

Flood Plain Mapping Study

McLarens Creek

Technical Appendices

April 2021



Kawartha Lakes
Jump In



Table of Contents

- Appendix A: Modeling Parameters Selection
- Appendix B: Rainfall Data
- Appendix C: Background Studies
- Appendix D: Subcatchment Data
- Appendix E: Subcatchment Maps
- Appendix F: VH Suite Outputs
- Appendix G: Sensitivity Analysis
- Appendix H: OP and Secondary Plan Maps
- Appendix I: Structure Photo Inventory Record
- Appendix J: HEC RAS Output
- Appendix K: DTM Data Assessment Report

Appendix A

Modeling Parameters Selection

CN (II) Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | CN (II) |
|----------------------------|-----------|--------------------|---------------------|
| Estate Density Residential | A | <i>Estate D-A</i> | 51 |
| Estate Density Residential | AB | <i>Estate D-AB</i> | 60 |
| Estate Density Residential | B | <i>Estate D-B</i> | 68 |
| Estate Density Residential | BC | <i>Estate D-BC</i> | 74 |
| Estate Density Residential | C | <i>Estate D-C</i> | 79 |
| Estate Density Residential | CD | <i>Estate D-CD</i> | 82 |
| Estate Density Residential | D | <i>Estate D-D</i> | 84 |
| Estate Density Residential | W | <i>Estate D-W</i> | 100 |
| Low Density Residential | A | <i>Low Dens-A</i> | 59 |
| Low Density Residential | AB | <i>Low Dens-AB</i> | 67 |
| Low Density Residential | B | <i>Low Dens-B</i> | 74 |
| Low Density Residential | BC | <i>Low Dens-BC</i> | 78 |
| Low Density Residential | C | <i>Low Dens-C</i> | 82 |
| Low Density Residential | CD | <i>Low Dens-CD</i> | 85 |
| Low Density Residential | D | <i>Low Dens-D</i> | 87 |
| Low Density Residential | W | <i>Low Dens-W</i> | 100 |
| High Density Residential | A | <i>High Den-A</i> | 77 |
| High Density Residential | AB | <i>High Den-AB</i> | 81 |
| High Density Residential | B | <i>High Den-B</i> | 85 |
| High Density Residential | BC | <i>High Den-BC</i> | 88 |
| High Density Residential | C | <i>High Den-C</i> | 90 |
| High Density Residential | CD | <i>High Den-CD</i> | 91 |
| High Density Residential | D | <i>High Den-D</i> | 92 |
| High Density Residential | W | <i>High Den-W</i> | 100 |
| Medium Density Residential | A | <i>Medium D-A</i> | 59 |
| Medium Density Residential | AB | <i>Medium D-AB</i> | 67 |
| Medium Density Residential | B | <i>Medium D-B</i> | 74 |
| Medium Density Residential | BC | <i>Medium D-BC</i> | 78 |
| Medium Density Residential | C | <i>Medium D-C</i> | 82 |
| Medium Density Residential | CD | <i>Medium D-CD</i> | 85 |
| Medium Density Residential | D | <i>Medium D-D</i> | 87 |
| Medium Density Residential | W | <i>Medium D-W</i> | 100 |
| cemetery | A | <i>cemetery-A</i> | 49 |
| cemetery | AB | <i>cemetery-AB</i> | 59 |
| cemetery | B | <i>cemetery-B</i> | 69 |
| cemetery | BC | <i>cemetery-BC</i> | 74 |
| cemetery | C | <i>cemetery-C</i> | 79 |
| cemetery | CD | <i>cemetery-CD</i> | 80 |
| cemetery | D | <i>cemetery-D</i> | 80 |
| cemetery | W | <i>cemetery-W</i> | 100 |
| Main Central Area | A | <i>Main Cen-A</i> | 89 using commercial |
| Main Central Area | AB | <i>Main Cen-AB</i> | 91 |
| Main Central Area | B | <i>Main Cen-B</i> | 92 |
| Main Central Area | BC | <i>Main Cen-BC</i> | 93 |
| Main Central Area | C | <i>Main Cen-C</i> | 94 |
| Main Central Area | CD | <i>Main Cen-CD</i> | 95 |

