NOVATECH

Engineers, Planners & Landscape Architects

Engineering

- Land / Site Development
- Municipal Infrastructure
- Environmental / Water Resources
- Traffic/ Transportation
- Structural
- Recreational

Planning

- Land/Site Development
- Planning Application Management
- Municipal
- Planning Documents & Studies
- Expert Witness (OMB)
- Wireless Industry

Landscape Architecture

- Urban Design & Streetscapes
- Recreation & Parks Planning
- Environmental Restoration
- Sustainable Design

32 Years

Appleton Shores Subdivision

Servicing Options and Conceptual Stormwater Management Report

Engineering excellence. Planning precision. Inspired landscapes.

SERVICING OPTIONS AND CONCEPTUAL STORMWATER MANAGEMENT REPORT

APPLETON SHORES SUBDIVISION

Municipality of Mississippi Mills
County of Lanark

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

September 2, 2022

Novatech File: 114165
Ref: R-2022-139

NOVATECH
Engineers, Planners & Landscape Architects

September 2, 2022

County of Lanark
99 Christie Lake Road
Perth, ON K7H 3E2

Attention: Julie Stewart

Dear Ms. Stewart:

Re: Servicing Options and Conceptual Stormwater Management Report
Appleton Shores Subdivision
Municipality of Mississippi Mills, County of Lanark
Novatech File No.: 114165

Please find enclosed the Servicing Options and Conceptual Stormwater Management Report (September 2, 2022) prepared for the proposed Appleton Subdivision. The report outlines the assumptions made in the roadway, servicing options and conceptual stormwater management design. This report is submitted in support of the Draft Plan of Subdivision submission.

Please contact us should you require any additional information.

Yours truly,

NOVATECH

Alex McAuley, P. Eng.
Project Manager | Land Development Engineering

cc: John Richard Southwell (Southwell Homes Ltd.)
Tracy Zander (ZanderPlan Inc.)

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

List of Drawings

Draft Plan of Subdivision	Rev. 4, August 12, 2022
Concept Plan – 14 Lots	114165-CP2021 (rev. 5)
Pre-Development Drainage Area Plan	114165-PRE (rev. 4)
Post-Development Drainage Area Plan	114165-POST (rev. 4)
Preliminary Grading Plan	114165-PGR (rev. 9)
Erosion & Sediment Control Plan	114165-ESC (rev. 4)

1.0 INTRODUCTION

Novatech has been retained to complete the servicing options and conceptual stormwater management design for a proposed rural residential subdivision in Appleton, Ontario. The proposed development consists of fourteen (14) rural estate lots with a minimum lot size of approximately 0.4 hectares (1.0 acres). Refer to the Draft Plan of Subdivision included in this report for the proposed lot layout.

1.1 Purpose

This report outlines the assumptions made in the roadway, servicing options and conceptual stormwater management design. This report is submitted in support of the Draft Plan of Subdivision submission.

1.2 Site Location and Description

The approximately 7.1 hectare site is described as Part of Lot 4, Concession 10, and Lot 7, Registered Plan 288, Geographic Township of Ramsay, Municipality of Mississippi Mills, County of Lanark.

The subject site is located within the Mississippi River watershed. The topography of the site slopes generally from southeast to northwest, towards the Mississippi River and the Provincially Significant Wetland (PSW) to the north, with elevations ranging between approximately 128.5 m and 118.0 m.

Refer to the following figures for the location of the proposed development and the existing conditions:

- **Figure 1** – Key Plan
- **Figure 2** – Existing Conditions

1.3 Reference Documents

This report should be read in conjunction with the following reference documents:

- Slope Stability Assessment (Paterson Group, May 2022)
- Hydrogeological Assessment and Terrain Analysis (Paterson Group, August 2022)
- Environmental Impact Assessment (Bowfin/CIMA+, Revised August 2022)

2.0 ENVIRONMENTAL CONSIDERATIONS

The site is bounded by the Mississippi River with a PSW to the north and a wetland to the south. Some of the wetland to the south is part of a PSW, with an unevaluated wetland portion extending into the existing Apple Street right-of-way.

A Slope Stability Assessment for the site was completed by Paterson. The assessment identifies a Limit of Hazard Lands setback within which no structures are to be constructed. The Limits of Hazard Lands is shown on the Concept Plan. Refer to the Paterson Slope Stability Assessment for details.

An Environmental Impact Statement (EIS) report for the site was prepared by Bowfin Environmental/CIMA+. The EIS identifies a 30m setback from the existing north PSW boundary. The portion of the south wetland within the proposed development (0.04 ha) is categorized as unevaluated wetland and would be removed. The boundaries and setbacks are shown on the Concept Plan. Refer to the EIS for further details.

Both wetlands are identified as turtle habitat, and the EIS notes that turtle exclusion fencing would be required. Turtle exclusion fencing has been noted on the Concept Plan. Refer to the EIS for further details.

3.0 ROADWAY DESIGN

Access to the subdivision would be from Wilson Street and from the extension of the existing Apple Street. The road cross-section shown on the enclosed Preliminary Grading Plan (**114165-PGR**) is based on discussions with the Director of Roads and Public Works for the Municipality of Mississippi Mills and corresponds to the cross-section used for the nearby Hillcrest Drive (Lubber's) Subdivision. The roadside ditch backslope of 2.5:1 has been included to ensure that the roadway and ditch cross-section fits within the 18.0m ROW width, such that the roadside ditch does not encroach on a private property.

The cross-section consists of a 6.0m wide asphalt roadway within an 18m rural right-of-way and includes 1.5m shoulders. One shoulder would be paved, while the other would be gravel.

Design components for the roadway within the subdivision are as follows:

- Minimum road grade proposed = 0.5%
- Roadway cross fall = 3.0%
- Vertical curves would be designed where change in grade exceeds 2.0%
- Roadside ditch bottom width = 0.9m
- Roadside ditch side slopes = 2.5:1 (H:V)
- Minimum invert of ditch to underside of granulars = 0.30m

The Roadway Pavement Structure being proposed is as follows and would be subject to a geotechnical investigation report prepared during the detailed design stage.

Table 3.1: Roadway Pavement Structure

Layer Thickness (mm)	Pavement Material Description
40	Asphalt Wear Course (Superpave 12.5)
50	Asphalt Base Course (Superpave 19)
150	OPSS Granular A
400	OPSS Granular B Type II
640	**Total**

4.0 SERVICING OPTIONS

The proposed development would consist of fourteen (14) rural estate lots.

With regards to municipal servicing as an option, the closest municipal services are 8km away in Almonte. Given that extending these municipal services is not feasible and since the proposed development is located outside of a public service area, the individual lots would be serviced by individual drilled wells and septic systems, in accordance with the recommendations of the hydrogeological report (Paterson, August 2022). Septic system permits would be required for each lot as part of the building permit process.

5.0 PRELIMINARY GRADING AND DRAINAGE

The preliminary grading information has been provided for the roadways and drainage outlets as indicated on the enclosed Preliminary Grading Plan (**114165-PGR**). The proposed lot grading would consist of split-lot drainage. The front yards would drain towards the proposed roadside ditches, while the rear-yards would drain towards the rear of the lots. Detailed lot grading would be provided with the detailed design required for the registration of the subdivision.

Surface drainage system design components are as follows:

Ditches and Swales

The roadway and associated roadside ditches would be designed with a minimum slope of 0.5%, where possible. The roadway ditch elevations would be set approximately 1.13m below the centerline of the proposed road elevations and would follow the longitudinal slope of the roadway.

Post-development stormwater runoff would be collected by the proposed roadside ditches and lot swales and would be directed to the Mississippi River and north PSW.

Culverts

Driveway culverts would be sized to convey the 5-year peak flows and would have a minimum diameter of 400mm. Road crossing culverts would be sized to convey the 10-year peak flows and would have a minimum diameter of 600mm. The site would be graded to ensure that peak flows greater than the culvert capacities would overtop the driveways but would still be confined within the right-of-way (ROW). Culvert sizes and locations would be confirmed as a part of the detailed design process.

Foundation Drainage

Foundation drainage from all dwelling units would discharge to the surface (i.e., low ground) via basement sump pumps, which should be directed towards the rear-yards or roadside ditches.

6.0 CONCEPTUAL STORMWATER MANAGEMENT

6.1 Stormwater Management Criteria

The following stormwater management criteria have been developed based on correspondence with the Mississippi Valley Conservation Authority (MVCA) and have been applied to the conceptual design for the proposed subdivision. A copy of the MVCA email (dated December 11, 2014) to this effect is included in **Appendix A**.

Stormwater Quantity Control

- Storm runoff from areas that outlet to the Mississippi River do not require quantity control. Outlets to the Mississippi River are to be designed to ensure they can accommodate the uncontrolled post-development peak flows and that there are no adverse impacts on the receiving watercourse (scour, erosion);
- Storm runoff from areas that outlet to the north PSW is to be controlled to pre-development levels for all storms up to and including the 100-year event.

Stormwater Quality Control

- Provide an Enhanced level of water quality control corresponding to a long-term removal rate of 80% Total Suspended Solids (TSS);
- Implement lot level and conveyance Best Management Practices.

Erosion and Sediment Control

- Minimize the impact on the downstream receiving watercourse (Mississippi River) by minimizing the potential erosion and volume of sediment on both a temporary (during construction) and permanent basis;
- All outlets are to be designed to protect the receiving watercourse from scour and erosion.

Flood Control

- Provide positive drainage outlets for the proposed subdivision capable of conveying the 100-year post-development flow from the respective sub-catchment areas;
- Ensure the proposed grading plan provides freeboard above the 100-year flood elevation in the Mississippi River.

6.2 Storm Drainage Areas

The Pre & Post Development Storm Drainage Area Plans are provided with this report.

- Pre-development drainage areas were delineated based on topographic mapping;
- Post-development drainage areas were delineated based on the proposed site grading and topographic mapping.

Note that topographic contours are based on data from two different sources (site survey points, and GeoOttawa mapping), and have been combined as required to delineate upstream drainage areas.

The storm drainage area plans divide the total area into various sub-catchment areas. The total drainage area (9.80 ha) is consistent between the pre-development and post-development plans. The total storm drainage area is greater than the subject site area (7.1 ha) due to the contributing off-site drainage area.

6.2.1 Pre-Development

Under existing conditions, the site has been divided into three sub-catchment areas as shown on the Pre-Development Drainage Area Plan (**114165-PRE**).

- **Area A:** Stormwater runoff from the central portion of the site flows overland to the west towards the Mississippi River;
- **Area B:** Stormwater runoff from the northeastern portion of the site flows overland to the north towards Wilson Street and ultimately into the Mississippi River;
- **Area C:** To be conservative, stormwater runoff from the southwestern portion of the site, including off-site drainage, is assumed to flow overland to the north PSW. This would be confirmed at the time of detailed design to be consistent with the EIS.

6.2.2 Post-Development

Existing drainage patterns would be maintained as much as possible under post-development conditions. Storm runoff from the proposed subdivision would be split between three outlets (A, B, and C). The contributing drainage areas upstream of each outlet have been subdivided based on the proposed grading design as shown on the Preliminary Grading Plan (**114165-PGR**) and on the Post-Development Drainage Area Plan **(114165-POST**).

- **Outlet A:** Stormwater runoff from Area ‘A1’ would flow overland to the west towards the Mississippi River as under pre-development conditions;

- **Outlet B:** Stormwater runoff from Areas 'B1' and 'B2' would be conveyed by roadside ditches to a Ditch Inlet Catch Basin (DICB) located in the southeast corner of the site. A new storm sewer would convey flows from the DICB under Wilson Street to the Mississippi River;
- **Outlet C:** Outlet C is the sum of the areas tributary to the north PSW. For modelling purposes, this is represented as outlets 'C1', 'C2' and 'C3'. The sum of outflows to outlet C would not be more than the pre-development condition.
    i. **Roadside drainage:** Stormwater runoff from Area 'C1', 'C2', and 'C3' would be conveyed by roadside ditches to the linear stormwater management facilities located on Lot 5 and Lot 9.
    ii. **Rear-yard and existing upstream areas:** Stormwater runoff from Areas 'C1-RY', 'C2-RY' and 'C3-RY' would flow overland uncontrolled to the north PSW, as in pre-development conditions.

6.3 Hydrologic & Hydraulic Modeling

The PCSWMM model was used to complete the hydrologic and hydraulic analysis of the proposed Appleton Subdivision. The drainage areas and model parameters for each sub-catchment were input into the PCSWMM models, along with the proposed ditches and culverts comprising the proposed storm drainage system.

6.3.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms. The IDF parameters used to generate the design storms were taken from the *City of Ottawa - Sewer Design Guidelines* (October 2012).

4 Hour Chicago Storms:	*12 Hour SCS Type II Storms*:
25mm 4hr Chicago storm	2-year 12 hour SCS Type II storm
2-year 4hr Chicago storm	5-year 12 hour SCS Type II storm
5-year 4hr Chicago storm	100-year 12 hour SCS Type II storm
100-year 4hr Chicago storm	

The 12-hour SCS distribution was found to generate the highest peak flows and governed the design of the proposed storm drainage system. The stormwater quality analysis uses the 4-hour, 25mm Chicago distribution as recommended in the *Ministry of the Environment Stormwater Management Planning and Design Manual (March 2003).*

6.3.2 Model Development & Modeling Parameters

The PCSWMM modelling files and model schematics are provided in **Appendix B**. Modeling parameters were determined as follows:

General

- Soil types were identified based on the Soil Map of Lanark County (North Sheet);
- Land use and ground cover were determined from aerial photography (**Figure 2**);
- SCS Curve Numbers were assigned for each sub-catchment area based on the soil types and land use;
- Depression storage represents the amount of rainfall required to generate runoff from a catchment area. The model uses typical values for Eastern Ontario;
    - Depression Storage (previous areas): 4.67 mm

- Depression Storage (roads, driveways): 1.57 mm
- Depression Storage (rooftops): 0 mm

- Catchment slopes are based on the topographic mapping (existing) or the conceptual grading plan (proposed).

6.4 Model Results

For each storm event, the PCSWMM model determines how the runoff from each of the individual sub-catchments is routed through the proposed drainage system. The following subsections summarize the output from the pre-development and post-development models of the proposed Appleton Subdivision.

6.4.1 Stormwater Quantity Control

As per correspondence with the MVCA, stormwater quantity control would not be required for Areas 'A' and 'B', which would outlet directly to the Mississippi River. Area 'C' would require post-to-pre-development quantity control up to the 100-year event as this area would outlet to the north PSW.

Linear stormwater management facilities on Lot 5 and Lot 9 would be used for quantity control storage. To estimate the required storage volumes, the conceptual PCSWMM model uses orifices to restrict outflows from the linear stormwater management facilities for smaller, more frequent events. Controlled outflows from larger events are represented in the model using a high-flow weir/spillway above the orifice but at an elevation that would still confine the runoff within the banks of the linear storage pond. The exact dimensions of the linear stormwater management facilities and the configuration of the outlet structures would be determined at the detailed design stage.

Table 6.1 provides a comparison of the pre-development and post-development peak flows at each of the three storm outlets from the site. The post-development flows at Outlet 'C' include both the controlled outflows from the linear SWM facilities and the uncontrolled rear yard flows from Area C.

Table 6.1: Pre vs. Post-Development Peak Flows (L/s)

Storm Distribution->		**Area (ha)**	**4hr Chicago**				**12hr SCS**		
Return Period->			**25mm**	**2yr**	**5yr**	**100yr**	**2yr**	**5yr**	**100yr**
Mississippi River *(Outlet 'A')*	PRE	1.52	8	21	47	158	30	56	150
	POST	1.60	15	32	63	187	38	67	167
Wilson Street *(Outlet 'B')*	PRE	1.36	4	13	30	106	20	40	113
	POST	1.65	10	22	44	126	30	56	135
Wetland Area *(Outlet 'C')*	PRE	6.92	15	50	126	484	83	173	519
	POST	6.52	19	46	104	449	67	169	473

Table 6.2 provides a summary of the storage requirements and release rates for the two linear stormwater management facilities for Outlets 'C1' and 'C2'. The proposed linear stormwater management facilities would control post-development flows to the north PSW to pre-development levels for all storm events, except for 25mm water quality event, where the impact of this small increase in flow (4~5 L/s) to the north PSW is expected to be negligible.

Table 6.2: Provided Storage and Release Rates to North PSW

Outlet 'C1'							
Storm Distribution->	**4hr Chicago**				**12hr SCS**		
Return Period->	**25mm**	**2yr**	**5yr**	**100yr**	**2yr**	**5yr**	**100yr**
Peak Inflow to Linear Stormwater Management Facility	6	13	27	97	19	36	71
Release Rate (L/s)	5	10	25	96	14	34	70
Provided Max. Storage (m^3)	**2**	**6**	**10**	**13**	**9**	**10**	**12**
Outlet 'C2'							
Storm Distribution->	**4hr Chicago**				**12hr SCS**		
Return Period->	**25mm**	**2yr**	**5yr**	**100yr**	**2yr**	**5yr**	**100yr**
Peak Inflow to Linear Stormwater Management Facility	9	24	46	127	33	49	135
Release Rate (L/s)	7	11	31	126	15	47	132
Provided Max. Storage (m^3)	**4**	**10.5**	**15**	**20**	**14**	**16**	**20**

6.4.2 Stormwater Quality Control

Based on correspondence from the MVCA, the proposed development would require an *Enhanced* Level of water quality protection corresponding to a long-term removal rate of 80% of Total Suspended Solids (TSS) due to its proximity to the Mississippi River. Water quality treatment would be provided using a treatment train consisting of lot level and conveyance best management practices (BMPs) designed to promote infiltration and filter sediment from runoff.

- The subdivision would consist of 14 rural lots with a minimum size of approximately 0.4 ha (1.0 acres).
- Roof leaders would be directed to grass surfaces.
- Roadside ditches would be vegetated with a flat bottom and constructed with a minimum longitudinal slope, where possible.
- Rear-yard swales and outlet ditches would also be vegetated and constructed with a minimum longitudinal slope, where possible.

Roadside Ditches (Grassed Swales)

Although roadside ditches and grassed swales are generally used for the conveyance of stormwater, under the appropriate conditions they permit significant amounts of total suspended solid (TSS) removal. Grassed swales are effective for treatment when the bottom width is maximized while the depth of flow and swale slope is minimized.

Case studies on the effectiveness of grassed swales for stormwater quality control indicate that properly designed grassed swales can provide in excess of 80% long-term TSS removal, which would meet the requirements for an *Enhanced* level of stormwater quality control as per the MOE guidelines.

