Sleepy Hollow Developments Inc. Functional Servicing and Stormwater Management Report, Town of the Blue Mountains

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1	Yes	Yes	Sleepy Hollow Developments

Record of Revisions

Revision	Date	Description
0	June 2014	Initial Submission to Town of the Blue Mountains

R.J. Burnside & Associates Limited

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Executive Summary

Sleepy Hollow Developments Inc. proposes to re-develop a 2.0 ha property located at 144 Sleepy Hollow Road in the Town of the Blue Mountains and the County of Grey. The development will be referred to as Sleepy Hollow Developments West and preliminary development plans show 10 residential lots. This development will work in conjunction with a proposed development east of Innsbruck Lane. The development to the east was formerly referred to as Mallins Development and a Functional Servicing Report (FSR) was previously submitted to the Town in October 2013 by R.J. Burnside & Associates Limited. The 8 lots which consist of the development to the east will now be referred to as Sleepy Hollow Developments East. This report will discuss the functional servicing of Sleepy Hollow Developments West and will address some comments from the Sleepy Hollow Developments East FSR submission.

The findings and recommendations of this report are summarized below:

- The site will be accessed by completing a small portion of Salzburg Place, connecting Innsbruck Lane to Alexandra Way. A cul-de-sac will also be constructed off of Alexandra Way, and the northern lots will front directly onto Sleepy Hollow Road.
- The site provides 10 residential lots, with an existing residence that will remain on the northwestern lot.
- Stormwater quantity and quality control will be provided through an enhanced grass swale.
- Municipal water service will be provided by connecting the watermains on Salzburg Place, extending the watermain stub off of Alexandra Way, and connecting to the Sleepy Hollow watermain.
- Sanitary collection will be via connection to the existing Salzburg Place, Alexandra Way and the Sleepy Hollow Road gravity sanitary sewers.

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Disclaimer

1.0 Information and Planning Context

R.J. Burnside & Associates Limited (Burnside) has been retained by Sleepy Hollow Developments Inc. to prepare a Functional Servicing Report (FSR) in support of the proposed residential development. Preliminary development plans provide 10 lots to be built on a 2.0 ha parcel.

The subject lands are legally described as Part of Lot 21 Concession 3 in the Town of the Blue Mountains. The site is located between 2 existing residential developments, with the Alpine Hill Subdivision to the east, and Craigleith Meadows to the south and west. Sleepy Hollow Road bounds the site to the north. There is an existing residence fronting onto Sleepy Hollow Road in the northwest corner of the site, with the remainder of the site being forested. Please refer to Figure 1 for the Location Plan.

This report will demonstrate how the subject lands can be serviced in accordance with the Town of the Blue Mountains, Grey Sauble Conservation Authority (GSCA) and the Ministry of the Environment (MOE) Design Standards.

This report will also discuss any implications that this design will have on the proposed residential development also owned by the Developer, located immediately east of Salzburg Place. An FSR, dated October 2013, was prepared by Burnside and submitted to the Town for the site to the east. At the time of the submission the development was shown as a Condominium Corporation. As a result of the proposed roads and services discussed below, it is proposed that the previous submission be considered a municipal development. For ease of reference we will refer to the 2 developments as Sleepy Hollow Developments East and West or SHD East and SHD West.

2.0 Site Access and Road System

The proposed SHD West access is via the following:

- Two lots with direct driveway access onto Sleepy Hollow Road.
- Four lots with driveway access via a new public road cul-de-sac, connecting to Alexandra Way.
- Four lots with driveway access via the completion of a short section of Salzburg Place, connecting Alexandra Way to Innsbruck Lane.

The sight distances at all proposed road intersections and driveway accesses are better than required by the municipal standards. The location of the proposed cul-de-sac from Alexandra Way provides spacing between public road intersections that is better than required by the municipal standards. Traffic volumes are not an issue, considering the small number of lots proposed and the relatively low traffic using the existing local roads and collector roads in the study area.

Sleepy Hollow Road is designated as a Collector Road in the Town's Official Plan. According to the Official Plan, Collector Roads may provide limited access to abutting properties, however new access onto these roads is discouraged, in order to maintain the collector function. Given the long, narrow configuration of this infill site it is reasonable to provide direct driveway access for the proposed lot fronting onto Sleepy Hollow Road. The existing driveway onto Sleepy Hollow Road from the existing residence will remain. This is also consistent with the existing development along this road, which has generally developed via direct residential driveway access to Sleepy Hollow Road. No significant impacts are anticipated from providing 1 additional driveway in this area.

The 4 lots in the central area of SHD West are to be serviced via a public road (cul-de-sac) which will meet all municipal standards.

The 4 lots in the south part of SHD West are to be serviced via a public road which will meet all municipal standards. The connection of this road completes a link in the municipal road network in this area. This will improve the road connectivity for access, emergency services and maintenance for the SHD West development, as well as for the existing development on Innsbruck Lane and to SHD East. Subsequent to the road connection being implemented the local road connections to the area collector roads will include:

- Innsbruck Road to Sleepy Hollow Road to the north.
- Alexandra Way to Sleepy Hollow Road to the north.
- Alexandra Way to Craigleith Road to the south.

The Town's Engineering Standards specify that up to 40 units can be serviced by cul-de-sacs on a single access up to 250 metres in length. Further, the Standards allow for up to 80 units to be serviced by cul-de-sacs on a single primary access of up to 500 metres in length, where a second emergency-only access is provided. The cul-de-sac proposed to service the 4 lots, located in the centre of SHD West, is only about 71 metres in length and therefore meets municipal requirements. The proposed SHD East development, located on Salzburg Place, east of Innsbruck Lane, is to be serviced with a cul-de-sac that is about 170 metres in length, however there is presently only a single access to that area and therefore the overall access length (about 428 metres, including the Innsbruck Lane connection to Sleepy Hollow Road) would not meet municipal requirements. The connection of Salzburg Place, as proposed in this current study, will provide the required second access to this area and therefore will allow for municipal assumption of the SHD East cul-de-sac.

The proposed connection of Salzburg Place is recommended and is preferred over servicing the 4 southerly lots via a cul-de-sac arrangement. The benefits provided by this connection include:

- Improved emergency access.
- Elimination of an existing cul-de-sac, thereby reducing maintenance and capital replacement costs.
- Facilitates municipal pedestrian connections between neighbourhoods.
- Allows for municipal assumption of Salzburg Place, east of Innsbruck Lane in the SHD East development.

3.0 Storm Drainage

3.1 Existing Drainage

Under existing conditions the SHD West site generally drains via sheet flow from the southwest to the northeast at approximately 2.0%. See Figure 2 for the Existing Conditions Site Plan. Runoff from the southeast corner of the site is intercepted by Salzburg Place east of the site. The runoff is then collected by a series of catchbasins on Salzburg Place and conveyed east. The storm sewer outlets into a drainage swale at the east end of the Alpine Hills Subdivision, where runoff is conveyed north to Sleepy Hollow Road. This swale is an enhanced grassed swale which has a small ponding area with a Hickenbottom structure and rock check dams. The proposed roadway and driveways from SHD East will now be directed to this swale for quality and quantity control as well, instead of to the SHD East pond. The swale eventually discharges to the Sleepy Hollow Road storm sewers.

A small portion of the runoff at the north end of the SHD West site flows directly onto Sleepy Hollow Road. The runoff is then collected by catchbasins and conveyed east through existing 1200 mm diameter storm sewers.

Runoff from the remainder of the proposed SHD West development flows overland through the rear yards and side yard swales of the Alpine Hills subdivision. The runoff is then collected through the Innsbruck Lane storm sewer network and conveyed north to Sleepy Hollow Road.

An existing conditions storm sewer design sheet was created for the Alpine Hills Subdivision, and is included in Appendix B. The design sheet was based on the record plans prepared for the site by Henderson, Paddon and Associates Limited in 2004. The original storm drainage area plans accounted for the proposed SHD West site runoff as unimproved open space. As shown on the design sheet, there is surcharging in the existing system during the 5-year design storm event.

The only imperviousness currently on the SHD West site is the existing dwelling located in the northwest corner, and only accounts for approximately 1.5% of the site. The remainder of the site is covered in forest. According to the Grey County Soils Map North Sheet, the site is comprised of Kemble (Type C). A geotechnical investigation of the site has not yet been completed, but will be included at the detailed design stage.