CN (II) Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | CN (II) |
|-------------------|-----------|--------------|---------|
| Main Central Area | D | Main Cen-D | 95 |
| Main Central Area | W | Main Cen-W | 100 |
| Commercial | A | Commerci-A | 89 |
| Commercial | AB | Commerci-AB | 91 |
| Commercial | B | Commerci-B | 92 |
| Commercial | BC | Commerci-BC | 93 |
| Commercial | C | Commerci-C | 94 |
| Commercial | CD | Commerci-CD | 95 |
| Commercial | D | Commerci-D | 95 |
| Commercial | W | Commerci-W | 100 |
| Agricultural | A | Agricult-A | 64 |
| Agricultural | AB | Agricult-AB | 70 |
| Agricultural | B | Agricult-B | 75 |
| Agricultural | BC | Agricult-BC | 79 |
| Agricultural | C | Agricult-C | 82 |
| Agricultural | CD | Agricult-CD | 84 |
| Agricultural | D | Agricult-D | 85 |
| Agricultural | W | Agricult-W | 100 |
| NAG Agri | A | NAG Agri-A | 49 |
| NAG Agri | AB | NAG Agri-AB | 62 |
| NAG Agri | B | NAG Agri-B | 69 |
| NAG Agri | BC | NAG Agri-BC | 74 |
| NAG Agri | C | NAG Agri-C | 79 |
| NAG Agri | CD | NAG Agri-CD | 82 |
| NAG Agri | D | NAG Agri-D | 84 |
| NAG Agri | W | NAG Agri-W | 100 |
| Industrial | A | Industri-A | 81 |
| Industrial | AB | Industri-AB | 85 |
| Industrial | B | Industri-B | 88 |
| Industrial | BC | Industri-BC | 90 |
| Industrial | C | Industri-C | 91 |
| Industrial | CD | Industri-CD | 92 |
| Industrial | D | Industri-D | 93 |
| Industrial | W | Industri-W | 100 |
| Meadow | A | Meadow-A | 46 |
| Meadow | AB | Meadow-AB | 56 |
| Meadow | B | Meadow-B | 66 |
| Meadow | BC | Meadow-BC | 71 |
| Meadow | C | Meadow-C | 77 |
| Meadow | CD | Meadow-CD | 78 |
| Meadow | D | Meadow-D | 82 |
| Meadow | W | Meadow-W | 100 |
| Alvar | A | Alvar-A | 100 |
| Alvar | AB | Alvar-AB | 100 |
| Alvar | B | Alvar-B | 100 |
| Alvar | BC | Alvar-BC | 100 |

using close-seeded
legumes or
rotation meadow
values

CN (II) Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | <i>lookup_value</i> | CN (II) |
|-----------------|-----------|---------------------|---------|
| Alvar | C | <i>Alvar-C</i> | 100 |
| Alvar | CD | <i>Alvar-CD</i> | 100 |
| Alvar | D | <i>Alvar-D</i> | 100 |
| Alvar | W | <i>Alvar-W</i> | 100 |
| Open Water Body | A | <i>Open Wat-A</i> | 50 |
| Open Water Body | AB | <i>Open Wat-AB</i> | 50 |
| Open Water Body | B | <i>Open Wat-B</i> | 50 |
| Open Water Body | BC | <i>Open Wat-BC</i> | 50 |
| Open Water Body | C | <i>Open Wat-C</i> | 50 |
| Open Water Body | CD | <i>Open Wat-CD</i> | 50 |
| Open Water Body | D | <i>Open Wat-D</i> | 50 |
| Open Water Body | W | <i>Open Wat-W</i> | 50 |
| pasture | A | <i>pasture -A</i> | 49 |
| pasture | AB | <i>pasture -AB</i> | 62 |
| pasture | B | <i>pasture -B</i> | 69 |
| pasture | BC | <i>pasture -BC</i> | 74 |
| pasture | C | <i>pasture -C</i> | 79 |
| pasture | CD | <i>pasture -CD</i> | 82 |
| pasture | D | <i>pasture -D</i> | 84 |
| pasture | W | <i>pasture -W</i> | 100 |
| railway | A | <i>railway-A</i> | 76 |
| railway | AB | <i>railway-AB</i> | 81 |
| railway | B | <i>railway-B</i> | 85 |
| railway | BC | <i>railway-BC</i> | 87 |
| railway | C | <i>railway-C</i> | 89 |
| railway | CD | <i>railway-CD</i> | 90 |
| railway | D | <i>railway-D</i> | 91 |
| railway | W | <i>railway-W</i> | 100 |
| Roads | A | <i>Roads-A</i> | 98 |
| Roads | AB | <i>Roads-AB</i> | 98 |
| Roads | B | <i>Roads-B</i> | 98 |
| Roads | BC | <i>Roads-BC</i> | 98 |
| Roads | C | <i>Roads-C</i> | 98 |
| Roads | CD | <i>Roads-CD</i> | 98 |
| Roads | D | <i>Roads-D</i> | 98 |
| Roads | W | <i>Roads-W</i> | 98 |
| Wetland | A | <i>Wetland-A</i> | 50 |
| Wetland | AB | <i>Wetland-AB</i> | 50 |
| Wetland | B | <i>Wetland-B</i> | 50 |
| Wetland | BC | <i>Wetland-BC</i> | 50 |
| Wetland | C | <i>Wetland-C</i> | 50 |
| Wetland | CD | <i>Wetland-CD</i> | 50 |
| Wetland | D | <i>Wetland-D</i> | 50 |
| Wetland | W | <i>Wetland-W</i> | 50 |
| Woods | A | <i>Woods-A</i> | 36 |
| Woods | AB | <i>Woods-AB</i> | 48 |