> *"Both dry and wet swales demonstrate good pollutant removal, with dry swales providing significantly better performance for metals and nitrate. Dry swales typically remove 65 percent of total phosphorus (TP), 50 percent of total nitrogen (TN), and between 80 and 90 percent of metals. Wet swale removal rates are closer to 20 percent of TP, 40 percent*

of TN, and between 40 and 70 percent of metals. The total suspended solids (TSS) removal for both swale types is typically between 80 and 90 percent." (FHWA, 1996)

In addition to the treatment provided by the grassed swales, the side slopes of the swales would act as grassed filter strips and provide additional removal of pollutants from the storm runoff as indicated in the following report:

"Studies of the performance of grassed swales have found that swale length is not an important parameter as long as the road runoff is allowed to flow directly down the side slope into the swale. The data suggests that under these conditions the side slope acts as a filter strip and removes most of the contaminants before the runoff begins to flow in the swale parallel to the road." (Weiss, Gulliver, & Erickson, 2010)

Proposed Design & Model Results

The proposed roadside ditches and swales have been sized to meet MOE / FHWA standards for stormwater quality treatment based on guidelines from the following publications:

- *Young et al., "Evaluation and Management of Highway Runoff Water Quality (FHWA,1996)*
- *Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring* (FHWA, 1996)
- *Stormwater Management Planning and Design Manual* (MOE, 2003)

The proposed roadside ditches would have a 0.9m flat bottom with 2.5:1 side slopes and a minimum longitudinal slope of 0.5%, where possible, otherwise, they would follow the roadway profile. Calculations were performed using Manning's roughness coefficient of 0.035, which assumes mature vegetative growth in the swales.

The post-development model has been used to confirm that the peak flows in the roadside ditches would meet or exceed the MOE / FHWA recommended criteria for depth and velocity for the 25mm event. The water quality results are summarized in **Table 6.3** and show that all recommended parameters would be met.

Table 6.3: Grassed Channel Design Criteria (Based on MOE / FHWA Guidelines)

Criteria	Recommended	Outlet B to Wilson St		Outlet A to North PSW		Outlet C to North PSW	
		North Roadside Ditch	South Roadside Ditch	North Roadside Ditch	South Roadside Ditch	North Roadside Ditch	South Roadside Ditch
Channel Slope	< 4.0% (MOE)	2.0%	2.0%	2.8%	3.3%	2.9%	3.2%
Bottom Width	> 0.75m (MOE)	0.90 m	0.90 m	0.90 m	0.90 m	0.90 m	0.90 m
Side Slopes (H:V)	> 2.5:1 (MOE)	2.5:1	2.5:1	2.5:1	2.5:1	2.5:1	2.5:1
Peak Flow		4.64 L/s	10.61 L/s	5.52 L/s	2.78 L/s	9.18 L/s	5.42 L/s
Flow Depth	± 0.1 (FHWA)	0.07 m	0.07 m	0.01 m	0.04 m	0.05 m	0.06 m
Velocity	< 0.5m/s (MOE)	0.25 m/s	0.12 m/s	0.16 m/s	0.44 m/s	0.13 m/s	0.33 m/s

**Flows and velocities are from the post-development PCSWMM model.*

Maintenance and Effectiveness

The roadside ditches acting as grassed swales should be planted with dense turf grass or similar vegetation. The height of vegetation in the swales should be maintained at approximately 100 mm (4 inches).

> *"Pollutant removal efficiencies of swales are related to flow retardance, vegetation density and the stiffness of grass blades, providing a "scrub brush" effect (Khan, 1993). Best removal rates have been achieved through dense turf grasses where a uniform blade height is maintained at least 50 mm (2 in) above the design water depth. Grasses too short do not provide sufficient flow reduction or pollutant filtration; grasses too long tend to bend and flatten, allowing the runoff to skim over the bentgrass, reducing flow retardance and filtration." (FHWA, 1996)*

Periodic inspection of the roadside ditches should be performed at least twice a year to monitor the accumulation of sediment or debris:

- Sediment removal should be performed when sediment depths build up to 100 mm.
- Grass damaged during the sediment removal process should be promptly replaced using the same seed mix used during swale establishment.
- If any areas are eroded, they should be filled, compacted, and re-seeded so that the final grade is level with the design invert of the swale.

7.0 FLOOD PROTECTION

To ensure adequate flood protection for the proposed dwellings, the following flood protection measures would be incorporated into the design of the proposed subdivision at the detailed design stage:

- The developed area of the subdivision is to be outside the limits of the 100-year floodplain for the Mississippi River;

- The proposed grading would direct stormwater runoff towards roadside ditches and rear-yards;
- The proposed roadside ditches, culverts and storm sewers would be designed and sized to convey runoff for storm events up to and including the 1:100-year event;
- Terrace elevations would be set at a minimum of 0.3m above the 1:100-year flood elevation.

8.0 EROSION AND SEDIMENT CONTROL

The following erosion and sediment control measures would be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987).

Construction Measures

The following erosion and sediment control measures are to be implemented prior to construction, are to remain in place throughout each phase of construction and are to be inspected regularly. Refer to the Erosion and Sediment Control Plan (**114165-ESC**).

- Light duty silt fence is to be installed along the north, east, and west boundaries of the site;
- Rock flow check dams are to be installed at all storm outlets from the site;
- Stockpiles are to be located away from watercourses and stabilized against erosion;
- Storing and maintenance of all machinery should be done away from the watercourse;
- Regular street-sweeping is to be conducted once the roads are completed;
- The contractor is to immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch. Appropriate response measures are to be carried out by the contractor without delay;
- No control measure is to be permanently removed without prior authorization from the Engineer;
- The contractor would be advised that failure to implement erosion and sediment control measures may result in penalties imposed by any applicable regulatory agency.

Permanent Measures

The following erosion and sediment control measures are to remain in place once construction is complete.

- The rock flow check dams at Outlets 'C1' and 'C2' would remain as permanent erosion control features;
- Roof leaders are to be directed to grass surfaces;
- Roadside and rear-yard ditches would be designed at minimum grade, where possible;
- Roadside and rear-yard ditches would be vegetated to provide permanent erosion and sediment control.

9.0 CONCLUSIONS

- The proposed development would consist of fourteen (14) rural estate lots with a minimum lot size of approximately 0.4 hectares (1.0 acres). Access to the subdivision would be provided off Wilson Street and Apple Street.
- The proposed subdivision is located in Appleton, outside of a public service area. As a result, the proposed lots would be serviced by private individual services (drilled wells and septic systems).
- On-site servicing (individual drilled wells and septic systems) is to be in accordance with the recommendations of the hydrogeological report (Paterson, August 2022).
- On-site stormwater quantity control is not required for outlets that convey flows directly to the Mississippi River. Quantity control is required for the outlet conveying flows to the north PSW, controlling flows for all storm events to pre-development levels.
    - Outlet 'A' would direct stormwater runoff overland to the Mississippi River uncontrolled as under pre-development conditions.
    - Outlet 'B' would direct stormwater runoff to a proposed ditch inlet catch basin (DICB). A new storm sewer would convey flows from the DICB under Wilson Street to the Mississippi River.
    - Outlet 'C' would direct stormwater runoff to the north PSW and would be controlled to pre-development levels for all storms up to and including the 100-year event.
    - Post-development runoff from the site would have no adverse impact on the receiving watercourse (Mississippi River).
- An Enhanced level of stormwater quality control corresponding to a long-term removal rate of 80% Total Suspended Solids (TSS) would be provided by a treatment train of lot level and conveyance best management practices (BMPs). The proposed roadside ditches would be designed to minimize flow velocities and promote the filtration of suspended solids.
- Erosion and sediment controls would be provided both during construction and on a permanent basis.
- Flood protection measures would be incorporated into the design of the proposed subdivision at the detailed design stage.

It is recommended that the proposed conceptual stormwater management system be approved for implementation.

NOVATECH

Prepared by:

Vahid Mehdipour

Vahid Mehdipour
M.Sc. (Civil Engineering) | Water Resources

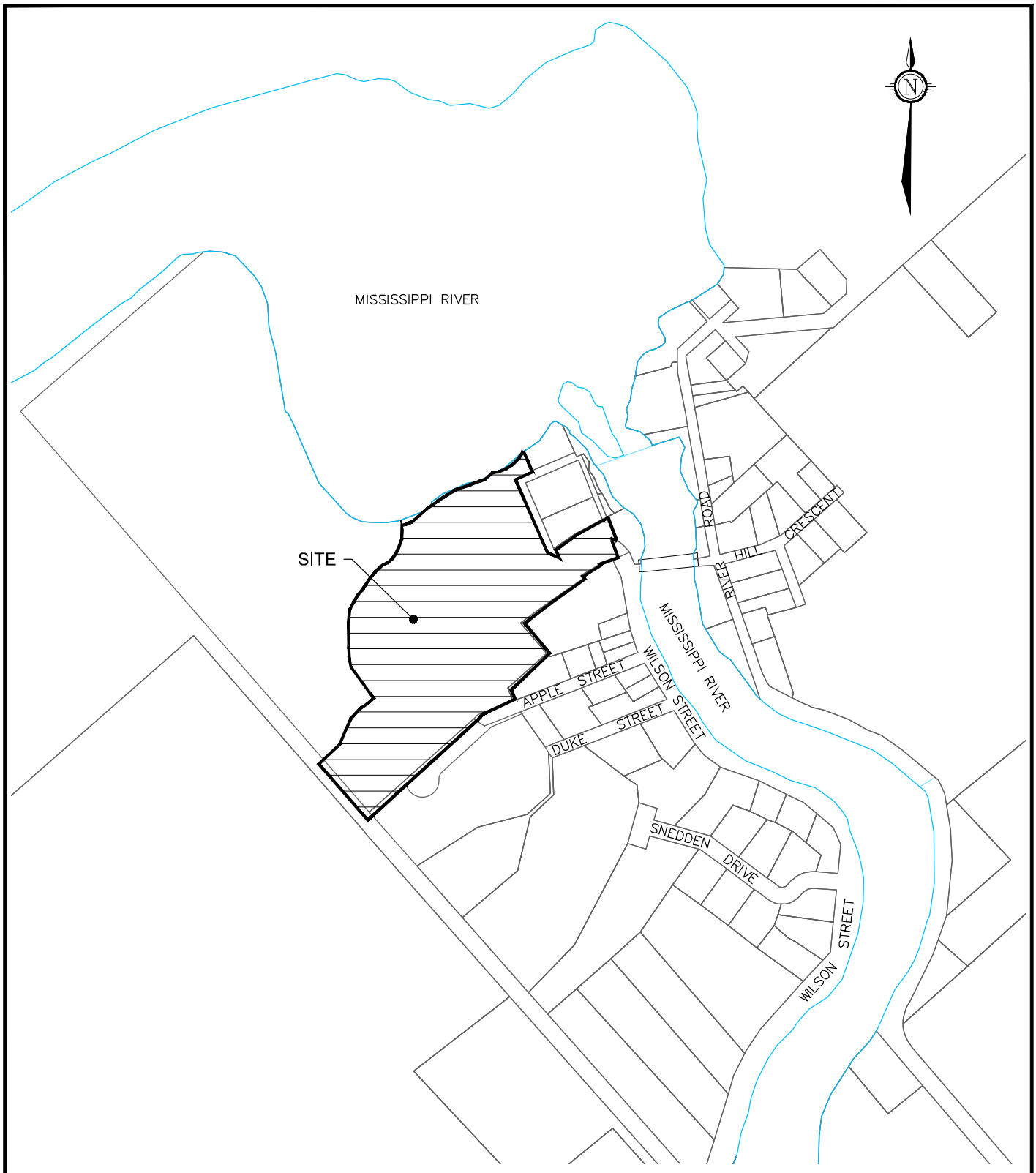
Aden Rongve, B.E.(Civil Engineering), EIT

Reviewed by:

Alex McAuley, P.Eng.
Project Manager | Land Development Engineering

Mike Petepiece, P.Eng.,
Senior Project Manager | Water Resources

Susan Gordon. P.Eng.
Director | Land Development



NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

APPLETON SUBDIVISION

KEY PLAN

AUG 2022 114165 FIGURE 1

SHT8X11.DWG - 216mmX278mm

M:\2014\114165\CAD\Design\Figures\114165-KP.dwg, KEY PLAN, Aug 18, 2022 - 9:51am, lcorry

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

APPLETON SUBDIVISION

EXISTING CONDITIONS PLAN

AUG 2022 114165 FIGURE 2

APPENDIX A

Correspondence

Kallie Auld

From: Myra Van Die <MVandie@mvc.on.ca>
Sent: December-11-14 2:46 PM
To: Kallie Auld
Subject: RE: Appleton subdivision

Categories: Project Info

Hi Kallie,

1) Water quality treatment corresponding to an enhanced level of protection is required.
2) Quantity control is not required provided it can be shown that the release of stormwater without quantity control will not have any adverse effects and that there is sufficient capacity within the downstream system. Given that the size of the site relative to the Mississippi River, it can be assumed the release of stormwater without quantity control will not have adverse effects. The outlet must be designed such that the channel will not be subject to erosion based on the soil characteristics and the expected velocities
3) Floodplain mapping can be provided as a shape file, I have requested it from our GIS staff and will forward it to you.

Let me know if you have any questions.

Regards,

Myra Van Die, P.Eng. | Water Resources Engineer
Mississippi Valley Conservation Authority

From: Kallie Auld [mailto:k.auld@novatech-eng.com]
Sent: December-03-14 2:38 PM
To: Myra Van Die
Subject: Appleton subdivision

Hello Myra,

I have a couple questions regarding a proposed subdivision in the town of Appleton.

1) What level of water quality will be required for the site (70%, 80%) if we are outletting to the Mississippi River?
2) For the proposal it was assumed that there would be no quantity control required as we are outletting into the river. Just want to confirm that this is correct.
3) Is there any floodplain mapping available for the area along the river upstream of/ North of the dam, and north west of Apple Street?

If you have any questions, don't hesitate to give me a call.

Thanks very much,

Kallie Auld (Banks), EIT
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x(294) | Fax: 613.254.5867

APPENDIX B

SWM Calculations/Modeling Files

Appleton Subdivision CSWM
Design Storm Time Series Data
Chicago Design Storms

NOVATECH
Engineers, Planners & Landscape Architects

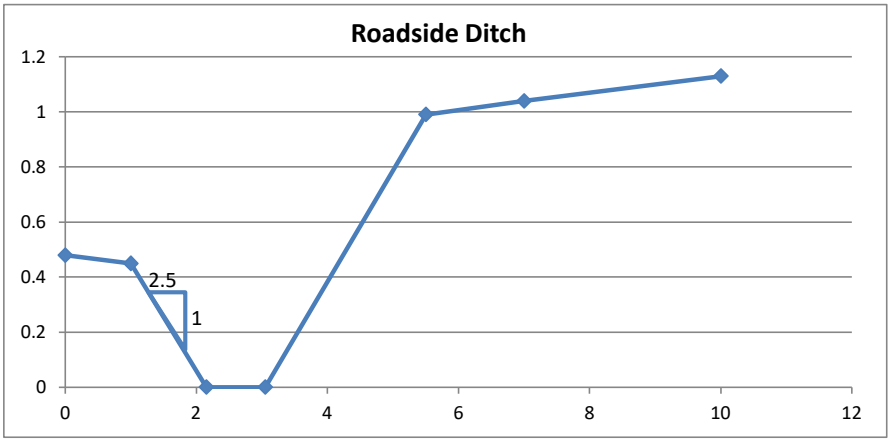
C25mm-4.stm		C2-4.stm		C5-4.stm		C100-4.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0	0:00	0
0:10	1.34	0:10	1.98	0:10	2.49	0:10	4.07
0:20	1.49	0:20	2.23	0:20	2.77	0:20	4.54
0:30	1.69	0:30	2.58	0:30	3.14	0:30	5.14
0:40	1.96	0:40	3.06	0:40	3.62	0:40	5.95
0:50	2.33	0:50	3.81	0:50	4.31	0:50	7.09
1:00	2.91	1:00	5.1	1:00	5.37	1:00	8.85
1:10	3.91	1:10	7.91	1:10	7.19	1:10	11.9
1:20	6.1	1:20	19.04	1:20	11.14	1:20	18.54
1:30	14.53	1:30	76.81	1:30	26.25	1:30	44.19
1:40	58.72	1:40	23.64	1:40	104.19	1:40	178.56
1:50	17.11	1:50	11.91	1:50	30.86	1:50	52.04
2:00	8.32	2:00	7.98	2:00	15.15	2:00	25.31
2:10	5.5	2:10	6.03	2:10	10.07	2:10	16.73
2:20	4.13	2:20	4.87	2:20	7.58	2:20	12.56
2:30	3.32	2:30	4.1	2:30	6.11	2:30	10.09
2:40	2.79	2:40	3.55	2:40	5.14	2:40	8.47
2:50	2.41	2:50	3.14	2:50	4.45	2:50	7.32
3:00	2.12	3:00	2.82	3:00	3.93	3:00	6.46
3:10	1.9	3:10	2.57	3:10	3.53	3:10	5.79
3:20	1.73	3:20	2.35	3:20	3.21	3:20	5.25
3:30	1.58	3:30	2.18	3:30	2.94	3:30	4.82
3:40	1.46	3:40	2.03	3:40	2.72	3:40	4.45
3:50	1.36	3:50	1.9	3:50	2.53	3:50	4.14
4:00	1.27	4:00	1.79	4:00	2.37	4:00	3.88

Appleton Subdivision CSWM
Cross-Sections

Engineers, Planners & Landscape Architects

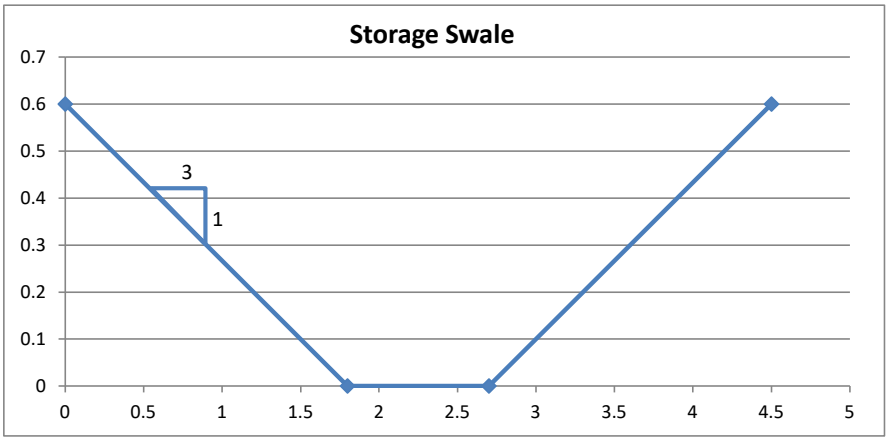
Roadside Ditch
18.0m ROW

Distance	Elevation
0	0.48
1	0.45
2.15	0
3.05	0
5.5	0.99
7	1.04
10	1.13



Storage Swale

Distance	Elevation
0	0.6
1.8	0
2.7	0
4.5	0.6



114165 (Appleton Subdivision) PCSWMM Pre Model Output 100-year, 4-hour Chicago Storm

```
  ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.4.3202
  ---------------------------------------------------------

  This is a new version of ARM - your feedback and suggestions are solicited.
  Create a ticket, post on the PCSWMM feature request forum, or email us directly!

  Simulation start time:                  03/29/2017 00:00:00
  Simulation end time:                    03/30/2017 00:00:00
  Runoff wet weather time steps:          60 seconds
  Report time steps:                      60 seconds
  Number of data points:                  1441


  ****************************
  Unit Hydrographs Runoff Method
  ****************************

  ------------------------------------------------------------------------------------------
------------------------------------------------------------------------
                                                                                  Area   Time of
Concentration  Time to Peak    Time after Peak    Peak UH Flow    UH Depth
  Subcatchment          Runoff Method             Raingage             (ha)    (min)
(min)           (min)               (m³/s/mm)       (mm)
  ------------------------------------------------------------------------------------------
------------------------------------------------------------------------
  B                     Nash IUH                  C100-4hr             1.36   13
8.67            49.33               0.01416         1
  C                     Nash IUH                  C100-4hr             6.92   11
7.33            49.67               0.08514         1
  A                     Nash IUH                  C100-4hr             1.522  10
6.67            39.33               0.0206          1


  ******************
  ARM Runoff Summary
  ******************

  ------------------------------------------------------------------------------------------
-------
                        Total       Total       Total       Total       Peak
Runoff
                        Precip      Losses      Runoff      Runoff      Runoff
Coeff
  Subcatchment          (mm)        (mm)        (mm)        10^6 ltr    LPS
(fraction)
  ------------------------------------------------------------------------------------------
-------
  B                     76.002      54.66       21.338      0.29        105.805
0.281
  C                     76.002      57.764      18.237      1.262       483.888
0.24
  A                     76.002      51.911      24.087      0.367       157.95
0.317
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.011)

****
Element Count
****
Number of rain gages 7
Number of subcatchments ... 0
Number of nodes 3
Number of links 0
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
C100-4hr	C100-4	INTENSITY	10 min.
C2-4hr	C2-4	INTENSITY	10 min.
C25mm-4hr	C25mm-4	INTENSITY	10 min.
C5-4hr	C5-4	INTENSITY	10 min.
S100-12hr	S100-12	INTENSITY	30 min.
S2-12hr	S2-12	INTENSITY	30 min.
S5-12hr	S5-12	INTENSITY	30 min.

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OUT_A	OUTFALL	0.00	0.00	0.0	
OUT_B	OUTFALL	0.00	0.00	0.0	
OUT_C	OUTFALL	0.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Starting Date 03/29/2017 00:00:00
Ending Date 03/30/2017 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00

```
  *************************        Volume        Volume
  Flow Routing Continuity       hectare-m      10^6 ltr
  *************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.000         0.000
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         0.192         1.919
  External Outflow .........         0.192         1.919
  Flooding Loss ............         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.000         0.000
  Continuity Error (%) .....         0.000


  Analysis begun on:  Tue Feb 01 09:50:11 2022
  Analysis ended on:  Tue Feb 01 09:50:11 2022
  Total elapsed time: < 1 sec
```

114165 (Appleton Subdivision) PCSWMM Post Model Output 100-year, 12-hour SCS Type II Storm

```
  ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.4.3202
  ---------------------------------------------------------

  This is a new version of ARM - your feedback and suggestions are solicited.
  Create a ticket, post on the PCSWMM feature request forum, or email us directly!