3.2 Proposed Drainage

3.2.1 Quantity Control

The SHD West site was already accounted for in the Alpine Hills Subdivision storm plans (Henderson, Paddon and Associates Limited, 2004). Maintaining the existing drainage pattern would result in the majority of the site runoff being conveyed through the Salzburg Place or Innsbruck Lane storm sewers. However, as discussed above, there is already surcharging within the Alpine Hills storm sewers during the 5-year design storm event. By developing the site, there would be an increase in runoff to Alpine Hills, which would result in a greater amount of surcharging. As a result it is proposed to interrupt the flow prior to reaching the Alpine Hills Subdivision. This will improve the existing storm sewer network, by reducing the flows.

In order to interrupt the flow prior to reaching the Alpine Hills Subdivision, it is proposed to provide a 6.0 m drainage easement along the east side of the SHD West site. This design is similar to what has been constructed for both the Alpine Hills (Henderson, Paddon and Associates Limited, 2004) and Craigleith Meadows (C.C. Tatham and Associates, 2002) Developments. An enhanced grass swale will be installed within the easement to convey flows from the site north to Sleepy Hollow Road.

Rational method calculations were completed for the site to determine the pre-development and post-development flows from the site. Runoff coefficients and storm parameters were determined from The Blue Mountains Engineering Standards (2009). Table 1 summarizes the pre-development and post-development flows for the 2 through 100-year design storm events. Calculations are provided in Appendix B.

Table 1: Stormwater Peak Flow Summary

Storm Event	Pre-Development Peak Runoff (m3/s)	Post-Development Peak Runoff (m3/s)
2-Year	0.1	0.2
5-Year	0.1	0.2
10-Year	0.2	0.3
25-Year	0.3	0.4
50-Year	0.4	0.5
100-Year	0.5	0.6

As shown in the table above there is approximately 0.1 m³/s additional flow for each storm under proposed conditions as a result of the minor increase in imperviousness. In order to reduce the post-development peak flows to pre-development peak flows, rock check dams are proposed within an enhanced grassed swale. The check dams will slow down the runoff, reducing the post-development peak flow.

Catchbasins will be provided to collect the runoff south of the proposed Salzburg Place, and convey the flow to the enhanced grassed swale. Similarly catchbasins in the proposed cul-de-sac will convey flows to the swale as well. At the north end of the swale at Sleepy Hollow Road, a ditch inlet catchbasin (DICB) will be installed. The DICB will collect the stormwater from the swale and storm sewers will convey the flow to the existing 1200 mm diameter storm sewer on Sleepy Hollow Road. During major storm events, if the runoff exceeds the capacity of the DICB or the downstream storm sewers, the swale will spill over onto Sleepy Hollow Road and will be conveyed east as per existing conditions.

3.2.2 Quality Control

As the majority of the runoff is from rooftops and pervious areas in yards, it will be considered clean (MOE, 2003). The remainder of the runoff from SHD West will be treated through the enhanced grass swale. Enhanced grass swales are effective for water treatment if the drainage area is 2 hectares or less; therefore it is a suitable option for the site (MOE, 2003). Enhanced grass swales promote infiltration and pollutant settling, providing treatment to the runoff. The check dams provided along the swale will reduce the velocity of the stormwater allowing pollutants to settle out. The grass within the swale will also promote filtration of the suspended solids. Additionally, by holding the water back behind the rock check dams, there is the potential for infiltration, allowing

pollutants to remain within the swale. The Low Impact Development Stormwater Management Planning and Design Guide (CVC and TRCA, 2010) also found that enhanced grass swales were effective for water quality treatment on sites 2 ha or less in size. Also, the National Pollutant Removal Performance Database Version 3 published by the Center for Watershed Protection (2007), as well as an article entitled Comparative Pollutant Removal Capability of Stormwater Treatment Practices from the Watershed Protection Techniques both found median TSS removal rates of 81% in enhanced grass swales. The MOE Stormwater Management and Design Manual (2003) requires 80% TSS removal to achieved Enhanced quality control. Based on the reports and articles discussed above, and use of rock check dams within the swale, Enhanced level quality treatment will be achieved.

4.0 Site Grading

The site grading design will take into consideration the following requirements and constraints:

- Conform to the Town of the Blue Mountains grading criteria.
- Match existing and proposed boundary grading conditions.
- Minimize required earthworks and rock removal.
- Provide minimum cover on proposed servicing.

Figure 3 provides a preliminary grading design for the site, which depicts preliminary finished floor elevations, road centerline grades and the emergency overland flow route.

The SHD West site has been designed to be compatible with the road elevations on Salzburg Place, Alexandra Way, Sleepy Hollow Road and the existing surrounding residential developments.

5.0 Wastewater Servicing

5.1 Wastewater Design Criteria

Sanitary servicing and sanitary design flows for the subject lands will be designed in accordance with:

- The Town of the Blue Mountains Engineering Standards (2009).
- MOE Design Guidelines for Sewage Works (2008).
- Ontario Building Code.

5.2 Proposed Sanitary Servicing

The following criteria from the Town of the Blue Mountains Engineering Standards were used to calculate the proposed sewer flows for the development:

- Average Flow Rate - 450 L/capita/day (exclusive of extraneous flows)
- Inflow & Infiltration - 0.23 L/ha/s
- Peaking Factor - Harmon Peaking Factor Formula
- Population Density - 2.3 persons per unit.

There are existing gravity sanitary sewers on Salzburg Place east of the SHD West site. A 200 mm diameter stub with a cap currently extends to the eastern boundary of SHD West. It is proposed to remove the cap and extend this sanitary sewer, along with the Salzburg Place roadway, through the site. This sewer will provide servicing for the 4 lots at the south end of SHD West which front onto the proposed Salzburg Place. The Salzburg Place sanitary sewers eventually discharge to Sleepy Hollow Road via Innsbruck Lane.

There is also a 200 mm diameter gravity sanitary sewer located along Alexandra Way. There is an existing capped stub which extends from the Alexandra Way sewer to the limit of the unopened road allowance. It is proposed that the cap be removed and the sanitary sewer extended east into the proposed SHD West cul-de-sac to provide services to the 4 lots which front onto the proposed cul-de-sac. The Alexandra Way sewer also discharges to the sanitary sewer on Sleepy Hollow Road.

Of the 2 lots that front onto Sleepy Hollow Road, there is an existing house on the lot to the west (144 Sleepy Hollow Road), which is serviced by the Sleepy Hollow Road sanitary sewer. The easterly lot will also be serviced by the same sanitary sewer, with a new connection.

See Figure 4 for the servicing plan and Appendix C for the sanitary sewer design sheet. The proposed flows from the development at 144 Sleepy Hollow Road, and the proposed residential development east of Salzburg Place were included in the sanitary sewer flow calculations. As seen in the sanitary sewer design sheet the expected flows from the developments are very low. The existing sanitary sewers will have sufficient capacity to convey the proposed flow.

The sanitary sewer design sheet also includes the flows from the SHD East development. For the SHD East development a grinder pump is proposed for each lot, which will connect to a low pressure sanity forcemain. The forcemain will convey the flows west to the existing gravity sewer on Salzburg Place, which ultimately connects to Sleepy Hollow Road.

6.0 Water Distribution

A water system analysis report entitled Mallins Development Hydraulic Modelling (2013) was completed and submitted during the FSR stage of the SHD East development. This report found that the preferred option would be to construct a new 150 mm diameter watermain from the intersection of Alexandra Way and Lendvay Alley along the east side of the existing (Town owned) dry SWM pond and then north under the existing pedestrian walkway to Salzburg Place. A 150 mm diameter private water line would extend east into the SHD East site with individual 19 mm diameter domestic water service lines to each residence.

However, as discussed in the Mallins Development Hydraulic Modeling Report (Burnside, 2014) which is a revised version of the 2013 report and includes both SHD East and West, the preferred option would be to connect the 150 mm diameter watermains found on both the east and west sides of Salzburg Place. This will allow for the high pressure zone found on the west side to extend to the east. As noted in the 2014 report a pressure reducing valve will be required to manage the pressure difference. This connection would eliminate the need for the construction of a separate watermain from the intersection of Alexandra Way and Lendvay Alley to service SHD East. Instead the existing watermain on Salzburg Place will be extended to the east, to service SHD East.