using gravel road parameters

CN (II) Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | <i>lookup_value</i> | CN (II) |
|----------------------|-----------|---------------------|---------|
| Woods | B | <i>Woods-B</i> | 60 |
| Woods | BC | <i>Woods-BC</i> | 67 |
| Woods | C | <i>Woods-C</i> | 73 |
| Woods | CD | <i>Woods-CD</i> | 74 |
| Woods | D | <i>Woods-D</i> | 79 |
| Woods | W | <i>Woods-W</i> | 100 |
| Parks and Open Space | A | <i>Parks an-A</i> | 49 |
| Parks and Open Space | AB | <i>Parks an-AB</i> | 59 |
| Parks and Open Space | B | <i>Parks an-B</i> | 69 |
| Parks and Open Space | BC | <i>Parks an-BC</i> | 74 |
| Parks and Open Space | C | <i>Parks an-C</i> | 79 |
| Parks and Open Space | CD | <i>Parks an-CD</i> | 80 |
| Parks and Open Space | D | <i>Parks an-D</i> | 80 |
| Parks and Open Space | W | <i>Parks an-W</i> | 100 |
| Institutional | A | <i>Institut-A</i> | 89 |
| Institutional | B | <i>Institut-B</i> | 92 |
| Institutional | C | <i>Institut-C</i> | 94 |
| Institutional | D | <i>Institut-D</i> | 95 |
| Institutional | W | <i>Institut-W</i> | 100 |
| pits/quarries | A | <i>pits/qua-A</i> | 98 |
| pits/quarries | AB | <i>pits/qua-AB</i> | 98 |
| pits/quarries | B | <i>pits/qua-B</i> | 98 |
| pits/quarries | BC | <i>pits/qua-BC</i> | 98 |
| pits/quarries | C | <i>pits/qua-C</i> | 98 |
| pits/quarries | CD | <i>pits/qua-CD</i> | 98 |
| pits/quarries | D | <i>pits/qua-D</i> | 98 |
| pits/quarries | W | <i>pits/qua-W</i> | 98 |
| Barren Rock | A | <i>Barren R-A</i> | 100 |
| Barren Rock | AB | <i>Barren R-AB</i> | 100 |
| Barren Rock | B | <i>Barren R-B</i> | 100 |
| Barren Rock | BC | <i>Barren R-BC</i> | 100 |
| Barren Rock | C | <i>Barren R-C</i> | 100 |
| Barren Rock | CD | <i>Barren R-CD</i> | 100 |
| Barren Rock | D | <i>Barren R-D</i> | 100 |
| Barren Rock | W | <i>Barren R-W</i> | 100 |

using commercial parameters

T_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | T _{imp} | |
|----------------------------|-----------|--------------------|------------------|---|
| Estate Density Residential | A | <i>Estate D-A</i> | 0.17 | |
| Estate Density Residential | AB | <i>Estate D-AB</i> | 0.17 | |
| Estate Density Residential | B | <i>Estate D-B</i> | 0.17 | |
| Estate Density Residential | BC | <i>Estate D-BC</i> | 0.17 | |
| Estate Density Residential | C | <i>Estate D-C</i> | 0.17 | |
| Estate Density Residential | CD | <i>Estate D-CD</i> | 0.17 | |
| Estate Density Residential | D | <i>Estate D-D</i> | 0.17 | |
| Estate Density Residential | W | <i>Estate D-W</i> | 0.17 | |
| Low Density Residential | A | <i>Low Dens-A</i> | 0.23 | |
| Low Density Residential | AB | <i>Low Dens-AB</i> | 0.23 | |
| Low Density Residential | B | <i>Low Dens-B</i> | 0.23 | |
| Low Density Residential | BC | <i>Low Dens-BC</i> | 0.23 | |
| Low Density Residential | C | <i>Low Dens-C</i> | 0.23 | |
| Low Density Residential | CD | <i>Low Dens-CD</i> | 0.23 | |
| Low Density Residential | D | <i>Low Dens-D</i> | 0.23 | |
| Low Density Residential | W | <i>Low Dens-W</i> | 0.23 | |
| Medium Density Residential | A | <i>Medium D-A</i> | 0.52 | Existing lots and 550 sq 1/8 acre therefore use middle value VO2 input p values |
| Medium Density Residential | AB | <i>Medium D-AB</i> | 0.52 | |
| Medium Density Residential | B | <i>Medium D-B</i> | 0.52 | |
| Medium Density Residential | BC | <i>Medium D-BC</i> | 0.52 | |
| Medium Density Residential | C | <i>Medium D-C</i> | 0.52 | |
| Medium Density Residential | CD | <i>Medium D-CD</i> | 0.52 | |
| Medium Density Residential | D | <i>Medium D-D</i> | 0.52 | |
| Medium Density Residential | W | <i>Medium D-W</i> | 0.52 | |
| High Density Residential | A | <i>High Den-A</i> | 0.65 | |
| High Density Residential | AB | <i>High Den-AB</i> | 0.65 | |
| High Density Residential | B | <i>High Den-B</i> | 0.65 | |
| High Density Residential | BC | <i>High Den-BC</i> | 0.65 | |
| High Density Residential | C | <i>High Den-C</i> | 0.65 | |
| High Density Residential | CD | <i>High Den-CD</i> | 0.65 | |
| High Density Residential | D | <i>High Den-D</i> | 0.65 | |
| High Density Residential | W | <i>High Den-W</i> | 0.65 | |
| Agricultural | A | <i>Agricult-A</i> | 0.01 | |
| Agricultural | AB | <i>Agricult-AB</i> | 0.01 | |
| Agricultural | B | <i>Agricult-B</i> | 0.01 | |
| Agricultural | BC | <i>Agricult-BC</i> | 0.01 | |
| Agricultural | C | <i>Agricult-C</i> | 0.01 | |
| Agricultural | CD | <i>Agricult-CD</i> | 0.01 | |
| Agricultural | D | <i>Agricult-D</i> | 0.01 | |
| Agricultural | W | <i>Agricult-W</i> | 0.01 | |
| cemetery | A | <i>cemetery-A</i> | 0.01 | |
| cemetery | AB | <i>cemetery-AB</i> | 0.01 | |
| cemetery | B | <i>cemetery-B</i> | 0.01 | |
| cemetery | BC | <i>cemetery-BC</i> | 0.01 | |
| cemetery | C | <i>cemetery-C</i> | 0.01 | |
| cemetery | CD | <i>cemetery-CD</i> | 0.01 | |

