.50	.002	159.00	.000
5.25	.147	43.75	.071	82.25	.013	120.75	.002	159.25	.000
5.50	.649	44.00	.070	82.50	.013	121.00	.002	159.50	.000
5.75	1.481	44.25	.069	82.75	.012	121.25	.002	159.75	.000
6.00	1.856	44.50	.069	83.00	.012	121.50	.002	160.00	.000
6.25	2.031	44.75	.068	83.25	.012	121.75	.002	160.25	.000
6.50	2.120	45.00	.067	83.50	.012	122.00	.002	160.50	.000
6.75	2.159	45.25	.067	83.75	.012	122.25	.002	160.75	.000
7.00	2.184	45.50	.066	84.00	.012	122.50	.002	161.00	.000
7.25	2.228	45.75	.065	84.25	.012	122.75	.002	161.25	.000
7.50	2.294	46.00	.064	84.50	.012	123.00	.002	161.50	.000
7.75	2.367	46.25	.063	84.75	.012	123.25	.002	161.75	.000
8.00	2.446	46.50	.063	85.00	.011	123.50	.002	162.00	.000
8.25	2.532	46.75	.062	85.25	.011	123.75	.002	162.25	.000
8.50	2.608	47.00	.061	85.50	.011	124.00	.002	162.50	.000
8.75	2.653	47.25	.061	85.75	.011	124.25	.002	162.75	.000
9.00	2.661	47.50	.060	86.00	.011	124.50	.002	163.00	.000
9.25	2.639	47.75	.059	86.25	.011	124.75	.002	163.25	.000
9.50	2.597	48.00	.059	86.50	.011	125.00	.002	163.50	.000
9.75	2.537	48.25	.058	86.75	.010	125.25	.002	163.75	.000
10.00	2.461	48.50	.057	87.00	.010	125.50	.002	164.00	.000
10.25	2.378	48.75	.057	87.25	.010	125.75	.002	164.25	.000
10.50	2.292	49.00	.056	87.50	.010	126.00	.002	164.50	.000
10.75	2.203	49.25	.056	87.75	.010	126.25	.002	164.75	.000
11.00	2.114	49.50	.055	88.00	.010	126.50	.002	165.00	.000
11.25	2.026	49.75	.054	88.25	.010	126.75	.002	165.25	.000
11.50	1.937	50.00	.054	88.50	.010	127.00	.002	165.50	.000
11.75	1.849	50.25	.053	88.75	.010	127.25	.002	165.75	.000
12.00	1.764	50.50	.053	89.00	.010	127.50	.002	166.00	.000
12.25	1.680	50.75	.052	89.25	.010	127.75	.002	166.25	.000
12.50	1.596	51.00	.051	89.50	.009	128.00	.002	166.50	.000
12.75	1.509	51.25	.051	89.75	.009	128.25	.002	166.75	.000
13.00	1.420	51.50	.050	90.00	.009	128.50	.002	167.00	.000
13.25	1.335	51.75	.050	90.25	.009	128.75	.002	167.25	.000
13.50	1.254	52.00	.049	90.50	.009	129.00	.002	167.50	.000
13.75	1.179	52.25	.049	90.75	.009	129.25	.002	167.75	.000
14.00	1.110	52.50	.048	91.00	.009	129.50	.002	168.00	.000
14.25	1.045	52.75	.047	91.25	.009	129.75	.002	168.25	.000
14.50	.983	53.00	.047	91.50	.008	130.00	.002	168.50	.000
14.75	.926	53.25	.047	91.75	.008	130.25	.002	168.75	.000
15.00	.872	53.50	.046	92.00	.008	130.50	.002	169.00	.000
15.25	.820	53.75	.045	92.25	.008	130.75	.002	169.25	.000
15.50	.771	54.00	.045	92.50	.008	131.00	.002	169.50	.000
15.75	.724	54.25	.045	92.75	.008	131.25	.002	169.75	.000
16.00	.679	54.50	.044	93.00	.008	131.50	.002	170.00	.000
16.25	.636	54.75	.043	93.25	.008	131.75	.002	170.25	.000
16.50	.595	55.00	.043	93.50	.008	132.00	.002	170.50	.000
16.75	.556	55.25	.043	93.75	.008	132.25	.001	170.75	.000
17.00	.519	55.50	.042	94.00	.008	132.50	.001	171.00	.000
17.25	.485	55.75	.041	94.25	.008	132.75	.001	171.25	.000
17.50	.452	56.00	.041	94.50	.008	133.00	.001	171.50	.000
17.75	.422	56.25	.041	94.75	.007	133.25	.001	171.75	.000
18.00	.394	56.50	.040	95.00	.007	133.50	.001	172.00	.000
18.25	.368	56.75	.040	95.25	.007	133.75	.001	172.25	.000
18.50	.344	57.00	.039	95.50	.007	134.00	.001	172.50	.000
18.75	.320	57.25	.039	95.75	.007	134.25	.001	172.75	.000
19.00	.299	57.50	.039	96.00	.007	134.50	.001	173.00	.000
19.25	.279	57.75	.038	96.25	.007	134.75	.001	173.25	.000
19.50	.260	58.00	.038	96.50	.007	135.00	.001	173.50	.000
19.75	.243	58.25	.037	96.75	.007	135.25	.001	173.75	.000
20.00	.227	58.50	.037	97.00	.007	135.50	.001	174.00	.000
20.25	.212	58.75	.036	97.25	.007	135.75	.001	174.25	.000
20.50	.198	59.00	.036	97.50	.006	136.00	.001	174.50	.000
20.75	.184	59.25	.035	97.75	.006	136.25	.001	174.75	.000
21.00	.172	59.50	.035	98.00	.006	136.50	.001	175.00	.000
21.25	.167	59.75	.035	98.25	.006	136.75	.001	175.25	.000
21.50	.167	60.00	.034	98.50	.006	137.00	.001	175.50	.000
21.75	.166	60.25	.034	98.75	.006	137.25	.001	175.75	.000
22.00	.166	60.50	.034	99.00	.006	137.50	.001	176.00	.000
22.25	.165	60.75	.033	99.25	.006	137.75	.001	176.25	.000
22.50	.164	61.00	.033	99.50	.006	138.00	.001	176.50	.000
22.75	.163	61.25	.033	99.75	.006	138.25	.001	176.75	.000
23.00	.163	61.50	.032	100.00	.006	138.50	.001	177.00	.000
23.25	.162	61.75	.032	100.25	.006	138.75	.001	177.25	.000
23.50	.161	62.00	.031	100.50	.006	139.00	.001	177.50	.000
23.75	.160	62.25	.031	100.75	.006	139.25	.001	177.75	.000
24.00	.159	62.50	.031	101.00	.006	139.50	.001	178.00	.000
24.25	.158	62.75	.031	101.25	.006	139.75	.001	178.25	.000
24.50	.157	63.00	.030	101.50	.006	140.00	.001	178.50	.000
24.75	.155	63.25	.030	101.75	.006	140.25	.001	178.75	.000
25.00	.154	63.50	.029	102.00	.005	140.50	.001	179.00	.000
25.25	.153	63.75	.029	102.25	.005	140.75	.001	179.25	.000
25.50	.152	64.00	.029	102.50	.005	141.00	.001	179.50	.000
25.75	.151	64.25	.029	102.75	.005	141.25	.001	179.75	.000
26.00	.149	64.50	.028	103.00	.005	141.50	.001	180.00	.000
26.25	.148	64.75	.028	103.25	.005	141.75	.001	180.25	.000
26.50	.147	65.00	.027	103.50	.005	142.00	.001	180.50	.000
26.75	.145	65.25	.027	103.75	.005	142.25	.001	180.75	.000
27.00	.144	65.50	.027	104.00	.005	142.50	.001	181.00	.000
27.25	.143	65.75	.027	104.25	.005	142.75	.001	181.25	.000
27.50	.141	66.00	.026	104.50	.005	143.00	.001	181.50	.000
27.75	.140	66.25	.026	104.75	.005	143.25	.001	181.75	.000
28.00	.139	66.50	.026	105.00	.005	143.50	.001	182.00	.000
28.25	.138	66.75	.026	105.25	.005	143.75	.001	182.25	.000
28.50	.136	67.00	.025	105.50	.004	144.00	.001	182.50	.000
28.75	.135	67.25	.025	105.75	.004	144.25	.001	182.75	.000

29.00	.134	67.50	.025	106.00	.004	144.50	.001	183.00	.000
29.25	.132	67.75	.024	106.25	.004	144.75	.001	183.25	.000
29.50	.131	68.00	.024	106.50	.004	145.00	.001	183.50	.000
29.75	.130	68.25	.024	106.75	.004	145.25	.001	183.75	.000
30.00	.129	68.50	.024	107.00	.004	145.50	.001	184.00	.000
30.25	.127	68.75	.024	107.25	.004	145.75	.001	184.25	.000
30.50	.126	69.00	.023	107.50	.004	146.00	.001	184.50	.000
30.75	.125	69.25	.023	107.75	.004	146.25	.001	184.75	.000
31.00	.124	69.50	.023	108.00	.004	146.50	.001	185.00	.000
31.25	.122	69.75	.022	108.25	.004	146.75	.001	185.25	.000
31.50	.121	70.00	.022	108.50	.004	147.00	.001	185.50	.000
31.75	.120	70.25	.022	108.75	.004	147.25	.001	185.75	.000
32.00	.118	70.50	.022	109.00	.004	147.50	.001	186.00	.000
32.25	.117	70.75	.022	109.25	.004	147.75	.001	186.25	.000
32.50	.116	71.00	.021	109.50	.004	148.00	.001	186.50	.000
32.75	.115	71.25	.021	109.75	.004	148.25	.001	186.75	.000
33.00	.114	71.50	.021	110.00	.004	148.50	.001	187.00	.000
33.25	.112	71.75	.020	110.25	.004	148.75	.001	187.25	.000
33.50	.111	72.00	.020	110.50	.004	149.00	.001	187.50	.000
33.75	.110	72.25	.020	110.75	.004	149.25	.001	187.75	.000
34.00	.109	72.50	.020	111.00	.004	149.50	.001	188.00	.000
34.25	.108	72.75	.020	111.25	.004	149.75	.001	188.25	.000
34.50	.106	73.00	.020	111.50	.004	150.00	.001	188.50	.000
34.75	.105	73.25	.019	111.75	.004	150.25	.001	188.75	.000
35.00	.104	73.50	.019	112.00	.004	150.50	.001	189.00	.000
35.25	.103	73.75	.019	112.25	.003	150.75	.001	189.25	.000
35.50	.102	74.00	.018	112.50	.003	151.00	.001	189.50	.000
35.75	.101	74.25	.018	112.75	.003	151.25	.000	189.75	.000
36.00	.100	74.50	.018	113.00	.003	151.50	.000	190.00	.000
36.25	.099	74.75	.018	113.25	.003	151.75	.000	190.25	.000
36.50	.098	75.00	.018	113.50	.003	152.00	.000	190.50	.000
36.75	.096	75.25	.018	113.75	.003	152.25	.000	190.75	.000
37.00	.096	75.50	.017	114.00	.003	152.50	.000	191.00	.000
37.25	.094	75.75	.017	114.25	.003	152.75	.000	191.25	.000
37.50	.094	76.00	.017	114.50	.003	153.00	.000	191.50	.000
37.75	.092	76.25	.017	114.75	.003	153.25	.000		
38.00	.091	76.50	.017	115.00	.003	153.50	.000		
38.25	.090	76.75	.016	115.25	.003	153.75	.000		

READ STORM	Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\ST
Ptotal= 88.54 mm	Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

READ HYD (6213)	AREA (ha)=2846.70
DT=15.0 min	TPEAK (hrs)= 9.75
	VOLUME (mm)= 24.40

Filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)\READHYD_

Comments:

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	41.75	.247	83.50	.017	125.25	.004	167.00	.001
.25	.000	42.00	.240	83.75	.017	125.50	.004	167.25	.001
.50	.000	42.25	.233	84.00	.016	125.75	.004	167.50	.001
.75	.000	42.50	.227	84.25	.016	126.00	.004	167.75	.001
1.00	.000	42.75	.220	84.50	.016	126.25	.004	168.00	.001
1.25	.000	43.00	.214	84.75	.016	126.50	.004	168.25	.001
1.50	.001	43.25	.208	85.00	.016	126.75	.004	168.50	.001
1.75	.002	43.50	.202	85.25	.016	127.00	.004	168.75	.001
2.00	.002	43.75	.196	85.50	.015	127.25	.004	169.00	.001
2.25	.004	44.00	.191	85.75	.015	127.50	.004	169.25	.001
2.50	.005	44.25	.186	86.00	.015	127.75	.003	169.50	.001
2.75	.007	44.50	.181	86.25	.015	128.00	.003	169.75	.001
3.00	.010	44.75	.176	86.50	.015	128.25	.003	170.00	.001
3.25	.015	45.00	.171	86.75	.015	128.50	.003	170.25	.001
3.50	.021	45.25	.166	87.00	.015	128.75	.003	170.50	.001
3.75	.030	45.50	.162	87.25	.014	129.00	.003	170.75	.001
4.00	.048	45.75	.158	87.50	.014	129.25	.003	171.00	.001
4.25	.079	46.00	.154	87.75	.014	129.50	.003	171.25	.001
4.50	.137	46.25	.150	88.00	.014	129.75	.003	171.50	.001
4.75	.263	46.50	.146	88.25	.014	130.00	.003	171.75	.001
5.00	.671	46.75	.142	88.50	.014	130.25	.003	172.00	.001
5.25	1.651	47.00	.138	88.75	.014	130.50	.003	172.25	.001
5.50	2.936	47.25	.135	89.00	.014	130.75	.003	172.50	.001
5.75	4.248	47.50	.131	89.25	.013	131.00	.003	172.75	.001
6.00	5.588	47.75	.128	89.50	.013	131.25	.003	173.00	.001
6.25	6.989	48.00	.125	89.75	.013	131.50	.003	173.25	.001
6.50	8.470	48.25	.122	90.00	.013	131.75	.003	173.50	.001
6.75	9.815	48.50	.119	90.25	.013	132.00	.003	173.75	.001
7.00	11.105	48.75	.116	90.50	.013	132.25	.003	174.00	.001
7.25	12.321	49.00	.114	90.75	.013	132.50	.003	174.25	.001
7.50	13.491	49.25	.111	91.00	.013	132.75	.003	174.50	.001
7.75	14.581	49.50	.108	91.25	.012	133.00	.003	174.75	.001
8.00	15.555	49.75	.106	91.50	.012	133.25	.003	175.00	.001
8.25	16.389	50.00	.104	91.75	.012	133.50	.003	175.25	.001
8.50	17.101	50.25	.101	92.00	.012	133.75	.003	175.50	.001
8.75	17.680	50.50	.099	92.25	.012	134.00	.003	175.75	.001
9.00	18.128	50.75	.097	92.50	.012	134.25	.003	176.00	.001
9.25	18.442	51.00	.095	92.75	.012	134.50	.003	176.25	.001
9.50	18.628	51.25	.093	93.00	.012	134.75	.003	176.50	.001
9.75	18.671	51.50	.091	93.25	.012	135.00	.003	176.75	.001
10.00	18.606	51.75	.089	93.50	.011	135.25	.003	177.00	.001
10.25	18.436	52.00	.087	93.75	.011	135.50	.003	177.25	.001
10.50	18.202	52.25	.085	94.00	.011	135.75	.003	177.50	.001
10.75	17.891	52.50	.083	94.25	.011	136.00	.003	177.75	.001
11.00	17.544	52.75	.082	94.50	.011	136.25	.003	178.00	.001
11.25	17.147	53.00	.080	94.75	.011	136.50	.003	178.25	.001
11.50	16.727	53.25	.079	95.00	.011	136.75	.003	178.50	.001
11.75	16.257	53.50	.077	95.25	.011	137.00	.003	178.75	.001
12.00	15.760	53.75	.076	95.50	.011	137.25	.003	179.00	.001
12.25	15.268	54.00	.074	95.75	.011	137.50	.003	179.25	.001
12.50	14.778	54.25	.073	96.00	.010	137.75	.003	179.50	.001
12.75	14.270	54.50	.071	96.25	.010	138.00	.002	179.75	.001
13.00	13.747	54.75	.070	96.50	.010	138.25	.002	180.00	.001
13.25	13.227	55.00	.069	96.75	.010	138.50	.002	180.25	.001
13.50	12.708	55.25	.068	97.00	.010	138.75	.002	180.50	.001
13.75	12.188	55.50	.066	97.25	.010	139.00	.002	180.75	.001
14.00	11.674	55.75	.065	97.50	.010	139.25	.002	181.00	.001
14.25	11.175	56.00	.064	97.75	.010	139.50	.002	181.25	.001
14.50	10.690	56.25	.063	98.00	.010	139.75	.002	181.50	.001
14.75	10.223	56.50	.062	98.25	.010	140.00	.002	181.75	.001
15.00	9.765	56.75	.061	98.50	.010	140.25	.002	182.00	.001
15.25	9.285	57.00	.060	98.75	.009	140.50	.002	182.25	.001
15.50	8.803	57.25	.059	99.00	.009	140.75	.002	182.50	.001
15.75	8.359	57.50	.058	99.25	.009	141.00	.002	182.75	.001
16.00	7.950	57.75	.057	99.50	.009	141.25	.002	183.00	.001
16.25	7.558	58.00	.056	99.75	.009	141.50	.002	183.25	.001
16.50	7.177	58.25	.055	100.00	.009	141.75	.002	183.50	.001
16.75	6.814	58.50	.054	100.25	.009	142.00	.002	183.75	.001
17.00	6.474	58.75	.053	100.50	.009	142.25	.002	184.00	.001
17.25	6.156	59.00	.052	100.75	.009	142.50	.002	184.25	.001
17.50	5.862	59.25	.051	101.00	.009	142.75	.002	184.50	.001
17.75	5.590	59.50	.051	101.25	.009	143.00	.002	184.75	.001
18.00	5.322	59.75	.050	101.50	.009	143.25	.002	185.00	.001
18.25	5.061	60.00	.049	101.75	.009	143.50	.002	185.25	.001
18.50	4.824	60.25	.048	102.00	.008	143.75	.002	185.50	.001
18.75	4.609	60.50	.048	102.25	.008	144.00	.002	185.75	.001
19.00	4.412	60.75	.047	102.50	.008	144.25	.002	186.00	.001
19.25	4.219	61.00	.046	102.75	.008	144.50	.002	186.25	.001
19.50	4.027	61.25	.046	103.00	.008	144.75	.002	186.50	.001
19.75	3.846	61.50	.045	103.25	.008	145.00	.002	186.75	.001
20.00	3.680	61.75	.044	103.50	.008	145.25	.002	187.00	.001
20.25	3.527	62.00	.044	103.75	.008	145.50	.002	187.25	.001
20.50	3.386	62.25	.043	104.00	.008	145.75	.002	187.50	.001
20.75	3.255	62.50	.042	104.25	.008	146.00	.002	187.75	.001
21.00	3.132	62.75	.042	104.50	.008	146.25	.002	188.00	.001
21.25	3.016	63.00	.041	104.75	.008	146.50	.002	188.25	.001

21.50	2.907	63.25	.040	105.00	.008	146.75	.002	188.50	.001
21.75	2.804	63.50	.040	105.25	.008	147.00	.002	188.75	.001
22.00	2.706	63.75	.039	105.50	.008	147.25	.002	189.00	.001
22.25	2.613	64.00	.039	105.75	.007	147.50	.002	189.25	.001
22.50	2.523	64.25	.038	106.00	.007	147.75	.002	189.50	.001
22.75	2.426	64.50	.038	106.25	.007	148.00	.002	189.75	.001
23.00	2.325	64.75	.037	106.50	.007	148.25	.002	190.00	.001
23.25	2.233	65.00	.037	106.75	.007	148.50	.002	190.25	.001
23.50	2.149	65.25	.036	107.00	.007	148.75	.002	190.50	.001
23.75	2.072	65.50	.036	107.25	.007	149.00	.002	190.75	.001
24.00	2.000	65.75	.035	107.50	.007	149.25	.002	191.00	.001
24.25	1.925	66.00	.035	107.75	.007	149.50	.002	191.25	.001
24.50	1.848	66.25	.035	108.00	.007	149.75	.002	191.50	.001
24.75	1.777	66.50	.034	108.25	.007	150.00	.002	191.75	.001
25.00	1.712	66.75	.034	108.50	.007	150.25	.002	192.00	.001
25.25	1.653	67.00	.033	108.75	.007	150.50	.002	192.25	.001
25.50	1.598	67.25	.033	109.00	.007	150.75	.002	192.50	.001
25.75	1.547	67.50	.033	109.25	.007	151.00	.002	192.75	.001
26.00	1.499	67.75	.032	109.50	.007	151.25	.002	193.00	.000
26.25	1.453	68.00	.032	109.75	.006	151.50	.002	193.25	.000
26.50	1.410	68.25	.031	110.00	.006	151.75	.002	193.50	.000
26.75	1.369	68.50	.031	110.25	.006	152.00	.002	193.75	.000
27.00	1.329	68.75	.031	110.50	.006	152.25	.002	194.00	.000
27.25	1.291	69.00	.030	110.75	.006	152.50	.002	194.25	.000
27.50	1.254	69.25	.030	111.00	.006	152.75	.002	194.50	.000
27.75	1.218	69.50	.030	111.25	.006	153.00	.002	194.75	.000
28.00	1.184	69.75	.029	111.50	.006	153.25	.002	195.00	.000
28.25	1.151	70.00	.029	111.75	.006	153.50	.002	195.25	.000
28.50	1.119	70.25	.029	112.00	.006	153.75	.002	195.50	.000
28.75	1.088	70.50	.028	112.25	.006	154.00	.002	195.75	.000
29.00	1.058	70.75	.028	112.50	.006	154.25	.002	196.00	.000
29.25	1.029	71.00	.028	112.75	.006	154.50	.002	196.25	.000
29.50	1.001	71.25	.027	113.00	.006	154.75	.002	196.50	.000
29.75	.973	71.50	.027	113.25	.006	155.00	.002	196.75	.000
30.00	.946	71.75	.027	113.50	.006	155.25	.002	197.00	.000
30.25	.920	72.00	.027	113.75	.006	155.50	.001	197.25	.000
30.50	.895	72.25	.026	114.00	.006	155.75	.001	197.50	.000
30.75	.870	72.50	.026	114.25	.006	156.00	.001	197.75	.000
31.00	.846	72.75	.026	114.50	.006	156.25	.001	198.00	.000
31.25	.822	73.00	.026	114.75	.005	156.50	.001	198.25	.000
31.50	.800	73.25	.025	115.00	.005	156.75	.001	198.50	.000
31.75	.777	73.50	.025	115.25	.005	157.00	.001	198.75	.000
32.00	.756	73.75	.025	115.50	.005	157.25	.001	199.00	.000
32.25	.736	74.00	.024	115.75	.005	157.50	.001	199.25	.000
32.50	.717	74.25	.024	116.00	.005	157.75	.001	199.50	.000
32.75	.697	74.50	.024	116.25	.005	158.00	.001	199.75	.000
33.00	.680	74.75	.024	116.50	.005	158.25	.001	200.00	.000
33.25	.661	75.00	.023	116.75	.005	158.50	.001	200.25	.000
33.50	.643	75.25	.023	117.00	.005	158.75	.001	200.50	.000
33.75	.625	75.50	.023	117.25	.005	159.00	.001	200.75	.000
34.00	.608	75.75	.023	117.50	.005	159.25	.001	201.00	.000
34.25	.591	76.00	.023	117.75	.005	159.50	.001	201.25	.000
34.50	.574	76.25	.022	118.00	.005	159.75	.001	201.50	.000
34.75	.558	76.50	.022	118.25	.005	160.00	.001	201.75	.000
35.00	.543	76.75	.022	118.50	.005	160.25	.001	202.00	.000
35.25	.529	77.00	.022	118.75	.005	160.50	.001	202.25	.000
35.50	.514	77.25	.021	119.00	.005	160.75	.001	202.50	.000
35.75	.500	77.50	.021	119.25	.005	161.00	.001	202.75	.000
36.00	.486	77.75	.021	119.50	.005	161.25	.001	203.00	.000
36.25	.473	78.00	.021	119.75	.005	161.50	.001	203.25	.000
36.50	.460	78.25	.021	120.00	.005	161.75	.001	203.50	.000
36.75	.447	78.50	.020	120.25	.005	162.00	.001	203.75	.000
37.00	.434	78.75	.020	120.50	.005	162.25	.001	204.00	.000
37.25	.421	79.00	.020	120.75	.005	162.50	.001	204.25	.000
37.50	.409	79.25	.020	121.00	.004	162.75	.001	204.50	.000
37.75	.397	79.50	.020	121.25	.004	163.00	.001	204.75	.000
38.00	.386	79.75	.019	121.50	.004	163.25	.001	205.00	.000
38.25	.375	80.00	.019	121.75	.004	163.50	.001	205.25	.000
38.50	.364	80.25	.019	122.00	.004	163.75	.001	205.50	.000
38.75	.353	80.50	.019	122.25	.004	164.00	.001	205.75	.000
39.00	.343	80.75	.019	122.50	.004	164.25	.001	206.00	.000
39.25	.333	81.00	.018	122.75	.004	164.50	.001	206.25	.000
39.50	.323	81.25	.018	123.00	.004	164.75	.001	206.50	.000
39.75	.313	81.50	.018	123.25	.004	165.00	.001	206.75	.000
40.00	.304	81.75	.018	123.50	.004	165.25	.001	207.00	.000
40.25	.295	82.00	.018	123.75	.004	165.50	.001	207.25	.000
40.50	.287	82.25	.018	124.00	.004	165.75	.001	207.50	.000
40.75	.278	82.50	.017	124.25	.004	166.00	.001		
41.00	.270	82.75	.017	124.50	.004	166.25	.001		
41.25	.262	83.00	.017	124.75	.004	166.50	.001		
41.50	.255	83.25	.017	125.00	.004	166.75	.001		

READ STORM

Ptotal= 88.54 mm

Filename: V:\01606\Active\160622264
\Analysis\SWM\Hydrology\
VO2 Event Modelling (Revised Pond H Model)\ST
Comments: 100yr/12hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	3.50	15.05	6.75	6.20	10.00	.89
.50	.89	3.75	15.05	7.00	6.20	10.25	.89
.75	.89	4.00	15.05	7.25	6.20	10.50	.89
1.00	.89	4.25	15.05	7.50	3.54	10.75	.89
1.25	.89	4.50	40.71	7.75	3.54	11.00	.89
1.50	.89	4.75	40.71	8.00	3.54	11.25	.89
1.75	.89	5.00	40.71	8.25	3.54	11.50	.89
2.00	.89	5.25	40.71	8.50	1.77	11.75	.89
2.25	.89	5.50	11.51	8.75	1.77	12.00	.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	.89		
3.25	5.31	6.50	6.20	9.75	.89		

RESERVOIR (1221)
IN= 2---> OUT= 1
DT= 5.0 min

Pond 4

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.0430	.5715
.0120	.0637	.1500	.6631
.0150	.0862	.3330	.7578
.0260	.2079	1.6540	.8887
.0290	.2604	5.1140	.9905
.0320	.3142	6.4570	1.0252
.0370	.4254	9.9400	1.0955
.0410	.5121	11.9190	1.1313
.0420	.5416	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (1222)	31.090	3.192	5.25	76.81
OUTFLOW: ID= 1 (1221)	31.090	3.076	5.33	76.77

PEAK FLOW REDUCTION [Qout/Qin](%)= 96.38
TIME SHIFT OF PEAK FLOW (min)= 5.00
MAXIMUM STORAGE USED (ha.m.)= .9318

RESERVOIR (0802)
IN= 2---> OUT= 1
DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.4000	.0620
.3500	.0005	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0109)	2.200	.245	5.25	85.01
OUTFLOW: ID= 1 (0802)	2.200	.245	5.25	85.01

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.99
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)= .0003

DUHYD (0204)
Inlet Cap.=7.653
#of Inlets= 1
Total(cms)= 7.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	52.89	5.27	5.25	75.60
MAJOR SYS.(ID= 2):	.00	.00	.00	.00
MINOR SYS.(ID= 3):	52.89	5.27	5.25	75.60

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0205) |
| Inlet Cap.=7.938 |
| #of Inlets=    1 |
| Total(cms)=  7.9 |      AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)    (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  54.99      5.48      5.25   75.60
     ===================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3):  54.99      5.48      5.25   75.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0206) |
| Inlet Cap.=3.047 |
| #of Inlets=    1 |
| Total(cms)=  3.0 |      AREA     QPEAK     TPEAK    R.V.
--------------------       (ha)    (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):  18.20      1.86      5.25   75.60
     ===================================================
     MAJOR SYS.(ID= 2):    .00       .00       .00     .00
     MINOR SYS.(ID= 3):  18.20      1.86      5.25   75.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0801) |
| IN= 2---> OUT= 1 |
| DT=  1.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   .0400       .0670
                          .0300      .0005    |   .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0108)       .950       .106        5.25       85.01
     OUTFLOW: ID= 1 (0801)       .950       .034        5.47       85.00

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 32.38
                   TIME SHIFT OF PEAK FLOW         (min)= 13.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0287

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0907) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0905):     5.25     .550     5.25    77.42
        + ID2= 2 (0906):     6.59     .692     5.25    77.69
          ==================================================
          ID = 3 (0907):    11.84    1.243     5.25    77.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0916) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   .0450       .4669
                          .0130      .0993    |   .1300       .6245
                          .0170      .1335    |   .2950       .8281
                          .0300      .3140    |   .7410      1.2578
                          .0320      .3518    |   .9230      1.5770
                          .0330      .3899    |  3.6480      1.9622
                          .0350      .4282    |  6.8140      2.0624

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0915)     22.800      2.408        5.25       79.11
     OUTFLOW: ID= 1 (0916)     22.800       .632        6.42       79.02
```

Pond 3

```
                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.23
                   TIME SHIFT OF PEAK FLOW         (min)= 70.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.1526

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0804) |
| IN= 2---> OUT= 1 |
| DT=  1.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   .0920       .0220

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0305)       .510       .056        5.25       83.74
     OUTFLOW: ID= 1 (0804)       .510       .046        5.30       83.62

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 81.85
                   TIME SHIFT OF PEAK FLOW         (min)=  3.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .0110

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0903) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0302):     1.31     .139     5.25    77.94
        + ID2= 2 (0303):     1.72     .173     5.25    72.54
          ==================================================
          ID = 3 (0903):     3.03     .312     5.25    74.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0902) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0903):     3.03     .312     5.25    74.88
        + ID2= 2 (0304):      .90     .000      .00      .00
          ==================================================
          ID = 3 (0902):     3.93     .312     5.25    57.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0201) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6200):   165.44    5.967     5.25    60.21
        + ID2= 2 (1221):    31.09    3.076     5.33    76.77
          ==================================================
          ID = 3 (0201):   196.53    9.011     5.25    62.83

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0700) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0102):    63.87    6.605     5.25    77.04
        + ID2= 2 (0204):    52.89    5.274     5.25    75.60
          ==================================================
          ID = 3 (0700):   116.76   11.879     5.25    76.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0701) |
|  1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
```

```
*** W A R N I N G :  HYDROGRAPH 0205 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
          ID1= 1 (0700):   116.76  11.879      5.25    76.39
        + ID2= 2 (0205):      .00    .000       .00      .00
          ==================================================
          ID = 3 (0701):   116.76  11.879      5.25    76.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0702) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0701):   116.76  11.879      5.25    76.39
        + ID2= 2 (0206):    18.20   1.856      5.25    75.60
          ==================================================
          ID = 3 (0702):   134.96  13.734      5.25    76.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```

Pond 2

```
--------------------
| RESERVOIR (0909) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .0640       .4187
                          .0020      .0210    |    .1120       .4740
                          .0100      .0869    |    .1400       .5021
                          .0140      .1576    |    .2730       .6168
                          .0150      .1822    |    .3120       .6461
                          .0160      .2073    |    .3520       .6757
                          .0170      .2329    |    .4970       .7967
                          .0180      .2587    |    .5850       .9220
                          .0200      .3110    |   6.6520      1.1183
                          .0210      .3376    |    .0000       .0000

                                      AREA      QPEAK        TPEAK        R.V.
                                      (ha)      (cms)        (hrs)        (mm)
     INFLOW : ID= 2 (0907)          11.840      1.243         5.25       77.57
     OUTFLOW: ID= 1 (0909)          11.840       .282         6.42       77.35

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.69
                    TIME SHIFT OF PEAK FLOW          (min)= 70.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=   .6236

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0901) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0804):      .51    .046      5.30    83.62
        + ID2= 2 (0902):     3.93    .312      5.25    57.66
          ==================================================
          ID = 3 (0901):     4.45    .357      5.25    60.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```

Node 849

```
--------------------
| ADD HYD   (0849) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (6204):  2846.70  43.476      9.50    51.01
        + ID2= 2 (0201):   196.53   9.011      5.25    62.83
          ==================================================
          ID = 3 (0849):  3043.23  46.042      9.25    51.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0703) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
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```
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0107):     5.56    .558      5.23    74.90
        + ID2= 2 (0702):   134.96  13.734      5.25    76.28
          ==================================================
          ID = 3 (0703):   140.52  14.251      5.23    76.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0910) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0300):     6.72    .540      5.17    52.50
        + ID2= 2 (0909):    11.84    .282      6.42    77.35
          ==================================================
          ID = 3 (0910):    18.56    .659      5.17    68.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0912) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0306):     2.51    .202      5.17    52.50
        + ID2= 2 (0901):     4.45    .357      5.25    60.64
          ==================================================
          ID = 3 (0912):     6.96    .554      5.17    57.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0704) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0703):   140.52  14.251      5.23    76.23
        + ID2= 2 (0801):      .95    .034      5.47    85.00
          ==================================================
          ID = 3 (0704):   141.47  14.285      5.23    76.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (1220) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
*** W A R N I N G :  HYDROGRAPH 0206 <ID= 2> IS DRY.
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
*** W A R N I N G :  HYDROGRAPH 0003 = HYDROGRAPH 0001
          ID1= 1 (0912):     6.96    .554      5.17    57.70
        + ID2= 2 (0206):      .00    .000       .00      .00
          ==================================================
          ID = 3 (1220):     6.96    .554      5.17    57.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0705) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
          ID1= 1 (0802):     2.20    .245      5.25    85.01
        + ID2= 2 (0704):   141.47  14.285      5.23    76.29
          ==================================================
          ID = 3 (0705):   143.67  14.529      5.23    76.42

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0706) |
```

```
|   1 +  2 =  3     |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0705):    143.67  14.529     5.23    76.42
        + ID2= 2 (0101):      3.15    .329     5.23    77.68
          ==================================================
          ID = 3 (0706):    146.82  14.858     5.23    76.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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```

Pond 1

```
--------------------
| RESERVOIR (0913) |
| IN= 2---> OUT= 1 |
| DT=  1.0 min     |      OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .9190     3.9180
                           .0930      1.0741   |   1.3490     4.3080
                           .1900      2.1933   |   2.3060     5.2941
                           .2010      2.3825   |   2.6670     5.8932
                           .2120      2.5723   |   2.8810     6.2959
                           .2220      2.7627   |   3.7300     7.1089
                           .2320      2.9538   |   4.5880     7.7255
                           .2990      3.1454   |   5.2250     8.1399
                           .4140      3.3376   |  26.3630     8.7664
                           .5600      3.5305   |  37.6740     8.9765

                                AREA       QPEAK        TPEAK         R.V.
                                (ha)       (cms)        (hrs)         (mm)
     INFLOW : ID= 2 (0706)    146.820     14.858         5.23        76.45
     OUTFLOW: ID= 1 (0913)    146.820      3.805         6.48        63.32

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 25.61
                   TIME SHIFT OF PEAK FLOW          (min)= 75.00
                   MAXIMUM  STORAGE   USED        (ha.m.)=  7.1630

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0708) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0913):    146.82   3.805     6.48    63.32
        + ID2= 2 (0910):     18.56    .659     5.17    68.35
          ==================================================
          ID = 3 (0708):    165.38   4.195     6.40    62.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0914) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0708):    165.38   4.195     6.40    62.46
        + ID2= 2 (0916):     22.80    .632     6.42    79.02
          ==================================================
          ID = 3 (0914):    188.18   4.826     6.42    62.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (1211) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0506):     31.89   1.823     5.75    59.05
        + ID2= 2 (0914):    188.18   4.826     6.42    62.91
          ==================================================
          ID = 3 (1211):    220.07   6.427     6.17    62.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0920) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 1 (1211):    220.07   6.427     6.17    62.35
        + ID2= 2 (1220):      6.96    .554     5.17    57.70
          ==================================================
          ID = 3 (0920):    227.02   6.608     6.15    62.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (1210) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6212):    150.47   2.661     9.00    60.86
        + ID2= 2 (0920):    227.02   6.608     6.15    62.21
          ==================================================
          ID = 3 (1210):    377.50   8.612     6.27    59.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

Node 867

```
--------------------
| ADD HYD   (0867) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (6208):   3174.13  40.963    10.50    48.33
        + ID2= 2 (1210):    377.50   8.612     6.27    59.26
          ==================================================
          ID = 3 (0867):   3551.63  46.100    10.00    49.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

Node 868

```
--------------------
| ADD HYD   (0868) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0849):   3043.23  46.042     9.25    51.77
        + ID2= 2 (0867):   3551.63  46.100    10.00    49.14
          ==================================================
          ID = 3 (0868):   6594.85  91.475     9.75    49.87

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

 FINISH
============================================================================================================

============================================================================================================


       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
```

2-Year Storm


```
                   *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\V02 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\V02 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
```

```
DATE: 10/6/2017                           TIME: 7:50:24 AM

USER:


COMMENTS: ____________________________________________________________


  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************

  W/E COMMAND            HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha     cms   hrs     mm          cms

      START @   .00 hrs
      --------------------
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
  **  CALIB NASHYD       0506  1  3.0   31.89     .57  5.85  19.11  .46    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .83]
*
  **  CALIB STANDHYD     0109  1  1.0    2.20     .11  5.25  39.08  .93    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0107  1  2.0    5.56     .22  5.23  31.41  .75    .000
      [I%=50.0:S%= 2.00]
*
  **  CALIB STANDHYD     0102  1  3.0   63.87    2.68  5.25  32.45  .77    .000
      [I%=40.0:S%= 2.00]
*
  **  CALIB STANDHYD     0104  1  3.0   52.89    2.05  5.30  31.44  .75    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0105  1  3.0   54.99    2.13  5.30  31.44  .75    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0106  1  3.0   18.20     .74  5.25  31.44  .75    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0108  1  1.0     .95     .05  5.25  39.08  .93    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0101  1  2.0    3.15     .14  5.27  33.52  .80    .000
      [I%=61.0:S%= 2.00]
*
  **  CALIB NASHYD       0300  1 10.0    6.72     .20  5.17  18.41  .44    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0905  1  5.0    5.25     .23  5.25  33.09  .79    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0906  1  5.0    6.59     .29  5.25  33.26  .79    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0915  1  5.0   22.80    1.01  5.25  34.01  .81    .000
      [I%=46.0:S%= 2.00]
*
  **  CALIB NASHYD       0306  1 10.0    2.51     .07  5.17  18.41  .44    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0305  1  1.0     .51     .03  5.25  38.12  .91    .000
      [I%=85.0:S%= 2.00]
*
  **  CALIB STANDHYD     0302  1  1.0    1.31     .06  5.25  33.42  .80    .000
      [I%=54.0:S%= 2.00]
*
  **  CALIB STANDHYD     0303  1  1.0    1.72     .07  5.25  29.29  .70    .000
      [I%=32.0:S%= 2.00]
*
  **  CALIB NASHYD       0304  1 10.0     .90     .00   .00    .00  .00    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .01]
```

```
*
  **  CALIB STANDHYD     1222  1  5.0   31.09     1.29  5.25  32.29  .77    .000
      [I%=40.0:S%= 2.00]
*
      READ HYD           0745  1 15.0 3174.13    4.09  7.00   5.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0925  1 15.0 3174.13    6.66  6.75   7.36  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0926  1 15.0 3174.13    9.29  7.00   9.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0950  1 15.0  150.47     .10 13.00   9.79  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0928  1 15.0  150.47     .14 13.75  12.98  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0929  1 15.0  150.47     .31 10.25  16.43  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           0200  1 15.0  165.44    2.48  1.75  11.03  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
```

```
*
      READ HYD           0733  1 15.0 2846.70    3.72  6.75   6.37  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           1200  1 15.0  165.44    3.09  1.75  14.15  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           1733  1 15.0 2846.70    5.85  6.50   8.91  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           2200  1 15.0  165.44    3.72  1.75  17.48  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           2733  1 15.0 2846.70    8.52  6.25  11.71  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           4200  1 15.0  165.44    3.30  5.25  31.76  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           5200  1 15.0  165.44    4.65  5.25  46.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6200  1 15.0  165.44    5.97  5.25  60.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
```

```
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6203  1 15.0 2846.70   31.46  9.50  38.51  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6204  1 15.0 2846.70   43.48  9.50  51.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6206  1 15.0 3174.13   18.59 11.25  22.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6207  1 15.0 3174.13   29.72 11.00  36.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6208  1 15.0 3174.13   40.96 10.50  48.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6210  1 15.0  150.47     .98 10.25  31.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD           6211  1 15.0  150.47    1.82  9.50  47.16  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
```

```
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD          6212  1 15.0  150.47    2.66  9.00  60.86  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD          6205  1 15.0 3174.13   12.10 11.00  14.09  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD          6209  1 15.0  150.47     .54 12.00  21.57  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD          6201  1 15.0 2846.70   11.17 10.00  16.00  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD          3200  1 15.0  165.44    2.46  5.25  22.41  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      READ HYD          6213  1 15.0 2846.70   18.67  9.75  24.40  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 42.00 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 2yr/12hr
*
      RESRVR [ 2 : 0109] 0802  1  1.0    2.20     .11  5.25  39.08  n/a    .000
      {ST=   .00 ha.m }
*
      DUHYD             0204  1  3.0   52.89    2.05  5.30  31.44  n/a    .000
         MAJOR SYSTEM:  0204  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:  0204  3  3.0   52.89    2.05  5.30  31.44  n/a    .000
*
      DUHYD             0205  1  3.0   54.99    2.13  5.30  31.44  n/a    .000
```

```
         MAJOR SYSTEM:  0205  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:  0205  3  3.0   54.99    2.13  5.30  31.44  n/a    .000
*
      DUHYD             0206  1  3.0   18.20     .74  5.25  31.44  n/a    .000
         MAJOR SYSTEM:  0206  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:  0206  3  3.0   18.20     .74  5.25  31.44  n/a    .000
*
      RESRVR [ 2 : 0108] 0801  1  1.0     .95     .03  5.35  39.08  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0905 + 0906]  0907  3  5.0   11.84     .52  5.25  33.19  n/a    .000
*
      RESRVR [ 2 : 0915] 0916  1  5.0   22.80     .12  7.83  33.92  n/a    .000
      {ST=   .60 ha.m }
*
      RESRVR [ 2 : 0305] 0804  1  1.0     .51     .02  5.32  38.00  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0302 + 0303]  0903  3  1.0    3.03     .13  5.25  31.07  n/a    .000
*
      ADD [0903 + 0304]  0902  3  1.0    3.93     .13  5.25  23.93  n/a    .000
*
      RESRVR [ 2 : 1222] 1221  1  5.0   31.09     .26  7.17  32.25  n/a    .000
      {ST=   .72 ha.m }
*
      ADD [3200 + 1221]  0201  3  5.0  196.53    2.49  5.25  23.97  n/a    .000
*
      ADD [0102 + 0204]  0700  3  3.0  116.76    4.71  5.25  31.99  n/a    .000
*
      ADD [0700 + 0205]  0701  3  3.0  116.76    4.71  5.25  31.99  n/a    .000
*
      ADD [0701 + 0206]  0702  3  3.0  134.96    5.45  5.25  31.92  n/a    .000
*
      RESRVR [ 2 : 0907] 0909  1  5.0   11.84     .02  9.33  32.96  n/a    .000
      {ST=   .34 ha.m }
*
      ADD [0804 + 0902]  0901  3  1.0    4.45     .15  5.25  25.54  n/a    .000
*
      ADD [6201 + 0201]  0849  3  5.0 3043.23   11.83 10.00  16.51  n/a    .000
*
      ADD [0107 + 0702]  0703  3  2.0  140.52    5.67  5.27  31.90  n/a    .000
*
      ADD [0300 + 0909]  0910  3  5.0   18.56     .21  5.17  27.69  n/a    .000
*
      ADD [0306 + 0901]  0912  3  1.0    6.96     .22  5.17  22.97  n/a    .000
*
      ADD [0703 + 0801]  0704  3  1.0  141.47    5.70  5.27  31.95  n/a    .000
*
      ADD [0912 + 0206]  1220  3  1.0    6.96     .22  5.17  22.97  n/a    .000
*
      ADD [0802 + 0704]  0705  3  1.0  143.67    5.81  5.27  32.05  n/a    .000
*
      ADD [0705 + 0101]  0706  3  1.0  146.82    5.95  5.27  32.09  n/a    .000
*
      RESRVR [ 2 : 0706] 0913  1  1.0  146.82     .74  7.97  20.31  n/a    .000
      {ST=  3.72 ha.m }
*
      ADD [0913 + 0910]  0708  3  1.0  165.38     .78  7.97  19.96  n/a    .000
*
      ADD [0708 + 0916]  0914  3  1.0  188.18     .90  7.97  20.31  n/a    .000
*
      ADD [0506 + 0914]  1211  3  1.0  220.07    1.18  7.17  20.14  n/a    .000
*
      ADD [1211 + 1220]  0920  3  1.0  227.02    1.23  7.17  20.22  n/a    .000
*
      ADD [6209 + 0920]  1210  3  1.0  377.49    1.35  7.17  18.16  n/a    .000
*
      ADD [6205 + 1210]  0867  3  1.0 3551.62   13.21 11.00  14.34  n/a    .000
*
      ADD [0867 + 0849]  0868  3  1.0 6594.85   24.85 10.50  14.96  n/a    .000
*
 FINISH

===========================================================================================================


===========================================================================================================


       V    V   I    SSSSS  U   U    A    L
```

5-Year Storm

```
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
        V V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M   M  O   O
       OOO      T      T    H   H    Y    M   M   OOO

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                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode

DATE: 10/6/2017                           TIME: 7:48:35 AM

USER:

COMMENTS: ____________________________________________________________

  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************

  W/E COMMAND             HYD ID   DT     AREA    Qpeak Tpeak    R.V. R.C.     Qbase
                                   min     ha      cms   hrs      mm            cms

      START @   .00 hrs
      --------------------
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
  **  CALIB NASHYD       0506  1  3.0    31.89     .88  5.85  29.02  .53    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .83]
*
  **  CALIB STANDHYD     0109  1  1.0     2.20     .15  5.25  51.23  .94    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0107  1  2.0     5.56     .31  5.23  42.66  .78    .000
      [I%=50.0:S%= 2.00]
*
  **  CALIB STANDHYD     0102  1  3.0    63.87    3.69  5.25  44.08  .81    .000
      [I%=40.0:S%= 2.00]
*
  **  CALIB STANDHYD     0104  1  3.0    52.89    2.88  5.25  42.91  .79    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0105  1  3.0    54.99    2.99  5.25  42.91  .79    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0106  1  3.0    18.20    1.03  5.25  42.91  .79    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0108  1  1.0      .95     .06  5.25  51.23  .94    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0101  1  2.0     3.15     .19  5.23  45.02  .83    .000
      [I%=61.0:S%= 2.00]
*
  **  CALIB NASHYD       0300  1 10.0     6.72     .29  5.17  26.94  .50    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
```

```
  **  CALIB STANDHYD     0905  1  5.0     5.25     .31  5.25  44.64  .82    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0906  1  5.0     6.59     .40  5.25  44.85  .82    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0915  1  5.0    22.80    1.37  5.25  45.83  .84    .000
      [I%=46.0:S%= 2.00]
*
  **  CALIB NASHYD       0306  1 10.0     2.51     .11  5.17  26.94  .50    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0305  1  1.0      .51     .03  5.25  50.16  .92    .000
      [I%=85.0:S%= 2.00]
*
  **  CALIB STANDHYD     0302  1  1.0     1.31     .08  5.25  45.03  .83    .000
      [I%=54.0:S%= 2.00]
*
  **  CALIB STANDHYD     0303  1  1.0     1.72     .09  5.25  40.43  .74    .000
      [I%=32.0:S%= 2.00]
*
  **  CALIB NASHYD       0304  1 10.0      .90     .00   .00    .00  .00    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .01]
*
  **  CALIB STANDHYD     1222  1  5.0    31.09    1.78  5.25  43.89  .81    .000
      [I%=40.0:S%= 2.00]
*
      READ HYD           0745  1 15.0 3174.13    4.09  7.00   5.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0925  1 15.0 3174.13    6.66  6.75   7.36  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0926  1 15.0 3174.13    9.29  7.00   9.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0950  1 15.0  150.47     .10 13.00   9.79  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0928  1 15.0  150.47     .14 13.75  12.98  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
```

```
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0929  1 15.0  150.47     .31 10.25  16.43  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0200  1 15.0  165.44    2.48  1.75  11.03  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           0733  1 15.0 2846.70    3.72  6.75   6.37  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           1200  1 15.0  165.44    3.09  1.75  14.15  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           1733  1 15.0 2846.70    5.85  6.50   8.91  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           2200  1 15.0  165.44    3.72  1.75  17.48  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           2733  1 15.0 2846.70    8.52  6.25  11.71  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
```

```
*
      READ HYD           3200  1 15.0  165.44    2.46  5.25  22.41  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           5200  1 15.0  165.44    4.65  5.25  46.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6200  1 15.0  165.44    5.97  5.25  60.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6201  1 15.0 2846.70   11.17 10.00  16.00  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6203  1 15.0 2846.70   31.46  9.50  38.51  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6204  1 15.0 2846.70   43.48  9.50  51.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6205  1 15.0 3174.13   12.10 11.00  14.09  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD           6207  1 15.0 3174.13   29.72 11.00  36.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
```

```
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6208  1 15.0 3174.13   40.96 10.50  48.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6209  1 15.0  150.47     .54 12.00  21.57  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6211  1 15.0  150.47    1.82  9.50  47.16  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6212  1 15.0  150.47    2.66  9.00  60.86  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6206  1 15.0 3174.13   18.59 11.25  22.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6210  1 15.0  150.47     .98 10.25  31.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          6213  1 15.0 2846.70   18.67  9.75  24.40  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
```

```
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      READ HYD          4200  1 15.0  165.44    3.30  5.25  31.76  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                15.0
      [ Ptot= 54.38 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 5yr/12hr
*
      RESRVR [ 2 : 0109] 0802  1  1.0    2.20     .15  5.25  51.23  n/a    .000
      {ST=   .00 ha.m }
*
      DUHYD              0204  1  3.0   52.89    2.88  5.25  42.91  n/a    .000
         MAJOR SYSTEM:   0204  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0204  3  3.0   52.89    2.88  5.25  42.91  n/a    .000
*
      DUHYD              0205  1  3.0   54.99    2.99  5.25  42.91  n/a    .000
         MAJOR SYSTEM:   0205  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0205  3  3.0   54.99    2.99  5.25  42.91  n/a    .000
*
      DUHYD              0206  1  3.0   18.20    1.03  5.25  42.91  n/a    .000
         MAJOR SYSTEM:   0206  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0206  3  3.0   18.20    1.03  5.25  42.91  n/a    .000
*
      RESRVR [ 2 : 0108] 0801  1  1.0     .95     .03  5.38  51.23  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0905 + 0906]  0907  3  5.0   11.84     .71  5.25  44.76  n/a    .000
*
      RESRVR [ 2 : 0915] 0916  1  5.0   22.80     .23  7.33  45.74  n/a    .000
      {ST=   .75 ha.m }
*
      RESRVR [ 2 : 0305] 0804  1  1.0     .51     .03  5.32  50.04  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0302 + 0303]  0903  3  1.0    3.03     .17  5.25  42.42  n/a    .000
*
      ADD [0903 + 0304]  0902  3  1.0    3.93     .17  5.25  32.66  n/a    .000
*
      RESRVR [ 2 : 1222] 1221  1  5.0   31.09     .77  5.92  43.85  n/a    .000
      {ST=   .80 ha.m }
*
      ADD [4200 + 1221]  0201  3  5.0  196.53    3.40  5.25  33.68  n/a    .000
*
      ADD [0102 + 0204]  0700  3  3.0  116.76    6.56  5.25  43.55  n/a    .000
*
      ADD [0700 + 0205]  0701  3  3.0  116.76    6.56  5.25  43.55  n/a    .000
*
      ADD [0701 + 0206]  0702  3  3.0  134.96    7.59  5.25  43.46  n/a    .000
*
      RESRVR [ 2 : 0907] 0909  1  5.0   11.84     .07  7.92  44.53  n/a    .000
      {ST=   .43 ha.m }
*
      ADD [0804 + 0902]  0901  3  1.0    4.45     .20  5.25  34.66  n/a    .000
*
      ADD [6213 + 0201]  0849  3  5.0 3043.23   19.80  9.50  25.00  n/a    .000
*
      ADD [0107 + 0702]  0703  3  2.0  140.52    7.87  5.27  43.43  n/a    .000
*
      ADD [0300 + 0909]  0910  3  5.0   18.56     .31  5.17  38.16  n/a    .000
*
      ADD [0306 + 0901]  0912  3  1.0    6.96     .30  5.17  31.87  n/a    .000
*
      ADD [0703 + 0801]  0704  3  1.0  141.47    7.90  5.27  43.48  n/a    .000
*
      ADD [0912 + 0206]  1220  3  1.0    6.96     .30  5.17  31.87  n/a    .000
*
      ADD [0802 + 0704]  0705  3  1.0  143.67    8.05  5.27  43.60  n/a    .000
*
      ADD [0705 + 0101]  0706  3  1.0  146.82    8.24  5.27  43.63  n/a    .000
*
      RESRVR [ 2 : 0706] 0913  1  1.0  146.82    1.59  7.23  31.34  n/a    .000
```

```
      {ST=  4.55 ha.m }
*
      ADD [0913 + 0910]  0708  3  1.0  165.38    1.70  7.17  30.78  n/a    .000
*
      ADD [0708 + 0916]  0914  3  1.0  188.18    1.94  7.17  31.15  n/a    .000
*
      ADD [0506 + 0914]  1211  3  1.0  220.07    2.58  6.45  30.84  n/a    .000
*
      ADD [1211 + 1220]  0920  3  1.0  227.02    2.66  6.37  30.87  n/a    .000
*
      ADD [6210 + 0920]  1210  3  1.0  377.50    2.96  7.50  28.50  n/a    .000
*
      ADD [6206 + 1210]  0867  3  1.0 3551.63   20.52 10.75  22.65  n/a    .000
*
      ADD [0867 + 0849]  0868  3  1.0 6594.85   39.87 10.00  23.32  n/a    .000
*
 FINISH
=============================================================================================================
=============================================================================================================

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO
```

25-Year Storm

```
Developed and Distributed by Clarifica Inc.
```



```
                   *****  S U M M A R Y   O U T P U T  *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H
Model)\Event Based Discretized Mode

DATE: 10/6/2017                            TIME: 7:47:21 AM

USER:

COMMENTS: ____________________________________________________________

  ****************************
  ** SIMULATION NUMBER:   8 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA   Qpeak Tpeak   R.V. R.C.    Qbase
                                   min    ha     cms   hrs     mm           cms

      START @   .00 hrs
      --------------------
      READ STORM                  15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
  **  CALIB NASHYD       0506  1  3.0   31.89    1.39  5.80  45.14  .62    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .83]
*
  **  CALIB STANDHYD     0109  1  1.0    2.20     .20  5.25  69.71  .95    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0107  1  2.0    5.56     .45  5.23  60.18  .82    .000
      [I%=50.0:S%= 2.00]
*
  **  CALIB STANDHYD     0102  1  3.0   63.87    5.28  5.25  62.04  .85    .000
      [I%=40.0:S%= 2.00]
*
  **  CALIB STANDHYD     0104  1  3.0   52.89    4.18  5.25  60.70  .83    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0105  1  3.0   54.99    4.34  5.25  60.70  .83    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0106  1  3.0   18.20    1.48  5.25  60.70  .83    .000
      [I%=38.0:S%= 2.00]
*
  **  CALIB STANDHYD     0108  1  1.0     .95     .09  5.25  69.71  .95    .000
      [I%=90.0:S%= 2.00]
*
  **  CALIB STANDHYD     0101  1  2.0    3.15     .27  5.23  62.80  .86    .000
      [I%=61.0:S%= 2.00]
*
  **  CALIB NASHYD       0300  1 10.0    6.72     .42  5.17  40.69  .56    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0905  1  5.0    5.25     .44  5.25  62.49  .85    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0906  1  5.0    6.59     .56  5.25  62.74  .86    .000
      [I%=53.0:S%= 2.00]
*
  **  CALIB STANDHYD     0915  1  5.0   22.80    1.95  5.25  63.98  .88    .000
      [I%=46.0:S%= 2.00]
*
  **  CALIB NASHYD       0306  1 10.0    2.51     .16  5.17  40.69  .56    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .12]
*
  **  CALIB STANDHYD     0305  1  1.0     .51     .05  5.25  68.52  .94    .000
      [I%=85.0:S%= 2.00]
*
  **  CALIB STANDHYD     0302  1  1.0    1.31     .11  5.25  62.96  .86    .000
      [I%=54.0:S%= 2.00]
*
  **  CALIB STANDHYD     0303  1  1.0    1.72     .14  5.25  57.86  .79    .000
      [I%=32.0:S%= 2.00]
*
  **  CALIB NASHYD       0304  1 10.0     .90     .00   .00    .00  .00    .000
      [CN=88.0         ]
      [ N = 3.0:Tp  .01]
*
  **  CALIB STANDHYD     1222  1  5.0   31.09    2.56  5.25  61.82  .85    .000
      [I%=40.0:S%= 2.00]
*
      READ HYD           0745  1 15.0 3174.13    4.09  7.00   5.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                  15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0925  1 15.0 3174.13    6.66  6.75   7.36  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                  15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0926  1 15.0 3174.13    9.29  7.00   9.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
```

```
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0950  1 15.0  150.47     .10 13.00   9.79  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0928  1 15.0  150.47     .14 13.75  12.98  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0929  1 15.0  150.47     .31 10.25  16.43  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0200  1 15.0  165.44    2.48  1.75  11.03  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           0733  1 15.0 2846.70    3.72  6.75   6.37  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           1200  1 15.0  165.44    3.09  1.75  14.15  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           1733  1 15.0 2846.70    5.85  6.50   8.91  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
```

```
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           2200  1 15.0  165.44    3.72  1.75  17.48  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           2733  1 15.0 2846.70    8.52  6.25  11.71  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           3200  1 15.0  165.44    2.46  5.25  22.41  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           4200  1 15.0  165.44    3.30  5.25  31.76  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6200  1 15.0  165.44    5.97  5.25  60.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6201  1 15.0 2846.70   11.17 10.00  16.00  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6204  1 15.0 2846.70   43.48  9.50  51.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
```

```
      READ HYD           6205  1 15.0 3174.13   12.10 11.00  14.09  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6206  1 15.0 3174.13   18.59 11.25  22.21  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6208  1 15.0 3174.13   40.96 10.50  48.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6209  1 15.0  150.47     .54 12.00  21.57  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6210  1 15.0  150.47     .98 10.25  31.33  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6212  1 15.0  150.47    2.66  9.00  60.86  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6207  1 15.0 3174.13   29.72 11.00  36.01  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6211  1 15.0  150.47    1.82  9.50  47.16  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
```

```
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6203  1 15.0 2846.70   31.46  9.50  38.51  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           5200  1 15.0  165.44    4.65  5.25  46.99  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      READ HYD           6213  1 15.0 2846.70   18.67  9.75  24.40  n/a    .000
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\READHYD_
      remark:
*
      READ STORM                 15.0
      [ Ptot= 73.10 mm ]
      fname : V:\01606\Active\160622264\Analysis\SWM\Hydrology\VO2 Event Modelling (Revised Pond H Model)
\STM_FINA
      remark: 25yr/12hr
*
      RESRVR [ 2 : 0109] 0802  1  1.0    2.20     .20  5.25  69.71  n/a    .000
      {ST=   .00 ha.m }
*
      DUHYD              0204  1  3.0   52.89    4.18  5.25  60.70  n/a    .000
         MAJOR SYSTEM:   0204  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0204  3  3.0   52.89    4.18  5.25  60.70  n/a    .000
*
      DUHYD              0205  1  3.0   54.99    4.34  5.25  60.70  n/a    .000
         MAJOR SYSTEM:   0205  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0205  3  3.0   54.99    4.34  5.25  60.70  n/a    .000
*
      DUHYD              0206  1  3.0   18.20    1.48  5.25  60.70  n/a    .000
         MAJOR SYSTEM:   0206  2  3.0     .00     .00   .00    .00  n/a    .000
         MINOR SYSTEM:   0206  3  3.0   18.20    1.48  5.25  60.70  n/a    .000
*
      RESRVR [ 2 : 0108] 0801  1  1.0     .95     .03  5.42  69.71  n/a    .000
      {ST=   .02 ha.m }
*
      ADD [0905 + 0906]  0907  3  5.0   11.84    1.00  5.25  62.63  n/a    .000
*
      RESRVR [ 2 : 0915] 0916  1  5.0   22.80     .45  6.50  63.90  n/a    .000
      {ST=   .97 ha.m }
*
      RESRVR [ 2 : 0305] 0804  1  1.0     .51     .04  5.30  68.40  n/a    .000
      {ST=   .01 ha.m }
*
      ADD [0302 + 0303]  0903  3  1.0    3.03     .25  5.25  60.06  n/a    .000
*
      ADD [0903 + 0304]  0902  3  1.0    3.93     .25  5.25  46.25  n/a    .000
*
      RESRVR [ 2 : 1222] 1221  1  5.0   31.09    2.08  5.42  61.78  n/a    .000
      {ST=   .90 ha.m }
*
      ADD [5200 + 1221]  0201  3  5.0  196.53    6.48  5.42  49.33  n/a    .000
*
      ADD [0102 + 0204]  0700  3  3.0  116.76    9.45  5.25  61.43  n/a    .000
*
      ADD [0700 + 0205]  0701  3  3.0  116.76    9.45  5.25  61.43  n/a    .000
*
```

```
      ADD [0701 + 0206]  0702  3  3.0  134.96   10.93  5.25  61.33  n/a    .000
*
      RESRVR [ 2 : 0907] 0909  1  5.0   11.84     .18  6.75  62.40  n/a    .000
      {ST=   .53 ha.m }
*
      ADD [0804 + 0902]  0901  3  1.0    4.45     .29  5.25  48.79  n/a    .000
*
      ADD [6203 + 0201]  0849  3  5.0 3043.23   33.35  9.50  39.21  n/a    .000
*
      ADD [0107 + 0702]  0703  3  2.0  140.52   11.34  5.23  61.29  n/a    .000
*
      ADD [0300 + 0909]  0910  3  5.0   18.56     .47  5.17  54.54  n/a    .000
*
      ADD [0306 + 0901]  0912  3  1.0    6.96     .44  5.17  45.87  n/a    .000
*
      ADD [0703 + 0801]  0704  3  1.0  141.47   11.37  5.23  61.34  n/a    .000
*
      ADD [0912 + 0206]  1220  3  1.0    6.96     .44  5.17  45.87  n/a    .000
*
      ADD [0802 + 0704]  0705  3  1.0  143.67   11.57  5.23  61.47  n/a    .000
*
      ADD [0705 + 0101]  0706  3  1.0  146.82   11.84  5.23  61.50  n/a    .000
*
      RESRVR [ 2 : 0706] 0913  1  1.0  146.82    2.70  6.67  48.70  n/a    .000
      {ST=  5.96 ha.m }
*
      ADD [0913 + 0910]  0708  3  1.0  165.38    2.95  6.60  47.96  n/a    .000
*
      ADD [0708 + 0916]  0914  3  1.0  188.18    3.40  6.58  48.37  n/a    .000
*
      ADD [0506 + 0914]  1211  3  1.0  220.07    4.63  6.17  47.91  n/a    .000
*
      ADD [1211 + 1220]  0920  3  1.0  227.02    4.77  6.17  47.84  n/a    .000
*
      ADD [6211 + 0920]  1210  3  1.0  377.50    5.93  6.50  45.10  n/a    .000
*
      ADD [6207 + 1210]  0867  3  1.0 3551.63   33.07 10.50  36.68  n/a    .000
*
      ADD [0867 + 0849]  0868  3  1.0 6594.85   65.83  9.75  37.39  n/a    .000
*
 FINISH

===============================================================================================================
```