By connecting the 2 portions of Salzburg Place, and the 150 mm diameter watermain which exists on either side, the 4 lots at the south end of the SHD West site will be serviced with individual 19 mm diameter domestic water service lines.

The lots which front onto the proposed SHD West cul-de-sac will be serviced with individual 19 mm diameter domestic water service lines off of a new 150 mm diameter watermain. This watermain will connect to the stub provided at the road allowance on Alexandra Way.

The proposed dwelling which fronts onto Sleepy Hollow Road will have an individual 19 mm diameter domestic water service line, connecting to the existing 200 mm diameter watermain on Sleepy Hollow Road.

7.0 Erosion and Sediment Control

The Erosion and Sediment Control Plan for the site will be designed in conformance with the Town of the Blue Mountains guidelines, Grey Sauble Conservation Authority, and Ministry of the Environment guidelines. Erosion and sediment controls will be implemented for all construction activities including topsoil stripping, foundation excavation and stockpiling of materials.

The erosion and sediment control strategy will include the following:

- Temporary sediment control fence at construction limits and/or downstream of any disturbed areas prior to grading.
- Gravel mud mats at construction vehicle access points to minimize off-site tracking of sediments.
- Temporary sediment ponds as required.
- Check dams, etc. for erosion/velocity control.
- Sediment traps in catchbasins.
- Routine inspection, monitoring, and repair as necessary of all temporary erosion and sediment control measures during construction.
- Removal of temporary controls once the areas they serve are restored and stable.

All reasonable measures will be taken to ensure that sediment loading is minimized both during and following construction. Erosion and Sediment Control Drawings will be completed as part of the detailed site design.

8.0 Utilities and Services

Provisions for utilities such as hydro, natural gas, telephone and fibre-optic cable, and services such as Canada Post will be coordinated with the respective providers at the detailed design stage. The existing services on Salzburg Place are all underground, and it may be possible to extend the services east or west into the proposed development. Similarly the underground servicing on Alexandra Way will allow for connections east into the proposed cul-de-sac. The lots at the north end of the site will be serviced off of Sleepy Hollow Road utilities.

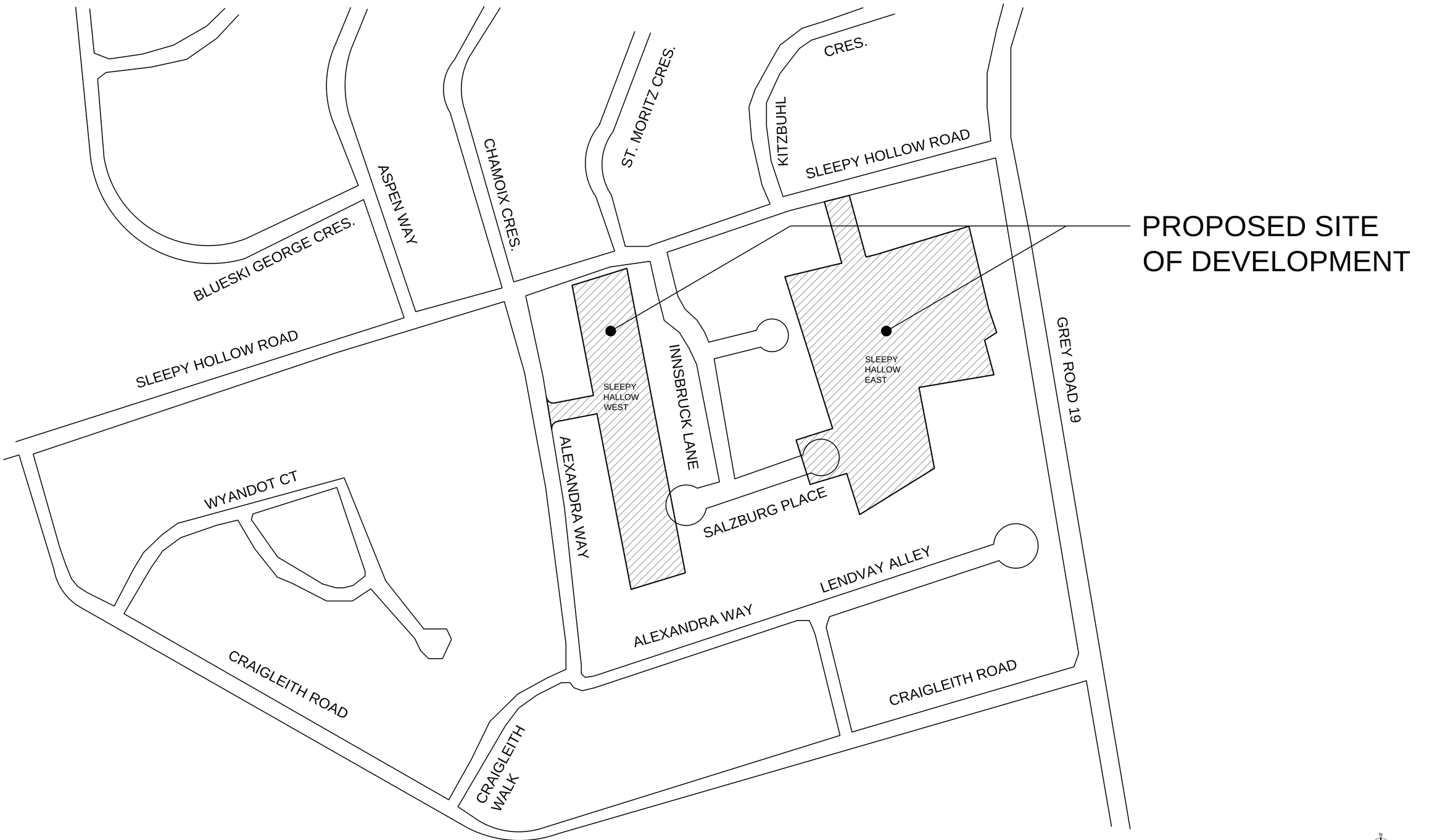
9.0 Conclusions

This Functional Servicing and Stormwater Management Report has demonstrated how SHD West can be serviced. Additionally the report has shown how SHD East will be affected by SHD West, and addresses some comments from the SHD East FSR. The findings are summarized below:

- The site will be serviced in accordance with the Town of the Blue Mountains, GSCA and MOE design criteria.
- The proposed residential development can be developed using connections to municipal sanitary and water services.
- The recommended sanitary sewer discharge point is to Salzburg Place, Alexandra Way and Sleepy Hollow Road.
- Connections to municipal watermains are recommended to be to Salzburg Place, Alexandra Way, and Sleepy Hollow Road.

- The site can be graded to be compatible with adjacent lands and boundary roads, and will provide emergency overland flow routes.
- Stormwater quality and quantity control will be achieved through an enhanced grass swale.
- Any traffic issues to SHD East will be eliminated by providing an intersection less than 250 m from the development.
- A viable solution for SHD East water supply has been provided with the Salzburg Place connection.
- Sanitary sewage from SHD East can still be accommodated in the Alpine Hill existing sewers.

Figures



BURNSIDE	Figure Title: **Sleepy Hollow Developments** KEY PLAN		
Client: **SLEEPY HOLLOW DEVELOPMENTS INC.**	Drawn: KAG	Checked: PCC	Date: 14/05/30
	Scale: NTS	Project No.: 300035191	Figure No.: **FIG1**

LIMIT OF SLEEPY HOLLOW WEST DEVELOPMENT

SLEEPY HOLLOW ROAD

LIMIT OF SLEEPY HOLLOW EAST DEVELOPMENT

ADDITIONAL LANDS OWNED BY DEVELOPER

ALEXANDRA WAY

BLOCK 52

DOLOMITE COURT

INNSBRUCK LANE

SALZBURG PLACE

BM 1 ELEV 195.403m
TOP OF HYDRANT #220 AT THE SOUTHWEST CORNER OF GREY ROAD #19 AND SLEEPY HOLLOW ROAD.

BM 5 ELEV 216.268m
TOP OF THE SOUTHEAST CORNER OF A STONE SLAB BASE AT THE SOUTHEAST CORNER OF THE GAZEBO AT THE SOUTHWEST CORNER OF THE POND.