T_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | T _{imp} |
|-------------------|-----------|--------------------|---|
| cemetery | D | <i>cemetery-D</i> | 0.01 |
| cemetery | W | <i>cemetery-W</i> | 0.01 |
| NAG Agri | A | <i>NAG Agri-A</i> | 0.01 |
| NAG Agri | AB | <i>NAG Agri-AB</i> | 0.01 |
| NAG Agri | B | <i>NAG Agri-B</i> | 0.01 |
| NAG Agri | BC | <i>NAG Agri-BC</i> | 0.01 |
| NAG Agri | C | <i>NAG Agri-C</i> | 0.01 |
| NAG Agri | CD | <i>NAG Agri-CD</i> | 0.01 |
| NAG Agri | D | <i>NAG Agri-D</i> | 0.01 |
| NAG Agri | W | <i>NAG Agri-W</i> | 0.01 |
| Main Central Area | A | <i>Main Cen-A</i> | 0.9 using Commercial |
| Main Central Area | AB | <i>Main Cen-AB</i> | 0.9 |
| Main Central Area | B | <i>Main Cen-B</i> | 0.9 |
| Main Central Area | BC | <i>Main Cen-BC</i> | 0.9 |
| Main Central Area | C | <i>Main Cen-C</i> | 0.9 |
| Main Central Area | CD | <i>Main Cen-CD</i> | 0.9 |
| Main Central Area | D | <i>Main Cen-D</i> | 0.9 |
| Main Central Area | W | <i>Main Cen-W</i> | 0.9 |
| Commercial | A | <i>Commerci-A</i> | 0.9 |
| Commercial | AB | <i>Commerci-AB</i> | 0.9 |
| Commercial | B | <i>Commerci-B</i> | 0.9 |
| Commercial | BC | <i>Commerci-BC</i> | 0.9 |
| Commercial | C | <i>Commerci-C</i> | 0.9 |
| Commercial | CD | <i>Commerci-CD</i> | 0.9 |
| Commercial | D | <i>Commerci-D</i> | 0.9 |
| Commercial | W | <i>Commerci-W</i> | 0.9 using close-seeded legumes or rotation meadow values |
| Cultivated Land | A | <i>Cultivat-A</i> | 0.01 |
| Cultivated Land | AB | <i>Cultivat-AB</i> | 0.01 |
| Cultivated Land | B | <i>Cultivat-B</i> | 0.01 |
| Cultivated Land | BC | <i>Cultivat-BC</i> | 0.01 |
| Cultivated Land | C | <i>Cultivat-C</i> | 0.01 |
| Cultivated Land | CD | <i>Cultivat-CD</i> | 0.01 |
| Cultivated Land | D | <i>Cultivat-D</i> | 0.01 |
| Cultivated Land | W | <i>Cultivat-W</i> | 0.01 |
| industrial | A | <i>industri-A</i> | 0.8 |
| industrial | AB | <i>industri-AB</i> | 0.8 |
| industrial | B | <i>industri-B</i> | 0.8 |
| industrial | BC | <i>industri-BC</i> | 0.8 |
| industrial | C | <i>industri-C</i> | 0.8 |
| industrial | CD | <i>industri-CD</i> | 0.8 |
| industrial | D | <i>industri-D</i> | 0.8 |
| industrial | W | <i>industri-W</i> | 0.8 |
| Meadow | A | <i>Meadow-A</i> | 0.01 |
| Meadow | AB | <i>Meadow-AB</i> | 0.01 |
| Meadow | B | <i>Meadow-B</i> | 0.01 |
| Meadow | BC | <i>Meadow-BC</i> | 0.01 |

T_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | T _{imp} |
|----------------------|-----------|--------------|------------------|
| Meadow | C | Meadow-C | 0.01 |
| Meadow | CD | Meadow-CD | 0.01 |
| Meadow | D | Meadow-D | 0.01 |
| Meadow | W | Meadow-W | 0.01 |
| Parks and open space | A | Parks an-A | 0.01 |
| Parks and open space | AB | Parks an-AB | 0.01 |
| Parks and open space | B | Parks an-B | 0.01 |
| Parks and open space | BC | Parks an-BC | 0.01 |
| Parks and open space | C | Parks an-C | 0.01 |
| Parks and open space | CD | Parks an-CD | 0.01 |
| Parks and open space | D | Parks an-D | 0.01 |
| Parks and open space | W | Parks an-W | 0.01 |
| Open Water Body | A | Open Wat-A | 0 |
| Open Water Body | AB | Open Wat-AB | 0 |
| Open Water Body | B | Open Wat-B | 0 |
| Open Water Body | BC | Open Wat-BC | 0 |
| Open Water Body | C | Open Wat-C | 0 |
| Open Water Body | CD | Open Wat-CD | 0 |
| Open Water Body | D | Open Wat-D | 0 |
| Open Water Body | W | Open Wat-W | 0 |
| pasture land | A | pasture -A | 0.01 |
| pasture land | AB | pasture -AB | 0.01 |
| pasture land | B | pasture -B | 0.01 |
| pasture land | BC | pasture -BC | 0.01 |
| pasture land | C | pasture -C | 0.01 |
| pasture land | CD | pasture -CD | 0.01 |
| pasture land | D | pasture -D | 0.01 |
| pasture land | W | pasture -W | 0.01 |
| pits/quarries | A | pits/qua-A | 0.01 |
| pits/quarries | AB | pits/qua-AB | 0.01 |
| pits/quarries | B | pits/qua-B | 0.01 |
| pits/quarries | BC | pits/qua-BC | 0.01 |
| pits/quarries | C | pits/qua-C | 0.01 |
| pits/quarries | CD | pits/qua-CD | 0.01 |
| pits/quarries | D | pits/qua-D | 0.01 |
| pits/quarries | W | pits/qua-W | 0.01 |
| railway | A | railway-A | 0.05 |
| railway | AB | railway-AB | 0.05 |
| railway | B | railway-B | 0.05 |
| railway | BC | railway-BC | 0.05 |
| railway | C | railway-C | 0.05 |
| railway | CD | railway-CD | 0.05 |
| railway | D | railway-D | 0.05 |
| railway | W | railway-W | 0.05 |
| Roads | A | Roads-A | 0.9 |
| Roads | AB | Roads-AB | 0.9 |