  Simulation start time:                  03/29/2017 00:00:00
  Simulation end time:                    03/30/2017 00:00:00
  Runoff wet weather time steps:          60 seconds
  Report time steps:                      60 seconds
  Number of data points:                  1441


  ******************************
  Unit Hydrographs Runoff Method
  ******************************

  ------------------------------------------------------------------------------------------
------------------------------------------------------------------------
                                                                                 Area   Time of
Concentration  Time to Peak    Time after Peak    Peak UH Flow    UH Depth
  Subcatchment         Runoff Method             Raingage             (ha)    (min)
(min)           (min)              (m³/s/mm)       (mm)
  ------------------------------------------------------------------------------------------
------------------------------------------------------------------------
  B                    Nash IUH                  S100-12hr            1.36   13
8.67           49.33             0.01416         1
```

```
  C                    Nash IUH                  S100-12hr            6.92   11
7.33            49.67              0.08514          1
  A                    Nash IUH                  S100-12hr            1.522  10
6.67            39.33              0.0206           1


  ******************
  ARM Runoff Summary
  ******************

  ------------------------------------------------------------------------------
-------
                       Total       Total       Total       Total       Peak
Runoff
                       Precip      Losses      Runoff      Runoff      Runoff
Coeff
  Subcatchment         (mm)        (mm)        (mm)        10^6 ltr    LPS
(fraction)
  ------------------------------------------------------------------------------
-------
  B                    93.91       62.164      31.735      0.432       112.958
0.338
  C                    93.91       66.281      27.63       1.912       518.82
0.294
  A                    93.91       58.618      35.283      0.537       150.239
0.376



  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.011)
  --------------------------------------------------------------


  *************
  Element Count
  *************
  Number of rain gages ...... 7
  Number of subcatchments ... 0
  Number of nodes ........... 3
  Number of links ........... 0
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                      Data       Recording
  Name                 Data Source                    Type       Interval
  ----------------------------------------------------------------------
  C100-4hr             C100-4                         INTENSITY   10 min.
  C2-4hr               C2-4                           INTENSITY   10 min.
  C25mm-4hr            C25mm-4                        INTENSITY   10 min.
  C5-4hr               C5-4                           INTENSITY   10 min.
  S100-12hr            S100-12                        INTENSITY   30 min.
  S2-12hr              S2-12                          INTENSITY   30 min.
  S5-12hr              S5-12                          INTENSITY   30 min.