BM 6 ELEV 219.538m
TOP OF HYDRANT # 216 AT THE NORTHEAST CORNER OF THE SALZBURG PLACE CUL DE SAC, EAST OF D/W # 119.

FD BM ELEV 206.952m
NAIL AND WASHERS IN WEST FACE OF 50 km/h SIGN NORTH OF D/W #7869573 ON EAST SIDE OF COUNTY ROAD #19.

SET BM ELEV 207.928m
TOP OF HYDRANT #219 AT THE SOUTHSIDE OF D/W #796574 ON THE WEST SIDE OF COUNTY ROAD #19.

GREY COUNTY ROAD #19 (ORIGINAL ROAD ALLOWANCE CONCESSIONS 2 AND 1)

0 10 20 40 60
Metres

BURNSIDE

Figure Title
Sleepy Hollow Developments
EXISTING CONDITIONS SITE PLAN

Client
SLEEPY HOLLOW DEVELOPMENTS INC.

Drawn	Checked	Date	Figure No.
KAG	PCC	14/05/30	**FIG2**
Scale		Project No.	
1:750		300035191	

SLEEPY HOLLOW ROAD

ALEXANDRA WAY

INNSBRUCK LANE

GREY ROAD 19

SALZBURG PLACE

BLOCK 52

BLOCK 10

EXISTING REAR YARD SWALES TO BE MAINTAINED TO AVOID GRADING IN ADJACENT PROPERTY (TYP.)

MATCH INTO EXISTING EDGE OF PAVEMENT GRADE OF ALEXANDRA WAY

ENHANCED SWALE DETAILS TO BE CONFIRMED DURING DETAILED DESIGN

DROPPED CURB AT OVERLAND SPILL POINT. TO BE CONFIRMED DURING DETAILED DESIGN.

6.00m

6.0m DRAINAGE EASEMENT

MATCH INTO EXISTING GRADE OF SALZBURG PLACE WITH PAVEMENT LAP JOINT

DROPPED CURB AT OVERLAND SPILL POINT. TO BE CONFIRMED DURING DETAILED DESIGN.

TEMPORARY CUL-DE-SAC ASPHALT AND CURB AND GUTTER TO BE REMOVED

MATCH INTO EXISTING GRADE OF ROAD

EXTEND CONCRETE CURB AND GUTTER TANGENTIALLY FROM EXISTING

CURB AND GUTTER TO BE EXTENDED THROUGH CUL-DE-SAC TANGENTIALLY FROM EXISTING

TEMPORARY CUL-DE-SAC ASPHALT AND CURB AND GUTTER TO BE REMOVED

GRADING AROUND EXISTING ASPHALT WALKWAY TO BE COMPLETED DURING DETAILED DESIGN

WALKWAT CONNECTION TO BE COMPLETED AS PER TOWN OF BLUE MOUNTAINS ENGINEERING STANDARDS

MATCH 3:1 SLOPING INTO EXISTING GRADE

BM 6 ELEV 219.539m
TOP OF HYDRANT # 216 AT THE NORTHEAST CORNER OF THE SALZBURG PLACE CUL DE SAC, EAST OF D/W # 119.

DRIVEWAY LOCATION, CULVERT INSTALLATION/RELOCATION TO BE COMPLETED DURING DETAILED DESIGN

DETAILED GRADING OF LOT TO BE COMPLETED DURING DETAILED DESIGN

BM 1 ELEV 195.403m
TOP OF HYDRANT #220 AT THE SOUTHWEST CORNER OF GREY ROAD #19 AND SLEEPY HOLLOW ROAD.

BM 5 ELEV 216.268m
TOP OF THE SOUTHEAST CORNER OF A STONE SLAB BASE AT THE SOUTHEAST CORNER OF THE GAZEBO AT THE SOUTHWEST CORNER OF THE POND.

SET BM ELEV 207.928m
TOP OF HYDRANT #219 AT THE SOUTH SIDE OF D/W #796574 ON THE WEST SIDE OF COUNTY ROAD #19.

SET BM ELEV 206.952m
NAIL AND WASHERS IN WEST FACE OF 50 Km/h SIGN NORTH OF D/W #796573 ON EAST SIDE OF COUNTY ROAD #19.

REAR YARD SWALE TO OUTLET INTO EXISTING SWALE

DETAILED GRADING OF LOT TO BE COMPLETED DURING DETAILED DESIGN

OPEN SPACE AREA

MATCH REAR LOT GRADES INTO EXISTING (TYP.)

6.00m DRAINAGE EASEMENT

NOTE:
GRADING OF SALZBURG PLACE CUL-DE-SAC TO BE CONFIRMED DURING DETAILED DESIGN TO PROVIDE A POSITIVE OUTLET FOR STORM AND SANITARY SEWER.

LEGEND

- SWALE
- 3:1 SLOPING (MAXIMUM)
- 184.90 SWALE/GUTTER GRADE
- 184.90 PROPOSED GRADE
- 184.90 EXISTING GRADE
- PROPOSED OVERLAND FLOW ROUTE
- 222.22 FIRST FLOOR ELEVATION

0 10 20 40 60
Metres

BURNSIDE

Figure Title: **Sleepy Hollow Developments**
GRADING PLAN

Client: **SLEEPY HOLLOW DEVELOPMENTS INC.**

Drawn	Checked	Date	Figure No.
KAG	PCC	14/05/30	**FIG3**
Scale: 1:750		Project No.: 300035191	

SLEEPY HOLLOW ROAD

BREAK INTO EXISTING 1200mm DIA. STORM SEWER AND INSTALL 300mm DIA. LEAD FROM DICB1
INV = 216.36

DICB1

9.9m - 300mm STM @ 5.00%

LOTS TO BE SERVICED FROM EXISTING WATERMAIN AND SEWER LOCATED ON SLEEPY HOLLOW ROAD

ENHANCED SWALE TO CONVEY STORMWATER TOWARDS SLEEPY HOLLOW ROAD DICB, DETAILS TO BE CONFIRMED DURING DETAILED DESIGN

REMOVE PLUG AND TIE IN PROPOSED 150mmØ WATERMAIN

BLOCK 52

ALEXANDRA WAY

22.5m - 300mm STM @ 0.30%

MH 5A
(120Ø)
OPSD 701.010
TOP=221.96
DEPTH TO SUMP=2.5
W INV=219.80

HYD

150mm DIA. WATERMAIN

70.3m - 200mm SAN @ 0.57%

HEADWALL OUTLET TO CHANNEL
INV = 220.27

HDWL4

6.0m DRAINAGE EASEMENT

REMOVE SANITARY CAP, AND TIE IN PROPOSED 200mmØ SAN
INV = 219.40

CBMH9
(1200Ø)
OPSD 701.010
TOP=222.09
DEPTH TO SUMP=1.7
E INV=220.65

DCBMH10
(1800Ø)
OPSD 701.010
TOP=221.75
DEPTH TO SUMP=1.7
W INV=220.37
E INV=220.34

28.2m - 300mm STM @ 1.00%

6.00m

6.0m DRAINAGE EASEMENT

HEADWALL OUTLET TO CHANNEL
INV = 221.12

REMOVE PLUG AND TIE IN PROPOSED 150mmØ WATERMAIN

MH 3A
(1050Ø)
OPSD 701.010
TOP=223.98
DEPTH TO SUMP=3.8
E INV=220.47

CBMH8
(1050Ø)
OPSD 701.010
TOP=222.62
DEPTH TO SUMP=1.8
S INV=221.15
N INV=221.15

11.5m - 300mm STM @ 0.30%

8.5m - 300mm STM @ 0.30%

REMOVE PLUG AND TIE IN PROPOSED 150mmØ WATERMAIN

HDWL3

SALZBURG PLACE

150mm DIA. WATERMAIN

56.7m - 200mm SAN @ 1.06%

53.5m - 300mm STM @ 0.30%

EX. 21.8m - 200mm SAN @ 0.41%

EX. MH6A

EX. MH7A

EX. 107.9m - 200mm SAN @ 0.41%

MH 4A
(1200Ø)
OPSD 701.010
TOP=222.61
DEPTH TO SUMP=3.6
W INV=218.34
E INV=219.31

CBMH6
(1200Ø)
OPSD 701.010
TOP=223.90
DEPTH TO SUMP=2.9
E INV=221.34

REMOVE SANITARY CAP, INSTALL MANHOLE, AND CONNECT EXISTING AND PROPOSED SANITARY.

