Appendix 'F'
Updates to Hydraulic Water Model to 2017

JLR No.: 27550-000 August 27, 2018

Technical Memorandum No. 2 –

Town of The Blue Mountains Water Model Updates Report

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Value through Service and Commitment

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Statement of Confidentiality

1.0 INTRODUCTION

The Town of The Blue Mountains (Town) retained J.L. Richards & Associates Limited (JLR) to update their existing Hydraulic Water Model (Model) to reflect current operating conditions in support of the Town-Wide Water Distribution System Master Plan. The original water model was developed and calibrated in 2009 and subsequently updated in 2014.

2.0 WATER MODEL UPDATE

2.1 Summary

The Town's existing WaterCAD Hydraulic Water Model was reviewed and updates were applied in the following areas:

- Water distribution network
- System operation and control
- Water demands

2.2 Water Distribution Network

The updated Model includes new watermains constructed in the following development areas:

- Georgian Ridge Estates (George McRae Road., Maryward Crescent)
- Georgian Woodlands Phase IV – Stage 2 (Arnot Crescent, Courchevel Crescent, Grindelwald Court, Nipissing Crescent, Interlaken Court)
- Windfall Phase 1 & 2A (Crosswinds Boulevard, Snow Apple Crescent, Yellow Birch Crescent)

The Town provided engineering drawings for the above-noted developments that were used to update new watermain lengths, diameters, and road elevations in the Model. For new watermains, the Hazen-Williams friction factors ("C" coefficients) were input into the Model in accordance with *The Blue Mountains Engineering Standards (April 2009)*.

It is recommended that the Town's GIS database be updated to include new watermains constructed in the foregoing development areas.

2.3 System Operations and Controls

The water model controls were reviewed with the Town's Operations Staff on August 2, 2017. From our review and discussion of the Water Treatment Plant (WTP) and remote facilities, the various High Lift Pump (HLP) start and stop set points and reservoir/standpipe/elevated tank operating levels remain valid and reflective of current operations.

Furthermore, the mixing system in the Swiss Meadows standpipe was recently replaced (with a PAX mixing system) to mitigate ice damage concerns from the previous top mounted mixing system. The updated Model is therefore more reflective of regular system operation for the Swiss Meadows standpipe.

Town staff advised that water consumption appears to be becoming more consistent with less seasonal demand fluctuation.

2.4 Water Demands

Domestic water demands were updated in the Model under average day, maximum day, and peak hour demand conditions as summarized in the following table.

Table 1: Domestic Water Demands

Scenario	Demand (L/s)
Average Day	46.5
Maximum Day	105.6
Peak Hour	150.7

Average day demands were updated based on the last five (5) years (2012 to 2016) of available water production records obtained from the Thornbury Water Treatment Plant. For the new development areas (refer to *Water Distribution Network* section), initial average day demands were estimated for constructed units using a population density of 2.3 p/p/u and an average day demand of 450 L/c/d in accordance with *The Blue Mountains Engineering Standards (April 2009).* The estimated average day demands were applied to the nearest junction node in the model.

The average day demand of the highest water users was estimated based on the top 10 highest water users for 2017. The average day high water users demands were applied to the nearest junction node in the model and their demands were removed from the total average day demand. The remaining average day demand was proportionally adjusted for existing/new development areas to match the total average day demand obtained from five (5) years of available water production records.

It is worth noting that water supply in the updated water model remains consistent with the original model. Water is supplied by the Thornbury Water Treatment Plant and does not account for water purchased from the Town of Collingwood under the reported scenarios. As part of the Town-Wide Water Distribution System Master Plan, additional water supply from the Town of Collingwood will be evaluated.

The model's current maximum day demand was reviewed and remains representative of current maximum day demands when compared to the available water production records.

Based on review of available background information and water production data, it appears that the peak hour water demand is estimated to be 150.7 L/s. The existing peak hour demand appears reasonable when compared to the Ministry of the

Environment and Climate Change (MOECC) water design guidelines and has been maintained in the model.

For water distribution systems servicing populations between 3,001 to 10,000 people, the MOECC guidelines recommend an average day to peak hour factor of 3, while the updated model peaking factor is 3.24 (i.e., 150.7 L/s / 46.5 L/s). With an expected seasonal increase in the service population equivalent to 25,000 people, the MOECC design guidelines recommend a lower peaking factor of 2.85. Therefore, the updated Model peaking factor of 3.24 remains conservative for the proposed Town-Wide Water Distribution Master Servicing Plan.

Under extended period simulations, the Model applies diurnal demand patterns for Residential, Recreational / Resorts / Hotel, and Commercial / Institutional land uses to reflect changes in water consumption over a 24 hour period. The diurnal patterns have been reviewed and maintained to reasonably mimic water demand fluctuations for various developments throughout the day.

3.0 CONCLUSION

The updated Hydraulic Water Model is expected to be a useful and reliable tool in evaluating and recommending water servicing upgrades as part of the Town-Wide Water Distribution System Master Plan.

A copy of the updated WaterCAD® Hydraulic Water Model files containing the current operating existing conditions over a 24 hour Extended Period Simulation (EPS) in one hour intervals for the Average Day and Maximum Day demand scenarios, along with the steady state Maximum Day plus Fire Flow and Peak Hour demand scenarios, is attached for the Town's records.

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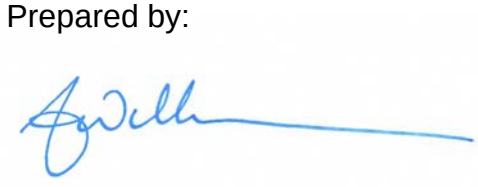

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Attachment

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