  ************
  Node Summary
  ************
```

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OUT_A	OUTFALL	0.00	0.00	0.0	
OUT_B	OUTFALL	0.00	0.00	0.0	
OUT_C	OUTFALL	0.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... NO
  Water Quality ..... NO
Starting Date 03/29/2017 00:00:00
Ending Date 03/30/2017 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.000	0.000
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.288	2.881
External Outflow	0.288	2.881
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

Analysis begun on: Tue Feb 01 09:51:12 2022
Analysis ended on: Tue Feb 01 09:51:12 2022
Total elapsed time: < 1 sec

By Vahid Mehdipour

Date February 1, 2022

Novatech

Appleton Subdivision CSWM
Pre-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Time to Peak Calculations
(Uplands Overland Flow Method)
Existing Conditions

Area ID	Area (ha)	Overland Flow						Concentrated Overland Flow						Overall			
		Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)	Time to Peak (min)	Time to Peak (hrs)
A	1.52	100	128.0	124.0	4.0%	0.3	5.56	20	124	118.0	30.0%	0.55	0.61	6	4	10	0.17
B	1.36	100	128.0	127.0	1.0%	0.15	11.11	61	127	126.0	1.6%	0.58	1.75	13	9	10	0.17
C	6.92	100	128.0	124.5	3.5%	0.17	9.80	60	124.8	118.0	11.3%	0.7	1.43	11	8	10	0.17

Weighted Curve Number Calculations
Soil type 'B'

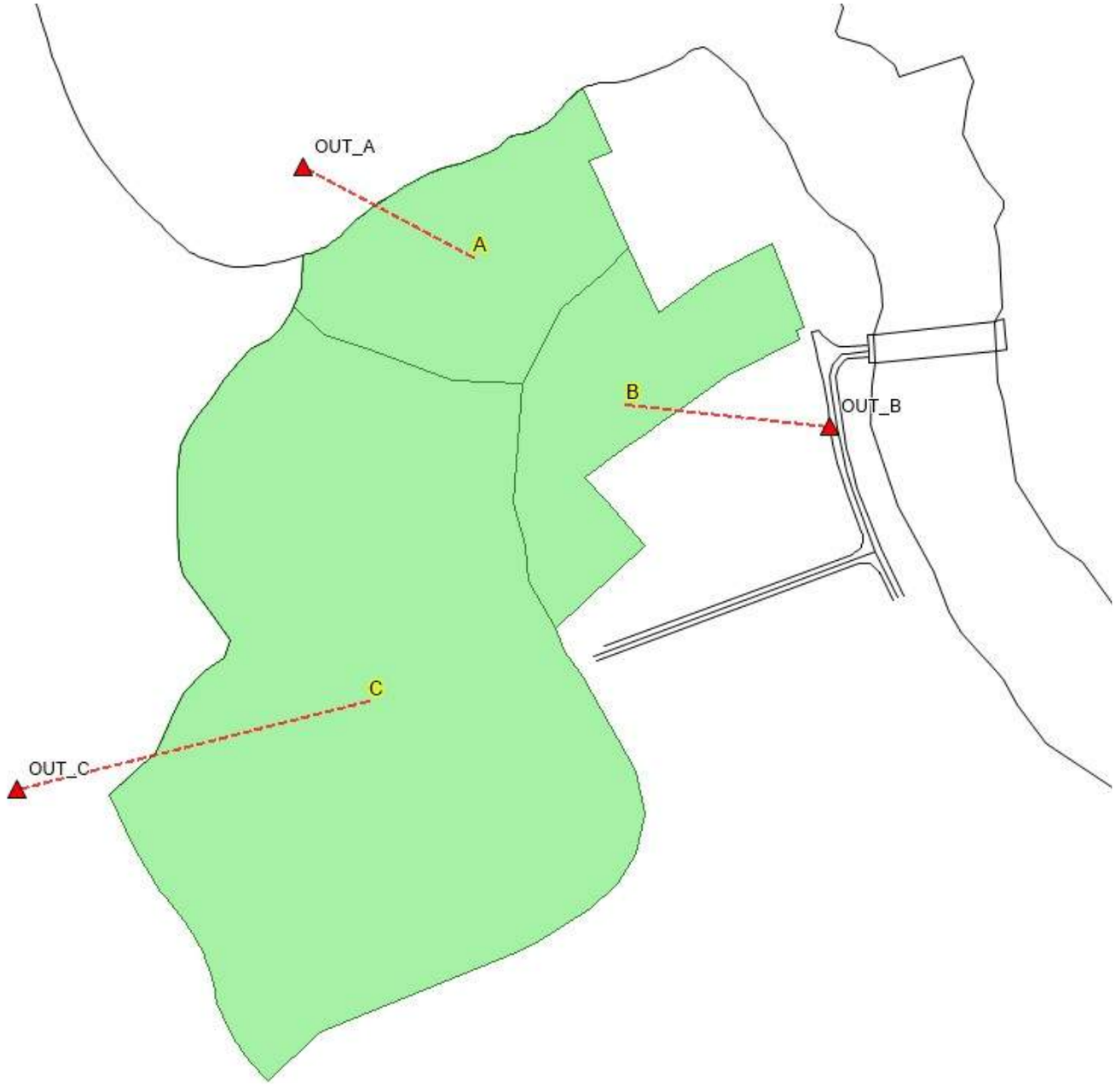
Area ID	Land Use 1	Area	CN	Land Use 2	Area	CN	Weighted CN
1	Open Space - fair grass cover	80%	69	Woods - fair	20%	60	68
2	Open Space - fair grass cover	50%	69	Woods - fair	50%	60	65
3	Woods - good	60%	55	Open Space - fair grass cover	40%	69	61

Weighted IA Calculations

Area ID	Land Use 1	S	IA
A	Open Space - fair grass cover	119.53	8.96
B	Open Space - fair grass cover	136.77	10.26
C	Woods - good	162.39	12.18

Appleton Subdivision CSWM
Pre-Development Model Schematic

NOVATECH
Engineers, Planners & Landscape Architects



114165 (Appleton Subdivision) PCSWMM Post Model Output 100-year, 4-hour Chicago Storm

ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.4.3202

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time:	03/29/2017 00:00:00
Simulation end time:	03/30/2017 00:00:00
Runoff wet weather time steps:	60 seconds
Report time steps:	30 seconds
Number of data points:	2881

Unit Hydrographs Runoff Method

Subcatchment	Time to Peak Runoff Method		Time after Peak (m³/s/mm)	Peak UH Flow Raingage (mm)	Area UH Depth (ha)	Time of Concentration (min)	(min)
A1	Nash IUH		C100-4	1.6	10	6.67	39.33
B2	Nash IUH		C100-4	0.78	13	8.67	46.33
C1-RY	Nash IUH		C100-4	0.88	10	6.67	37.33
C2-RY	Nash IUH		C100-4	2.07	10	6.67	41.33
C3-RY	Nash IUH		C100-4	1.874	42	28	141
		0.02165	1				
		0.00812	1				
		0.01191	1				
		0.02801	1				
		0.00604	0.999				

ARM Runoff Summary

Subcatchment	Total Precip (mm)	Total Losses (mm)	Total Runoff (mm)	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff (fraction)
A1	76.002	49.316	26.681	0.427	186.667	0.351
B2	76.002	55.096	20.897	0.163	58.67	0.275

C1-RY	76.002	56.256	19.739	0.174	71.054
0.26					
C2-RY	76.002	56.256	19.744	0.409	167.138
0.26					
C3-RY	76.002	60.592	15.4	0.289	50.014
0.203					

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.011)

WARNING 03: negative offset ignored for Link C6_1
WARNING 02: maximum depth increased for Node B13-in
WARNING 02: maximum depth increased for Node B13-out
WARNING 02: maximum depth increased for Node B15-in
WARNING 02: maximum depth increased for Node B15-out
WARNING 02: maximum depth increased for Node B16-in
WARNING 02: maximum depth increased for Node B16-out
WARNING 02: maximum depth increased for Node B71-in
WARNING 02: maximum depth increased for Node B72-out
WARNING 02: maximum depth increased for Node C27C-in
WARNING 02: maximum depth increased for Node C27-out
WARNING 02: maximum depth increased for Node C71-in
WARNING 02: maximum depth increased for Node C71-out
WARNING 02: maximum depth increased for Node C76-in
WARNING 02: maximum depth increased for Node C76-out
WARNING 06: dry weather time step increased to the wet weather time step

****
Element Count
****
Number of rain gages 8
Number of subcatchments ... 20
Number of nodes 43
Number of links 45
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
C100-4	C100-4	INTENSITY	10 min.
C100-4+20%	C100-4+20%	INTENSITY	10 min.
C2-4	C2-4	INTENSITY	10 min.
C25mm-4	C25mm-4	INTENSITY	10 min.
C5-4	C5-4	INTENSITY	10 min.
S100-12hr	S100-12	INTENSITY	30 min.
S2-12	S2-12	INTENSITY	30 min.
S5-12	S5-12	INTENSITY	30 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet

B1-1	0.28	114.07	25.00	2.5000	C100-4 WilsC-in
B1-2	0.06	67.14	25.00	2.5000	C100-4 Wils-out
B1-3	0.08	56.30	25.00	3.1500	C100-4 B13-in
B1-4	0.11	71.93	25.00	2.0000	C100-4 B14-in
B1-5	0.08	54.77	25.00	2.5000	C100-4 B15-in
B1-6	0.22	144.61	25.00	2.0000	C100-4 B16-in
B1-7	0.07	45.12	25.00	2.5000	C100-4 B71-in
C1-1	0.08	55.49	25.00	2.5000	C100-4 C71-in
C1-2	0.06	38.45	25.00	2.5000	C100-4 S1-LP1
C1-3	0.08	50.28	25.00	2.5000	C100-4 S1-LP1
C1-4	0.10	64.49	25.00	2.5000	C100-4 C76-in
C1-5	0.14	91.12	25.00	2.5000	C100-4 ST1_1_US
C1-6	0.10	66.83	25.00	2.5000	C100-4 ST1_1_US
C2-1	0.23	155.29	25.00	1.8000	C100-4 C21-in
C2-2	0.10	57.99	25.00	1.5000	C100-4 C21-out
C2-3	0.08	55.55	25.00	1.0000	C100-4 ST2_DS
C2-4	0.08	49.52	25.00	1.0000	C100-4 C27C-in
C2-5	0.17	77.25	25.00	1.8000	C100-4 ST1_2_US
C3_2	0.30	177.49	25.00	4.0000	C100-4 ST2_US
C3-1	0.18	100.76	25.00	1.8000	C100-4 ST2_US

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
B13-in	JUNCTION	126.38	1.13	0.0	
B13-out	JUNCTION	126.18	1.13	0.0	
B14-in	JUNCTION	124.99	1.13	0.0	
B14-out	JUNCTION	124.96	1.13	0.0	
B15-in	JUNCTION	127.02	1.13	0.0	
B15-out	JUNCTION	126.83	1.13	0.0	
B16-in	JUNCTION	127.40	1.13	0.0	
B16-out	JUNCTION	127.35	1.13	0.0	
B71-in	JUNCTION	127.64	1.13	0.0	
B72-out	JUNCTION	127.51	1.13	0.0	
C1-RY	JUNCTION	128.00	0.60	0.0	
C21-in	JUNCTION	124.47	1.13	0.0	
C21-out	JUNCTION	124.07	1.13	0.0	

C27C-in	JUNCTION	122.96	1.13	0.0
C27-out	JUNCTION	122.90	1.13	0.0
C71-in	JUNCTION	127.68	1.13	0.0
C71-out	JUNCTION	127.28	1.13	0.0
C76-in	JUNCTION	126.63	1.13	0.0
C76-out	JUNCTION	126.58	1.13	0.0
DICB1-in	JUNCTION	122.67	0.60	0.0
DICB-B-in	JUNCTION	124.42	1.64	0.0
DICM1-out	JUNCTION	122.67	0.60	0.0
J1	JUNCTION	124.85	0.60	0.0
J2	JUNCTION	124.85	0.60	0.0
S1L-HP1	JUNCTION	128.09	1.13	0.0
S1L-HP2	JUNCTION	126.79	1.13	0.0
S1-LP1	JUNCTION	126.46	1.13	0.0
S1R-HP1	JUNCTION	128.09	1.13	0.0
S1R-HP2	JUNCTION	126.79	1.13	0.0
S2End	JUNCTION	123.07	1.13	0.0
S2L-HP1	JUNCTION	126.95	1.13	0.0
ST1_1_US	JUNCTION	126.54	1.13	0.0
ST1_2_DS	JUNCTION	125.93	1.13	0.0
ST1_2_US	JUNCTION	125.99	1.13	0.0
ST2_DS	JUNCTION	122.80	1.13	0.0
ST2_US	JUNCTION	122.86	1.13	0.0
WilsC-in	JUNCTION	124.46	1.13	0.0
Wils-out	JUNCTION	124.43	1.13	0.0
OutA	OUTFALL	0.00	0.00	0.0
OutB	OUTFALL	124.30	0.45	0.0
OutC1	OUTFALL	121.00	0.60	0.0
OutC2	OUTFALL	119.00	0.60	0.0
OutC3	OUTFALL	0.00	0.00	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
B1-3_Culvert	B13-in	B13-out	CONDUIT	11.0	1.8094	0.0240
B1-4_Culvert	B14-in	B14-out	CONDUIT	11.0	0.2727	0.0240
B1-5_Culvert	B15-in	B15-out	CONDUIT	11.0	1.6730	0.0240
B1-6_culvert	B16-in	B16-out	CONDUIT	11.0	0.4546	0.0240
B7-1_Culvert	B71-in	B72-out	CONDUIT	11.0	1.2546	0.0240
BOUT-01	Wils-out	DICB-B-in	CONDUIT	7.6	0.1314	0.0160
C2	S2L-HP1	ST2_US	CONDUIT	125.7	3.2547	0.0160
C6_1	S1-LP1	J1	CONDUIT	24.0	6.7235	0.0350
C6_4	J2	OutC1	CONDUIT	89.0	4.3299	0.0350
C7	S1L-HP2	ST1_1_US	CONDUIT	65.0	0.3846	0.0160
C7-1_Culvert	C71-in	C71-out	CONDUIT	11.0	3.6570	0.0240
C7-6_Culvert	C76-in	C76-out	CONDUIT	11.0	0.4000	0.0240

C8_1	S2End	C27C-in	CONDUIT	22.1	0.4924
0.0160					
C8_3	C27C-in	C27-out	CONDUIT	11.0	0.5455
0.0240					
C8_4	C27-out	ST2_DS	CONDUIT	20.5	0.4921
0.0160					
COUT-03_2	ST2_DS	DICB1-in	CONDUIT	24.0	0.5417
0.0350					
COUT-03_6	DICM1-out	OutC2	CONDUIT	81.0	4.5355
0.0350					
DICB-B	DICB-B-in	OutB	CONDUIT	45.0	0.2667
0.0130					
RY	C1-RY	B14-in	CONDUIT	148.9	2.0213
0.0350					
S1N-02_1	S1R-HP1	B71-in	CONDUIT	23.3	1.9157
0.0160					
S1N-02_3	B72-out	B15-in	CONDUIT	25.5	1.9154
0.0160					
S1N-02_5	B15-out	B13-in	CONDUIT	23.8	1.9172
0.0160					
S1N-02_8	B13-out	WilsC-in	CONDUIT	89.6	1.9169
0.0160					
S1N-06_1	S1R-HP1	C71-in	CONDUIT	27.1	1.5094
0.0160					
S1N-06_4	C71-out	S1-LP1	CONDUIT	19.3	4.2445
0.0160					
S1N-12_2	S1R-HP2	C76-in	CONDUIT	35.7	0.4569
0.0160					
S1N-12_4	C76-out	S1-LP1	CONDUIT	27.0	0.4559
0.0160					
S1N-13_3	S1R-HP2	ST1_2_DS	CONDUIT	56.2	1.5306
0.0160					
S1S-03_2	S1L-HP1	B16-in	CONDUIT	81.8	0.8439
0.0160					
S1S-03_4	B16-out	B14-in	CONDUIT	58.0	4.0723
0.0160					
S1S-03_6	B14-out	Wils-out	CONDUIT	22.0	2.4098
0.0160					
S1S-05	S1L-HP1	ST1_1_US	CONDUIT	47.4	3.2746
0.0160					
S1S-10_1	S1L-HP2	ST1_2_US	CONDUIT	56.6	1.4136
0.0160					
S2N-03_1	C21-in	C21-out	CONDUIT	11.0	3.6297
0.0240					
S2N-03_2	ST1_2_DS	C21-in	CONDUIT	38.5	3.7931
0.0160					
S2N-03_4	C21-out	ST2_DS	CONDUIT	33.5	3.7982
0.0160					
S2S-03_1	ST2_US	S2End	CONDUIT	54.2	-0.3875
0.0160					
ST1_Culvert1	ST1_1_US	S1-LP1	CONDUIT	14.0	0.5714
0.0240					
ST1_Culvert2	ST1_2_US	ST1_2_DS	CONDUIT	13.0	0.4615
0.0240					
ST2_Culvert	ST2_US	ST2_DS	CONDUIT	12.0	0.5000
0.0240					
Wils_Culvert	WilsC-in	Wils-out	CONDUIT	15.0	0.2000
0.0240					
DICB_C1	J1	J2	ORIFICE		
DICB_C2	DICB1-in	DICM1-out	ORIFICE		
W1	J1	J2	WEIR		
Weir_OutC	DICB1-in	DICM1-out	WEIR		

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
B1-3_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	151.75
B1-4_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	58.91
B1-5_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	145.92
B1-6_culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	76.06
B7-1_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	126.36
BOUT-01	RoadsideDitch	1.13	4.59	0.57	10.00	1	7159.48
C2	RoadsideDitch	1.13	4.59	0.57	10.00	1	35631.10
C6_1	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	6186.25
C6_4	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	4964.43
C7	RoadsideDitch	1.13	4.59	0.57	10.00	1	12248.66
C7-1_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	215.73
C7-6_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	71.35
C8_1	RoadsideDitch	1.13	4.59	0.57	10.00	1	13858.95
C8_3	CIRCULAR	0.40	0.13	0.10	0.40	1	83.32
C8_4	RoadsideDitch	1.13	4.59	0.57	10.00	1	13854.31
COUT-03_2	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	1755.90
COUT-03_6	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	5080.94
DICB-B	CIRCULAR	0.45	0.16	0.11	0.45	1	147.24
RY	TRAPEZOIDAL	0.60	1.62	0.35	4.50	1	3237.63
S1N-02_1	RoadsideDitch	1.13	4.59	0.57	10.00	1	27335.91
S1N-02_3	RoadsideDitch	1.13	4.59	0.57	10.00	1	27333.69
S1N-02_5	RoadsideDitch	1.13	4.59	0.57	10.00	1	27346.99
S1N-02_8	RoadsideDitch	1.13	4.59	0.57	10.00	1	27344.62
S1N-06_1	RoadsideDitch	1.13	4.59	0.57	10.00	1	24264.73
S1N-06_4	RoadsideDitch	1.13	4.59	0.57	10.00	1	40689.87
S1N-12_2	RoadsideDitch	1.13	4.59	0.57	10.00	1	13350.02

S1N-12_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
13335.45						
S1N-13_3	RoadsideDitch	1.13	4.59	0.57	10.00	1
24434.50						
S1S-03_2	RoadsideDitch	1.13	4.59	0.57	10.00	1
18143.00						
S1S-03_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
39856.18						
S1S-03_6	RoadsideDitch	1.13	4.59	0.57	10.00	1
30659.38						
S1S-05	RoadsideDitch	1.13	4.59	0.57	10.00	1
35739.64						
S1S-10_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
23481.85						
S2N-03_1	CIRCULAR	0.40	0.13	0.10	0.40	1
214.93						
S2N-03_2	RoadsideDitch	1.13	4.59	0.57	10.00	1
38465.46						
S2N-03_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
38491.31						
S2S-03_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
12294.69						
ST1_Culvert1	CIRCULAR	0.60	0.28	0.15	0.60	1
251.43						
ST1_Culvert2	CIRCULAR	0.60	0.28	0.15	0.60	1
225.96						
ST2_Culvert	CIRCULAR	0.60	0.28	0.15	0.60	1
235.19						
Wils_Culvert	CIRCULAR	0.60	0.28	0.15	0.60	1
148.75						

****
Transect Summary
****

Transect RoadsideDitch
Area:

0.0047	0.0100	0.0158	0.0222	0.0292
0.0367	0.0448	0.0534	0.0626	0.0724
0.0827	0.0936	0.1050	0.1170	0.1296
0.1427	0.1564	0.1706	0.1854	0.2008
0.2187	0.2396	0.2608	0.2823	0.3041
0.3261	0.3485	0.3711	0.3940	0.4171
0.4406	0.4643	0.4883	0.5125	0.5371
0.5619	0.5870	0.6123	0.6380	0.6639
0.6901	0.7166	0.7433	0.7704	0.7998
0.8326	0.8689	0.9089	0.9526	1.0000

Hrad:

0.0368	0.0697	0.0998	0.1277	0.1541
0.1793	0.2036	0.2270	0.2499	0.2722
0.2940	0.3155	0.3367	0.3576	0.3783
0.3987	0.4190	0.4392	0.4592	0.4798
0.5010	0.5150	0.5304	0.5468	0.5639
0.5816	0.5996	0.6179	0.6364	0.6550
0.6738	0.6926	0.7114	0.7303	0.7492
0.7681	0.7869	0.8057	0.8245	0.8433
0.8621	0.8808	0.8994	0.9201	0.9457
0.9660	0.9812	0.9915	0.9975	1.0000

Width:

0.1014	0.1127	0.1241	0.1355	0.1468
0.1582	0.1696	0.1809	0.1923	0.2037

0.2151	0.2264	0.2378	0.2492	0.2605
0.2719	0.2833	0.2946	0.3060	0.3235
0.4045	0.4280	0.4336	0.4392	0.4448
0.4504	0.4560	0.4616	0.4672	0.4728
0.4784	0.4840	0.4896	0.4952	0.5008
0.5063	0.5119	0.5175	0.5231	0.5287
0.5343	0.5399	0.5455	0.5632	0.6310
0.6988	0.7740	0.8493	0.9247	1.0000

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... CURVE_NUMBER
Flow Routing Method ..... DYNWAVE
Starting Date 03/29/2017 00:00:00
Ending Date 03/30/2017 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:00:30
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 4
Head Tolerance ..... 0.001500 m

**********	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
**********	---------	-------
Total Precipitation	0.197	76.002
Evaporation Loss	0.000	0.000
Infiltration Loss	0.109	42.151
Surface Runoff	0.085	32.755
Final Storage	0.003	1.137
Continuity Error (%)	-0.054	

**********	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
**********	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.085	0.847
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.146	1.461
External Outflow	0.231	2.306

Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.001
Continuity Error (%)	0.000	

****
Time-Step Critical Elements
****
Link B1-4_Culvert (4.42%)
Link S2N-03_1 (1.00%)

****
Highest Flow Instability Indexes
****
Link S2N-03_4 (2)
Link S2N-03_1 (2)
Link B1-3_Culvert (2)

****
Routing Time Step Summary
****

Minimum Time Step	:	1.22 sec
Average Time Step	:	4.94 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
B1-1	76.00	0.00	0.00	42.31	32.60	0.09	47.61	0.429
B1-2	76.00	0.00	0.00	41.89	33.01	0.02	14.13	0.434
B1-3	76.00	0.00	0.00	42.02	32.88	0.03	17.94	0.433
B1-4	76.00	0.00	0.00	42.11	32.79	0.03	21.45	0.431
B1-5	76.00	0.00	0.00	42.07	32.84	0.03	16.72	0.432
B1-6	76.00	0.00	0.00	42.13	32.77	0.07	44.21	0.431
B1-7	76.00	0.00	0.00	42.07	32.84	0.02	13.79	0.432

C1-1			76.00	0.00	0.00	42.07	32.84
0.03	17.11	0.432					
C1-2			76.00	0.00	0.00	42.07	32.83
0.02	11.95	0.432					
C1-3			76.00	0.00	0.00	42.09	32.83
0.03	15.81	0.432					
C1-4			76.00	0.00	0.00	42.09	32.81
0.03	20.83	0.432					
C1-5			76.00	0.00	0.00	42.09	32.82
0.05	28.95	0.432					
C1-6			76.00	0.00	0.00	42.07	32.84
0.03	20.55	0.432					
C2-1			76.00	0.00	0.00	42.15	32.76
0.08	45.92	0.431					
C2-2			76.00	0.00	0.00	42.24	32.67
0.03	17.49	0.430					
C2-3			76.00	0.00	0.00	42.31	32.61
0.03	14.55	0.429					
C2-4			76.00	0.00	0.00	42.33	32.57
0.03	13.39	0.429					
C2-5			76.00	0.00	0.00	42.35	32.56
0.06	28.39	0.428					
C3_2			76.00	0.00	0.00	42.02	32.88
0.10	64.42	0.433					
C3-1			76.00	0.00	0.00	42.22	32.68
0.06	32.66	0.430					

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
B13-in	JUNCTION	0.01	0.19	126.57	0 01:31	0.19
B13-out	JUNCTION	0.00	0.04	126.22	0 01:32	0.04
B14-in	JUNCTION	0.04	0.30	125.29	0 01:47	0.30
B14-out	JUNCTION	0.00	0.06	125.02	0 01:47	0.06
B15-in	JUNCTION	0.01	0.14	127.16	0 01:31	0.14
B15-out	JUNCTION	0.00	0.03	126.87	0 01:31	0.03
B16-in	JUNCTION	0.02	0.20	127.60	0 01:32	0.20
B16-out	JUNCTION	0.00	0.03	127.38	0 01:33	0.03
B71-in	JUNCTION	0.01	0.10	127.75	0 01:31	0.10
B72-out	JUNCTION	0.00	0.02	127.53	0 01:31	0.02
C1-RY	JUNCTION	0.01	0.08	128.08	0 01:40	0.08
C21-in	JUNCTION	0.02	0.26	124.73	0 01:32	0.26
C21-out	JUNCTION	0.00	0.05	124.12	0 01:32	0.05
C27C-in	JUNCTION	0.01	0.17	123.13	0 01:40	0.17
C27-out	JUNCTION	0.02	0.22	123.12	0 01:38	0.22
C71-in	JUNCTION	0.01	0.10	127.78	0 01:31	0.10
C71-out	JUNCTION	0.00	0.02	127.30	0 01:31	0.02
C76-in	JUNCTION	0.01	0.14	126.76	0 01:31	0.14
C76-out	JUNCTION	0.00	0.04	126.62	0 01:31	0.04
DICB1-in	JUNCTION	0.06	0.45	123.12	0 01:38	0.45
DICB-B-in	JUNCTION	0.03	0.30	124.72	0 01:42	0.30
DICM1-out	JUNCTION	0.01	0.09	122.76	0 01:39	0.09
J1	JUNCTION	0.04	0.43	125.28	0 01:32	0.43
J2	JUNCTION	0.00	0.08	124.93	0 01:32	0.08
S1L-HP1	JUNCTION	0.00	0.00	128.09	0 00:00	0.00
S1L-HP2	JUNCTION	0.00	0.00	126.79	0 00:00	0.00

S1-LP1	JUNCTION	0.00	0.07	126.53	0	01:31	0.07
S1R-HP1	JUNCTION	0.00	0.00	128.09	0	00:00	0.00
S1R-HP2	JUNCTION	0.00	0.00	126.79	0	00:00	0.00
S2End	JUNCTION	0.00	0.06	123.13	0	01:39	0.06
S2L-HP1	JUNCTION	0.00	0.00	126.95	0	00:00	0.00
ST1_1_US	JUNCTION	0.01	0.16	126.70	0	01:32	0.16
ST1_2_DS	JUNCTION	0.00	0.03	125.96	0	01:32	0.03
ST1_2_US	JUNCTION	0.01	0.15	126.14	0	01:31	0.15
ST2_DS	JUNCTION	0.04	0.32	123.12	0	01:38	0.32
ST2_US	JUNCTION	0.03	0.27	123.13	0	01:39	0.27
WilsC-in	JUNCTION	0.02	0.29	124.75	0	01:41	0.29
Wils-out	JUNCTION	0.02	0.30	124.73	0	01:42	0.30
OutA	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OutB	OUTFALL	0.02	0.25	124.55	0	01:42	0.25
OutC1	OUTFALL	0.00	0.08	121.08	0	01:32	0.08
OutC2	OUTFALL	0.01	0.09	119.09	0	01:39	0.09
OutC3	OUTFALL	0.00	0.00	0.00	0	00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
B13-in	JUNCTION	17.94	44.44	0	01:31	0.0272	0.0748	-0.099
B13-out	JUNCTION	0.00	44.11	0	01:31	0	0.0749	-0.173
B14-in	JUNCTION	21.45	97.76	0	01:37	0.0349	0.272	0.619
B14-out	JUNCTION	0.00	74.88	0	01:47	0	0.27	0.019
B15-in	JUNCTION	16.72	28.93	0	01:30	0.0261	0.0476	-0.042
B15-out	JUNCTION	0.00	28.12	0	01:31	0	0.0477	0.052
B16-in	JUNCTION	44.21	44.21	0	01:30	0.0728	0.0728	0.089
B16-out	JUNCTION	0.00	34.55	0	01:33	0	0.0728	-0.182
B71-in	JUNCTION	13.79	13.79	0	01:30	0.0215	0.0215	-0.044
B72-out	JUNCTION	0.00	13.04	0	01:31	0	0.0215	0.061
C1-RY	JUNCTION	58.67	58.67	0	01:39	0.163	0.163	-0.480
C21-in	JUNCTION	45.92	67.96	0	01:31	0.0765	0.132	-0.125
C21-out	JUNCTION	17.49	81.73	0	01:32	0.0313	0.163	-0.015
C27C-in	JUNCTION	13.39	15.81	0	01:40	0.0259	0.0348	-0.113

C27-out	JUNCTION	0.00	28.67	0	01:30	0	
0.0359	0.111						
C71-in	JUNCTION	17.11	17.11	0	01:30	0.0268	
0.0268	-0.121						
C71-out	JUNCTION	0.00	16.21	0	01:31	0	
0.0268	0.132						
C76-in	JUNCTION	20.83	20.83	0	01:30	0.0334	
0.0334	0.002						
C76-out	JUNCTION	0.00	19.00	0	01:31	0	
0.0334	0.020						
DICB1-in	JUNCTION	0.00	126.11	0	01:38	0	
0.372	0.082						
DICB-B-in	JUNCTION	0.00	126.27	0	01:42	0	
0.455	0.007						
DICM1-out	JUNCTION	0.00	126.06	0	01:38	0	
0.372	-0.003						
J1	JUNCTION	0.00	96.98	0	01:31	0	
0.182	0.113						
J2	JUNCTION	0.00	96.53	0	01:32	0	
0.182	-0.010						
S1L-HP1	JUNCTION	0.00	0.00	0	00:00	0	
0	0.000 ltr						
S1L-HP2	JUNCTION	0.00	0.00	0	00:00	0	
0	0.000 ltr						
S1-LP1	JUNCTION	27.77	97.43	0	01:31	0.0438	
0.182	-0.115						
S1R-HP1	JUNCTION	0.00	0.00	0	00:00	0	
0	0.000 ltr						
S1R-HP2	JUNCTION	0.00	0.00	0	00:00	0	
0	0.000 ltr						
S2End	JUNCTION	0.00	21.07	0	01:32	0	
0.00907	0.227						
S2L-HP1	JUNCTION	0.00	0.00	0	00:00	0	
0	0.000 ltr						
ST1_1_US	JUNCTION	49.50	49.50	0	01:30	0.0782	
0.0782	0.084						
ST1_2_DS	JUNCTION	0.00	26.68	0	01:32	0	
0.0555	0.058						
ST1_2_US	JUNCTION	28.39	28.39	0	01:31	0.0555	
0.0555	0.000						
ST2_DS	JUNCTION	14.55	127.58	0	01:37	0.0274	
0.374	-0.013						
ST2_US	JUNCTION	97.08	97.08	0	01:30	0.156	
0.156	0.081						
WilsC-in	JUNCTION	47.61	87.41	0	01:31	0.0901	
0.165	0.127						
Wils-out	JUNCTION	14.13	127.03	0	01:41	0.0198	
0.455	0.002						
OutA	OUTFALL	186.62	186.62	0	01:35	0.427	
0.427	0.000						
OutB	OUTFALL	0.00	126.25	0	01:42	0	
0.455	0.000						
OutC1	OUTFALL	71.05	162.75	0	01:33	0.174	
0.356	0.000						
OutC2	OUTFALL	167.14	286.73	0	01:37	0.409	
0.781	0.000						
OutC3	OUTFALL	50.01	50.01	0	02:08	0.289	
0.289	0.000						

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OutA	19.50	31.30	186.62	0.427
OutB	64.28	9.89	126.25	0.455
OutC1	37.68	13.42	162.75	0.356
OutC2	52.63	20.91	286.73	0.781
OutC3	25.22	14.67	50.01	0.289
System	39.86	90.17	742.92	2.306

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
B1-3_Culvert	CONDUIT	44.11	0	01:31	1.48	0.29	0.29
B1-4_Culvert	CONDUIT	74.88	0	01:47	1.37	1.27	0.45
B1-5_Culvert	CONDUIT	28.12	0	01:31	1.36	0.19	0.22
B1-6_culvert	CONDUIT	34.55	0	01:33	1.17	0.45	0.28
B7-1_Culvert	CONDUIT	13.04	0	01:31	1.05	0.10	0.16
BOUT-01	CHANNEL	126.27	0	01:42	0.26	0.02	0.27
C2	CHANNEL	0.00	0	00:00	0.00	0.00	0.12
C6_1	CONDUIT	96.98	0	01:31	0.32	0.02	0.42
C6_4	CONDUIT	95.52	0	01:32	0.97	0.02	0.13
C7	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
C7-1_Culvert	CONDUIT	16.21	0	01:31	1.39	0.08	0.15
C7-6_Culvert	CONDUIT	19.00	0	01:31	0.92	0.27	0.22
C8_1	CHANNEL	7.68	0	01:42	0.06	0.00	0.10
C8_3	CONDUIT	15.88	0	01:40	0.77	0.19	0.49
C8_4	CHANNEL	17.18	0	01:43	0.12	0.00	0.24
COUT-03_2	CONDUIT	126.11	0	01:38	0.33	0.07	0.64
COUT-03_6	CONDUIT	125.98	0	01:39	1.07	0.02	0.15
DICB-B	CONDUIT	126.25	0	01:42	1.23	0.86	0.61
RY	CONDUIT	58.03	0	01:40	0.25	0.02	0.31
S1N-02_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.05
S1N-02_3	CHANNEL	13.01	0	01:31	0.14	0.00	0.07
S1N-02_5	CHANNEL	28.09	0	01:31	0.21	0.00	0.10
S1N-02_8	CHANNEL	43.13	0	01:32	0.23	0.00	0.14
S1N-06_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.04
S1N-06_4	CHANNEL	16.20	0	01:31	0.42	0.00	0.04

S1N-12_2	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
S1N-12_4	CHANNEL	18.91	0	01:31	0.32	0.00	0.05
S1N-13_3	CHANNEL	0.00	0	00:00	0.00	0.00	0.01
S1S-03_2	CHANNEL	0.00	0	00:00	0.00	0.00	0.09
S1S-03_4	CHANNEL	34.49	0	01:33	0.33	0.00	0.14
S1S-03_6	CHANNEL	74.87	0	01:47	0.34	0.00	0.15
S1S-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S1S-10_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.07
S2N-03_1	CONDUIT	67.10	0	01:33	1.60	0.31	0.38
S2N-03_2	CHANNEL	26.45	0	01:32	0.15	0.00	0.13
S2N-03_4	CHANNEL	77.82	0	01:32	0.57	0.00	0.16
S2S-03_1	CHANNEL	16.73	0	01:32	0.10	0.00	0.15
ST1_Culvert1	CONDUIT	38.69	0	01:32	1.01	0.15	0.19
ST1_Culvert2	CONDUIT	26.68	0	01:32	1.04	0.12	0.15
ST2_Culvert	CONDUIT	41.89	0	01:40	0.54	0.18	0.49
Wils_Culvert	CONDUIT	65.36	0	01:34	0.58	0.44	0.49
DICB_C1	ORIFICE	13.68	0	01:30			1.00
DICB_C2	ORIFICE	12.79	0	01:32			1.00
W1	WEIR	83.13	0	01:32			0.40
Weir_OutC	WEIR	113.33	0	01:38			0.48

****
Flow Classification Summary
****

	Adjusted	Fraction of Time in Flow Class								
	/Actual		Up	Down	Sub	Sup	Up	Down	Norm	Inlet
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
B1-3_Culvert	1.00	0.05	0.00	0.00	0.75	0.20	0.00	0.00	0.00	0.46
B1-4_Culvert	1.00	0.02	0.00	0.00	0.83	0.16	0.00	0.00	0.00	0.02
B1-5_Culvert	1.00	0.05	0.00	0.00	0.77	0.18	0.00	0.00	0.00	0.12
B1-6_culvert	1.00	0.05	0.00	0.00	0.79	0.15	0.00	0.00	0.00	0.00
B7-1_Culvert	1.00	0.05	0.00	0.00	0.79	0.16	0.00	0.00	0.00	0.11
BOUT-01	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.67	0.00
C2	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6_1	1.00	0.05	0.00	0.00	0.94	0.00	0.00	0.00	0.94	0.00
C6_4	1.00	0.06	0.00	0.00	0.88	0.06	0.00	0.00	0.69	0.00
C7	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7-1_Culvert	1.00	0.05	0.00	0.00	0.75	0.19	0.00	0.00	0.00	0.12
C7-6_Culvert	1.00	0.05	0.00	0.00	0.85	0.09	0.00	0.00	0.00	0.02
C8_1	1.00	0.05	0.81	0.00	0.14	0.00	0.00	0.00	0.92	0.00
C8_3	1.00	0.05	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.02
C8_4	1.00	0.05	0.40	0.00	0.54	0.00	0.00	0.00	0.80	0.00
COUT-03_2	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.78	0.00
COUT-03_6	1.00	0.06	0.00	0.00	0.79	0.16	0.00	0.00	0.00	0.00
DICB-B	1.00	0.04	0.00	0.00	0.94	0.02	0.00	0.00	0.00	0.00
RY	1.00	0.01	0.47	0.00	0.53	0.00	0.00	0.00	0.96	0.00
S1N-02_1	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S1N-02_3	1.00	0.05	0.51	0.00	0.44	0.00	0.00	0.00	0.94	0.00
S1N-02_5	1.00	0.05	0.41	0.00	0.54	0.00	0.00	0.00	0.94	0.00
S1N-02_8	1.00	0.05	0.29	0.00	0.66	0.00	0.00	0.00	0.94	0.00
S1N-06_1	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S1N-06_4	1.00	0.05	0.66	0.00	0.29	0.00	0.00	0.00	0.94	0.00
S1N-12_2	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S1N-12_4	1.00	0.05	0.00	0.00	0.94	0.00	0.00	0.00	0.94	0.00
S1N-13_3	1.00	0.06	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S1S-03_2	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S1S-03_4	1.00	0.02	0.04	0.00	0.94	0.00	0.00	0.00	0.94	0.00

S1S-03_6	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.96	0.00
S1S-05	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S1S-10_1	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S2N-03_1	1.00	0.05	0.00	0.00	0.53	0.41	0.00	0.00	0.00	0.14
S2N-03_2	1.00	0.05	0.00	0.00	0.94	0.00	0.00	0.00	0.94	0.00
S2N-03_4	1.00	0.05	0.01	0.00	0.94	0.00	0.00	0.00	0.94	0.00
S2S-03_1	1.00	0.05	0.81	0.00	0.14	0.00	0.00	0.00	0.91	0.00
ST1_Culvert1	1.00	0.05	0.00	0.00	0.88	0.07	0.00	0.00	0.00	0.11
ST1_Culvert2	1.00	0.05	0.00	0.00	0.80	0.14	0.00	0.00	0.00	0.02
ST2_Culvert	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.01
Wils_Culvert	1.00	0.02	0.03	0.00	0.95	0.00	0.00	0.00	0.00	0.18

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
B1-4_Culvert	0.01	0.01	0.01	0.38	0.01

Analysis begun on: Tue Feb 01 09:44:20 2022
Analysis ended on: Tue Feb 01 09:44:21 2022
Total elapsed time: 00:00:01

114165 (Appleton Subdivision) PCSWMM Post Model Output 100-year, 12-hour SCS Type II Storm

ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.4.3202

This is a new version of ARM - your feedback and suggestions are solicited.
Create a ticket, post on the PCSWMM feature request forum, or email us directly!

Simulation start time: 03/29/2017 00:00:00
Simulation end time: 03/30/2017 00:00:00
Runoff wet weather time steps: 60 seconds
Report time steps: 30 seconds
Number of data points: 2881

****
Unit Hydrographs Runoff Method
****

Subcatchment	Runoff Method	Raingage	Area (ha)	Time of Concentration (min)	Time to Peak (min)	Time after Peak (min)	Peak UH Flow (m³/s/mm)	UH Depth (mm)
A1	Nash IUH	S100-12hr	1.6	10	6.67	39.33	0.02165	1