DCBMH7
(1800Ø)
OPSD 701.010
TOP=222.62
DEPTH TO SUMP=1.7
W INV=221.18
N INV=221.18

EX. 72.6m - 200mm SAN @ 0.70%

INNSBRUCK LANE

BLOCK 10

LOTS 1-7 TO HAVE INDIVIDUAL SEWAGE GRINDER PUMPS TO LOW PRESSURE FORCEMAIN

ENHANCED SWALE TO CONVEY STORMWATER TOWARDS SLEEPY HOLLOW ROAD DICB, DETAILS TO BE CONFIRMED DURING DETAILED DESIGN

ADDITIONAL LANDS OWNED BY DEVELOPER

LOT TO BE SERVICED FROM EXISTING WATERMAIN AND SANITARY SEWER LOCATED ON SLEEPY HOLLOW ROAD

200mmØ WATERMAIN

50mm - 78.2m SANITARY FORCEMAIN

HYD.

DCB1

12.2m - 450mm STM @ 0.50%

HDWL 2

MH1A

MH2

CBMH5

53.4m - 300mm STM @ 0.50%

EX. CBMH8

37.7m - 375mm STM @ 1.19%

6.0m DRAINAGE EASEMENT

6.00m

EX. SWALE TO BE ADJUSTED TO LIE WITHIN 6.0m SWALE

NOTE:
SERVICING ARRANGEMENT OPTIONS FOR SALZBURG PLACE CUL-DE-SAC TO BE CONFIRMED DURING DETAILED DESIGN TO PROVIDE SUITABLE OUTLET FOR STORM AND SANITARY SEWER

LEGEND

- SANITARY MANHOLE
- STORM MANHOLE
- STORM CATCHBASIN (ROADSIDE, DITCH INLET & REAR LOT)
- STORM DOUBLE CATCHBASIN
- FIRE HYDRANT
- 19mmØ SERIES 160 PE WATER SERVICE c/w CURB STOP AND TEST FITTING
- 125mmØ PVC SDR28 SANITARY SERVICE
- 100mmØ PVC SDR28 STORM SERVICE
- ASPHALT DRIVEWAY c/w DROP CURB
- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER

0 10 20 40 60
Metres

BURNSIDE

Figure Title
Sleepy Hollow Developments
SERVICING PLAN

Client
SLEEPY HOLLOW DEVELOPMENTS INC.

Drawn	Checked	Date	Figure No.
KAG	PCC	14/05/30	**FIG4**
Scale		Project No.	
1:750		300035191	

File Name: 300191-Post SUBMISSION.dwg Date/Time: June 2, 2014 - 5:17 PM

SLEEPY HOLLOW ROAD

ALEXANDRA WAY

DOLOMITE COURT

INNISBRUCK LANE

SALZBURG PLACE

GREY COUNTY ROAD #19

BLOCK 52

BLOCK 10

ADDITIONAL LANDS OWNED BY DEVELOPER

RESIDENTIAL LOTS

ASPHALT TENNIS COURT

POND

CONCESSION 3

LEGEND

- OPTION 1 & 5; SERVICING FROM SALZBURG PLACE
- OPTION 2; SERVICING FROM DOLOMITE COURT
- OPTION 3; SERVICING FROM SLEEPY HOLLOW ROAD
- OPTION 4; SERVICING FROM ALEXANDRA WAY
- OPTION 5; SERVICING FROM SALZBURG PLACE
- OPTION 2 & 3
- ALL OPTIONS

0 10 20 40 60

Metres

BURNSIDE

Figure Title

Sleepy Hollow Developments

WATER DISTRIBUTION PLAN

Client

SLEEPY HOLLOW DEVELOPMENTS INC.

Drawn	Checked	Date	Figure No.
KAG	PCC	14/05/30	**FIG5**
Scale		Project No.	
1:750		300035191	

SLEEPY HOLLOW ROAD

ALEXANDRA WAY

INNSBRUCK LANE

SALZBURG PLACE

BLOCK 52

EX. RESIDENCE 166, SLEEPY HOLLOW ROAD

ADDITIONAL LANDS OWNED BY DEVELOPER

NEW GARDEN BED WITH REDAWN PLANK BORDER

POND OUTLET 450mmØ PIPE

WOOD DOCK

POND OVERFLOW MH UNDER DOCK

ASPHALT TENNIS COURT

POND

SWAMP AREA

STONE STYN AREA

SANDY BEACH AREA

TOP PRISMA-AIR WITH PUMP INSIDE

STY GAZEBO

SHED PUMPHOUSE

HSE #116 FF 210.05

SHED

RED MULBERRY BUSH 1

RED MULBERRY BUSH 4-5

RESIDENTIAL LOTS

SIDEWALK

BERM

PONDING AREA

EX. VCB TOP = 215.29 N INV = 213.99

EX. STM DMH

EX. STM MH

EX. 375mmØ STM

EX. 200mmØ WM

EX. 200mmØ SAN

EX. 1200mmØ STM

EX. 250mmØ STM

EX. 50mmØ SAN F/M

EX. 38mmØ SAN F/M

EX. HYD

SAN MH TOP 208.47 N INV 207.74 (200Ø SAN) E INV 207.29 (35m F/M PVC PE)

SAN MH TOP 219.14 W INV 216.69 N INV 216.76 S INV 216.76

STM MH TOP 211.37 CONC INV 208.02s (PIPE O/S TO NORTH)

DICB INLET SLEEVE TOP 214.74 N INV 209.97 (100Ø)

CB TOP 213.71 S INV 210.06

1200 x 1650Ø CSPA N INV 205.81 E INV 206.55

1200 x 1800 CSPA N INV 205.49 S INV 206.07

S INV 100Ø PE 207.40

MHCB TOP 219.40 sW INV 218.33 ± sE INV 218.00 ±

300Ø CSP N INV 218.23 S INV 218.34

CONC INFT MHCB OUTLET E INV 217.95 (300Ø PVC)

200mmØ WM PLUG

50Ø PVC SIGN

RIDGE STONE

RED MULBERRY BUSH 1

RESIDENTIAL LOTS

PART 1, 16R-2612

PART 12, 16R-2315

PART 13, 16R-2315

PART 1, 16R-2052

PART 2, 16R-2052

PART 1, 16R-1111

PART 2, 16R-1111

PART 3, 16R-1111

PART 3, 16R-943

PART 1, 16R-3600

LOT 17

LOT 16

LOT 4

LOT 3

LOT 2

LOT 23

LOT 22

LOT 21

LOT 16

LOT 15

LOT 13

LOT 14

BLOCK 31

BLOCK 30

BLOCK 32

BLOCK 21

BLOCK 25

REGISTERED PLAN 822

RLP. 1119

101 / 0.70

102 / 1.86

103 / 1.13

104 / 2.00

LEGEND

- 101 / 0.70 — CATCHMENT I.D. / CATCHMENT AREA (ha)
- OVERLAND FLOW ROUTE
- LIMIT OF DRAINAGE BOUNDARY

0 10 20 40 60 Metres

BURNSIDE

Figure Title

Sleepy Hollow Developments

PRE-DEVELOPMENT DRAINAGE PLAN

Client

SLEEPY HOLLOW DEVELOPMENTS INC.