25mm Chicago Storm & 2-100 Year 4-hour Markham Storms

```
===========================================================================================

      V    V   I    SSSSS  U   U    A    L
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M   M  O   O
       OOO     T      T    H   H    Y    M   M   OOO

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                   *****  D E T A I L E D   O U T P U T *****

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: C:\Users\spentelow\Desktop\1-100Year_EventModel\Event Based Discretized Model.out
  Summary filename: C:\Users\spentelow\Desktop\1-100Year_EventModel\Event Based Discretized Model.sum

DATE: 11/1/2017                            TIME: 9:04:54 AM

USER:

COMMENTS: ____________________________________________________________

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  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

 -------------------
 |   READ STORM     |    Filename: V:\01606\Active\160622264
 |                  |              \Analysis\SWM\Hydrology\
 |                  |              V02 Event Modelling (Revised Pond H Model)\ST
 | Ptotal= 25.00 mm |    Comments: Twenty five mm Four Hour Chicago Storm
 -------------------
                   TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                    hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                    .17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                    .33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                    .50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                    .67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                    .83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                   1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

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 -------------------
 | RESERVOIR (0913) |
 | IN= 2---> OUT= 1 |
 | DT=  1.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 -------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .9190     3.9180
                           .0930      1.0741   |   1.3490     4.3080
                           .1900      2.1933   |   2.3060     5.2941
                           .2010      2.3825   |   2.6670     5.8932
                           .2120      2.5723   |   2.8810     6.2959
                           .2220      2.7627   |   3.7300     7.1089
                           .2320      2.9538   |   4.5880     7.7255
                           .2990      3.1454   |   5.2250     8.1399
                           .4140      3.3376   |  26.3630     8.7664
                           .5600      3.5305   |  37.6740     8.9765

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0706)      146.820      6.539        1.57      16.93
     OUTFLOW: ID= 1 (0913)      146.820       .196        4.48      10.51

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.99
                   TIME SHIFT OF PEAK FLOW         (min)=175.00
```

```
                   MAXIMUM  STORAGE   USED       (ha.m.)=  2.2938

 -------------------------------------------------------------------------------
 -------------------
 | RESERVOIR (0909) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 -------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .0640      .4187
                           .0020       .0210   |    .1120      .4740
                           .0100       .0869   |    .1400      .5021
                           .0140       .1576   |    .2730      .6168
                           .0150       .1822   |    .3120      .6461
                           .0160       .2073   |    .3520      .6757
                           .0170       .2329   |   1.6240      .7967
                           .0180       .2587   |   6.5870      .9220
                           .0200       .3110   |  19.6150     1.1183
                           .0210       .3376   |    .0000      .0000

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0907)       11.840       .835        1.50      17.93
     OUTFLOW: ID= 1 (0909)       11.840       .016        4.33      17.71

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.86
                   TIME SHIFT OF PEAK FLOW         (min)=170.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .1963

 -------------------------------------------------------------------------------
 -------------------
 | RESERVOIR (0916) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 -------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .0450      .4669
                           .0130       .0993   |    .1300      .6245
                           .0170       .1335   |    .2950      .8281
                           .0300       .3140   |    .7410     1.2578
                           .0320       .3518   |    .9230     1.5770
                           .0330       .3899   |   3.6480     1.9622
                           .0350       .4282   |   6.8140     2.0624

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0915)       22.800      1.259        1.58      18.30
     OUTFLOW: ID= 1 (0916)       22.800       .033        4.42      18.22

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.61
                   TIME SHIFT OF PEAK FLOW         (min)=170.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .3837

 -------------------------------------------------------------------------------
 -------------------
 | RESERVOIR (1221) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 -------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .0430      .5715
                           .0120       .0637   |    .1500      .6631
                           .0150       .0862   |    .3330      .7578
                           .0260       .2079   |   1.6540      .8887
                           .0290       .2604   |   5.1140      .9905
                           .0320       .3142   |   6.4570     1.0252
                           .0370       .4254   |   9.9400     1.0955
                           .0410       .5121   |  11.9190     1.1313
                           .0420       .5416   |    .0000      .0000

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (1222)       31.090      1.475        1.58      17.04
     OUTFLOW: ID= 1 (1221)       31.090       .040        4.50      17.00

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.70
                   TIME SHIFT OF PEAK FLOW         (min)=175.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4869

 -------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************
```

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--------------------
| MASS STORM        |    Filename: V:\01606\Active\160622264
|                   |              \Analysis\SWM\Hydrology\
|                   |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 29.16 mm  |    Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES
--------------------
                         Duration of storm    =  3.00 hrs
                         Mass curve time step =  5.00 min

                  TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                   .08    1.57 |   .83    3.88 |  1.58   13.33 |  2.33    2.34
                   .17    1.78 |   .92    4.76 |  1.67    8.15 |  2.42    2.24
                   .25    1.85 |  1.00    6.05 |  1.75    5.67 |  2.50    2.13
                   .33    1.96 |  1.08    9.34 |  1.83    4.37 |  2.58    2.03
                   .42    2.13 |  1.17   21.80 |  1.92    3.64 |  2.67    1.96
                   .50    2.41 |  1.25   41.22 |  2.00    3.11 |  2.75    1.85
                   .58    2.62 |  1.33  100.08 |  2.08    2.73 |  2.83    1.89
                   .67    2.97 |  1.42   53.15 |  2.17    2.59 |  2.92    1.75
                   .75    3.36 |  1.50   25.05 |  2.25    2.41 |  3.00    1.68

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0913)  |
| IN= 2---> OUT= 1  |
| DT=  1.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------        (cms)     (ha.m.)   |   (cms)     (ha.m.)
                              .0000      .0000   |    .9190     3.9180
                              .0930     1.0741   |   1.3490     4.3080
                              .1900     2.1933   |   2.3060     5.2941
                              .2010     2.3825   |   2.6670     5.8932
                              .2120     2.5723   |   2.8810     6.2959
                              .2220     2.7627   |   3.7300     7.1089
                              .2320     2.9538   |   4.5880     7.7255
                              .2990     3.1454   |   5.2250     8.1399
                              .4140     3.3376   |  26.3630     8.7664
                              .5600     3.5305   |  37.6740     8.9765

                                    AREA      QPEAK       TPEAK       R.V.
                                    (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0706)       146.820     13.248        1.43      20.53
     OUTFLOW: ID= 1 (0913)       146.820       .227        3.30      12.76

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.71
                   TIME SHIFT OF PEAK FLOW         (min)=112.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  2.8566

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0909)  |
| IN= 2---> OUT= 1  |
| DT=  5.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------        (cms)     (ha.m.)   |   (cms)     (ha.m.)
                              .0000      .0000   |    .0640      .4187
                              .0020      .0210   |    .1120      .4740
                              .0100      .0869   |    .1400      .5021
                              .0140      .1576   |    .2730      .6168
                              .0150      .1822   |    .3120      .6461
                              .0160      .2073   |    .3520      .6757
                              .0170      .2329   |   1.6240      .7967
                              .0180      .2587   |   6.5870      .9220
                              .0200      .3110   |  19.6150     1.1183
                              .0210      .3376   |    .0000      .0000

                                    AREA      QPEAK       TPEAK       R.V.
                                    (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0907)        11.840      1.559        1.33      21.57
     OUTFLOW: ID= 1 (0909)        11.840       .017        3.17      21.35

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.12
                   TIME SHIFT OF PEAK FLOW         (min)=110.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .2432

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0916)  |
| IN= 2---> OUT= 1  |
| DT=  5.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------        (cms)     (ha.m.)   |   (cms)     (ha.m.)
```

```
                              .0000      .0000   |    .0450      .4669
                              .0130      .0993   |    .1300      .6245
                              .0170      .1335   |    .2950      .8281
                              .0300      .3140   |    .7410     1.2578
                              .0320      .3518   |    .9230     1.5770
                              .0330      .3899   |   3.6480     1.9622
                              .0350      .4282   |   6.8140     2.0624

                                    AREA      QPEAK       TPEAK       R.V.
                                    (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (0915)        22.800      2.412        1.42      22.06
     OUTFLOW: ID= 1 (0916)        22.800       .049        3.17      21.98

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.02
                   TIME SHIFT OF PEAK FLOW         (min)=105.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .4738

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (1221)  |
| IN= 2---> OUT= 1  |
| DT=  5.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------        (cms)     (ha.m.)   |   (cms)     (ha.m.)
                              .0000      .0000   |    .0430      .5715
                              .0120      .0637   |    .1500      .6631
                              .0150      .0862   |    .3330      .7578
                              .0260      .2079   |   1.6540      .8887
                              .0290      .2604   |   5.1140      .9905
                              .0320      .3142   |   6.4570     1.0252
                              .0370      .4254   |   9.9400     1.0955
                              .0410      .5121   |  11.9190     1.1313
                              .0420      .5416   |    .0000      .0000

                                    AREA      QPEAK       TPEAK       R.V.
                                    (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (1222)        31.090      2.915        1.42      20.67
     OUTFLOW: ID= 1 (1221)        31.090       .079        3.17      20.62

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.71
                   TIME SHIFT OF PEAK FLOW         (min)=105.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=   .6024

-------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************
--------------------
| MASS STORM        |    Filename: V:\01606\Active\160622264
|                   |              \Analysis\SWM\Hydrology\
|                   |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 42.00 mm  |    Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES
--------------------
                         Duration of storm    =  3.00 hrs
                         Mass curve time step =  5.00 min

                  TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                   .08    2.27 |   .83    5.59 |  1.58   19.20 |  2.33    3.38
                   .17    2.57 |   .92    6.85 |  1.67   11.74 |  2.42    3.23
                   .25    2.67 |  1.00    8.72 |  1.75    8.16 |  2.50    3.07
                   .33    2.82 |  1.08   13.46 |  1.83    6.30 |  2.58    2.92
                   .42    3.07 |  1.17   31.40 |  1.92    5.24 |  2.67    2.82
                   .50    3.48 |  1.25   59.37 |  2.00    4.49 |  2.75    2.67
                   .58    3.78 |  1.33  144.14 |  2.08    3.93 |  2.83    2.72
                   .67    4.28 |  1.42   76.56 |  2.17    3.73 |  2.92    2.52
                   .75    4.84 |  1.50   36.09 |  2.25    3.48 |  3.00    2.42

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0913)  |
| IN= 2---> OUT= 1  |
| DT=  1.0 min      |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------        (cms)     (ha.m.)   |   (cms)     (ha.m.)
                              .0000      .0000   |    .9190     3.9180
                              .0930     1.0741   |   1.3490     4.3080
                              .1900     2.1933   |   2.3060     5.2941
                              .2010     2.3825   |   2.6670     5.8932
                              .2120     2.5723   |   2.8810     6.2959
                              .2220     2.7627   |   3.7300     7.1089
                              .2320     2.9538   |   4.5880     7.7255
```

```
                    .2990     3.1454   |   5.2250      8.1399
                    .4140     3.3376   |  26.3630      8.7664
                    .5600     3.5305   |  37.6740      8.9765

                          AREA      QPEAK       TPEAK       R.V.
                          (ha)      (cms)       (hrs)       (mm)
    INFLOW : ID= 2 (0706)    146.820     22.598        1.43       32.08
    OUTFLOW: ID= 1 (0913)    146.820      1.149        2.82       22.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.08
                  TIME SHIFT OF PEAK FLOW         (min)= 83.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  4.1265

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0909) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                    .0000      .0000   |    .0640       .4187
                    .0020      .0210   |    .1120       .4740
                    .0100      .0869   |    .1400       .5021
                    .0140      .1576   |    .2730       .6168
                    .0150      .1822   |    .3120       .6461
                    .0160      .2073   |    .3520       .6757
                    .0170      .2329   |   1.6240       .7967
                    .0180      .2587   |   6.5870       .9220
                    .0200      .3110   |  19.6150      1.1183
                    .0210      .3376   |    .0000       .0000

                          AREA      QPEAK       TPEAK       R.V.
                          (ha)      (cms)       (hrs)       (mm)
    INFLOW : ID= 2 (0907)     11.840      2.600        1.33       33.19
    OUTFLOW: ID= 1 (0909)     11.840       .040        3.08       32.97

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.52
                  TIME SHIFT OF PEAK FLOW         (min)=105.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .3727

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0916) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                    .0000      .0000   |    .0450       .4669
                    .0130      .0993   |    .1300       .6245
                    .0170      .1335   |    .2950       .8281
                    .0300      .3140   |    .7410      1.2578
                    .0320      .3518   |    .9230      1.5770
                    .0330      .3899   |   3.6480      1.9622
                    .0350      .4282   |   6.8140      2.0624

                          AREA      QPEAK       TPEAK       R.V.
                          (ha)      (cms)       (hrs)       (mm)
    INFLOW : ID= 2 (0915)     22.800      3.830        1.33       34.01
    OUTFLOW: ID= 1 (0916)     22.800       .177        2.75       33.92

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.62
                  TIME SHIFT OF PEAK FLOW         (min)= 85.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .6824

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (1221) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                    .0000      .0000   |    .0430       .5715
                    .0120      .0637   |    .1500       .6631
                    .0150      .0862   |    .3330       .7578
                    .0260      .2079   |   1.6540       .8887
                    .0290      .2604   |   5.1140       .9905
                    .0320      .3142   |   6.4570      1.0252
                    .0370      .4254   |   9.9400      1.0955
                    .0410      .5121   |  11.9190      1.1313
                    .0420      .5416   |    .0000       .0000

                          AREA      QPEAK       TPEAK       R.V.
                          (ha)      (cms)       (hrs)       (mm)
```

```
    INFLOW : ID= 2 (1222)     31.090      4.686        1.42       32.29
    OUTFLOW: ID= 1 (1221)     31.090       .711        2.08       32.25

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 15.18
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .7965

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 ****************************
 ** SIMULATION NUMBER:   4 **
 ****************************

--------------------
| MASS STORM       |    Filename: V:\01606\Active\160622264
|                  |              \Analysis\SWM\Hydrology\
|                  |              VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal= 61.00 mm |    Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES
--------------------
                        Duration of storm    =  3.00 hrs
                        Mass curve time step =  5.00 min

              TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .08    3.29 |   .83    8.13 |  1.58   27.89 |  2.33    4.90
               .17    3.73 |   .92    9.96 |  1.67   17.06 |  2.42    4.68
               .25    3.88 |  1.00   12.66 |  1.75   11.86 |  2.50    4.47
               .33    4.10 |  1.08   19.54 |  1.83    9.15 |  2.58    4.25
               .42    4.47 |  1.17   45.60 |  1.92    7.61 |  2.67    4.10
               .50    5.05 |  1.25   86.23 |  2.00    6.51 |  2.75    3.88
               .58    5.49 |  1.33  209.35 |  2.08    5.71 |  2.83    3.95
               .67    6.22 |  1.42  111.19 |  2.17    5.42 |  2.92    3.66
               .75    7.03 |  1.50   52.41 |  2.25    5.05 |  3.00    3.51

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0913) |
| IN= 2---> OUT= 1 |
| DT=  1.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                    .0000      .0000   |    .9190      3.9180
                    .0930     1.0741   |   1.3490      4.3080
                    .1900     2.1933   |   2.3060      5.2941
                    .2010     2.3825   |   2.6670      5.8932
                    .2120     2.5723   |   2.8810      6.2959
                    .2220     2.7627   |   3.7300      7.1089
                    .2320     2.9538   |   4.5880      7.7255
                    .2990     3.1454   |   5.2250      8.1399
                    .4140     3.3376   |  26.3630      8.7664
                    .5600     3.5305   |  37.6740      8.9765

                          AREA      QPEAK       TPEAK       R.V.
                          (ha)      (cms)       (hrs)       (mm)
    INFLOW : ID= 2 (0706)    144.860     36.096        1.43       49.91
    OUTFLOW: ID= 1 (0913)    144.860      2.695        2.27       39.17

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.47
                  TIME SHIFT OF PEAK FLOW         (min)= 50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  5.9466

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0909) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                    .0000      .0000   |    .0640       .4187
                    .0020      .0210   |    .1120       .4740
                    .0100      .0869   |    .1400       .5021
                    .0140      .1576   |    .2730       .6168
                    .0150      .1822   |    .3120       .6461
                    .0160      .2073   |    .3520       .6757
                    .0170      .2329   |   1.6240       .7967
                    .0180      .2587   |   6.5870       .9220
                    .0200      .3110   |  19.6150      1.1183
                    .0210      .3376   |    .0000       .0000

                          AREA      QPEAK       TPEAK       R.V.
                          (ha)      (cms)       (hrs)       (mm)
    INFLOW : ID= 2 (0907)     11.840      4.099        1.33       51.04
    OUTFLOW: ID= 1 (0909)     11.840       .164        2.33       50.81
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.01
                  TIME SHIFT OF PEAK FLOW         (min)= 60.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .5232

 -------------------------------------------------------------------------------
 --------------------
 | RESERVOIR (0916) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .0450       .4669
                           .0130      .0993    |    .1300       .6245
                           .0170      .1335    |    .2950       .8281
                           .0300      .3140    |    .7410      1.2578
                           .0320      .3518    |    .9230      1.5770
                           .0330      .3899    |   3.6480      1.9622
                           .0350      .4282    |   6.8140      2.0624

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
      INFLOW : ID= 2 (0915)     22.800      6.963        1.42       52.22
      OUTFLOW: ID= 1 (0916)     22.800       .461        2.08       52.13

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.63
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .9890

 -------------------------------------------------------------------------------
 --------------------
 | RESERVOIR (1221) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .0430       .5715
                           .0120      .0637    |    .1500       .6631
                           .0150      .0862    |    .3330       .7578
                           .0260      .2079    |   1.6540       .8887
                           .0290      .2604    |   5.1140       .9905
                           .0320      .3142    |   6.4570      1.0252
                           .0370      .4254    |   9.9400      1.0955
                           .0410      .5121    |  11.9190      1.1313
                           .0420      .5416    |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
      INFLOW : ID= 2 (1222)     31.090      7.530        1.42       50.19
      OUTFLOW: ID= 1 (1221)     31.090      3.867        1.67       50.15

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 51.35
                  TIME SHIFT OF PEAK FLOW         (min)= 15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .9544

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   ****************************
   ** SIMULATION NUMBER:   5 **
   ****************************

 --------------------
 | MASS STORM       |    Filename: V:\01606\Active\160622264
 |                  |              \Analysis\SWM\Hydrology\
 |                  |              VO2 Event Modelling (Revised Pond H Model)\ST
 | Ptotal= 80.00 mm |    Comments: TOWN OF MARKHAM MASS STORM (MODIFIED AES
 --------------------
                         Duration of storm    =  3.00 hrs
                         Mass curve time step =  5.00 min

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .08    4.32 |   .83   10.66 |  1.58   36.58 |  2.33    6.43
                 .17    4.90 |   .92   13.06 |  1.67   22.37 |  2.42    6.14
                 .25    5.09 |  1.00   16.61 |  1.75   15.55 |  2.50    5.86
                 .33    5.38 |  1.08   25.63 |  1.83   12.00 |  2.58    5.57
                 .42    5.86 |  1.17   59.81 |  1.92    9.98 |  2.67    5.38
                 .50    6.62 |  1.25  113.09 |  2.00    8.54 |  2.75    5.09
                 .58    7.20 |  1.33  274.56 |  2.08    7.49 |  2.83    5.18
                 .67    8.16 |  1.42  145.82 |  2.17    7.10 |  2.92    4.80
                 .75    9.22 |  1.50   68.74 |  2.25    6.62 |  3.00    4.61

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 --------------------
 | RESERVOIR (0913) |
 | IN= 2---> OUT= 1 |
 | DT=  1.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .9190      3.9180
                           .0930     1.0741    |   1.3490      4.3080
                           .1900     2.1933    |   2.3060      5.2941
                           .2010     2.3825    |   2.6670      5.8932
                           .2120     2.5723    |   2.8810      6.2959
                           .2220     2.7627    |   3.7300      7.1089
                           .2320     2.9538    |   4.5880      7.7255
                           .2990     3.1454    |   5.2250      8.1399
                           .4140     3.3376    |  26.3630      8.7664
                           .5600     3.5305    |  37.6740      8.9765

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
      INFLOW : ID= 2 (0706)    142.637     51.981        1.40       68.18
      OUTFLOW: ID= 1 (0913)    142.637      4.675        2.12       56.81

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.99
                  TIME SHIFT OF PEAK FLOW         (min)= 43.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  7.7823

 -------------------------------------------------------------------------------
 --------------------
 | RESERVOIR (0909) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .0640       .4187
                           .0020      .0210    |    .1120       .4740
                           .0100      .0869    |    .1400       .5021
                           .0140      .1576    |    .2730       .6168
                           .0150      .1822    |    .3120       .6461
                           .0160      .2073    |    .3520       .6757
                           .0170      .2329    |   1.6240       .7967
                           .0180      .2587    |   6.5870       .9220
                           .0200      .3110    |  19.6150      1.1183
                           .0210      .3376    |    .0000       .0000

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
      INFLOW : ID= 2 (0907)     11.840      5.675        1.33       69.29
      OUTFLOW: ID= 1 (0909)     11.840       .375        2.00       69.06

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.61
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=   .6785

 -------------------------------------------------------------------------------
 --------------------
 | RESERVOIR (0916) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .0450       .4669
                           .0130      .0993    |    .1300       .6245
                           .0170      .1335    |    .2950       .8281
                           .0300      .3140    |    .7410      1.2578
                           .0320      .3518    |    .9230      1.5770
                           .0330      .3899    |   3.6480      1.9622
                           .0350      .4282    |   6.8140      2.0624

                                 AREA      QPEAK       TPEAK       R.V.
                                 (ha)      (cms)       (hrs)       (mm)
      INFLOW : ID= 2 (0915)     22.800      9.637        1.42       70.73
      OUTFLOW: ID= 1 (0916)     22.800       .768        2.00       70.65

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.97
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3052

 -------------------------------------------------------------------------------
 --------------------
 | RESERVOIR (1221) |
 | IN= 2---> OUT= 1 |
 | DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
 --------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
```

```
                              .0000      .0000   |    .0430       .5715
                              .0120      .0637   |    .1500       .6631
                              .0150      .0862   |    .3330       .7578
                              .0260      .2079   |   1.6540       .8887
                              .0290      .2604   |   5.1140       .9905
                              .0320      .3142   |   6.4570      1.0252
                              .0370      .4254   |   9.9400      1.0955
                              .0410      .5121   |  11.9190      1.1313
                              .0420      .5416   |    .0000       .0000

                                   AREA      QPEAK       TPEAK       R.V.
                                   (ha)      (cms)       (hrs)       (mm)
     INFLOW : ID= 2 (1222)     31.090     12.353        1.42       68.50
     OUTFLOW: ID= 1 (1221)     31.090      7.939        1.58       68.46

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 64.27
                   TIME SHIFT OF PEAK FLOW          (min)= 10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  1.0762

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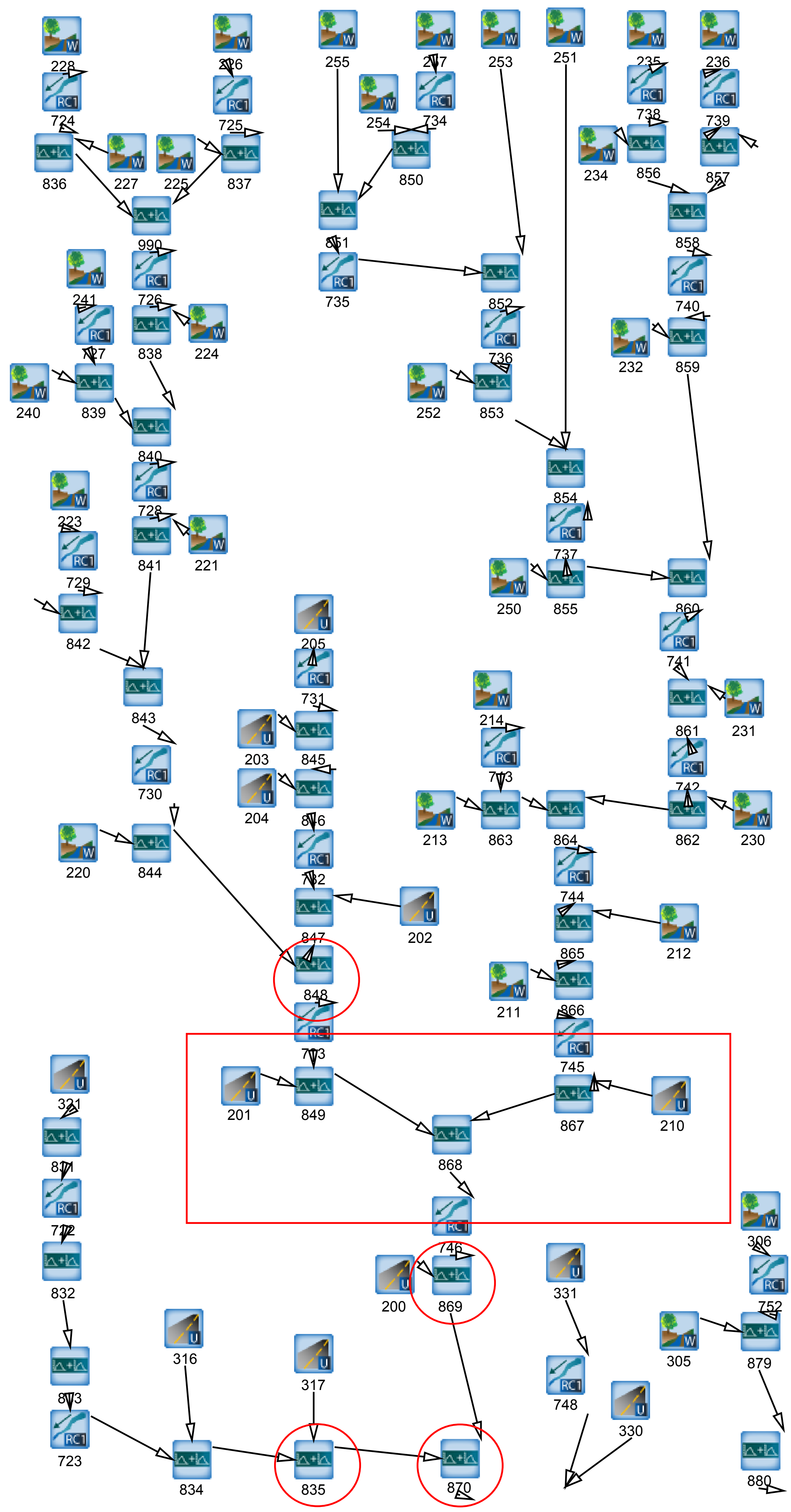
C.2 REGIONAL VO2 MODELING

Regional Model Schematic (Partial Screen Capture)



Stantec

4134 16th Avenue Residential Development
Regional Flow Scenario Summary Table

Project No. 160622264

Watershed	Flow Node	Sub-Catchment ID	Cumulative Drainage Area (ha)	Areal Reduction Factor per 2001 MMM Rouge River Report	Original Ex. (2000) Conds % Imp	2001 Rouge River Report Existing Conditions (2000) Flow (m3/s)	Updated Ex. (2016) % Imp	Updated Existing Conditions (2016) Flow (m3/s)	Propsed Build-Out % Imp	Proposed Build-Out Flow (m3/s)	Existing HEC-RAS Flow (2015)	Percentage Difference in D/S Nodal Flows - Proposed vs. Existing (2000)
Berczy Creek	848		2846.7	**0.971**		178.9		178.9		178.9		
		201	196.533	**-**	**31**	14.7	**31**	14.7	**38**	15.9		
	849		3043.2	**0.963**		173.1		173.3		172.4	182.9	-0.4%
Bruce Creek		**210**	377.541	**-**	**20**	23.9	**26**	25.3	**43**	30.5		
	867		3551.7	**0.963**		201.6		200.3		196.7	213.5	-2.4%
	868		6594.9	**0.963**		374.7		373.6		369.1		-1.5%
	869		6697.8	**0.963**		374.4		373.4		369.4		-1.3%
	835		6959.0	**0.948**		271.3		270.1		270.1		-0.4%
	870		13630.7	**0.948**		634.1		634.3		630.1		-0.6%

Stantec

4134 16th Avenue Residential Development
Regional Model Land Use Breakdown

Project No. 160622264

Berczy Creek (Catchment 201) Land Use

Catchment ID	Scenario	Area (ha)	Proposed Development (Avg 48% Imp)*	Area (ha)	High Density (65% Imp.)	Area (ha)	Medium Density (45% Imp.)	Area (ha)	Industrial / Commercial (80% Imp.)	Area (ha)	Institutional (65% Imp.)	Area (ha)	Open Space (0% Imp.)	Area (ha)	Overall Catchment Imperviousness
		Percent Imperviousness	0.48		0.65		0.45		0.8		0.65		0		
201	2001 Rouge River Report Existing Conditions (2000)	196.533	-	-	-	-	65.0%	127.7	-	-	2.6%	5.1	32.4%	63.7	31%
	2016 Updated Existing Conditions		-	-	-	-	65.0%	127.7	-	-	2.6%	5.1	32.4%	63.7	31%
	Future Conditions (Proposed Build-Out)		14.2%	28.0	-	-	65.0%	127.7	-	-	2.6%	5.1	18.2%	35.7	38%

*Proposed development lumped impervious percentages calculated based on City of Markham 2016 Engineering Standards
Note: Total area within each subcatchment has been adjusted to match the 2001 MMM subwatershed map

Bruce Creek (Catchment 210) Land Use

Catchment ID	Scenario	Area (ha)	Proposed Development (Avg 46% Imp)*	Area (ha)	High Density (65% Imp.)	Area (ha)	Medium Density (45% Imp.)	Area (ha)	Industrial / Commercial (80% Imp.)	Area (ha)	Institutional (65% Imp.)	Area (ha)	Open Space (0% Imp.)	Area (ha)	Overall Catchment Imperviousness
		Percent Imperviousness	0.46		0.65		0.45		0.8		0.65		0		
210	2001 Rouge River Report Existing Conditions (2000)	377.541	-	-	1.3%	4.9	36.3%	137.0	1.5%	5.7	1.8%	6.8	59.0%	222.7	20%
	2016 Updated Existing Conditions		-	-	1.3%	4.9	50.1%	189.0	1.5%	5.7	1.8%	6.8	45.3%	171.1	26%
	Future Conditions (Proposed Build-Out)		37.1%	140.1	1.3%	4.9	50.1%	189.0	1.5%	5.7	1.8%	6.8	8.2%	31.1	43%

*Proposed development lumped impervious percentages calculated based on City of Markham 2016 Engineering Standards
Note: Total area within each subcatchment has been adjusted to match the 2001 MMM subwatershed map

Stantec

4134 16th Avenue Residential Development
Landuse Breakdown for Proposed Conditions Regional Storm Modelling Based on Existing Drainage Boundaries used in the 2001 MMM Subwatershed Areas

		Bruce (210)[1]						Berczy (201)[1,2]		Total Site[2]	
Land Use	Imperv. %	East		West		Total					
		Parcel Area	Imperv. Area	Parcel Area	Imperv. Area	Parcel Area	Imperv. Area	Parcel Area	Imperv. Area	Parcel Area	Imperv. Area
Singles	61.5%	246005	151388	167298	102952	413303	254340	41601	25601	454905	279941
Towns	76.9%	78053	60041	24959	19199	103012	79240	20405	15696	123417	94936
Towns - Stacked	92.3%	0	0	0	0	0	0	0	0	0	0
Towns - Back to Back	76.9%	6958	5352	0	0	6958	5352	0	0	6958	5352
Mid Rise	92.3%	0	0	0	0	0	0	0	0	0	0
Mixed Use	92.3%	0	0	21033	19416	21033	19416	14317	13216	35351	32632
School	76.9%	24566	18897	0	0	24566	18897	0	0	24566	18897
Park	23.1%	42746	9865	5427	1252	48173	11117	36598	8446	84771	19563
Greenway/Open Space	0.0%	7663	0	322830	0	330493	0	60511	0	391004	0
Woodlot/Wetland	0.0%	73858	0	0	0	73858	0	0	0	73858	0
Medium Density	92.3%	19082	17614	23843	22009	42925	39623	9015	8322	51941	47945
Pond	53.8%	68028	36630	13822	7443	81850	44073	11167	6013	93017	50086
Laneway	100.0%	19474	19474	7001	7001	26474	26474	8610	8610	35084	35084
ROW	61.5%	175556	108034	53367	32841	228923	140875	77020	47397	305943	188273
	Total Area =	761988	427294	639581	212113	1401569	639408	279245	133300	1680814	772708
	Average Imperviousness =	56%		33%		46%		48%		46%	

Note: Total area within each subcatchment has been adjusted to match the 2001 MMM subwatershed map

[1] 9.65 ha of drainage which physically drains to catchment 201 was included in catchment 210 in the 2001 MMM Subwatershed Area Map. For consistency with this model, 9.65 ha of singles has been transferred from catchment 210 to

[2] 0.49 ha of drainage from the western end of the site is not part of catchment 201 or 210 from the 2001 MMM Subwatershed Area Map and has been excluded from the Regional Storm Modelling. This area has been removed from the

Rouge River Hydrologic Update
Table D.7 Regional Event Peak Flows

Existing Conditions (2000) Regional Model Output

Flow Point	Drainage Area	Peak Flow Rate (m^3/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
100	159.9	15.60	16.10	16.10	
101	215.0	14.15	18.47	18.47	
102	129.0	14.16	13.34	13.13	
103	162.5	17.05	17.05	16.79	18.96
104	96.0	14.11	11.69	11.01	
105	333.7	29.44	24.99	24.99	
106	242.2	23.38	23.38	23.49	
107	119.3	13.69	13.69	12.75	19.50
110	160.0	15.39	15.74	15.74	
120	123.6	15.08	11.89	11.89	
121	271.7	26.17	26.88	23.89	36.20
130	234.1	21.47	18.04	18.04	
131	225.5	24.20	20.74	22.48	
132	84.2	9.23	9.23	8.89	17.10
140	46.6	4.76	4.76	4.76	
141	233.0	21.08	21.14	21.14	
142	115.0	13.44	13.84	12.44	14.90
143	231.8	20.27	20.87	20.87	
144	115.7	13.86	14.65	14.65	
200	102.9	8.63	8.63	8.63	
201	196.5	14.69	14.69	14.69	
202	227.6	18.50	18.58	18.58	
203	161.6	16.12	14.79	14.79	
204	84.8	9.50	9.06	9.06	
205	75.2	9.19	8.59	8.59	11.10
210	377.5	23.87	23.87	23.87	
211	301.4	30.51	30.51	30.11	
212	269.2	24.58	24.58	25.64	
213	340.9	30.45	30.45	32.39	
214	143.0	14.16	14.16	14.21	
220	323.6	28.51	28.51	30.50	
221	326.6	27.33	27.33	30.67	
222	337.9	27.38	27.58	30.95	
223	116.9	13.34	13.34	12.55	
224	107.2	10.54	10.92	10.81	
225	323.9	30.80	31.56	31.42	
226	63.5	7.39	7.39	6.87	
227	105.4	11.20	11.46	10.84	
228	155.8	16.72	16.72	15.97	
230	180.3	16.13	16.13	17.37	
231	158.2	11.59	11.59	14.36	
232	198.3	19.35	19.35	19.64	
233	29.5	3.60	3.60	3.45	
234	117.6	14.76	14.76	12.66	
235	34.2	4.17	4.17	4.22	
236	108.6	12.06	12.06	11.56	
240	306.9	26.97	31.76	28.91	

Flow Point	Drainage Area	Peak Flow Rate (m^3/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
6130	63.0		7.06	7.06	
6131	59.9		5.78	5.78	
614	440.1	31.90	35.95	35.95	
615	358.0	31.51	32.96	32.96	
616	101.4	11.03	9.43	9.43	
617	39.3	4.02	4.02	4.02	5.70
618	111.2	10.35	10.34	10.34	14.90
620	63.4	7.54	7.54	6.81	
621	70.6	10.23	7.16	7.16	
630	276.6	24.09	24.09	24.09	
631	200.7	18.06	19.26	19.26	
632	325.6	25.08	27.12	32.47	
633	88.8	8.79	8.79	9.02	
800	348.1	28.95	29.16	29.09	37.40
801	347.6	28.01	28.95	28.95	
802	695.6	56.96	58.11	58.04	74.80
803	742.2	59.38	60.83	60.71	78.34
804	309.7	30.71	28.39	29.24	42.80
805	505.8	39.48	36.22	34.80	
806	815.5	66.49	59.90	60.51	
807	1557.7	124.91	120.58	121.22	57.40
808	1681.3	139.01	132.47	133.11	
809	1841.4	142.00	133.99	135.21	187.80
810	361.5	35.34	35.34	34.06	42.50
811	695.2	52.84	47.06	48.59	65.50
812	291.5	29.86	28.98	28.32	31.80
813	387.5	42.13	39.18	38.44	52.60
814	602.5	54.17	55.47	55.17	72.56
815	1297.7	105.97	102.53	103.76	121.80
816	1457.6	103.53	96.97	98.31	110.50
817	3298.9	245.11	229.33	233.34	297.00
818	3497.4	253.43	237.63	240.81	297.80
819	3661.5	201.94	196.59	200.37	237.40
820	371.2	34.87	35.75	35.75	
821	4032.7	218.32	211.60	217.89	267.90
822	4134.3	209.67	205.06	210.01	258.20
823	176.3	19.17	21.76	21.76	
824	488.9	42.19	42.10	42.10	
825	815.5	72.60	72.69	72.69	
826	1244.1	103.04	105.98	105.98	
827	1654.1	137.58	145.10	145.10	
828	1682.4	138.62	146.59	146.59	
829	5816.7	295.59	303.91	311.97	376.70
830	5947.4	290.98	294.46	302.45	398.50
831	6111.9	298.09	304.13	312.13	349.80
832	6400.1	267.81	266.23	273.20	349.80
833	6633.9	274.34	274.95	282.30	350.60
834	6670.8	264.56	265.15	270.84	340.40
835	6966.2	271.31	273.44	280.16	340.40
836	261.2	26.03	26.06	25.25	
837	387.4	35.89	36.65	35.40	
838	755.8	71.35	72.66	68.61	86.00

Flow Point	Drainage Area	Peak Flow Rate (m³/s) for Development Scenario			
		Existing Conditions (2000)	Future Committed Development	Complete Development	TRCA*
839	436.7	36.91	40.91	36.96	49.70
840	1192.4	107.87	113.57	105.27	130.60
841	1519.1	115.40	120.00	114.74	139.70
842	454.8	37.45	37.65	38.77	
843	1973.9	151.00	156.50	152.58	182.00
844	2297.5	141.77	145.93	140.26	174.20
845	236.8	23.70	22.38	22.38	31.90
846	321.6	32.64	31.16	31.16	44.30
847	549.2	41.45	41.24	41.24	62.50
848	2846.7	178.93	182.91	178.16	227.00
849	3043.2	173.10	176.69	176.80	227.00
850	180.6	17.24	17.24	18.18	
851	553.6	52.13	52.13	54.06	
852	711.8	67.14	67.14	67.64	
853	852.1	79.84	79.84	80.52	
854	1025.2	97.20	97.20	98.02	
855	1293.0	119.10	119.10	121.42	
856	151.8	18.16	18.16	16.08	
857	138.1	14.68	14.68	14.11	
858	289.8	32.10	32.10	30.10	
859	488.1	46.11	46.11	44.97	
860	1781.1	165.18	165.18	166.40	174.90
861	1939.3	167.24	167.24	167.81	163.50
862	2119.6	157.04	157.04	155.14	161.60
863	484.0	43.51	43.51	43.40	
864	2603.6	194.63	194.63	189.74	178.20
865	2872.7	195.69	195.69	192.21	199.80
866	3174.1	213.48	213.48	210.09	211.00
867	3551.7	201.62	201.62	205.89	212.90
868	6594.9	374.73	378.31	382.70	430.00
869	6697.8	374.40	378.03	382.98	429.70
870	13664.1	634.08	643.02	652.70	736.20
871	13717.8	626.54	636.02	645.66	736.80
872	526.3	40.51	40.51	40.51	
873	14244.1	648.36	658.42	670.26	766.10
874	14368.1	650.02	660.12	672.61	765.60
875	14584.9	656.35	666.45	680.74	768.70
876	14853.1	587.81	597.12	613.15	716.10
877	15115.0	591.83	601.75	618.49	716.20
878	15158.3	590.22	599.78	617.30	700.40
879	390.2	37.39	37.39	36.43	36.30
880	494.2	48.03	48.03	47.45	82.70
881	808.1	68.92	X 64.99	70.52	106.70
882	229.9	22.69	23.77	22.19	
883	1038.0	90.67	88.70	92.71	106.70
884	1377.2	104.45	103.25	111.87	137.80
885	16535.5	631.47	645.06	662.15	716.90
886	16577.8	630.96	645.19	662.52	716.60
887	414.5	32.56	32.00	39.23	35.00
888	615.1	50.62	51.26	58.48	76.80
889	891.7	70.80	71.47	78.06	88.49
890	17469.5	656.30	662.78	685.64	719.80

Existing Conditions (2016) Regional Model Output

```
 ****************************
 ** SIMULATION NUMBER:   1 **
 ****************************

--------------------
| CALIB            |
| STANDHYD  (0201) |   Area    (ha)= 196.53
|ID= 1 DT=15.0 min |   Total Imp(%)=  31.00   Dir. Conn.(%)=  31.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      60.93       135.61
     Dep. Storage     (mm)=        .10         5.00
     Average Slope     (%)=        .34          .34
     Length            (m)=    1145.00      1145.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      53.00        51.59
                over (min)       15.00       150.00
     Storage Coeff.  (min)=      19.65 (ii)  136.76 (ii)
     Unit Hyd. Tpeak (min)=      15.00       150.00
     Unit Hyd. peak  (cms)=        .06          .01
                                                          *TOTALS*
     PEAK FLOW       (cms)=       8.65        10.29         14.685 (iii)
     TIME TO PEAK    (hrs)=      10.00        12.25          11.00
     RUNOFF VOLUME    (mm)=     211.90       184.84         193.23
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00          .87            .91

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  91.1    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   1 **
 ****************************

--------------------
| CALIB            |
| STANDHYD  (0210) |   Area    (ha)= 377.54
|ID= 1 DT=15.0 min |   Total Imp(%)=  26.00   Dir. Conn.(%)=  26.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      98.16       279.38
     Dep. Storage     (mm)=        .10         5.00
     Average Slope     (%)=        .30          .30
     Length            (m)=    1585.00      1585.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO  15.0 MIN. TIME STEP.


                            ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                  .250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                  .500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                  .750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        52.23
                over (min)       30.00       180.00
     Storage Coeff.  (min)=      24.80 (ii)  171.84 (ii)
     Unit Hyd. Tpeak (min)=      30.00       180.00
     Unit Hyd. peak  (cms)=        .04          .01
                                                          *TOTALS*
     PEAK FLOW       (cms)=      13.01        19.27         25.269 (iii)
     TIME TO PEAK    (hrs)=      10.00        12.50          11.00
     RUNOFF VOLUME    (mm)=     211.90       190.98         196.42
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00          .90            .93

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.6    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   4 **
 ****************************

--------------------
| ADD HYD   (0835) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0317):   295.46  24.204    11.00   180.99
        + ID2= 2 (0834):  6637.45 261.985    14.00   177.57
          ===================================================
          ID = 3 (0835):  6932.91 270.053    13.50   177.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   2 **
 ****************************

--------------------
| ADD HYD   (0848) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0844):  2297.50 142.265    12.25   178.15
        + ID2= 2 (0847):   549.20  39.856    11.00   188.57
          ===================================================
          ID = 3 (0848):  2846.70 178.861    12.00   180.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   3 **
 ****************************

--------------------
| ADD HYD   (0849) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0201):   196.53  14.077    11.00   185.45
        + ID2= 2 (0733):  2846.70 163.674    12.75   178.49
          ==================================================
          ID = 3 (0849):  3043.23 173.311    12.75   178.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   3 **
 ****************************

--------------------
| ADD HYD   (0867) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0210):   377.54  24.221    11.00   188.61
        + ID2= 2 (0745):  3174.13 180.864    12.75   176.91
          ==================================================
          ID = 3 (0867):  3551.67 200.279    12.75   178.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   3 **
 ****************************

--------------------
| ADD HYD   (0868) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0867):  3551.67 200.279    12.75   178.15
        + ID2= 2 (0849):  3043.23 173.311    12.75   178.94
          ==================================================
          ID = 3 (0868):  6594.90 373.591    12.75   178.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
 ****************************
 ** SIMULATION NUMBER:   3 **
 ****************************

--------------------
| ADD HYD   (0869) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0200):   102.93   8.262    11.00   178.17
        + ID2= 2 (0746):  6594.90 369.422    13.00   178.52
          ==================================================
          ID = 3 (0869):  6697.83 373.436    13.00   178.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

--------------------
| ADD HYD   (0870) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0869):  6697.83 366.088    13.00   175.38
        + ID2= 2 (0835):  6932.91 270.053    13.50   177.72
          ==================================================
          ID = 3 (0870): 13630.74 634.347    13.25   176.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

Regional Post-Development Conditions

```
==================================================================================================

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO
       O   O     T      T    H   H   Y Y   MM MM  O   O
       O   O     T      T    H   H    Y    M   M  O   O
        OOO      T      T    H   H    Y    M   M   OOO

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                   *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 2.3.3\voin.dat
  Output  filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\Regional Analysis & Rouge Event
Watershed Model\2017 MESP VO2 Model\Fut
  Summary filename: V:\01606\Active\160622264\Analysis\SWM\Hydrology\Regional Analysis & Rouge Event
Watershed Model\2017 MESP VO2 Model\Fut


DATE: 10/24/2017                          TIME: 10:43:38 AM

USER:


COMMENTS: ____________________________________________________________
```

Storm 1 - No Areal Reduction

```
--------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|   READ STORM     |     Filename: V:\01606\Active\160622264\An
|                  |               alysis\SWM\Hydrology\SS\2017-10-06\
|                  |               VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal=212.00 mm |     Comments: HURRICANE HAZEL - FINAL 12 HOURS
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

-------------------------------------------------------------------------------
```

Storm 2 - Areal Reduction 0.971

```
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


--------------------
|   READ STORM     |     Filename: V:\01606\Active\160622264\An
|                  |               alysis\SWM\Hydrology\SS\2017-10-06\
|                  |               VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal=212.00 mm |     Comments: HURRICANE HAZEL - FINAL 12 HOURS
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

-------------------------------------------------------------------------------

--------------------
| MODIFY STORM     |     MODIFYING PARAMETERS
| CASE= 1          |     Multiplication Factor=   .97
--------------------     Time shift  (min)    =   .00
```

```
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               1.000    5.83 | 4.000   12.62 | 7.000   22.33 | 10.00   51.46
               2.000    3.88 | 5.000   16.51 | 8.000   12.62 | 11.00   36.90
               3.000    5.83 | 6.000   12.62 | 9.000   12.62 | 12.00   12.62

-------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************
```

Storm 3 - Areal Reduction 0.963

```
--------------------
|   READ STORM     |     Filename: V:\01606\Active\160622264\An
|                  |               alysis\SWM\Hydrology\SS\2017-10-06\
|                  |               VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal=212.00 mm |     Comments: HURRICANE HAZEL - FINAL 12 HOURS
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

-------------------------------------------------------------------------------

--------------------
| MODIFY STORM     |     MODIFYING PARAMETERS
| CASE= 1          |     Multiplication Factor=   .96
--------------------     Time shift  (min)    =   .00

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               1.000    5.78 | 4.000   12.52 | 7.000   22.15 | 10.00   51.04
               2.000    3.85 | 5.000   16.37 | 8.000   12.52 | 11.00   36.59
               3.000    5.78 | 6.000   12.52 | 9.000   12.52 | 12.00   12.52

-------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************
```

Storm 4 - Areal Reduction 0.948

```
--------------------
|   READ STORM     |     Filename: V:\01606\Active\160622264\An
|                  |               alysis\SWM\Hydrology\SS\2017-10-06\
|                  |               VO2 Event Modelling (Revised Pond H Model)\ST
| Ptotal=212.00 mm |     Comments: HURRICANE HAZEL - FINAL 12 HOURS
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

-------------------------------------------------------------------------------

--------------------
| MODIFY STORM     |     MODIFYING PARAMETERS
| CASE= 1          |     Multiplication Factor=   .95
--------------------     Time shift  (min)    =   .00

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               1.000    5.69 | 4.000   12.32 | 7.000   21.80 | 10.00   50.24
               2.000    3.79 | 5.000   16.12 | 8.000   12.32 | 11.00   36.02
               3.000    5.69 | 6.000   12.32 | 9.000   12.32 | 12.00   12.32

-------------------------------------------------------------------------------
```

Berczy Creek Nodes

```
 ***************************
 ** SIMULATION NUMBER:   2 **
 ***************************

--------------------
| ADD HYD   (0848) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0847):   549.20  39.856    11.00   188.57
        + ID2= 2 (0844):  2297.50 142.265    12.25   178.15
          ===============================================
          ID = 3 (0848):  2846.70 178.861    12.00   180.16

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
 ***************************
 ** SIMULATION NUMBER:   1 **
 ***************************

--------------------
| CALIB            |
| STANDHYD  (0201) |   Area    (ha)= 196.53
|ID= 1 DT=15.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  38.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      74.68       121.85
     Dep. Storage     (mm)=        .10         5.00
     Average Slope     (%)=        .34          .34
     Length            (m)=    1145.00      1145.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      53.00        51.59
                over (min)       15.00       150.00
     Storage Coeff.  (min)=      19.65 (ii)  136.76 (ii)
     Unit Hyd. Tpeak (min)=      15.00       150.00
     Unit Hyd. peak  (cms)=        .06          .01
                                                          *TOTALS*
     PEAK FLOW       (cms)=      10.60         9.24        15.869 (iii)
     TIME TO PEAK    (hrs)=      10.00        12.25         10.00
     RUNOFF VOLUME    (mm)=     211.90       184.84        195.12
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       1.00          .87           .92


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  91.1    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
 ***************************
 ** SIMULATION NUMBER:   3 **
 ***************************

--------------------
| ADD HYD   (0849) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0733):  2846.70 163.674    12.75   178.49
        + ID2= 2 (0201):   196.53  15.216    10.00   187.34
          ===============================================
          ID = 3 (0849):  3043.23 172.413    12.75   179.06

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
```

Bruce Creek and Combined Nodes

```
 ***************************
 ** SIMULATION NUMBER:   1 **
 ***************************

--------------------
| CALIB            |
| STANDHYD  (0210) |   Area    (ha)= 377.54
|ID= 1 DT=15.0 min |   Total Imp(%)=  43.00   Dir. Conn.(%)=  43.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     162.34       215.20
     Dep. Storage     (mm)=        .10         5.00
     Average Slope     (%)=        .30          .30
     Length            (m)=    1585.00      1585.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      53.00        52.23
                over (min)       30.00       180.00
     Storage Coeff.  (min)=      24.80 (ii)  171.84 (ii)
     Unit Hyd. Tpeak (min)=      30.00       180.00
     Unit Hyd. peak  (cms)=        .04          .01
                                                          *TOTALS*
     PEAK FLOW       (cms)=      21.51        14.85        30.493 (iii)
     TIME TO PEAK    (hrs)=      10.00        12.50         10.25
     RUNOFF VOLUME    (mm)=     211.90       190.98        199.97
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       1.00          .90           .94


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.6    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-------------------------------------------------------------------------------
 ***************************
 ** SIMULATION NUMBER:   3 **
 ***************************

--------------------
| ADD HYD   (0867) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0745):  3174.13 180.864    12.75   176.91
        + ID2= 2 (0210):   377.54  29.243    10.25   192.16
          ===============================================
          ID = 3 (0867):  3551.67 196.706    12.75   178.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
 ***************************
 ** SIMULATION NUMBER:   3 **
 ***************************

--------------------
| ADD HYD   (0868) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0849):  3043.23 172.413    12.75   179.06
        + ID2= 2 (0867):  3551.67 196.706    12.75   178.53
          ===============================================
          ID = 3 (0868):  6594.90 369.119    12.75   178.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
 ***************************
 ** SIMULATION NUMBER:   3 **
 ***************************

--------------------
| ADD HYD   (0869) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0746):  6594.90 365.366    13.00   178.78
        + ID2= 2 (0200):   102.93   8.262    11.00   178.17
          ===============================================
          ID = 3 (0869):  6697.83 369.379    13.00   178.77
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

--------------------
| ADD HYD   (0835) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0834):  6637.45 261.985    14.00   177.57
        + ID2= 2 (0317):   295.46  24.204    11.00   180.99
          ===================================================
          ID = 3 (0835):  6932.91 270.053    13.50   177.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************

--------------------
| ADD HYD   (0870) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0835):  6932.91 270.053    13.50   177.72
        + ID2= 2 (0869):  6697.83 362.127    13.00   175.64
          ===================================================
          ID = 3 (0870): 13630.74 630.072    13.25   176.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

Appendix D PCSWMM HYDROLOGY MODELING

D.1 2 – 100 YEAR PCSWMM MODELING

Stantec

Project Description: **4134 16th Avenue MESP/FSR**
Job Number: **160622264**
Date: **Oct-17**

PCSWMM Modeling Output Summary Tables **2 to 100 Year Event**

Description	Existing Conditions with Updated Pond H		YDD Proposed		Existing Conditions with Updated Pond H		YDD Proposed	
Node	**Node 171**				**Node J5720.94**			
Drainage Area (ha)	**6405**		**6407**		**13359**		**13361**	
Storm Event Flows (12 hr AES)	**Existing Flow (m^3/s)**	**Existing Water Level (m)**	**Proposed Flow (m^3/s)**	**Proposed Water Level (m)**	**Existing Flow (m^3/s)**	**Existing Water Level (m)**	**Proposed Flow (m^3/s)**	**Proposed Water Level (m)**
2 year	5.19	173.59	5.02	173.59	21.51	169.86	21.56	169.87
5 year	13.69	173.81	14.19	173.82	43.17	170.11	43.62	170.11
25 year	38.84	174.17	39.32	174.17	87.59	170.52	88.22	170.52
100 year	62.02	174.38	62.94	174.38	135.31	170.97	136.25	170.97

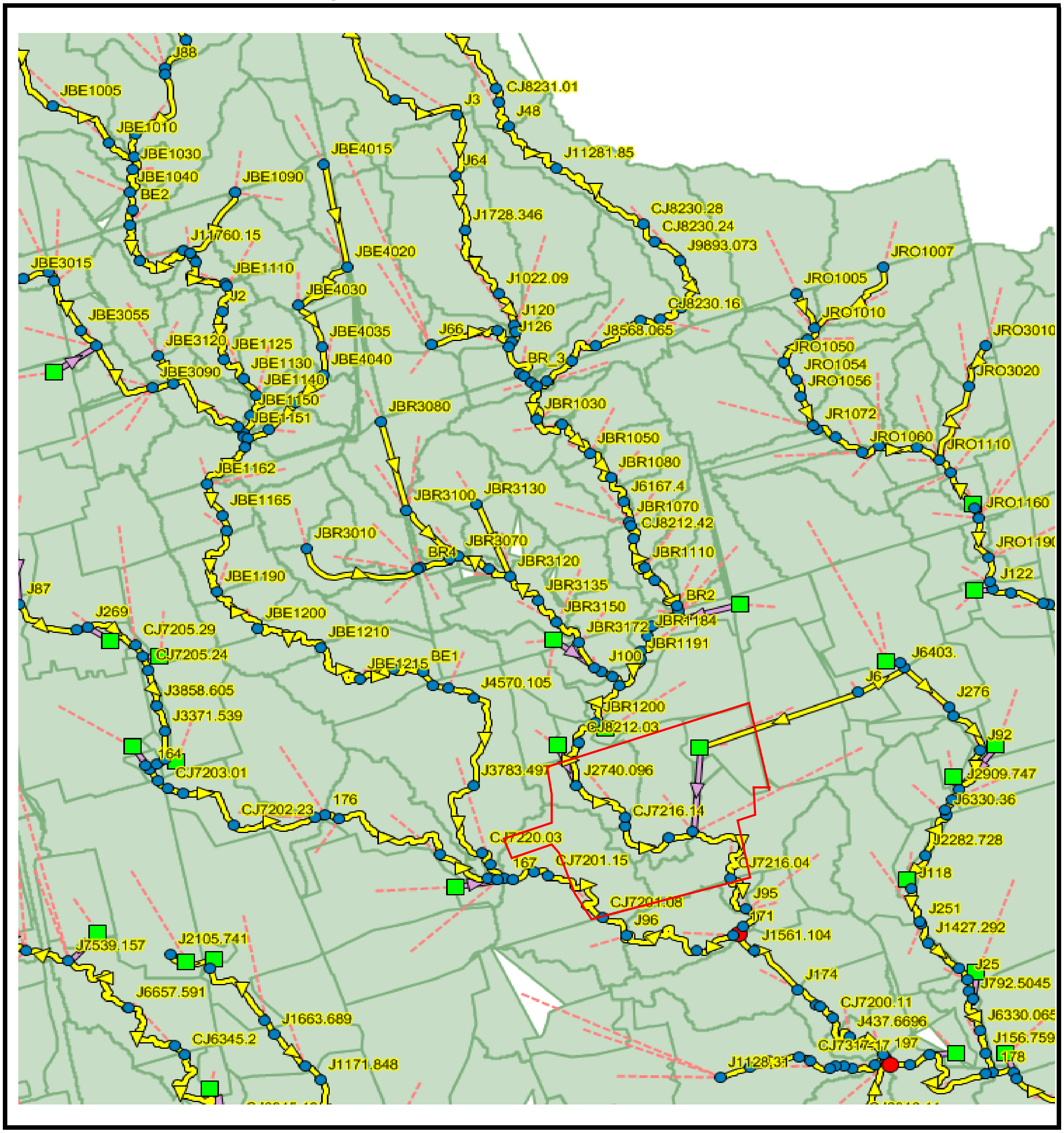
Project Description: **4134 16th Avenue MESP/FSR**

Job Number: **160622264**

Date: **Oct-17**

PCSWMM Modeling Schematic

Existing Conditions **2 to 100 Year Storm**



Project Description: 4134 16th Avenue MESP/FSR
Job Number: 160622264
Date: Oct-17