```
  B2                    Nash IUH                  S100-12hr            0.78   13
8.67            46.33               0.00812         1
  C1-RY                 Nash IUH                  S100-12hr            0.88   10
6.67            37.33               0.01191         1
  C2-RY                 Nash IUH                  S100-12hr            2.07   10
6.67            41.33               0.02801         1
  C3-RY                 Nash IUH                  S100-12hr            1.874  42
28              141                 0.00604         0.999


  ******************
  ARM Runoff Summary
  ******************

  ---------------------------------------------------------------------------------------
-------
                        Total       Total       Total       Total       Peak
Runoff
                        Precip      Losses      Runoff      Runoff      Runoff
Coeff
  Subcatchment          (mm)        (mm)        (mm)        10^6 ltr    LPS
(fraction)
  ---------------------------------------------------------------------------------------
-------
  A1                    93.91       55.687      38.219      0.612       167.512
0.407
  B2                    93.91       63.22       30.679      0.239       60.935
0.327
  C1-RY                 93.91       64.551      29.352      0.258       70.77
0.313
  C2-RY                 93.91       64.551      29.357      0.608       166.471
0.313
  C3-RY                 93.91       69.97       23.927      0.448       62.399
0.255



  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.011)
  --------------------------------------------------------------

  WARNING 03: negative offset ignored for Link C6_1
  WARNING 02: maximum depth increased for Node B13-in
  WARNING 02: maximum depth increased for Node B13-out
  WARNING 02: maximum depth increased for Node B15-in
  WARNING 02: maximum depth increased for Node B15-out
  WARNING 02: maximum depth increased for Node B16-in
  WARNING 02: maximum depth increased for Node B16-out
  WARNING 02: maximum depth increased for Node B71-in
  WARNING 02: maximum depth increased for Node B72-out
  WARNING 02: maximum depth increased for Node C27C-in
  WARNING 02: maximum depth increased for Node C27-out
  WARNING 02: maximum depth increased for Node C71-in
  WARNING 02: maximum depth increased for Node C71-out
  WARNING 02: maximum depth increased for Node C76-in
  WARNING 02: maximum depth increased for Node C76-out
  WARNING 06: dry weather time step increased to the wet weather time step

  *************
  Element Count
  *************
  Number of rain gages ...... 8
  Number of subcatchments ... 20
```

```
  Number of nodes ........... 43
  Number of links ........... 45
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ---------------------------------------------------------------------
  C100-4               C100-4                       INTENSITY   10 min.
  C100-4+20%           C100-4+20%                   INTENSITY   10 min.
  C2-4                 C2-4                         INTENSITY   10 min.
  C25mm-4              C25mm-4                      INTENSITY   10 min.
  C5-4                 C5-4                         INTENSITY   10 min.
  S100-12hr            S100-12                      INTENSITY   30 min.
  S2-12                S2-12                        INTENSITY   30 min.
  S5-12                S5-12                        INTENSITY   30 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ------------------------------------------------------------------------------
-----------------------
  B1-1                        0.28    114.07     25.00    2.5000 S100-12hr
WilsC-in
  B1-2                        0.06     67.14     25.00    2.5000 S100-12hr
Wils-out
  B1-3                        0.08     56.30     25.00    3.1500 S100-12hr
B13-in
  B1-4                        0.11     71.93     25.00    2.0000 S100-12hr
B14-in
  B1-5                        0.08     54.77     25.00    2.5000 S100-12hr
B15-in
  B1-6                        0.22    144.61     25.00    2.0000 S100-12hr
B16-in
  B1-7                        0.07     45.12     25.00    2.5000 S100-12hr
B71-in
  C1-1                        0.08     55.49     25.00    2.5000 S100-12hr
C71-in
  C1-2                        0.06     38.45     25.00    2.5000 S100-12hr
S1-LP1
  C1-3                        0.08     50.28     25.00    2.5000 S100-12hr
S1-LP1
  C1-4                        0.10     64.49     25.00    2.5000 S100-12hr
C76-in
  C1-5                        0.14     91.12     25.00    2.5000 S100-12hr
ST1_1_US
  C1-6                        0.10     66.83     25.00    2.5000 S100-12hr
ST1_1_US
  C2-1                        0.23    155.29     25.00    1.8000 S100-12hr
C21-in
  C2-2                        0.10     57.99     25.00    1.5000 S100-12hr
C21-out
  C2-3                        0.08     55.55     25.00    1.0000 S100-12hr
ST2_DS
  C2-4                        0.08     49.52     25.00    1.0000 S100-12hr
C27C-in
```

C2-5	0.17	77.25	25.00	1.8000	S100-12hr
ST1_2_US					
C3_2	0.30	177.49	25.00	4.0000	S100-12hr
ST2_US					
C3-1	0.18	100.76	25.00	1.8000	S100-12hr
ST2_US					

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
B13-in	JUNCTION	126.38	1.13	0.0	
B13-out	JUNCTION	126.18	1.13	0.0	
B14-in	JUNCTION	124.99	1.13	0.0	
B14-out	JUNCTION	124.96	1.13	0.0	
B15-in	JUNCTION	127.02	1.13	0.0	
B15-out	JUNCTION	126.83	1.13	0.0	
B16-in	JUNCTION	127.40	1.13	0.0	
B16-out	JUNCTION	127.35	1.13	0.0	
B71-in	JUNCTION	127.64	1.13	0.0	
B72-out	JUNCTION	127.51	1.13	0.0	
C1-RY	JUNCTION	128.00	0.60	0.0	
C21-in	JUNCTION	124.47	1.13	0.0	
C21-out	JUNCTION	124.07	1.13	0.0	
C27C-in	JUNCTION	122.96	1.13	0.0	
C27-out	JUNCTION	122.90	1.13	0.0	
C71-in	JUNCTION	127.68	1.13	0.0	
C71-out	JUNCTION	127.28	1.13	0.0	
C76-in	JUNCTION	126.63	1.13	0.0	
C76-out	JUNCTION	126.58	1.13	0.0	
DICB1-in	JUNCTION	122.67	0.60	0.0	
DICB-B-in	JUNCTION	124.42	1.64	0.0	
DICM1-out	JUNCTION	122.67	0.60	0.0	
J1	JUNCTION	124.85	0.60	0.0	
J2	JUNCTION	124.85	0.60	0.0	
S1L-HP1	JUNCTION	128.09	1.13	0.0	
S1L-HP2	JUNCTION	126.79	1.13	0.0	
S1-LP1	JUNCTION	126.46	1.13	0.0	
S1R-HP1	JUNCTION	128.09	1.13	0.0	
S1R-HP2	JUNCTION	126.79	1.13	0.0	
S2End	JUNCTION	123.07	1.13	0.0	
S2L-HP1	JUNCTION	126.95	1.13	0.0	
ST1_1_US	JUNCTION	126.54	1.13	0.0	
ST1_2_DS	JUNCTION	125.93	1.13	0.0	
ST1_2_US	JUNCTION	125.99	1.13	0.0	
ST2_DS	JUNCTION	122.80	1.13	0.0	
ST2_US	JUNCTION	122.86	1.13	0.0	
WilsC-in	JUNCTION	124.46	1.13	0.0	
Wils-out	JUNCTION	124.43	1.13	0.0	
OutA	OUTFALL	0.00	0.00	0.0	
OutB	OUTFALL	124.30	0.45	0.0	
OutC1	OUTFALL	121.00	0.60	0.0	
OutC2	OUTFALL	119.00	0.60	0.0	
OutC3	OUTFALL	0.00	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
B1-3_Culvert	B13-in	B13-out	CONDUIT	11.0	1.8094	0.0240
B1-4_Culvert	B14-in	B14-out	CONDUIT	11.0	0.2727	0.0240
B1-5_Culvert	B15-in	B15-out	CONDUIT	11.0	1.6730	0.0240
B1-6_culvert	B16-in	B16-out	CONDUIT	11.0	0.4546	0.0240
B7-1_Culvert	B71-in	B72-out	CONDUIT	11.0	1.2546	0.0240
BOUT-01	Wils-out	DICB-B-in	CONDUIT	7.6	0.1314	0.0160
C2	S2L-HP1	ST2_US	CONDUIT	125.7	3.2547	0.0160
C6_1	S1-LP1	J1	CONDUIT	24.0	6.7235	0.0350
C6_4	J2	OutC1	CONDUIT	89.0	4.3299	0.0350
C7	S1L-HP2	ST1_1_US	CONDUIT	65.0	0.3846	0.0160
C7-1_Culvert	C71-in	C71-out	CONDUIT	11.0	3.6570	0.0240
C7-6_Culvert	C76-in	C76-out	CONDUIT	11.0	0.4000	0.0240
C8_1	S2End	C27C-in	CONDUIT	22.1	0.4924	0.0160
C8_3	C27C-in	C27-out	CONDUIT	11.0	0.5455	0.0240
C8_4	C27-out	ST2_DS	CONDUIT	20.5	0.4921	0.0160
COUT-03_2	ST2_DS	DICB1-in	CONDUIT	24.0	0.5417	0.0350
COUT-03_6	DICM1-out	OutC2	CONDUIT	81.0	4.5355	0.0350
DICB-B	DICB-B-in	OutB	CONDUIT	45.0	0.2667	0.0130
RY	C1-RY	B14-in	CONDUIT	148.9	2.0213	0.0350
S1N-02_1	S1R-HP1	B71-in	CONDUIT	23.3	1.9157	0.0160
S1N-02_3	B72-out	B15-in	CONDUIT	25.5	1.9154	0.0160
S1N-02_5	B15-out	B13-in	CONDUIT	23.8	1.9172	0.0160
S1N-02_8	B13-out	WilsC-in	CONDUIT	89.6	1.9169	0.0160
S1N-06_1	S1R-HP1	C71-in	CONDUIT	27.1	1.5094	0.0160
S1N-06_4	C71-out	S1-LP1	CONDUIT	19.3	4.2445	0.0160
S1N-12_2	S1R-HP2	C76-in	CONDUIT	35.7	0.4569	0.0160
S1N-12_4	C76-out	S1-LP1	CONDUIT	27.0	0.4559	0.0160
S1N-13_3	S1R-HP2	ST1_2_DS	CONDUIT	56.2	1.5306	0.0160
S1S-03_2	S1L-HP1	B16-in	CONDUIT	81.8	0.8439	0.0160

S1S-03_4	B16-out	B14-in	CONDUIT	58.0	4.0723
0.0160					
S1S-03_6	B14-out	Wils-out	CONDUIT	22.0	2.4098
0.0160					
S1S-05	S1L-HP1	ST1_1_US	CONDUIT	47.4	3.2746
0.0160					
S1S-10_1	S1L-HP2	ST1_2_US	CONDUIT	56.6	1.4136
0.0160					
S2N-03_1	C21-in	C21-out	CONDUIT	11.0	3.6297
0.0240					
S2N-03_2	ST1_2_DS	C21-in	CONDUIT	38.5	3.7931
0.0160					
S2N-03_4	C21-out	ST2_DS	CONDUIT	33.5	3.7982
0.0160					
S2S-03_1	ST2_US	S2End	CONDUIT	54.2	-0.3875
0.0160					
ST1_Culvert1	ST1_1_US	S1-LP1	CONDUIT	14.0	0.5714
0.0240					
ST1_Culvert2	ST1_2_US	ST1_2_DS	CONDUIT	13.0	0.4615
0.0240					
ST2_Culvert	ST2_US	ST2_DS	CONDUIT	12.0	0.5000
0.0240					
Wils_Culvert	WilsC-in	Wils-out	CONDUIT	15.0	0.2000
0.0240					
DICB_C1	J1	J2	ORIFICE		
DICB_C2	DICB1-in	DICM1-out	ORIFICE		
W1	J1	J2	WEIR		
Weir_OutC	DICB1-in	DICM1-out	WEIR		

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
B1-3_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	151.75
B1-4_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	58.91
B1-5_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	145.92
B1-6_culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	76.06
B7-1_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	126.36
BOUT-01	RoadsideDitch	1.13	4.59	0.57	10.00	1	7159.48
C2	RoadsideDitch	1.13	4.59	0.57	10.00	1	35631.10
C6_1	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	6186.25
C6_4	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1	4964.43
C7	RoadsideDitch	1.13	4.59	0.57	10.00	1	12248.66
C7-1_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	215.73
C7-6_Culvert	CIRCULAR	0.40	0.13	0.10	0.40	1	71.35

C8_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
13858.95						
C8_3	CIRCULAR	0.40	0.13	0.10	0.40	1
83.32						
C8_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
13854.31						
COUT-03_2	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1
1755.90						
COUT-03_6	TRAPEZOIDAL	0.60	1.68	0.35	4.60	1
5080.94						
DICB-B	CIRCULAR	0.45	0.16	0.11	0.45	1
147.24						
RY	TRAPEZOIDAL	0.60	1.62	0.35	4.50	1
3237.63						
S1N-02_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
27335.91						
S1N-02_3	RoadsideDitch	1.13	4.59	0.57	10.00	1
27333.69						
S1N-02_5	RoadsideDitch	1.13	4.59	0.57	10.00	1
27346.99						
S1N-02_8	RoadsideDitch	1.13	4.59	0.57	10.00	1
27344.62						
S1N-06_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
24264.73						
S1N-06_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
40689.87						
S1N-12_2	RoadsideDitch	1.13	4.59	0.57	10.00	1
13350.02						
S1N-12_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
13335.45						
S1N-13_3	RoadsideDitch	1.13	4.59	0.57	10.00	1
24434.50						
S1S-03_2	RoadsideDitch	1.13	4.59	0.57	10.00	1
18143.00						
S1S-03_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
39856.18						
S1S-03_6	RoadsideDitch	1.13	4.59	0.57	10.00	1
30659.38						
S1S-05	RoadsideDitch	1.13	4.59	0.57	10.00	1
35739.64						
S1S-10_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
23481.85						
S2N-03_1	CIRCULAR	0.40	0.13	0.10	0.40	1
214.93						
S2N-03_2	RoadsideDitch	1.13	4.59	0.57	10.00	1
38465.46						
S2N-03_4	RoadsideDitch	1.13	4.59	0.57	10.00	1
38491.31						
S2S-03_1	RoadsideDitch	1.13	4.59	0.57	10.00	1
12294.69						
ST1_Culvert1	CIRCULAR	0.60	0.28	0.15	0.60	1
251.43						
ST1_Culvert2	CIRCULAR	0.60	0.28	0.15	0.60	1
225.96						
ST2_Culvert	CIRCULAR	0.60	0.28	0.15	0.60	1
235.19						
Wils_Culvert	CIRCULAR	0.60	0.28	0.15	0.60	1
148.75						

****
Transect Summary