using gravel road
parameters

T_{imp} Lookup table

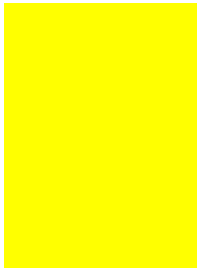
All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | T _{imp} |
|---------------|-----------|--------------------|------------------|
| Roads | B | <i>Roads-B</i> | 0.9 |
| Roads | BC | <i>Roads-BC</i> | 0.9 |
| Roads | C | <i>Roads-C</i> | 0.9 |
| Roads | CD | <i>Roads-CD</i> | 0.9 |
| Roads | D | <i>Roads-D</i> | 0.9 |
| Roads | W | <i>Roads-W</i> | 0.9 |
| Wetland | A | <i>Wetland-A</i> | 0.01 |
| Wetland | AB | <i>Wetland-AB</i> | 0.01 |
| Wetland | B | <i>Wetland-B</i> | 0.01 |
| Wetland | BC | <i>Wetland-BC</i> | 0.01 |
| Wetland | C | <i>Wetland-C</i> | 0.01 |
| Wetland | CD | <i>Wetland-CD</i> | 0.01 |
| Wetland | D | <i>Wetland-D</i> | 0.01 |
| Wetland | W | <i>Wetland-W</i> | 0.01 |
| Woods | A | <i>Woods-A</i> | 0.01 |
| Woods | AB | <i>Woods-AB</i> | 0.01 |
| Woods | B | <i>Woods-B</i> | 0.01 |
| Woods | BC | <i>Woods-BC</i> | 0.01 |
| Woods | C | <i>Woods-C</i> | 0.01 |
| Woods | CD | <i>Woods-CD</i> | 0.01 |
| Woods | D | <i>Woods-D</i> | 0.01 |
| Woods | W | <i>Woods-W</i> | 0.01 |
| Institutional | A | <i>Institut-A</i> | 0.55 |
| Institutional | AB | <i>Institut-AB</i> | 0.55 |
| Institutional | B | <i>Institut-B</i> | 0.55 |
| Institutional | BC | <i>Institut-BC</i> | 0.55 |
| Institutional | C | <i>Institut-C</i> | 0.55 |
| Institutional | CD | <i>Institut-CD</i> | 0.55 |
| Institutional | D | <i>Institut-D</i> | 0.55 |
| Institutional | W | <i>Institut-W</i> | 0.55 |
| Barren Rock | A | <i>Barren R-A</i> | 0.9 |
| Barren Rock | AB | <i>Barren R-AB</i> | 0.9 |
| Barren Rock | B | <i>Barren R-B</i> | 0.9 |
| Barren Rock | BC | <i>Barren R-BC</i> | 0.9 |
| Barren Rock | C | <i>Barren R-C</i> | 0.9 |
| Barren Rock | CD | <i>Barren R-CD</i> | 0.9 |
| Barren Rock | D | <i>Barren R-D</i> | 0.9 |
| Barren Rock | W | <i>Barren R-W</i> | 0.9 |
| Alvar | A | <i>Alvar-A</i> | 0.9 |
| Alvar | AB | <i>Alvar-AB</i> | 0.9 |
| Alvar | B | <i>Alvar-B</i> | 0.9 |
| Alvar | BC | <i>Alvar-BC</i> | 0.9 |
| Alvar | C | <i>Alvar-C</i> | 0.9 |
| Alvar | CD | <i>Alvar-CD</i> | 0.9 |
| Alvar | D | <i>Alvar-D</i> | 0.9 |
| Alvar | W | <i>Alvar-W</i> | 0.9 |

T_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | <i>lookup_value</i> | T_{imp} |
|-----------------|------------------|----------------------------|------------------------|
| Aggregate | A | <i>Aggregat-A</i> | 0.01 |
| Aggregate | AB | <i>Aggregat-AB</i> | 0.01 |
| Aggregate | B | <i>Aggregat-B</i> | 0.01 |
| Aggregate | BC | <i>Aggregat-BC</i> | 0.01 |
| Aggregate | C | <i>Aggregat-C</i> | 0.01 |
| Aggregate | CD | <i>Aggregat-CD</i> | 0.01 |
| Aggregate | D | <i>Aggregat-D</i> | 0.01 |
| Aggregate | W | <i>Aggregat-W</i> | 0.01 |