PCSWMM Modeling Input Parameters **Existing Conditions**

2 to 100 Year Event								
Description	**Name**	**Area (ha)**	**Imperv. (%)**	**Flow Length (m)**	**Width (m)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
YDDEX	S124	48.73	8	270	1802	160.493	4.009	0.176
YDDEX	S138	61.84	14	521	1188	152.773	3.456	0.175
YDDEX	S2	23.50	64	170	1383	131.437	3.343	0.15
YDDEX	S268_1	74.13	10	526	1410	168.686	2.976	0.191
YDDEX	S290_2	39.49	10	380	1039	106.869	8.303	0.123
External EX1	S129_4	16.11	43	656	245	62.23	2.31	0.104
External EX1	S131	63.67	57	2005	318	70.067	4.175	0.097

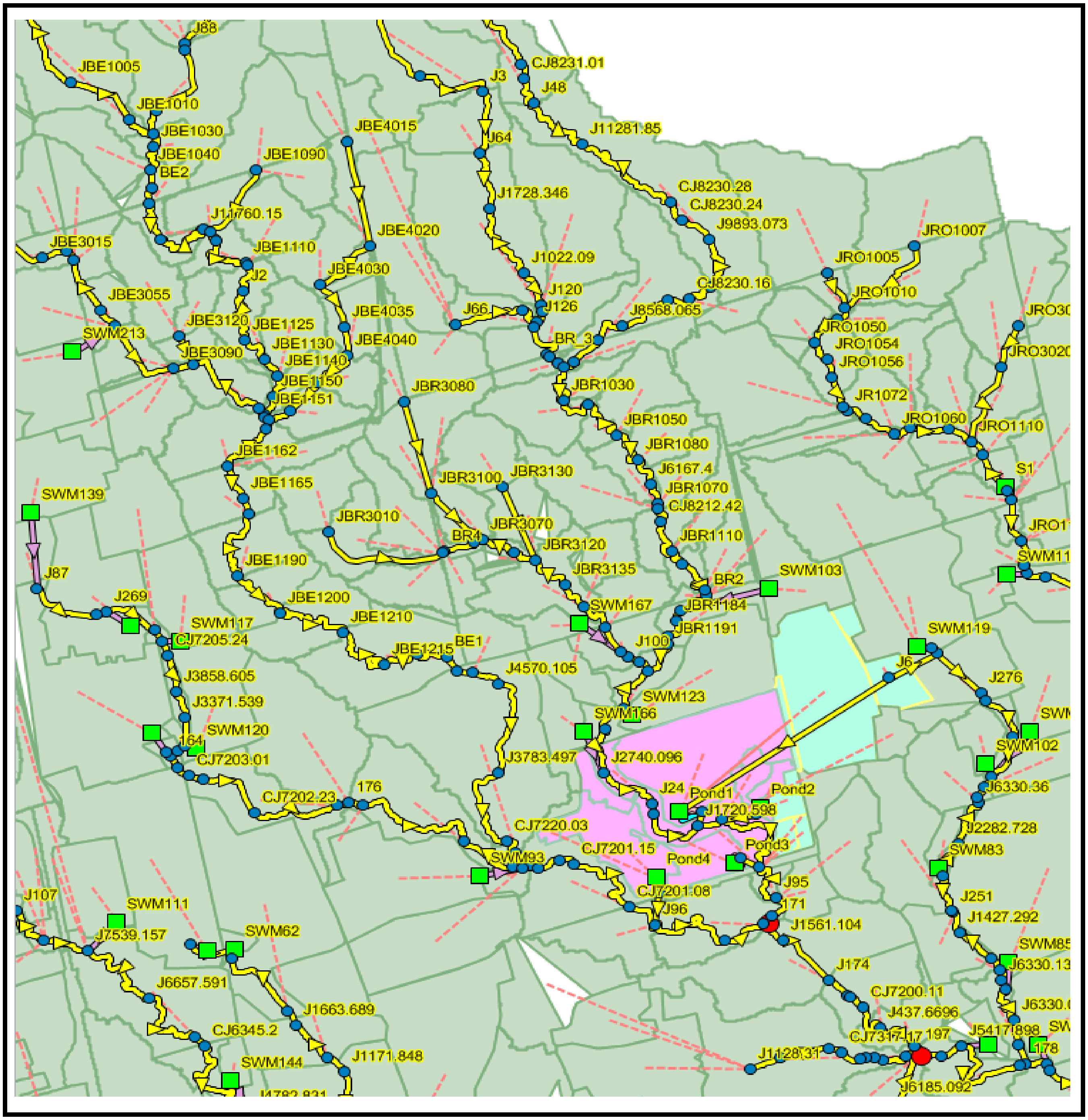
Project Description: **4134 16th Avenue MESP/FSR**

Job Number: **160622264**

Date: **Oct-17**

PCSWMM Modeling Schematic

Proposed Conditions **2 to 100 Year Storm**



Project Description: **4134 16th Avenue MESP/FSR**
Job Number: **160622264**
Date: **Oct-17**

PCSWMM Modeling Input Parameters **Post Development Conditions**

2 to 100 Year Event								
Description	**Name**	**Area (ha)**	**Imperv. (%)**	**Flow Length (m)**	**Width (m)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
YDD_to Pond 1	TP1	63.89	62	125	5111	160.493	4.009	0.176
YDD_to Pond 2	TP2	5.25	70	120	437	152.773	3.456	0.175
YDD_to Pond 3	TP3	22.77	70	440	517	134.411	5.395	0.154
YDD_to Pond 4	TP4	29.25	61	295	992	168.686	2.976	0.191
YDD_to Pond 4	TP41	1.85	61	100	185	168.686	2.976	0.191
YDD_uncontrolled	Nat	6.72	5	220	306	152.773	3.456	0.175
External EX1	S129_4	16.11	43	656	245	62.23	2.31	0.104
External EX1	S131	63.67	57	2005	318	70.067	4.175	0.097
External EX1	TP21	6.60	71	100	660	152.773	3.456	0.175
External EX1	S12	4.45	46	100	445	152.773	3.456	0.175
External EX1	S13	2.52	5	100	252	152.773	3.456	0.175
External EX1	S28	3.14	61	1200	26	70.067	4.175	0.097
Bruce River	S67	24.59	5	100	2459	156.633	3.732	0.176
Bruce River	S68	7.30	5	100	730	106.869	8.303	0.123

D.2 REGIONAL PCSWMM MODELING

Project Description: **4134 16th Avenue MESP/FSR**
Job Number: **160622264**
Date: **Oct-17**

PCSWMM Modeling Output Summary Tables **Regional Event**

Description	Existing		YDD Proposed + FUA		Existing		YDD Proposed + FUA	
Node	**Node 171**		**Node 171**		**Node J5720.94**		**Node J5720.94**	
Watershed	**Confluence**		**Confluence**		**Confluence**		**Confluence**	
Drainage Area (ha)	**6405**		**6407**		**13359**		**13361**	
	Existing Flow (m^3/s)	**Existing Water Level (m)**	**Proposed Flow (m^3/s)**	**Proposed Water Level (m)**	**Existing Flow (m^3/s)**	**Existing Water Level (m)**	**Proposed Flow (m^3/s)**	**Proposed Water Level (m)**
Regional Storm	295.47	175.30	293.95	175.30	609.18	173.47	605.13	173.45

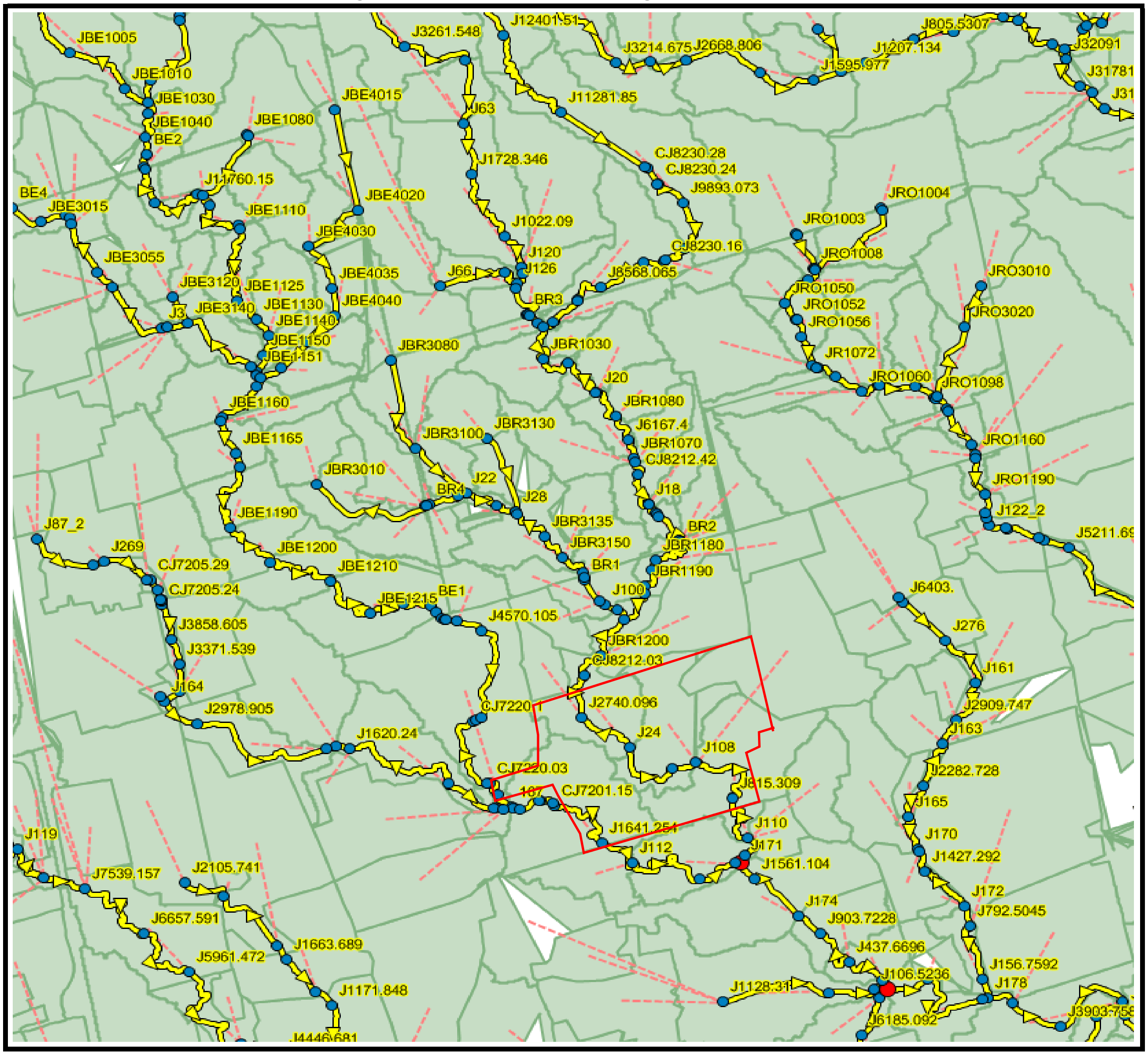
Project Description: **4134 16th Avenue MESP/FSR**

Job Number: **160622264**

Date: **Oct-17**

PCSWMM Modeling Schematic

Existing Conditions **Regional Storm**



Stantec

Project Description: 4134 16th Avenue MESP/FSR
Job Number: 160622264
Date: Oct-17

PCSWMM Modeling Input Parameters **Existing Conditions**

Regional Event								
Description	**Name**	**Area (ha)**	**Imperv. (%)**	**Flow Length (m)**	**Width (m)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
YDDEX	S124	50.44	7.7	270	1865	164.107	2.605	0.180
YDDEX	S138	65.32	13.97	521	1255	156.588	1.974	0.179
YDDEX	S268_1	74.13	10.3	526	1410	172.68	1.423	0.195
YDDEX	S290_2	39.49	10.4	380	1039	117.899	4.017	0.134
External EX1	S129_4	16.11	43.0	656	245	62.23	2.31	0.104
External EX1	S131	89.86	29.5	2005	448	70.067	4.175	0.097

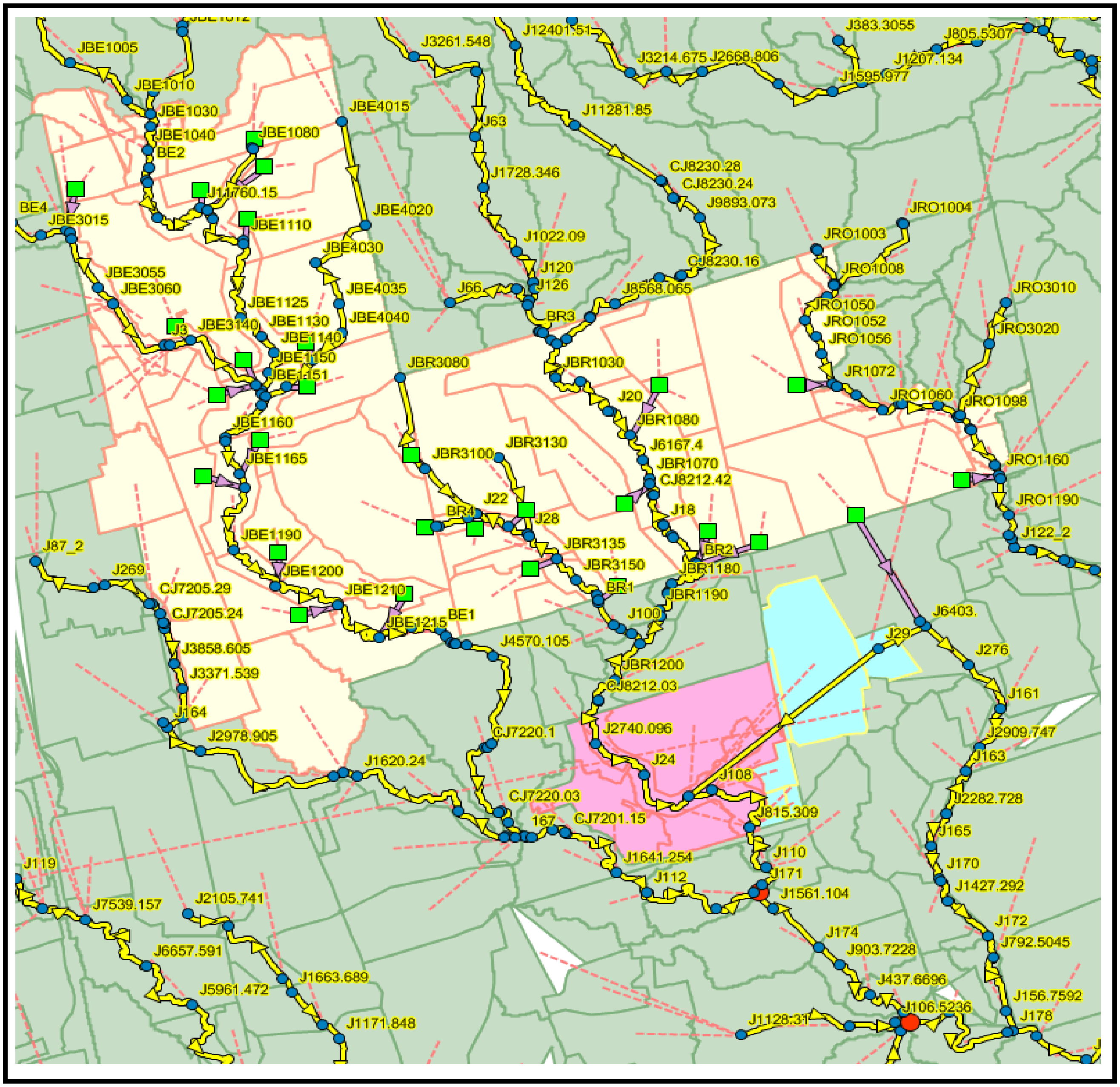
Project Description: **4134 16th Avenue MESP/FSR**

Job Number: **160622264**

Date: **Oct-17**

PCSWMM Modeling Schematic

Proposed Conditions + FUA **Regional Storm**



Stantec

Project Description: **4134 16th Avenue MESP/FSR**
Job Number: **160622264**
Date: **Oct-17**

PCSWMM Modeling Input Parameters **Post Development Conditions**

Regional Event								
Description	**Name**	**Area (ha)**	**Imperv. (%)**	**Flow Length (m)**	**Width (m)**	**Suction Head (mm)**	**Conductivity (mm/hr)**	**Initial Deficit (frac.)**
YDD_to Pond 1	TP1	63.89	62	125	5111	160.493	4.009	0.176
YDD_to Pond 2	TP2	5.25	70	120	437	152.773	3.456	0.175
YDD_to Pond 3	TP3	22.77	70	440	517	134.411	5.395	0.154
YDD_to Pond 4	TP4	29.25	61	295	992	168.686	2.976	0.191
YDD_to Pond 4	TP41	1.85	61	100	185	168.686	2.976	0.191
YDD_uncontrolled	Nat	6.72	5	220	306	152.773	3.456	0.175
External EX1	S129_4	16.11	43	656	245	62.23	2.31	0.104
External EX1	S131	63.67	57	2005	318	70.067	4.175	0.097
External EX1	TP21	6.60	71	100	660	152.773	3.456	0.175
External EX1	S12	4.45	46	100	445	152.773	3.456	0.175
External EX1	S13	2.52	5	100	252	152.773	3.456	0.175
External EX1	S28	3.14	61	1200	26	70.067	4.175	0.097
Bruce River	S67	24.59	5	100	2459	156.633	3.732	0.176
Bruce River	S68	7.30	5	100	730	106.869	8.303	0.123

Appendix E EROSION MODELING TERMS OF REFERENCE

Palmer, Amber

From:	Dan Hipple <DHipple@trca.on.ca>
Sent:	Thursday, June 09, 2016 3:46 PM
To:	Palmer, Amber
Cc:	Alison MacLennan (AMacLennan@trca.on.ca); sgorenc@beaconenviro.com
Subject:	Re: York Downs Erosion Control Methodology

Hi Amber,

This looks great...very detailed. For the Hydrologic model output, I apologize as I wasn't clear, but I was looking for a range of modeled rainfall events from the 25mm up to the 35 or 40mm event. So, if you'd like to investigate the 25, 30, and 35mm events, that would work as well; primarily showing the sensitivity (or lack there-of) of the system to erosion storm event retention.

Also, I've included these bullet points in an email of comments to Soran related to finalizing the TOR of the MESP. Hopefully this will make it into the final TOR and clear up the analysis for all review agencies.

Thanks,
Dan

Dan Hipple, P.Eng. | Manager, Water Resources Engineering | Engineering Services | Restoration & Infrastructure
Toronto and Region Conservation Authority *for The Living City* | ☎416 661-6600 ext. 5336 | 416-661-6898 |
dhipple@trca.on.ca | www.trca.on.ca/flood | Follow us on Twitter @TRCA_Flood

Office Location and Courier Address |101 Exchange Avenue | Vaughan, Ontario L4K 5R6| 101 Exchange Ave | Vaughan, ON | L4K 5R6
Mailing Address | 5 Shoreham Drive | Toronto, Ontario M3N 1S4

From: "Palmer, Amber" <amber.palmer@stantec.com>
To: "'DHipple@trca.on.ca'" <DHipple@trca.on.ca>, "Alison MacLennan (AMacLennan@trca.on.ca)" <AMacLennan@trca.on.ca>,
Cc: "sgorenc@beaconenviro.com" <sgorenc@beaconenviro.com>
Date: 09/06/2016 02:19 PM
Subject: York Downs Erosion Control Methodology

Dan and Alison,

Below a summary of the proposed erosion control analysis methodology for York Downs as discussed earlier this week.
Please review and advise if you are in agreement with this approach.

Proposed Erosion Control Analysis Methodology

Per our meeting held on June 6, 2015 with TRCA to review preliminary results relating the to fluvial geomorphic assessment, and discuss MESP submission requirements relating to stormwater management for erosion control, the following points outline our proposed approach for the York Downs property in Markham, Ontario:

- Discretization of a watershed into relatively homogeneous river reaches;

- Rapid assessment of geomorphic stability of each reach;
- Collection of detailed geomorphic field data at a level of detail sufficient to support the determination of erosion thresholds for both Bruce Creek and Berczy Creek;
- Referencing TRCA SWM criteria and flow conditions at the time of survey, establish thresholds for sediment entrainment for Bruce Creek and Berczy Creek
- Establish estimated baseflow conditions for Bruce Creek and Berczy Creek, referencing TRCA gauging data, stream flow monitoring data, and geomorphic field data for each watercourse;
- Integrate the baseflow component with the hydrologic model output (VO2) - 25 mm and 35 mm events;
- Calibrate and Verify the VO2 hydrologic model by comparing the existing condition model to field-estimates of bankfull flow;
- Compare pre- and post-development (controlled) flow conditions for the 25 mm and 35 mm storm events under 24 hour, 48 hour and 72 hour detention scenarios (event-based modelling) at nodes located at the downstream limit of the site to evaluate how closely post-development conditions can replicate existing condition hydrograph (peak, volume and form), focussing on those portions of the hydrograph above the critical discharge;
- Integrate VO2 model output from the above scenarios into a Matlab-based software program which uses representative surveyed cross-sections of the active (bankfull) channel to test pre- to post-development exceedance of the erosion threshold for Bruce and Berczy Creek. In this sense, continuous modelling for threshold exceedance will be undertaken for a finite time series (i.e., length of generated 25 mm and 35 mm storm event);

  · Model Outputs:
- Time of exceedance; (tex = $\Sigma\Delta t$ (for QT>Qthreshold)
- Cumulative effective discharge; and

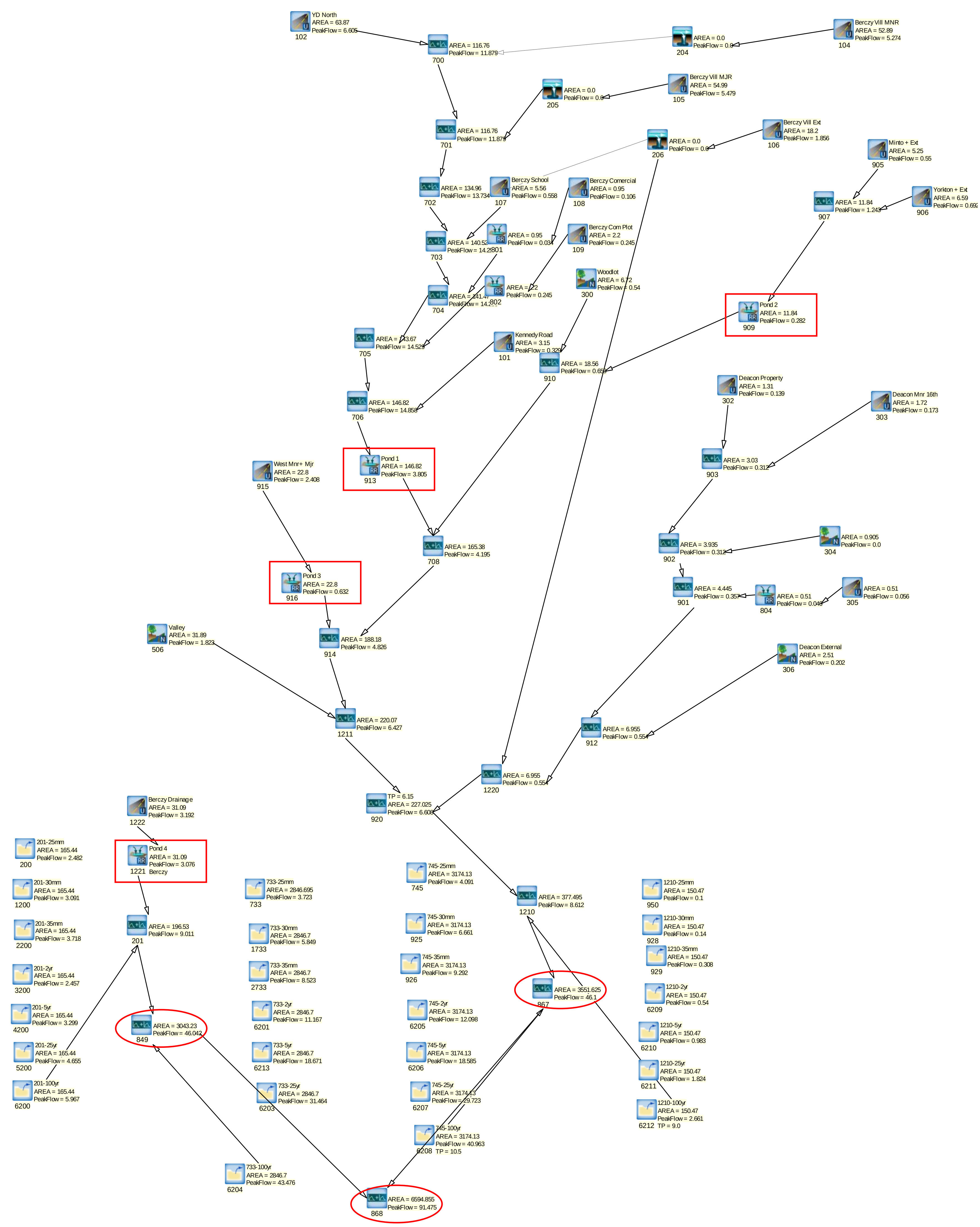
  \- Cumulative effective work/shear stress
- For the purposes of the MESP, pre- to post flow conditions will be considered a match if post-development hours of exceedance are within 5% of the existing condition.

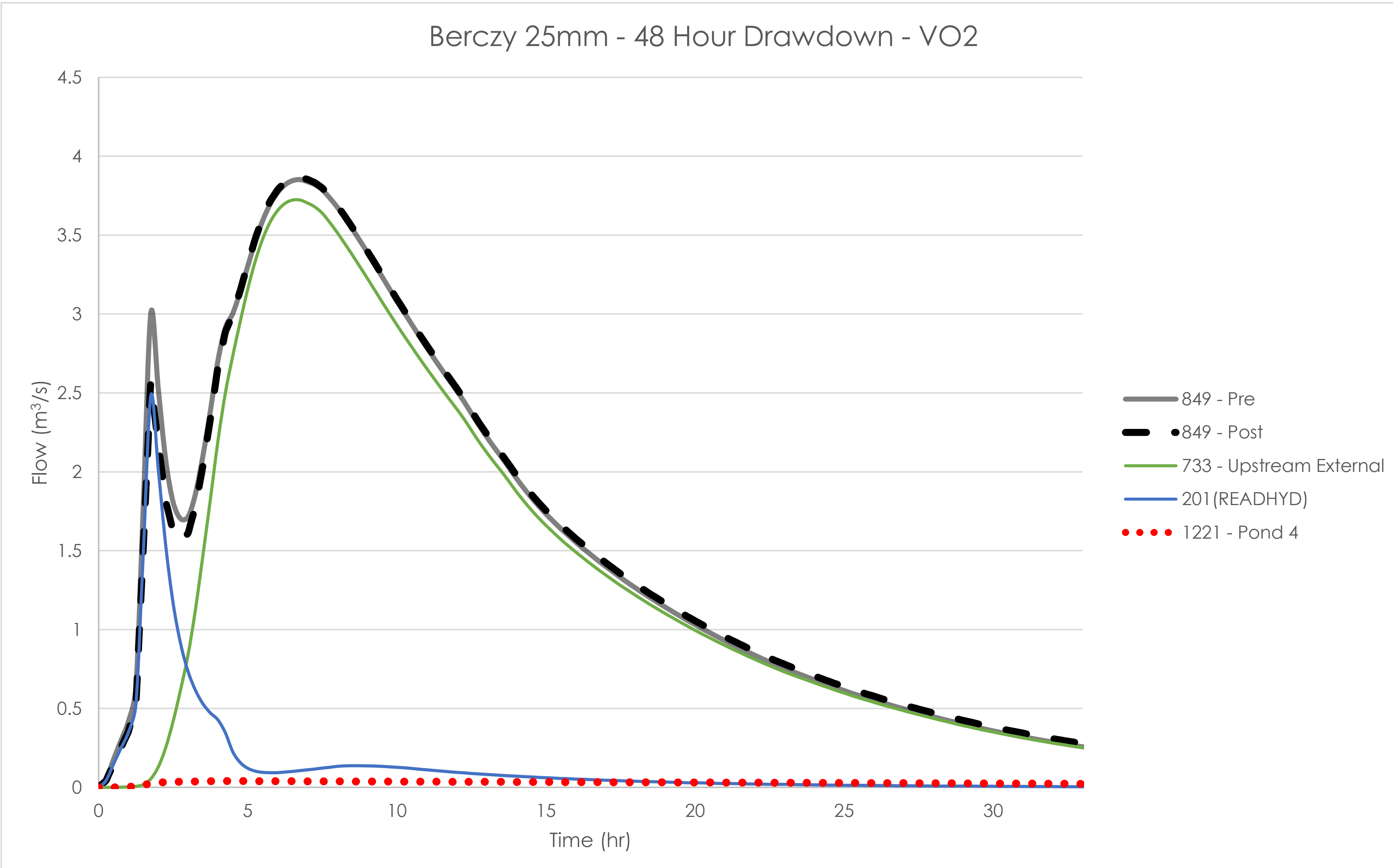
Thanks,

Amber Palmer, P.Eng.
Senior Associate, Water Resources
Stantec
Phone: (905) 944-4806
Cell: (416) 606-5485
Fax: (905) 474-9889
amber.palmer@stantec.com

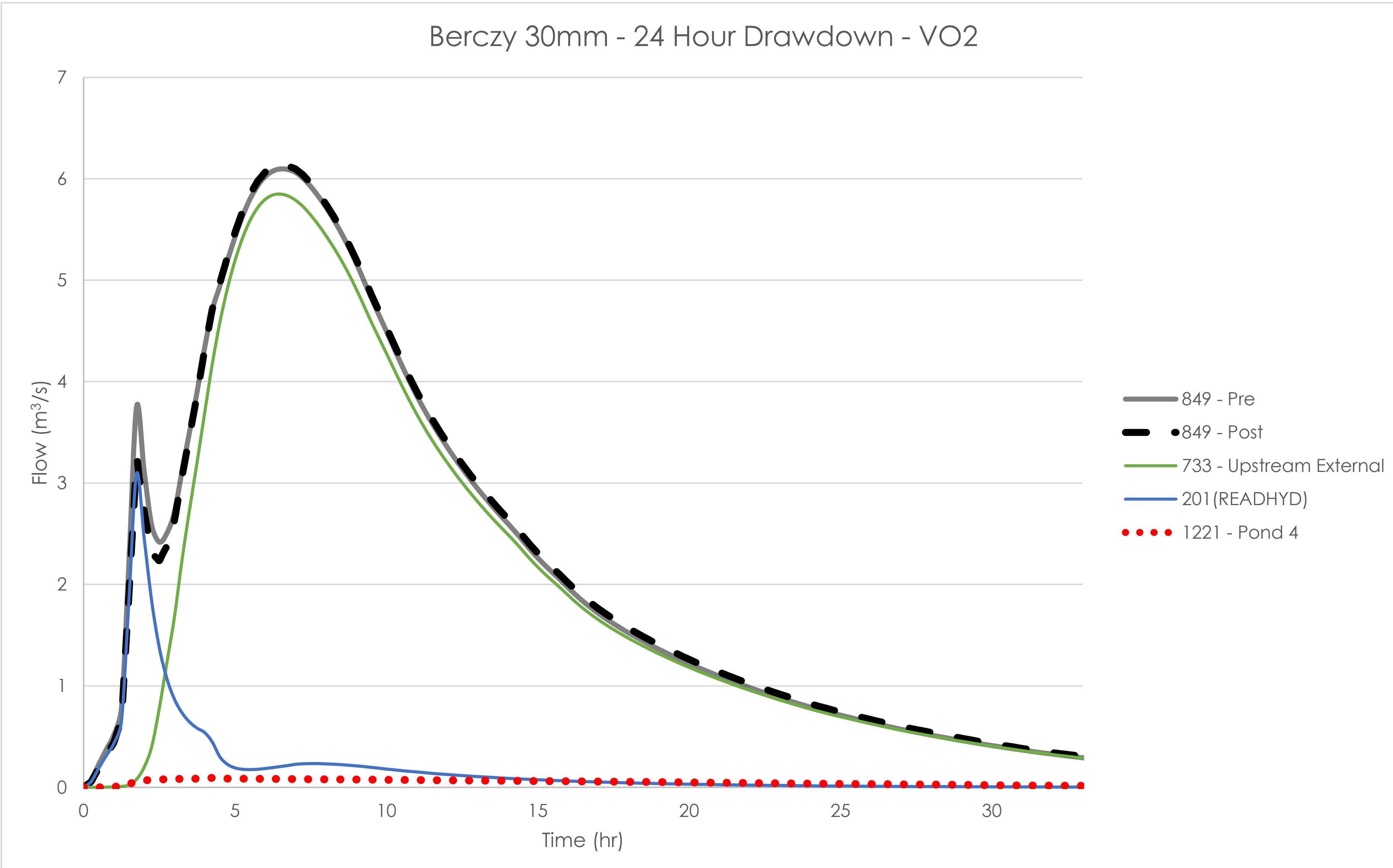
E.1 EROSION MODELING HYDROGRAPHS

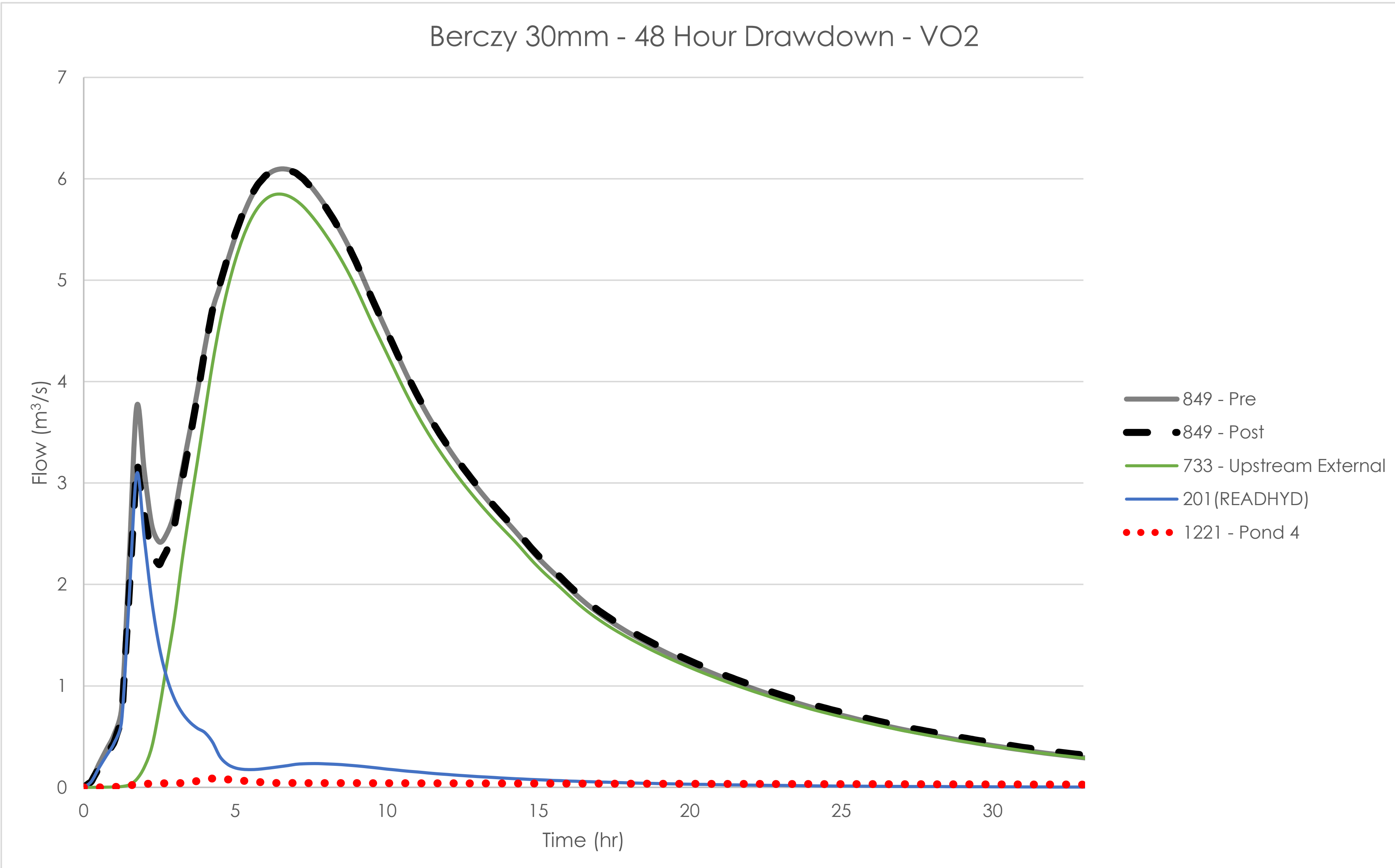
Post-Development Event Based Model Schematic

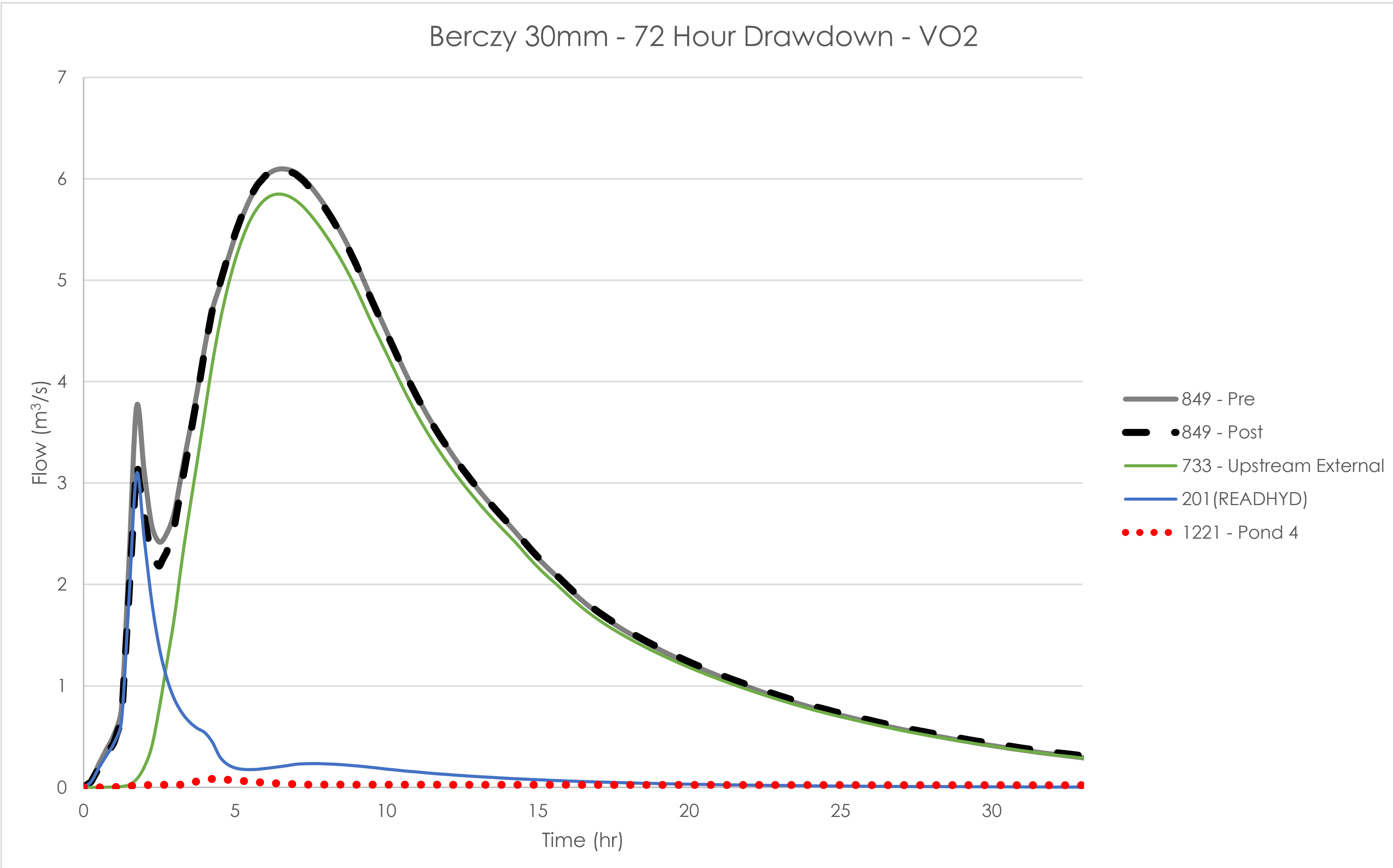


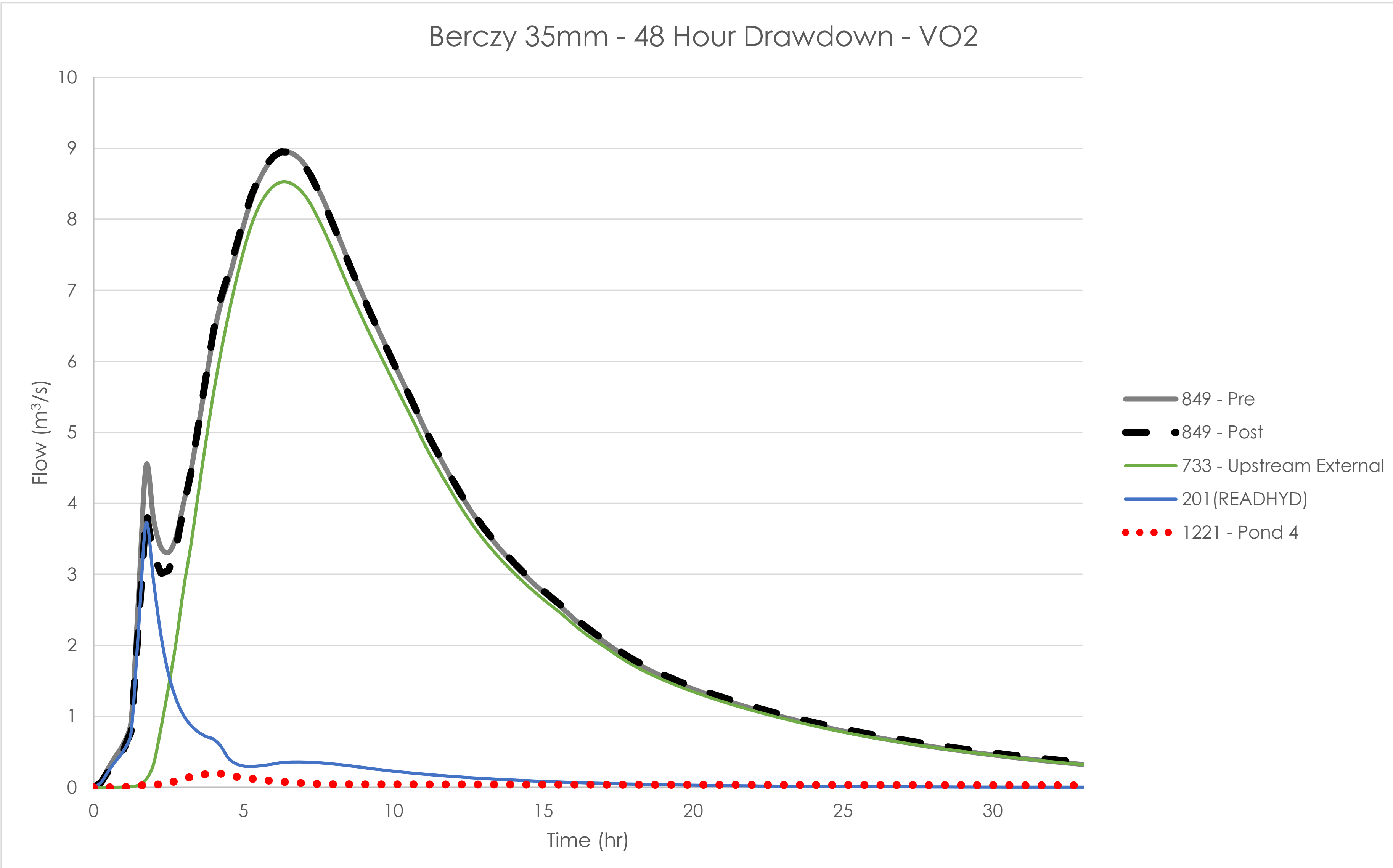


Berczy 25mm - 48 Hour Drawdown - VO2
Flow (m3/s)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
5
10
15
20
25
30
Time (hr)
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

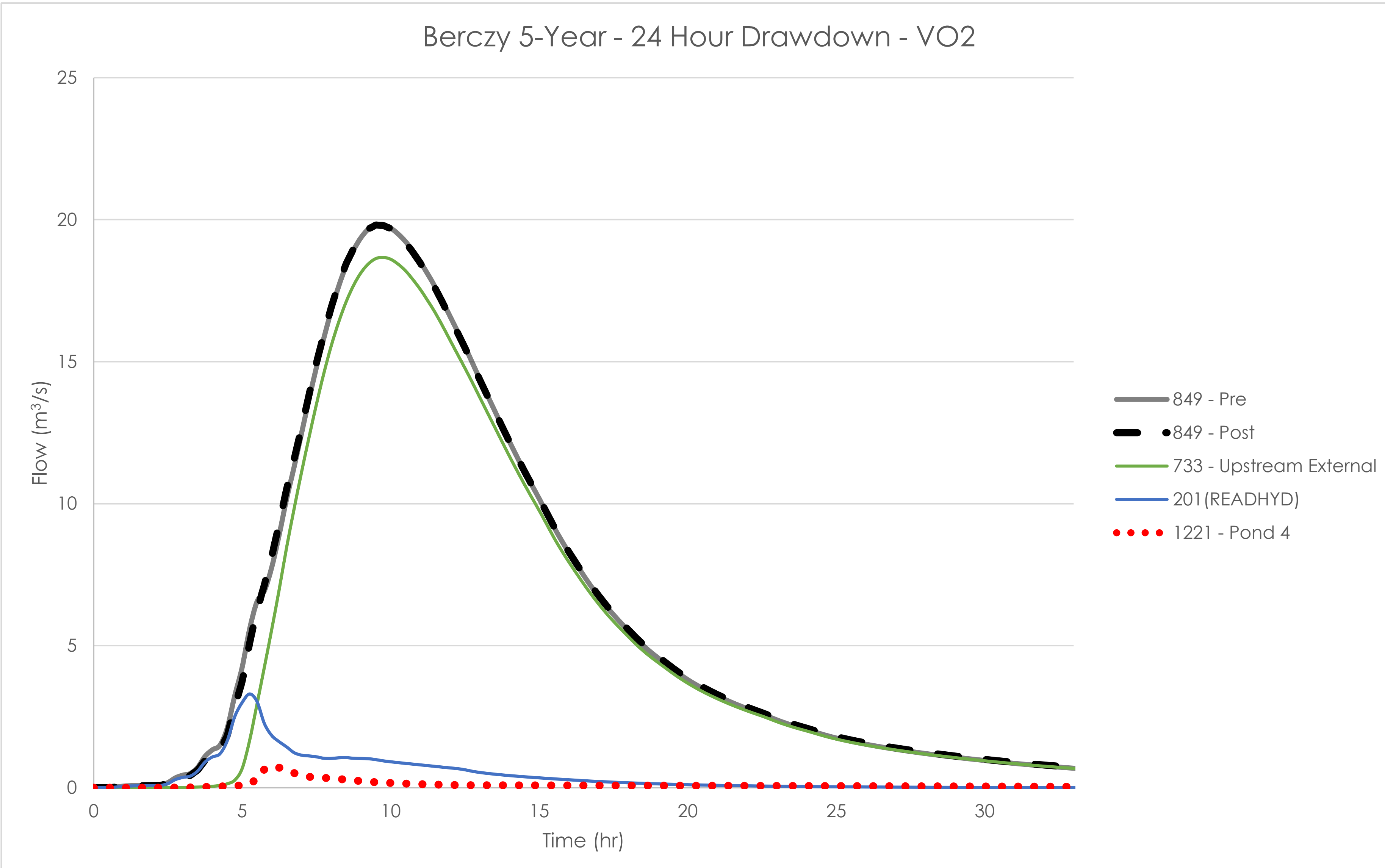

Berczy 30mm - 24 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

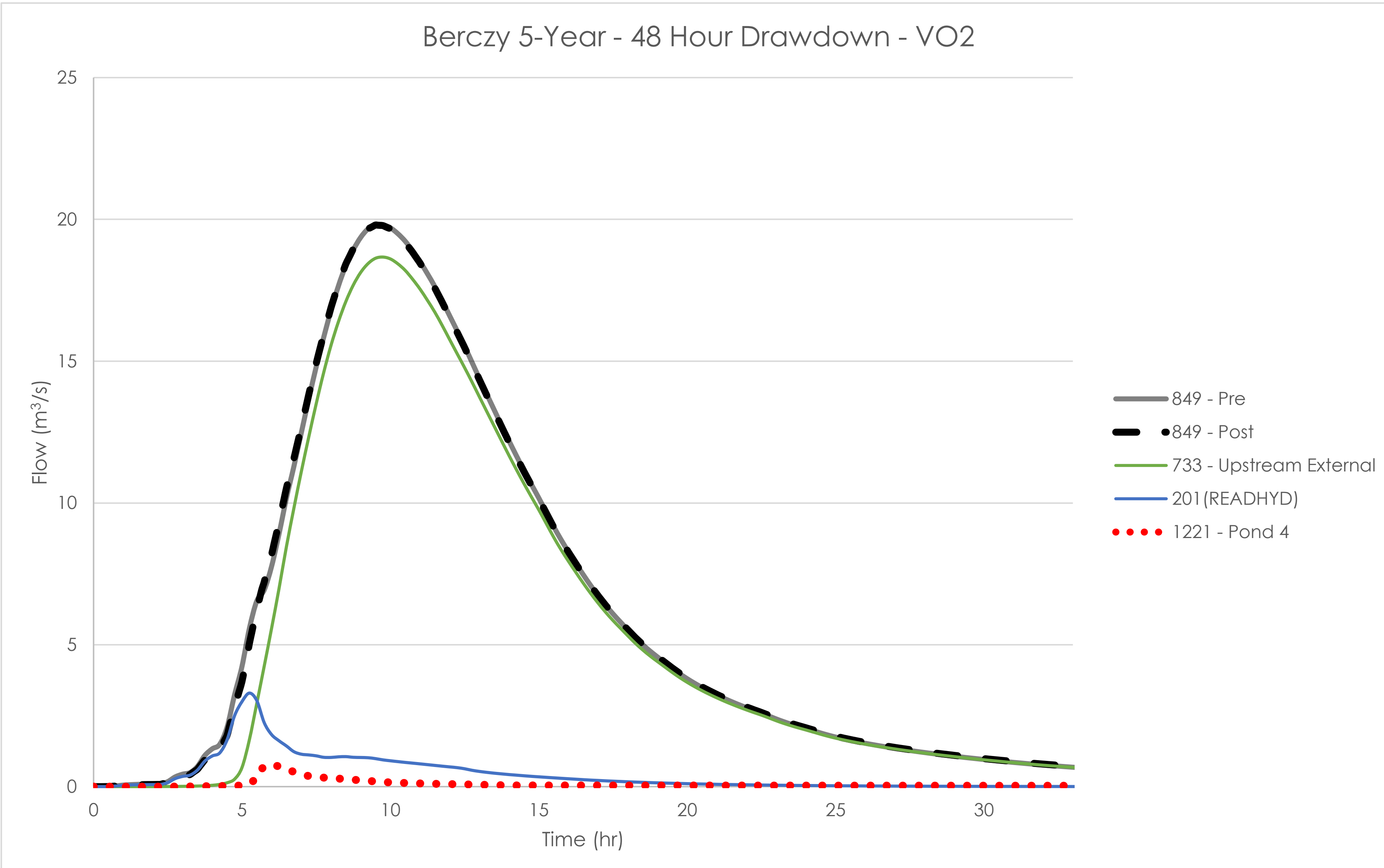

Berczy 30mm - 48 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4


Berczy 30mm - 72 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

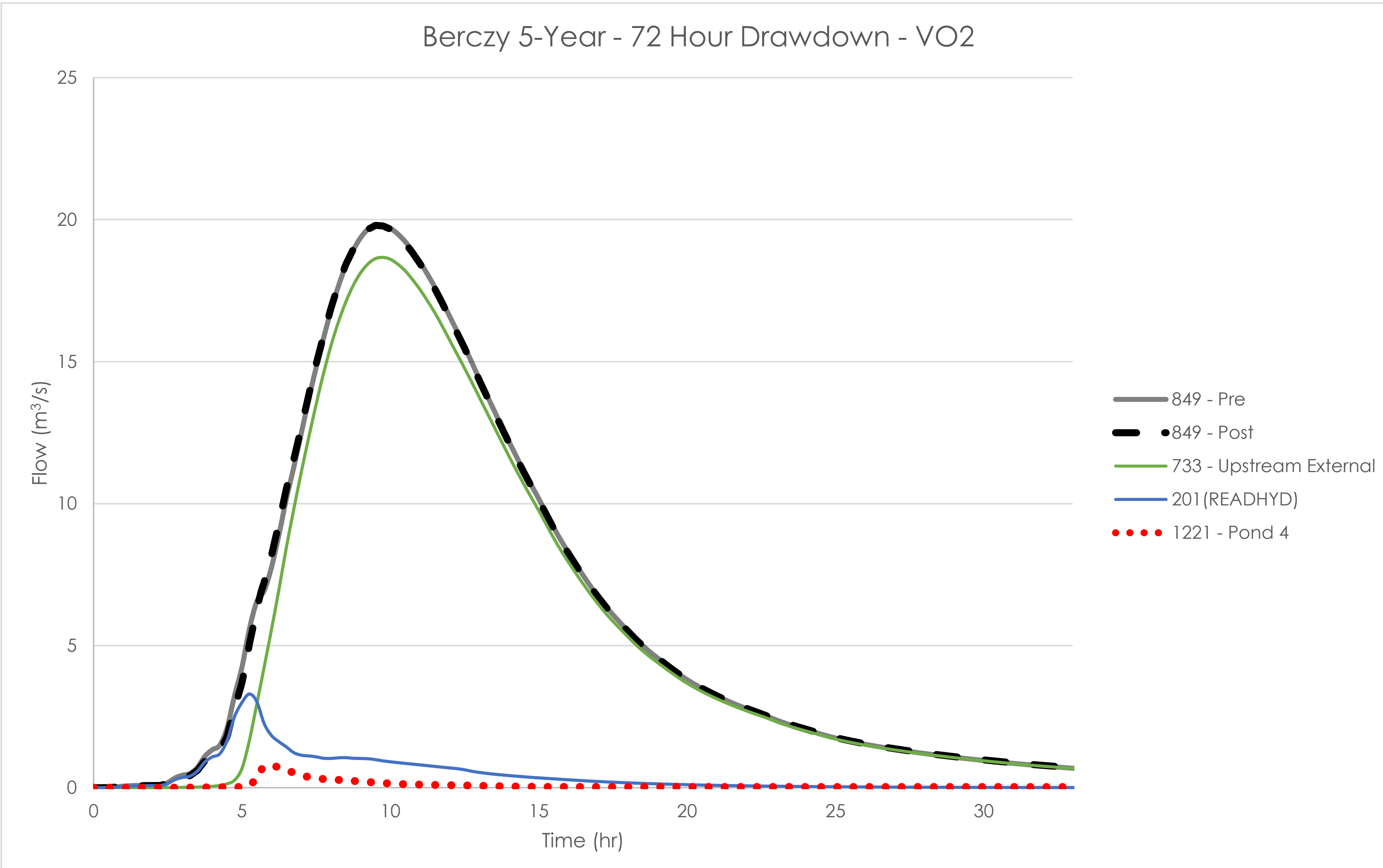


Berczy 35mm - 48 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15
20
25
30
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

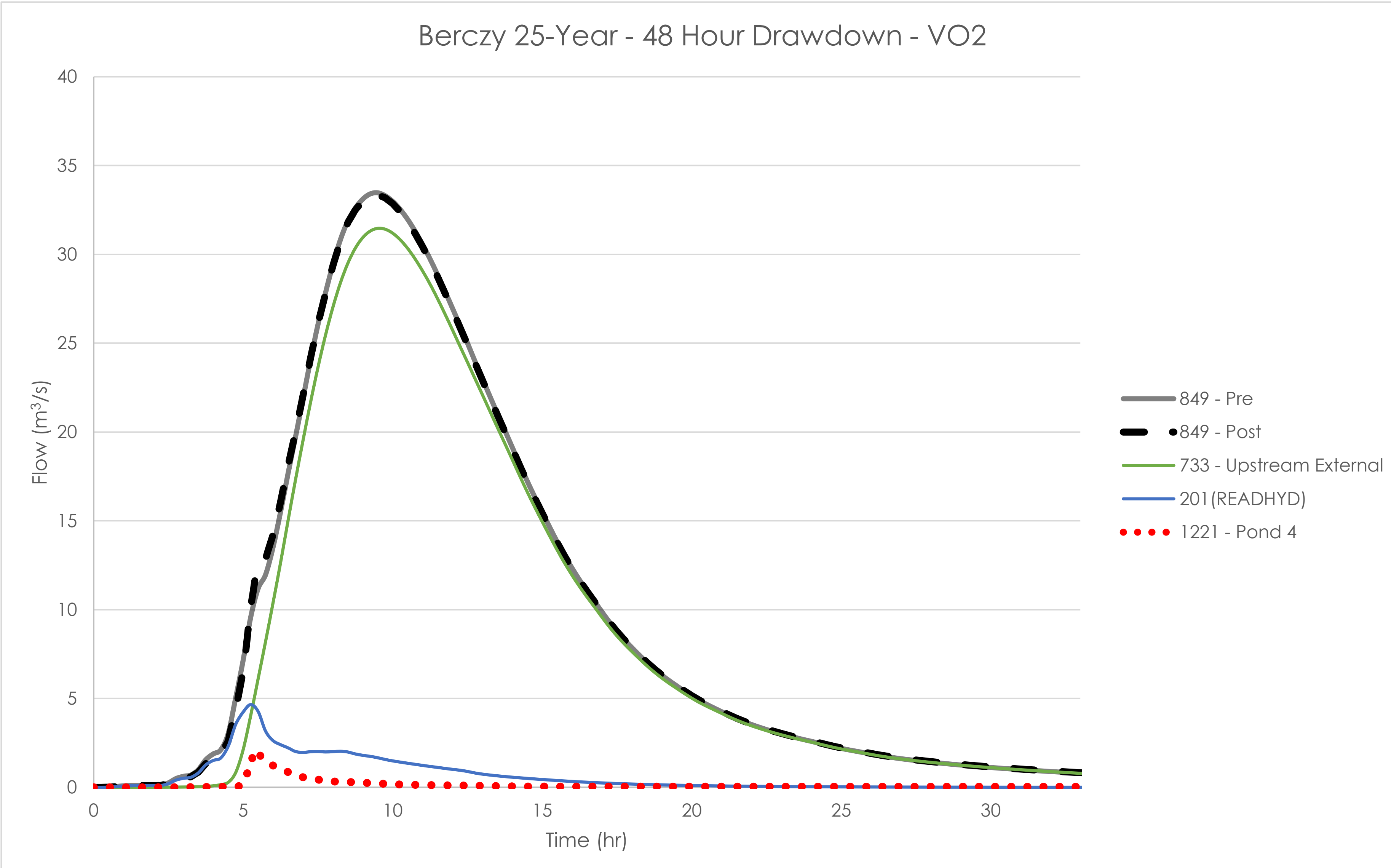

Berczy 5-Year - 24 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
5
10
15
20
25
30
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