```
****************

Transect RoadsideDitch
Area:
            0.0047     0.0100     0.0158     0.0222     0.0292
            0.0367     0.0448     0.0534     0.0626     0.0724
            0.0827     0.0936     0.1050     0.1170     0.1296
            0.1427     0.1564     0.1706     0.1854     0.2008
            0.2187     0.2396     0.2608     0.2823     0.3041
            0.3261     0.3485     0.3711     0.3940     0.4171
            0.4406     0.4643     0.4883     0.5125     0.5371
            0.5619     0.5870     0.6123     0.6380     0.6639
            0.6901     0.7166     0.7433     0.7704     0.7998
            0.8326     0.8689     0.9089     0.9526     1.0000
Hrad:
            0.0368     0.0697     0.0998     0.1277     0.1541
            0.1793     0.2036     0.2270     0.2499     0.2722
            0.2940     0.3155     0.3367     0.3576     0.3783
            0.3987     0.4190     0.4392     0.4592     0.4798
            0.5010     0.5150     0.5304     0.5468     0.5639
            0.5816     0.5996     0.6179     0.6364     0.6550
            0.6738     0.6926     0.7114     0.7303     0.7492
            0.7681     0.7869     0.8057     0.8245     0.8433
            0.8621     0.8808     0.8994     0.9201     0.9457
            0.9660     0.9812     0.9915     0.9975     1.0000
Width:
            0.1014     0.1127     0.1241     0.1355     0.1468
            0.1582     0.1696     0.1809     0.1923     0.2037
            0.2151     0.2264     0.2378     0.2492     0.2605
            0.2719     0.2833     0.2946     0.3060     0.3235
            0.4045     0.4280     0.4336     0.4392     0.4448
            0.4504     0.4560     0.4616     0.4672     0.4728
            0.4784     0.4840     0.4896     0.4952     0.5008
            0.5063     0.5119     0.5175     0.5231     0.5287
            0.5343     0.5399     0.5455     0.5632     0.6310
            0.6988     0.7740     0.8493     0.9247     1.0000


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... CURVE_NUMBER
Flow Routing Method ...... DYNWAVE
Starting Date ............ 03/29/2017 00:00:00
Ending Date .............. 03/30/2017 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:00:30
Wet Time Step ............ 00:01:00
```

Dry Time Step 00:01:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 4
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.243	93.910
Evaporation Loss	0.000	0.000
Infiltration Loss	0.123	47.659
Surface Runoff	0.117	45.128
Final Storage	0.003	1.145
Continuity Error (%)	-0.023	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.117	1.167
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.216	2.165
External Outflow	0.333	3.330
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.002
Continuity Error (%)	0.002	

Time-Step Critical Elements
Link B1-4_Culvert (5.24%)
Link S2N-03_1 (1.50%)

Highest Flow Instability Indexes
Link S2N-03_4 (2)
Link C7-1_Culvert (2)
Link S2N-03_1 (2)
Link S1N-06_4 (2)
Link B1-3_Culvert (2)

Routing Time Step Summary

Minimum Time Step	:	3.26 sec
Average Time Step	:	4.92 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
B1-1	93.91	0.00	0.00	47.76	45.03	0.12	35.04	0.479
B1-2	93.91	0.00	0.00	47.49	45.29	0.03	7.92	0.482
B1-3	93.91	0.00	0.00	47.58	45.21	0.04	10.83	0.481
B1-4	93.91	0.00	0.00	47.64	45.15	0.05	13.79	0.481
B1-5	93.91	0.00	0.00	47.61	45.18	0.04	10.36	0.481
B1-6	93.91	0.00	0.00	47.65	45.14	0.10	28.77	0.481
B1-7	93.91	0.00	0.00	47.61	45.18	0.03	8.55	0.481
C1-1	93.91	0.00	0.00	47.61	45.18	0.04	10.64	0.481
C1-2	93.91	0.00	0.00	47.61	45.18	0.03	7.46	0.481
C1-3	93.91	0.00	0.00	47.62	45.17	0.03	9.91	0.481
C1-4	93.91	0.00	0.00	47.63	45.16	0.05	13.21	0.481
C1-5	93.91	0.00	0.00	47.62	45.17	0.06	18.23	0.481
C1-6	93.91	0.00	0.00	47.61	45.18	0.04	12.77	0.481
C2-1	93.91	0.00	0.00	47.65	45.13	0.11	30.17	0.481
C2-2	93.91	0.00	0.00	47.71	45.07	0.04	12.25	0.480
C2-3	93.91	0.00	0.00	47.75	45.03	0.04	10.64	0.480
C2-4	93.91	0.00	0.00	47.78	45.01	0.04	10.04	0.479
C2-5	93.91	0.00	0.00	47.79	45.00	0.08	21.47	0.479
C3_2	93.91	0.00	0.00	47.58	45.21	0.13	39.03	0.481
C3-1	93.91	0.00	0.00	47.70	45.08	0.08	22.61	0.480

****
Node Depth Summary
****

Node	Average	Maximum	Maximum	Time of Max	Reported

Node	Type	Depth Meters	Depth Meters	HGL Meters	Occurrence days	Occurrence hr:min	Max Depth Meters
B13-in	JUNCTION	0.02	0.14	126.52	0	06:30	0.14
B13-out	JUNCTION	0.00	0.03	126.21	0	06:30	0.03
B14-in	JUNCTION	0.05	0.32	125.31	0	06:38	0.32
B14-out	JUNCTION	0.01	0.06	125.02	0	06:38	0.06
B15-in	JUNCTION	0.02	0.12	127.13	0	06:30	0.12
B15-out	JUNCTION	0.00	0.03	126.86	0	06:30	0.03
B16-in	JUNCTION	0.02	0.18	127.58	0	06:30	0.18
B16-out	JUNCTION	0.00	0.03	127.38	0	06:31	0.03
B71-in	JUNCTION	0.01	0.08	127.73	0	06:30	0.08
B72-out	JUNCTION	0.00	0.02	127.52	0	06:30	0.02
C1-RY	JUNCTION	0.01	0.08	128.08	0	06:34	0.08
C21-in	JUNCTION	0.02	0.21	124.68	0	06:31	0.21
C21-out	JUNCTION	0.00	0.04	124.11	0	06:29	0.04
C27C-in	JUNCTION	0.02	0.18	123.14	0	06:31	0.18
C27-out	JUNCTION	0.03	0.22	123.12	0	06:30	0.22
C71-in	JUNCTION	0.01	0.08	127.76	0	06:28	0.08
C71-out	JUNCTION	0.00	0.02	127.29	0	06:30	0.01
C76-in	JUNCTION	0.02	0.11	126.74	0	06:30	0.11
C76-out	JUNCTION	0.00	0.03	126.62	0	06:30	0.03
DICB1-in	JUNCTION	0.09	0.45	123.12	0	06:32	0.45
DICB-B-in	JUNCTION	0.05	0.32	124.74	0	06:33	0.32
DICM1-out	JUNCTION	0.01	0.09	122.76	0	06:32	0.09
J1	JUNCTION	0.05	0.41	125.26	0	06:30	0.41
J2	JUNCTION	0.01	0.07	124.92	0	06:31	0.07
S1L-HP1	JUNCTION	0.00	0.00	128.09	0	00:00	0.00
S1L-HP2	JUNCTION	0.00	0.00	126.79	0	00:00	0.00
S1-LP1	JUNCTION	0.01	0.06	126.52	0	06:30	0.06
S1R-HP1	JUNCTION	0.00	0.00	128.09	0	00:00	0.00
S1R-HP2	JUNCTION	0.00	0.00	126.79	0	00:00	0.00
S2End	JUNCTION	0.00	0.07	123.14	0	06:31	0.07
S2L-HP1	JUNCTION	0.00	0.00	126.95	0	00:00	0.00
ST1_1_US	JUNCTION	0.02	0.14	126.68	0	06:30	0.14
ST1_2_DS	JUNCTION	0.00	0.02	125.95	0	06:31	0.02
ST1_2_US	JUNCTION	0.02	0.13	126.12	0	06:30	0.13
ST2_DS	JUNCTION	0.05	0.32	123.12	0	06:31	0.32
ST2_US	JUNCTION	0.05	0.28	123.14	0	06:31	0.28
WilsC-in	JUNCTION	0.04	0.30	124.76	0	06:32	0.30
Wils-out	JUNCTION	0.04	0.31	124.74	0	06:33	0.31
OutA	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
OutB	OUTFALL	0.03	0.26	124.56	0	06:34	0.26
OutC1	OUTFALL	0.01	0.07	121.07	0	06:31	0.07
OutC2	OUTFALL	0.01	0.09	119.09	0	06:32	0.09
OutC3	OUTFALL	0.00	0.00	0.00	0	00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent

```
  ------------------------------------------------------------------------------
-------------
  B13-in                JUNCTION     10.83    29.41     0  06:30       0.0374
0.103       0.075
  B13-out               JUNCTION      0.00    29.22     0  06:30            0
0.103      -0.188
  B14-in                JUNCTION     13.79    97.34     0  06:31        0.048
0.388       0.436
  B14-out               JUNCTION      0.00    80.78     0  06:38            0
0.386       0.007
  B15-in                JUNCTION     10.36    18.79     0  06:30       0.0359
0.0655      -0.097
  B15-out               JUNCTION      0.00    18.64     0  06:30            0
0.0656       0.110
  B16-in                JUNCTION     28.77    28.77     0  06:30          0.1
0.1       0.141
  B16-out               JUNCTION      0.00    27.63     0  06:30            0
0.1      -0.080
  B71-in                JUNCTION      8.55     8.55     0  06:30       0.0296
0.0296       0.258
  B72-out               JUNCTION      0.00     8.46     0  06:30            0
0.0296      -0.251
  C1-RY                 JUNCTION     60.93    60.93     0  06:33        0.239
0.239       -0.185
  C21-in                JUNCTION     30.17    50.82     0  06:30        0.105
0.182       -0.025
  C21-out               JUNCTION     12.25    62.23     0  06:29       0.0432
0.225       -0.013
  C27C-in               JUNCTION     10.04    18.62     0  06:31       0.0358
0.0474      -0.033
  C27-out               JUNCTION      0.00    18.31     0  06:31            0
0.048       0.039
  C71-in                JUNCTION     10.64    10.64     0  06:30       0.0369
0.0369       0.367
  C71-out               JUNCTION      0.00    11.66     0  06:28            0
0.0368      -0.375
  C76-in                JUNCTION     13.21    13.21     0  06:30       0.0459
0.0459       0.046
  C76-out               JUNCTION      0.00    12.98     0  06:30            0
0.0459       0.007
  DICB1-in              JUNCTION      0.00   133.02     0  06:31            0
0.513       0.013
  DICB-B-in             JUNCTION      0.00   135.05     0  06:33            0
0.641       0.009
  DICM1-out             JUNCTION      0.00   132.55     0  06:32            0
0.513       0.005
  J1                    JUNCTION      0.00    70.55     0  06:30            0
0.251       0.039
  J2                    JUNCTION      0.00    70.36     0  06:30            0
0.251       0.004
  S1L-HP1               JUNCTION      0.00     0.00     0  00:00            0
0       0.000 ltr
  S1L-HP2               JUNCTION      0.00     0.00     0  00:00            0
0       0.000 ltr
  S1-LP1                JUNCTION     17.37    70.97     0  06:30       0.0603
0.251       -0.030
  S1R-HP1               JUNCTION      0.00     0.00     0  00:00            0
0       0.000 ltr
  S1R-HP2               JUNCTION      0.00     0.00     0  00:00            0
0       0.000 ltr
  S2End                 JUNCTION      0.00    10.24     0  06:17            0
0.0117       0.109
```

```
  S2L-HP1              JUNCTION      0.00     0.00     0  00:00           0
0       0.000 ltr
  ST1_1_US             JUNCTION     31.00    31.00     0  06:30       0.108
0.108       0.140
  ST1_2_DS             JUNCTION      0.00    20.93     0  06:30           0
0.0766       0.006
  ST1_2_US             JUNCTION     21.47    21.47     0  06:30      0.0767
0.0767       0.040
  ST2_DS               JUNCTION     10.64   135.32     0  06:30      0.0378
0.514       0.019
  ST2_US               JUNCTION     61.63    61.63     0  06:30       0.214
0.215       0.163
  WilsC-in             JUNCTION     35.04    63.99     0  06:30       0.124
0.228       0.095
  Wils-out             JUNCTION      7.92   135.84     0  06:32      0.0272
0.641       0.004
  OutA                 OUTFALL     167.50   167.50     0  06:32       0.611
0.611       0.000
  OutB                 OUTFALL       0.00   135.02     0  06:34           0
0.641       0.000
  OutC1                OUTFALL      70.76   140.58     0  06:31       0.258
0.509       0.000
  OutC2                OUTFALL     166.44   298.55     0  06:32       0.608
1.12       0.000
  OutC3                OUTFALL      62.40    62.40     0  06:57       0.448
0.448       0.000


  **********************
  Node Surcharge Summary
  **********************

  No nodes were surcharged.


  **********************
  Node Flooding Summary
  **********************

  No nodes were flooded.


  ************************
  Outfall Loading Summary
  ************************

  -------------------------------------------------------------
                        Flow       Avg       Max       Total
                        Freq      Flow      Flow      Volume
  Outfall Node           Pcnt       LPS       LPS    10^6 ltr
  -------------------------------------------------------------
  OutA                  51.25     16.48    167.50       0.611
  OutB                  87.86     10.01    135.02       0.641
  OutC1                 71.47      9.81    140.58       0.509
  OutC2                 83.93     18.37    298.55       1.120
  OutC3                 56.41     10.22     62.40       0.448
  -------------------------------------------------------------
  System                70.18     64.88    773.67       3.330


  ********************
  Link Flow Summary
  ********************
```

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
B1-3_Culvert	CONDUIT	29.22	0	06:30	1.39	0.19	0.22
B1-4_Culvert	CONDUIT	80.78	0	06:38	1.38	1.37	0.47
B1-5_Culvert	CONDUIT	18.64	0	06:30	1.22	0.13	0.18
B1-6_culvert	CONDUIT	27.63	0	06:30	1.10	0.36	0.25
B7-1_Culvert	CONDUIT	8.46	0	06:30	0.93	0.07	0.13
BOUT-01	CHANNEL	135.05	0	06:33	0.26	0.02	0.28
C2	CHANNEL	0.00	0	00:00	0.00	0.00	0.12
C6_1	CONDUIT	70.55	0	06:30	0.17	0.01	0.39
C6_4	CONDUIT	70.19	0	06:31	0.87	0.01	0.11
C7	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
C7-1_Culvert	CONDUIT	11.66	0	06:28	1.34	0.05	0.12
C7-6_Culvert	CONDUIT	12.98	0	06:30	0.82	0.18	0.18
C8_1	CHANNEL	9.45	0	06:31	0.06	0.00	0.11
C8_3	CONDUIT	18.31	0	06:31	0.52	0.22	0.50
C8_4	CHANNEL	18.94	0	06:32	0.05	0.00	0.24
COUT-03_2	CONDUIT	133.02	0	06:31	0.16	0.08	0.65
COUT-03_6	CONDUIT	132.24	0	06:32	1.09	0.03	0.16
DICB-B	CONDUIT	135.02	0	06:34	1.26	0.92	0.64
RY	CONDUIT	60.13	0	06:34	0.21	0.02	0.33
S1N-02_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.04
S1N-02_3	CHANNEL	8.45	0	06:30	0.12	0.00	0.06
S1N-02_5	CHANNEL	18.63	0	06:30	0.20	0.00	0.08
S1N-02_8	CHANNEL	29.12	0	06:30	0.16	0.00	0.15
S1N-06_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.04
S1N-06_4	CHANNEL	10.95	0	06:30	0.30	0.00	0.03
S1N-12_2	CHANNEL	0.00	0	00:00	0.00	0.00	0.05
S1N-12_4	CHANNEL	12.96	0	06:30	0.28	0.00	0.04
S1N-13_3	CHANNEL	0.00	0	00:00	0.00	0.00	0.01
S1S-03_2	CHANNEL	0.00	0	00:00	0.00	0.00	0.08
S1S-03_4	CHANNEL	27.59	0	06:31	0.17	0.00	0.15
S1S-03_6	CHANNEL	80.78	0	06:38	0.35	0.00	0.16
S1S-05	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
S1S-10_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.06
S2N-03_1	CONDUIT	50.24	0	06:31	1.60	0.23	0.32
S2N-03_2	CHANNEL	20.87	0	06:31	0.15	0.00	0.11
S2N-03_4	CHANNEL	62.14	0	06:30	0.30	0.00	0.16
S2S-03_1	CHANNEL	9.83	0	06:30	0.07	0.00	0.15
ST1_Culvert1	CONDUIT	29.96	0	06:30	0.95	0.12	0.17
ST1_Culvert2	CONDUIT	20.93	0	06:30	0.96	0.09	0.13
ST2_Culvert	CONDUIT	47.71	0	06:31	0.38	0.20	0.50
Wils_Culvert	CONDUIT	56.48	0	06:31	0.44	0.38	0.51
DICB_C1	ORIFICE	13.31	0	06:30			1.00
DICB_C2	ORIFICE	12.75	0	06:30			1.00
W1	WEIR	57.05	0	06:30			0.32
Weir_OutC	WEIR	119.80	0	06:32			0.50

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl

```
  ---------------------------------------------------------------------------------------
-
  B1-3_Culvert            1.00   0.19  0.00  0.00  0.41  0.40  0.00  0.00  0.00  0.30
  B1-4_Culvert            1.00   0.02  0.00  0.00  0.67  0.31  0.00  0.00  0.00  0.02
  B1-5_Culvert            1.00   0.19  0.00  0.00  0.43  0.38  0.00  0.00  0.00  0.30
  B1-6_culvert            1.00   0.19  0.00  0.00  0.49  0.32  0.00  0.00  0.00  0.00
  B7-1_Culvert            1.00   0.19  0.00  0.00  0.46  0.35  0.00  0.00  0.00  0.22
  BOUT-01                 1.00   0.04  0.00  0.00  0.96  0.00  0.00  0.00  0.43  0.00
  C2                      1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  C6_1                    1.00   0.19  0.00  0.00  0.81  0.00  0.00  0.00  0.80  0.00
  C6_4                    1.00   0.20  0.00  0.00  0.73  0.07  0.00  0.00  0.34  0.00
  C7                      1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  C7-1_Culvert            1.00   0.19  0.00  0.00  0.41  0.39  0.00  0.00  0.00  0.16
  C7-6_Culvert            1.00   0.19  0.00  0.00  0.69  0.12  0.00  0.00  0.00  0.03
  C8_1                    1.00   0.19  0.66  0.00  0.14  0.00  0.00  0.00  0.72  0.00
  C8_3                    1.00   0.19  0.00  0.00  0.73  0.08  0.00  0.00  0.00  0.05
  C8_4                    1.00   0.19  0.01  0.00  0.80  0.00  0.00  0.00  0.59  0.00
  COUT-03_2               1.00   0.19  0.00  0.00  0.81  0.00  0.00  0.00  0.54  0.00
  COUT-03_6               1.00   0.21  0.00  0.00  0.58  0.22  0.00  0.00  0.01  0.00
  DICB-B                  1.00   0.06  0.00  0.00  0.91  0.03  0.00  0.00  0.00  0.00
  RY                      1.00   0.02  0.14  0.00  0.84  0.00  0.00  0.00  0.94  0.00
  S1N-02_1                1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S1N-02_3                1.00   0.19  0.17  0.00  0.64  0.00  0.00  0.00  0.79  0.00
  S1N-02_5                1.00   0.19  0.07  0.00  0.74  0.00  0.00  0.00  0.80  0.00
  S1N-02_8                1.00   0.19  0.01  0.00  0.80  0.00  0.00  0.00  0.79  0.00
  S1N-06_1                1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S1N-06_4                1.00   0.19  0.32  0.00  0.49  0.00  0.00  0.00  0.80  0.00
  S1N-12_2                1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S1N-12_4                1.00   0.19  0.01  0.00  0.80  0.00  0.00  0.00  0.79  0.00
  S1N-13_3                1.00   0.20  0.80  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S1S-03_2                1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S1S-03_4                1.00   0.02  0.18  0.00  0.79  0.00  0.00  0.00  0.79  0.00
  S1S-03_6                1.00   0.04  0.00  0.00  0.95  0.00  0.00  0.00  0.94  0.00
  S1S-05                  1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S1S-10_1                1.00   0.19  0.81  0.00  0.00  0.00  0.00  0.00  0.00  0.00
  S2N-03_1                1.00   0.19  0.00  0.00  0.19  0.62  0.00  0.00  0.00  0.32
  S2N-03_2                1.00   0.19  0.01  0.00  0.80  0.00  0.00  0.00  0.79  0.00
  S2N-03_4                1.00   0.19  0.00  0.00  0.80  0.01  0.00  0.00  0.80  0.00
  S2S-03_1                1.00   0.19  0.66  0.00  0.14  0.00  0.00  0.00  0.71  0.00
  ST1_Culvert1            1.00   0.19  0.00  0.00  0.60  0.20  0.00  0.00  0.00  0.16
  ST1_Culvert2            1.00   0.19  0.00  0.00  0.50  0.31  0.00  0.00  0.00  0.03
  ST2_Culvert             1.00   0.19  0.00  0.00  0.81  0.00  0.00  0.00  0.00  0.04
  Wils_Culvert            1.00   0.04  0.15  0.00  0.81  0.00  0.00  0.00  0.00  0.01


  *************************
  Conduit Surcharge Summary
  *************************

  ---------------------------------------------------------------------------
                                                      Hours        Hours
                          --------- Hours Full --------   Above Full   Capacity
  Conduit                 Both Ends  Upstream  Dnstream   Normal Flow   Limited
  ---------------------------------------------------------------------------
  B1-4_Culvert                0.01      0.01      0.01      0.46         0.01


