



APPENDIX K

Oak Lake FLOOD HAZARD

May 31, 2024

Oak Lake Assessment for Flood hazard

Watershed Information:

Drainage Area for Oak Lake = 286.5 ha

Oak Lake Area = 47.8 ha

Remaining Lands draining to Oak Lake = 238.7 ha (286.5 - 47.8)

Soils in the watershed area are almost exclusively Bondhead Sandy Loam with a little section of marsh. So very similar soil conditions as Little Lake. Soil type AB and landscape considered "rolling" (5 - 10% slopes). Based on MTO Design Chart 1.07, runoff coefficients for open sandy loam for rolling rural landscape range from 0.3 (cultivated lands) to 0.12 (woodlands). For the 100-year flow calculations typically increase runoff by 25%. Using the most conservative runoff coefficient of 0.3, add 25% gives 0.375 and rounded up to 0.4. Sensitivity analysis using 0.3 and 0.5.

100-year rainfall depths from the MTO IDF Curve Tool:

2010 = 121.6 mm

2070 = 129.6 mm

2120 = 136.8 mm

USE 125 mm

Calculating the depth of flooding on Oak Lake, continuing with the simple addition of rain on the lake plus runoff contributions from the remaining drainage area.

For Runoff Coefficient of 0.4:

Rainfall on Lake + Runoff Depth from Land

$$[(0.125 \text{ m}) \times (478,000 \text{ m}^2)] / (478,000 \text{ m}^2) + [(0.4) \times (0.125 \text{ m}) \times (2,387,000 \text{ m}^2)] / (478,000 \text{ m}^2)$$

$$0.125 \text{ m} + 0.250 \text{ m}$$

$$0.375 \text{ m}$$

For Runoff Coefficient of 0.3 = 0.312 m

For Runoff Coefficient of 0.5 = 0.437 m

Similarly for the Timmins event (193 mm), the results are:

$$\text{Runoff Coefficient of 0.3} = 0.482 \text{ m}$$

Runoff Coefficient of 0.4 = 0.579 m

Runoff Coefficient of 0.5 = 0.675 m

Static water level approximately 204.4m using the 2022 FHIMP LiDAR.

Using above calculations arrive at:

100yr WL: 204.75m

Regulatory: 204.9m