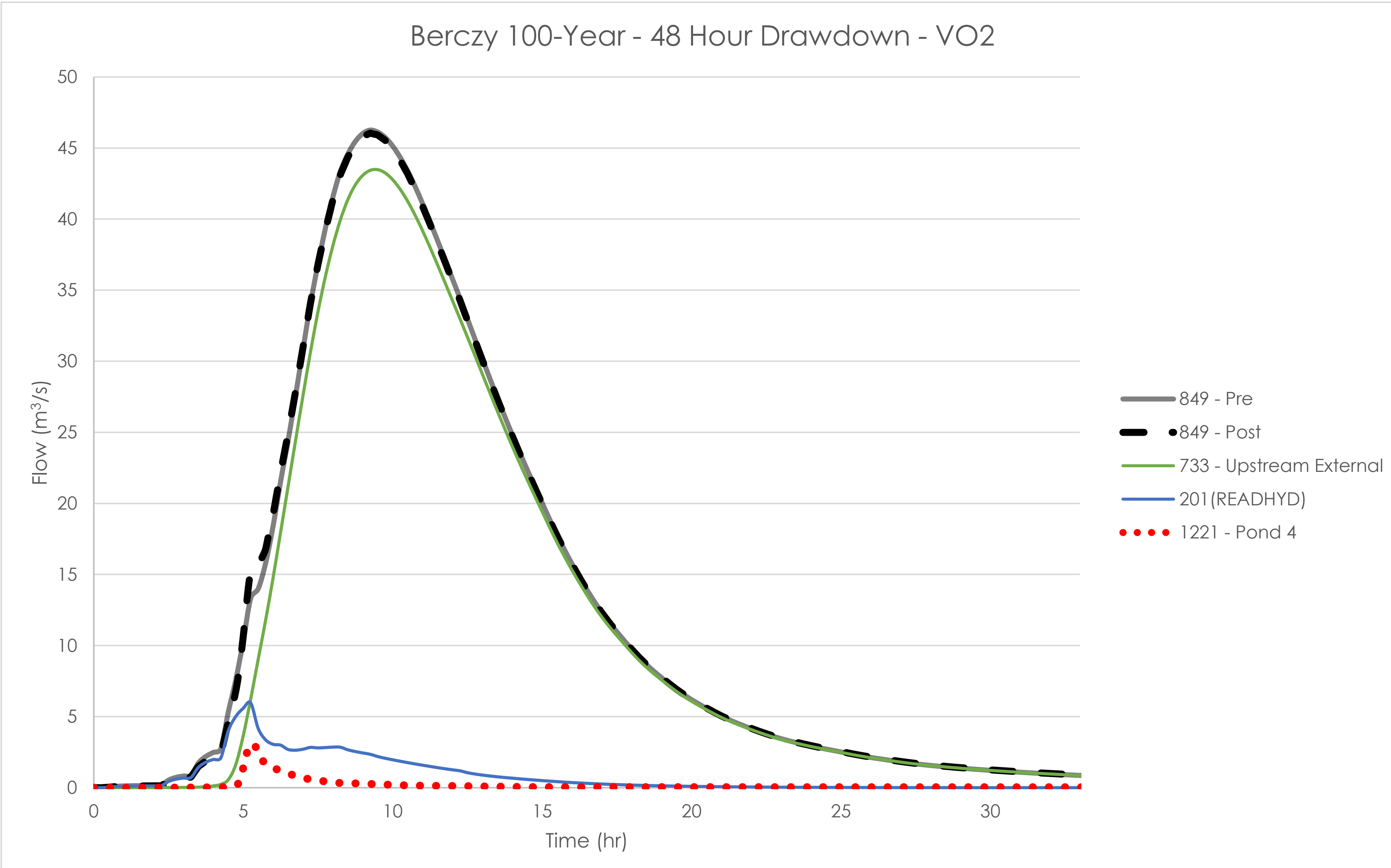


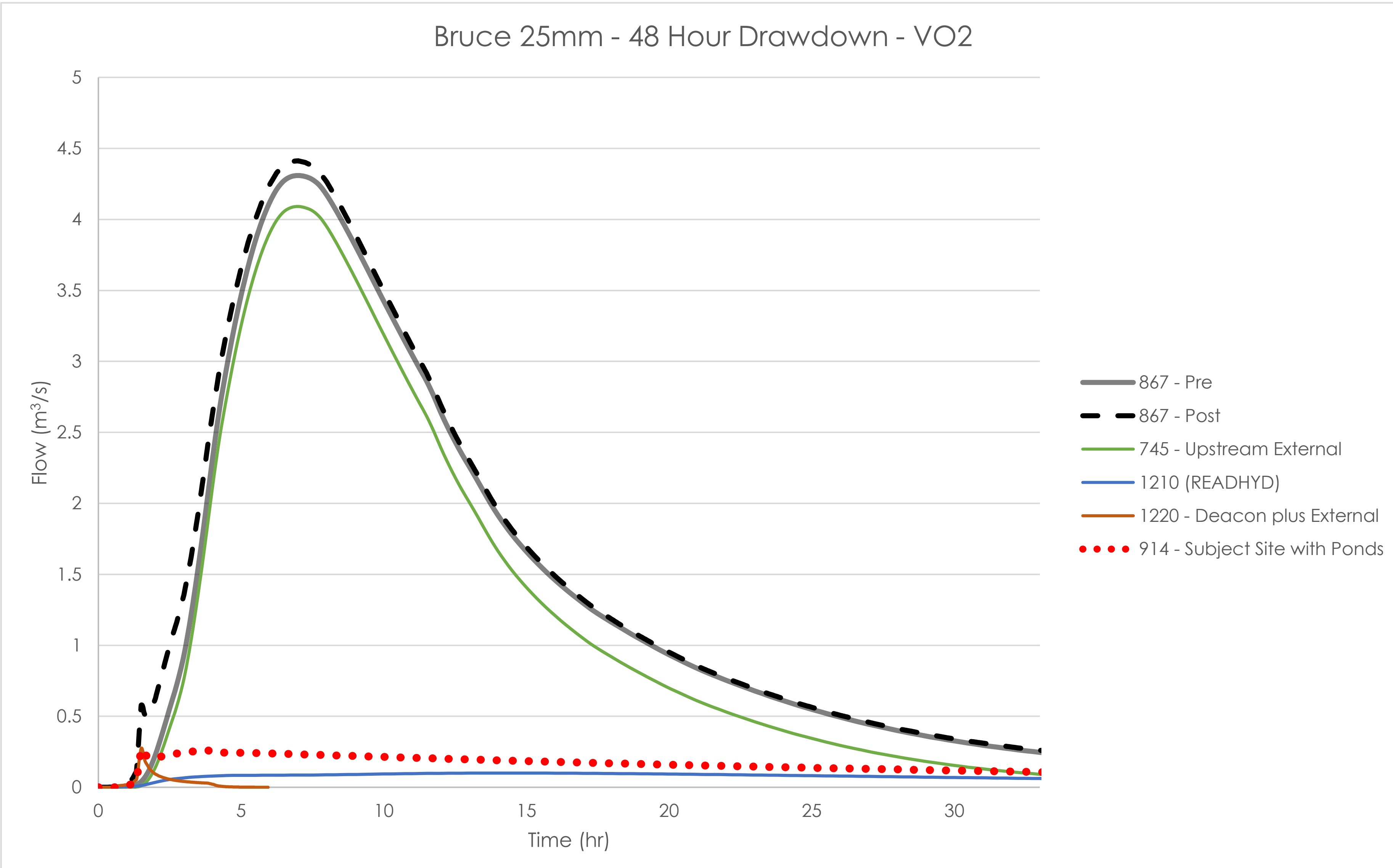
Berczy 5-Year - 48 Hour Drawdown - VO2
25
20
15
10
5
0
Flow (m3/s)
0
5
10
15
20
25
30
Time (hr)
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4



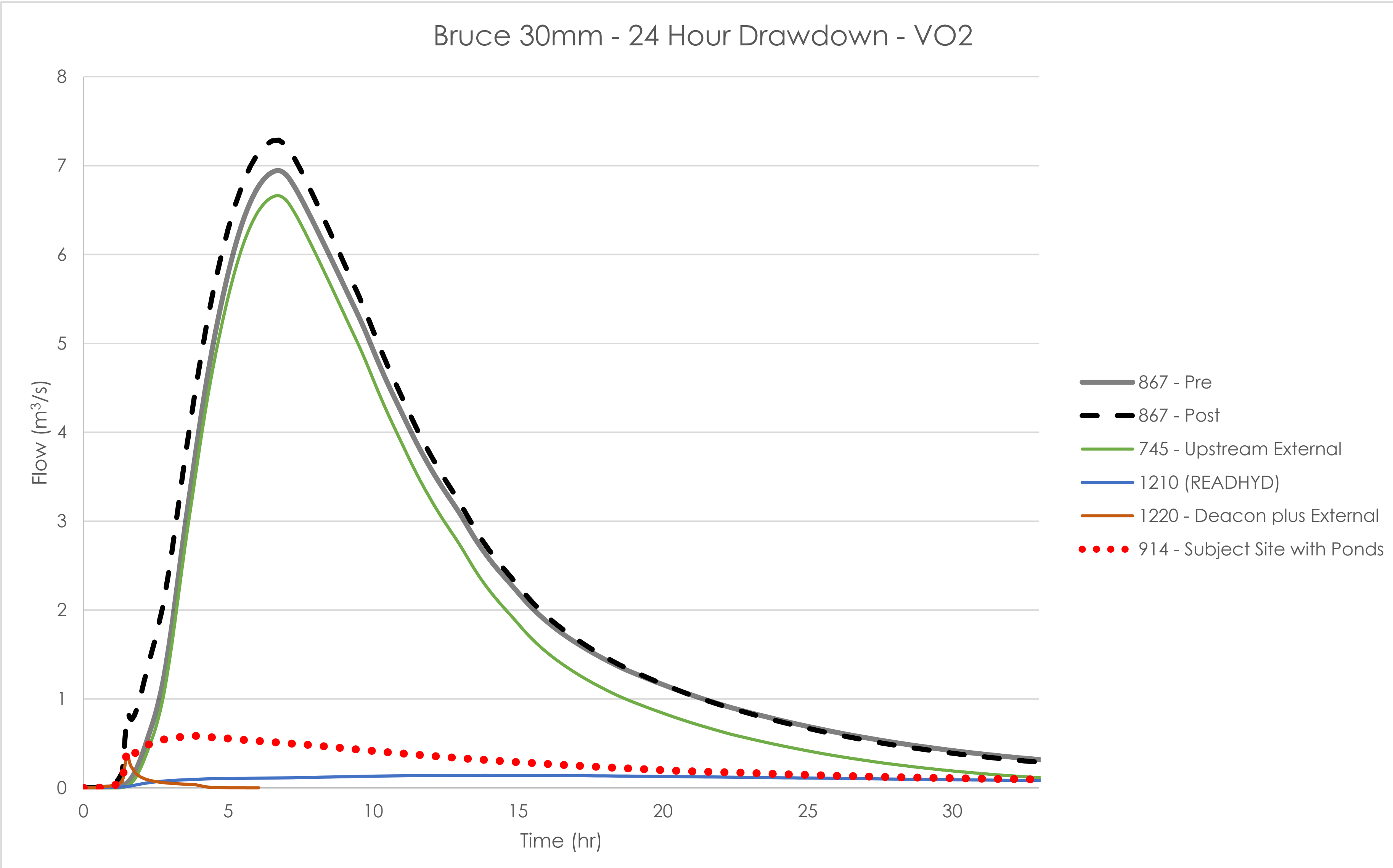
Berczy 5-Year - 72 Hour Drawdown - VO2
Flow (m3/s)
0
5
10
15
20
25
0
5
10
15
20
25
30
Time (hr)
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4


Berczy 25-Year - 48 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
5
10
15
20
25
30
35
40
0
5
10
15
20
25
30
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

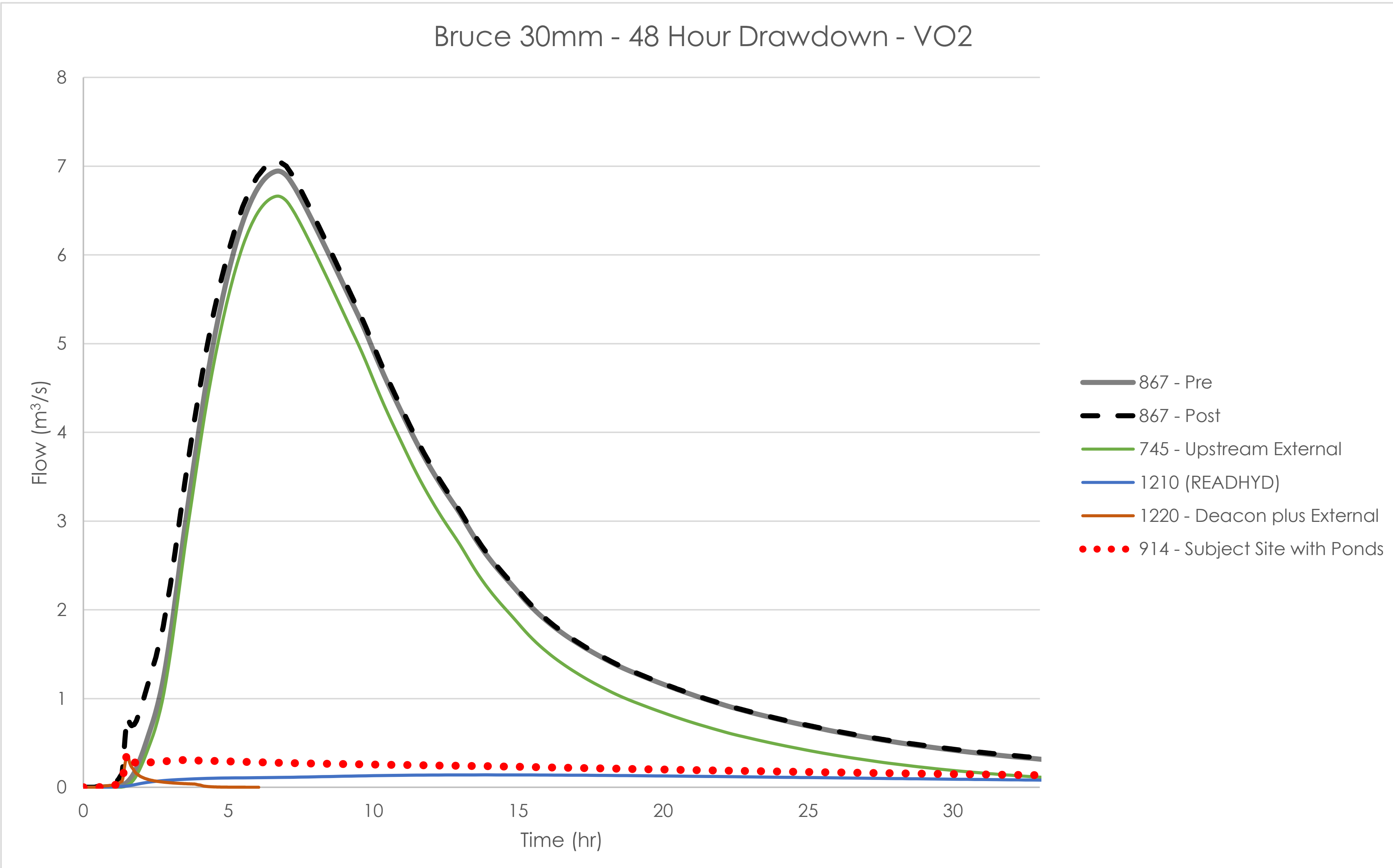

Berczy 100-Year - 48 Hour Drawdown - VO2
Flow (m3/s)
50
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
Time (hr)
849 - Pre
849 - Post
733 - Upstream External
201(READHYD)
1221 - Pond 4

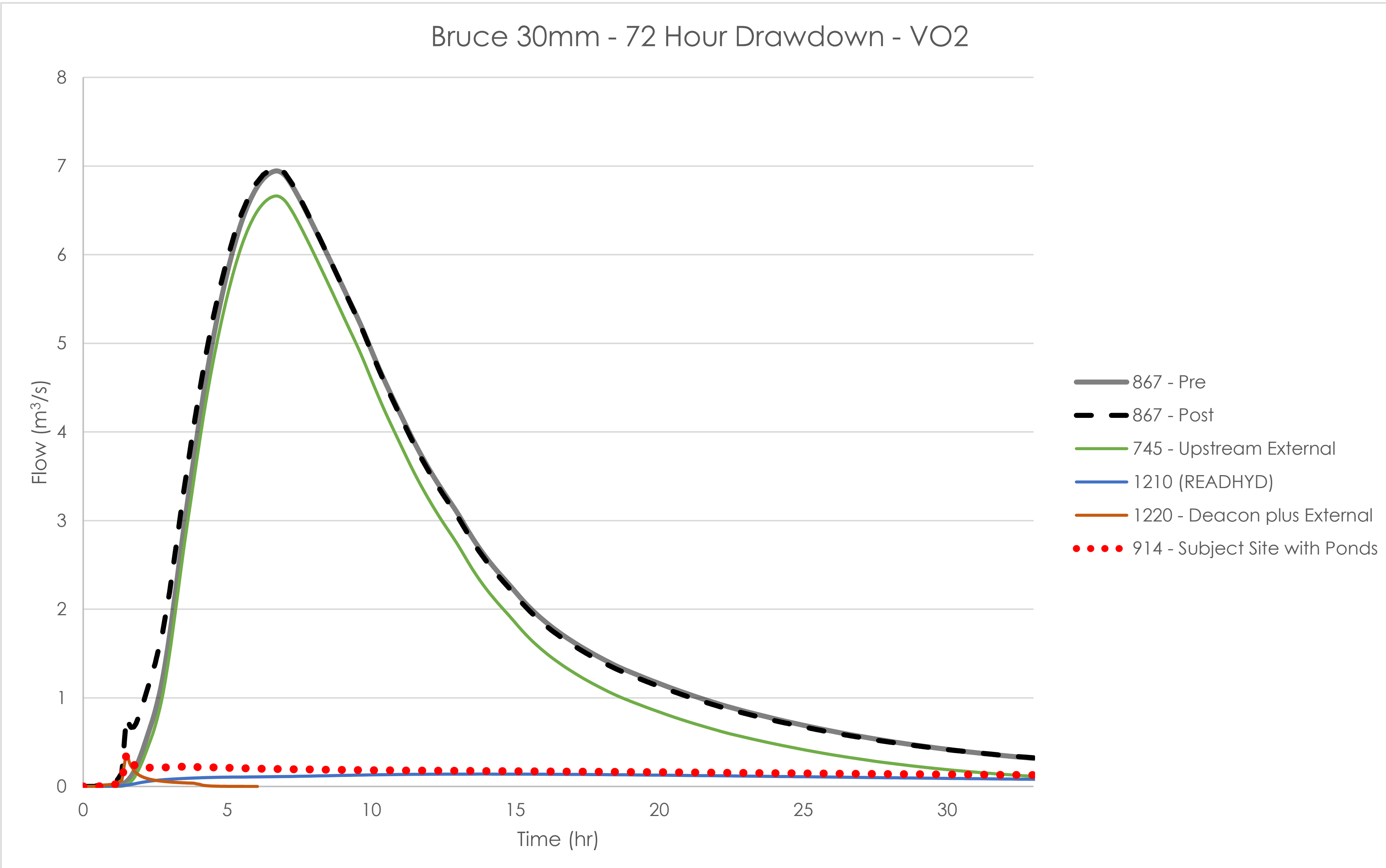


Bruce 25mm - 48 Hour Drawdown - VO2
Flow (m3/s)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
5
10
15
20
25
30
Time (hr)
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds

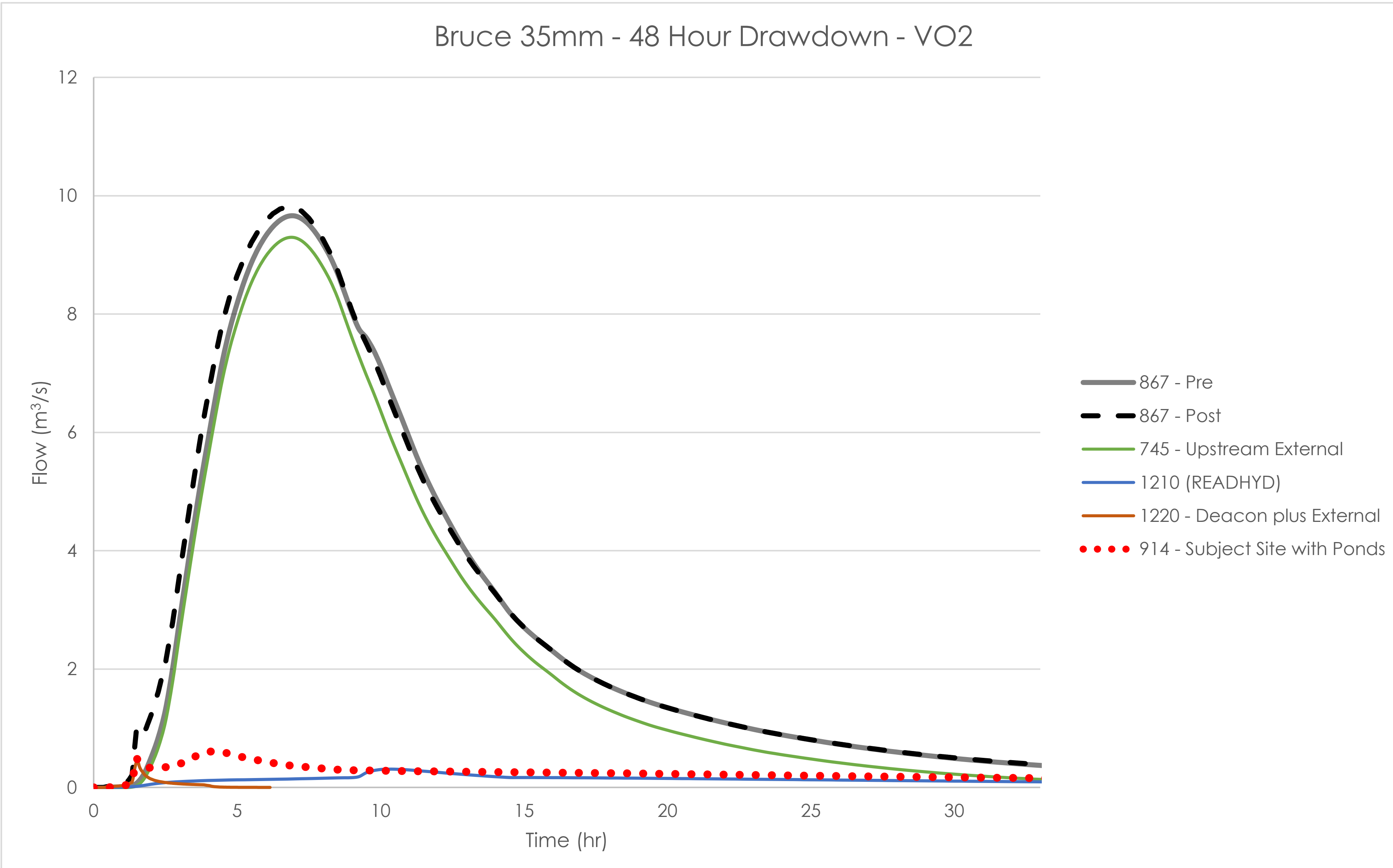


Bruce 30mm - 24 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
1
2
3
4
5
6
7
8
0
5
10
15
20
25
30
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds

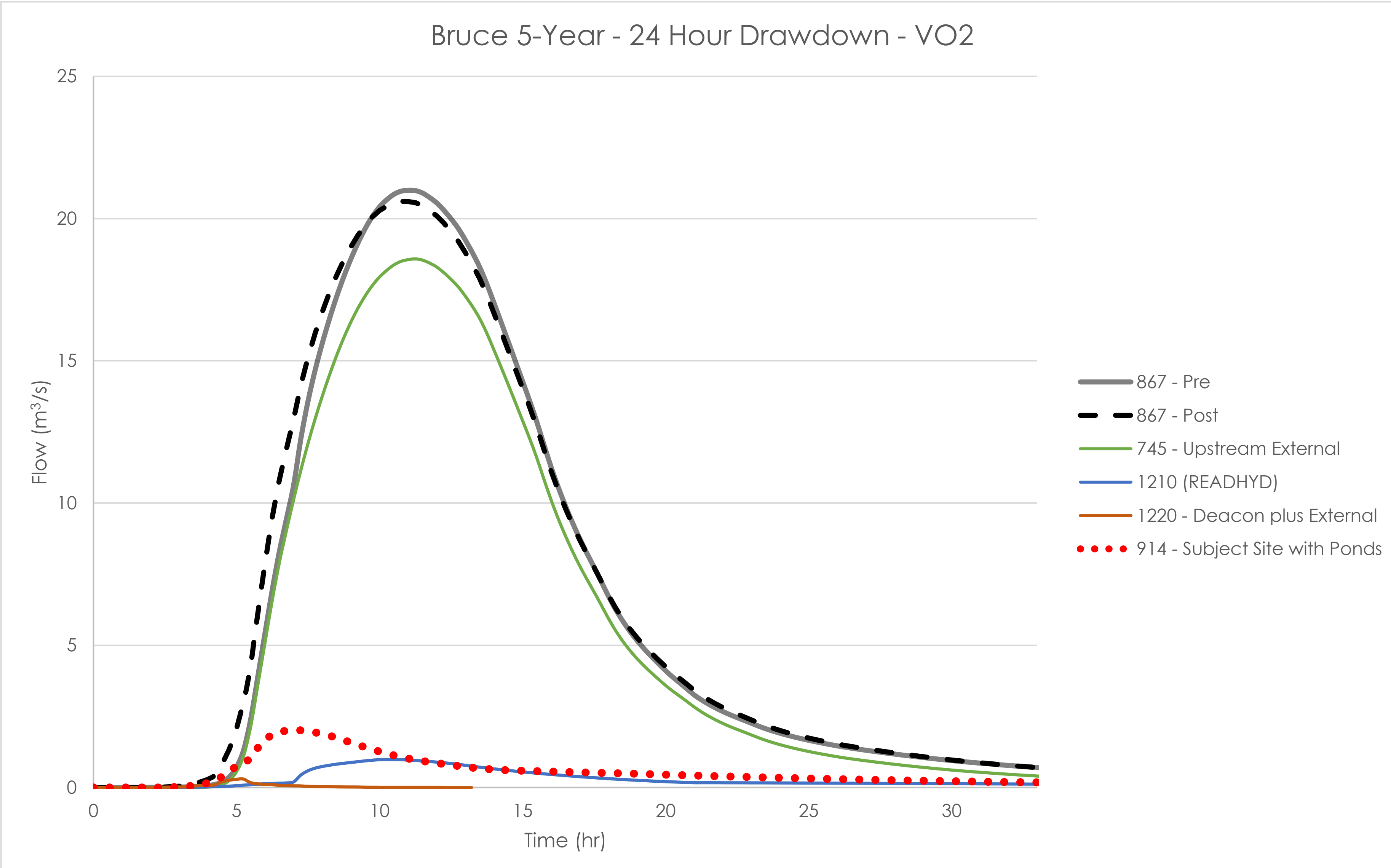

Bruce 30mm - 48 Hour Drawdown - VO2
Flow (m3/s)
0
1
2
3
4
5
6
7
8
Time (hr)
0
5
10
15
20
25
30
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds



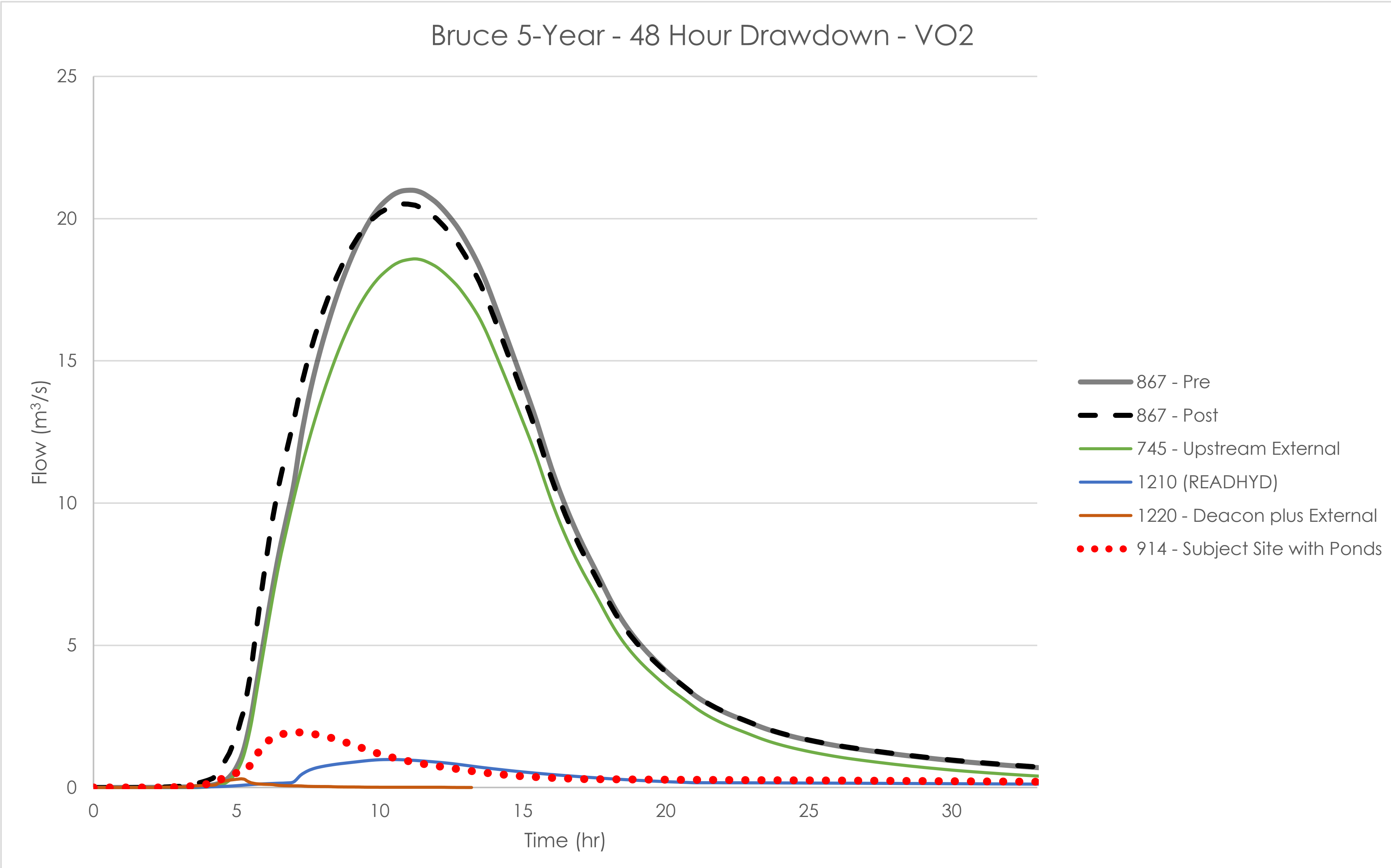
Bruce 30mm - 72 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
1
2
3
4
5
6
7
8
0
5
10
15
20
25
30
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds

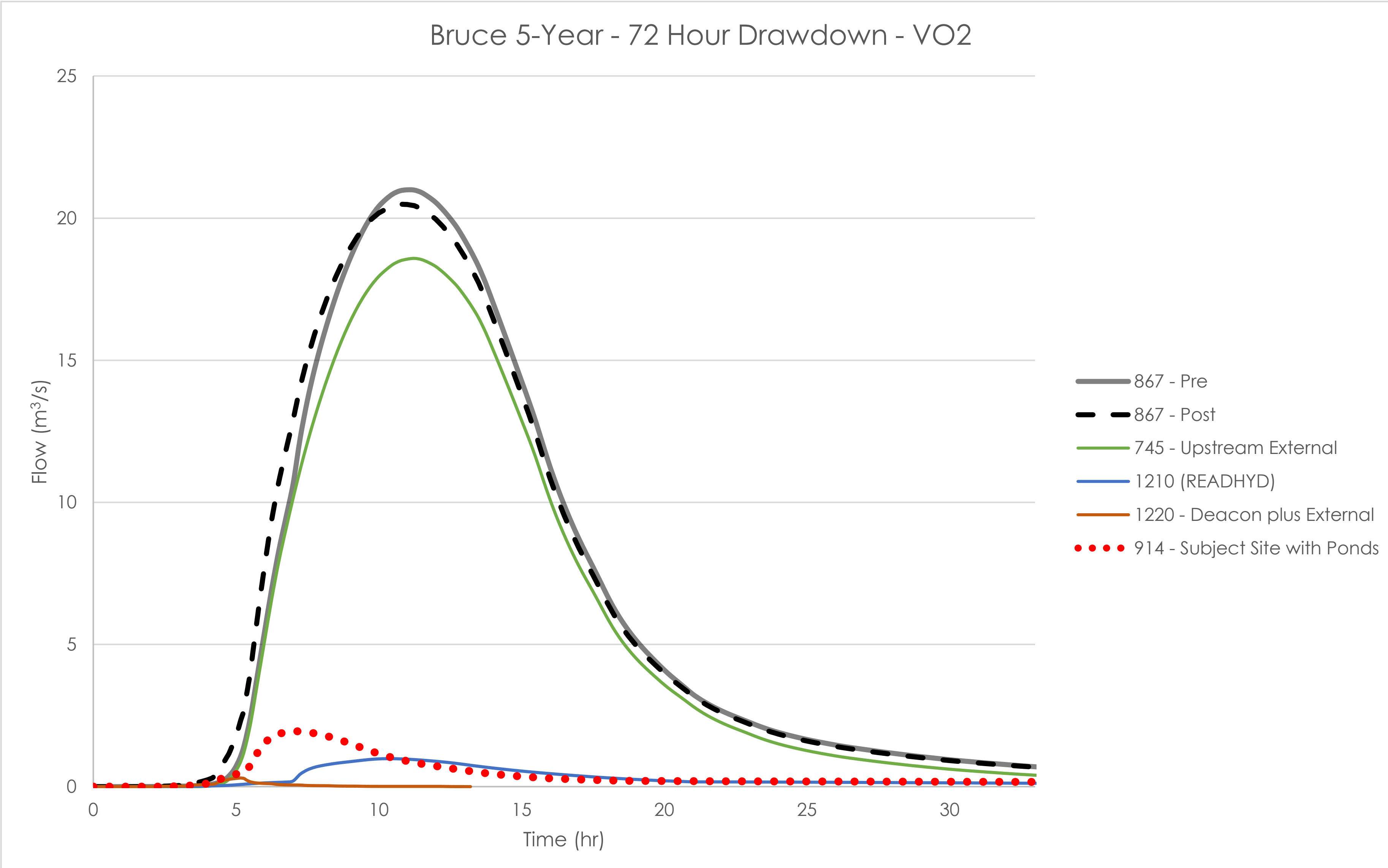


Bruce 35mm - 48 Hour Drawdown - VO2
Flow (m3/s)
Time (hr)
0
2
4
6
8
10
12
0
5
10
15
20
25
30
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds

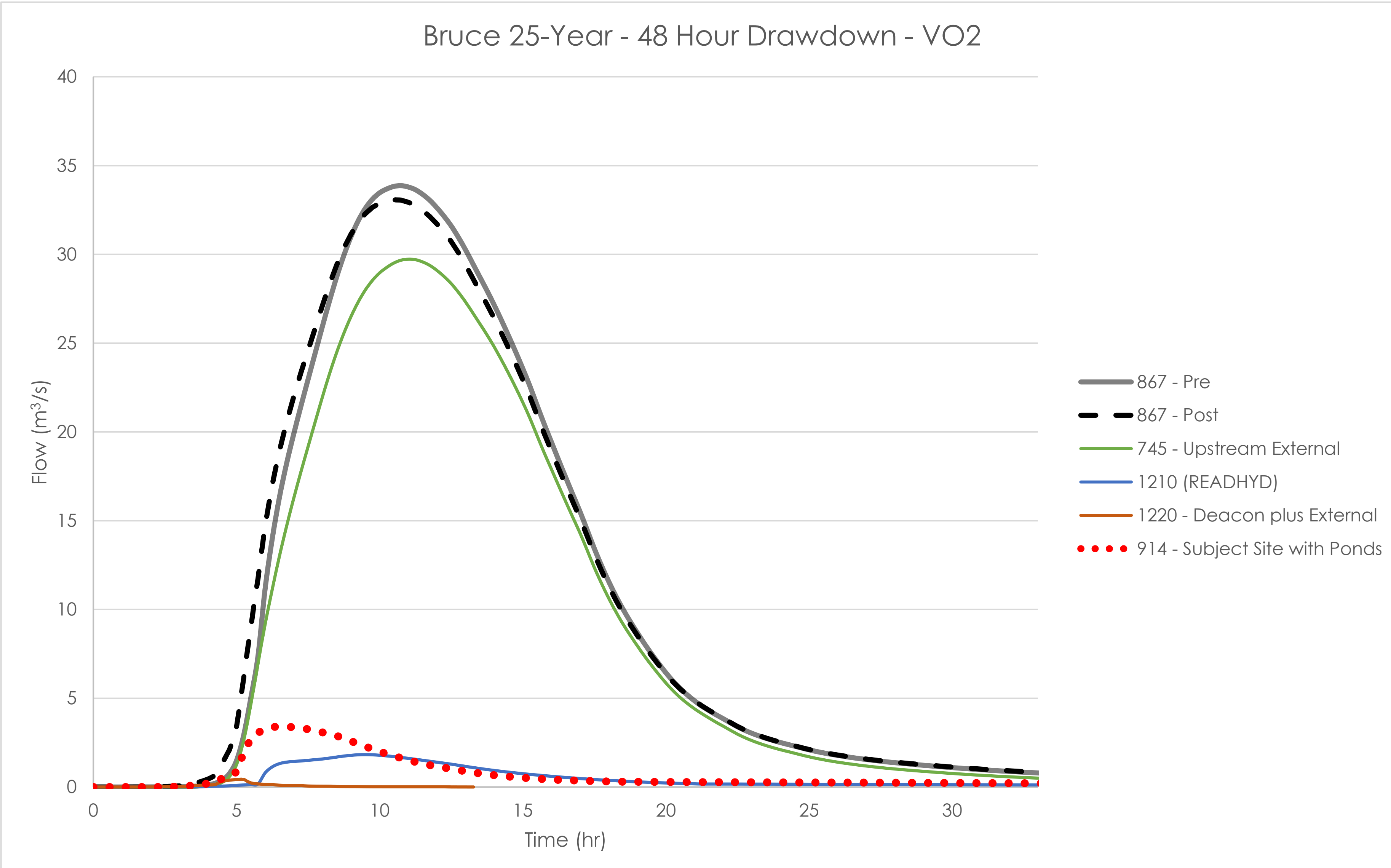


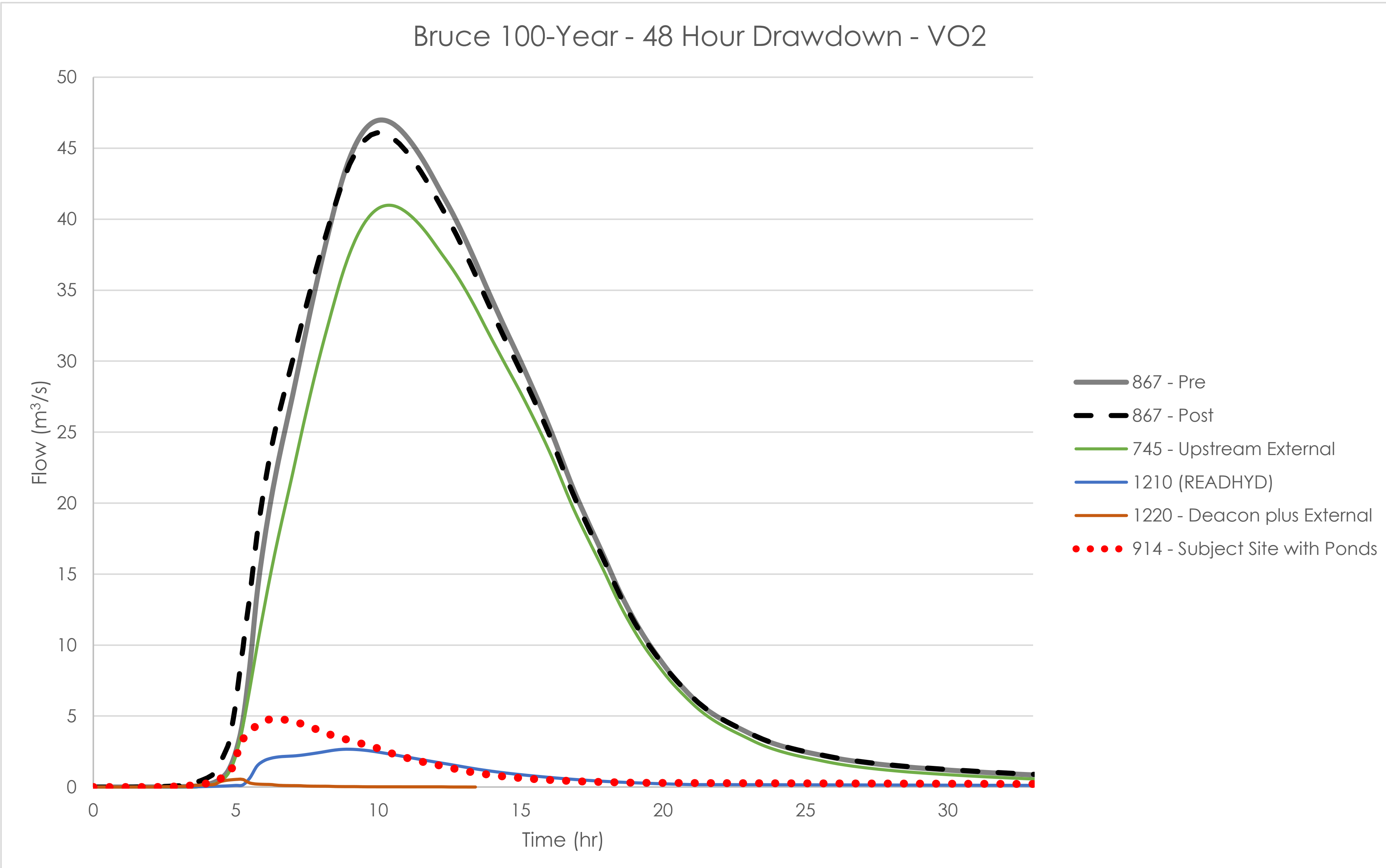
Bruce 5-Year - 24 Hour Drawdown - VO2
Flow (m^3/s)
Time (hr)
0
5
10
15
20
25
30
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds


Bruce 5-Year - 48 Hour Drawdown - VO2
Flow (m3/s)
25
20
15
10
5
0
0
5
10
15
20
25
30
Time (hr)
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds



Bruce 5-Year - 72 Hour Drawdown - VO2
25
20
15
10
5
0
0
5
10
15
20
25
30
Flow (m^3/s)
Time (hr)
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds


Bruce 25-Year - 48 Hour Drawdown - VO2
Flow (m3/s)
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
Time (hr)
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds


Bruce 100-Year - 48 Hour Drawdown - VO2
Flow (m3/s)
50
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
Time (hr)
867 - Pre
867 - Post
745 - Upstream External
1210 (READHYD)
1220 - Deacon plus External
914 - Subject Site with Ponds

Appendix F SWM POND CALCULATIONS

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 26-Oct-17

Summary of Pond 1 - Pond 4 Volumes

Pond #	Site Area (ha)	External Area (ha)	Total Area (ha)	Imperviousness	Required Permanent Pool Size (m^3)	Provided Permanent Pool Size (m^3)	Unrouted Extended Detention Size (m^3)	100 yr storage (m3)	Total Storage Vol
1	63.87	82.95	146.82	59%	22,896	72,347	24,857	77,823	150,170
2	5.25	6.59	11.84	70%	2,149	6,082	2,123	6,790	12,872
3	22.80		22.80	70%	4,097	10,497	4,172	13,052	23,549
4	29.24		29.24	61%	4,718	5,561	4,982	-	5,561
Infiltration Facility 1	1.85		1.85	62%			316		

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 1 Permanent Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	5.8	3.5	
Park Block	0.40	4.0	1.6	
School Block	0.75	2.5	1.8	
Townhouses - Stacked	0.85	5.3	4.5	
Townhouses - Back-to-back	0.75	0.7	0.5	
Medium Density	0.85	0.0	0.0	
Mixed Use	0.85	0.0	0.0	
Singles	0.65	45.6	29.6	
Subtotal Proposed	*0.65*	*63.87*	*41.6*	*62%*
Existing				
Berczy Village	0.61	52.9	32.3	
Berczy Village	0.61	18.2	11.1	
Berzy Village School	0.58	5.6	3.2	
Berczy Village Commercial	0.84	1.0	0.8	
Berczy Village Commercial	0.84	2.2	1.8	
Kennedy Road	0.65	3.2	2.0	
Subtotal Existing	*0.62*	*82.95*	*51.3*	*57%*
Total	0.63	146.82	92.9	59%

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid
Imperviousness %	59	
MOE, SWMPDM Table 3.2 Volume	196	m^3/ha
	156	m^3/ha Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	Rate (m^3/s)
Level 1 Wet Pond	22896	5873	24857	0.216

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event from V02

RV = 16.93 mm >>>> (For minimum of 48 hr extended detention)

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Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 1 Storage Calculations

Input

Base of Pond =	176.50	
N.W.L. =	179.50	masl
Increment for Volume =	0.1	m
Required Permanent Pool Volume =	22896	m^3
Permanent Pool Volume Provided =	72347	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	176.50	0.00	14,928	14,928		0		
	177.00	0.50	15,768	15,768	15,348	7,674	7,674	0
	177.50	1.00	16,637	16,637	16,202	8,101	15,775	0
	178.00	1.50	27,422	27,422	22,029	11,015	26,790	0
	178.50	2.00	29,085	29,085	28,254	14,127	40,917	0
	179.00	2.50	30,814	30,814	29,950	14,975	55,891	0
NWL	179.50	3.00	35,008	35,008	32,911	16,455	72,347	0
	180.00	3.50	37,686	37,686	36,347	18,173	90,520	18,173
	180.50	4.00	38,895	38,895	38,291	19,145	109,666	37,319
	181.00	4.50	40,145	40,145	39,520	19,760	129,425	57,079
	181.50	5.00	41,436	41,436	40,791	20,395	149,821	77,474
Pond Top	181.80	5.30	42,224	42,224	41,830	12,549	162,370	90,023

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 2 Permant Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	1.03	0.6	
Park Block	0.40	0.23	0.1	
School Block	0.75	0.00	0.0	
Townhouses - Stacked	0.85	0.22	0.2	
Townhouses - Back-to-back	0.75	0.00	0.0	
Medium Density	0.85	1.69	1.4	
Mixed Use	0.85	0.00	0.0	
Singles	0.65	2.07	1.3	
Subtotal Proposed	*0.70*	*5.25*	*3.7*	*70%*
Existing				
Yorkton + Ext	0.71	6.59	4.69	
Subtotal Existing	*0.71*	**6.59**	**4.69**	*71%*
Total	**0.71**	**11.84**	**8.38**	*70%*

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid
Imperviousness %	70	

MOE, SWMPDM Table 3.2 Volume 222 m^3/ha

182 m^3/ha Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	**Rate** (m^3/s)
Level 1 Wet Pond	2149	474	2123	0.018

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event fromV02

RV = 17.93 mm >>>> (For minimum of 48 hr extended detention)

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Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 11/1/2017

SWM Pond 2 Storage Calculations

Input

Base of Pond =	178.50	
N.W.L. =	181.50	masl
Increment for Volume =	0.5	m
Required Permanent Pool Volume =	2149	m^3
Permanent Pool Volume Provided =	6082	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	178.50	0.00	797	797		0		
	179.00	0.50	1,039	1,039	918	459	**459**	**0**
	179.50	1.00	1,311	1,311	1,175	587	**1,046**	**0**
	180.00	1.50	1,936	1,936	1,624	812	**1,858**	**0**
	180.50	2.00	2,431	2,431	2,183	1,092	**2,950**	**0**
	181.00	2.50	2,978	2,978	2,704	1,352	**4,302**	**0**
NWL	181.50	3.00	4,145	4,145	3,561	1,781	**6,082**	**0**
	182.00	3.50	5,186	5,186	4,665	2,333	**8,415**	**2,333**
	182.50	4.00	5,684	5,684	5,435	2,717	**11,132**	**5,050**
	183.00	4.50	6,205	6,205	5,944	2,972	**14,105**	**8,022**
Pond Top	183.50	5.00	6,760	6,760	6,482	3,241	**17,346**	**11,264**

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 1-Nov-17

SWM Pond 3 Permant Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	1.38	0.8	
Park Block	0.40	0.57	0.2	
School Block	0.75	0.00	0.0	
Townhouses - Stacked	0.85	2.16	1.8	
Townhouses - Back-to-back	0.75	0.00	0.0	
Medium Density	0.85	1.29	1.1	
Mixed Use	0.85	3.54	3.0	
Singles	0.65	13.86	9.0	
Total	0.70	22.80	16.0	70%

0.57

22.8

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid
Imperviousness %	70	

MOE, SWMPDM Table 3.2 Volume	220	m^3/ha	
	180	m^3/ha	Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release
	Wet Pond	MOE Guideline	Extended Detention	Rate
	(m^3)	(m^3)	(m^3)	(m^3/s)
Level 1 Wet Pond	4097	912	4172	0.036

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event from V02

RV = 18.3 mm >>>> (For minimum of 48 hr extended detention)

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Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 11/1/2017

SWM Pond 3 Storage Calculations

Input

Base of Pond =	174.60	
N.W.L. =	176.50	masl
Increment for Volume =	0.5	m
Required Permanent Pool Volume =	4097	m^3
Permanent Pool Volume Provided =	10497	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	173.50	0.00	1,627	1,627		0		
	174.00	0.50	1,901	1,901	1,764	882	**882**	**0**
	174.50	1.00	2,201	2,201	2,051	1,026	**1,908**	**0**
	175.00	1.50	3,614	3,614	2,907	1,454	**3,361**	**0**
	175.50	2.00	4,263	4,263	3,938	1,969	**5,331**	**0**
	176.00	2.50	4,978	4,978	4,620	2,310	**7,641**	**0**
NWL	176.50	3.00	6,445	6,445	5,712	2,856	**10,497**	**0**
	177.00	3.50	7,645	7,645	7,045	3,523	**14,019**	**3,523**
	177.50	4.00	8,229	8,229	7,937	3,969	**17,988**	**7,491**
	178.00	4.50	8,830	8,830	8,529	4,265	**22,252**	**11,756**
	178.50	5.00	9,459	9,459	7,218	18,046	**25,686**	**15,190**
Pond Top	179.00	5.50	10,218	10,218	9838.3	4919.2	**30,606**	**20,109**

Stantec

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 26-Oct-17

SWM Pond 4 Permant Pool and Extended Detention Sizing Calculations

Landuse	C (Runoff Coef.)	Area (ha)	C x A	Imp %
Proposed				
Pond Block	0.60	1.12	0.7	
Park Block	0.40	3.47	1.4	
School Block	0.75	0.00	0.0	
Townhouses - Stacked	0.85	2.38	2.0	
Townhouses - Back-to-back	0.75	0.00	0.0	
Medium Density	0.85	2.01	1.7	
Mixed Use	0.85	0.00	0.0	
Singles	0.65	20.26	13.2	
Total	0.65	29.24	19.0	61%

Note: Percent impervious (I) converted from C values based City of Markham Standard, C = 0.25 +0.65I

Protection Level	1	Choose Level 1, 2, 3, 4
Pond Type	Wetpond	Choose Infiltration, Wetpond, Wetland, or Hybrid
Imperviousness %	61	

MOE, SWMPDM Table 3.2 Volume 201 m^3/ha
161 m^3/ha Less 40 m^3/ha for active storage

Protection and Pond Type	Permanent Pool	Active Pond *		Est. Release
	Wet Pond (m^3)	MOE Guideline (m^3)	Extended Detention (m^3)	Rate (m^3/s)
Level 1 Wet Pond	4718	1170	4982	0.043

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the runoff volume from the 25mm 4hr storm event from SWMHYMO

RV = 17.04 mm >>>> (For minimum of 48 hr extended detention)

Project Description: 4134 16th Avenue
Job Number: 160622264
Creation Date: 10/26/2017

SWM Pond 4 Storage Calculations

Input

Base of Pond =	175.50	
N.W.L. =	178.50	masl
Increment for Volume =	0.5	m
Required Permanent Pool Volume =	4718	m^3
Permanent Pool Volume Provided =	5561	m^3

Elevation/Storage Information

	Elevation (m)	Stage (m)	Area 1 (m^2)	Total Area (m^2)	Avg. Area (m^2)	Incremental Storage (m^3)	Cumulative Storage (m^3)	Cumulative Storage above Permanent Pool (m^3)
Pond Base	175.50	0.00	679	679		0		
	176.00	0.50	875	875	777	388	388	0
	176.50	1.00	1,114	1,114	994	497	886	0
	177.00	1.50	1,736	1,736	1,425	712	1,598	0
	177.50	2.00	2,228	2,228	1,982	991	2,589	0
	178.00	2.50	2,795	2,795	2,511	1,256	3,845	0
NWL	178.50	3.00	4,069	4,069	3,432	1,716	5,561	0
	179.00	3.50	5,310	5,310	4,689	2,345	7,905	2,345
	179.50	4.00	5,933	5,933	5,622	2,811	10,716	5,155
	180.00	4.50	6,597	6,597	6,265	3,133	13,849	8,288
Pond Top	180.45	4.95	7,228	7,228	6,912	3,110	16,959	11,398

Appendix G WSP WATERMAIN ANALYSIS

November 03, 2017

171-15332-00

Mr. Bob Judges,
STANTEC
300W-675 Cochrane Drive
Markham, Ontario L3R 0B8

Subject: York Downs Development, City of Markham, Region of York

Dear Mr. Judges,

WSP Canada Inc. (WSP) is pleased to present the results of its watermain analysis for the York Down Development, in the City of Markham, Region of York.

The analysis in this report includes hydraulic simulation of the Minimum Hour, Maximum Day, Maximum Day plus Fire and the Peak (Maximum) Hour demands at the proposed development for the present planning horizons. The hydraulic analysis was completed using an InfoWater model of the proposed development's water distribution network, built by WSP and calibrated using City of Markham boundary conditions.

The proposed watermain sizes and network were confirmed using the model to ensure that the system can provide adequate pressures and fire flows to all junctions in the proposed development, subject to constraints.

The modeling shows that the development can achieve the hydraulic requirements prescribed by the City of Markham as well as the Ministry of the Environment and Climate Change watermain design criteria.

If you have any questions, do not hesitate to call.

Sincerely,

WSP Canada Inc.

LICENSED PROFESSIONAL ENGINEER
J-L E. DAVIAU
Nov. 3, 2017
PROVINCE OF ONTARIO

Jean-Luc Daviau, M.A.Sc., P.Eng.
Sr. Hydraulic Specialist
Manager, Hydraulics

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Fax: +1 905 882-0055
wsp.com

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APPENDICES

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Stantec to provide a hydraulic analysis of the proposed York Downs Development in the City of Markham, ON. The proposed development is bounded by Warden Avenue and Kennedy Road to the west and east, and is immediately north of 16th Ave. In this location, the development stagers two (2) pressure districts, PD5 and PD6RD.

Figure 1 shows that the proposed development is primarily residential made up of both single family homes and townhomes blocks, with a mixed use area along 16th Ave. At this time, the development will be constructed in 2 phases. Phase 1 of the development is located along Kennedy Road, and is part of PD6RD with a connection to PD6RE, while the rest of the development was considered as part of Phase 2 and is mostly in PD5. Details on the phasing plan have been included in the Appendix A.

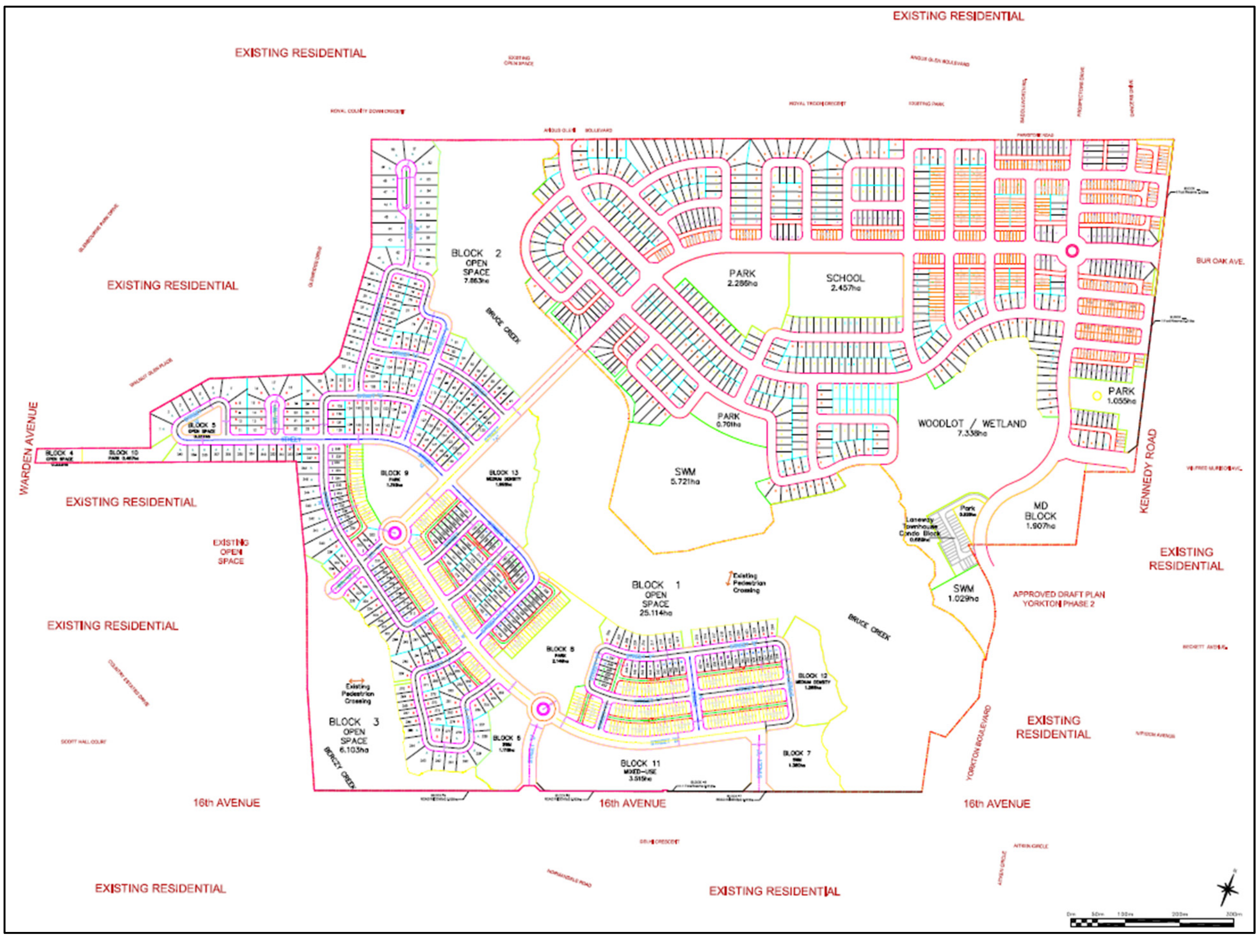


Figure 1 – York Downs Proposed Development Site Layout

2 DESIGN CRITERIA AND DEMANDS

2.1 DEVELOPMENT DEMANDS

The design criteria to determine water demands for this proposed development were based on the City of Markham's Design Criteria (2013). Table 1 summarizes the unit rates and peaking factors used to determine the demands for the York Downs Development.

Table 1 - City of Markham Water Demand Criteria

DEMAND	CRITERA
Average Residential Consumption	365 L/cap/day
Maximum Hour Peaking Factor	4.5
Maximum Day Peaking Factor	2.0
Minimum Hour Peaking Factor	0.7

Source: City of Markham Design Criteria, 2013

Table 2Table 2 presents the total calculated demand rates for the York Down Development while using the rates outlined in the table above. Appendix A provides a detailed calculation of the demands and how they were distributed to each modelled node.

Table 2 - Calculated Demand Rates for the York Downs Development

STUDY AREA	MINIMUM HOUR DEMAND (L/S)	MAXIMUM DAY DEMAND (L/S)	PEAK HOUR DEMAND (L/S)
York Downs Development Demands	20.14	57.47	129.47

2.2 FIRE DEMANDS

The required fire flows were based on the City of Markham's recommended rate of 117 L/s for single family dwellings, 167 L/s for Townhomes (in yellow) and 250 L/s for the mixed use lands and the school block and Block 11 were used in the York Downs Development. These areas are shown in Figure 1.

Details regarding the fire flow demands for each modelled node can be seen in Appendix B.

2.3 SYSTEM PRESSURE REQUIREMENTS

As stipulated by the MOECC, the acceptable pressures under normal conditions are between 275 kPa (40 psi) and 690 kPa (100 psi). That being said the City of Markham required a minimum pressure of 300 kPa (44 psi) and recommends a maximum pressure of 550 kPa (80 psi).

Note that any pressures which are above 690 kPa (100 psi) may require Pressure Reducing Valves (PRVs) to reduce pressure to the acceptable range by the MOECC.

The minimum allowable pressure under maximum day demand plus fire flow is 140 kPa (20 psi) at the location of the fire and everywhere else in the pressure district.

2.4 WATERMAIN SIZING

Watermains are to be sized appropriately to maintain adequate flows without causing excessive energy loss or resulting in excessive water quality decay. Main diameters should therefore be sized to carry the larger of: Maximum Days Demand plus Fire Flow or Peak Hour Demand.

According to the Ministry of the Environment and Climate Change (MOECC), the minimum pipe size in a distribution system providing fire protection should be at least 150 mm in diameter. Additionally, pipes should be looped wherever possible to improve supply security and water quality. Friction factors were assigned according to the pipe diameter as suggested by the MOECC and as shown in Table 3.

Table 3 - Hazen-Williams Roughness Factors

NOMINAL DIAMETER	C-FACTOR
150 mm and smaller	100
200 mm to 250 mm	110
300 mm to 400 mm	120
Over 450 mm	130

3 HYDRAULIC MODEL

3.1 MODEL SETUP

To complete this analysis, a model of the development was created in InfoWater using boundary conditions provided from the City of Markham. A copy of the boundary conditions are included in Appendix C. The proposed zone boundaries were discussed with the City of Markham in March 2016. The closest nodes in the present model were assigned the City's boundary conditions, e.g: flows and pressures.

The proposed development will be split among two pressure districts, PD5 and PD6RD/RE. A connection between PD6RD and PD6RE will be made at Bur Oak Avenue, which will consolidate these two pressure districts. Within the model, the boundary conditions for the Bur Oak connection were assumed to be the same as for the Prospectors Drive connection. With the consolidation of these two pressure districts the City will need to ensure that the settings for the PRVs servicing these two pressure districts are updated accordingly to service both areas as one single pressure district.