  Analysis begun on:  Tue Feb 01 09:46:11 2022
  Analysis ended on:  Tue Feb 01 09:46:12 2022
  Total elapsed time: 00:00:01
*******************************************************************************
```

Appleton Subdivision CSWM
Post-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

Sub-Catchments (Front Yards)

Area ID	Catchment Area	Runoff Coefficient	Percent Impervious	No Depression	Average Slope
	(ha)	c	(%)	(%)	(%)
B1-1	0.28	0.48	25	50	2.50
B1-2	0.06	0.48	25	50	2.50
B1-3	0.08	0.48	25	50	3.15
B1-4	0.11	0.48	25	50	2.00
B1-5	0.08	0.48	25	50	2.50
B1-6	0.22	0.48	25	50	2.00
B1-7	0.07	0.48	25	50	2.50
C1-1	0.08	0.48	25	50	2.50
C1-2	0.06	0.48	25	50	2.50
C1-3	0.08	0.48	25	50	2.50
C1-4	0.10	0.48	25	50	2.50
C1-5	0.14	0.48	25	50	2.50
C1-6	0.10	0.48	25	50	2.50
C2-1	0.23	0.48	25	50	1.80
C2-2	0.10	0.48	25	50	1.50
C2-3	0.08	0.48	25	50	1.00
C2-4	0.08	0.48	25	50	1.00
C2-5	0.17	0.48	25	50	1.80
C3_2	0.30	0.48	25	50	4.00
C3-1	0.18	0.48	25	50	1.80
TOTAL:	**2.59**				

Appleton Subdivision CSWM
Post-Development Model Parameters

NOVATECH
Engineers, Planners & Landscape Architects

ARM Catchments (Rear Yards)

Catchment		Overland Flow					Concentrated Overland Flow						Overall			
Area ID	Area (ha)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Velocity (m/s)	Travel Time (min)	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)	Time to Peak (min)	Time to Peak (hrs)
A1	1.6	88	128.0	118.0	0.5	2.93	0			0.0%	0	0.00	3	2	10	0.17
B1	0.8	100	128.0	127.0	0.15	11.11	0	-	-	0.0%	0	0.00	13	9	10	0.17
C1-RY	0.88	98	124.9	121.0	0.3	5.44	0	0	0.0	0.0%		0.00	5	4	10	0.17
C2-RY	2.07	100	126.0	119.0	0.4	4.17	0	0	0.0	0.0%		0.00	4	3	10	0.17
C3-RY	1.87	100	125.0	124.0	0.08	20.83	90	124	124.0	0.0%	0.07	21.43	42	28	28	0.47

Weighted Curve Number Calculations
Soil type 'B'

Area ID	Land Use 1	Area	CN
A1	From CAD	100%	68
B1	From CAD	100%	61
C1-RY	From CAD	100%	61
C2-RY	From CAD	100%	61
C3-RY	From CAD	100%	58

Weighted IA Calculations

Area ID	Land Use 1	Area	S	IA
A1	From CAD	100%	119.53	8.965
B1	From CAD	100%	162.39	12.18
C1-RY	From CAD	100%	162.39	12.18
C2-RY	From CAD	100%	162.39	12.18
C3-RY	From CAD	100%	183.93	15.2

Appleton Subdivision CSWM
Post-Development Model Schematic

NOVATECH
Engineers, Planners & Landscape Architects

Appleton Subdivision CSWM
Required Storage Volume (m3)

NOVATECH
Engineers, Planners & Landscape Architects

REQUIRED STORAGE - C1

Storage Swale Outlet **C1**	H Max	H Min	Area Max	Area Min	Average (Req.) Volume of the Swale (m3)
C100yr-4hr	0.43	0.07	0.98	0.08	12.83
C5yr-4hr	0.37	0.03	0.78	0.03	9.76
C2yr-4hr	0.25	0.02	0.44	0.02	5.50
C25mmyr-4hr	0.1	0.01	0.13	0.01	1.68

Storage Swale Outlet **C1**	H Max	H Min	Area Max	Area Min	Average (Req.) Volume of the Swale (m3)
S100yr-12hr	0.36	0.03	0.75	0.03	9.38
S5yr-12hr	0.38	0.04	0.81	0.04	10.30
S2yr-12hr	0.41	0.06	0.91	0.07	11.82

REQUIRED STORAGE - C2

Storage Swale Outlet **C2**	H Max	H Min	Area Max	Area Min	Average (Req.) Volume of the Swale (m3)
C100yr-4hr	0.45	0.32	1.06	0.63	20.22
C5yr-4hr	0.38	0.25	0.81	0.44	15.01
C2yr-4hr	0.31	0.18	0.60	0.28	10.51
C25mmyr-4hr	0.18	0.05	0.28	0.06	4.02

Storage Swale Outlet **C2**	H Max	H Min	Area Max	Area Min	Average (Req.) Volume of the Swale (m3)
S100yr-12hr	0.36	0.23	0.75	0.39	13.65
S5yr-12hr	0.4	0.27	0.88	0.49	16.42
S2yr-12hr	0.45	0.32	1.06	0.63	20.22

H Max = Maximum elevation of water in the swale

H Min = Minimum elevation of water in the swale

Area Max = Area of the trapizoid based on maximum elevation (H+3H^2)

Area Min = Area of the trapizoid based on minimum elevation (H+3H^2)

Required Volume = Average of Area Max & Min times length of the swale (24m)

Appleton Subdivision CSWM
Design Storm Time Series Data
SCS Design Storms

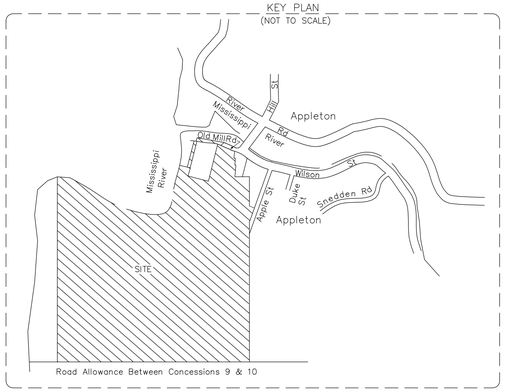
NOVATECH
Engineers, Planners & Landscape Architects

S2-12.stm		S5-12.stm		S100-12.stm	
Duration min	Intensity mm/hr	Duration min	Intensity mm/hr	Duration min	Intensity mm/hr
0:00	0.00	0:00	0	0:00	0
0:30	1.27	0:30	1.69	0:30	2.82
1:00	0.59	1:00	0.79	1:00	1.31
1:30	1.10	1:30	1.46	1:30	2.44
2:00	1.10	2:00	1.46	2:00	2.44
2:30	1.44	2:30	1.91	2:30	3.19
3:00	1.27	3:00	1.69	3:00	2.82
3:30	1.69	3:30	2.25	3:30	3.76
4:00	1.69	4:00	2.25	4:00	3.76
4:30	2.29	4:30	3.03	4:30	5.07
5:00	2.88	5:00	3.82	5:00	6.39
5:30	4.57	5:30	6.07	5:30	10.14
6:00	36.24	6:00	48.08	6:00	80.38
6:30	9.23	6:30	12.25	6:30	20.47
7:00	4.06	7:00	5.39	7:00	9.01
7:30	2.71	7:30	3.59	7:30	6.01
8:00	2.37	8:00	3.15	8:00	5.26
8:30	1.86	8:30	2.47	8:30	4.13
9:00	1.95	9:00	2.58	9:00	4.32
9:30	1.27	9:30	1.69	9:30	2.82
10:00	1.02	10:00	1.35	10:00	2.25
10:30	1.44	10:30	1.91	10:30	3.19
11:00	0.93	11:00	1.24	11:00	2.07
11:30	0.85	11:30	1.12	11:30	1.88
12:00	0.85	12:00	1.12	12:00	1.88

DRAWINGS

APPLETON SHORES SUBDIVISION

KEY PLAN
(NOT TO SCALE)



SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

_____

THIS DRAFT PLAN IS APPROVED BY THE COUNTY OF LANARK UNDER SECTION 51 OF THE PLANNING ACT.
THIS _____ DAY OF _____, 20___.

_____
KURT GREAVES
CHIEF ADMINISTRATIVE OFFICER
COUNTY OF LANARK

SCHEDULE OF AREAS AND LOT FRONTAGE		
LOT/BLOCK	AREA (sqm)	FRONTAGE (m)
LOT 1	4000.1	34.98
LOT 2	4001.1	33.88
LOT 3	4003.0	32.03
LOT 4	4003.0	30.04
LOT 5	4657.2	30.00
LOT 6	5122.7	30.00
LOT 7	4899.5	30.00
LOT 8	4035.8	69.48
LOT 9	4023.3	36.95
LOT 10	4134.8	31.28
LOT 11	5664.3	30.62
LOT 12	4030.7	62.66
LOT 13	4104.3	100.45
LOT 14	4009.4	117.38
BLOCK 15	587.1	N/A
BLOCK 16	581.1	N/A
BLOCK 17	1180.1	N/A
BLOCK 18	117199.0	N/A
BLOCK 19	162.3	N/A
BLOCK 20	6407.5	N/A
BLOCK 21	289.8	N/A

DRAFT PLAN OF SUBDIVISION
OF PART OF
LOT 4, CONCESSION 10
AND
LOT 7, REGISTERED PLAN 288
GEOGRAPHIC TOWNSHIP OF RAMSAY
MUNICIPALITY OF MISSISSIPPI MILLS
COUNTY OF LANARK
SCALE 1:1000 metres

40 30 20 10 0 20 40
(SCALE IN METRES)

BENNETT J. FAULHAMMER
ONTARIO LAND SURVEYOR

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

LAND USE SCHEDULE:

LOTS 1 TO 14 – SINGLE FAMILY RESIDENTIAL	6.06871 ha. (60687.1 sq.m.)
BLOCK 15–PRIVATE ROAD (PROPOSED FOR SALE TO ABUTTING LAND OWNERS)	0.05871 ha. (587.1 sq.m)
BLOCK 16 – PROPOSED ADDITION TO ABUTTING LAND	0.05811 ha. (581.1 sq.m)
BLOCK 17 – PROPOSED FUTURE PARK	0.11801 ha. (1180.1 sq.m)
BLOCK 18 – WET LANDS	11.7199 ha. (117199.0 sq.m)
BLOCK 19 – PROPOSED ADDITION TO ABUTTING LAND	0.16273 ha. (1627.3 sq.m)
BLOCK 20 – FUTURE STREET	0.64075 ha. (6407.5 sq.m)
BLOCK 21 – FUTURE STREET (APPLE STREET)	0.0289.8 ha. (289.8 sq.m)
TOTAL SITE AREA:	18.85590 ha. (188559.0 sq.m.)

SECTION 51(17) OF THE PLANNING ACT:

a) AS SHOWN
b) AS SHOWN
c) AS SHOWN
d) SEE PROPOSED LAND USE SCHEDULE ABOVE
e) AS SHOWN
f) AS SHOWN
f.1) NOT APPLICABLE
g) AS SHOWN
h) DRILLED WELLS & SEPTIC SEWER DISPOSAL
i) SEE SOIL REPORT
j) AS SHOWN AT 0.5m INTERVALS
k) SEPTIC SYSTEMS
l) AS SHOWN

OWNER'S CERTIFICATE:

I JOHN RICHARD SOUTHWELL, PRESIDENT OF SOUTHWELL HOMES LTD. BEING THE REGISTERED OWNER, HEREBY AUTHORIZE CALLON DIETZ INC. TO SUBMIT THIS PLAN OF PROPOSED SUBDIVISION TO THE COUNTY OF LANARK FOR APPROVAL.

DATED IN CARLETON PLACE, ONTARIO

SOUTHWELL HOMES LTD.
JOHN RICHARD SOUTHWELL
PRESIDENT
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE:

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJOINING LANDS ARE ACCURATELY AND CORRECTLY SHOWN ON THIS PLAN.

DATED IN CARLETON PLACE, ONTARIO

BENNETT J. FAULHAMMER
ONTARIO LAND SURVEYOR

No.	REVISION	DATE	BY
2	AMENDED AND ISSUED FOR COMMENT	AUGUST 12, 2022	BF
1	ISSUED FOR COMMENT	AUGUST 11, 2022	BF

Callon Dietz INCORPORATED
ONTARIO LAND SURVEYORS
CARLETON PLACE LONDON NORTH BAY
info@callondietz.com callondietz.com

ISO 9001 REGISTERED

SURVEY BY: RG	DRAWN BY: RW	FILE No: 22-1464_C	PLAN No: X

SOURCE REFERENCE:
Legal Information: *Draft Plan of Subdivision*
Callon Dietz OLS / August 12, 2022 / NAD83 MTM Zone 9
Topographic Information: *Draft Plan of Subdivision*
Callon Dietz OLS / August 12, 2022 / NAD83 MTM Zone 9

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
5.	ISSUED FOR COORDINATION	SEP 1/22	SMG
4.	ISSUED FOR COORDINATION	AUG 25/22	SMG
3.	ISSUED FOR COORDINATION	AUG 17/22	SMG
2.	ISSUED FOR COORDINATION	JUL 21/22	SMG
1.	ISSUED FOR COMMENT	SEP 08/21	SMG

SCALE
1:1250 (A1) /
1:1500 (11x17)
1:1250
0 10 20 30 40 50

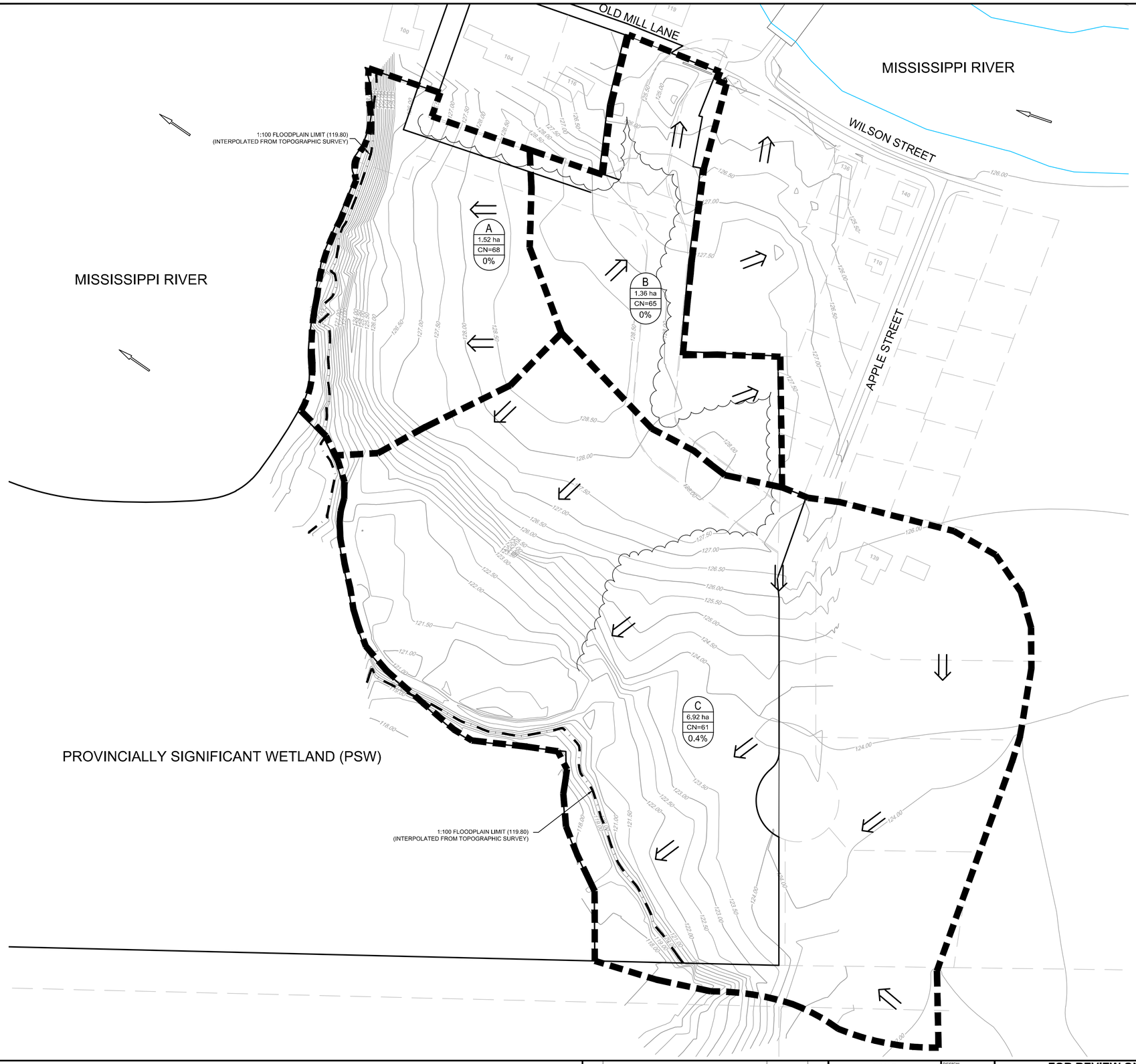
FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

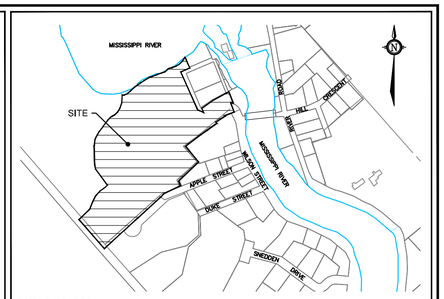
MUNICIPALITY of MISSISSIPPI MILLS
APPLETON SHORES

DRAWING NAME
CONCEPT PLAN - 14 Lots

PROJECT No.
114165-00
REV
REV #5
DRAWING No.
114165-CP2021



NORTH



KEY PLAN
N.T.S.

LEGEND

A / 1.52 ha / CN=68 / 0%	AREA ID / AREA (ha) / CURVE NUMBER / % IMPERVIOUS
	AREA BOUNDARY
	OVERLAND FLOW DIRECTION
	MISSISSIPPI RIVER FLOW DIRECTION

NOTE: THE CONTOURS SHOWN ARE DERIVED FROM THE FOLLOWING TOPOGRAPHICAL SURVEYS:
- G.A. SMITH SURVEY (ON-SITE CONTOURS)
- GEOOTTAWA MAPS (CONTOURS BEYOND EASTERN BOUNDARY OF SITE AND ARE APPROXIMATE)

PRELIMINARY

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
4.	ISSUED WITH SERVICING & CONCEPTUAL SWM REPORT	SEP 2/22	AAR
3.	REVISED PER MISSISSIPPI MILLS & MVCA COMMENTS	APR 18/17	LKS
2.	ISSUED WITH CSWM REPORT (WITH NO CHANGES)	NOV 18/15	DJC
1.	ISSUED WITH DRAFT CSWM REPORT	JUN 10/15	DJC

SCALE
1:1000
1:1000
0 10 20 30 40

DESIGN DJC
CHECKED SMG
DRAWN DJC
CHECKED SMG
APPROVED SMG

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
A.R. MCAULEY
100141256
Sept 2, 2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M. J. PETEPIECE
100079354
Sept 2, 2022
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

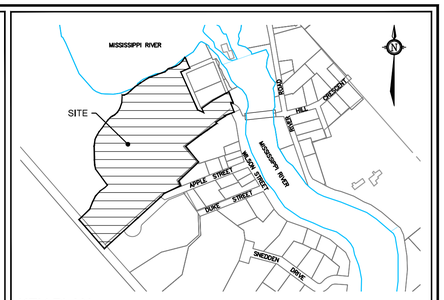
LOCATION
MISSISSIPPI MILLS
APPLETON SUBDIVISION

DRAWING NAME
PRE-DEVELOPMENT
DRAINAGE AREA PLAN

PROJECT No. 114165-00
REV REV # 4
DRAWING No. 114165-PRE

M:\2014\114165\CAD\Design\114165-CSWM.dwg, PRE, Aug 26, 2022 - 3:42pm, lcorry

NORTH



KEY PLAN
N.T.S.

LEGEND

- A1 / 1.07 ha / CN=68 / 5% — AREA ID, AREA (ha), CURVE NUMBER, % IMPERVIOUS
- AREA BOUNDARY
- PROPOSED LOT LINES
- ℄ DITCH AND DIRECTION OF FLOW
- PAVED SHOULDER / PATHWAY
- GRAVEL SHOULDER
- PROPOSED CULVERT
- PROPOSED STORM SEWER
- DICB — PROPOSED DITCH INLET CATCHBASIN
- OVERLAND FLOW DIRECTION
- MISSISSIPPI RIVER FLOW DIRECTION
- ROCK FLOW CHECK DAM (OPSD 219.211)
- RIP RAP (OPSD 810.010)

NOTE: THE CONTOURS SHOWN ARE DERIVED FROM THE FOLLOWING TOPOGRAPHICAL SURVEYS:
- G.A. SMITH SURVEY (ON-SITE CONTOURS)
- GEOOTTAWA MAPS (CONTOURS BEYOND EASTERN BOUNDARY OF SITE AND ARE APPROXIMATE)

PRELIMINARY

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
4.	ISSUED WITH SERVICING & CONCEPTUAL SWM REPORT	SEP 2/22	AAR
3.	REVISED PER MISSISSIPPI MILLS & MVCA COMMENTS	APR 18/17	LKS
2.	ISSUED WITH CSWM REPORT (WITH NO CHANGES)	NOV 18/15	DJC
1.	ISSUED WITH DRAFT CSWM REPORT	JUN 10/15	DJC

SCALE
1:1000
1:1000
0 10 20 30 40

DESIGN DJC
CHECKED SMG
DRAWN DJC
CHECKED SMG
APPROVED SMG

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
A.R. MCAULEY
100141256
Sept 2, 2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
M. J. PETEPIECE
100079354
Sept 2, 2022
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

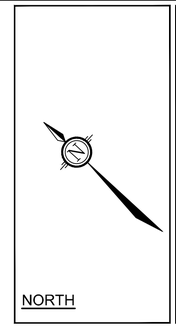
LOCATION
MISSISSIPPI MILLS
APPLETON SUBDIVISION

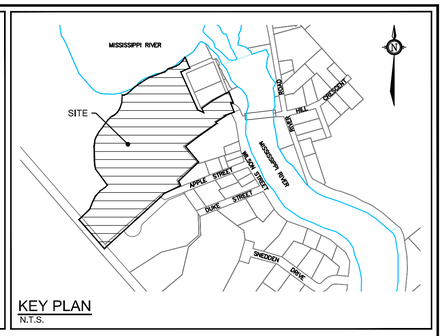
DRAWING NAME
POST-DEVELOPMENT
DRAINAGE AREA PLAN

PROJECT No. 114165-00
REV REV # 4
DRAWING No. 114165-POST

M:\2014\114165\CAD\Design\114165-CSWM.dwg, POST, Aug 26, 2022 - 3:42pm, tcorry

BLOCK 15
BLOCK 16
OLD MILL LANE
BLOCK 19
EXISTING BRIDGE
OUTLET 'B'
INV. 124.30
MISSISSIPPI RIVER
45m - 450mmø STM @ 0.25%
PROPOSED DICB
INLET INV. 124.42
PROPOSED 15m -
600mmØ CULVERT
N. INV = 124.46
S. INV = 124.43
WILSON STREET
BLOCK 17
1:100 FLOODPLAIN LIMIT (119.80)
(INTERPOLATED FROM TOPOGRAPHIC SURVEY)
TOP OF SLOPE
(BASED ON THE PATERSON GROUP SITE
VISIT ON APRIL 20, 2022)
LIMIT OF HAZARD LANDS
(BASED ON SLOPE STABILITY ASSESSMENT BY
PATERSON GROUP)
EXISTING STONE WALL
BLOCK 20
STREET ONE
APPLE STREET
PROPOSED 14m -
600mmØ CULVERT
E. INV = 126.54
W. INV = 126.46
PROPOSED 18.0m ROW
PROPOSED LINEAR
STORMWATER
MANAGEMENT FACILITY
PROPOSED
DRAINAGE/STORMWATER
MANAGEMENT EASEMENT
TURTLE EXCLUSION FENCE
PROVINCIALLY SIGNIFICANT WETLAND (PSW) BOUNDARY
(PROVIDED BY BOWFIN/CIMA+)
30m BUFFER FROM WETLAND/RIVER
(PROVIDED BY BOWFIN/CIMA+)
30m BUFFER FROM UNEVALUATED WELAND
(PROVIDED BY BOWFIN/CIMA+)
UNEVALUATED WETLAND (0.04ha)
(PROVIDED BY BOWFIN/CIMA+)
PROPOSED 13m -
600mmØ CULVERT
N. INV = 125.99
S. INV = 125.93
PROPOSED 12m -
600mmØ CULVERT
E. INV = 122.86
W. INV = 122.80
BLOCK 18
BLOCK 21
1:100 FLOODPLAIN LIMIT (119.80)
(INTERPOLATED FROM TOPOGRAPHIC SURVEY)

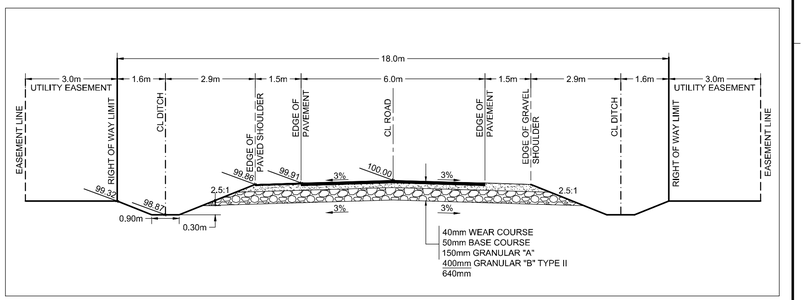




KEY PLAN
N.T.S.

LEGEND

- ℄ DITCH AND DIRECTION OF FLOW
- EASEMENT LIMIT
- EXISTING TREELINE
- PROPOSED ELEVATION / EXISTING ELEVATION (127.55 / 127.45)
- PAVED SHOULDER / PATHWAY
- GRAVEL SHOULDER
- PROPOSED CULVERT
- PROPOSED STORM SEWER
- DICB — PROPOSED DITCH INLET CATCHBASIN
- OVERLAND FLOW DIRECTION
- MISSISSIPPI RIVER FLOW DIRECTION
- ROCK FLOW CHECK DAM (OPSD 219.211)
- RIP RAP (OPSD 810.010)



TYPICAL 18.0m R.O.W. CROSS-SECTION
SCALE 1:100

NOTE: THE CONTOURS SHOWN ARE DERIVED FROM THE FOLLOWING TOPOGRAPHICAL SURVEYS:
- G.A. SMITH SURVEY (ON-SITE CONTOURS)
- GEOOTTAWA MAPS (CONTOURS BEYOND EASTERN BOUNDARY OF SITE AND ARE APPROXIMATE)

PRELIMINARY

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
9.	ISSUED WITH SERVICING & CONCEPTUAL SWM REPORT	SEP 2/22	LKC
8.	REVISED PER DRAFT LEGAL AND SETBACKS	APR 6/22	LKC
7.	ISSUED FOR COORDINATION	MAR 9/22	LKC
6.	ISSUED FOR COORDINATION	FEB 25/22	LKC
5.	FLOODPLAIN ELEVATION UPDATED TO 119.80	JUL 8/16	DJC
4.	ISSUED WITH CSWM REPORT (WITH NO CHANGES)	NOV 18/15	DJC
3.	ISSUED WITH DRAFT CSWM REPORT	JUN 10/15	DJC
2.	ISSUED FOR DISCUSSION	APR 14/15	DJC
1.	ISSUED FOR DISCUSSION	JAN 22/15	DJC

SCALE
1:1000
1:1000
0 10 20 30 40

DESIGN DJC
CHECKED SMG
DRAWN DJC
CHECKED SMG
APPROVED SMG

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
A.R. MCAULEY
100141256
Sept 2, 2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
S.M. GORDON
Sep 02, 2022
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

MISSISSIPPI MILLS
APPLETON SUBDIVISION

PRELIMINARY GRADING PLAN

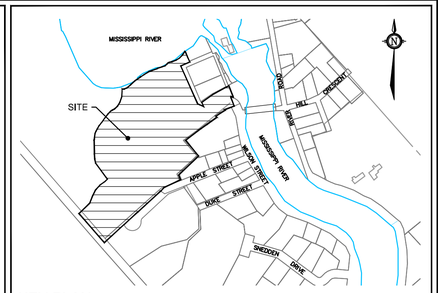
PROJECT No. 114165-00
REV REV # 9
DRAWING No. 114165-PGR

M:\2014\114165\CAD\design\114165-PGR.dwg, PGR, Aug 26, 2022 - 3:42pm, tcorry

BLOCK 15
OLD MILL LANE
BLOCK 16
BLOCK 19
BLOCK 17
BLOCK 18
BLOCK 20
STREET ONE
BLOCK 21
APPLE STREET
WILSON STREET
MISSISSIPPI RIVER
EXISTING BRIDGE
EXISTING STONE WALL
RIP-RAP (PER OPSD 810.010)
1:100 FLOODPLAIN LIMIT (119.80) (INTERPOLATED FROM TOPOGRAPHIC SURVEY)
TEMPORARY ROCK FLOW CHECK DAMS (PER OPSD 219.211)
SILT FENCE (PER OPSD 219.110)
PROPOSED LINEAR STORMWATER MANAGEMENT FACILITY
PROPOSED DRAINAGE/STORMWATER MANAGEMENT EASEMENT
PERMANENT ROCK FLOW CHECK DAM (PER OPSD 219.211)
TOP OF SLOPE
1 2 3 4 5 6 7 8 9 10 11 12 13 14

NORTH

KEY PLAN
N.T.S.



LEGEND

- ℄ DITCH AND DIRECTION OF FLOW
- EASEMENT LIMIT
- EXISTING TREELINE
- 127.55 / 127.45 — PROPOSED ELEVATION / EXISTING ELEVATION
- PAVED SHOULDER / PATHWAY
- GRAVEL SHOULDER
- PROPOSED CULVERT
- PROPOSED STORM SEWER
- DICB — PROPOSED DITCH INLET CATCHBASIN
- OVERLAND FLOW DIRECTION
- MISSISSIPPI RIVER FLOW DIRECTION
- PROPOSED SILT FENCE LOCATION (219.110)
- ROCK FLOW CHECK DAM (OPSD 219.211)
- RIP RAP (OPSD 810.010)

MINIMUM EROSION AND SEDIMENT CONTROL RESPONSIBILITIES:

	ESC Measure	Symbol	OPSD No.	During Construction: Installation Responsibility	During Construction: Inspection Responsibility	After Construction Prior to Final Acceptance: Inspection/Maintenance Responsibility	After Construction Prior to Final Acceptance: Removal Responsibility	After Final Acceptance: Inspection/Maintenance Responsibility
Temporary Measures	Temporary Rock Flow Check Dam		219.211	Developer's Contractor	Developer's Contractor	Developer	Developer	N/A
	Light Duty Silt Fence		219.110	Developer's Contractor	Developer's Contractor	Developer	Developer's Contractor	N/A
Permanent Measures	Roof Leaders Directed to Grassed Areas	N/A	N/A	Builder	Builder	Homeowner	N/A	Homeowner
	Roadside Ditches, Swales (Grading and Vegetation)	N/A	N/A	Developer's Contractor	Developer's Contractor	Developer - Inspection Developer - Repairs Homeowner - Grasscutting	N/A	Municipality
	Rip-Rap		810.010	Developer's Contractor	Developer's Contractor	Developer	N/A	Municipality
	Permanent Rock Flow Check Dam		219.211	Developer's Contractor	Developer's Contractor	Developer	N/A	Municipality

NOTE: THE CONTOURS SHOWN ARE DERIVED FROM THE FOLLOWING TOPOGRAPHICAL SURVEYS:
- G.A. SMITH SURVEY (ON-SITE CONTOURS)
- GEOOTTAWA MAPS (CONTOURS BEYOND EASTERN BOUNDARY OF SITE AND ARE APPROXIMATE)

PRELIMINARY

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
4.	ISSUED WITH SERVICING & CONCEPTUAL SWM REPORT	SEP 2/22	LKC
3.	REVISED PER MISSISSIPPI MILLS & MVCA COMMENTS	APR 18/17	LKS
2.	ISSUED WITH CSWM REPORT (WITH NO CHANGES)	NOV 18/15	DJC
1.	ISSUED WITH DRAFT CSWM REPORT	JUN 10/15	DJC

SCALE
1:1000
1:1000
0 10 20 30 40

DESIGN DJC
CHECKED SMG
DRAWN DJC
CHECKED SMG
APPROVED SMG

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
A.R. MCAULEY
100141256
Sept 2, 2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
S.M. GORDON
Sep 02, 2022
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
MISSISSIPPI MILLS
APPLETON SUBDIVISION

DRAWING NAME
EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 114165-00
REV REV # 4
DRAWING No. 114165-ESC

M:\2014\114165\CAD\design\114165-ESC.dwg, ESC, Aug 29, 2022 - 4:00pm, lcorry