X_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | Ximp | |
|----------------------------|-----------|--------------------|------|---|
| Estate Density Residential | A | <i>Estate D-A</i> | 0.10 | |
| Estate Density Residential | AB | <i>Estate D-AB</i> | 0.10 | |
| Estate Density Residential | B | <i>Estate D-B</i> | 0.10 | |
| Estate Density Residential | BC | <i>Estate D-BC</i> | 0.10 | |
| Estate Density Residential | C | <i>Estate D-C</i> | 0.10 | |
| Estate Density Residential | CD | <i>Estate D-CD</i> | 0.10 | |
| Estate Density Residential | D | <i>Estate D-D</i> | 0.10 | |
| Estate Density Residential | W | <i>Estate D-W</i> | 0.10 | |
| Low Density Residential | A | <i>Low Dens-A</i> | 0.15 | |
| Low Density Residential | AB | <i>Low Dens-AB</i> | 0.15 | |
| Low Density Residential | B | <i>Low Dens-B</i> | 0.15 | |
| Low Density Residential | BC | <i>Low Dens-BC</i> | 0.15 | |
| Low Density Residential | C | <i>Low Dens-C</i> | 0.15 | |
| Low Density Residential | CD | <i>Low Dens-CD</i> | 0.15 | |
| Low Density Residential | D | <i>Low Dens-D</i> | 0.15 | |
| Low Density Residential | W | <i>Low Dens-W</i> | 0.15 | |
| Medium Density Residential | A | <i>Medium D-A</i> | 0.25 | Existing lots and 550 sq 1/8 acre therefore use middle value VO2 input p values |
| Medium Density Residential | AB | <i>Medium D-AB</i> | 0.25 | |
| Medium Density Residential | B | <i>Medium D-B</i> | 0.25 | |
| Medium Density Residential | BC | <i>Medium D-BC</i> | 0.25 | |
| Medium Density Residential | C | <i>Medium D-C</i> | 0.25 | |
| Medium Density Residential | CD | <i>Medium D-CD</i> | 0.25 | |
| Medium Density Residential | D | <i>Medium D-D</i> | 0.25 | |
| Medium Density Residential | W | <i>Medium D-W</i> | 0.25 | |
| High Density Residential | A | <i>High Den-A</i> | 0.35 | |
| High Density Residential | AB | <i>High Den-AB</i> | 0.35 | |
| High Density Residential | B | <i>High Den-B</i> | 0.35 | |
| High Density Residential | BC | <i>High Den-BC</i> | 0.35 | |
| High Density Residential | C | <i>High Den-C</i> | 0.35 | |
| High Density Residential | CD | <i>High Den-CD</i> | 0.35 | |
| High Density Residential | D | <i>High Den-D</i> | 0.35 | |
| High Density Residential | W | <i>High Den-W</i> | 0.35 | |
| cemetery | A | <i>cemetery-A</i> | 0.01 | |
| cemetery | AB | <i>cemetery-AB</i> | 0.01 | |
| cemetery | B | <i>cemetery-B</i> | 0.01 | |
| cemetery | BC | <i>cemetery-BC</i> | 0.01 | |
| cemetery | C | <i>cemetery-C</i> | 0.01 | |
| cemetery | CD | <i>cemetery-CD</i> | 0.01 | |
| cemetery | D | <i>cemetery-D</i> | 0.01 | |
| cemetery | W | <i>cemetery-W</i> | 0.01 | |
| Main Central Area | A | <i>Main Cen-A</i> | 0.90 | |
| Main Central Area | AB | <i>Main Cen-AB</i> | 0.90 | |
| Main Central Area | B | <i>Main Cen-B</i> | 0.90 | |
| Main Central Area | BC | <i>Main Cen-BC</i> | 0.90 | |
| Main Central Area | C | <i>Main Cen-C</i> | 0.90 | |