Phase 1 will be serviced from PD6RD/RE. Connections to PR6RD will be made at Prospectors Drive and a connection to PD6RE will be made at Bur Oak Avenue. The PD6RD and PD6RE pressure districts will be consolidated during Phase 1 of the development.

The northern portion of the development will be serviced from PD6RD/RE, with connections to the existing system at Angus Glen Boulevard, Prospectors Drive and Bur Oak Avenue. There will be two east west connections within the development to supply the north western portion of the development. For additional security of supply and/or to supplement fire flows in the event of an upset, a normally closed check valve has been provided from PD5 to PD6RD/RE in the western portion of the development – this would flow northward when open.

The south western portion of the development will be serviced from PD5 with two connections to 16th Avenue. There is an existing 150mm diameter stub across 16th Avenue, this connection will need to be upgraded to supply the proposed development.

The south eastern portion of the development will be serviced from PD5 with one connection to Yorkton Boulevard. Security of supply will be provided from a normally closed PRV from the PD6RD/RE zone.

A layout of the proposed zone boundaries and connections are included in Appendix C.

The analysis was conducted under Minimum Hour, Maximum Day, Maximum Hour and Maximum Day plus Fire demand conditions. The proposed pipe sizes and layout are shown in Appendix A.

4 ANALYSIS AND RESULTS

The proposed watermains within the development were sized to satisfy the greater of either Peak Hour or Maximum Day plus Fire Flow demands. Modeling was carried out for Minimum Hour, Maximum Day, Maximum Day plus Fire Flow and Peak Hour demand conditions under the current planning horizons using an InfoWater model of the development, built and calibrated by WSP as described in previous sections.

4.1 WATERMAIN SIZING AND SYSTEM PRESSURES

Modeled service pressures for the development are summarized in Table 4. All pressures are above the minimum pressures indicated in section 2.3 under Minimum Hour, Maximum Day, Maximum Day plus Fire Flow and Peak Hour demands. The Appendix also includes Average Day results.

The watermains in the development were sized according to the results of the Maximum Hour, Maximum Day plus Fire Flow and Minimum Hour models. Schematics of the development are included in Appendix A.

The modeling indicates that the expected service pressures range between approximately 335 kPa and 650 kPa for the development under Phase 1 conditions and between 335 kPa and 689 kPa (99.9psi) under full buildout conditions.

Based on the simulations, Pressure Reducing Valves (PRV) will not be required at individual service connections. Note that if operating, real-world pressures exceed 690 kPa (100 psi), MOECC would require PRVs at the relevant service connections to reduce pressure to the acceptable range. The City's target is to operate at or below 550 kPa (80 psi) and this may result in lower boundary conditions in the future, with correspondingly lower service pressures. Hydrant flow tests can be performed once the system is operational to validate the computer model predictions.

Table 4 - Summary of Modeled Service Pressures (kPa)

	MINIMUM HOUR	MAXIMUM DAY	PEAK HOUR	MAX DAY + FIRE FLOW
Phase 1 Conditions	335 – 650	335 – 650	335 – 650	201 – 2795 L/s available at 140 kPa
Full Buildout Conditions	335 - 689	335 – 688	335 – 681	163 – 1491 L/s available at 140 kPa

Note: Table includes all boundary condition junctions built into the model and these govern some of the node presures.

4.2 FIRE FLOWS

The minimum allowable pressure under Maximum Day Demand plus Fire Flow is 140 kPa (20 psi) at the location of the fire or anywhere else in the pressure district. The fire flow scenarios were simulated under Maximum Day Demand conditions for the existing planning horizons with the model setup as per section .

The available fire flow from all nodes in the proposed development is greater than the required fire flow for single homes during the 2016 planning horizon. A detailed analysis of fire flow availability at all nodes in the proposed system is included in Appendix C.

5 CONCLUSIONS

The proposed watermain system for the York Downs Development site can achieve hydraulic requirements as prescribed by the Ministry of the Environment & Climate Change and the City of Markham, design criteria as summarized below:

1. The service pressures under existing conditions are expected to range between approximately 335 kPa and 689 kPa which are above the minimum standard pressure established by the MOECC. Based on the simulations, Pressure Reducing Valves (PRV) will not be required at individual service connections.
2. Hydrant flow tests can be performed once the system is operational to validate the computer model predictions. If operating, real-world pressures exceed 690 kPa (100 psi), MOECC would require PRVs at the relevant service connections to reduce pressure to the acceptable range. However, the City's target is to operate at or below 550 kPa (80 psi) and this may result in lower boundary conditions in the future, with correspondingly lower service pressures.
3. All required fire flows can be achieved under Maximum Day Demand conditions for the proposed development under existing conditions;
4. Under Maximum Day plus Fire Flow for existing conditions, the distribution system is able to maintain pressure above 140 kPa at ground level at all modeled nodes in the district;

These conclusions remain valid as long as the water distribution system and the City's network configuration remain as described herein. If significant changes are contemplated to the pipe sizes, water demands or system pressures (boundary conditions), this analysis should be updated.

APPENDIX

A

SYSTEM LAYOUT AND CALCULATED DEMANDS

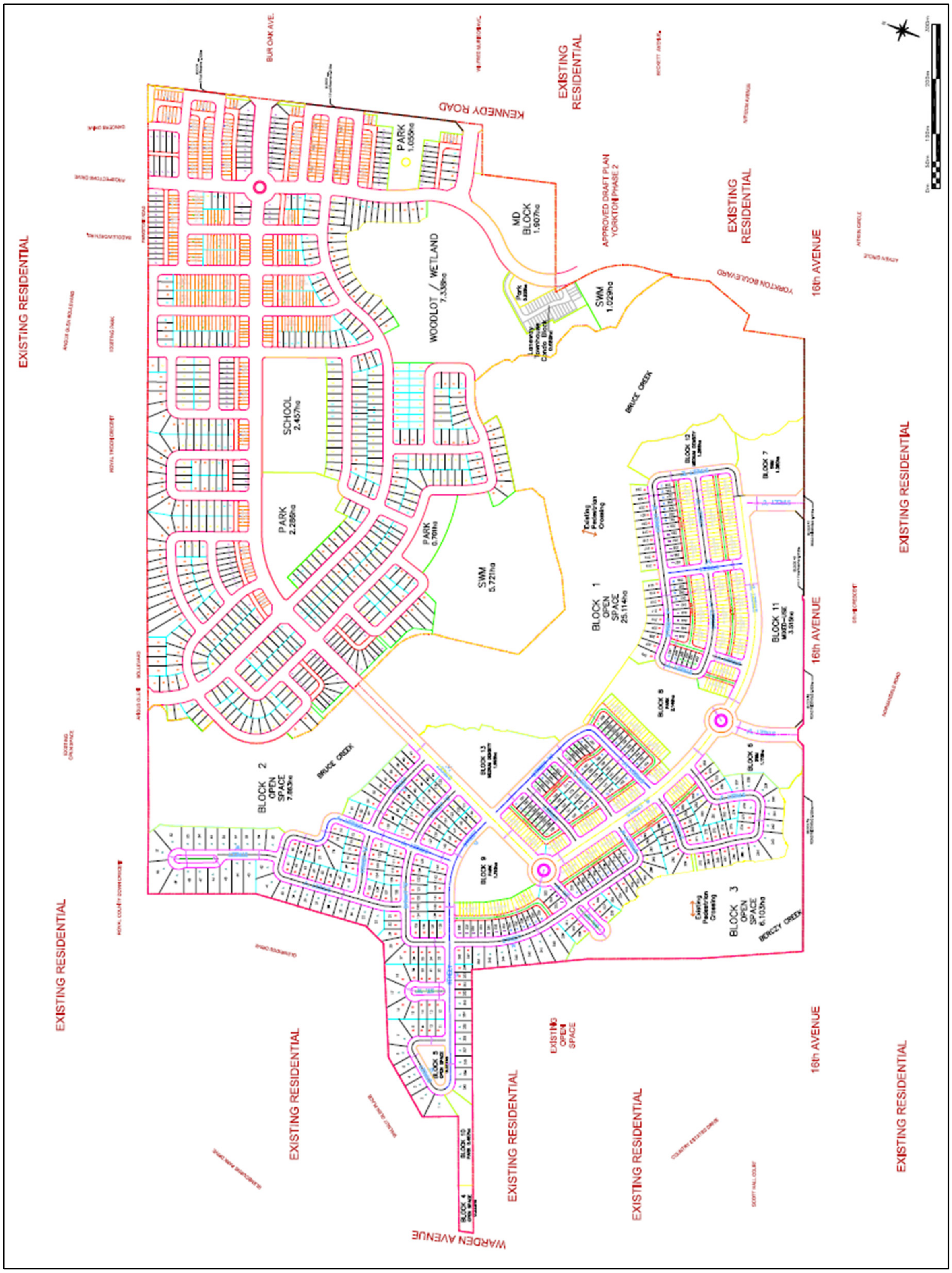


Figure A1 - Proposed System Layout – Showing Street Configuration and Building Types

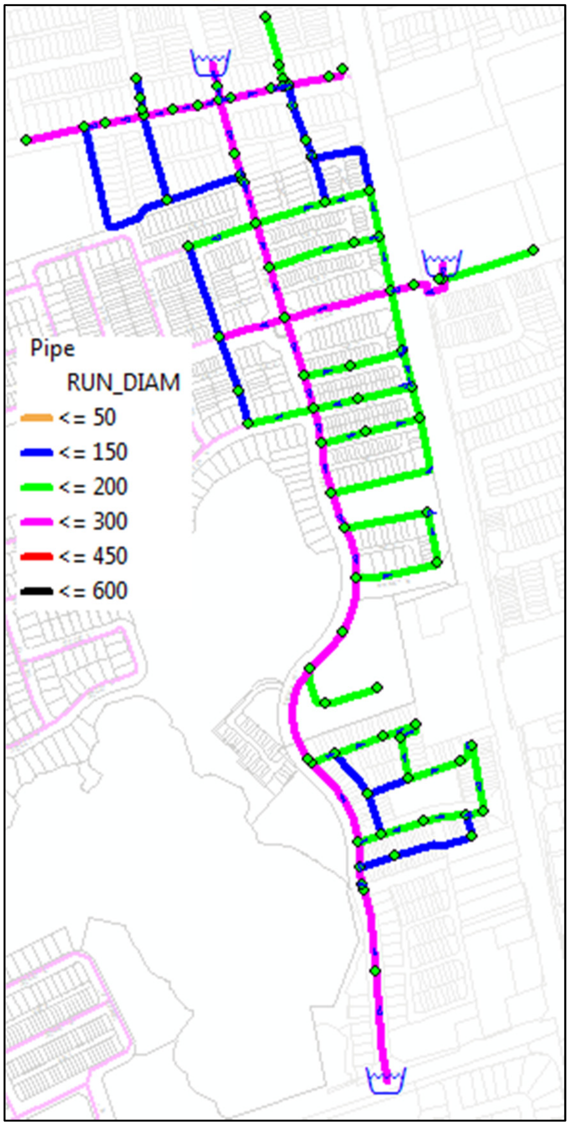


Figure A2 - Proposed System Layout – Showing the Proposed Watermain Layout and Sizes for Phase 1.

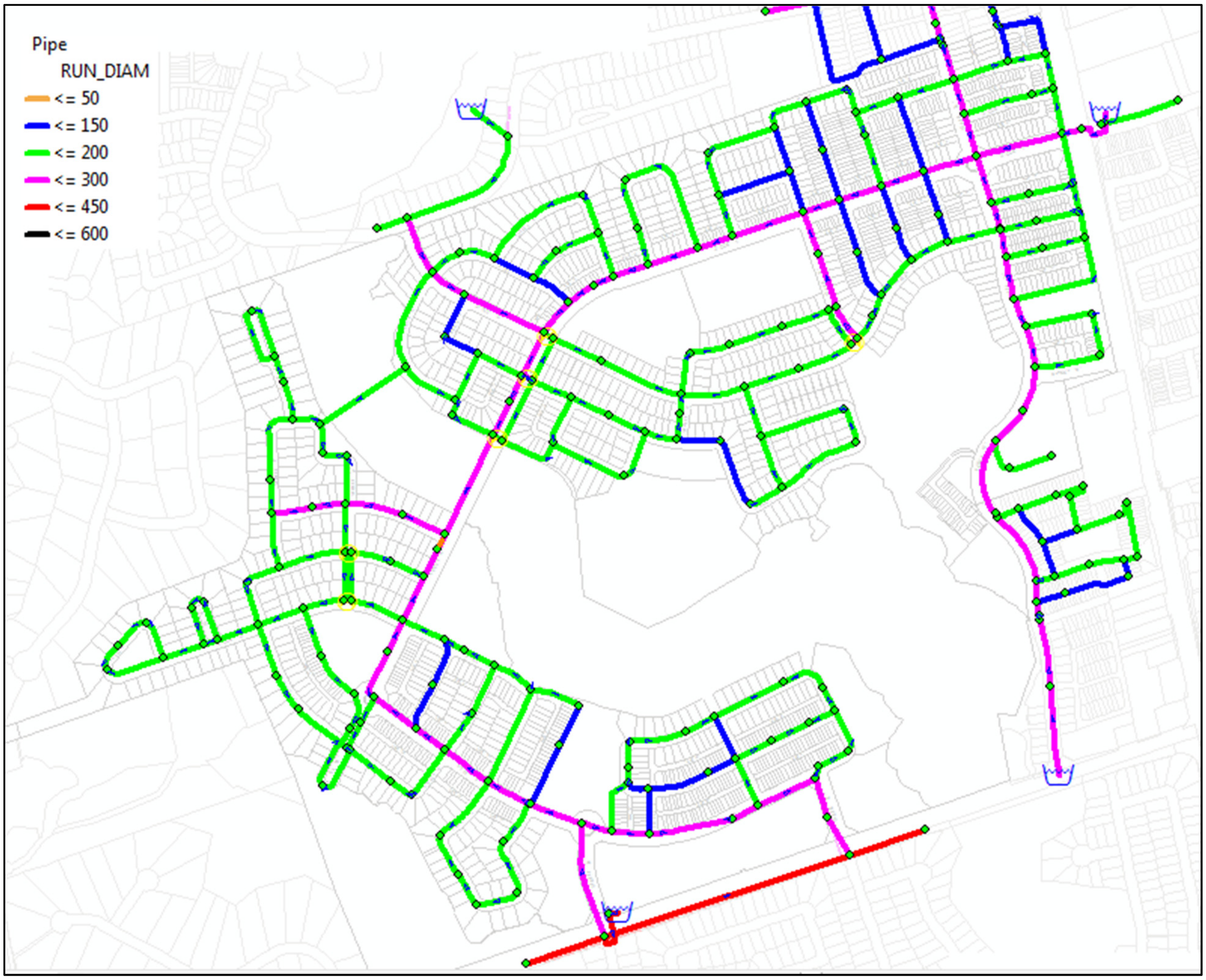


Figure A3 - Proposed System Layout – Showing the Proposed Watermain Layout and Sizes for Full Buildout.

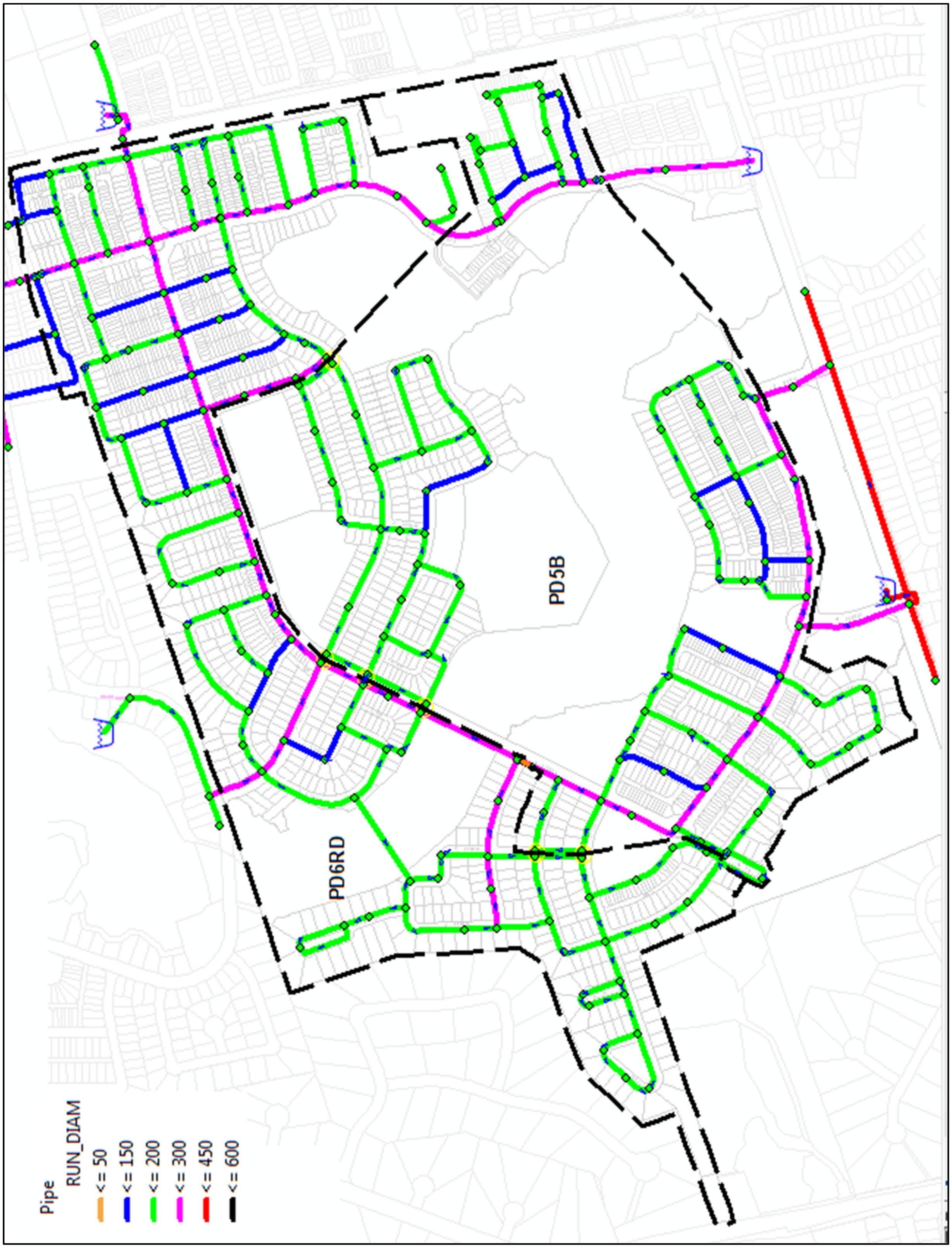


Figure A4 - Proposed System Layout – Showing the Pressure Districts in the Development.

APPENDIX

B

SIMULATED RESULTS

Phase 1 Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J716	PD6RD	0.65	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.58	193.00	254	601
WSP-J722	PD6RD	0.58	193.00	254	601
WSP-J721	PD6RD	0.58	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	592
WSP-J713	PD6RD	0.51	194.00	254	592
WSP-J717	PD6RD	0.07	194.00	254	592
WSP-J725	PD6RD	0.51	194.00	254	592
WSP-J711	PD6RD	0.07	194.50	254	587
WSP-J753	PD6RD	0.14	194.50	254	587
WSP-J754	PD6RD	0.18	194.50	254	587
WSP-J707	PD6RD	0.66	195.00	254	582
WSP-J715	PD6RD	0.58	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J846	PD6RD	0.07	195.02	254	582
WSP-J709	PD6RD	0.54	195.50	254	577
WSP-J710	PD6RD	0.25	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.19	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.39	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.33	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-15.79	0.22
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-7.00	0.10
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.02	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	-0.01	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	-0.01	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	-0.01	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	-0.01	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.01	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.01	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.01	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.01	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.01	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.01	0.00
P15140	H744	N49213	PD5B	19.65	300	155	16.85	0.24
4919949213B	N49199	H747	PD6RD	3.64	300	155	-12.73	0.18
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-12.73	0.18
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.58	0.15
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.30	0.07
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.21	0.07
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.80	0.10
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-1.29	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.00	0.06
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-0.97	0.01
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.65	0.02
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.63	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.50	0.02
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-0.48	0.02
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.44	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.44	0.01
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.41	0.02
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	-0.33	0.00
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-0.25	0.01
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.22	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.19	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.14	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.14	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.10	0.01
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.09	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.04	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.07	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.14	0.00
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	0.16	0.01
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	0.16	0.01
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.31	0.01
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.52	0.01
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.83	0.01
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	0.98	0.03
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	1.02	0.01
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	1.27	0.02
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	1.36	0.02
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	1.39	0.04
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	1.60	0.02
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.47	0.08
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	2.89	0.04
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	4.23	0.06

Phase 1 Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J716	PD6RD	0.45	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.40	193.00	254	601
WSP-J722	PD6RD	0.40	193.00	254	601
WSP-J721	PD6RD	0.40	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	592
WSP-J713	PD6RD	0.36	194.00	254	592
WSP-J717	PD6RD	0.05	194.00	254	592
WSP-J725	PD6RD	0.36	194.00	254	592
WSP-J711	PD6RD	0.05	194.50	254	587
WSP-J753	PD6RD	0.09	194.50	254	587
WSP-J754	PD6RD	0.12	194.50	254	587
WSP-J707	PD6RD	0.46	195.00	254	582
WSP-J715	PD6RD	0.40	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J846	PD6RD	0.05	195.02	254	582
WSP-J709	PD6RD	0.38	195.50	254	577
WSP-J710	PD6RD	0.18	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	575
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.13	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.28	197.00	254	562
N49198	PD6RD	8.50	197.04	254	562
WSP-J728	PD6RD	0.23	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-14.55	0.21
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-6.07	0.09
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.01	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
P15140	H744	N49213	PD5B	19.65	300	155	15.73	0.22
4919949213B	N49199	H747	PD6RD	3.64	300	155	-11.69	0.17
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-11.69	0.17
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.63	0.15
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.34	0.07
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.02	0.06
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.83	0.10
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-1.16	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-0.92	0.05
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	-0.88	0.01
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-0.70	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.70	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.51	0.02
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.45	0.01
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.38	0.02
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.30	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.30	0.01
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-0.30	0.01
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-0.15	0.00
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.14	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.13	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.11	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.10	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.10	0.00
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.08	0.00
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.04	0.00
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.04	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.01	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.05	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.10	0.00
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.21	0.01
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	0.32	0.00
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.36	0.01
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.57	0.01
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	0.70	0.02
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	0.87	0.01
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	0.95	0.01
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	0.96	0.01
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	1.15	0.04
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.40	0.08
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	2.54	0.04
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	3.19	0.05

Results: York Downs

Markham, Region of York

Revision Date: November 2017

Phase 1 Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J716	PD6RD	1.30	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	1.16	193.00	254	601
WSP-J722	PD6RD	1.16	193.00	254	601
WSP-J721	PD6RD	1.16	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	1.02	194.00	254	591
WSP-J717	PD6RD	0.14	194.00	254	591
WSP-J725	PD6RD	1.02	194.00	254	591
WSP-J711	PD6RD	0.14	194.50	254	587
WSP-J753	PD6RD	0.27	194.50	254	586
WSP-J754	PD6RD	0.35	194.50	254	587
WSP-J707	PD6RD	1.32	195.00	254	582
WSP-J715	PD6RD	1.16	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J846	PD6RD	0.14	195.02	254	581
WSP-J709	PD6RD	1.08	195.50	254	577
WSP-J710	PD6RD	0.51	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.37	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.79	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.67	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-19.30	0.27
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-10.51	0.15
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.02	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	-0.01	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	-0.01	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	-0.01	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	-0.01	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.01	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.01	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.01	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.01	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.01	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.01	0.00
P15140	H744	N49213	PD5B	19.65	300	155	20.20	0.29
4919949213B	N49199	H747	PD6RD	3.64	300	155	-15.77	0.22
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-15.77	0.22
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.89	0.09
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.40	0.14
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.13	0.07
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-1.88	0.03
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.67	0.09
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-1.64	0.05
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-1.29	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.24	0.07
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-1.07	0.03
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.94	0.03
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.94	0.03
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-0.60	0.02
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.51	0.03
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.49	0.03
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.46	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.38	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.32	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.29	0.01
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.29	0.01
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.14	0.01
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.13	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.09	0.01
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.14	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.29	0.00
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	0.63	0.02
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	0.63	0.02
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.67	0.02
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	1.04	0.01
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	1.20	0.02
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	1.71	0.02
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	1.84	0.06
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	2.37	0.08
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	2.66	0.04
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.72	0.09
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	2.79	0.04
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	2.97	0.04
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	3.55	0.05
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	4.23	0.06
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	7.27	0.10

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J738	PD5B	0.00	181.66	225	429
N51954	PD5B	4.24	183.24	225	413
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
KYP2-J6	PD5B	0.00	185.90	225	387
KYP2-J8	PD5B	0.00	186.19	225	385
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J730	PD6RD	0.00	190.00	254	630
WSP-J731	PD6RD	0.00	190.00	254	630
WSP-J716	PD6RD	2.92	192.00	254	611
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	2.60	193.00	254	601
WSP-J722	PD6RD	2.60	193.00	254	601
WSP-J721	PD6RD	2.60	193.50	254	596
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	2.29	194.00	254	591
WSP-J717	PD6RD	0.30	194.00	254	591
WSP-J725	PD6RD	2.29	194.00	254	591
WSP-J711	PD6RD	0.30	194.50	254	586
WSP-J753	PD6RD	0.61	194.50	254	586
WSP-J754	PD6RD	0.79	194.50	254	586
WSP-J707	PD6RD	2.96	195.00	254	581
WSP-J715	PD6RD	2.60	195.00	254	581
WSP-J720	PD6RD	0.00	195.00	254	581
WSP-J724	PD6RD	0.00	195.00	254	581
WSP-J846	PD6RD	0.30	195.02	254	581
WSP-J709	PD6RD	2.43	195.50	254	576
WSP-J710	PD6RD	1.14	195.50	254	576
WSP-J723	PD6RD	0.00	195.50	254	576
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.84	196.00	254	571
WSP-J727	PD6RD	0.00	196.00	254	571
H747	PD6RD	0.00	196.01	254	571
WSP-J701	PD6RD	0.00	196.12	254	570
WSP-J708	PD6RD	0.00	196.50	254	566
WSP-J705	PD6RD	1.77	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	1.50	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			182		335
Maximum			198		650

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-28.14	0.40
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-19.35	0.27
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	-0.04	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	-0.02	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	-0.02	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	-0.02	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	-0.02	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	-0.01	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	-0.01	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	-0.01	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.01	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.01	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.01	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.01	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.01	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.01	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.02	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.02	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.02	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.02	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.02	0.00
P15140	H744	N49213	PD5B	19.65	300	155	28.49	0.40
4919949213B	N49199	H747	PD6RD	3.64	300	155	-23.05	0.33
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-23.05	0.33
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-4.41	0.14
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-4.04	0.06
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-2.90	0.09
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-2.64	0.08
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-2.35	0.07
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-2.19	0.07
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-2.19	0.07
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.82	0.10
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-1.80	0.10
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	-1.48	0.05
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-1.37	0.04
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.25	0.07
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-1.15	0.07
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.85	0.03
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.74	0.04
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.64	0.02
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.64	0.02
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.36	0.02
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-0.25	0.01
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.11	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.04	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.30	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	0.61	0.02
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.64	0.01
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	1.57	0.05
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	1.67	0.05
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	1.67	0.05
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	2.33	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	3.46	0.11
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	3.91	0.06
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	4.02	0.13
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	4.66	0.07
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	4.96	0.16
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	6.10	0.09
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	6.35	0.09
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	7.31	0.10
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	7.70	0.11
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	8.32	0.12
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	14.55	0.21

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	462
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	468
WSP-J515	PD5B	0.00	180.24	224	433
WSP-J514	PD5B	0.39	180.49	224	430
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	430
WSP-J505	PD5B	0.39	180.50	224	430
WSP-J511	PD5B	0.39	180.50	224	430
WSP-J512	PD5B	0.39	180.50	224	430
WSP-J513	PD5B	0.00	180.50	224	430
WSP-J516	PD5B	0.00	180.50	224	430
WSP-J517	PD5B	0.39	180.50	224	430
WSP-J506	PD5B	0.00	181.00	224	425
WSP-J507	PD5B	0.13	181.00	224	425
WSP-J508	PD5B	0.00	181.00	224	425
WSP-J509	PD5B	0.31	181.00	224	425
WSP-J510	PD5B	0.00	181.00	224	425
WSP-J518	PD5B	0.00	181.00	224	425
WSP-J825	PD5B	0.00	181.00	224	425
WSP-J836	PD5B	0.34	181.27	224	423
WSP-J519	PD5B	0.30	181.50	224	420
WSP-J520	PD5B	0.35	181.50	224	420
WSP-J521	PD5B	0.00	181.50	224	420
WSP-J522	PD5B	0.10	181.50	224	420
WSP-J524	PD5B	0.13	181.50	224	420
WSP-J525	PD5B	0.37	181.50	224	420
WSP-J527	PD5B	0.22	181.50	224	420
WSP-J823	PD5B	0.00	181.50	224	420
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	415
WSP-J531	PD5B	0.19	182.00	224	415
WSP-J532	PD5B	0.00	182.00	224	415
WSP-J567	PD5B	0.19	182.00	224	415
WSP-J785	PD5B	0.17	182.00	228	449
WSP-J529	PD5B	0.41	182.50	224	411
WSP-J530	PD5B	0.31	182.50	224	411
WSP-J533	PD5B	0.00	182.50	224	411
WSP-J788	PD5B	0.15	182.50	228	444
WSP-J534	PD5B	0.29	183.00	224	406
WSP-J536	PD5B	0.00	183.00	224	406
WSP-J537	PD5B	0.00	183.00	224	406
WSP-J538	PD5B	0.55	183.00	224	406
WSP-J539	PD5B	0.00	183.00	224	406
WSP-J540	PD5B	0.08	183.00	224	406
WSP-J541	PD5B	0.29	183.00	224	406
WSP-J787	PD5B	0.20	183.00	228	439
WSP-J789	PD5B	0.24	183.00	228	439
WSP-J817	PD5B	0.00	183.00	224	406
WSP-J818	PD5B	0.22	183.00	224	406
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	0.24	183.50	224	401
WSP-J543	PD5B	0.00	183.50	224	401
WSP-J544	PD5B	0.00	183.50	224	401
WSP-J551	PD5B	0.10	183.50	224	401
WSP-J554	PD5B	0.25	183.50	224	401
WSP-J542	PD5B	0.00	184.00	224	396
WSP-J779	PD5B	0.19	184.00	228	429
WSP-J827	PD5B	0.00	184.00	224	396
WSP-J828	PD5B	0.10	184.00	224	396
WSP-J829	PD5B	0.00	184.00	224	396
WSP-J561	PD5B	0.00	184.50	224	391
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.07	185.00	228	419
WSP-J774	PD5B	0.24	185.00	228	419
WSP-J777	PD5B	0.35	185.00	228	419
WSP-J778	PD5B	0.29	185.00	228	419
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	383
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	379
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	0.29	186.00	228	410
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.14	186.50	228	405
WSP-J772	PD5B	0.14	186.50	228	405
WSP-J782	PD5B	0.00	186.50	228	405
WSP-J800	PD5B	0.00	186.50	228	405
WSP-J830	PD5B	0.00	186.72	228	403
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	0.27	187.00	228	400
WSP-J770	PD5B	0.32	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	400
WSP-J832	PD5B	0.29	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
WSP-J768	PD5B	0.51	188.00	228	390
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-20.44	0.29
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-11.65	0.16
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-3.70	0.05
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-3.25	0.05
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-2.26	0.03
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-1.95	0.03
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-1.94	0.03
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-1.56	0.02
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-1.44	0.05
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-1.29	0.02
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-1.02	0.03
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-0.92	0.03
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-0.76	0.02
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-0.76	0.02
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-0.75	0.02
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-0.69	0.02
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-0.68	0.02
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-0.61	0.02
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-0.61	0.02
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-0.52	0.03
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-0.51	0.02
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-0.49	0.02
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-0.40	0.01
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-0.34	0.02
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-0.34	0.01
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-0.30	0.01
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-0.29	0.01
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-0.29	0.01
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.18	0.01
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.18	0.01
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.18	0.01
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.15	0.01
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.14	0.00
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.11	0.00
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.09	0.00
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.09	0.01
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.09	0.01
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.05	0.00
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.05	0.00
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.04	0.00
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.04	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.01	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.01	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.03	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.03	0.00
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.04	0.00
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.04	0.00
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.04	0.00
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.05	0.00
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.05	0.00
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.05	0.00
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.05	0.00
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.06	0.00
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.06	0.00
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.07	0.00
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.07	0.00
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.07	0.00
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.11	0.00
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.13	0.00
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.16	0.01
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.16	0.01
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.19	0.01
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.19	0.01
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.20	0.01
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.21	0.00
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	0.23	0.01
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	0.23	0.01
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	0.28	0.01

Full Buildout Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	254	689
WSP-J826	PD6RD	0.05	184.00	254	689
WSP-J556	PD6RD	0.29	184.50	254	684
WSP-J742	PD6RD	0.00	185.00	254	679
WSP-J546	PD6RD	0.14	185.50	254	674
WSP-J552	PD6RD	0.00	185.50	254	674
WSP-J562	PD6RD	0.19	185.50	254	674
WSP-J748	PD6RD	0.00	185.50	254	675
WSP-J806	PD6RD	0.00	185.50	254	674
WSP-J548	PD6RD	0.37	186.00	254	669
WSP-J550	PD6RD	0.00	186.00	254	669
WSP-J557	PD6RD	0.00	186.00	254	669
WSP-J809	PD6RD	0.00	186.00	254	669
WSP-J816	PD6RD	0.00	186.00	254	669
WSP-J810	PD6RD	0.20	186.50	254	665
WSP-J743	PD6RD	0.19	187.00	254	660
WSP-J762	PD6RD	0.20	187.00	254	660
WSP-J764	PD6RD	0.30	187.00	254	660
WSP-J805	PD6RD	0.20	187.00	254	660
WSP-J812	PD6RD	0.14	187.00	254	660
WSP-J761	PD6RD	0.24	187.50	254	655
WSP-J547	PD6RD	0.22	188.00	254	650
WSP-J564	PD6RD	0.05	188.00	254	650
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J749	PD6RD	0.15	188.00	254	650
WSP-J766	PD6RD	0.00	188.00	254	650
WSP-J804	PD6RD	0.17	188.00	254	650
WSP-J807	PD6RD	0.02	188.00	254	650
WSP-J811	PD6RD	0.00	188.50	254	645
WSP-J852	PD6RD	0.17	188.53	254	645
WSP-J563	PD6RD	0.10	189.00	254	640
WSP-J565	PD6RD	0.12	189.00	254	640
WSP-J750	PD6RD	0.43	189.00	254	640
WSP-J763	PD6RD	0.27	189.00	254	640
WSP-J844	PD6RD	0.38	189.15	254	639
WSP-J790	PD6RD	0.00	189.50	254	635
WSP-J560	PD6RD	0.17	190.00	254	630
WSP-J577	PD6RD	0.12	190.00	254	630
WSP-J578	PD6RD	0.00	190.00	254	630
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J744	PD6RD	0.00	190.00	254	630
WSP-J745	PD6RD	0.00	190.00	254	630
WSP-J746	PD6RD	0.51	190.00	254	630
WSP-J765	PD6RD	0.39	190.00	254	630
WSP-J791	PD6RD	0.37	190.00	254	630
WSP-J794	PD6RD	0.35	190.00	254	630
WSP-J799	PD6RD	0.00	190.00	254	630
WSP-J851	PD6RD	0.00	190.16	254	629
WSP-J760	PD6RD	0.15	190.50	254	626
WSP-J847	PD6RD	0.15	190.60	254	624
WSP-J837	PD6RD	0.15	190.86	254	622
WSP-J558	PD6RD	0.14	191.00	254	620
WSP-J747	PD6RD	0.00	191.00	254	621
WSP-J752	PD6RD	0.24	191.00	254	621
WSP-J793	PD6RD	0.00	191.00	254	621
WSP-J798	PD6RD	0.00	191.00	254	621
WSP-J801	PD6RD	0.00	191.00	254	621
WSP-J802	PD6RD	0.39	191.00	254	621
WSP-J759	PD6RD	0.00	191.50	254	616
WSP-J795	PD6RD	0.37	191.50	254	616
WSP-J842	PD6RD	0.00	191.53	254	615
WSP-J566	PD6RD	0.00	192.00	254	611
WSP-J574	PD6RD	0.00	192.00	254	611
WSP-J716	PD6RD	0.65	192.00	254	611
WSP-J751	PD6RD	0.24	192.00	254	611
WSP-J792	PD6RD	0.00	192.00	254	611
WSP-J796	PD6RD	0.39	192.50	254	606
WSP-J559	PD6RD	0.00	193.00	254	601
WSP-J568	PD6RD	0.30	193.00	254	601
WSP-J569	PD6RD	0.00	193.00	254	601
WSP-J571	PD6RD	0.00	193.00	254	601
WSP-J572	PD6RD	0.19	193.00	254	601
WSP-J576	PD6RD	0.14	193.00	254	601
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.58	193.00	254	601
WSP-J722	PD6RD	0.58	193.00	254	601
WSP-J757	PD6RD	0.55	193.00	254	601
WSP-J721	PD6RD	0.58	193.50	254	596
WSP-J573	PD6RD	0.19	194.00	254	591
WSP-J575	PD6RD	0.00	194.00	254	591
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	0.51	194.00	254	591
WSP-J717	PD6RD	0.07	194.00	254	591
WSP-J725	PD6RD	0.51	194.00	254	591
WSP-J711	PD6RD	0.07	194.50	254	586
WSP-J753	PD6RD	0.14	194.50	254	586
WSP-J754	PD6RD	0.18	194.50	254	586
WSP-J758	PD6RD	0.14	194.50	254	586
WSP-J707	PD6RD	0.66	195.00	254	582
WSP-J715	PD6RD	0.58	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	0.32	0.02
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	0.32	0.00
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	0.33	0.01
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	0.33	0.01
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	0.34	0.02
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	0.36	0.01
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	0.42	0.01
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	0.44	0.02
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	0.49	0.02
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	0.55	0.01
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	0.57	0.02
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	0.57	0.02
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	0.66	0.01
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	0.68	0.02
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	0.69	0.02
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	0.71	0.02
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	0.82	0.03
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	0.86	0.03
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	0.87	0.03
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	0.87	0.01
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	0.87	0.03
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	0.92	0.03
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	0.97	0.03
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	1.38	0.04
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	1.38	0.04
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	1.41	0.04
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	2.90	0.04
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	3.84	0.05
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	4.14	0.06
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	7.39	0.10
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
P15140	H744	N49213	PD5B	19.65	300	155	21.58	0.31
4919949213B	N49199	H747	PD6RD	3.64	300	155	-17.10	0.24
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-17.10	0.24
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-6.58	0.09
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-5.42	0.08
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-4.37	0.06
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-3.49	0.05
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-3.25	0.05
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.68	0.09
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-2.42	0.08
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.37	0.13
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.19	0.07
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-2.07	0.03
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-1.91	0.06
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-1.84	0.06
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-1.81	0.06
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-1.80	0.03
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.65	0.09
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-1.60	0.02
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.35	0.08
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-1.13	0.04
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-1.13	0.04
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-1.13	0.02
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-0.99	0.03
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-0.91	0.03
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-0.85	0.03
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-0.79	0.03
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-0.75	0.02
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-0.74	0.02
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-0.71	0.02
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.65	0.02
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-0.63	0.04
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.56	0.02
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.56	0.02
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.55	0.03
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.54	0.02
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-0.47	0.01
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-0.44	0.01
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	-0.43	0.01
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-0.41	0.02
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-0.40	0.01
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-0.34	0.01
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-0.28	0.01
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-0.28	0.01
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-0.28	0.01
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-0.25	0.01
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-0.24	0.01
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.23	0.01
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-0.23	0.01
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-0.23	0.01
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.21	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.21	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.19	0.01
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.18	0.01
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.18	0.01
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.18	0.01
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.14	0.00
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.14	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.14	0.00
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.14	0.00
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.12	0.00
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.10	0.00
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.09	0.00
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.07	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.06	0.00
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.05	0.00

Full Buildout Average Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J755	PD6RD	0.42	195.00	254	581
WSP-J846	PD6RD	0.07	195.02	254	581
WSP-J854	PD6RD	0.00	195.25	254	579
WSP-J709	PD6RD	0.54	195.50	254	577
WSP-J710	PD6RD	0.25	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J756	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.19	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.39	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.33	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			176		335
Maximum			198		689

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	-0.04	0.00
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.02	0.00
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	0.00	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	0.00	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	0.01	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.03	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.03	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.04	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.07	0.00
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.07	0.00
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.07	0.00
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.11	0.00
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.12	0.00
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.14	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.14	0.00
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.16	0.01
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.18	0.01
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	0.20	0.01
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.21	0.01
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.22	0.01
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	0.23	0.01
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.24	0.01
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	0.26	0.01
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.28	0.01
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	0.30	0.01
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	0.30	0.01
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	0.34	0.01
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	0.36	0.02
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	0.38	0.01
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	0.39	0.01
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	0.41	0.01
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	0.43	0.01
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	0.44	0.01
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	0.46	0.03
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	0.47	0.01
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.52	0.01
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	0.59	0.02
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	0.59	0.02
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	0.61	0.03
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.64	0.01
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	0.79	0.03
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	0.85	0.01
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	0.85	0.03
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	0.94	0.03
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	0.94	0.01
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	0.94	0.01
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	0.95	0.01
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	0.95	0.01
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	0.96	0.03
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	1.01	0.03
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	1.06	0.03
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	1.21	0.04
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	1.40	0.04
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	1.44	0.05
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	1.53	0.05
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	1.53	0.05
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	1.53	0.05
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	1.78	0.03
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	2.06	0.03
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	2.07	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.22	0.07
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	2.26	0.03
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	2.54	0.08
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	2.76	0.04
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	2.92	0.04
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	3.05	0.04
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	3.64	0.05
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	3.70	0.05
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	3.84	0.05
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	4.33	0.06
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	4.57	0.06
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	4.89	0.07
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	5.46	0.08
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	5.55	0.08
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	5.73	0.08
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	5.92	0.08
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	8.60	0.12

Full Buildout Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	462
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	468
WSP-J515	PD5B	0.00	180.24	224	433
WSP-J514	PD5B	0.27	180.49	224	430
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	430
WSP-J505	PD5B	0.27	180.50	224	430
WSP-J511	PD5B	0.27	180.50	224	430
WSP-J512	PD5B	0.27	180.50	224	430
WSP-J513	PD5B	0.00	180.50	224	430
WSP-J516	PD5B	0.00	180.50	224	430
WSP-J517	PD5B	0.27	180.50	224	430
WSP-J506	PD5B	0.00	181.00	224	425
WSP-J507	PD5B	0.09	181.00	224	425
WSP-J508	PD5B	0.00	181.00	224	425
WSP-J509	PD5B	0.21	181.00	224	425
WSP-J510	PD5B	0.00	181.00	224	425
WSP-J518	PD5B	0.00	181.00	224	425
WSP-J825	PD5B	0.00	181.00	224	425
WSP-J836	PD5B	0.24	181.27	224	423
WSP-J519	PD5B	0.21	181.50	224	420
WSP-J520	PD5B	0.25	181.50	224	420
WSP-J521	PD5B	0.00	181.50	224	420
WSP-J522	PD5B	0.07	181.50	224	420
WSP-J524	PD5B	0.09	181.50	224	420
WSP-J525	PD5B	0.26	181.50	224	420
WSP-J527	PD5B	0.16	181.50	224	420
WSP-J823	PD5B	0.00	181.50	224	420
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	416
WSP-J531	PD5B	0.13	182.00	224	416
WSP-J532	PD5B	0.00	182.00	224	416
WSP-J567	PD5B	0.13	182.00	224	416
WSP-J785	PD5B	0.12	182.00	228	449
WSP-J529	PD5B	0.28	182.50	224	411
WSP-J530	PD5B	0.21	182.50	224	411
WSP-J533	PD5B	0.00	182.50	224	411
WSP-J788	PD5B	0.11	182.50	228	444
WSP-J534	PD5B	0.20	183.00	224	406
WSP-J536	PD5B	0.00	183.00	224	406
WSP-J537	PD5B	0.00	183.00	224	406
WSP-J538	PD5B	0.38	183.00	224	406
WSP-J539	PD5B	0.00	183.00	224	406
WSP-J540	PD5B	0.06	183.00	224	406
WSP-J541	PD5B	0.20	183.00	224	406
WSP-J787	PD5B	0.14	183.00	228	439
WSP-J789	PD5B	0.17	183.00	228	439
WSP-J817	PD5B	0.00	183.00	224	406
WSP-J818	PD5B	0.16	183.00	224	406
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	0.17	183.50	224	401
WSP-J543	PD5B	0.00	183.50	224	401
WSP-J544	PD5B	0.00	183.50	224	401
WSP-J551	PD5B	0.07	183.50	224	401
WSP-J554	PD5B	0.18	183.50	224	401
WSP-J542	PD5B	0.00	184.00	224	396
WSP-J779	PD5B	0.13	184.00	228	429
WSP-J827	PD5B	0.00	184.00	224	396
WSP-J828	PD5B	0.07	184.00	224	396
WSP-J829	PD5B	0.00	184.00	224	396
WSP-J561	PD5B	0.00	184.50	224	391
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.05	185.00	228	419
WSP-J774	PD5B	0.17	185.00	228	419
WSP-J777	PD5B	0.25	185.00	228	419
WSP-J778	PD5B	0.20	185.00	228	419
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	383
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	379
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	0.20	186.00	228	410
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.09	186.50	228	405
WSP-J772	PD5B	0.09	186.50	228	405
WSP-J782	PD5B	0.00	186.50	228	405
WSP-J800	PD5B	0.00	186.50	228	405
WSP-J830	PD5B	0.00	186.72	228	403
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	0.19	187.00	228	400
WSP-J770	PD5B	0.22	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	400
WSP-J832	PD5B	0.20	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
WSP-J768	PD5B	0.35	188.00	228	390
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-17.35	0.25
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-8.88	0.13
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-2.59	0.04
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-2.28	0.03
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-1.58	0.02
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-1.36	0.02
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-1.36	0.02
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-1.09	0.02
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-1.01	0.03
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-0.91	0.01
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-0.72	0.02
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-0.65	0.02
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-0.53	0.02
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-0.53	0.02
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-0.53	0.02
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-0.49	0.02
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-0.48	0.02
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-0.43	0.01
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-0.43	0.01
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-0.37	0.02
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-0.36	0.01
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-0.34	0.01
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-0.28	0.01
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-0.24	0.01
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-0.24	0.01
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-0.21	0.01
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-0.20	0.01
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-0.20	0.01
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.13	0.00
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.13	0.00
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.12	0.00
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.10	0.01
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.10	0.00
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.08	0.00
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.06	0.00
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.06	0.00
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.06	0.00
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.04	0.00
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.04	0.00
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.04	0.00
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.04	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.01	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.01	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.02	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.02	0.00
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.03	0.00
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.03	0.00
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.03	0.00
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.04	0.00
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.04	0.00
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.04	0.00
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.04	0.00
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.04	0.00
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.04	0.00
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.05	0.00
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.05	0.00
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.05	0.00
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.08	0.00
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.09	0.00
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.11	0.00
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.11	0.00
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.13	0.00
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.14	0.00
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.14	0.00
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.14	0.00
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	0.16	0.01
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	0.16	0.01
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	0.19	0.01

Full Buildout Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	254	689
WSP-J826	PD6RD	0.04	184.00	254	689
WSP-J556	PD6RD	0.20	184.50	254	684
WSP-J742	PD6RD	0.00	185.00	254	680
WSP-J546	PD6RD	0.09	185.50	254	675
WSP-J552	PD6RD	0.00	185.50	254	675
WSP-J562	PD6RD	0.13	185.50	254	675
WSP-J748	PD6RD	0.00	185.50	254	675
WSP-J806	PD6RD	0.00	185.50	254	675
WSP-J548	PD6RD	0.26	186.00	254	670
WSP-J550	PD6RD	0.00	186.00	254	670
WSP-J557	PD6RD	0.00	186.00	254	670
WSP-J809	PD6RD	0.00	186.00	254	670
WSP-J816	PD6RD	0.00	186.00	254	670
WSP-J810	PD6RD	0.14	186.50	254	665
WSP-J743	PD6RD	0.13	187.00	254	660
WSP-J762	PD6RD	0.14	187.00	254	660
WSP-J764	PD6RD	0.21	187.00	254	660
WSP-J805	PD6RD	0.14	187.00	254	660
WSP-J812	PD6RD	0.09	187.00	254	660
WSP-J761	PD6RD	0.17	187.50	254	655
WSP-J547	PD6RD	0.15	188.00	254	650
WSP-J564	PD6RD	0.04	188.00	254	650
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J749	PD6RD	0.11	188.00	254	650
WSP-J766	PD6RD	0.00	188.00	254	650
WSP-J804	PD6RD	0.12	188.00	254	650
WSP-J807	PD6RD	0.01	188.00	254	650
WSP-J811	PD6RD	0.00	188.50	254	645
WSP-J852	PD6RD	0.12	188.53	254	645
WSP-J563	PD6RD	0.07	189.00	254	640
WSP-J565	PD6RD	0.08	189.00	254	640
WSP-J750	PD6RD	0.30	189.00	254	640
WSP-J763	PD6RD	0.19	189.00	254	640
WSP-J844	PD6RD	0.27	189.15	254	639
WSP-J790	PD6RD	0.00	189.50	254	635
WSP-J560	PD6RD	0.12	190.00	254	631
WSP-J577	PD6RD	0.08	190.00	254	631
WSP-J578	PD6RD	0.00	190.00	254	631
WSP-J730	PD6RD	0.00	190.00	254	631
WSP-J731	PD6RD	0.00	190.00	254	631
WSP-J744	PD6RD	0.00	190.00	254	631
WSP-J745	PD6RD	0.00	190.00	254	631
WSP-J746	PD6RD	0.36	190.00	254	631
WSP-J765	PD6RD	0.28	190.00	254	631
WSP-J791	PD6RD	0.26	190.00	254	631
WSP-J794	PD6RD	0.25	190.00	254	631
WSP-J799	PD6RD	0.00	190.00	254	631
WSP-J851	PD6RD	0.00	190.16	254	629
WSP-J760	PD6RD	0.11	190.50	254	626
WSP-J847	PD6RD	0.11	190.60	254	625
WSP-J837	PD6RD	0.11	190.86	254	622
WSP-J558	PD6RD	0.09	191.00	254	621
WSP-J747	PD6RD	0.00	191.00	254	621
WSP-J752	PD6RD	0.17	191.00	254	621
WSP-J793	PD6RD	0.00	191.00	254	621
WSP-J798	PD6RD	0.00	191.00	254	621
WSP-J801	PD6RD	0.00	191.00	254	621
WSP-J802	PD6RD	0.27	191.00	254	621
WSP-J759	PD6RD	0.00	191.50	254	616
WSP-J795	PD6RD	0.26	191.50	254	616
WSP-J842	PD6RD	0.00	191.53	254	616
WSP-J566	PD6RD	0.00	192.00	254	611
WSP-J574	PD6RD	0.00	192.00	254	611
WSP-J716	PD6RD	0.45	192.00	254	611
WSP-J751	PD6RD	0.17	192.00	254	611
WSP-J792	PD6RD	0.00	192.00	254	611
WSP-J796	PD6RD	0.27	192.50	254	606
WSP-J559	PD6RD	0.00	193.00	254	601
WSP-J568	PD6RD	0.21	193.00	254	601
WSP-J569	PD6RD	0.00	193.00	254	601
WSP-J571	PD6RD	0.00	193.00	254	601
WSP-J572	PD6RD	0.13	193.00	254	601
WSP-J576	PD6RD	0.09	193.00	254	601
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	0.40	193.00	254	601
WSP-J722	PD6RD	0.40	193.00	254	601
WSP-J757	PD6RD	0.38	193.00	254	601
WSP-J721	PD6RD	0.40	193.50	254	596
WSP-J573	PD6RD	0.13	194.00	254	591
WSP-J575	PD6RD	0.00	194.00	254	591
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	0.36	194.00	254	592
WSP-J717	PD6RD	0.05	194.00	254	591
WSP-J725	PD6RD	0.36	194.00	254	591
WSP-J711	PD6RD	0.05	194.50	254	587
WSP-J753	PD6RD	0.09	194.50	254	587
WSP-J754	PD6RD	0.12	194.50	254	587
WSP-J758	PD6RD	0.09	194.50	254	587
WSP-J707	PD6RD	0.46	195.00	254	582
WSP-J715	PD6RD	0.40	195.00	254	582
WSP-J720	PD6RD	0.00	195.00	254	582

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	0.22	0.01
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	0.23	0.00
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	0.23	0.01
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	0.23	0.01
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	0.24	0.01
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	0.25	0.01
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	0.30	0.01
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	0.31	0.02
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	0.34	0.01
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	0.38	0.01
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	0.40	0.01
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	0.40	0.01
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	0.46	0.01
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	0.48	0.02
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	0.49	0.02
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	0.50	0.02
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	0.57	0.02
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	0.60	0.02
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	0.61	0.02
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	0.61	0.01
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	0.61	0.02
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	0.65	0.02
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	0.68	0.02
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	0.96	0.03
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	0.96	0.03
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	0.99	0.03
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	2.03	0.03
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	2.69	0.04
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	2.90	0.04
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	5.17	0.07
P15140	H744	N49213	PD5B	19.65	300	155	18.65	0.26
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
4919949213B	N49199	H747	PD6RD	3.64	300	155	-14.43	0.20
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-14.43	0.20
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-4.15	0.06
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-3.26	0.05
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-2.52	0.04
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-2.52	0.14
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-2.31	0.07
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-2.29	0.07
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-1.92	0.03
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.76	0.10
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-1.72	0.02
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-1.45	0.05
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-1.43	0.02
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-1.22	0.02
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-1.21	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.14	0.06
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-1.13	0.04
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-1.09	0.03
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-1.08	0.02
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	-0.85	0.03
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-0.71	0.02
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-0.65	0.02
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-0.65	0.02
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-0.65	0.01
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-0.64	0.02
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	-0.61	0.02
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-0.60	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.55	0.02
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-0.55	0.02
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.47	0.03
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-0.46	0.03
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-0.45	0.01
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.44	0.01
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.44	0.01
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-0.41	0.01
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-0.39	0.01
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	-0.39	0.01
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-0.35	0.01
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-0.29	0.01
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-0.26	0.01
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-0.21	0.01
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-0.20	0.01
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-0.20	0.01
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	-0.20	0.01
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-0.17	0.01
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-0.17	0.01
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-0.17	0.01
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.15	0.01
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.14	0.01
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.14	0.00
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.14	0.00
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.13	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.13	0.00
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.12	0.01
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.10	0.00
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.10	0.00
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.10	0.00
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.10	0.00
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.08	0.00
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.07	0.00
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-0.06	0.00
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.06	0.00
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-0.06	0.00
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-0.06	0.00
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	-0.05	0.00

Full Buildout Minimum Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J724	PD6RD	0.00	195.00	254	582
WSP-J755	PD6RD	0.29	195.00	254	582
WSP-J846	PD6RD	0.05	195.02	254	581
WSP-J854	PD6RD	0.00	195.25	254	579
WSP-J709	PD6RD	0.38	195.50	254	577
WSP-J710	PD6RD	0.18	195.50	254	577
WSP-J723	PD6RD	0.00	195.50	254	577
WSP-J756	PD6RD	0.00	195.50	254	577
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.13	196.00	254	572
WSP-J727	PD6RD	0.00	196.00	254	572
H747	PD6RD	0.00	196.01	254	572
WSP-J701	PD6RD	0.00	196.12	254	571
WSP-J708	PD6RD	0.00	196.50	254	567
WSP-J705	PD6RD	0.28	197.00	254	562
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.23	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			176		335
Maximum			198		689

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.05	0.00
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.02	0.00
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.01	0.00
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	0.00	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	0.00	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.02	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.02	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.05	0.00
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.05	0.00
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.05	0.00
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	0.06	0.00
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.07	0.00
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.08	0.00
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.10	0.00
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.11	0.00
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	0.11	0.01
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.13	0.00
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	0.14	0.01
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.15	0.00
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.15	0.00
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	0.17	0.01
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.20	0.01
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.21	0.01
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	0.21	0.01
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	0.21	0.01
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	0.24	0.01
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	0.24	0.01
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	0.25	0.01
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.25	0.01
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	0.26	0.01
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	0.26	0.01
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	0.28	0.01
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	0.31	0.01
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	0.35	0.01
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	0.36	0.01
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	0.38	0.01
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	0.41	0.01
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	0.42	0.01
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	0.44	0.01
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	0.45	0.03
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	0.49	0.02
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	0.52	0.01
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	0.52	0.01
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	0.55	0.02
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	0.57	0.01
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	0.58	0.02
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	0.60	0.02
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	0.61	0.02
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	0.66	0.01
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	0.66	0.01
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	0.70	0.02
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	0.74	0.02
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	0.92	0.03
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	0.93	0.03
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	0.93	0.03
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	1.00	0.03
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	1.08	0.03
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	1.16	0.02
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	1.23	0.02
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	1.39	0.02
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	1.43	0.02
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	1.78	0.03
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	1.84	0.06
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	1.87	0.03
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	1.99	0.03
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	2.06	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.24	0.07
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	2.31	0.03
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	2.37	0.03
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	2.58	0.04
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	2.69	0.04
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	2.78	0.04
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	2.99	0.04
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	3.50	0.05
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	3.79	0.05
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	4.38	0.06
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	5.93	0.08

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	461
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	468
WSP-J515	PD5B	0.00	180.24	224	432
WSP-J514	PD5B	0.77	180.49	224	430
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	430
WSP-J505	PD5B	0.77	180.50	224	430
WSP-J511	PD5B	0.77	180.50	224	430
WSP-J512	PD5B	0.77	180.50	224	430
WSP-J513	PD5B	0.00	180.50	224	430
WSP-J516	PD5B	0.00	180.50	224	430
WSP-J517	PD5B	0.78	180.50	224	430
WSP-J506	PD5B	0.00	181.00	224	425
WSP-J507	PD5B	0.26	181.00	224	425
WSP-J508	PD5B	0.00	181.00	224	425
WSP-J509	PD5B	0.61	181.00	224	425
WSP-J510	PD5B	0.00	181.00	224	425
WSP-J518	PD5B	0.00	181.00	224	425
WSP-J825	PD5B	0.00	181.00	224	425
WSP-J836	PD5B	0.68	181.27	224	422
WSP-J519	PD5B	0.61	181.50	224	420
WSP-J520	PD5B	0.71	181.50	224	420
WSP-J521	PD5B	0.00	181.50	224	420
WSP-J522	PD5B	0.20	181.50	224	420
WSP-J524	PD5B	0.26	181.50	224	420
WSP-J525	PD5B	0.74	181.50	224	420
WSP-J527	PD5B	0.45	181.50	224	420
WSP-J823	PD5B	0.00	181.50	224	420
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	415
WSP-J531	PD5B	0.37	182.00	224	415
WSP-J532	PD5B	0.00	182.00	224	415
WSP-J567	PD5B	0.37	182.00	224	415
WSP-J785	PD5B	0.34	182.00	228	449
WSP-J529	PD5B	0.81	182.50	224	410
WSP-J530	PD5B	0.61	182.50	224	410
WSP-J533	PD5B	0.00	182.50	224	410
WSP-J788	PD5B	0.30	182.50	228	444
WSP-J534	PD5B	0.57	183.00	224	405
WSP-J536	PD5B	0.00	183.00	224	405
WSP-J537	PD5B	0.00	183.00	224	405
WSP-J538	PD5B	1.09	183.00	224	405
WSP-J539	PD5B	0.00	183.00	224	405
WSP-J540	PD5B	0.17	183.00	224	405
WSP-J541	PD5B	0.57	183.00	224	405
WSP-J787	PD5B	0.41	183.00	228	439
WSP-J789	PD5B	0.47	183.00	228	439
WSP-J817	PD5B	0.00	183.00	224	405
WSP-J818	PD5B	0.45	183.00	224	405
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	0.47	183.50	224	400
WSP-J543	PD5B	0.00	183.50	224	400
WSP-J544	PD5B	0.00	183.50	224	400
WSP-J551	PD5B	0.20	183.50	224	400
WSP-J554	PD5B	0.51	183.50	224	400
WSP-J542	PD5B	0.00	184.00	224	395
WSP-J779	PD5B	0.37	184.00	228	429
WSP-J827	PD5B	0.00	184.00	224	395
WSP-J828	PD5B	0.20	184.00	224	395
WSP-J829	PD5B	0.00	184.00	224	395
WSP-J561	PD5B	0.00	184.50	224	390
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.14	185.00	228	419
WSP-J774	PD5B	0.47	185.00	228	419
WSP-J777	PD5B	0.71	185.00	228	419
WSP-J778	PD5B	0.57	185.00	228	419
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	382
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	379
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	0.57	186.00	228	409
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.27	186.50	228	405
WSP-J772	PD5B	0.27	186.50	228	405
WSP-J782	PD5B	0.00	186.50	228	405
WSP-J800	PD5B	0.00	186.50	228	405
WSP-J830	PD5B	0.00	186.72	228	402
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	0.54	187.00	228	400
WSP-J770	PD5B	0.64	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	400
WSP-J832	PD5B	0.57	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369
WSP-J768	PD5B	1.01	188.00	228	390
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-29.82	0.42
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-21.03	0.30
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-7.40	0.10
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-6.50	0.09
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-4.53	0.06
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-3.89	0.06
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-3.89	0.05
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-3.12	0.04
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-2.89	0.09
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-2.59	0.04
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-2.04	0.07
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-1.84	0.06
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-1.52	0.05
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-1.52	0.05
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-1.50	0.05
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-1.39	0.04
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-1.37	0.04
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-1.22	0.04
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-1.22	0.04
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-1.05	0.06
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-1.02	0.03
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-0.98	0.03
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-0.79	0.03
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-0.68	0.04
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-0.68	0.02
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-0.61	0.02
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-0.58	0.02
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-0.58	0.02
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.36	0.01
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.36	0.01
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.35	0.01
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.30	0.02
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.28	0.01
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.22	0.01
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.18	0.01
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.18	0.01
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.18	0.01
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.10	0.00
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.10	0.00
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.09	0.00
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.09	0.00
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.02	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.02	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.06	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.07	0.00
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.08	0.00
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.09	0.00
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.09	0.00
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.09	0.00
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.10	0.00
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.10	0.00
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.10	0.00
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.11	0.00
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.12	0.00
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.14	0.00
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.14	0.01
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.14	0.00
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.22	0.01
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.27	0.01
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.32	0.01
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.32	0.01
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.38	0.01
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.39	0.01
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.40	0.01
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.41	0.01
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	0.46	0.01
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	0.46	0.01
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	0.56	0.02