Drawn	Checked	Date	Figure No.
KAG	PCC	14/05/30	**FIG6**
Scale		Project No.	
1:750		300035191	

SLEEPY HOLLOW ROAD

9.9m - 300mm STM @ 5.00%

EX. HYD

EX. 200mmØ WM

EX. 200mmØ SAN

EX. 1200mmØ STM

CB1

206
2.00

1

2

3

4

BLOCK 52

EX. HYD

28.2m - 300mm STM @ 1.00%

EX. 55.0m - 300mmØ STM

CBMH9

DCBMH10

HDWL4

22.5m - 300mm STM @ 0.30%

ALEXANDRA WAY

EX. 189.0m - 150mmØ WM

EX. 41.5m - 200mmØ SAN

EX. 47.6m - 900mmØ STM

EX. 49.7m - 900mmØ STM

EX. 62.0m - 200mmØ SAN

EX. 130.0m - 150mmØ WM

EX. 110.6m - 200mmØ SAN

EX. 44.3m - 450mmØ STM

EX. 21.0m - 900mmØ STM

EX. 137.0m - 900mmØ STM

EX. 69.0m - 150mmØ WM

EX. 59.0m - 300mmØ STM

EX. 60.0m - 200mmØ SAN

EX. 59.4m - 450mmØ STM

6

5

7

8

9

10

DWL3

CBMH8

CBMH6

53.5m - 300mm STM @ 0.30%

CBMH7

11.5m - 300mm STM @ 0.30%

8.5m - 300mm STM @ 0.30%

EX. HYD

EX. 50.7m - 150mmØ WM

EX. 38.2m - 200mmØ SAN

EX. 54.4m - 300mmØ STM

EX. 107.7m - 200mmØ SAN

EX. 50.7m - 300mmØ STM

INNSBRUCK LANE

EX. 15.0m - 200mmØ WM

EX. 99.5m - 200mmØ SAN

EX. 46.0m - 375mmØ STM

EX. 9.3m - 375mmØ STM

EX. 36.5m - 200mmØ SAN

EX. 59.6m - 300mmØ STM

EX. 60.0m - 300mmØ STM

EX. 124.5m - 200mmØ WM

EX. 44.1m - 200mmØ SAN

SALZBURG PLACE

37.7m - 375mm STM @ 1.19%

TOP 218.00
sW INV 218.33 ±
sE INV 218.00 ±

EX. CBMH8

EX. 126.5m - 200mmØ WM

EX. 200mmØ SAN

EX. 38.5m - 300mmØ STM

CBMH5

HDWL 2
300mmØ
STM

12.2m - 450mm STM @ 0.50%

58.4m - 300mm STM @ 0.50%

MH2

204
0.47

205
0.29

SALZBURG PLACE

BLOCK 31

BLOCK 30

BLOCK 32

SAN MH
TOP 218.14
W INV 216.69
N INV 216.76
S INV 216.76

300D CSP
N INV 218.27
S INV 218.34

SIDEWALK

ASPHALT WALKWAY BLOCK 27

LOT 15

LOT 14

LOT 16

LOT 17

LOT 18

LOT 23

LOT 22

LOT 21

R.P. 1119

BLOCK 28

BLOCK 21

EX. STM DMH

EX. STM MH

EX. 2130x1400 CSPA

EX. 1385x1400 CSPA

PART 3, 16R-943

PART 1, 16R-3600

WALKWAY BLOCK, R.P. 16R-11

SAN MH
TOP 218.15
N INV 206.75
W INV 206.68
S INV 206.58

EX. HYD

EX. 200mmØ WM

EX. 200mmØ SAN

EX. 1200mmØ STM

EX. 250mmØ STM

EX. 200mmØ WM

EX. 50mmØ SAN F/M

EX. 38mmØ SAN F/M

50L SIGN

WM PLUG

SAN FLUSH

SIGN

RESIDENTIAL LOTS

5000 PVC

CB

SAN MH
TOP 211.51
N INV 206.75
W INV 206.68
S INV 206.58

DOM INLET ELEV. 217.74
N INV 209.50DR

STM MH
TOP 211.37
x C/L MH INV 208.02±
(PIPE N/S TO NORTH)

S INV 100D PE 207.63

1200 x 1800 CSPA
N INV 206.43
S INV 206.03

PART 1, 16R-2612

PART 12, 16R-2315

PART 3, 16R-2315

PART 1, 16R-2052

PART 2, 16R-2052

PART 1, 16R-1117

PART 2, 16R-1111

PART 3, 16R-1117

8

SHED

HSE
#116
FF
210.05

EXISTING PIPE FLOW TO SLEEPY HOLLOW ROAD (ASSUMED)

RESIDENTIAL LOTS

SAN MH
TOP 217.95

CBMH
TOP 200.38

DITCH

SW INV 193.79

CBMH
TOP 199.58
N/W INV 191.55
S INV 192.80
W INV 192.77

SAN MH
TOP 199.09

CBMH
TOP 200.09

CBMH
TOP 200.03

SAN MH
TOP 200.15

SAN MH
TOP 200.07

N INV 190.84

N/W INV 189.84

RED MULBERRY BUSH 1

RED MULBERRY BUSH 2-3

RED MULBERRY BUSH 4-5

RESIDENTIAL LOTS

PART 1, 16R-10074

BLOCK 10

WOOD DOCK

POND OVERFLOW MH UNDER DOCK
SEE DETAIL

POND OVERFLOW MH
SEE DETAIL

NAT'L GRADE 89.62

NEW GARDEN WITH CEDAR MULCH

FIELDSTONE STEPS

POND OUTLET PIPE
(NO SIZE)

SHED PUMPHOUSE

201
0.35

202
2.25

203
0.33

7

LOT 21

POND

CONCESSION 3

ASPHALT TENNIS COURT

MAJOR SYSTEM OVERLAND SPILLWAY

SWAMP AREA

SWAMP AREA

SANDY BEACH AREA

SANDY BEACH AREA

PRE-CAST MH WITH FLOW VALVE

STY GAZEBO

SWALE

SWALE

1200 x 1500 CSPA
N INV 206.94
S INV 206.83

RESIDENTIAL LOTS

RESIDENTIAL LOTS

CONCESSION 2 AND 3

(ORCHARD ROAD)

LEGEND

101
0.70
CATCHMENT I.D.
CATCHMENT AREA (ha)