X_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | Ximp |
|----------------------|-----------|--------------------|------|
| Main Central Area | CD | <i>Main Cen-CD</i> | 0.90 |
| Main Central Area | D | <i>Main Cen-D</i> | 0.90 |
| Main Central Area | W | <i>Main Cen-W</i> | 0.90 |
| Commercial | A | <i>Commerci-A</i> | 0.90 |
| Commercial | AB | <i>Commerci-AB</i> | 0.90 |
| Commercial | B | <i>Commerci-B</i> | 0.90 |
| Commercial | BC | <i>Commerci-BC</i> | 0.90 |
| Commercial | C | <i>Commerci-C</i> | 0.90 |
| Commercial | CD | <i>Commerci-CD</i> | 0.90 |
| Commercial | D | <i>Commerci-D</i> | 0.90 |
| Commercial | W | <i>Commerci-W</i> | 0.90 |
| Agricultural | A | <i>Agricult-A</i> | 0.01 |
| Agricultural | AB | <i>Agricult-AB</i> | 0.01 |
| Agricultural | B | <i>Agricult-B</i> | 0.01 |
| Agricultural | BC | <i>Agricult-BC</i> | 0.01 |
| Agricultural | C | <i>Agricult-C</i> | 0.01 |
| Agricultural | CD | <i>Agricult-CD</i> | 0.01 |
| Agricultural | D | <i>Agricult-D</i> | 0.01 |
| Agricultural | W | <i>Agricult-W</i> | 0.01 |
| NAG Agri | A | <i>NAG Agri-A</i> | 0.01 |
| NAG Agri | AB | <i>NAG Agri-AB</i> | 0.01 |
| NAG Agri | B | <i>NAG Agri-B</i> | 0.01 |
| NAG Agri | BC | <i>NAG Agri-BC</i> | 0.01 |
| NAG Agri | C | <i>NAG Agri-C</i> | 0.01 |
| NAG Agri | CD | <i>NAG Agri-CD</i> | 0.01 |
| NAG Agri | D | <i>NAG Agri-D</i> | 0.01 |
| NAG Agri | W | <i>NAG Agri-W</i> | 0.01 |
| Industrial | A | <i>Industri-A</i> | 0.75 |
| Industrial | AB | <i>Industri-AB</i> | 0.75 |
| Industrial | B | <i>Industri-B</i> | 0.75 |
| Industrial | BC | <i>Industri-BC</i> | 0.75 |
| Industrial | C | <i>Industri-C</i> | 0.75 |
| Industrial | CD | <i>Industri-CD</i> | 0.75 |
| Industrial | D | <i>Industri-D</i> | 0.75 |
| Industrial | W | <i>Industri-W</i> | 0.75 |
| Meadow | A | <i>Meadow-A</i> | 0.01 |
| Meadow | AB | <i>Meadow-AB</i> | 0.01 |
| Meadow | B | <i>Meadow-B</i> | 0.01 |
| Meadow | BC | <i>Meadow-BC</i> | 0.01 |
| Meadow | C | <i>Meadow-C</i> | 0.01 |
| Meadow | CD | <i>Meadow-CD</i> | 0.01 |
| Meadow | D | <i>Meadow-D</i> | 0.01 |
| Meadow | W | <i>Meadow-W</i> | 0.01 |
| Parks and Open Space | A | <i>Parks an-A</i> | 0.01 |
| Parks and Open Space | AB | <i>Parks an-AB</i> | 0.01 |

X_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | Ximp |
|----------------------|-----------|--------------------|------|
| Parks and Open Space | B | <i>Parks an-B</i> | 0.01 |
| Parks and Open Space | BC | <i>Parks an-BC</i> | 0.01 |
| Parks and Open Space | C | <i>Parks an-C</i> | 0.01 |
| Parks and Open Space | CD | <i>Parks an-CD</i> | 0.01 |
| Parks and Open Space | D | <i>Parks an-D</i> | 0.01 |
| Parks and Open Space | W | <i>Parks an-W</i> | 0.01 |
| Open Water Body | A | <i>Open Wat-A</i> | 0.01 |
| Open Water Body | AB | <i>Open Wat-AB</i> | 0.01 |
| Open Water Body | B | <i>Open Wat-B</i> | 0.01 |
| Open Water Body | BC | <i>Open Wat-BC</i> | 0.01 |
| Open Water Body | C | <i>Open Wat-C</i> | 0.01 |
| Open Water Body | CD | <i>Open Wat-CD</i> | 0.01 |
| Open Water Body | D | <i>Open Wat-D</i> | 0.01 |
| Open Water Body | W | <i>Open Wat-W</i> | 0.01 |
| pasture land | A | <i>pasture -A</i> | 0.01 |
| pasture land | AB | <i>pasture -AB</i> | 0.01 |
| pasture land | B | <i>pasture -B</i> | 0.01 |
| pasture land | BC | <i>pasture -BC</i> | 0.01 |
| pasture land | C | <i>pasture -C</i> | 0.01 |
| pasture land | CD | <i>pasture -CD</i> | 0.01 |
| pasture land | D | <i>pasture -D</i> | 0.01 |
| pasture land | W | <i>pasture -W</i> | 0.01 |
| Aggregate | A | <i>Aggregat-A</i> | 0.00 |
| Aggregate | AB | <i>Aggregat-AB</i> | 0.00 |
| Aggregate | B | <i>Aggregat-B</i> | 0.00 |
| Aggregate | BC | <i>Aggregat-BC</i> | 0.00 |
| Aggregate | C | <i>Aggregat-C</i> | 0.00 |
| Aggregate | CD | <i>Aggregat-CD</i> | 0.00 |
| Aggregate | D | <i>Aggregat-D</i> | 0.00 |
| Aggregate | W | <i>Aggregat-W</i> | 0.00 |
| Wetland | A | <i>Wetland-A</i> | 0.00 |
| Wetland | AB | <i>Wetland-AB</i> | 0.00 |
| Wetland | B | <i>Wetland-B</i> | 0.00 |
| Wetland | BC | <i>Wetland-BC</i> | 0.00 |
| Wetland | C | <i>Wetland-C</i> | 0.00 |
| Wetland | CD | <i>Wetland-CD</i> | 0.00 |
| Wetland | D | <i>Wetland-D</i> | 0.00 |
| Wetland | W | <i>Wetland-W</i> | 0.00 |
| Woods | A | <i>Woods-A</i> | 0.01 |
| Woods | AB | <i>Woods-AB</i> | 0.01 |
| Woods | B | <i>Woods-B</i> | 0.01 |
| Woods | BC | <i>Woods-BC</i> | 0.01 |
| Woods | C | <i>Woods-C</i> | 0.01 |
| Woods | CD | <i>Woods-CD</i> | 0.01 |
| Woods | D | <i>Woods-D</i> | 0.01 |