Results: York Downs

Markham, Region of York

Revision Date: November 2017

Full Buildout Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	254	688
WSP-J826	PD6RD	0.10	184.00	254	687
WSP-J556	PD6RD	0.57	184.50	254	683
WSP-J742	PD6RD	0.00	185.00	254	679
WSP-J546	PD6RD	0.27	185.50	254	673
WSP-J552	PD6RD	0.00	185.50	254	673
WSP-J562	PD6RD	0.37	185.50	254	673
WSP-J748	PD6RD	0.00	185.50	254	674
WSP-J806	PD6RD	0.00	185.50	254	673
WSP-J548	PD6RD	0.74	186.00	254	668
WSP-J550	PD6RD	0.00	186.00	254	668
WSP-J557	PD6RD	0.00	186.00	254	668
WSP-J809	PD6RD	0.00	186.00	254	668
WSP-J816	PD6RD	0.00	186.00	254	668
WSP-J810	PD6RD	0.41	186.50	254	663
WSP-J743	PD6RD	0.37	187.00	254	659
WSP-J762	PD6RD	0.41	187.00	254	659
WSP-J764	PD6RD	0.61	187.00	254	659
WSP-J805	PD6RD	0.41	187.00	254	658
WSP-J812	PD6RD	0.27	187.00	254	658
WSP-J761	PD6RD	0.47	187.50	254	654
WSP-J547	PD6RD	0.44	188.00	254	648
WSP-J564	PD6RD	0.10	188.00	254	648
WSP-J732	PD6RD	0.00	188.00	254	650
WSP-J733	PD6RD	0.00	188.00	254	650
WSP-J749	PD6RD	0.30	188.00	254	649
WSP-J766	PD6RD	0.00	188.00	254	649
WSP-J804	PD6RD	0.34	188.00	254	649
WSP-J807	PD6RD	0.03	188.00	254	649
WSP-J811	PD6RD	0.00	188.50	254	644
WSP-J852	PD6RD	0.34	188.53	254	643
WSP-J563	PD6RD	0.20	189.00	254	638
WSP-J565	PD6RD	0.24	189.00	254	639
WSP-J750	PD6RD	0.87	189.00	254	639
WSP-J763	PD6RD	0.54	189.00	254	639
WSP-J844	PD6RD	0.76	189.15	254	638
WSP-J790	PD6RD	0.00	189.50	254	634
WSP-J560	PD6RD	0.34	190.00	254	629
WSP-J577	PD6RD	0.24	190.00	254	629
WSP-J578	PD6RD	0.00	190.00	254	629
WSP-J730	PD6RD	0.00	190.00	254	630
WSP-J731	PD6RD	0.00	190.00	254	630
WSP-J744	PD6RD	0.00	190.00	254	630
WSP-J745	PD6RD	0.00	190.00	254	630
WSP-J746	PD6RD	1.03	190.00	254	630
WSP-J765	PD6RD	0.79	190.00	254	629
WSP-J791	PD6RD	0.74	190.00	254	629
WSP-J794	PD6RD	0.71	190.00	254	629
WSP-J799	PD6RD	0.00	190.00	254	629
WSP-J851	PD6RD	0.00	190.16	254	627
WSP-J760	PD6RD	0.30	190.50	254	625
WSP-J847	PD6RD	0.30	190.60	254	623
WSP-J837	PD6RD	0.30	190.86	254	620
WSP-J558	PD6RD	0.27	191.00	254	619
WSP-J747	PD6RD	0.00	191.00	254	620
WSP-J752	PD6RD	0.48	191.00	254	620
WSP-J793	PD6RD	0.00	191.00	254	619
WSP-J798	PD6RD	0.00	191.00	254	619
WSP-J801	PD6RD	0.00	191.00	254	619
WSP-J802	PD6RD	0.77	191.00	254	619
WSP-J759	PD6RD	0.00	191.50	254	615
WSP-J795	PD6RD	0.74	191.50	254	614
WSP-J842	PD6RD	0.00	191.53	254	614
WSP-J566	PD6RD	0.00	192.00	254	609
WSP-J574	PD6RD	0.00	192.00	254	609
WSP-J716	PD6RD	1.30	192.00	254	610
WSP-J751	PD6RD	0.47	192.00	254	610
WSP-J792	PD6RD	0.00	192.00	254	609
WSP-J796	PD6RD	0.78	192.50	254	605
WSP-J559	PD6RD	0.00	193.00	254	599
WSP-J568	PD6RD	0.61	193.00	254	599
WSP-J569	PD6RD	0.00	193.00	254	599
WSP-J571	PD6RD	0.00	193.00	254	599
WSP-J572	PD6RD	0.37	193.00	254	599
WSP-J576	PD6RD	0.27	193.00	254	599
WSP-J718	PD6RD	0.00	193.00	254	601
WSP-J719	PD6RD	1.16	193.00	254	601
WSP-J722	PD6RD	1.16	193.00	254	601
WSP-J757	PD6RD	1.09	193.00	254	600
WSP-J721	PD6RD	1.16	193.50	254	596
WSP-J573	PD6RD	0.37	194.00	254	589
WSP-J575	PD6RD	0.00	194.00	254	589
WSP-J712	PD6RD	0.00	194.00	254	591
WSP-J713	PD6RD	1.02	194.00	254	591
WSP-J717	PD6RD	0.14	194.00	254	591
WSP-J725	PD6RD	1.02	194.00	254	591
WSP-J711	PD6RD	0.14	194.50	254	586
WSP-J753	PD6RD	0.27	194.50	254	586
WSP-J754	PD6RD	0.35	194.50	254	586
WSP-J758	PD6RD	0.27	194.50	254	585
WSP-J707	PD6RD	1.32	195.00	254	581
WSP-J715	PD6RD	1.16	195.00	254	581
WSP-J720	PD6RD	0.00	195.00	254	581

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	0.64	0.04
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	0.65	0.01
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	0.67	0.02
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	0.67	0.02
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	0.67	0.04
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	0.73	0.02
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	0.85	0.03
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	0.88	0.05
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	0.98	0.03
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	1.10	0.02
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	1.14	0.04
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	1.14	0.04
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	1.32	0.02
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	1.37	0.04
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	1.39	0.04
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	1.42	0.05
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	1.64	0.05
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	1.72	0.05
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	1.74	0.06
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	1.75	0.02
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	1.75	0.06
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	1.84	0.06
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	1.95	0.06
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	2.75	0.09
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	2.75	0.09
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	2.82	0.09
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	5.81	0.08
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	7.67	0.11
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	8.27	0.12
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	14.77	0.21
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
P15140	H744	N49213	PD5B	19.65	300	155	30.63	0.43
4919949213B	N49199	H747	PD6RD	3.64	300	155	-25.11	0.36
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-25.11	0.36
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-14.36	0.20
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-12.26	0.17
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-10.16	0.14
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-8.14	0.12
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-7.97	0.11
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-5.50	0.17
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-4.17	0.13
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-4.16	0.06
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-4.10	0.13
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-4.07	0.13
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-4.03	0.13
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-3.68	0.05
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-3.28	0.05
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-2.62	0.08
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-2.62	0.08
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-2.62	0.04
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-1.98	0.11
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-1.96	0.06
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-1.83	0.06
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-1.80	0.06
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-1.78	0.06
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	-1.76	0.10
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-1.70	0.05
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-1.57	0.05
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	-1.52	0.05
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-1.29	0.04
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	-1.22	0.07
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-1.22	0.07
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-1.22	0.04
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-1.17	0.04
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-0.98	0.03
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-0.98	0.03
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-0.91	0.05
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-0.88	0.03
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-0.81	0.05
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-0.79	0.03
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-0.77	0.02
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-0.66	0.02
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-0.64	0.02
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-0.56	0.02
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-0.55	0.02
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-0.52	0.03
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-0.49	0.02
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	-0.47	0.03
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-0.45	0.01
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-0.45	0.01
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-0.45	0.01
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.38	0.01
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.36	0.02
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.35	0.02
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.32	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	-0.29	0.01
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.29	0.01
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.29	0.01
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.29	0.01
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.28	0.01
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.24	0.01
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.19	0.01
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.18	0.01
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.17	0.01
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	-0.17	0.01
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.13	0.01
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.04	0.00

Results: York Downs

Markham, Region of York

Revision Date: November 2017

Full Buildout Maximum Day

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J724	PD6RD	0.00	195.00	254	581
WSP-J755	PD6RD	0.83	195.00	254	581
WSP-J846	PD6RD	0.14	195.02	254	581
WSP-J854	PD6RD	0.00	195.25	254	578
WSP-J709	PD6RD	1.08	195.50	254	576
WSP-J710	PD6RD	0.51	195.50	254	576
WSP-J723	PD6RD	0.00	195.50	254	576
WSP-J756	PD6RD	0.00	195.50	254	576
WSP-J845	PD6RD	0.00	195.74	254	574
N49199	PD6RD	8.50	195.96	254	572
WSP-J704	PD6RD	0.00	196.00	254	572
WSP-J726	PD6RD	0.37	196.00	254	571
WSP-J727	PD6RD	0.00	196.00	254	571
H747	PD6RD	0.00	196.01	254	571
WSP-J701	PD6RD	0.00	196.12	254	570
WSP-J708	PD6RD	0.00	196.50	254	566
WSP-J705	PD6RD	0.79	197.00	254	561
N49198	PD6RD	8.50	197.04	254	561
WSP-J728	PD6RD	0.67	198.00	254	552
WSP-J815	PD6RD	0.00	198.00	254	552

Minimum			176		335
Maximum			198		688

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	-0.01	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	-0.01	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.06	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.06	0.00
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	0.12	0.00
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.14	0.00
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.14	0.00
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.14	0.00
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	0.17	0.01
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.17	0.01
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.17	0.01
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.23	0.01
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.24	0.01
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.26	0.01
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.29	0.00
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.30	0.01
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.32	0.01
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.35	0.01
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.43	0.01
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.45	0.01
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	0.47	0.02
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	0.48	0.03
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	0.54	0.03
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	0.61	0.02
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	0.61	0.02
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	0.64	0.02
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	0.67	0.02
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	0.74	0.04
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	0.76	0.02
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	0.81	0.03
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	0.84	0.03
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	0.88	0.03
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	0.88	0.03
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	1.04	0.01
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	1.08	0.06
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	1.17	0.04
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	1.18	0.04
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	1.18	0.07
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	1.30	0.02
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	1.44	0.05
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	1.57	0.05
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	1.70	0.05
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	1.75	0.02
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	1.91	0.03
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	1.91	0.03
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	2.12	0.07
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	2.25	0.03
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	2.25	0.03
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.25	0.07
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	2.34	0.07
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	2.41	0.08
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	2.60	0.08
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	2.74	0.09
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	2.75	0.09
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	2.82	0.09
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	3.13	0.04
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	3.43	0.11
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	3.43	0.11
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	3.47	0.11
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	3.58	0.05
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	4.16	0.06
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	4.89	0.16
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	5.06	0.07
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	5.08	0.07
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	5.93	0.08
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	7.67	0.11
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	8.34	0.12
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	8.36	0.12
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	8.74	0.12
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	10.58	0.15
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	11.09	0.16
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	11.28	0.16
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	11.34	0.16
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	11.50	0.16
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	12.78	0.18
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	13.12	0.19
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	16.61	0.24

Full Buildout Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
M32165	PD5B	0.00	176.14	224	473
M32130	PD5B	0.00	177.29	224	461
N52100	PD5B	0.00	178.08	224	454
N04521	PD5B	21.19	178.13	224	453
WSP-J502	PD5B	0.00	180.00	224	435
WSP-J786	PD5B	0.00	180.00	228	467
WSP-J515	PD5B	0.00	180.24	224	430
WSP-J514	PD5B	1.73	180.49	224	428
WSP-J503	PD5B	0.00	180.50	224	430
WSP-J504	PD5B	0.00	180.50	224	428
WSP-J505	PD5B	1.73	180.50	224	428
WSP-J511	PD5B	1.73	180.50	224	428
WSP-J512	PD5B	1.73	180.50	224	428
WSP-J513	PD5B	0.00	180.50	224	428
WSP-J516	PD5B	0.00	180.50	224	428
WSP-J517	PD5B	1.75	180.50	224	428
WSP-J506	PD5B	0.00	181.00	224	423
WSP-J507	PD5B	0.58	181.00	224	423
WSP-J508	PD5B	0.00	181.00	224	423
WSP-J509	PD5B	1.37	181.00	224	423
WSP-J510	PD5B	0.00	181.00	224	423
WSP-J518	PD5B	0.00	181.00	224	423
WSP-J825	PD5B	0.00	181.00	224	423
WSP-J836	PD5B	1.52	181.27	224	420
WSP-J519	PD5B	1.37	181.50	224	418
WSP-J520	PD5B	1.59	181.50	224	418
WSP-J521	PD5B	0.00	181.50	224	418
WSP-J522	PD5B	0.46	181.50	224	418
WSP-J524	PD5B	0.58	181.50	224	418
WSP-J525	PD5B	1.66	181.50	224	418
WSP-J527	PD5B	1.01	181.50	224	418
WSP-J823	PD5B	0.00	181.50	224	418
WSP-J738	PD5B	0.00	181.66	225	429
WSP-J528	PD5B	0.00	182.00	224	413
WSP-J531	PD5B	0.84	182.00	224	413
WSP-J532	PD5B	0.00	182.00	224	413
WSP-J567	PD5B	0.84	182.00	224	413
WSP-J785	PD5B	0.76	182.00	228	448
WSP-J529	PD5B	1.82	182.50	224	408
WSP-J530	PD5B	1.37	182.50	224	408
WSP-J533	PD5B	0.00	182.50	224	408
WSP-J788	PD5B	0.68	182.50	228	443
WSP-J534	PD5B	1.29	183.00	224	403
WSP-J536	PD5B	0.00	183.00	224	403
WSP-J537	PD5B	0.00	183.00	224	403
WSP-J538	PD5B	2.46	183.00	224	403
WSP-J539	PD5B	0.00	183.00	224	403
WSP-J540	PD5B	0.38	183.00	224	403
WSP-J541	PD5B	1.29	183.00	224	403
WSP-J787	PD5B	0.91	183.00	228	438
WSP-J789	PD5B	1.06	183.00	228	438
WSP-J817	PD5B	0.00	183.00	224	403
WSP-J818	PD5B	1.01	183.00	224	403
N51954	PD5B	4.24	183.24	225	413
WSP-J535	PD5B	1.06	183.50	224	398
WSP-J543	PD5B	0.00	183.50	224	398
WSP-J544	PD5B	0.00	183.50	224	398
WSP-J551	PD5B	0.46	183.50	224	398
WSP-J554	PD5B	1.14	183.50	224	398
WSP-J542	PD5B	0.00	184.00	224	393
WSP-J779	PD5B	0.84	184.00	228	428
WSP-J827	PD5B	0.00	184.00	224	393
WSP-J828	PD5B	0.46	184.00	224	393
WSP-J829	PD5B	0.00	184.00	224	393
WSP-J561	PD5B	0.00	184.50	224	388
KYP2-J2	PD5B	0.00	184.62	225	400
WSP-J857	PD5B	0.00	184.72	225	399
KYP2-J16	PD5B	0.00	184.86	225	398
WSP-J741	PD5B	0.30	185.00	228	418
WSP-J774	PD5B	1.06	185.00	228	418
WSP-J777	PD5B	1.60	185.00	228	418
WSP-J778	PD5B	1.29	185.00	228	418
WSP-J803	PD5B	0.00	185.00	228	419
WSP-J831	PD5B	0.00	185.00	228	419
WSP-J833	PD5B	0.00	185.35	224	380
KYP2-J1	PD5B	0.00	185.50	225	391
KYP2-J7	PD5B	0.00	185.50	225	391
KYP2-J21	PD5B	0.00	185.58	225	391
WSP-J834	PD5B	0.00	185.71	224	377
KYP2-J6	PD5B	0.00	185.90	225	387
WSP-J773	PD5B	1.29	186.00	228	409
WSP-J860	PD5B	0.00	186.02	228	409
KYP2-J8	PD5B	0.00	186.19	225	385
WSP-J771	PD5B	0.61	186.50	228	405
WSP-J772	PD5B	0.61	186.50	228	404
WSP-J782	PD5B	0.00	186.50	228	404
WSP-J800	PD5B	0.00	186.50	228	404
WSP-J830	PD5B	0.00	186.72	228	402
KYP2-J17	PD5B	0.00	186.76	225	379
KYP2-J18	PD5B	0.00	186.97	225	377
WSP-J769	PD5B	1.22	187.00	228	399
WSP-J770	PD5B	1.44	187.00	228	400
WSP-J781	PD5B	0.00	187.00	228	399
WSP-J832	PD5B	1.29	187.00	228	400
KYP2-J12	PD5B	0.00	187.69	225	370
KYP2-J19	PD5B	0.00	187.73	225	369

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P916	N49493	WSP-J714	PD5B	65.09	300	120	-52.38	0.74
WSP-P854	WSP-J713	N49493	PD5B	32.15	300	120	-43.59	0.62
WSP-P876	WSP-J527	WSP-J823	PD5B	3.93	300	120	-16.64	0.24
WSP-P507	WSP-J507	WSP-J508	PD5B	50.17	300	120	-14.63	0.21
WSP-P506	WSP-J506	WSP-J507	PD5B	63.54	300	120	-10.19	0.14
WSP-P548	WSP-J539	WSP-J530	PD5B	87.62	300	120	-8.76	0.12
WSP-P505	WSP-J505	WSP-J506	PD5B	141.17	300	120	-8.74	0.12
WSP-P504	WSP-J504	WSP-J505	PD5B	48.58	300	120	-7.01	0.10
WSP-P788	WSP-J831	WSP-J800	PD5B	55.62	200	110	-6.50	0.21
WSP-P549	WSP-J538	WSP-J539	PD5B	61.22	300	120	-5.82	0.08
WSP-P789	WSP-J769	WSP-J770	PD5B	69.74	200	110	-4.60	0.15
WSP-P806	WSP-J781	WSP-J782	PD5B	31.78	200	110	-4.15	0.13
WSP-P795	WSP-J771	WSP-J860	PD5B	110.08	200	110	-3.42	0.11
WSP-P891	WSP-J860	WSP-J832	PD5B	111.37	200	110	-3.42	0.11
WSP-P832	WSP-J800	WSP-J769	PD5B	65.81	200	110	-3.38	0.11
WSP-P804	WSP-J800	WSP-J803	PD5B	83.53	200	110	-3.12	0.10
WSP-P800	WSP-J773	WSP-J772	PD5B	66.15	200	110	-3.08	0.10
WSP-P524	WSP-J519	WSP-J521	PD5B	96.61	200	110	-2.73	0.09
WSP-P525	WSP-J521	WSP-J522	PD5B	44.03	200	110	-2.73	0.09
WSP-P792	WSP-J779	WSP-J831	PD5B	72.79	150	100	-2.35	0.13
WSP-P536	WSP-J529	WSP-J530	PD5B	170.96	200	110	-2.30	0.07
WSP-P517	WSP-J512	WSP-J515	PD5B	76.64	200	110	-2.20	0.07
WSP-P793	WSP-J774	WSP-J773	PD5B	94.26	200	110	-1.78	0.06
WSP-P528	WSP-J520	WSP-J524	PD5B	104.57	150	100	-1.54	0.09
WSP-P520	WSP-J517	WSP-J518	PD5B	129.24	200	110	-1.52	0.05
WSP-P521	WSP-J518	WSP-J519	PD5B	54.52	200	110	-1.37	0.04
WSP-P920	WSP-J534	WSP-J537	PD5B	89.30	200	110	-1.31	0.04
WSP-P921	WSP-J537	WSP-J539	PD5B	76.07	200	110	-1.31	0.04
WSP-P543	WSP-J536	WSP-J534	PD5B	54.93	200	110	-0.80	0.03
WSP-P546	WSP-J535	WSP-J536	PD5B	37.51	200	110	-0.80	0.03
WSP-P542	WSP-J534	WSP-J529	PD5B	72.52	200	110	-0.79	0.03
WSP-P529	WSP-J524	WSP-J825	PD5B	36.42	150	100	-0.67	0.04
WSP-P537	WSP-J531	WSP-J530	PD5B	123.53	200	110	-0.63	0.02
WSP-P562	WSP-J543	WSP-J544	PD5B	47.82	200	110	-0.50	0.02
WSP-P799	WSP-J778	WSP-J741	PD5B	99.56	200	110	-0.42	0.01
WSP-P922	WSP-J535	WSP-J817	PD5B	79.42	150	100	-0.40	0.02
WSP-P923	WSP-J817	WSP-J538	PD5B	81.07	150	100	-0.40	0.02
WSP-P512	WSP-J511	WSP-J512	PD5B	47.62	200	110	-0.24	0.01
WSP-P880	WSP-J828	WSP-J827	PD5B	81.89	200	110	-0.23	0.01
WSP-P576	WSP-J554	WSP-J561	PD5B	60.28	200	110	-0.21	0.01
WSP-P896	WSP-J834	WSP-J551	PD5B	92.78	200	110	-0.21	0.01
KYP2-P12	KYP2-J1	KYP2-J7	PD5B	32.33	200	110	0.00	0.00
KYP2-P13	KYP2-J7	KYP2-J8	PD5B	60.67	200	110	0.00	0.00
KYP2-P14	KYP2-J8	KYP2-J19	PD5B	57.95	200	110	0.00	0.00
KYP2-P19	KYP2-J16	KYP2-J1	PD5B	35.61	300	120	0.00	0.00
KYP2-P11	KYP2-J7	KYP2-J6	PD5B	59.64	150	100	0.00	0.00
KYP2-P1	N51954	KYP2-J16	PD5B	22.14	300	120	0.00	0.00
KYP2-P10	KYP2-J11	KYP2-J10	PD5B	29.91	200	110	0.00	0.00
KYP2-P22	KYP2-J19	KYP2-J9	PD5B	24.29	200	110	0.00	0.00
KYP2-P25	KYP2-J9	KYP2-J11	PD5B	90.97	200	110	0.00	0.00
KYP2-P26	KYP2-J20	KYP2-J5	PD5B	47.44	200	110	0.00	0.00
KYP2-P27	KYP2-J21	KYP2-J20	PD5B	67.99	200	110	0.00	0.00
KYP2-P29	KYP2-J21	KYP2-J6	PD5B	69.75	150	100	0.00	0.00
KYP2-P5	KYP2-J5	KYP2-J4	PD5B	32.82	200	110	0.00	0.00
KYP2-P7	KYP2-J6	KYP2-J12	PD5B	59.48	150	100	0.00	0.00
KYP2-P8	KYP2-J4	KYP2-J12	PD5B	56.52	200	110	0.00	0.00
KYP2-P9	KYP2-J12	KYP2-J10	PD5B	75.31	200	110	0.00	0.00
WSP-P502	WSP-J502	WSP-J503	PD5B	70.03	300	120	0.00	0.00
WSP-P513	M32130	N04521	PD5B	132.90	450	130	0.00	0.00
WSP-P569	WSP-J554	WSP-J829	PD5B	50.21	300	120	0.00	0.00
WSP-P852	WSP-J502	N04521	PD5B	70.94	300	120	0.00	0.00
WSP-P883	WSP-J860	V_5B_6RD-2	PD5B	9.01	200	110	0.00	0.00
WSP-P886	V_5B_6RD-1	WSP-J775	PD5B	10.35	200	110	0.00	0.00
WSP-P892	V_5B_6RD-3	WSP-J833	PD5B	6.16	200	110	0.00	0.00
WSP-P895	V_5B_6RD-4	WSP-J834	PD5B	6.25	200	110	0.00	0.00
WSP-P908	N52100	M32165	PD5B	137.26	450	130	0.00	0.00
WSP-P913	WSP-J857	KYP2-J2	PD5B	7.82	300	120	0.00	0.00
WSP-P925	WSP-J742	V_5B_6RD-6	PD5B	6.96	300	120	0.00	0.00
KYP2-P20	KYP2-J16	KYP2-J17	PD5B	49.69	150	100	0.00	0.00
KYP2-P21	KYP2-J17	KYP2-J18	PD5B	111.22	150	100	0.00	0.00
KYP2-P23	KYP2-J18	KYP2-J19	PD5B	30.42	150	100	0.00	0.00
KYP2-P28	KYP2-J2	KYP2-J21	PD5B	37.06	200	110	0.00	0.00
KYP2-P35	KYP2-J1	KYP2-J2	PD5B	126.61	300	120	0.00	0.00
WSP-P878	WSP-J827	WSP-J541	PD5B	85.97	200	110	0.04	0.00
WSP-P523	WSP-J509	WSP-J520	PD5B	50.71	150	100	0.05	0.00
WSP-P589	WSP-J535	WSP-J551	PD5B	78.49	200	110	0.14	0.00
WSP-P522	WSP-J509	WSP-J518	PD5B	79.00	150	100	0.16	0.01
WSP-P817	WSP-J788	WSP-J789	PD5B	59.78	200	110	0.17	0.01
WSP-P591	WSP-J567	WSP-J531	PD5B	73.17	200	110	0.21	0.01
WSP-P894	WSP-J834	WSP-J833	PD5B	81.08	200	110	0.21	0.01
WSP-P893	WSP-J833	WSP-J561	PD5B	67.37	200	110	0.21	0.01
WSP-P879	WSP-J542	WSP-J828	PD5B	96.41	200	110	0.22	0.01
WSP-P518	WSP-J512	WSP-J516	PD5B	40.54	200	110	0.23	0.01
WSP-P519	WSP-J516	WSP-J517	PD5B	84.54	200	110	0.23	0.01
WSP-P592	WSP-J785	WSP-J786	PD5B	92.98	200	110	0.25	0.01
WSP-P553	WSP-J542	WSP-J827	PD5B	6.38	200	110	0.27	0.01
WSP-P790	WSP-J770	WSP-J771	PD5B	80.92	200	110	0.31	0.01
WSP-P531	WSP-J525	WSP-J528	PD5B	72.67	150	100	0.31	0.02
WSP-P535	WSP-J528	WSP-J529	PD5B	86.57	200	110	0.31	0.01
WSP-P563	WSP-J543	WSP-J542	PD5B	48.89	200	110	0.50	0.02
WSP-P813	WSP-J787	WSP-J786	PD5B	60.05	200	110	0.60	0.02
WSP-P794	WSP-J774	WSP-J830	PD5B	82.59	200	110	0.72	0.02
WSP-P872	WSP-J830	WSP-J741	PD5B	69.59	200	110	0.72	0.02
WSP-P814	WSP-J786	WSP-J788	PD5B	145.77	200	110	0.86	0.03
WSP-P798	WSP-J777	WSP-J778	PD5B	94.05	200	110	0.88	0.03
WSP-P811	WSP-J785	WSP-J789	PD5B	146.21	200	110	0.89	0.03

Full Buildout Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J768	PD5B	2.28	188.00	228	389
WSP-J775	PD5B	0.00	188.00	228	390
KYP2-J20	PD5B	0.00	188.50	225	362
KYP2-J4	PD5B	0.00	188.50	225	362
KYP2-J9	PD5B	0.00	188.59	225	361
KYP2-J5	PD5B	0.00	189.60	225	351
KYP2-J10	PD5B	0.00	190.48	225	343
KYP2-J11	PD5B	0.00	191.20	225	335
WSP-J555	PD6RD	0.00	184.00	253	681
WSP-J826	PD6RD	0.23	184.00	253	680
WSP-J556	PD6RD	1.29	184.50	253	676
WSP-J742	PD6RD	0.00	185.00	254	675
WSP-J546	PD6RD	0.61	185.50	253	666
WSP-J552	PD6RD	0.00	185.50	253	666
WSP-J562	PD6RD	0.84	185.50	253	666
WSP-J748	PD6RD	0.00	185.50	254	670
WSP-J806	PD6RD	0.00	185.50	254	666
WSP-J548	PD6RD	1.66	186.00	253	661
WSP-J550	PD6RD	0.00	186.00	253	661
WSP-J557	PD6RD	0.00	186.00	253	661
WSP-J809	PD6RD	0.00	186.00	254	661
WSP-J816	PD6RD	0.00	186.00	253	661
WSP-J810	PD6RD	0.91	186.50	254	657
WSP-J743	PD6RD	0.84	187.00	254	655
WSP-J762	PD6RD	0.91	187.00	254	653
WSP-J764	PD6RD	1.37	187.00	254	653
WSP-J805	PD6RD	0.91	187.00	254	652
WSP-J812	PD6RD	0.61	187.00	254	652
WSP-J761	PD6RD	1.06	187.50	254	649
WSP-J547	PD6RD	0.99	188.00	253	641
WSP-J564	PD6RD	0.23	188.00	253	642
WSP-J732	PD6RD	0.00	188.00	254	647
WSP-J733	PD6RD	0.00	188.00	254	647
WSP-J749	PD6RD	0.68	188.00	254	646
WSP-J766	PD6RD	0.00	188.00	254	643
WSP-J804	PD6RD	0.76	188.00	254	643
WSP-J807	PD6RD	0.08	188.00	254	642
WSP-J811	PD6RD	0.00	188.50	254	637
WSP-J852	PD6RD	0.76	188.53	254	637
WSP-J563	PD6RD	0.46	189.00	253	631
WSP-J565	PD6RD	0.53	189.00	253	632
WSP-J750	PD6RD	1.95	189.00	254	636
WSP-J763	PD6RD	1.22	189.00	254	635
WSP-J844	PD6RD	1.72	189.15	254	633
WSP-J790	PD6RD	0.00	189.50	254	628
WSP-J560	PD6RD	0.76	190.00	253	622
WSP-J577	PD6RD	0.53	190.00	253	621
WSP-J578	PD6RD	0.00	190.00	253	621
WSP-J730	PD6RD	0.00	190.00	254	628
WSP-J731	PD6RD	0.00	190.00	254	628
WSP-J744	PD6RD	0.00	190.00	254	626
WSP-J745	PD6RD	0.00	190.00	254	626
WSP-J746	PD6RD	2.31	190.00	254	626
WSP-J765	PD6RD	1.77	190.00	254	625
WSP-J791	PD6RD	1.67	190.00	254	623
WSP-J794	PD6RD	1.60	190.00	254	623
WSP-J799	PD6RD	0.00	190.00	254	623
WSP-J851	PD6RD	0.00	190.16	253	620
WSP-J760	PD6RD	0.68	190.50	254	620
WSP-J847	PD6RD	0.68	190.60	253	616
WSP-J837	PD6RD	0.68	190.86	253	613
WSP-J558	PD6RD	0.61	191.00	253	612
WSP-J747	PD6RD	0.00	191.00	254	617
WSP-J752	PD6RD	1.08	191.00	254	617
WSP-J793	PD6RD	0.00	191.00	254	613
WSP-J798	PD6RD	0.00	191.00	254	613
WSP-J801	PD6RD	0.00	191.00	254	613
WSP-J802	PD6RD	1.73	191.00	254	613
WSP-J759	PD6RD	0.00	191.50	254	611
WSP-J795	PD6RD	1.67	191.50	254	608
WSP-J842	PD6RD	0.00	191.53	253	607
WSP-J566	PD6RD	0.00	192.00	253	602
WSP-J574	PD6RD	0.00	192.00	253	602
WSP-J716	PD6RD	2.92	192.00	254	607
WSP-J751	PD6RD	1.06	192.00	254	607
WSP-J792	PD6RD	0.00	192.00	254	603
WSP-J796	PD6RD	1.75	192.50	254	598
WSP-J559	PD6RD	0.00	193.00	253	592
WSP-J568	PD6RD	1.37	193.00	253	593
WSP-J569	PD6RD	0.00	193.00	253	593
WSP-J571	PD6RD	0.00	193.00	253	593
WSP-J572	PD6RD	0.84	193.00	253	593
WSP-J576	PD6RD	0.61	193.00	253	592
WSP-J718	PD6RD	0.00	193.00	254	598
WSP-J719	PD6RD	2.60	193.00	254	598
WSP-J722	PD6RD	2.60	193.00	254	598
WSP-J757	PD6RD	2.46	193.00	254	596
WSP-J721	PD6RD	2.60	193.50	254	593
WSP-J573	PD6RD	0.84	194.00	253	582
WSP-J575	PD6RD	0.00	194.00	253	582
WSP-J712	PD6RD	0.00	194.00	254	589
WSP-J713	PD6RD	2.29	194.00	254	589
WSP-J717	PD6RD	0.30	194.00	254	589
WSP-J725	PD6RD	2.29	194.00	254	588
WSP-J711	PD6RD	0.30	194.50	254	584
WSP-J753	PD6RD	0.61	194.50	254	583

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P568	WSP-J551	WSP-J554	PD5B	78.97	300	120	0.93	0.01
WSP-P532	WSP-J836	WSP-J533	PD5B	73.67	200	110	1.04	0.03
WSP-P540	WSP-J533	WSP-J567	PD5B	57.64	200	110	1.04	0.03
WSP-P552	WSP-J540	WSP-J541	PD5B	40.39	200	110	1.25	0.04
WSP-P527	WSP-J506	WSP-J524	PD5B	74.86	150	100	1.44	0.08
WSP-P884	WSP-J818	WSP-J551	PD5B	58.59	300	120	1.45	0.02
WSP-P510	WSP-J509	WSP-J510	PD5B	68.03	200	110	1.50	0.05
WSP-P511	WSP-J510	WSP-J511	PD5B	68.45	200	110	1.50	0.05
WSP-P802	WSP-J779	WSP-J787	PD5B	118.89	150	100	1.52	0.09
WSP-P551	WSP-J539	WSP-J540	PD5B	93.65	200	110	1.63	0.05
WSP-P810	WSP-J777	WSP-J785	PD5B	86.50	200	110	1.90	0.06
WSP-P875	WSP-J823	WSP-J525	PD5B	111.03	150	100	1.98	0.11
WSP-P516	WSP-J514	WSP-J515	PD5B	54.96	200	110	2.20	0.07
WSP-P561	WSP-J544	WSP-J818	PD5B	87.89	300	120	2.47	0.03
WSP-P539	WSP-J527	WSP-J532	PD5B	75.40	200	110	2.57	0.08
WSP-P541	WSP-J532	WSP-J836	PD5B	94.20	200	110	2.57	0.08
WSP-P560	WSP-J538	WSP-J544	PD5B	87.94	300	120	2.96	0.04
WSP-P509	WSP-J504	WSP-J509	PD5B	87.40	200	110	3.08	0.10
WSP-P924	WSP-J771	WSP-J803	PD5B	134.44	200	110	3.12	0.10
WSP-P873	WSP-J825	WSP-J522	PD5B	24.94	200	110	3.19	0.10
WSP-P796	WSP-J781	WSP-J772	PD5B	72.33	200	110	3.69	0.12
WSP-P874	WSP-J507	WSP-J825	PD5B	97.21	200	110	3.86	0.12
WSP-P787	WSP-J768	WSP-J781	PD5B	144.42	200	110	3.92	0.12
WSP-P503	WSP-J504	WSP-J513	PD5B	104.24	300	120	3.93	0.06
WSP-P515	WSP-J513	WSP-J514	PD5B	21.07	200	110	3.93	0.13
WSP-P803	WSP-J831	WSP-J782	PD5B	43.75	200	110	4.15	0.13
WSP-P797	WSP-J781	WSP-J777	PD5B	106.78	200	110	4.38	0.14
WSP-P887	WSP-J832	WSP-J775	PD5B	79.17	200	110	6.20	0.20
WSP-P805	WSP-J775	WSP-J768	PD5B	90.88	200	110	6.20	0.20
WSP-P849	WSP-J832	WSP-J770	PD5B	70.34	200	110	6.35	0.20
WSP-P538	WSP-J527	WSP-J530	PD5B	77.27	300	120	13.06	0.18
WSP-P751	PRV-9000	WSP-J832	PD5B	9.36	300	120	17.26	0.24
WSP-P533	WSP-J508	WSP-J823	PD5B	91.91	300	120	18.61	0.26
WSP-P500	N52100	N04521	PD5B	432.95	450	130	21.19	0.13
WSP-P851	N52100	WSP-J508	PD5B	196.33	300	120	33.24	0.47
P15140	H744	N49213	PD5B	19.65	300	155	52.92	0.75
4919949213B	N49199	H747	PD6RD	3.64	300	155	-43.88	0.62
4919949213C	H747	WSP-J701	PD6RD	8.19	300	155	-43.88	0.62
WSP-P758	WSP-J716	WSP-J712	PD6RD	91.02	300	120	-33.12	0.47
WSP-P756	WSP-J746	WSP-J747	PD6RD	74.00	300	120	-28.57	0.40
WSP-P755	WSP-J745	WSP-J746	PD6RD	63.00	300	120	-23.87	0.34
WSP-P836	WSP-J799	WSP-J801	PD6RD	66.01	300	120	-19.22	0.27
WSP-P837	WSP-J801	WSP-J802	PD6RD	51.37	300	120	-19.05	0.27
WSP-P718	WSP-J715	WSP-J710	PD6RD	96.01	200	110	-12.86	0.41
WSP-P763	WSP-J753	WSP-J720	PD6RD	90.22	200	110	-9.62	0.31
WSP-P897	WSP-J854	WSP-J715	PD6RD	74.00	200	110	-9.59	0.31
WSP-P762	WSP-J751	WSP-J753	PD6RD	67.52	200	110	-9.42	0.30
WSP-P850	WSP-J555	WSP-J809	PD6RD	183.91	300	120	-9.37	0.13
WSP-P846	WSP-J810	WSP-J812	PD6RD	49.19	300	120	-8.34	0.12
WSP-P845	WSP-J809	WSP-J810	PD6RD	62.17	300	120	-7.43	0.11
WSP-P707	WSP-J709	WSP-J713	PD6RD	76.55	200	110	-6.71	0.21
WSP-P759	WSP-J742	WSP-J748	PD6RD	44.47	200	110	-6.16	0.20
WSP-P760	WSP-J748	WSP-J749	PD6RD	37.64	200	110	-6.16	0.20
WSP-P752	WSP-J743	WSP-J742	PD6RD	64.92	300	120	-6.16	0.09
WSP-P557	WSP-J851	WSP-J852	PD6RD	171.58	200	110	-4.38	0.14
WSP-P780	WSP-J761	WSP-J763	PD6RD	72.66	200	110	-4.27	0.14
WSP-P898	WSP-J764	WSP-J844	PD6RD	219.54	200	110	-4.21	0.13
WSP-P573	WSP-J847	WSP-J558	PD6RD	92.03	200	110	-4.11	0.13
WSP-P882	WSP-J559	WSP-J847	PD6RD	61.63	200	110	-3.83	0.12
WSP-P578	WSP-J563	WSP-J550	PD6RD	67.90	200	110	-3.54	0.11
WSP-P704	WSP-J701	WSP-J704	PD6RD	105.18	150	100	-3.46	0.20
WSP-P824	WSP-J795	WSP-J791	PD6RD	69.13	200	110	-3.08	0.10
WSP-P727	WSP-J721	WSP-J722	PD6RD	73.46	200	110	-2.90	0.09
WSP-P781	WSP-J762	WSP-J764	PD6RD	84.26	200	110	-2.84	0.09
WSP-P841	WSP-J807	WSP-J794	PD6RD	77.92	150	100	-2.71	0.15
WSP-P782	WSP-J760	WSP-J745	PD6RD	71.50	150	100	-2.11	0.12
WSP-P723	WSP-J717	WSP-J718	PD6RD	65.13	200	110	-2.02	0.06
WSP-P724	WSP-J718	WSP-J719	PD6RD	73.63	200	110	-2.02	0.06
WSP-P835	WSP-J809	WSP-J806	PD6RD	75.90	200	110	-1.94	0.06
WSP-P783	WSP-J766	WSP-J762	PD6RD	62.35	200	110	-1.93	0.06
WSP-P584	WSP-J565	WSP-J851	PD6RD	48.95	200	110	-1.76	0.06
WSP-P899	WSP-J755	WSP-J854	PD6RD	41.74	200	110	-1.60	0.05
WSP-P822	WSP-J793	WSP-J792	PD6RD	58.65	200	110	-1.52	0.05
WSP-P905	WSP-J704	M15120	PD6RD	229.97	150	100	-1.42	0.08
WSP-P826	WSP-J796	WSP-J793	PD6RD	74.02	150	100	-1.35	0.08
WSP-P593	WSP-J572	WSP-J566	PD6RD	133.51	200	110	-1.25	0.04
WSP-P583	WSP-J564	WSP-J565	PD6RD	40.71	200	110	-1.23	0.04
WSP-P769	WSP-J754	WSP-J716	PD6RD	76.93	150	100	-1.21	0.07
WSP-P579	WSP-J560	WSP-J563	PD6RD	79.74	200	110	-1.11	0.04
WSP-P729	WSP-J725	WSP-J724	PD6RD	73.57	200	110	-1.07	0.03
WSP-P730	WSP-J724	WSP-J723	PD6RD	63.23	200	110	-1.07	0.03
WSP-P829	WSP-J798	WSP-J796	PD6RD	60.36	200	110	-1.01	0.03
WSP-P582	WSP-J816	WSP-J564	PD6RD	79.19	200	110	-1.00	0.03
WSP-P864	WSP-J728	WSP-J726	PD6RD	113.17	200	110	-0.85	0.03
WSP-P767	WSP-J752	WSP-J747	PD6RD	75.71	150	100	-0.81	0.05
WSP-P774	WSP-J757	WSP-J758	PD6RD	86.50	150	100	-0.77	0.04
WSP-P765	WSP-J750	WSP-J746	PD6RD	92.34	150	100	-0.71	0.04
WSP-P587	WSP-J568	WSP-J569	PD6RD	112.77	200	110	-0.65	0.02
WSP-P735	WSP-J815	WSP-J727	PD6RD	112.34	200	110	-0.64	0.02
WSP-P863	WSP-J728	WSP-J815	PD6RD	70.91	200	110	-0.64	0.02
WSP-P909	WSP-J576	WSP-J837	PD6RD	67.04	200	110	-0.63	0.02
WSP-P555	WSP-J546	WSP-J547	PD6RD	66.91	200	110	-0.53	0.02
WSP-P768	WSP-J753	WSP-J754	PD6RD	45.89	150	100	-0.42	0.02
WSP-P594	WSP-J558	WSP-J572	PD6RD	53.68	200	110	-0.42	0.01
WSP-P558	WSP-J847	WSP-J562	PD6RD	111.98	200	110	-0.40	0.01
WSP-P766	WSP-J752	WSP-J751	PD6RD	59.00	150	100	-0.27	0.02

Full Buildout Peak Hour

Node Table

Label	Pressure District	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
WSP-J754	PD6RD	0.79	194.50	254	583
WSP-J758	PD6RD	0.61	194.50	254	582
WSP-J707	PD6RD	2.96	195.00	254	579
WSP-J715	PD6RD	2.60	195.00	254	578
WSP-J720	PD6RD	0.00	195.00	254	579
WSP-J724	PD6RD	0.00	195.00	254	579
WSP-J755	PD6RD	1.88	195.00	254	577
WSP-J846	PD6RD	0.30	195.02	254	578
WSP-J854	PD6RD	0.00	195.25	254	575
WSP-J709	PD6RD	2.43	195.50	254	574
WSP-J710	PD6RD	1.14	195.50	254	574
WSP-J723	PD6RD	0.00	195.50	254	574
WSP-J756	PD6RD	0.00	195.50	254	572
WSP-J845	PD6RD	0.00	195.74	254	571
N49199	PD6RD	8.50	195.96	254	571
WSP-J704	PD6RD	0.00	196.00	254	571
WSP-J726	PD6RD	0.84	196.00	254	569
WSP-J727	PD6RD	0.00	196.00	254	569
H747	PD6RD	0.00	196.01	254	570
WSP-J701	PD6RD	0.00	196.12	254	569
WSP-J708	PD6RD	0.00	196.50	254	565
WSP-J705	PD6RD	1.77	197.00	254	560
N49198	PD6RD	8.50	197.04	254	559
WSP-J728	PD6RD	1.50	198.00	254	549
WSP-J815	PD6RD	0.00	198.00	254	549

Minimum			176		335
Maximum			198		681

Pipe Table

Label	Start Node	Stop Node	Pressure District	Length (m)	Diameter (mm)	Roughness (C)	Flow (L/s)	Velocity (m/s)
WSP-P554	WSP-J546	WSP-J826	PD6RD	118.04	200	110	-0.08	0.00
WSP-P600	WSP-J578	WSP-J576	PD6RD	62.57	200	110	-0.02	0.00
WSP-P601	WSP-J577	WSP-J578	PD6RD	49.07	200	110	-0.02	0.00
WSP-P559	WSP-J550	V_5B_6RD-4	PD6RD	6.03	200	110	0.00	0.00
WSP-P577	WSP-J562	V_5B_6RD-3	PD6RD	5.71	200	110	0.00	0.00
WSP-P580	WSP-J829	WSP-J555	PD6RD	28.79	300	120	0.00	0.00
WSP-P736	WSP-J727	WSP-J730	PD6RD	76.38	300	120	0.00	0.00
WSP-P737	WSP-J730	WSP-J733	PD6RD	66.50	300	120	0.00	0.00
WSP-P740	WSP-J732	WSP-J731	PD6RD	74.51	200	110	0.00	0.00
WSP-P741	WSP-J733	WSP-J732	PD6RD	59.01	200	110	0.00	0.00
WSP-P816	V_5B_6RD-6	WSP-J741	PD6RD	6.94	300	120	0.00	0.00
WSP-P885	WSP-J799	V_5B_6RD-1	PD6RD	7.60	200	110	0.00	0.00
WSP-P889	V_5B_6RD-2	WSP-J809	PD6RD	9.02	200	110	0.00	0.00
WSP-P900	WSP-J830	WSP-J743	PD6RD	12.63	200	110	0.00	0.00
WSP-P902	WSP-J733	WSP-J857	PD6RD	133.74	300	120	0.00	0.00
WSP-P597	WSP-J575	WSP-J574	PD6RD	62.74	200	110	0.12	0.00
WSP-P598	WSP-J573	WSP-J575	PD6RD	32.83	200	110	0.12	0.00
WSP-P823	WSP-J793	WSP-J801	PD6RD	72.34	150	100	0.18	0.01
WSP-P901	N49198	WSP-J708	PD6RD	122.62	150	100	0.27	0.02
WSP-P705	N49198	WSP-J705	PD6RD	62.33	150	100	0.27	0.02
WSP-P770	WSP-J747	WSP-J755	PD6RD	88.08	200	110	0.28	0.01
WSP-P726	WSP-J721	WSP-J846	PD6RD	62.17	200	110	0.30	0.01
WSP-P566	WSP-J552	WSP-J826	PD6RD	63.78	200	110	0.31	0.01
WSP-P567	WSP-J548	WSP-J552	PD6RD	85.91	200	110	0.31	0.01
WSP-P602	WSP-J837	WSP-J577	PD6RD	98.97	200	110	0.51	0.02
WSP-P728	WSP-J722	WSP-J725	PD6RD	45.37	200	110	0.58	0.02
WSP-P709	WSP-J705	WSP-J708	PD6RD	62.71	200	110	0.63	0.02
WSP-P911	WSP-J845	WSP-J725	PD6RD	207.43	200	110	0.64	0.02
WSP-P732	WSP-J726	WSP-J727	PD6RD	68.77	300	120	0.64	0.01
WSP-P719	WSP-J715	WSP-J716	PD6RD	130.46	150	100	0.68	0.04
WSP-P848	WSP-J811	WSP-J812	PD6RD	81.50	200	110	0.71	0.02
WSP-P588	WSP-J569	WSP-J568	PD6RD	91.68	200	110	0.72	0.02
WSP-P710	WSP-J708	WSP-J709	PD6RD	61.52	200	110	0.90	0.03
WSP-P914	WSP-J852	WSP-J805	PD6RD	100.26	200	110	0.93	0.03
WSP-P596	WSP-J842	WSP-J573	PD6RD	64.17	200	110	0.96	0.03
WSP-P838	WSP-J798	WSP-J804	PD6RD	54.54	200	110	1.01	0.03
WSP-P776	WSP-J759	WSP-J760	PD6RD	78.13	150	100	1.13	0.06
WSP-P764	WSP-J749	WSP-J750	PD6RD	85.32	150	100	1.25	0.07
WSP-P586	WSP-J566	WSP-J571	PD6RD	63.57	200	110	1.37	0.04
WSP-P590	WSP-J571	WSP-J569	PD6RD	46.19	200	110	1.37	0.04
WSP-P825	WSP-J795	WSP-J796	PD6RD	189.51	200	110	1.41	0.04
WSP-P575	WSP-J560	WSP-J547	PD6RD	90.59	200	110	1.52	0.05
WSP-P833	WSP-J791	WSP-J792	PD6RD	75.90	200	110	1.52	0.05
WSP-P773	WSP-J746	WSP-J757	PD6RD	86.54	150	100	1.69	0.10
WSP-P912	WSP-J842	WSP-J574	PD6RD	23.00	200	110	1.70	0.05
WSP-P599	WSP-J574	WSP-J837	PD6RD	72.05	200	110	1.82	0.06
WSP-P847	WSP-J811	WSP-J805	PD6RD	85.00	200	110	1.92	0.06
WSP-P840	WSP-J805	WSP-J806	PD6RD	27.66	200	110	1.94	0.06
WSP-P556	WSP-J563	WSP-J548	PD6RD	84.40	200	110	1.97	0.06
WSP-P706	WSP-J710	WSP-J705	PD6RD	97.21	200	110	2.12	0.07
WSP-P708	WSP-J707	WSP-J711	PD6RD	119.68	200	110	2.21	0.07
WSP-P918	WSP-J845	WSP-J726	PD6RD	50.96	300	120	2.33	0.03
WSP-P777	WSP-J760	WSP-J761	PD6RD	124.84	150	100	2.55	0.14
WSP-P545	WSP-J851	WSP-J566	PD6RD	48.33	200	110	2.62	0.08
WSP-P842	WSP-J807	WSP-J811	PD6RD	63.53	150	100	2.64	0.15
WSP-P595	WSP-J560	WSP-J842	PD6RD	74.25	200	110	2.66	0.08
WSP-P731	WSP-J723	WSP-J845	PD6RD	71.18	300	120	2.97	0.04
WSP-P544	WSP-J562	WSP-J550	PD6RD	80.98	200	110	3.54	0.11
WSP-P574	WSP-J559	WSP-J560	PD6RD	73.59	200	110	3.83	0.12
WSP-P722	WSP-J720	WSP-J723	PD6RD	48.21	300	120	4.04	0.06
WSP-P572	WSP-J557	WSP-J558	PD6RD	68.05	300	120	4.30	0.06
WSP-P867	WSP-J816	WSP-J557	PD6RD	57.54	300	120	4.30	0.06
WSP-P581	WSP-J816	WSP-J562	PD6RD	80.87	200	110	4.77	0.15
WSP-P711	WSP-J709	WSP-J707	PD6RD	35.56	200	110	5.18	0.16
WSP-P753	WSP-J743	WSP-J744	PD6RD	92.99	300	120	5.32	0.08
WSP-P754	WSP-J744	WSP-J745	PD6RD	73.73	300	120	5.32	0.08
WSP-P779	WSP-J759	WSP-J763	PD6RD	120.90	200	110	5.49	0.17
WSP-P778	WSP-J761	WSP-J765	PD6RD	71.50	200	110	5.76	0.18
WSP-P839	WSP-J804	WSP-J852	PD6RD	179.10	200	110	6.07	0.19
WSP-P725	WSP-J719	WSP-J722	PD6RD	48.90	200	110	6.08	0.19
WSP-P830	WSP-J794	WSP-J799	PD6RD	146.68	300	120	6.28	0.09
WSP-P819	WSP-J790	WSP-J791	PD6RD	75.34	200	110	6.28	0.20
WSP-P775	WSP-J758	WSP-J759	PD6RD	81.98	200	110	6.61	0.21
WSP-P771	WSP-J854	WSP-J756	PD6RD	40.64	200	110	7.99	0.25
WSP-P772	WSP-J756	WSP-J758	PD6RD	71.96	200	110	7.99	0.25
WSP-P571	WSP-J556	WSP-J816	PD6RD	97.20	300	120	8.07	0.11
WSP-P761	WSP-J751	WSP-J749	PD6RD	77.82	200	110	8.09	0.26
WSP-P570	WSP-J555	WSP-J556	PD6RD	76.76	300	120	9.37	0.13
WSP-P910	WSP-J804	WSP-J794	PD6RD	65.82	300	120	10.58	0.15
WSP-P869	WSP-J713	WSP-J719	PD6RD	83.81	200	110	10.70	0.34
WSP-P720	WSP-J712	WSP-J717	PD6RD	82.94	300	120	11.94	0.17
WSP-P721	WSP-J717	WSP-J720	PD6RD	44.32	300	120	13.66	0.19
WSP-P547	WSP-J812	PRV-9000	PD6RD	9.39	300	120	17.26	0.24
WSP-P713	WSP-J710	WSP-J711	PD6RD	61.54	300	120	19.25	0.27
WSP-P818	WSP-J790	WSP-J802	PD6RD	35.27	300	120	20.78	0.29
WSP-P714	WSP-J711	WSP-J712	PD6RD	72.27	300	120	21.16	0.30
WSP-P715	WSP-J713	WSP-J712	PD6RD	149.36	300	120	23.90	0.34
WSP-P915	WSP-J844	WSP-J766	PD6RD	85.00	300	120	25.13	0.36
WSP-P831	WSP-J799	WSP-J812	PD6RD	79.27	300	120	25.50	0.36
WSP-P820	WSP-J766	WSP-J790	PD6RD	63.00	300	120	27.06	0.38
WSP-P784	WSP-J745	WSP-J765	PD6RD	124.84	300	120	27.08	0.38
WSP-P757	WSP-J716	WSP-J747	PD6RD	74.00	300	120	29.66	0.42
WSP-P785	WSP-J765	WSP-J844	PD6RD	63.00	300	120	31.06	0.44
WSP-P712	N49199	WSP-J710	PD6RD	58.30	300	120	35.38	0.50

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Phase 1 Fire Flow Table

ID	Pressure District	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
KYP2-J17	PD5B	0.00	554.54	243.35	167.00	223.14	201.62	139.96
KYP2-J18	PD5B	0.00	563.52	244.48	167.00	245.59	212.37	139.96
KYP2-J11	PD5B	0.00	530.01	245.29	167.00	280.43	249.02	139.96
KYP2-J10	PD5B	0.00	538.34	245.42	167.00	290.47	254.71	139.96
KYP2-J5	PD5B	0.00	554.50	246.19	167.00	317.66	271.73	139.96
KYP2-J9	PD5B	0.00	551.70	244.89	167.00	317.10	272.62	139.96
KYP2-J4	PD5B	0.00	563.69	246.02	167.00	326.73	275.51	139.96
KYP2-J6	PD5B	0.00	586.34	245.74	167.00	346.62	283.90	139.96
KYP2-J19	PD5B	0.00	559.09	244.78	167.00	333.93	286.58	139.96
KYP2-J20	PD5B	0.00	567.58	246.42	167.00	339.12	288.08	139.96
KYP2-J12	PD5B	0.00	568.89	245.74	167.00	341.93	289.61	139.96
KYP2-J8	PD5B	0.00	573.87	244.75	167.00	353.96	301.44	139.96
KYP2-J7	PD5B	0.00	580.30	244.72	167.00	386.49	350.49	139.96
KYP2-J21	PD5B	0.00	599.48	246.76	167.00	408.47	364.04	139.96
KYP2-J16	PD5B	0.00	568.23	242.85	167.00	397.79	365.72	139.96
N51954	PD5B	4.24	570.14	241.42	167.00	411.39	365.88	139.96
KYP2-J1	PD5B	0.00	578.31	244.52	167.00	397.58	377.26	139.96
KYP2-J2	PD5B	0.00	614.04	247.28	167.00	445.88	444.33	139.96
WSP-J731	PD6RD	0.00	630.59	254.35	167.00	329.57	217.73	139.96
WSP-J721	PD6RD	1.16	596.26	254.35	167.00	420.71	282.94	139.96
WSP-J754	PD6RD	0.35	586.50	254.35	167.00	417.78	284.11	139.96
WSP-J732	PD6RD	0.00	650.19	254.35	167.00	468.27	292.78	139.96
WSP-J704	PD6RD	0.00	571.97	254.37	167.00	423.60	298.06	139.96
WSP-J815	PD6RD	0.00	552.19	254.35	167.00	436.30	334.35	139.96
WSP-J728	PD6RD	0.67	552.19	254.35	167.00	437.30	336.77	139.96
WSP-J753	PD6RD	0.27	586.50	254.35	167.00	484.92	375.47	139.96
WSP-J715	PD6RD	1.16	581.61	254.35	167.00	482.87	380.16	139.96
N49198	PD6RD	8.50	561.37	254.33	167.00	470.06	401.95	139.96
WSP-J733	PD6RD	0.00	650.19	254.35	167.00	562.60	438.50	139.96
WSP-J730	PD6RD	0.00	630.59	254.35	167.00	555.56	468.14	139.96
WSP-J724	PD6RD	0.00	581.59	254.35	167.00	518.09	485.52	139.96
WSP-J727	PD6RD	0.00	571.79	254.35	167.00	511.18	492.63	139.96
WSP-J722	PD6RD	1.16	601.18	254.35	167.00	544.73	535.27	139.96
WSP-J725	PD6RD	1.02	591.38	254.35	167.00	537.21	540.56	139.96
WSP-J726	PD6RD	0.37	571.79	254.35	167.00	521.34	547.35	139.96
WSP-J718	PD6RD	0.00	601.20	254.35	167.00	548.08	548.66	139.96
WSP-J708	PD6RD	0.00	566.85	254.35	167.00	520.29	571.06	139.96
WSP-J705	PD6RD	0.79	561.95	254.35	167.00	516.09	574.23	139.96
WSP-J707	PD6RD	1.32	581.58	254.35	167.00	534.45	575.73	139.96
WSP-J719	PD6RD	1.16	601.20	254.35	167.00	561.98	656.73	139.96
WSP-J709	PD6RD	1.08	576.68	254.35	167.00	543.53	701.41	139.96
WSP-J723	PD6RD	0.00	576.70	254.35	167.00	545.27	723.64	139.96
WSP-J720	PD6RD	0.00	581.60	254.35	167.00	555.53	812.27	139.96
WSP-J716	PD6RD	1.30	611.01	254.35	167.00	585.68	851.61	139.97
WSP-J717	PD6RD	0.14	591.40	254.35	167.00	569.69	916.13	139.97
N49219	PD6RD	0.00	569.36	254.37	167.00	552.75	1003.33	139.97
N49494	PD6RD	0.00	543.87	254.37	167.00	528.74	1037.75	139.97
WSP-J712	PD6RD	0.00	591.42	254.35	167.00	577.56	1202.85	139.97
WSP-J711	PD6RD	0.14	586.52	254.35	167.00	573.21	1221.35	139.97
WSP-J710	PD6RD	0.51	576.73	254.35	167.00	564.91	1298.51	139.97
WSP-J701	PD6RD	0.00	570.68	254.36	167.00	560.48	1393.12	139.97
WSP-J713	PD6RD	1.02	591.45	254.36	167.00	580.84	1409.20	139.97
N49213	PD6RD	0.00	556.72	254.37	167.00	550.67	1842.16	139.97
WSP-J714	PD6RD	0.00	604.25	254.38	167.00	601.17	2795.32	139.99