OVERLAND FLOW ROUTE

LIMIT OF DRAINAGE BOUNDARY

N

0 10 20 40 60
Metres

BURNSIDE

Figure Title

Sleepy Hollow Developments

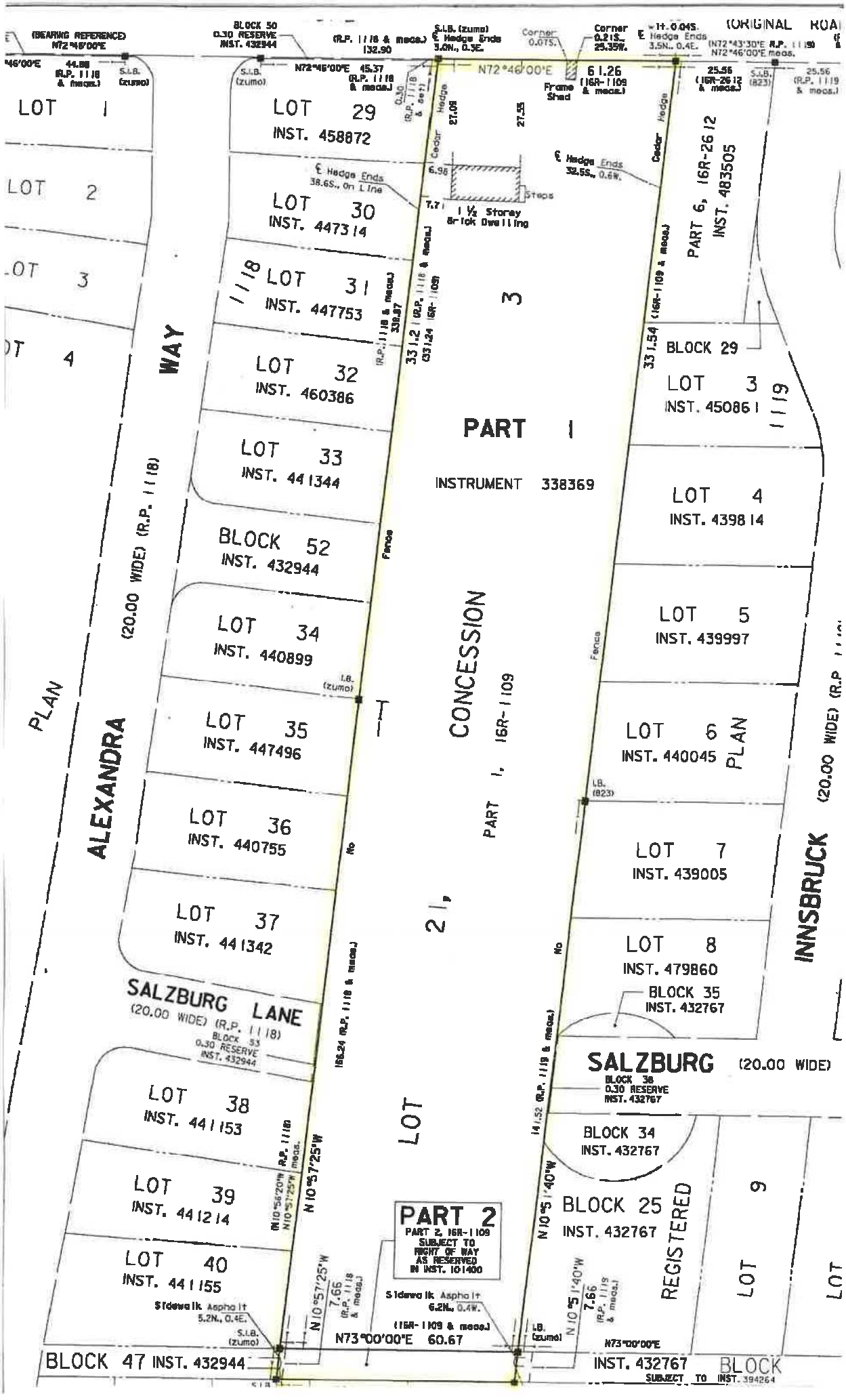
POST-DEVELOPMENT DRAINAGE PLAN

Client

SLEEPY HOLLOW DEVELOPMENTS INC.

Drawn	Checked	Date	Figure-No.
KAG	PCC	14/05/30	**FIG7**
Scale		Project No.	
1:750		300035191	

Appendix A
Legal Survey


(BEARING REFERENCE) N72°46'00"E
BLOCK 50 0.30 RESERVE INST. 432944
(R.P. 1118 & meas.) 132.90
S.I.B. (zumo) & Hedge Ends 3.0N., 0.3E.
Corner 0.0TS.
Corner 0.2IS., 25.35W.
Hedge Ends 3.5N., 0.4E.
(ORIGINAL ROAD ALLOWANCE BETWEEN CONCESSION 1 & 2)
(N72°43'30"E R.P. 1119 N72°46'00"E meas.)
44.88 (R.P. 1118 & meas.)
S.I.B. (zumo)
N72°46'00"E 45.37 (R.P. 1118 & meas.)
S.I.B. (zumo)
N72°46'00"E 61.26 (16R-1109 & meas.)
Frame Shed
25.56 (16R-2612 & meas.)
S.I.B. (823)
25.56 (R.P. 1119 & meas.)
LOT 1
LOT 29 INST. 458872
0.30 (R.P. 1118 & set)
Cedar Hedge
21.09
27.55
LOT 2
Hedge Ends 38.6S., On Line
LOT 30 INST. 447314
6.98
7.7
Steps
1½ Storey Brick Dwelling
Hedge Ends 32.5S., 0.6W.
PART 6, 16R-2612 INST. 483505
LOT 3
LOT 31 INST. 447753
1118
(R.P. 1118 & meas.) 339.87
331.24 (R.P. 1118 & meas.) (16R-1109)
331.54 (16R-1109 & meas.)
BLOCK 29
LOT 4
LOT 32 INST. 460386
PART 1
INSTRUMENT 338369
LOT 3 INST. 450861
1119
LOT 33 INST. 441344
LOT 4 INST. 439814
BLOCK 52 INST. 432944
Fence
LOT 5 INST. 439997
LOT 34 INST. 440899
I.B. (zumo)
CONCESSION
PART 1, 16R-1109
Fence
LOT 35 INST. 447496
LOT 6 INST. 440045
PLAN
I.B. (823)
ALEXANDRA
(20.00 WIDE) (R.P. 1118)
PLAN
LOT 36 INST. 440755
No
LOT 7 INST. 439005
INNSBRUCK
(20.00 WIDE) (R.P.
LOT 37 INST. 441342
21
No
LOT 8 INST. 479860
BLOCK 35 INST. 432767
SALZBURG LANE
(20.00 WIDE) (R.P. 1118)
BLOCK 33 0.30 RESERVE INST. 432944
186.24 (R.P. 1118 & meas.)
SALZBURG (20.00 WIDE)
BLOCK 36 0.30 RESERVE INST. 432767
LOT 38 INST. 441153
LOT
141.52 (R.P. 1118 & meas.)
BLOCK 34 INST. 432767
N10°56'20"W N10°57'25"W meas.
N10°57'25"W
LOT 39 INST. 441214
PART 2
PART 2, 16R-1109 SUBJECT TO RIGHT OF WAY AS RESERVED IN INST. 101400
N10°51'40"W
BLOCK 25 INST. 432767
REGISTERED
LOT 9
LOT
LOT 40 INST. 441155
Sidewalk Asphalt 5.2N., 0.4E.
S.I.B. (zumo)
N10°57'25"W 7.66 (R.P. 1118 & meas.)
Sidewalk Asphalt 6.2N., 0.4W.
(16R-1109 & meas.)
N73°00'00"E 60.67
I.B. (zumo)
N10°51'40"W 7.66 (R.P. 1119 & meas.)
N73°00'00"E
BLOCK 47 INST. 432944
INST. 432767 BLOCK
SUBJECT TO INST. 394264

Appendix B
Stormwater Design Calculations

STORM SEWER DESIGN SHEET: (5 Year Storm)

Existing

144 Sleepy Hollow, Town of The Blue Mountains

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

Project #: 300035191.0
Date: 26-Mar-14
Designed: MLZ
Checked: PCC

Min. Diameter = 300 mm
Mannings 'n'= 0.009
Starting Tc = 15 min
Factor of Safety = 0 %

Rainfall Intensity = $\frac{A}{(Tc+B)^{c}}$ *where Tc is in minutes*

A = 1234.576
B = 8.297 *(5 Yr)*
C = 0.851

NOMINAL PIPE SIZE USED

DESCRIPTION	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
Innsbruck Lane	CBMH5	CBMH4	0.48	0.37	0.18	0.18	84.7	0.042			0.042	60.0	1.30	300	0.159	2.25	15.00	0.44	15.44	26%
Innsbruck Lane	CBMH4	CBMH3	0.96	0.35	0.34	0.51	83.4	0.119			0.119	58.0	0.80	300	0.125	1.77	15.44	0.55	15.99	95%
Innsbruck Lane	CBMH3	CBMH2	0.61	0.34	0.21	0.72	81.8	0.164			0.164	52.7	0.80	300	0.125	1.77	15.99	0.50	16.49	131%
Innsbruck Lane	CBMH2	CBMH1	0.91	0.36	0.33	1.05	80.4	0.234			0.234	46.9	0.60	375	0.196	1.78	16.49	0.44	16.93	119%
Innsbruck Lane	CBMH1	STM3	0.14	0.50	0.07	1.12	79.2	0.246			0.246	9.3	0.60	375	0.196	1.78	16.93	0.09	17.02	125%
Salzburg Place	CBMH6	CBMH7	0.87	0.39	0.34	0.34	84.7	0.080			0.080	55.4	2.00	300	0.198	2.79	15.00	0.33	15.33	40%
Salzburg Place	CBMH7	CBMH8	0.46	0.48	0.22	0.56	83.7	0.130			0.130	50.7	0.60	300	0.108	1.53	15.33	0.55	15.88	120%
Salzburg Place	CBMH8	New MH	0.54	0.44	0.24	0.80	82.1	0.182			0.182	39.5	1.14	375	0.270	2.45	15.88	0.27	16.15	67%
Salzburg Place	New MH	New HW	0.19	0.50	0.10	0.89	81.3	0.202			0.202	12.2	0.50	450	0.291	1.83	16.15	0.11	16.26	69%

Project : 144 Sleepy Hollow
Project No. : 300035191
Municipality : Blue Mountains
Designer : MLZ
Checked By : PCC
Date : 28-Mar-2014
Updated : 21-May-2014

Q = 2.78 Ca x C x I x A (Rational Method Formula)
Q Peak flow in litres per second (L/s)
Ca Antecedent precipitation factor
(for storm events greater than the 5-year storm)
A Area (ha)
I Rainfall intensity (mm/hr)
C Runoff coefficient