Full Buildout Fire Flow Table

ID	Pressure District	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
WSP-J525	PD5B	0.74	419.90	224.35	167.00	126.26	163.40	139.96
WSP-J779	PD5B	0.37	429.08	227.79	167.00	132.10	164.41	139.96
KYP2-J17	PD5B	0.00	378.98	225.43	167.00	148.86	170.47	139.96
KYP2-J18	PD5B	0.00	376.92	225.43	167.00	158.17	174.41	139.96
WSP-J520	PD5B	0.71	419.93	224.35	167.00	176.58	181.13	139.96
WSP-J789	PD5B	0.47	438.84	227.78	167.00	175.73	182.24	139.96
WSP-J788	PD5B	0.30	443.74	227.78	167.00	178.10	182.84	139.96
KYP2-J11	PD5B	0.00	335.47	225.43	167.00	181.15	189.94	139.96
WSP-J787	PD5B	0.41	438.85	227.78	167.00	191.50	190.09	139.96
KYP2-J10	PD5B	0.00	342.52	225.43	167.00	189.43	194.48	139.96
WSP-J828	PD5B	0.20	395.40	224.35	167.00	201.60	194.84	139.96
WSP-J833	PD5B	0.00	382.17	224.35	167.00	200.84	196.12	139.96
WSP-J834	PD5B	0.00	378.66	224.35	167.00	205.44	199.58	139.96
KYP2-J5	PD5B	0.00	351.15	225.43	167.00	204.59	203.73	139.96
WSP-J528	PD5B	0.00	415.00	224.35	167.00	226.57	205.93	139.96
KYP2-J4	PD5B	0.00	361.93	225.43	167.00	215.31	209.28	139.96
WSP-J533	PD5B	0.00	410.12	224.35	167.00	231.49	210.04	139.96
WSP-J561	PD5B	0.00	390.50	224.35	167.00	225.44	210.63	139.96
WSP-J567	PD5B	0.37	415.02	224.35	167.00	239.34	214.51	139.96
KYP2-J9	PD5B	0.00	361.04	225.43	167.00	222.98	215.78	139.96
KYP2-J20	PD5B	0.00	361.93	225.43	167.00	224.49	216.79	139.96
WSP-J827	PD5B	0.00	395.40	224.35	167.00	239.26	219.68	139.96
WSP-J542	PD5B	0.00	395.40	224.35	167.00	240.42	220.61	139.96
WSP-J541	PD5B	0.57	405.20	224.35	167.00	244.97	221.68	139.96
KYP2-J6	PD5B	0.00	387.40	225.43	167.00	241.16	222.31	139.96
WSP-J836	PD5B	0.68	422.22	224.35	167.00	253.00	222.48	139.96
KYP2-J12	PD5B	0.00	369.86	225.43	167.00	234.51	222.82	139.96
WSP-J786	PD5B	0.00	468.24	227.78	167.00	253.12	223.19	139.96
WSP-J517	PD5B	0.78	429.72	224.35	167.00	261.49	226.69	139.96
WSP-J531	PD5B	0.37	415.02	224.35	167.00	256.96	227.57	139.96
WSP-J540	PD5B	0.17	405.20	224.35	167.00	254.08	228.66	139.96
KYP2-J19	PD5B	0.00	369.47	225.43	167.00	241.62	229.66	139.96
WSP-J519	PD5B	0.61	419.93	224.35	167.00	267.90	235.11	139.96
WSP-J785	PD5B	0.34	448.65	227.78	167.00	262.60	239.16	139.96
WSP-J829	PD5B	0.00	395.40	224.35	167.00	261.17	239.31	139.96
WSP-J543	PD5B	0.00	400.30	224.35	167.00	263.81	239.54	139.96
WSP-J516	PD5B	0.00	429.72	224.35	167.00	279.27	240.57	139.96
WSP-J524	PD5B	0.26	419.96	224.36	167.00	277.79	243.57	139.96
WSP-J518	PD5B	0.00	424.83	224.35	167.00	280.94	244.28	139.96
KYP2-J8	PD5B	0.00	384.56	225.43	167.00	264.50	246.07	139.96
WSP-J510	PD5B	0.00	424.83	224.35	167.00	282.92	246.25	139.96
WSP-J521	PD5B	0.00	419.95	224.36	167.00	281.34	246.90	139.96
WSP-J511	PD5B	0.77	429.72	224.35	167.00	285.27	246.96	139.96
WSP-J536	PD5B	0.00	405.20	224.35	167.00	277.29	251.11	139.96
WSP-J532	PD5B	0.00	415.04	224.35	167.00	283.45	251.77	139.96
WSP-J535	PD5B	0.47	400.30	224.35	167.00	275.25	252.26	139.96
WSP-J554	PD5B	0.51	400.30	224.35	167.00	275.55	252.68	139.96
WSP-J515	PD5B	0.00	432.24	224.35	167.00	299.03	258.83	139.96
WSP-J529	PD5B	0.81	410.10	224.35	167.00	288.13	261.45	139.96
WSP-J512	PD5B	0.77	429.72	224.35	167.00	299.13	261.47	139.96
WSP-J551	PD5B	0.20	400.30	224.35	167.00	287.07	266.77	139.96
WSP-J534	PD5B	0.57	405.20	224.35	167.00	290.71	268.12	139.96
WSP-J773	PD5B	0.57	409.46	227.79	167.00	263.61	268.91	139.96
WSP-J522	PD5B	0.20	419.96	224.36	167.00	300.80	269.09	139.96
KYP2-J21	PD5B	0.00	390.54	225.43	167.00	289.66	274.29	139.96
WSP-J818	PD5B	0.45	405.20	224.35	167.00	295.95	275.41	139.96
WSP-J774	PD5B	0.47	419.26	227.78	167.00	274.01	275.83	139.96
WSP-J509	PD5B	0.61	424.83	224.35	167.00	312.91	282.47	139.96
WSP-J514	PD5B	0.77	429.85	224.35	167.00	316.20	282.78	139.96
WSP-J544	PD5B	0.00	400.30	224.35	167.00	298.68	283.71	139.96
WSP-J825	PD5B	0.00	424.86	224.36	167.00	321.79	294.81	139.96
WSP-J768	PD5B	1.01	389.95	227.79	167.00	282.00	294.81	139.96
KYP2-J7	PD5B	0.00	391.32	225.43	167.00	303.71	296.91	139.96
WSP-J772	PD5B	0.27	404.58	227.79	167.00	277.99	297.79	139.96
WSP-J538	PD5B	1.09	405.20	224.35	167.00	310.09	298.95	139.96
WSP-J513	PD5B	0.00	429.74	224.36	167.00	331.16	305.87	139.96
WSP-J539	PD5B	0.00	405.21	224.35	167.00	316.80	310.70	139.96
WSP-J803	PD5B	0.00	419.40	227.80	167.00	325.87	313.08	139.96
WSP-J857	PD5B	0.00	398.93	225.43	167.00	318.26	315.84	139.96
KYP2-J2	PD5B	0.00	399.95	225.43	167.00	320.76	319.76	139.96
WSP-J830	PD5B	0.00	402.39	227.78	167.00	283.54	324.13	139.96
WSP-J860	PD5B	0.00	409.44	227.80	167.00	344.44	324.50	139.96
WSP-J775	PD5B	0.00	390.02	227.80	167.00	318.56	325.91	139.96
WSP-J504	PD5B	0.00	429.75	224.36	167.00	343.59	330.63	139.96
WSP-J769	PD5B	0.54	399.80	227.80	167.00	325.42	336.95	139.96
WSP-J778	PD5B	0.57	419.25	227.78	167.00	302.96	340.68	139.96
WSP-J505	PD5B	0.77	429.75	224.36	167.00	347.84	341.13	139.96

Results: York Downs
Markham, Region of York
Revision Date: November 2017

Full Buildout Fire Flow Table

ID	Pressure District	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
WSP-J525	PD5B	0.74	419.90	224.35	167.00	126.26	163.40	139.96
WSP-J530	PD5B	0.61	410.12	224.35	167.00	333.46	341.48	139.96
WSP-J777	PD5B	0.71	419.26	227.78	167.00	307.46	348.16	139.96
KYP2-J1	PD5B	0.00	391.32	225.43	167.00	327.90	355.03	139.96
WSP-J771	PD5B	0.27	404.73	227.80	167.00	349.05	359.66	139.96
WSP-J800	PD5B	0.00	404.68	227.80	167.00	332.23	373.72	139.96
KYP2-J16	PD5B	0.00	397.60	225.43	167.00	340.29	380.75	139.96
WSP-J527	PD5B	0.45	419.95	224.36	167.00	354.45	381.13	139.96
WSP-J823	PD5B	0.00	419.95	224.36	167.00	355.23	383.33	139.96
WSP-J506	PD5B	0.00	424.88	224.36	167.00	359.42	383.74	139.96
WSP-J782	PD5B	0.00	404.61	227.79	167.00	316.65	388.22	139.96
WSP-J831	PD5B	0.00	419.33	227.79	167.00	333.72	389.04	139.96
WSP-J770	PD5B	0.64	399.83	227.80	167.00	357.55	394.45	139.96
N51954	PD5B	4.24	413.47	225.43	167.00	360.34	414.62	139.96
WSP-J507	PD5B	0.26	424.90	224.36	167.00	368.94	420.68	139.96
WSP-J781	PD5B	0.00	399.70	227.79	167.00	321.77	428.12	139.96
WSP-J738	PD5B	0.00	428.95	225.43	167.00	377.45	430.10	139.96
WSP-J508	PD5B	0.00	424.92	224.36	167.00	379.11	472.60	139.96
WSP-J503	PD5B	0.00	430.02	224.38	167.00	388.56	490.23	139.96
WSP-J832	PD5B	0.57	399.89	227.81	167.00	397.97	550.02	139.96
WSP-J741	PD5B	0.14	419.25	227.78	167.00	349.54	579.46	139.96
WSP-J502	PD5B	0.00	434.92	224.38	167.00	406.68	619.36	139.96
M32130	PD5B	0.00	461.48	224.38	167.00	443.63	861.32	139.97
N04521	PD5B	21.19	453.24	224.38	167.00	438.40	978.49	139.97
M32165	PD5B	0.00	472.96	224.40	167.00	467.00	1576.30	139.97
N52100	PD5B	0.00	453.93	224.40	167.00	451.07	2510.06	139.99
WSP-J576	PD6RD	0.27	599.28	254.16	167.00	51.85	151.77	139.96
WSP-J578	PD6RD	0.00	628.67	254.16	167.00	68.22	154.79	139.96
WSP-J577	PD6RD	0.24	628.67	254.16	167.00	71.95	155.60	139.96
WSP-J837	PD6RD	0.30	620.27	254.16	167.00	121.28	163.80	139.96
WSP-J575	PD6RD	0.00	589.48	254.16	167.00	187.43	177.73	139.96
WSP-J573	PD6RD	0.37	589.48	254.16	167.00	190.10	178.77	139.96
WSP-J568	PD6RD	0.61	599.37	254.17	167.00	207.39	182.99	139.96
WSP-J574	PD6RD	0.00	609.08	254.16	167.00	226.30	187.09	139.96
WSP-J842	PD6RD	0.00	613.72	254.16	167.00	252.21	194.26	139.96
WSP-J569	PD6RD	0.00	599.38	254.17	167.00	252.59	195.28	139.96
WSP-J552	PD6RD	0.00	672.78	254.16	167.00	335.88	215.77	139.96
WSP-J826	PD6RD	0.10	687.48	254.16	167.00	341.55	215.92	139.96
WSP-J846	PD6RD	0.14	580.77	254.29	167.00	306.73	216.74	139.96
WSP-J546	PD6RD	0.27	672.78	254.16	167.00	339.09	217.22	139.96
WSP-J731	PD6RD	0.00	629.96	254.29	167.00	331.12	218.60	139.96
WSP-J547	PD6RD	0.44	648.29	254.16	167.00	339.87	221.42	139.96
WSP-J571	PD6RD	0.00	599.38	254.17	167.00	326.92	223.67	139.96
WSP-J548	PD6RD	0.74	667.89	254.16	167.00	362.22	227.59	139.96
WSP-J560	PD6RD	0.34	628.69	254.16	167.00	387.43	249.12	139.96
WSP-J757	PD6RD	1.09	600.16	254.25	167.00	377.27	250.08	139.96
WSP-J563	PD6RD	0.20	638.50	254.16	167.00	396.27	251.15	139.96
WSP-J559	PD6RD	0.00	599.32	254.16	167.00	379.36	253.26	139.96
WSP-J750	PD6RD	0.87	639.38	254.25	167.00	414.36	259.78	139.96
WSP-J807	PD6RD	0.03	648.51	254.18	167.00	418.55	259.81	139.96
WSP-J550	PD6RD	0.00	667.91	254.16	167.00	440.84	268.79	139.96
WSP-J721	PD6RD	1.16	595.65	254.29	167.00	421.14	284.25	139.96
WSP-J752	PD6RD	0.48	619.90	254.26	167.00	447.05	293.23	139.96
WSP-J847	PD6RD	0.30	622.90	254.16	167.00	444.48	294.42	139.96
WSP-J732	PD6RD	0.00	649.56	254.29	167.00	469.83	295.21	139.96
WSP-J572	PD6RD	0.37	599.37	254.17	167.00	430.81	295.47	139.96
WSP-J566	PD6RD	0.00	609.18	254.17	167.00	439.02	296.83	139.96
WSP-J704	PD6RD	0.00	571.72	254.34	167.00	423.02	297.94	139.96
WSP-J754	PD6RD	0.35	585.71	254.27	167.00	433.91	302.06	139.96
WSP-J565	PD6RD	0.24	638.58	254.17	167.00	476.69	327.22	139.96
WSP-J562	PD6RD	0.37	672.83	254.16	167.00	497.31	329.97	139.96
WSP-J795	PD6RD	0.74	614.31	254.19	167.00	475.84	335.39	139.96
WSP-J564	PD6RD	0.10	648.38	254.17	167.00	485.92	335.90	139.96
WSP-J815	PD6RD	0.00	551.56	254.29	167.00	437.86	339.08	139.96
WSP-J728	PD6RD	0.67	551.56	254.29	167.00	438.86	341.59	139.96
WSP-J792	PD6RD	0.00	609.42	254.19	167.00	480.13	346.12	139.96
WSP-J760	PD6RD	0.30	624.59	254.24	167.00	495.25	347.82	139.96
WSP-J851	PD6RD	0.00	627.26	254.17	167.00	479.69	350.44	139.96
WSP-J793	PD6RD	0.00	619.21	254.19	167.00	490.97	351.80	139.96
WSP-J764	PD6RD	0.61	658.57	254.21	167.00	529.37	364.77	139.96
WSP-J796	PD6RD	0.78	604.50	254.19	167.00	488.14	367.57	139.96
H755	PD6RD	0.00	560.46	254.29	167.00	468.02	390.92	139.96
WSP-J798	PD6RD	0.00	619.20	254.19	167.00	513.14	394.60	139.96
WSP-J558	PD6RD	0.27	618.97	254.17	167.00	482.04	401.08	139.96
N49198	PD6RD	8.50	560.96	254.29	167.00	469.33	402.07	139.96
WSP-J763	PD6RD	0.54	639.23	254.23	167.00	538.03	407.72	139.96
WSP-J791	PD6RD	0.74	629.02	254.19	167.00	527.92	411.42	139.96
WSP-J762	PD6RD	0.41	658.56	254.21	167.00	555.00	415.62	139.96

Results: York Downs
Markham, Region of York
Revision Date: November 2017

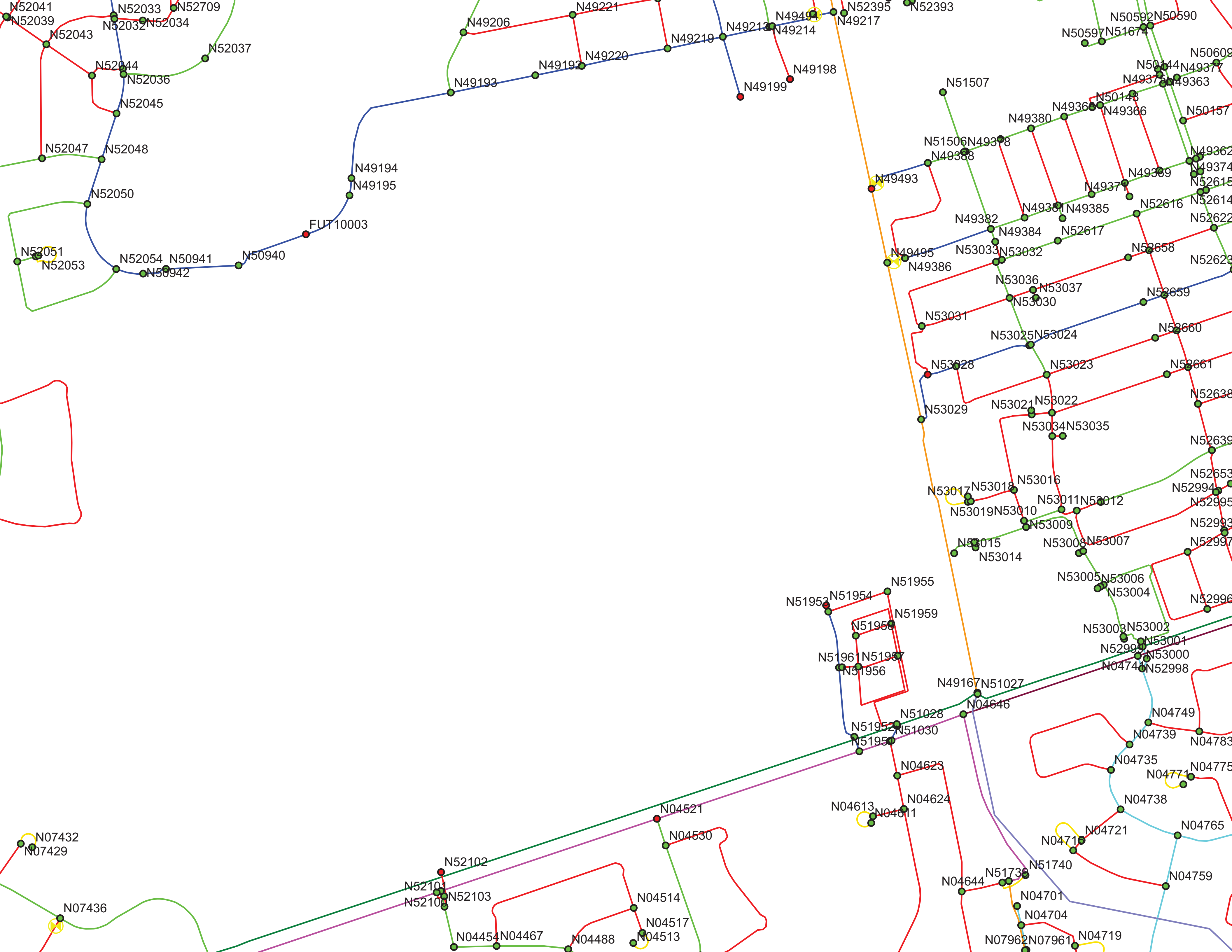
Full Buildout Fire Flow Table

ID	Pressure District	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
WSP-J525	PD5B	0.74	419.90	224.35	167.00	126.26	163.40	139.96
WSP-J852	PD6RD	0.34	643.26	254.17	167.00	528.11	426.38	139.96
WSP-J759	PD6RD	0.00	614.80	254.24	167.00	530.78	440.27	139.96
WSP-J811	PD6RD	0.00	643.56	254.17	167.00	533.64	441.75	139.96
WSP-J733	PD6RD	0.00	649.56	254.29	167.00	564.16	447.67	139.96
WSP-J758	PD6RD	0.27	585.47	254.25	167.00	510.92	455.04	139.96
WSP-J557	PD6RD	0.00	667.97	254.17	167.00	535.41	458.67	139.96
WSP-J806	PD6RD	0.00	672.95	254.17	167.00	558.95	464.46	139.96
WSP-J756	PD6RD	0.00	575.76	254.26	167.00	508.37	474.76	139.96
WSP-J730	PD6RD	0.00	629.96	254.29	167.00	557.11	479.91	139.96
WSP-J805	PD6RD	0.41	658.25	254.17	167.00	551.19	482.32	139.96
WSP-J816	PD6RD	0.00	667.97	254.17	167.00	541.10	490.16	139.96
WSP-J761	PD6RD	0.47	653.90	254.23	167.00	578.18	492.39	139.96
WSP-J724	PD6RD	0.00	580.96	254.29	167.00	519.38	499.02	139.96
WSP-J727	PD6RD	0.00	571.16	254.29	167.00	512.74	508.50	139.96
WSP-J755	PD6RD	0.83	580.71	254.26	167.00	522.65	522.66	139.96
WSP-J751	PD6RD	0.47	610.10	254.26	167.00	551.38	536.54	139.96
WSP-J749	PD6RD	0.30	649.20	254.25	167.00	586.65	542.73	139.96
WSP-J722	PD6RD	1.16	600.56	254.29	167.00	545.16	547.03	139.96
WSP-J748	PD6RD	0.00	673.67	254.25	167.00	610.00	551.70	139.96
WSP-J725	PD6RD	1.02	590.76	254.29	167.00	538.09	556.21	139.96
WSP-J753	PD6RD	0.27	585.71	254.27	167.00	534.12	559.26	139.96
WSP-J718	PD6RD	0.00	600.59	254.29	167.00	548.44	561.33	139.96
WSP-J556	PD6RD	0.57	682.69	254.17	167.00	563.19	566.80	139.96
WSP-J726	PD6RD	0.37	571.16	254.29	167.00	522.90	569.52	139.96
WSP-J708	PD6RD	0.00	566.35	254.30	167.00	519.45	573.65	139.96
WSP-J854	PD6RD	0.00	578.25	254.26	167.00	529.39	575.62	139.96
WSP-J705	PD6RD	0.79	561.45	254.30	167.00	515.28	577.08	139.96
WSP-J707	PD6RD	1.32	581.06	254.30	167.00	533.59	579.12	139.96
WSP-J715	PD6RD	1.16	580.83	254.27	167.00	532.99	580.97	139.96
WSP-J794	PD6RD	0.71	628.98	254.19	167.00	554.09	629.88	139.96
WSP-J742	PD6RD	0.00	678.54	254.24	167.00	627.07	634.12	139.96
WSP-J804	PD6RD	0.34	648.60	254.19	167.00	574.78	645.16	139.96
WSP-J845	PD6RD	0.00	573.71	254.29	167.00	535.17	653.58	139.96
WSP-J743	PD6RD	0.37	658.93	254.24	167.00	611.43	654.62	139.96
WSP-J809	PD6RD	0.00	668.04	254.17	167.00	576.13	659.87	139.96
WSP-J810	PD6RD	0.41	663.15	254.17	167.00	576.00	660.54	139.96
WSP-J555	PD6RD	0.00	687.60	254.17	167.00	574.87	663.71	139.96
WSP-J719	PD6RD	1.16	600.60	254.29	167.00	561.96	673.78	139.96
WSP-J801	PD6RD	0.00	619.21	254.19	167.00	551.27	674.93	139.96
WSP-J812	PD6RD	0.27	658.26	254.17	167.00	576.49	679.42	139.96
WSP-J802	PD6RD	0.77	619.25	254.19	167.00	554.31	681.80	139.96
WSP-J799	PD6RD	0.00	628.96	254.19	167.00	557.21	688.03	139.96
WSP-J709	PD6RD	1.08	576.17	254.30	167.00	542.67	707.91	139.96
WSP-J790	PD6RD	0.00	633.97	254.20	167.00	572.22	713.93	139.96
WSP-J744	PD6RD	0.00	629.53	254.24	167.00	589.15	722.24	139.96
WSP-J766	PD6RD	0.00	648.75	254.20	167.00	592.87	746.14	139.96
WSP-J844	PD6RD	0.76	637.59	254.21	167.00	588.43	766.31	139.96
WSP-J723	PD6RD	0.00	576.06	254.29	167.00	546.90	778.74	139.96
WSP-J765	PD6RD	0.79	629.36	254.23	167.00	587.18	805.59	139.96
WSP-J745	PD6RD	0.00	629.52	254.24	167.00	596.52	891.64	139.97
WSP-J720	PD6RD	0.00	580.97	254.29	167.00	557.38	897.47	139.97
WSP-J746	PD6RD	1.03	629.59	254.25	167.00	599.89	929.96	139.97
WSP-J717	PD6RD	0.14	590.78	254.29	167.00	570.43	1001.52	139.97
WSP-J747	PD6RD	0.00	619.90	254.26	167.00	595.04	1004.95	139.97
WSP-J716	PD6RD	1.30	610.22	254.27	167.00	589.64	1088.61	139.97
WSP-J711	PD6RD	0.14	585.96	254.30	167.00	572.34	1288.75	139.97
WSP-J712	PD6RD	0.00	590.81	254.29	167.00	577.23	1376.94	139.97
WSP-J710	PD6RD	0.51	576.21	254.30	167.00	564.29	1379.07	139.97
H747	PD6RD	0.00	571.38	254.32	167.00	560.68	1427.77	139.97
N49199	PD6RD	8.50	571.85	254.32	167.00	561.05	1430.85	139.97
WSP-J701	PD6RD	0.00	570.30	254.32	167.00	559.84	1441.49	139.97
WSP-J713	PD6RD	1.02	590.99	254.31	167.00	580.13	1491.29	139.97

APPENDIX

C

BOUNDARY CONDITIONS



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York Downs Boundary Information

Existing scenarios, new model, with PRVs

Min Hour	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Average Day	Demand (L/s	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Max Day	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Peak Hour No PD5 Milliken pumps	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	47.68	178.13	222.13	431.17
16th/Normandale (Street B)	N52102	47.68	180.5	217.76	365.11
Bur Oak	N49493	19.35	192.72	258.47	644.31
Prospectors	N49199	19.04	195.96	254.05	569.26
Dancer's Drive	N49198	19.04	197.04	253.42	552.47
Wilfred Murison Ave	N53028	19.03	199.25	258.49	580.5
Angus Glen (in valley)	FUT10003	18.97	188	253.95	646.24
Yorkton	N51954	9.54	181.66	222.26	397.87

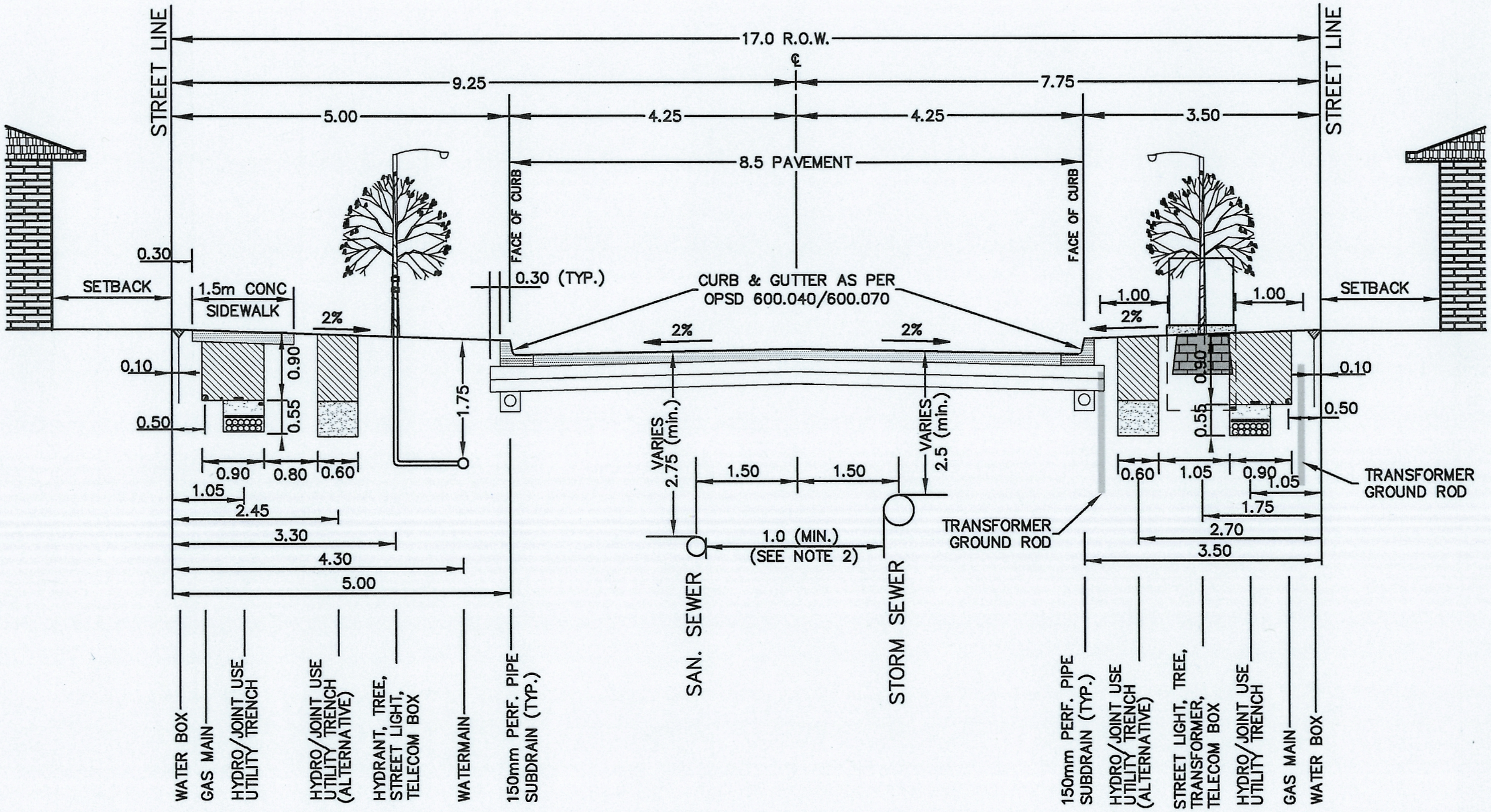
Peak Hour	ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
16th/Normandale (Street A)	N04521	21.19	178.13	225.4	463.18
16th/Normandale (Street B)	N52102	21.19	180.5	224.42	430.42
Bur Oak	N49493	8.79	192.72	260.31	662.33
Prospectors	N49199	8.5	195.96	254.53	573.97
Dancer's Drive	N49198	8.5	197.04	254.39	562
Wilfred Murison Ave	N53028	8.48	199.25	260.34	598.62
Angus Glen (in valley)	FUT10003	8.43	188	254.51	651.7
Yorkton	N51954	4.24	181.66	225.44	429.04

Max Day Fire Flow

ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow at Hydrant (L/s)	Available Flow Pressure (kPa)
N52102	21.19	430.42	224.42	250	-675.63	132.82	140
N04521	21.19	463.18	225.4	250	419.95	910.21	140
N49493	8.79	662.33	260.31	250	631.86	1,415.45	140
N49199	8.5	573.97	254.53	250	495.2	753.75	140
N49198	8.5	562	254.39	250	-286.44	173.29	140
N53028	8.48	598.62	260.34	250	543.39	862.21	140
FUT10003	8.43	651.7	254.51	250	519.88	595	140
N51954	4.24	429.04	225.44	117	403.08	496.83	140

Notes: N52102 is the connection point on north side of 16th supplied via a 150 mm pipe. Pipe will need to be replaced or another connection made to the 16th Ave PD5 450 to support York Downs

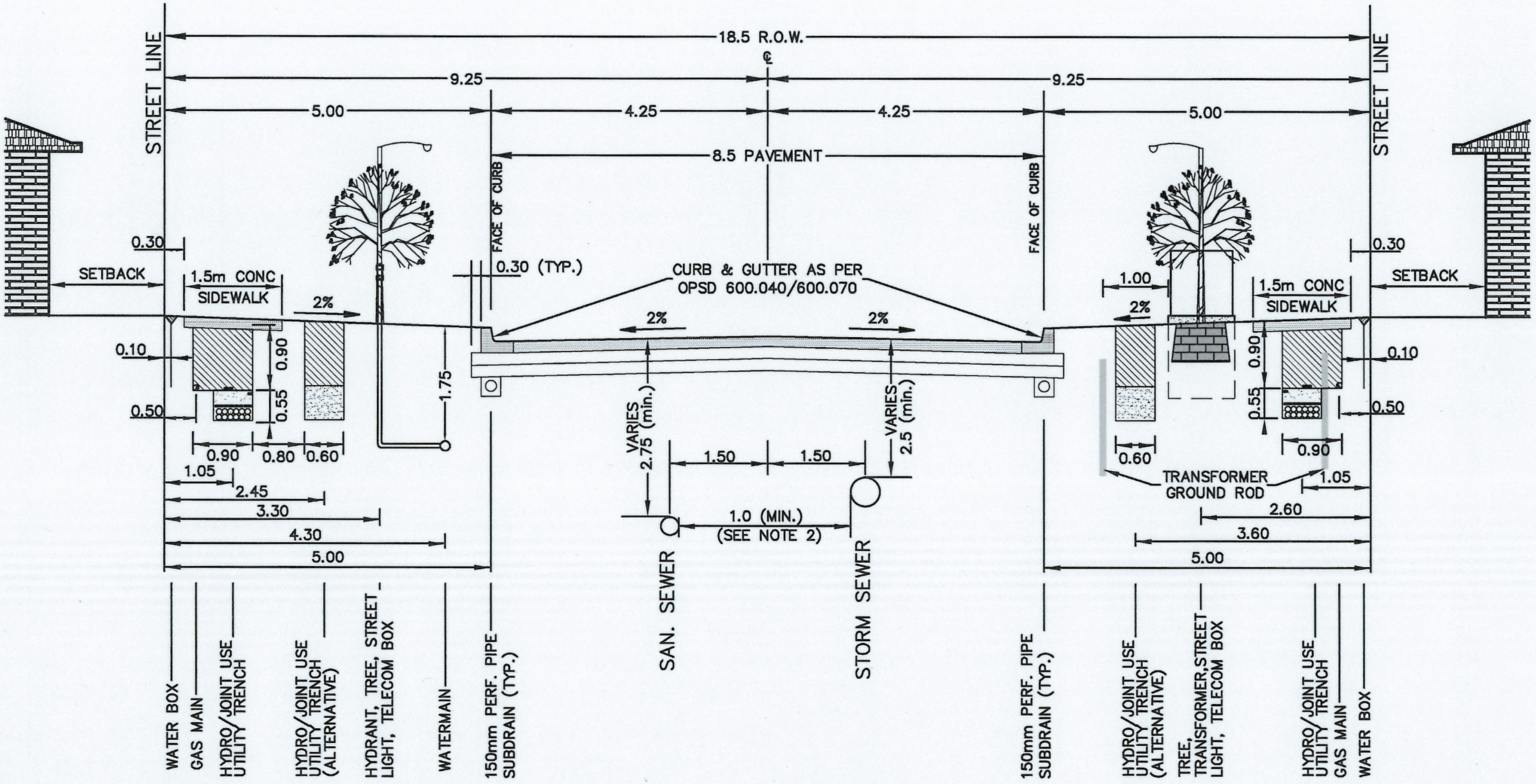
Appendix H TYPICAL ROW SECTIONS



NOTE:
1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSING SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN PIPES SHALL BE 1.0m.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM ENGINEERING DEPARTMENT	DRAWING NAME: 17.0m RESIDENTIAL LOCAL ROAD (SIDEWALK ON ONE SIDE) NOTE: THIS STANDARD TO BE USED ONLY IF APPROVED BY THE D.O.E.	SCALE: NTS REV: 0 DATE: SEPTEMBER 2010	APPROVED BY: DIRECTOR OF ENGINEERING DWG. NO. MR3

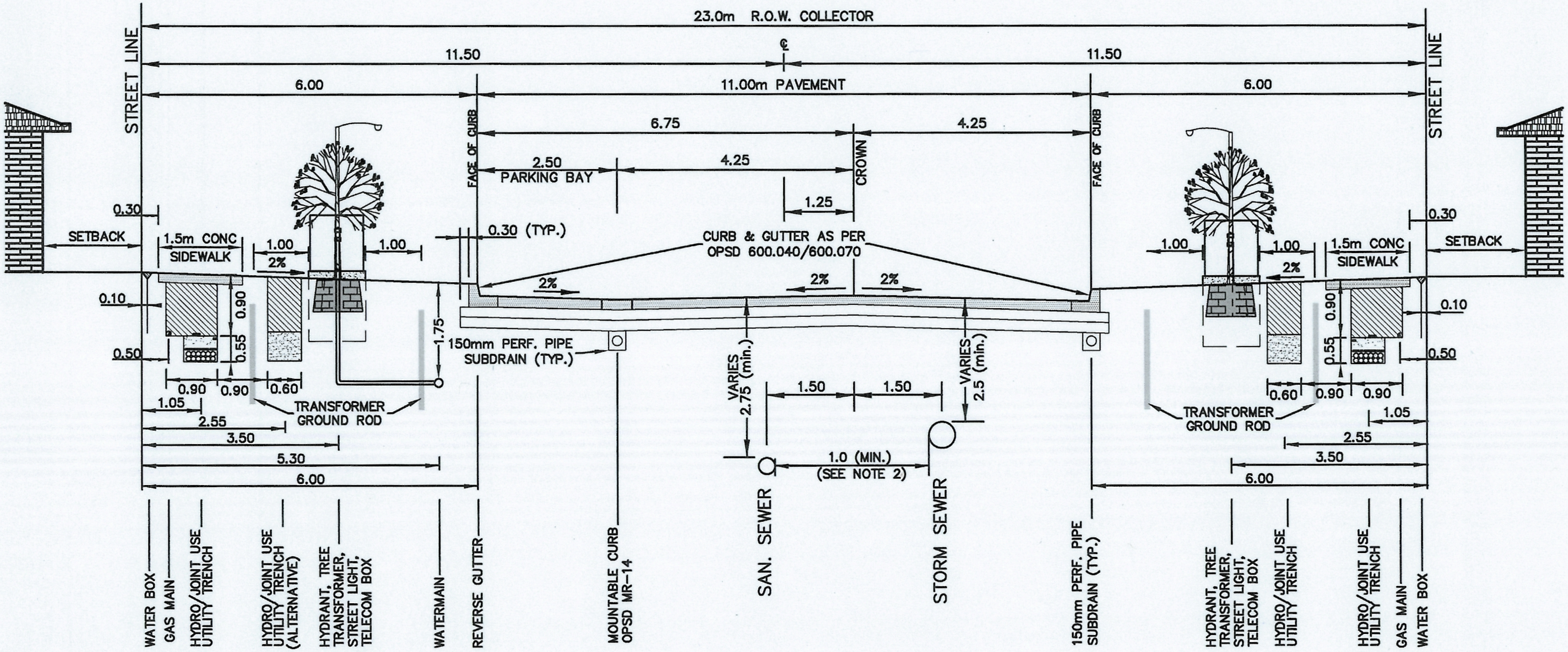


NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSING SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0m.
3. THIS STANDARD TO BE USED FOR LOCAL ROADS SURROUNDING SCHOOLS, PARKS, ICI, MEDIUM OR HIGH DENSITY RESIDENTIAL AREAS, AND IN AREAS WHERE SIDEWALKS ARE REQUIRED ON BOTH SIDES.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM ENGINEERING DEPARTMENT	DRAWING NAME: 18.5m RESIDENTIAL LOCAL ROAD (SIDEWALKS ON BOTH SIDES)	SCALE: NTS REV: 0 DATE: SEPTEMBER 2010	APPROVED BY: DIRECTOR OF ENGINEERING DWG. NO. MR4

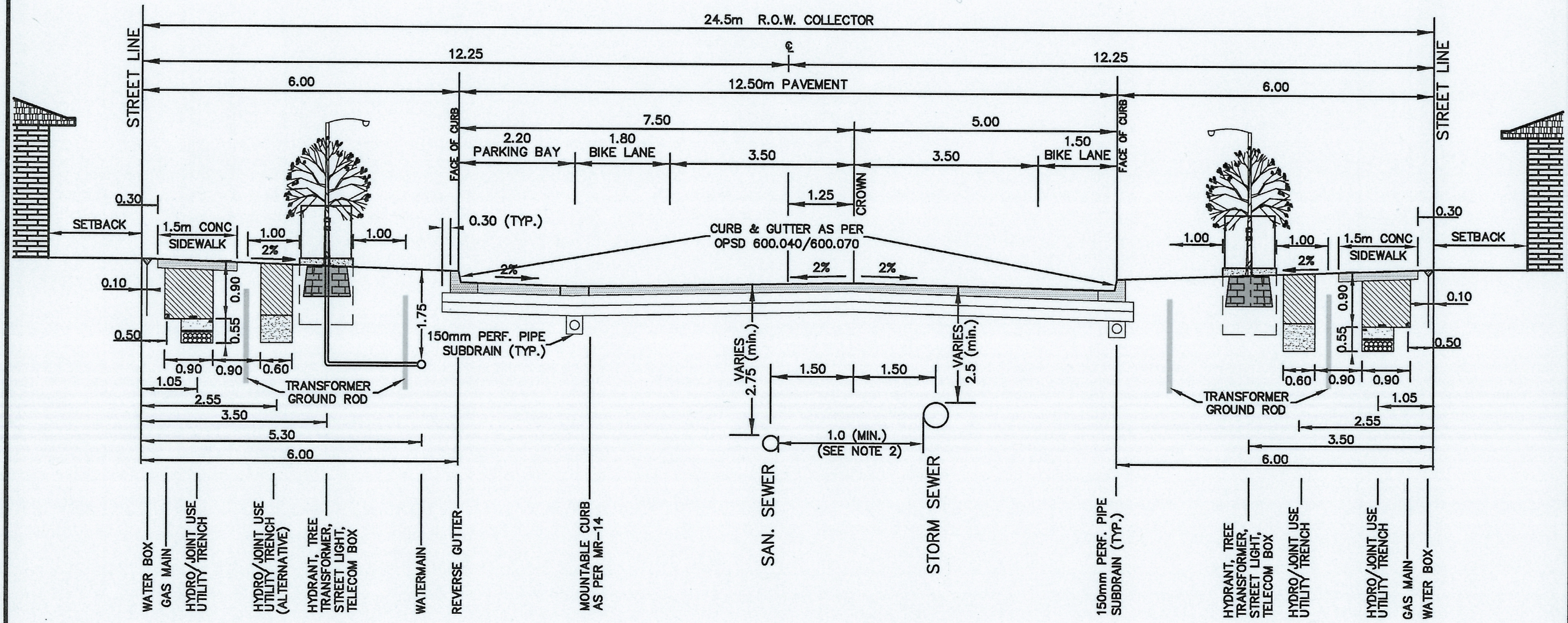


NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSINGS SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0m.
3. FOR CURB TRANSITION ON PARKING BAY, SEE MR18.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM ENGINEERING DEPARTMENT	DRAWING NAME: 23.0m RESIDENTIAL COLLECTOR ROAD (ONE SIDE PARKING & SHARED BIKE ROUTE)	SCALE: NTS REV: 0 DATE: SEPTEMBER 2010	APPROVED BY: DIRECTOR OF ENGINEERING DWG. NO. MR6

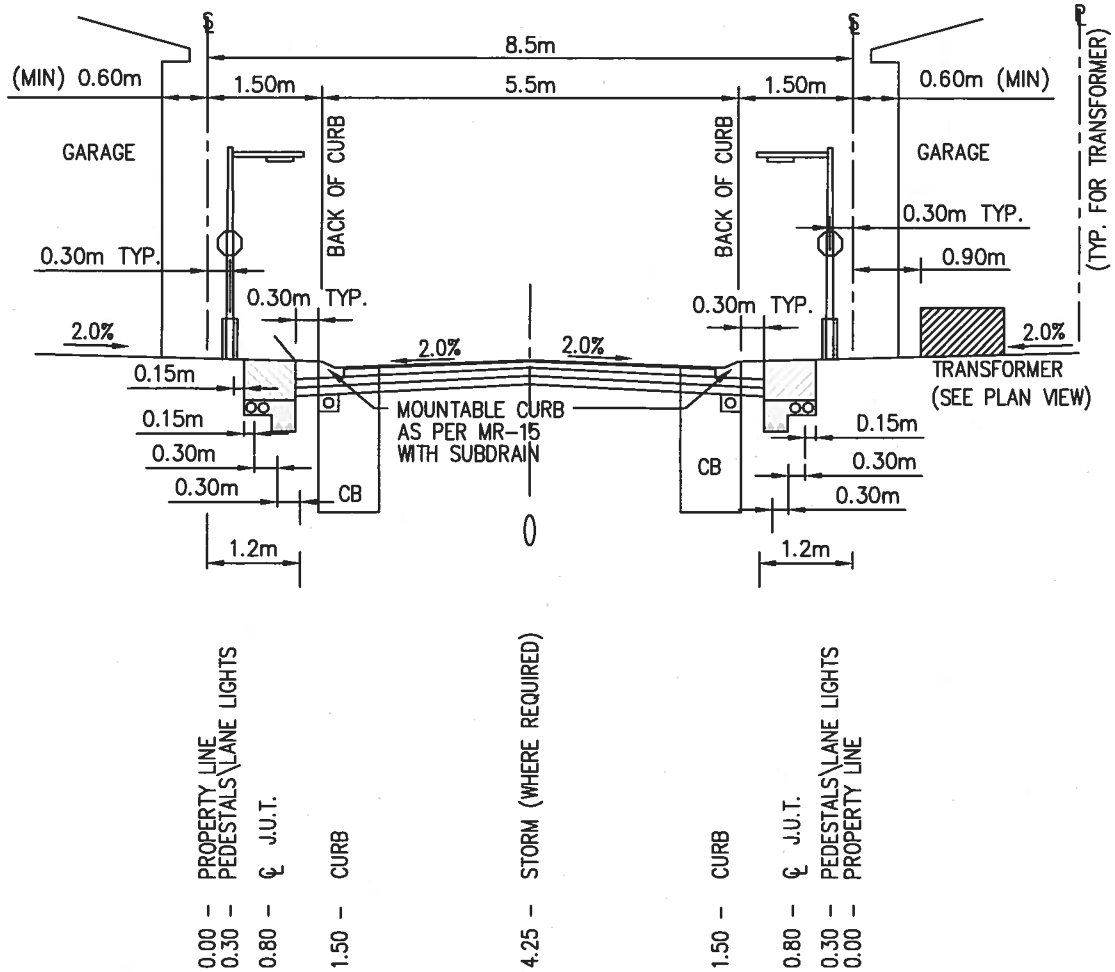


NOTE:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSINGS SHALL BE 1.0m (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0m.
3. FOR CURB TRANSITION ON PARKING BAY, SEE MR18.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.

MARKHAM ENGINEERING DEPARTMENT	DRAWING NAME: 24.5m RESIDENTIAL COLLECTOR ROAD (ONE SIDE PARKING BAY & BIKE LANES)	SCALE: NTS REV: 0 DATE: SEPTEMBER 2010	APPROVED BY: DIRECTOR OF ENGINEERING DWG. NO. MR7



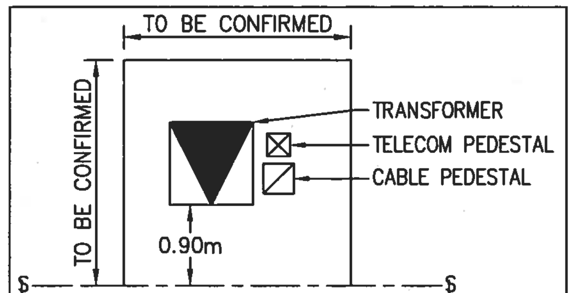
ALL DIMENSIONS ARE IN METRES
UNLESS OTHERWISE SHOWN.

<u>CRITERIA FOR LANE WAYS</u>

1. MAXIMUM LENGTH OF LANE SHALL BE 120m FOR SINGLES AND 90m FOR TOWNS.
2. LANES SHALL NOT INTERSECT LANES, EXCEPT APPROVED BY THE DIRECTOR OF ENGINEERING.
3. LANES SHALL START AND END ON ROADS.
4. LANES SHALL PREFERABLY BE STRAIGHT OR WITH SLIGHT CURVATURE. MINIMUM CENTRE LINE RADIUS SHALL BE 12m.
5. ROADS SHALL NOT START OR END AT A LANE.
6. MINIMUM DRIVEWAY APRON SHALL BE 4% AND MAXIMUM 8%.

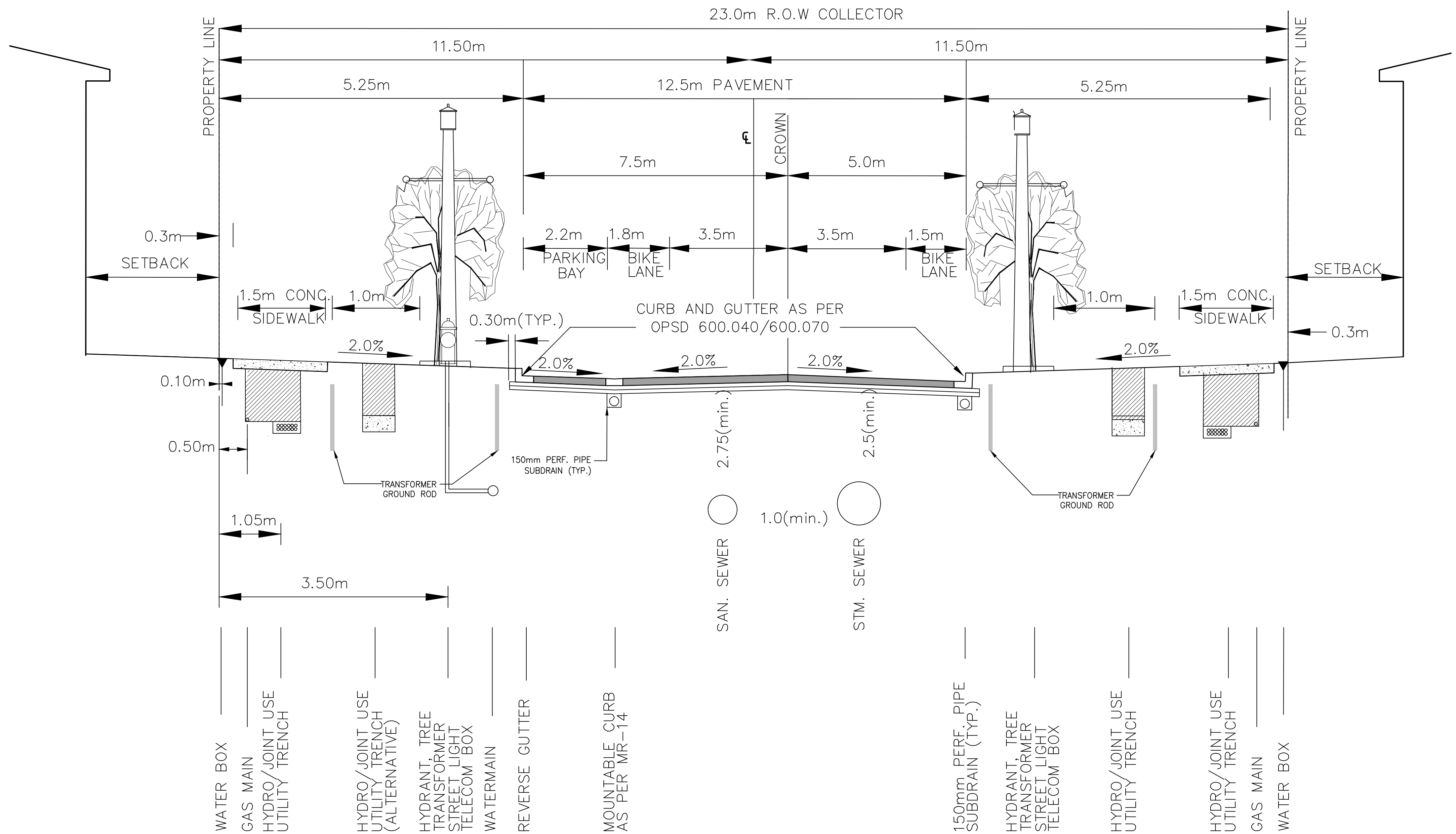
<u>NOTES</u>

1. LANE R.O.W. TO BE WIDENED PERIODICALLY TO ACCOMMODATE TRANSFORMERS, SWITCH GEARS, UTILITY PEDESTALS, AND HYDRANTS, WHERE NECESSARY.
2. WHERE PRACTICAL, BELL AND CABLE TV PEDESTALS TO BE INSTALLED WITHIN TRANSFORMER NOTCHES.
3. GARAGES TO BE SET BACK MIN. 0.60m FROM STREETLINE. EAVES MAY EXTEND INTO SET BACK, BUT EAVES OR GARAGE FOUNDATION SHALL NOT ENCROACH ONTO R.O.W..
4. PUBLIC LANE LIGHTING TO BE PROVIDED.
5. PROVIDE FULL DEPTH GRANULAR PAVEMENT STRUCTURE FOR A MINIMUM WIDTH OF 300mm BEHIND EACH CURB.
6. TYP. MINIMUM DEPTH FOR UTILITY CROSSING SHALL BE 1.0m (TO CLEAR SUB-DRAINS).



PLAN VIEW FOR TRANSFORMER CUTOUT

MARKHAM ENGINEERING DEPARTMENT	DRAWING NAME: 8.5m RESIDENTIAL LANE (WITH UTILITIES)	SCALE: NTS REV: 1 DATE: AUGUST 2012	APPROVED BY: DIRECTOR OF ENGINEERING DWG. NO. MR10



22.5m STREET

PARKING PERMITTED BOTH SIDES IN OFF PEAK PERIODS

N.T.S.

NOTES:

1. TYPICAL MINIMUM DEPTH OF UTILITY CROSSINGS SHALL BE 1.0M (TO CLEAR SUBDRAINS).
2. FOR SANITARY AND STORM SEWERS IN COMMON TRENCH, THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PIPES SHALL BE 1.0M.
3. FOR THE CURB TRANSITION ON PARKING BAY, SEE MR18.
4. THIS STANDARD IS A MODIFIED VERSION OF TOWN STANDARD MR7.

File: V:\01606\Active\160622264\Drawing\sheet_files\[MESP]\Figure H-1 – 23.0m Modified ROW.dwg – Revised by <Guerriero, Michael>, Mon, Oct 02, 2017, 5:05 PM

Stantec
BEACON ENVIRONMENTAL
BURNSIDE

0 5 10 15 20 25
1:500

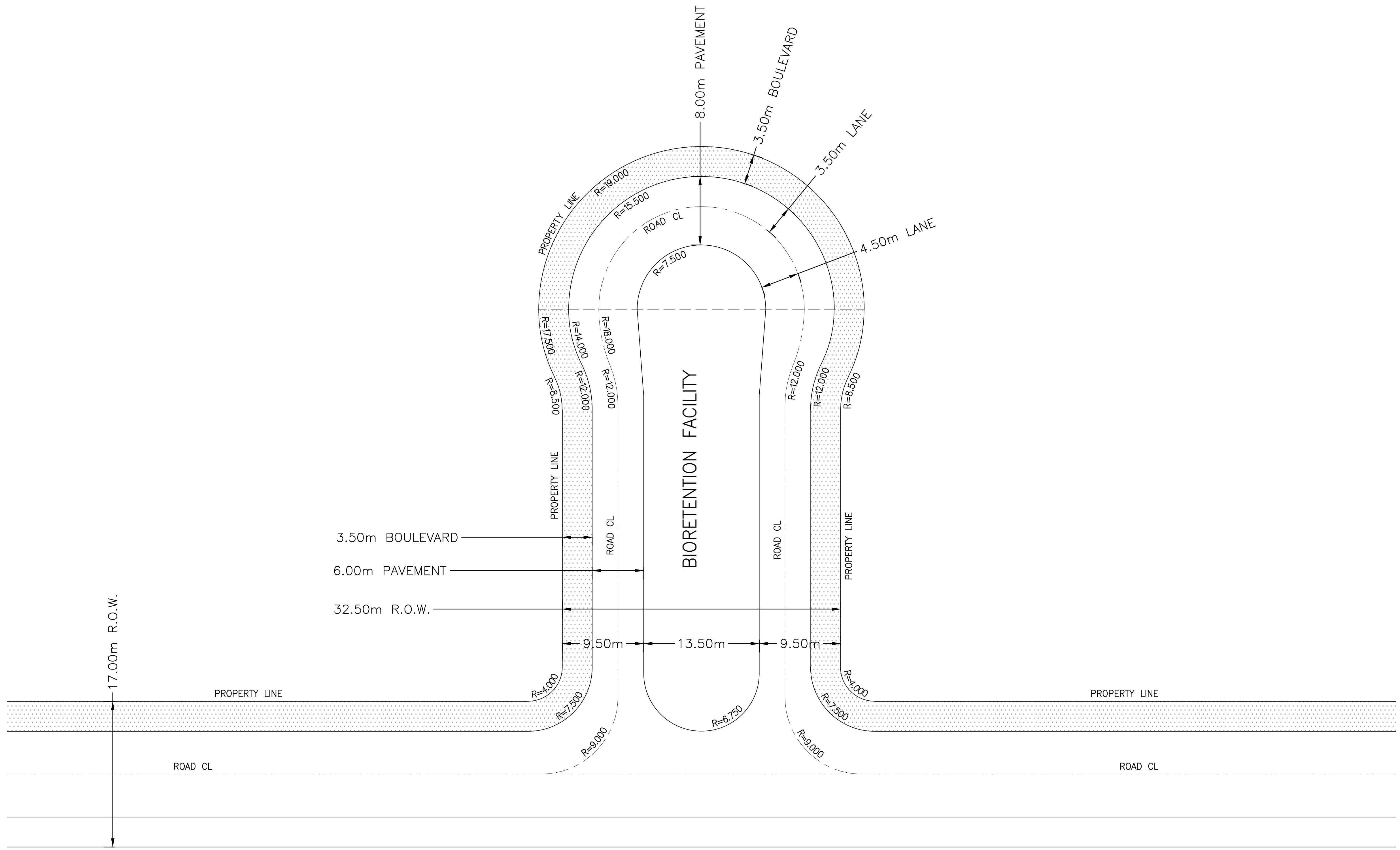
Legend

MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE H-1

23.0m MODIFIED ROW

October 2017



Stantec
BEACON ENVIRONMENTAL
BURNSIDE

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MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE H-2

RESIDENTIAL ENCLAVE CUL-DE-SAC (TYPICAL MODIFIED)

October 2017

Appendix I EXISTING CONDITIONS HYDRAULICS BRUCE CREEK

Revised Existing Bruce Creek Hydraulic Modelling Analysis for

2 - 100 Year and Regional Storm Events

October 2017

HEC-RAS Plan: ExAug2017 River: Bruce Creek Reach: Reach 2

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	8212.01	Regional	213.48	182.30	185.77		185.81	0.000260	1.06	286.55	133.05	0.18
Reach 2	8212.01	100 YR	50.23	182.30	184.07		184.09	0.000215	0.61	99.95	87.33	0.15
Reach 2	8212.01	50 YR	42.61	182.30	183.93		183.95	0.000213	0.58	88.05	82.55	0.14
Reach 2	8212.01	25 YR	35.47	182.30	183.79		183.80	0.000209	0.54	76.54	76.42	0.14
Reach 2	8212.01	10 YR	27.35	182.30	183.59		183.60	0.000211	0.49	62.20	68.01	0.14
Reach 2	8212.01	5 YR	21.47	182.30	183.42		183.43	0.000215	0.45	51.37	60.90	0.14
Reach 2	8212.01	2 YR	13.60	182.30	183.14		183.15	0.000237	0.39	35.80	48.90	0.14
Reach 2	7216.195	Regional	213.48	181.68	185.66		185.77	0.000892	1.95	177.65	77.24	0.32
Reach 2	7216.195	100 YR	50.23	181.68	184.01		184.05	0.000674	1.15	68.88	59.04	0.25
Reach 2	7216.195	50 YR	42.61	181.68	183.87		183.91	0.000687	1.11	60.68	58.17	0.25
Reach 2	7216.195	25 YR	35.47	181.68	183.73		183.77	0.000709	1.07	52.25	57.26	0.25
Reach 2	7216.195	10 YR	27.35	181.68	183.52		183.56	0.000797	1.05	40.63	55.99	0.26
Reach 2	7216.195	5 YR	21.47	181.68	183.34		183.39	0.000928	1.04	30.78	54.89	0.28
Reach 2	7216.195	2 YR	13.60	181.68	183.04		183.09	0.001198	1.01	15.08	38.65	0.31
Reach 2	7216.19	Regional	213.48	181.52	184.78	184.78	185.52	0.007671	4.95	75.66	53.55	0.91
Reach 2	7216.19	100 YR	50.23	181.52	183.42	183.42	183.87	0.007602	3.29	21.50	27.12	0.82
Reach 2	7216.19	50 YR	42.61	181.52	183.29	183.29	183.73	0.007723	3.15	18.35	25.14	0.82
Reach 2	7216.19	25 YR	35.47	181.52	183.14	183.14	183.57	0.008397	3.06	14.79	22.03	0.84
Reach 2	7216.19	10 YR	27.35	181.52	182.91	182.91	183.34	0.010507	3.02	10.48	14.73	0.91
Reach 2	7216.19	5 YR	21.47	181.52	182.75	182.75	183.15	0.011378	2.84	8.32	12.49	0.92
Reach 2	7216.19	2 YR	13.60	181.52	182.51	182.48	182.82	0.012063	2.45	5.75	9.29	0.91
Reach 2	7216.186	Regional	213.48	181.34	184.24		184.48	0.003531	3.16	109.35	59.18	0.61
Reach 2	7216.186	100 YR	50.23	181.34	183.09		183.17	0.002459	1.84	46.40	49.53	0.46
Reach 2	7216.186	50 YR	42.61	181.34	183.00		183.08	0.002348	1.73	42.13	48.64	0.45
Reach 2	7216.186	25 YR	35.47	181.34	182.91		182.98	0.002245	1.63	37.75	47.97	0.43
Reach 2	7216.186	10 YR	27.35	181.34	182.83		182.88	0.001806	1.41	34.01	47.40	0.38
Reach 2	7216.186	5 YR	21.47	181.34	182.69		182.75	0.002033	1.39	27.53	46.39	0.40
Reach 2	7216.186	2 YR	13.60	181.34	182.55		182.59	0.001675	1.16	21.14	45.04	0.36
Reach 2	7216.183	Regional	213.48	181.04	184.15		184.34	0.003121	2.93	124.37	73.33	0.57
Reach 2	7216.183	100 YR	50.23	181.04	183.00		183.08	0.002376	1.76	50.63	59.12	0.45
Reach 2	7216.183	50 YR	42.61	181.04	182.92		182.98	0.002350	1.69	45.50	58.44	0.45
Reach 2	7216.183	25 YR	35.47	181.04	182.82		182.89	0.002350	1.61	40.17	57.73	0.44
Reach 2	7216.183	10 YR	27.35	181.04	182.76	182.49	182.81	0.001811	1.38	36.74	57.27	0.38
Reach 2	7216.183	5 YR	21.47	181.04	182.59	182.44	182.65	0.002709	1.53	26.83	55.88	0.46
Reach 2	7216.183	2 YR	13.60	181.04	182.34	182.34	182.47	0.005646	1.87	13.55	51.40	0.64
Reach 2	7216.18	Regional	213.48	180.83	183.78	183.45	184.13	0.004590	3.53	101.52	67.61	0.69
Reach 2	7216.18	100 YR	50.23	180.83	182.58	182.58	182.86	0.005913	2.68	30.24	51.80	0.71
Reach 2	7216.18	50 YR	42.61	180.83	182.51	182.51	182.77	0.005699	2.54	26.49	50.85	0.69
Reach 2	7216.18	25 YR	35.47	180.83	182.43	182.43	182.68	0.005464	2.39	22.61	49.85	0.67
Reach 2	7216.18	10 YR	27.35	180.83	182.15	182.09	182.56	0.010966	2.87	9.63	11.69	0.91
Reach 2	7216.18	5 YR	21.47	180.83	182.10	181.93	182.38	0.007993	2.37	9.09	10.34	0.77
Reach 2	7216.18	2 YR	13.60	180.83	181.97	181.66	182.12	0.004954	1.73	7.87	9.20	0.60
Reach 2	7216.175	Regional	213.48	180.45	183.60	182.71	183.76	0.002110	2.52	144.25	83.40	0.48
Reach 2	7216.175	100 YR	50.23	180.45	182.38	181.95	182.44	0.001605	1.50	56.53	61.93	0.38
Reach 2	7216.175	50 YR	42.61	180.45	182.26	181.89	182.32	0.001670	1.45	49.67	60.36	0.38
Reach 2	7216.175	25 YR	35.47	180.45	182.16	181.84	182.21	0.001699	1.39	43.36	58.88	0.38
Reach 2	7216.175	10 YR	27.35	180.45	182.05	181.76	182.10	0.001579	1.27	36.96	57.34	0.36
Reach 2	7216.175	5 YR	21.47	180.45	181.96	181.70	182.00	0.001453	1.16	31.92	56.09	0.34
Reach 2	7216.175	2 YR	13.60	180.45	181.82	181.45	181.85	0.001173	0.96	24.48	54.20	0.30
Reach 2	7216.172	Regional	213.48	180.39	183.31		183.47	0.002481	2.74	138.93	91.59	0.53
Reach 2	7216.172	100 YR	50.23	180.39	182.14		182.21	0.002003	1.70	52.80	59.95	0.43
Reach 2	7216.172	50 YR	42.61	180.39	181.99		182.06	0.002496	1.77	43.65	57.49	0.48
Reach 2	7216.172	25 YR	35.47	180.39	181.82		181.91	0.003488	1.92	34.12	55.00	0.55
Reach 2	7216.172	10 YR	27.35	180.39	181.70		181.79	0.003774	1.87	27.56	54.37	0.56
Reach 2	7216.172	5 YR	21.47	180.39	181.60		181.70	0.004177	1.85	22.13	53.99	0.58
Reach 2	7216.172	2 YR	13.60	180.39	181.43	181.43	181.57	0.005442	1.88	13.26	53.37	0.65
Reach 2	7216.171	Regional	213.48	180.05	183.26		183.35	0.001385	2.13	178.04	99.93	0.39
Reach 2	7216.171	100 YR	50.23	180.05	182.10		182.13	0.000840	1.20	76.05	77.69	0.28
Reach 2	7216.171	50 YR	42.61	180.05	181.93		181.97	0.001020	1.24	63.21	74.87	0.31
Reach 2	7216.171	25 YR	35.47	180.05	181.73		181.78	0.001423	1.34	48.80	70.66	0.35
Reach 2	7216.171	10 YR	27.35	180.05	181.62		181.66	0.001339	1.23	40.85	66.70	0.34
Reach 2	7216.171	5 YR	21.47	180.05	181.53		181.56	0.001237	1.13	34.83	63.53	0.32
Reach 2	7216.171	2 YR	13.60	180.05	181.35		181.39	0.001187	1.00	24.33	57.55	0.31
Reach 2	7216.168	Regional	213.48	179.70	183.10		183.17	0.000860	1.77	214.33	110.97	0.32
Reach 2	7216.168	100 YR	50.23	179.70	182.01		182.03	0.000429	0.94	101.13	96.66	0.21
Reach 2	7216.168	50 YR	42.61	179.70	181.82		181.84	0.000552	1.00	82.58	94.29	0.23
Reach 2	7216.168	25 YR	35.47	179.70	181.51		181.56	0.001207	1.31	54.13	90.54	0.34
Reach 2	7216.168	10 YR	27.35	179.70	181.37		181.42	0.001402	1.32	41.22	88.66	0.36
Reach 2	7216.168	5 YR	21.47	179.70	181.22		181.30	0.001853	1.41	28.57	83.37	0.40

HEC-RAS Plan: ExAug2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	7216.168	2 YR	13.60	179.70	180.91	180.58	181.03	0.003273	1.56	9.60	15.04	0.51
Reach 2	7216.165	Regional	213.48	179.27	183.01	181.99	183.10	0.000989	1.83	207.70	134.27	0.33
Reach 2	7216.165	100 YR	50.23	179.27	181.97	181.25	182.00	0.000428	0.92	94.12	94.10	0.20
Reach 2	7216.165	50 YR	42.61	179.27	181.77	180.94	181.80	0.000549	0.97	75.31	88.51	0.23
Reach 2	7216.165	25 YR	35.47	179.27	181.36	180.79	181.44	0.001586	1.39	41.49	78.18	0.37
Reach 2	7216.165	10 YR	27.35	179.27	181.11	180.59	181.24	0.002876	1.64	21.98	74.53	0.48
Reach 2	7216.165	5 YR	21.47	179.27	180.92	180.41	181.05	0.003483	1.62	13.26	13.35	0.52
Reach 2	7216.165	2 YR	13.60	179.27	180.59	180.15	180.70	0.003339	1.46	9.33	10.60	0.50
Reach 2	7216.16	Regional	213.48	179.12	182.94	182.18	183.03	0.001043	2.01	222.96	170.91	0.35
Reach 2	7216.16	100 YR	50.23	179.12	181.84	180.84	181.93	0.001028	1.54	44.33	102.51	0.32
Reach 2	7216.16	50 YR	42.61	179.12	181.62	180.70	181.72	0.001148	1.53	37.30	89.05	0.34
Reach 2	7216.16	25 YR	35.47	179.12	181.03	180.52	181.24	0.003217	2.06	19.15	39.13	0.53
Reach 2	7216.16	10 YR	27.35	179.12	180.83	180.33	181.01	0.003195	1.87	15.44	16.50	0.52
Reach 2	7216.16	5 YR	21.47	179.12	180.66	180.17	180.81	0.003143	1.69	12.89	14.16	0.50
Reach 2	7216.16	2 YR	13.60	179.12	180.36	179.93	180.47	0.002992	1.44	9.47	10.12	0.47
Reach 2	7216.145		Bridge									
Reach 2	7216.13	Regional	213.48	178.92	182.07	182.07	182.66	0.006920	4.28	92.88	95.23	0.86
Reach 2	7216.13	100 YR	50.23	178.92	180.97	180.86	181.40	0.006993	2.95	18.74	36.48	0.78
Reach 2	7216.13	50 YR	42.61	178.92	180.88	180.66	181.25	0.006527	2.72	16.80	22.55	0.75
Reach 2	7216.13	25 YR	35.47	178.92	180.80	180.52	181.10	0.005531	2.41	15.36	19.05	0.68
Reach 2	7216.13	10 YR	27.35	178.92	180.66	180.33	180.89	0.004885	2.10	13.13	13.21	0.63
Reach 2	7216.13	5 YR	21.47	178.92	180.53	180.16	180.71	0.004586	1.87	11.47	11.43	0.60
Reach 2	7216.13	2 YR	13.60	178.92	180.24	179.90	180.37	0.004357	1.63	8.34	9.84	0.57
Reach 2	7216.128	Regional	213.48	178.63	182.09		182.20	0.001677	2.44	180.82	122.76	0.43
Reach 2	7216.128	100 YR	50.23	178.63	180.91		181.04	0.002153	2.05	53.50	89.38	0.45
Reach 2	7216.128	50 YR	42.61	178.63	180.69	180.61	180.89	0.003338	2.37	35.85	69.75	0.55
Reach 2	7216.128	25 YR	35.47	178.63	180.50	180.33	180.78	0.004718	2.62	23.50	58.19	0.65
Reach 2	7216.128	10 YR	27.35	178.63	180.40	180.15	180.62	0.003832	2.27	18.64	41.72	0.58
Reach 2	7216.128	5 YR	21.47	178.63	180.21		180.42	0.004259	2.19	13.05	21.88	0.60
Reach 2	7216.128	2 YR	13.60	178.63	179.91		180.09	0.004471	1.91	8.08	12.84	0.59
Reach 2	7216.125	Regional	213.48	178.49	182.06		182.13	0.000945	1.82	218.25	147.42	0.32
Reach 2	7216.125	100 YR	50.23	178.49	180.92		180.95	0.000628	1.12	90.01	103.09	0.24
Reach 2	7216.125	50 YR	42.61	178.49	180.70		180.75	0.000984	1.31	67.26	101.44	0.30
Reach 2	7216.125	25 YR	35.47	178.49	180.46		180.56	0.001854	1.65	43.54	99.56	0.40
Reach 2	7216.125	10 YR	27.35	178.49	180.13	179.79	180.36	0.004488	2.22	14.39	16.79	0.60
Reach 2	7216.125	5 YR	21.47	178.49	179.92	179.61	180.14	0.004895	2.12	11.21	13.85	0.62
Reach 2	7216.125	2 YR	13.60	178.49	179.60		179.78	0.005250	1.87	7.47	9.92	0.62
Reach 2	7216.123	Regional	213.48	177.97	181.99		182.08	0.001183	2.27	209.80	141.01	0.37
Reach 2	7216.123	100 YR	50.23	177.97	180.85		180.92	0.000863	1.52	72.15	95.26	0.30
Reach 2	7216.123	50 YR	42.61	177.97	180.56		180.68	0.001566	1.89	45.35	86.96	0.40
Reach 2	7216.123	25 YR	35.47	177.97	180.29		180.45	0.002162	2.05	28.31	38.08	0.46
Reach 2	7216.123	10 YR	27.35	177.97	179.93	179.49	180.17	0.003400	2.26	16.25	31.04	0.55
Reach 2	7216.123	5 YR	21.47	177.97	179.73		179.93	0.003319	2.05	12.34	12.41	0.54
Reach 2	7216.123	2 YR	13.60	177.97	179.41		179.56	0.003263	1.73	8.70	10.44	0.51
Reach 2	7216.122	Regional	213.48	178.05	181.56	181.56	182.00	0.004859	4.29	115.32	108.42	0.74
Reach 2	7216.122	100 YR	50.23	178.05	180.59	180.01	180.86	0.002798	2.60	33.79	52.54	0.53
Reach 2	7216.122	50 YR	42.61	178.05	180.35	179.91	180.62	0.003029	2.53	25.08	26.40	0.54
Reach 2	7216.122	25 YR	35.47	178.05	180.11	179.70	180.38	0.003457	2.50	19.43	19.97	0.57
Reach 2	7216.122	10 YR	27.35	178.05	179.79	179.46	180.07	0.004186	2.44	13.99	15.64	0.61
Reach 2	7216.122	5 YR	21.47	178.05	179.59		179.83	0.004365	2.28	11.07	12.17	0.61
Reach 2	7216.122	2 YR	13.60	178.05	179.29		179.47	0.004113	1.90	7.89	9.70	0.57
Reach 2	7216.121	Regional	213.48	178.02	181.27	181.27	181.70	0.005345	4.15	108.66	104.64	0.76
Reach 2	7216.121	100 YR	50.23	178.02	179.93	179.93	180.71	0.010414	3.94	13.57	9.72	0.96
Reach 2	7216.121	50 YR	42.61	178.02	179.75	179.75	180.47	0.010998	3.77	11.87	9.25	0.97
Reach 2	7216.121	25 YR	35.47	178.02	179.58	179.58	180.22	0.011589	3.56	10.29	8.79	0.98
Reach 2	7216.121	10 YR	27.35	178.02	179.45	179.36	179.92	0.009792	3.06	9.15	8.45	0.88
Reach 2	7216.121	5 YR	21.47	178.02	179.37		179.70	0.007593	2.57	8.48	8.24	0.77
Reach 2	7216.121	2 YR	13.60	178.02	179.15		179.36	0.006099	2.01	6.79	7.68	0.67
Reach 2	7216.12	Regional	213.48	177.76	180.46		180.82	0.006093	3.97	108.80	100.83	0.80
Reach 2	7216.12	100 YR	50.23	177.76	179.69	179.68	179.92	0.004305	2.60	38.26	80.12	0.63
Reach 2	7216.12	50 YR	42.61	177.76	179.62	179.45	179.84	0.004127	2.47	32.73	76.47	0.62
Reach 2	7216.12	25 YR	35.47	177.76	179.58	179.29	179.76	0.003260	2.17	30.30	74.75	0.55
Reach 2	7216.12	10 YR	27.35	177.76	179.49		179.63	0.002626	1.87	23.69	62.24	0.49
Reach 2	7216.12	5 YR	21.47	177.76	179.33		179.46	0.002658	1.75	17.02	25.50	0.48
Reach 2	7216.12	2 YR	13.60	177.76	179.06		179.17	0.002725	1.52	11.01	18.50	0.47
Reach 2	7216.115	Regional	213.48	177.31	179.91	179.91	180.28	0.007903	4.39	110.92	121.13	0.89
Reach 2	7216.115	100 YR	50.23	177.31	179.29	179.29	179.51	0.004564	2.74	41.07	95.22	0.65

HEC-RAS Plan: ExAug2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	7216.115	50 YR	42.61	177.31	179.22	179.22	179.44	0.004437	2.64	34.54	91.37	0.63
Reach 2	7216.115	25 YR	35.47	177.31	179.06	179.06	179.35	0.005652	2.80	22.50	61.08	0.70
Reach 2	7216.115	10 YR	27.35	177.31	178.79	178.79	179.18	0.008618	3.05	12.63	20.77	0.84
Reach 2	7216.115	5 YR	21.47	177.31	178.64	178.64	179.00	0.008914	2.87	9.86	16.64	0.84
Reach 2	7216.115	2 YR	13.60	177.31	178.39	178.36	178.69	0.009319	2.51	6.46	11.82	0.83
Reach 2	7216.11	Regional	213.48	176.96	179.58		179.72	0.003358	2.78	151.84	126.29	0.57
Reach 2	7216.11	100 YR	50.23	176.96	178.89		178.95	0.001989	1.71	67.15	115.26	0.42
Reach 2	7216.11	50 YR	42.61	176.96	178.77		178.84	0.002537	1.84	53.67	107.26	0.46
Reach 2	7216.11	25 YR	35.47	176.96	178.65		178.76	0.003563	2.07	40.73	106.21	0.54
Reach 2	7216.11	10 YR	27.35	176.96	178.55	178.30	178.69	0.003993	2.09	30.67	103.48	0.57
Reach 2	7216.11	5 YR	21.47	176.96	178.39		178.51	0.003975	1.92	19.05	40.21	0.55
Reach 2	7216.11	2 YR	13.60	176.96	178.16		178.27	0.004408	1.76	11.73	26.11	0.56
Reach 2	7216.105	Regional	213.48	176.20	179.01		179.29	0.005425	3.81	122.52	114.46	0.76
Reach 2	7216.105	100 YR	50.23	176.20	178.07	178.07	178.54	0.009138	3.63	23.77	52.10	0.92
Reach 2	7216.105	50 YR	42.61	176.20	178.03	178.03	178.41	0.007610	3.24	21.68	33.01	0.83
Reach 2	7216.105	25 YR	35.47	176.20	177.97	177.97	178.28	0.006282	2.88	19.94	30.41	0.75
Reach 2	7216.105	10 YR	27.35	176.20	177.69	177.69	178.08	0.009555	3.08	12.69	20.57	0.89
Reach 2	7216.105	5 YR	21.47	176.20	177.53	177.53	177.89	0.010290	2.91	9.82	15.94	0.91
Reach 2	7216.105	2 YR	13.60	176.20	177.30	177.30	177.60	0.010691	2.53	6.63	12.91	0.89
Reach 2	7216.1	Regional	213.48	175.72	178.76		178.93	0.002318	2.67	178.02	115.82	0.51
Reach 2	7216.1	100 YR	50.23	175.72	177.60		177.72	0.002161	1.81	54.32	91.99	0.45
Reach 2	7216.1	50 YR	42.61	175.72	177.50		177.60	0.002045	1.69	45.70	75.74	0.43
Reach 2	7216.1	25 YR	35.47	175.72	177.39		177.48	0.001825	1.52	38.93	50.09	0.40
Reach 2	7216.1	10 YR	27.35	175.72	177.25		177.33	0.001680	1.36	32.34	46.42	0.38
Reach 2	7216.1	5 YR	21.47	175.72	177.14		177.20	0.001572	1.24	27.03	43.40	0.36
Reach 2	7216.1	2 YR	13.60	175.72	176.91		176.96	0.001614	1.09	17.74	37.52	0.35
Reach 2	7216.095	Regional	213.48	175.25	178.58		178.74	0.002672	3.11	170.30	94.29	0.56
Reach 2	7216.095	100 YR	50.23	175.25	177.53		177.59	0.001292	1.66	74.99	86.68	0.36
Reach 2	7216.095	50 YR	42.61	175.25	177.42		177.48	0.001236	1.57	66.26	85.67	0.35
Reach 2	7216.095	25 YR	35.47	175.25	177.31		177.37	0.001199	1.49	56.85	84.16	0.34
Reach 2	7216.095	10 YR	27.35	175.25	177.18		177.23	0.001094	1.36	45.90	81.32	0.32
Reach 2	7216.095	5 YR	21.47	175.25	177.07		177.11	0.000988	1.23	36.98	76.80	0.30
Reach 2	7216.095	2 YR	13.60	175.25	176.85		176.88	0.000824	1.03	22.34	40.51	0.27
Reach 2	7216.09	Regional	213.48	175.29	178.49		178.56	0.001616	2.14	267.35	201.79	0.40
Reach 2	7216.09	100 YR	50.23	175.29	177.44	177.04	177.48	0.001211	1.38	102.08	126.08	0.32
Reach 2	7216.09	50 YR	42.61	175.29	177.34	176.89	177.38	0.001266	1.35	88.97	123.83	0.33
Reach 2	7216.09	25 YR	35.47	175.29	177.22	176.86	177.26	0.001408	1.36	74.28	121.12	0.34
Reach 2	7216.09	10 YR	27.35	175.29	177.07	176.78	177.13	0.001618	1.37	56.88	117.82	0.36
Reach 2	7216.09	5 YR	21.47	175.29	176.95	176.63	177.01	0.001799	1.36	42.33	111.22	0.37
Reach 2	7216.09	2 YR	13.60	175.29	176.69	176.26	176.77	0.002550	1.41	19.60	68.01	0.43
Reach 2	7216.08	Regional	213.48	175.13	177.93	177.93	178.28	0.005715	3.96	124.88	160.48	0.77
Reach 2	7216.08	100 YR	50.23	175.13	176.84	176.84	177.21	0.007073	3.12	25.40	35.60	0.79
Reach 2	7216.08	50 YR	42.61	175.13	176.70	176.70	177.09	0.007969	3.11	20.62	31.40	0.82
Reach 2	7216.08	25 YR	35.47	175.13	176.60	176.60	176.96	0.007744	2.92	17.60	28.59	0.80
Reach 2	7216.08	10 YR	27.35	175.13	176.44	176.44	176.78	0.008154	2.75	13.38	24.33	0.81
Reach 2	7216.08	5 YR	21.47	175.13	176.29	176.29	176.62	0.009045	2.65	9.98	20.08	0.83
Reach 2	7216.08	2 YR	13.60	175.13	176.17		176.36	0.005807	1.96	7.92	15.36	0.65
Reach 2	7216.075	Regional	213.48	174.84	177.92		177.94	0.000336	1.04	394.17	236.55	0.19
Reach 2	7216.075	100 YR	50.23	174.84	176.76		176.77	0.000270	0.67	150.90	169.58	0.16
Reach 2	7216.075	50 YR	42.61	174.84	176.56		176.57	0.000418	0.77	116.90	165.74	0.19
Reach 2	7216.075	25 YR	35.47	174.84	176.37		176.39	0.000700	0.91	86.71	164.22	0.25
Reach 2	7216.075	10 YR	27.35	174.84	176.19		176.22	0.001313	1.14	56.85	162.83	0.33
Reach 2	7216.075	5 YR	21.47	174.84	176.09	176.02	176.14	0.001727	1.24	41.27	162.12	0.37
Reach 2	7216.075	2 YR	13.60	174.84	175.99	175.58	176.05	0.001740	1.16	24.90	161.36	0.37
Reach 2	7216.07	Regional	213.48	174.56	177.34		177.74	0.004660	3.57	98.26	75.25	0.72
Reach 2	7216.07	100 YR	50.23	174.56	176.62		176.70	0.001157	1.42	52.00	53.64	0.34
Reach 2	7216.07	50 YR	42.61	174.56	176.38		176.47	0.001529	1.48	39.99	46.32	0.38
Reach 2	7216.07	25 YR	35.47	174.56	176.15		176.24	0.002042	1.54	30.15	34.50	0.43
Reach 2	7216.07	10 YR	27.35	174.56	175.86		175.97	0.003185	1.62	21.59	28.15	0.51
Reach 2	7216.07	5 YR	21.47	174.56	175.65		175.77	0.004788	1.71	15.86	26.88	0.60
Reach 2	7216.07	2 YR	13.60	174.56	175.38	175.36	175.54	0.009877	1.87	8.73	25.22	0.81
Reach 2	7216.065	Regional	213.48	173.99	177.47		177.51	0.000517	1.38	381.58	182.82	0.25
Reach 2	7216.065	100 YR	50.23	173.99	176.65		176.65	0.000111	0.52	238.19	165.38	0.11
Reach 2	7216.065	50 YR	42.61	173.99	176.41		176.41	0.000135	0.54	199.07	163.28	0.12
Reach 2	7216.065	25 YR	35.47	173.99	176.17		176.18	0.000171	0.56	161.23	161.33	0.13
Reach 2	7216.065	10 YR	27.35	173.99	175.88		175.89	0.000259	0.61	114.31	157.78	0.16
Reach 2	7216.065	5 YR	21.47	173.99	175.66		175.68	0.000382	0.67	80.43	156.25	0.19
Reach 2	7216.065	2 YR	13.60	173.99	175.37		175.40	0.000630	0.74	36.61	129.45	0.23

HEC-RAS Plan: ExAug2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	7216.06	Regional	213.48	173.78	177.39	176.39	177.43	0.000841	1.82	339.18	188.13	0.32
Reach 2	7216.06	100 YR	50.23	173.78	176.63	175.40	176.64	0.000158	0.66	203.42	151.03	0.13
Reach 2	7216.06	50 YR	42.61	173.78	176.32	175.30	176.37	0.000665	1.25	63.85	140.53	0.26
Reach 2	7216.06	25 YR	35.47	173.78	176.09	175.21	176.13	0.000727	1.22	54.60	132.24	0.27
Reach 2	7216.06	10 YR	27.35	173.78	175.78	175.07	175.83	0.000864	1.19	42.64	122.02	0.29
Reach 2	7216.06	5 YR	21.47	173.78	175.55	174.96	175.60	0.000995	1.17	33.64	113.71	0.30
Reach 2	7216.06	2 YR	13.60	173.78	175.25	174.67	175.29	0.001052	1.04	22.39	102.22	0.30
Reach 2	7216.045		Bridge									
Reach 2	7216.03	Regional	213.48	173.75	176.74	176.39	176.77	0.000929	1.61	346.14	205.14	0.31
Reach 2	7216.03	100 YR	50.23	173.75	175.43	175.43	175.82	0.009289	3.34	27.99	183.33	0.87
Reach 2	7216.03	50 YR	42.61	173.75	175.34	175.34	175.69	0.008996	3.15	24.98	180.88	0.85
Reach 2	7216.03	25 YR	35.47	173.75	175.24	175.24	175.57	0.008597	2.94	21.99	178.43	0.82
Reach 2	7216.03	10 YR	27.35	173.75	175.12	175.12	175.41	0.008214	2.69	17.98	175.17	0.79
Reach 2	7216.03	5 YR	21.47	173.75	175.02	175.02	175.28	0.007774	2.47	14.71	172.50	0.76
Reach 2	7216.03	2 YR	13.60	173.75	174.79	174.79	175.05	0.009339	2.31	7.58	67.73	0.80

Appendix J EXISTING CONDITIONS HYDRAULICS BERCZY CREEK

Revised Existing Berczy Creek Hydraulics Modelling Analysis for

2 - 100 Year and Regional Storm Events

October 2017

HEC-RAS Plan: ExAug2017 River: Berczy Creek Reach: Reach 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 1	7201.13	Regional	182.91	178.40	180.81		180.92	0.002993	2.81	137.29	106.38	0.58
Reach 1	7201.13	100 YR	48.45	178.40	179.84	179.84	180.01	0.008787	3.41	39.72	93.81	0.91
Reach 1	7201.13	50 YR	41.46	178.40	179.82	179.82	179.96	0.007538	3.13	37.52	93.49	0.84
Reach 1	7201.13	25 YR	35.56	178.40	179.79	179.79	179.92	0.006850	2.94	34.73	93.09	0.80
Reach 1	7201.13	10 YR	27.32	178.40	179.74	179.74	179.86	0.005899	2.66	30.10	92.41	0.74
Reach 1	7201.13	5 YR	20.62	178.40	179.69	179.69	179.80	0.005058	2.40	25.56	91.73	0.68
Reach 1	7201.13	2 YR	11.71	178.40	179.46	179.46	179.68	0.008641	2.76	7.90	17.17	0.86
Reach 1	7201.125	Regional	182.91	177.33	180.56		180.69	0.001978	2.42	152.40	159.41	0.45
Reach 1	7201.125	100 YR	48.45	177.33	179.40		179.52	0.002732	2.05	44.43	61.81	0.48
Reach 1	7201.125	50 YR	41.46	177.33	179.29		179.42	0.002946	2.04	38.04	59.82	0.50
Reach 1	7201.125	25 YR	35.56	177.33	179.20		179.34	0.003105	2.02	32.68	57.71	0.51
Reach 1	7201.125	10 YR	27.32	177.33	179.00	178.97	179.19	0.004398	2.20	21.65	52.18	0.59
Reach 1	7201.125	5 YR	20.62	177.33	178.84	178.62	179.07	0.005376	2.25	13.73	46.62	0.64
Reach 1	7201.125	2 YR	11.71	177.33	178.59		178.74	0.004422	1.77	6.92	9.41	0.56
Reach 1	7201.12	Regional	182.91	177.05	180.37		180.52	0.001845	2.48	141.50	96.27	0.45
Reach 1	7201.12	100 YR	48.45	177.05	179.20		179.29	0.001765	1.75	50.24	65.70	0.41
Reach 1	7201.12	50 YR	41.46	177.05	179.06		179.16	0.002028	1.78	41.40	62.76	0.43
Reach 1	7201.12	25 YR	35.56	177.05	178.93		179.05	0.002330	1.81	33.63	58.84	0.46
Reach 1	7201.12	10 YR	27.32	177.05	178.75		178.85	0.002200	1.63	25.74	36.51	0.44
Reach 1	7201.12	5 YR	20.62	177.05	178.57		178.67	0.002421	1.56	19.45	33.95	0.45
Reach 1	7201.12	2 YR	11.71	177.05	178.24		178.34	0.003104	1.43	10.21	20.96	0.48
Reach 1	7201.11	Regional	182.91	176.84	179.79	179.79	180.32	0.006373	4.02	79.16	73.61	0.81
Reach 1	7201.11	100 YR	48.45	176.84	178.70	178.61	179.10	0.007056	2.89	20.53	30.66	0.77
Reach 1	7201.11	50 YR	41.46	176.84	178.63	178.46	178.97	0.006297	2.64	18.54	27.13	0.73
Reach 1	7201.11	25 YR	35.56	176.84	178.57	178.34	178.85	0.005553	2.41	16.95	24.23	0.68
Reach 1	7201.11	10 YR	27.32	176.84	178.48		178.68	0.004261	2.01	15.01	20.00	0.59
Reach 1	7201.11	5 YR	20.62	176.84	178.37		178.51	0.003519	1.71	12.87	17.21	0.52
Reach 1	7201.11	2 YR	11.71	176.84	178.07		178.16	0.003426	1.36	8.61	11.18	0.49
Reach 1	7201.105	Regional	182.91	176.49	179.22		179.48	0.003974	3.28	142.60	113.53	0.65
Reach 1	7201.105	100 YR	48.45	176.49	178.42		178.53	0.002085	1.85	61.97	91.17	0.44
Reach 1	7201.105	50 YR	41.46	176.49	178.34		178.45	0.001986	1.75	54.89	89.63	0.43
Reach 1	7201.105	25 YR	35.56	176.49	178.25		178.36	0.002046	1.71	46.52	87.78	0.43
Reach 1	7201.105	10 YR	27.32	176.49	178.04		178.18	0.002732	1.80	28.75	76.83	0.49
Reach 1	7201.105	5 YR	20.62	176.49	177.78	177.45	177.95	0.003968	1.89	13.67	31.55	0.57
Reach 1	7201.105	2 YR	11.71	176.49	177.41		177.54	0.004971	1.64	7.44	11.57	0.60
Reach 1	7201.1	Regional	182.91	176.13	179.29	178.15	179.31	0.000376	1.11	436.88	271.29	0.20
Reach 1	7201.1	100 YR	48.45	176.13	178.45	177.44	178.46	0.000162	0.58	237.76	252.83	0.13
Reach 1	7201.1	50 YR	41.46	176.13	178.37	177.33	178.38	0.000149	0.55	219.19	250.26	0.12
Reach 1	7201.1	25 YR	35.56	176.13	178.28	177.23	178.28	0.000147	0.53	197.52	246.59	0.12
Reach 1	7201.1	10 YR	27.32	176.13	177.98	177.06	178.05	0.001032	1.25	25.51	235.24	0.31
Reach 1	7201.1	5 YR	20.62	176.13	177.73	176.90	177.79	0.001053	1.13	19.00	208.00	0.30
Reach 1	7201.1	2 YR	11.71	176.13	177.35	176.68	177.39	0.000962	0.88	13.33	61.02	0.27
Reach 1	7201.085		Culvert									
Reach 1	7201.07	Regional	182.91	176.11	179.21	178.55	179.27	0.000847	1.67	327.11	283.62	0.31
Reach 1	7201.07	100 YR	48.45	176.11	178.12	177.32	178.23	0.001304	1.51	41.74	198.84	0.36
Reach 1	7201.07	50 YR	41.46	176.11	178.03	177.22	178.12	0.001178	1.39	38.49	191.87	0.34
Reach 1	7201.07	25 YR	35.56	176.11	177.94	177.12	178.01	0.001060	1.27	35.52	40.33	0.32
Reach 1	7201.07	10 YR	27.32	176.11	177.78	176.99	177.84	0.000919	1.10	30.46	36.21	0.29
Reach 1	7201.07	5 YR	20.62	176.11	177.58	176.85	177.63	0.000898	0.99	24.41	31.05	0.28
Reach 1	7201.07	2 YR	11.71	176.11	177.26	176.65	177.29	0.000805	0.77	15.97	22.85	0.25

Appendix K PROPOSED CONDITIONS HYDRAULICS BRUCE CREEK INCLUDING CUT GRADING

Stantec

Bruce Creek Hydraulics Modelling Analysis (Proposed Cut & Fill) for

2 - 100 Year and Regional Storm Events

October 2017

HEC-RAS Plan: CF Sept 2017   River: Bruce Creek   Reach: Reach 2

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	8212.01	Regional	213.48	182.30	185.77		185.81	0.000260	1.06	286.55	133.05	0.18
Reach 2	8212.01	100 YR	50.23	182.30	184.07		184.09	0.000215	0.61	99.95	87.33	0.15
Reach 2	8212.01	50 YR	42.61	182.30	183.93		183.95	0.000213	0.58	88.05	82.55	0.14
Reach 2	8212.01	25 YR	35.47	182.30	183.79		183.80	0.000209	0.54	76.54	76.42	0.14
Reach 2	8212.01	10 YR	27.35	182.30	183.59		183.60	0.000211	0.49	62.20	68.01	0.14
Reach 2	8212.01	5 YR	21.47	182.30	183.42		183.43	0.000215	0.45	51.37	60.90	0.14
Reach 2	8212.01	2 YR	13.60	182.30	183.14		183.15	0.000237	0.39	35.79	48.88	0.14
Reach 2	7216.195	Regional	213.48	181.68	185.66		185.77	0.000892	1.95	177.65	77.24	0.32
Reach 2	7216.195	100 YR	50.23	181.68	184.01		184.05	0.000674	1.15	68.88	59.04	0.25
Reach 2	7216.195	50 YR	42.61	181.68	183.87		183.91	0.000687	1.11	60.68	58.17	0.25
Reach 2	7216.195	25 YR	35.47	181.68	183.73		183.77	0.000709	1.07	52.25	57.26	0.25
Reach 2	7216.195	10 YR	27.35	181.68	183.52		183.56	0.000797	1.05	40.63	55.99	0.26
Reach 2	7216.195	5 YR	21.47	181.68	183.34		183.39	0.000928	1.04	30.78	54.89	0.28
Reach 2	7216.195	2 YR	13.60	181.68	183.04		183.09	0.001200	1.01	15.06	38.54	0.31
Reach 2	7216.19	Regional	213.48	181.52	184.78	184.78	185.52	0.007671	4.95	75.66	53.55	0.91
Reach 2	7216.19	100 YR	50.23	181.52	183.42	183.42	183.87	0.007602	3.29	21.50	27.12	0.82
Reach 2	7216.19	50 YR	42.61	181.52	183.29	183.29	183.73	0.007723	3.15	18.35	25.14	0.82
Reach 2	7216.19	25 YR	35.47	181.52	183.14	183.14	183.57	0.008397	3.06	14.79	22.03	0.84
Reach 2	7216.19	10 YR	27.35	181.52	182.91	182.91	183.34	0.010507	3.02	10.48	14.73	0.91
Reach 2	7216.19	5 YR	21.47	181.52	182.75	182.75	183.15	0.011378	2.84	8.32	12.49	0.92
Reach 2	7216.19	2 YR	13.60	181.52	182.52	182.48	182.82	0.011887	2.44	5.78	9.33	0.90
Reach 2	7216.186	Regional	213.48	181.34	184.52		184.70	0.002535	2.85	126.47	66.08	0.52
Reach 2	7216.186	100 YR	50.23	181.34	183.09		183.17	0.002459	1.84	46.40	49.53	0.46
Reach 2	7216.186	50 YR	42.61	181.34	183.00		183.08	0.002348	1.73	42.13	48.64	0.45
Reach 2	7216.186	25 YR	35.47	181.34	182.91		182.98	0.002245	1.63	37.75	47.97	0.43
Reach 2	7216.186	10 YR	27.35	181.34	182.83		182.88	0.001816	1.41	33.95	47.39	0.39
Reach 2	7216.186	5 YR	21.47	181.34	182.69		182.75	0.002031	1.39	27.54	46.39	0.40
Reach 2	7216.186	2 YR	13.60	181.34	182.56		182.60	0.001612	1.15	21.45	45.13	0.35
Reach 2	7216.183	Regional	213.48	181.04	184.47		184.60	0.001977	2.51	149.10	81.60	0.46
Reach 2	7216.183	100 YR	50.23	181.04	183.00		183.08	0.002376	1.76	50.63	59.12	0.45
Reach 2	7216.183	50 YR	42.61	181.04	182.92		182.98	0.002350	1.69	45.50	58.44	0.45
Reach 2	7216.183	25 YR	35.47	181.04	182.82		182.89	0.002350	1.61	40.17	57.73	0.44
Reach 2	7216.183	10 YR	27.35	181.04	182.76	182.49	182.81	0.001828	1.38	36.63	57.25	0.39
Reach 2	7216.183	5 YR	21.47	181.04	182.59	182.44	182.65	0.002702	1.53	26.86	55.88	0.46
Reach 2	7216.183	2 YR	13.60	181.04	182.33	182.33	182.47	0.006328	1.96	12.82	51.14	0.67
Reach 2	7216.18	Regional	213.48	180.83	184.33	183.45	184.50	0.001880	2.56	140.05	74.32	0.46
Reach 2	7216.18	100 YR	50.23	180.83	182.58	182.58	182.86	0.005913	2.68	30.24	51.80	0.71
Reach 2	7216.18	50 YR	42.61	180.83	182.51	182.51	182.77	0.005699	2.54	26.49	50.85	0.69
Reach 2	7216.18	25 YR	35.47	180.83	182.43	182.43	182.68	0.005464	2.39	22.61	49.85	0.67
Reach 2	7216.18	10 YR	27.35	180.83	182.16	182.09	182.57	0.010280	2.81	9.86	12.22	0.88
Reach 2	7216.18	5 YR	21.47	180.83	182.14	181.93	182.40	0.006832	2.26	9.59	11.60	0.72
Reach 2	7216.18	2 YR	13.60	180.83	182.03	181.66	182.16	0.004077	1.62	8.41	9.52	0.55
Reach 2	7216.175	Regional	213.48	180.45	184.27	182.71	184.34	0.000846	1.84	204.53	99.81	0.32
Reach 2	7216.175	100 YR	50.23	180.45	182.48	181.95	182.53	0.001176	1.34	63.00	63.38	0.33
Reach 2	7216.175	50 YR	42.61	180.45	182.35	181.89	182.39	0.001275	1.32	54.61	61.50	0.34
Reach 2	7216.175	25 YR	35.47	180.45	182.20	181.84	182.25	0.001469	1.32	45.66	59.42	0.36
Reach 2	7216.175	10 YR	27.35	180.45	182.00	181.76	182.06	0.001912	1.37	34.47	56.73	0.40
Reach 2	7216.175	5 YR	21.47	180.45	181.84	181.70	181.91	0.002619	1.45	25.55	54.48	0.45
Reach 2	7216.175	2 YR	13.60	180.45	181.65	181.45	181.74	0.003432	1.45	15.50	51.83	0.50
Reach 2	7216.172	Regional	213.48	180.39	184.25		184.30	0.000625	1.66	239.40	121.22	0.28
Reach 2	7216.172	100 YR	50.23	180.39	182.44		182.48	0.000821	1.21	71.66	64.92	0.28
Reach 2	7216.172	50 YR	42.61	180.39	182.31		182.34	0.000857	1.17	62.97	62.54	0.29
Reach 2	7216.172	25 YR	35.47	180.39	182.15		182.19	0.000946	1.16	53.61	60.13	0.30
Reach 2	7216.172	10 YR	27.35	180.39	181.95		181.99	0.001160	1.16	41.69	56.92	0.32
Reach 2	7216.172	5 YR	21.47	180.39	181.77		181.81	0.001566	1.23	31.62	54.64	0.36
Reach 2	7216.172	2 YR	13.60	180.39	181.48		181.57	0.003610	1.55	16.01	53.81	0.53
Reach 2	7216.171	Regional	213.48	180.05	184.12	182.66	184.24	0.001005	2.15	157.35	108.16	0.35
Reach 2	7216.171	100 YR	50.23	180.05	182.36	181.66	182.42	0.000984	1.42	57.05	82.10	0.31
Reach 2	7216.171	50 YR	42.61	180.05	182.23	181.57	182.28	0.000984	1.35	50.92	79.84	0.31
Reach 2	7216.171	25 YR	35.47	180.05	182.07	181.48	182.13	0.001034	1.31	43.98	77.25	0.31
Reach 2	7216.171	10 YR	27.35	180.05	181.86	181.36	181.91	0.001192	1.30	34.58	73.66	0.33
Reach 2	7216.171	5 YR	21.47	180.05	181.66	181.25	181.72	0.001437	1.30	26.30	68.16	0.35
Reach 2	7216.171	2 YR	13.60	180.05	181.33	180.95	181.41	0.002111	1.32	14.84	56.91	0.41
Reach 2	7216.169		Bridge									
Reach 2	7216.168	Regional	213.48	179.70	182.81	182.42	183.22	0.004472	3.73	89.12	107.01	0.71
Reach 2	7216.168	100 YR	50.23	179.70	181.72	181.44	181.86	0.002520	2.02	39.16	93.10	0.49
Reach 2	7216.168	50 YR	42.61	179.70	181.61	181.35	181.75	0.002516	1.94	34.58	91.78	0.49
Reach 2	7216.168	25 YR	35.47	179.70	181.50	181.25	181.63	0.002520	1.85	29.93	90.42	0.48

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	7216.168	10 YR	27.35	179.70	181.38	180.99	181.49	0.002315	1.68	25.00	88.82	0.45
Reach 2	7216.168	5 YR	21.47	179.70	181.23	180.84	181.34	0.002521	1.62	19.19	83.80	0.47
Reach 2	7216.168	2 YR	13.60	179.70	180.92	180.60	181.04	0.003410	1.56	9.69	15.14	0.52
Reach 2	7216.165	Regional	213.48	179.27	182.77	181.99	182.88	0.001443	2.09	175.78	122.20	0.40
Reach 2	7216.165	100 YR	50.23	179.27	181.61	181.25	181.67	0.001283	1.39	61.27	84.05	0.34
Reach 2	7216.165	50 YR	42.61	179.27	181.47	180.94	181.55	0.001471	1.41	50.49	80.69	0.36
Reach 2	7216.165	25 YR	35.47	179.27	181.32	180.79	181.41	0.001884	1.49	38.26	77.59	0.40
Reach 2	7216.165	10 YR	27.35	179.27	181.09	180.59	181.23	0.003052	1.68	20.97	74.34	0.50
Reach 2	7216.165	5 YR	21.47	179.27	180.91	180.41	181.05	0.003520	1.63	13.21	13.31	0.52
Reach 2	7216.165	2 YR	13.60	179.27	180.59	180.15	180.69	0.003373	1.46	9.29	10.57	0.50
Reach 2	7216.16	Regional	213.48	179.12	182.63		182.78	0.001740	2.44	173.86	141.37	0.44
Reach 2	7216.16	100 YR	50.23	179.12	181.35	180.85	181.54	0.002552	2.08	38.63	74.39	0.49
Reach 2	7216.16	50 YR	42.61	179.12	181.14	180.68	181.38	0.003518	2.25	24.40	53.94	0.56
Reach 2	7216.16	25 YR	35.47	179.12	180.99		181.22	0.003530	2.12	18.35	19.70	0.55
Reach 2	7216.16	10 YR	27.35	179.12	180.82		181.00	0.003318	1.89	15.21	16.30	0.53
Reach 2	7216.16	5 YR	21.47	179.12	180.66		180.81	0.003195	1.70	12.81	14.08	0.51
Reach 2	7216.16	2 YR	13.60	179.12	180.36		180.46	0.003060	1.45	9.40	10.09	0.48
Reach 2	7216.13	Regional	213.48	178.92	182.14	182.14	182.66	0.006091	4.08	99.09	101.44	0.81
Reach 2	7216.13	100 YR	50.23	178.92	180.86	180.82	181.39	0.009406	3.24	16.57	20.99	0.90
Reach 2	7216.13	50 YR	42.61	178.92	180.83	180.66	181.24	0.007359	2.82	15.94	20.32	0.79
Reach 2	7216.13	25 YR	35.47	178.92	180.80		181.10	0.005579	2.42	15.30	18.92	0.68
Reach 2	7216.13	10 YR	27.35	178.92	180.66		180.89	0.004904	2.10	13.11	13.19	0.63
Reach 2	7216.13	5 YR	21.47	178.92	180.52		180.70	0.004697	1.89	11.38	11.40	0.60
Reach 2	7216.13	2 YR	13.60	178.92	180.23		180.37	0.004464	1.64	8.27	9.80	0.57
Reach 2	7216.128	Regional	213.48	178.63	182.09		182.20	0.001677	2.44	180.82	122.76	0.43
Reach 2	7216.128	100 YR	50.23	178.63	180.91		181.04	0.002154	2.05	53.49	89.37	0.45
Reach 2	7216.128	50 YR	42.61	178.63	180.69	180.61	180.89	0.003338	2.37	35.85	69.76	0.55
Reach 2	7216.128	25 YR	35.47	178.63	180.50	180.33	180.78	0.004718	2.62	23.50	58.18	0.65
Reach 2	7216.128	10 YR	27.35	178.63	180.40	180.15	180.62	0.003832	2.27	18.64	41.72	0.58
Reach 2	7216.128	5 YR	21.47	178.63	180.21		180.42	0.004259	2.19	13.05	21.88	0.60
Reach 2	7216.128	2 YR	13.60	178.63	179.91		180.09	0.004471	1.91	8.08	12.84	0.59
Reach 2	7216.125	Regional	213.48	178.49	182.06		182.13	0.000945	1.82	218.25	147.42	0.32
Reach 2	7216.125	100 YR	50.23	178.49	180.92		180.95	0.000628	1.12	90.00	103.09	0.24
Reach 2	7216.125	50 YR	42.61	178.49	180.70		180.75	0.000984	1.31	67.26	101.44	0.30
Reach 2	7216.125	25 YR	35.47	178.49	180.46		180.56	0.001854	1.65	43.53	99.55	0.40
Reach 2	7216.125	10 YR	27.35	178.49	180.13	179.79	180.36	0.004487	2.22	14.39	16.79	0.60
Reach 2	7216.125	5 YR	21.47	178.49	179.92	179.61	180.14	0.004895	2.12	11.21	13.85	0.62
Reach 2	7216.125	2 YR	13.60	178.49	179.60		179.78	0.005250	1.87	7.47	9.92	0.62
Reach 2	7216.123	Regional	213.48	177.97	181.99		182.08	0.001183	2.27	209.80	141.01	0.37
Reach 2	7216.123	100 YR	50.23	177.97	180.85		180.92	0.000863	1.52	72.14	95.26	0.30
Reach 2	7216.123	50 YR	42.61	177.97	180.56		180.68	0.001566	1.89	45.36	86.97	0.40
Reach 2	7216.123	25 YR	35.47	177.97	180.29		180.45	0.002162	2.05	28.31	38.08	0.46
Reach 2	7216.123	10 YR	27.35	177.97	179.93	179.49	180.17	0.003398	2.26	16.26	31.05	0.55
Reach 2	7216.123	5 YR	21.47	177.97	179.73		179.93	0.003319	2.05	12.34	12.41	0.54
Reach 2	7216.123	2 YR	13.60	177.97	179.41		179.56	0.003263	1.73	8.70	10.44	0.51
Reach 2	7216.122	Regional	213.48	178.05	181.56	181.56	182.00	0.004859	4.29	115.32	108.42	0.74
Reach 2	7216.122	100 YR	50.23	178.05	180.59	180.01	180.86	0.002800	2.60	33.78	52.52	0.53
Reach 2	7216.122	50 YR	42.61	178.05	180.35	179.91	180.62	0.003029	2.53	25.08	26.40	0.54
Reach 2	7216.122	25 YR	35.47	178.05	180.11	179.70	180.38	0.003457	2.50	19.43	19.97	0.57
Reach 2	7216.122	10 YR	27.35	178.05	179.79	179.46	180.07	0.004185	2.44	13.99	15.64	0.61
Reach 2	7216.122	5 YR	21.47	178.05	179.59		179.83	0.004365	2.28	11.07	12.17	0.61
Reach 2	7216.122	2 YR	13.60	178.05	179.29		179.47	0.004113	1.90	7.89	9.70	0.57
Reach 2	7216.121	Regional	213.48	178.02	181.27	181.27	181.70	0.005345	4.15	108.66	104.64	0.76
Reach 2	7216.121	100 YR	50.23	178.02	179.93	179.93	180.71	0.010414	3.94	13.57	9.72	0.96
Reach 2	7216.121	50 YR	42.61	178.02	179.75	179.75	180.47	0.010998	3.77	11.87	9.25	0.97
Reach 2	7216.121	25 YR	35.47	178.02	179.58	179.58	180.22	0.011589	3.56	10.29	8.79	0.98
Reach 2	7216.121	10 YR	27.35	178.02	179.44	179.36	179.92	0.009831	3.06	9.14	8.44	0.88
Reach 2	7216.121	5 YR	21.47	178.02	179.37		179.70	0.007594	2.57	8.48	8.24	0.77
Reach 2	7216.121	2 YR	13.60	178.02	179.15		179.36	0.006099	2.01	6.79	7.68	0.67
Reach 2	7216.12	Regional	213.48	177.76	180.44	180.39	180.82	0.006706	4.14	111.37	117.76	0.84
Reach 2	7216.12	100 YR	50.23	177.76	179.69	179.68	179.92	0.004197	2.57	38.78	80.43	0.63
Reach 2	7216.12	50 YR	42.61	177.76	179.62	179.45	179.84	0.003981	2.44	33.43	77.07	0.61
Reach 2	7216.12	25 YR	35.47	177.76	179.59	179.29	179.76	0.003225	2.16	30.52	75.02	0.54
Reach 2	7216.12	10 YR	27.35	177.76	179.48	179.11	179.63	0.002667	1.88	23.44	61.73	0.49
Reach 2	7216.12	5 YR	21.47	177.76	179.33		179.46	0.002659	1.75	17.02	25.50	0.48
Reach 2	7216.12	2 YR	13.60	177.76	179.06		179.17	0.002725	1.52	11.01	18.50	0.47
Reach 2	7216.115	Regional	213.48	177.31	179.91	179.91	180.24	0.007507	4.28	116.32	130.87	0.87
Reach 2	7216.115	100 YR	50.23	177.31	179.31	179.31	179.53	0.004379	2.71	44.33	105.42	0.64

Stantec

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	7216.115	50 YR	42.61	177.31	179.24	179.24	179.46	0.004306	2.62	37.05	97.82	0.63
Reach 2	7216.115	25 YR	35.47	177.31	179.05	179.05	179.35	0.005775	2.82	22.19	59.69	0.71
Reach 2	7216.115	10 YR	27.35	177.31	178.79	178.79	179.18	0.008560	3.04	12.71	21.01	0.84
Reach 2	7216.115	5 YR	21.47	177.31	178.64	178.64	179.00	0.008891	2.86	9.88	16.77	0.84
Reach 2	7216.115	2 YR	13.60	177.31	178.39	178.36	178.69	0.009320	2.51	6.46	11.82	0.83
Reach 2	7216.11	Regional	213.48	176.96	179.53		179.67	0.003622	2.85	151.26	132.33	0.59
Reach 2	7216.11	100 YR	50.23	176.96	178.89		178.95	0.002025	1.73	68.35	122.50	0.42
Reach 2	7216.11	50 YR	42.61	176.96	178.77		178.85	0.002511	1.83	54.47	110.57	0.46
Reach 2	7216.11	25 YR	35.47	176.96	178.65		178.76	0.003570	2.07	40.68	106.15	0.54
Reach 2	7216.11	10 YR	27.35	176.96	178.55	178.30	178.69	0.003995	2.09	30.65	103.37	0.57
Reach 2	7216.11	5 YR	21.47	176.96	178.39		178.51	0.003976	1.92	19.05	40.18	0.55
Reach 2	7216.11	2 YR	13.60	176.96	178.16		178.27	0.004406	1.76	11.73	26.11	0.56
Reach 2	7216.105	Regional	213.48	176.20	179.03		179.25	0.004757	3.58	137.40	140.40	0.71
Reach 2	7216.105	100 YR	50.23	176.20	178.07	178.07	178.54	0.009146	3.63	23.75	51.99	0.92
Reach 2	7216.105	50 YR	42.61	176.20	178.02	178.02	178.41	0.007617	3.25	21.67	32.79	0.83
Reach 2	7216.105	25 YR	35.47	176.20	177.97	177.97	178.28	0.006283	2.88	19.93	30.40	0.75
Reach 2	7216.105	10 YR	27.35	176.20	177.69	177.69	178.08	0.009553	3.08	12.69	20.57	0.89
Reach 2	7216.105	5 YR	21.47	176.20	177.53	177.53	177.89	0.010288	2.91	9.82	15.94	0.91
Reach 2	7216.105	2 YR	13.60	176.20	177.30	177.30	177.60	0.010699	2.53	6.63	12.91	0.89
Reach 2	7216.1	Regional	213.48	175.72	178.76		178.93	0.002318	2.67	178.02	115.82	0.51
Reach 2	7216.1	100 YR	50.23	175.72	177.60		177.72	0.002161	1.81	54.32	91.99	0.45
Reach 2	7216.1	50 YR	42.61	175.72	177.50		177.60	0.002045	1.69	45.70	75.74	0.43
Reach 2	7216.1	25 YR	35.47	175.72	177.39		177.48	0.001825	1.52	38.93	50.09	0.40
Reach 2	7216.1	10 YR	27.35	175.72	177.25		177.33	0.001680	1.36	32.34	46.42	0.38
Reach 2	7216.1	5 YR	21.47	175.72	177.14		177.20	0.001572	1.24	27.03	43.40	0.36
Reach 2	7216.1	2 YR	13.60	175.72	176.91		176.96	0.001614	1.09	17.74	37.52	0.35
Reach 2	7216.095	Regional	213.48	175.25	178.58		178.74	0.002672	3.11	170.30	94.29	0.56
Reach 2	7216.095	100 YR	50.23	175.25	177.53		177.59	0.001292	1.66	74.99	86.68	0.36
Reach 2	7216.095	50 YR	42.61	175.25	177.42		177.48	0.001236	1.57	66.26	85.67	0.35
Reach 2	7216.095	25 YR	35.47	175.25	177.31		177.37	0.001199	1.49	56.85	84.16	0.34
Reach 2	7216.095	10 YR	27.35	175.25	177.18		177.23	0.001094	1.36	45.90	81.32	0.32
Reach 2	7216.095	5 YR	21.47	175.25	177.07		177.11	0.000988	1.23	36.98	76.80	0.30
Reach 2	7216.095	2 YR	13.60	175.25	176.85		176.88	0.000824	1.03	22.34	40.51	0.27
Reach 2	7216.09	Regional	213.48	175.29	178.49		178.56	0.001616	2.14	267.35	201.79	0.40
Reach 2	7216.09	100 YR	50.23	175.29	177.44	177.04	177.48	0.001211	1.38	102.08	126.08	0.32
Reach 2	7216.09	50 YR	42.61	175.29	177.34	176.89	177.38	0.001266	1.35	88.97	123.83	0.33
Reach 2	7216.09	25 YR	35.47	175.29	177.22	176.86	177.26	0.001408	1.36	74.28	121.12	0.34
Reach 2	7216.09	10 YR	27.35	175.29	177.07	176.78	177.13	0.001618	1.37	56.88	117.82	0.36
Reach 2	7216.09	5 YR	21.47	175.29	176.95	176.63	177.01	0.001799	1.36	42.33	111.22	0.37
Reach 2	7216.09	2 YR	13.60	175.29	176.69	176.26	176.77	0.002550	1.41	19.60	68.01	0.43
Reach 2	7216.08	Regional	213.48	175.13	177.93	177.93	178.28	0.005715	3.96	124.88	160.48	0.77
Reach 2	7216.08	100 YR	50.23	175.13	176.84	176.84	177.21	0.007073	3.12	25.40	35.60	0.79
Reach 2	7216.08	50 YR	42.61	175.13	176.70	176.70	177.09	0.007969	3.11	20.62	31.40	0.82
Reach 2	7216.08	25 YR	35.47	175.13	176.60	176.60	176.96	0.007744	2.92	17.60	28.59	0.80
Reach 2	7216.08	10 YR	27.35	175.13	176.44	176.44	176.78	0.008154	2.75	13.38	24.33	0.81
Reach 2	7216.08	5 YR	21.47	175.13	176.29	176.29	176.62	0.009045	2.65	9.98	20.08	0.83
Reach 2	7216.08	2 YR	13.60	175.13	176.17		176.36	0.005807	1.96	7.92	15.36	0.65
Reach 2	7216.075	Regional	213.48	174.84	177.92		177.94	0.000336	1.04	394.17	236.55	0.19
Reach 2	7216.075	100 YR	50.23	174.84	176.76		176.77	0.000270	0.67	150.90	169.58	0.16
Reach 2	7216.075	50 YR	42.61	174.84	176.56		176.57	0.000418	0.77	116.90	165.74	0.19
Reach 2	7216.075	25 YR	35.47	174.84	176.37		176.39	0.000700	0.91	86.71	164.22	0.25
Reach 2	7216.075	10 YR	27.35	174.84	176.19		176.22	0.001313	1.14	56.85	162.83	0.33
Reach 2	7216.075	5 YR	21.47	174.84	176.09	176.02	176.14	0.001727	1.24	41.27	162.12	0.37
Reach 2	7216.075	2 YR	13.60	174.84	175.99	175.58	176.05	0.001740	1.16	24.90	161.36	0.37
Reach 2	7216.07	Regional	213.48	174.56	177.34		177.74	0.004660	3.57	98.26	75.25	0.72
Reach 2	7216.07	100 YR	50.23	174.56	176.62		176.70	0.001157	1.42	52.00	53.64	0.34
Reach 2	7216.07	50 YR	42.61	174.56	176.38		176.47	0.001529	1.48	39.99	46.32	0.38
Reach 2	7216.07	25 YR	35.47	174.56	176.15		176.24	0.002042	1.54	30.15	34.50	0.43
Reach 2	7216.07	10 YR	27.35	174.56	175.86		175.97	0.003185	1.62	21.59	28.15	0.51
Reach 2	7216.07	5 YR	21.47	174.56	175.65		175.77	0.004788	1.71	15.86	26.88	0.60
Reach 2	7216.07	2 YR	13.60	174.56	175.38	175.36	175.54	0.009877	1.87	8.73	25.22	0.81
Reach 2	7216.065	Regional	213.48	173.99	177.47		177.51	0.000517	1.38	381.58	182.82	0.25
Reach 2	7216.065	100 YR	50.23	173.99	176.65		176.65	0.000111	0.52	238.19	165.38	0.11
Reach 2	7216.065	50 YR	42.61	173.99	176.41		176.41	0.000135	0.54	199.07	163.28	0.12
Reach 2	7216.065	25 YR	35.47	173.99	176.17		176.18	0.000171	0.56	161.23	161.33	0.13
Reach 2	7216.065	10 YR	27.35	173.99	175.88		175.89	0.000259	0.61	114.31	157.78	0.16
Reach 2	7216.065	5 YR	21.47	173.99	175.66		175.68	0.000382	0.67	80.43	156.25	0.19
Reach 2	7216.065	2 YR	13.60	173.99	175.37		175.40	0.000630	0.74	36.61	129.45	0.23

HEC-RAS Plan: CF Sept 2017 River: Bruce Creek Reach: Reach 2 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Reach 2	7216.06	Regional	213.48	173.78	177.39	176.39	177.43	0.000841	1.82	339.18	188.13	0.32
Reach 2	7216.06	100 YR	50.23	173.78	176.63	175.40	176.64	0.000158	0.66	203.43	151.03	0.13
Reach 2	7216.06	50 YR	42.61	173.78	176.32	175.30	176.37	0.000665	1.25	63.85	140.53	0.26
Reach 2	7216.06	25 YR	35.47	173.78	176.09	175.21	176.13	0.000727	1.22	54.60	132.24	0.27
Reach 2	7216.06	10 YR	27.35	173.78	175.78	175.07	175.83	0.000864	1.19	42.64	122.02	0.29
Reach 2	7216.06	5 YR	21.47	173.78	175.55	174.96	175.60	0.000995	1.17	33.64	113.71	0.30
Reach 2	7216.06	2 YR	13.60	173.78	175.25	174.67	175.29	0.001052	1.04	22.39	102.22	0.30
Reach 2	7216.045		Bridge									
Reach 2	7216.03	Regional	213.48	173.75	176.74	176.39	176.77	0.000929	1.61	346.14	205.14	0.31
Reach 2	7216.03	100 YR	50.23	173.75	175.43	175.43	175.82	0.009289	3.34	27.99	183.33	0.87
Reach 2	7216.03	50 YR	42.61	173.75	175.34	175.34	175.69	0.008996	3.15	24.98	180.88	0.85
Reach 2	7216.03	25 YR	35.47	173.75	175.24	175.24	175.57	0.008597	2.94	21.99	178.43	0.82
Reach 2	7216.03	10 YR	27.35	173.75	175.12	175.12	175.41	0.008214	2.69	17.98	175.17	0.79
Reach 2	7216.03	5 YR	21.47	173.75	175.02	175.02	175.28	0.007774	2.47	14.71	172.50	0.76
Reach 2	7216.03	2 YR	13.60	173.75	174.79	174.79	175.05	0.009339	2.31	7.58	67.73	0.80

Appendix L DIGITAL MODELING