CATCHMENT **Site**

Rational Method			
Area (ha)	A =	**2.06**	
Runoff Coefficient	$C_{2,5}$ =	**0.25**	
	C_{10} =	**0.40**	$C_{10} = (0.8 \times C_5) + 0.2$
	C_{25} =	**0.48**	$C_{25} = (0.7 \times C_5) + 0.3$
	C_{50} =	**0.55**	$C_{50} = (0.6 \times C_5) + 0.4$
	C_{100} =	**0.63**	$C_{100} = (0.5 \times C_5) + 0.5$
Time of Concentration (min)	T_C =	**15.00**	

Chicago Storm Distribution
(IDF Curves defined by A,B Coefficients)

	2 Year		5 Year		10 Year		25 Year		50 Year		100 Year	
	A =	**22.3**	A =	**29.1**	A =	**33.6**	A =	**39.3**	A =	**43.5**	A =	**47.7**
	B =	**-0.714**	B =	**-0.724**	B =	**-0.729**	B =	**-0.734**	B =	**-0.736**	B =	**-0.738**
Rainfall Intensity (mm/hr) =		60.00		79.39		92.31		108.72		120.67		132.69
Peak Runoff (L/s) =		**85.9**		**113.7**		**211.5**		**295.7**		**380.1**		**474.9**
Peak Runoff (m3/s) =		**0.1**		**0.1**		**0.2**		**0.3**		**0.4**		**0.5**
Peak Runoff (L/s/ha) =		41.7		55.2		102.6		143.6		184.5		230.5

<< Elements requiring Input Information

Project : 144 Sleepy Hollow
Project No. : 300035191
Municipality : Blue Mountains
Designer : MLZ
Checked By : PCC
Date : 28-Mar-2014
Updated : 21-May-2014

Q = 2.78 Ca x C x I x A (Rational Method Formula)
Q Peak flow in litres per second (L/s)
Ca Antecedent precipitation factor
(for storm events greater than the 5-year storm)
A Area (ha)
I Rainfall intensity (mm/hr)
C Runoff coefficient

CATCHMENT **Site**

Rational Method			
Area (ha)	A =	**2.06**	
Runoff Coefficient	$C_{2,5}$ =	**0.45**	
	C_{10} =	**0.56**	$C_{10} = (0.8 \times C_5) + 0.2$
	C_{25} =	**0.62**	$C_{25} = (0.7 \times C_5) + 0.3$
	C_{50} =	**0.67**	$C_{50} = (0.6 \times C_5) + 0.4$
	C_{100} =	**0.73**	$C_{100} = (0.5 \times C_5) + 0.5$
Time of Concentration (min)	T_C =	**15.00**	

Chicago Storm Distribution
(IDF Curves defined by A,B Coefficients)

	2 Year		5 Year		10 Year		25 Year		50 Year		100 Year	
	A =	**22.3**	A =	**29.1**	A =	**33.6**	A =	**39.3**	A =	**43.5**	A =	**47.7**
	B =	**-0.714**	B =	**-0.724**	B =	**-0.729**	B =	**-0.734**	B =	**-0.736**	B =	**-0.738**
Rainfall Intensity (mm/hr) =		60.00		79.39		92.31		108.72		120.67		132.69
Peak Runoff (L/s) =		**154.6**		**204.6**		**296.0**		**382.9**		**463.0**		**550.9**
Peak Runoff (m3/s) =		**0.2**		**0.2**		**0.3**		**0.4**		**0.5**		**0.6**
Peak Runoff (L/s/ha) =		75.1		99.3		143.7		185.9		224.8		267.4

<< Elements requiring Input Information

Appendix C
Sanitary Sewer Design Calculations

SANITARY SEWER DESIGN SHEET

Sleepy Hollow Developments, Town of the Blue Mountains

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

Project #: 300035191
Date: 26-May-14
Designed: MLZ
Checked: PCC

Min Diameter = 200 mm
Mannings 'n'= 0.009
Min. Velocity = 0.75 m/s
Max. Velocity = 3.00 m/s

Avg. Domestic Flow = 450.0 l/c/d
Infiltration = 0.230 l/s/ha
Max. Peaking Factor = 4.50
Min. Peaking Factor= 2.00

Factor of Safety = 10 %

NOMINAL PIPE SIZE USED

DESCRIPTION	FROM MH	TO MH	RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS							PIPE DATA					
			AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENISTY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	POP. FLOW (l/s)	CONSTANT COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
Salzburg Place	EX MH1A	EX 7	2.94	2.94	17		2.3	40	40							0.7	40	4.33	0.9			1.6	0.40	200	30.0	0.95	0.50	5%
Salzburg Place	MH3A	MH4A	0.82	0.82	4		2.3	10	10							0.2	10	4.41	0.2			0.4	2.00	200	67.0	2.13	0.59	1%
Salzburg Place	MH4A	EX 6	0.38	1.20	6		2.3	14	24							0.3	24	4.37	0.5			0.8	0.42	200	30.7	0.98	0.42	3%
Salzburg Place	EX 6	EX 7	3.01	4.21	20		2.3	46	70							1.0	70	4.28	1.6			2.5	0.40	200	30.0	0.95	0.58	8%
Innsbruck Lane	EX 7	EX 5	0.43	7.58	2		2.3	5	115							1.7	115	4.23	2.5			4.3	0.40	200	30.0	0.95	0.68	14%
Innsbruck Lane	EX 5	EX 3	0.43	8.01	2		2.3	5	120							1.8	120	4.22	2.6			4.5	0.60	200	36.7	1.17	0.79	12%
Dolomite Court	EX 4	EX 3	1.30	1.30	7		2.3	17	17							0.3	17	4.39	0.4			0.7	0.40	200	30.0	0.95	0.39	2%
Innsbruck Lane	EX 3	EX 2	0.22	9.53	1		2.3	3	140							2.2	140	4.20	3.1			5.3	0.40	200	30.0	0.95	0.72	18%
Innsbruck Lane	EX 2	EX 1	0.22	9.75	1		2.3	3	143							2.2	143	4.20	3.1			5.4	0.40	200	30.0	0.95	0.72	18%
Innsbruck Lane	EX 1	SHMH4	0.27	10.02	1		2.3	3	146							2.3	146	4.19	3.2			5.5	0.50	200	33.5	1.07	0.79	16%
Alexandra Way	CM PLUG	CMMH6			72		2.3	166	166								166	4.18	3.6			3.6	1.00	200	47.4	1.51	0.89	8%
Alexandra Way	CMMH6	CMMH5	0.76	0.76	4		2.3	10	176							0.2	176	4.17	3.8			4.0	1.65	200	60.9	1.94	1.09	7%
Alexandra Way	CMMH5	CMMH4	1.15	1.91	7		2.3	17	193							0.4	193	4.15	4.2			4.6	1.25	200	53.0	1.69	1.04	9%
Alexandra Way	CMMH4	CMMH3	1.64	3.55	9		2.3	21	214							0.8	214	4.14	4.6			5.4	1.64	200	60.7	1.93	1.20	9%
New Cul-de-Sac (West)	MH5A	CMMH3	0.88	0.88	4		2.3	10	10							0.2	10	4.41	0.2			0.4	0.57	200	35.8	1.14	0.39	1%
Alexandra Way	CMMH3	CMMH2	0.84	5.27	6		2.3	14	238							1.2	238	4.12	5.1			6.3	0.90	200	44.9	1.43	1.01	14%
Alexandra Way	CMMH2	SH PLUG	0.62	5.89	4		2.3	10	248							1.4	248	4.11	5.3			6.7	0.75	200	41.0	1.31	0.96	16%
Alexandra Way	SH PLUG	SHMH2		5.89					248							1.4	248	4.11	5.3			6.7	0.75	200	41.0	1.31	0.96	16%
Sleepy Hollow Road	SHMH2	SHMH3		5.89					248							1.4	248	4.11	5.3			6.7	1.71	200	62.0	1.97	1.29	11%
Sleepy Hollow Road	SHMH3	SHMH4		5.89	1		2.3	3	251							1.4	251	4.11	5.4			6.7	1.76	200	62.9	2.00	1.30	11%

Notes:

The flows from the Sleepy Hollow Road East development will connect to the Alpine Hills sanitary sewers via a low pressure sanitary forcemain, these values incorporate the forcemain flows.

- "EX" denotes an existing Alpine Hills structure
- "CM" denotes an existing Craigleith Meadows structure
- "SH" denotes an existing structure on Sleepy Hollow Road