X_{imp} Lookup table

All values derived from Hydrology Modeling Parameters Selection (September 2013)

| Land Use | Soil Type | lookup_value | Ximp |
|---------------|-----------|--------------------|------|
| Woods | W | <i>Woods-W</i> | 0.01 |
| Institutional | A | <i>Institut-A</i> | 0.30 |
| Institutional | AB | <i>Institut-AB</i> | 0.30 |
| Institutional | B | <i>Institut-B</i> | 0.30 |
| Institutional | BC | <i>Institut-BC</i> | 0.30 |
| Institutional | C | <i>Institut-C</i> | 0.30 |
| Institutional | CD | <i>Institut-CD</i> | 0.30 |
| Institutional | D | <i>Institut-D</i> | 0.30 |
| Institutional | W | <i>Institut-W</i> | 0.30 |
| Roads | A | <i>Roads-A</i> | 0.9 |
| Roads | AB | <i>Roads-AB</i> | 0.9 |
| Roads | B | <i>Roads-B</i> | 0.9 |
| Roads | BC | <i>Roads-BC</i> | 0.9 |
| Roads | C | <i>Roads-C</i> | 0.9 |
| Roads | CD | <i>Roads-CD</i> | 0.9 |
| Roads | D | <i>Roads-D</i> | 0.9 |
| Roads | W | <i>Roads-W</i> | 0.9 |
| pits/quarries | A | <i>pits/qua-A</i> | 0.90 |
| pits/quarries | AB | <i>pits/qua-AB</i> | 0.90 |
| pits/quarries | B | <i>pits/qua-B</i> | 0.90 |
| pits/quarries | BC | <i>pits/qua-BC</i> | 0.90 |
| pits/quarries | C | <i>pits/qua-C</i> | 0.90 |
| pits/quarries | CD | <i>pits/qua-CD</i> | 0.90 |
| pits/quarries | D | <i>pits/qua-D</i> | 0.90 |
| pits/quarries | W | <i>pits/qua-W</i> | 0.90 |
| Barren Rock | A | <i>Barren R-A</i> | 0.90 |
| Barren Rock | AB | <i>Barren R-AB</i> | 0.90 |
| Barren Rock | B | <i>Barren R-B</i> | 0.90 |
| Barren Rock | BC | <i>Barren R-BC</i> | 0.90 |
| Barren Rock | C | <i>Barren R-C</i> | 0.90 |
| Barren Rock | CD | <i>Barren R-CD</i> | 0.90 |
| Barren Rock | D | <i>Barren R-D</i> | 0.90 |
| Barren Rock | W | <i>Barren R-W</i> | 0.90 |
| Alvar | A | <i>Alvar-A</i> | 0.90 |
| Alvar | AB | <i>Alvar-AB</i> | 0.90 |
| Alvar | B | <i>Alvar-B</i> | 0.90 |
| Alvar | BC | <i>Alvar-BC</i> | 0.90 |
| Alvar | C | <i>Alvar-C</i> | 0.90 |
| Alvar | CD | <i>Alvar-CD</i> | 0.90 |
| Alvar | D | <i>Alvar-D</i> | 0.90 |
| Alvar | W | <i>Alvar-W</i> | 0.90 |

total directly connected impervious

s are 55' wide
m, or

se
ies from
parameter

total directly connected impervious

total directly connected impervious

total directly connected impervious

Convert CN(II) to CN (III)

| CN (II) | CN (III) | CN (II) |
|---------|----------|---------|
| 0 | 0 | 0 |
| 0.5 | 1 | 0.5 |
| 0 | 2 | 0 |
| 1 | 3 | 1 |
| 1.5 | 4 | 1.5 |
| 2 | 5 | 2 |
| 2.3 | 6 | 2.3 |
| 2.5 | 7 | 2.5 |
| 3 | 8 | 3 |
| 3.5 | 9 | 3.5 |
| 4 | 10 | 4 |
| 4.5 | 11 | 4.5 |
| 4.8 | 12 | 4.8 |
| 5 | 13 | 5 |
| 5.5 | 14 | 5.5 |
| 6 | 15 | 6 |
| 6.5 | 16 | 6.5 |
| 7 | 17 | 7 |
| 8 | 18 | 8 |
| 8.5 | 19 | 8.5 |
| 9 | 20 | 9 |
| 9.5 | 21 | 9.5 |
| 10 | 22 | 10 |
| 11 | 23 | 11 |
| 11.5 | 24 | 11.5 |
| 12 | 25 | 12 |
| 12.5 | 26 | 12.5 |
| 13 | 27 | 13 |
| 14 | 28 | 14 |
| 14.5 | 29 | 14.5 |
| 15 | 30 | 15 |
| 15.5 | 31 | 15.5 |
| 16 | 32 | 16 |
| 17 | 33 | 17 |
| 18 | 34 | 18 |
| 19 | 35 | 19 |
| 19.5 | 36 | 19.5 |
| 20 | 37 | 20 |
| 21 | 38 | 21 |
| 22 | 39 | 22 |
| 23 | 40 | 23 |
| 23.5 | 41 | 23.5 |
| 24 | 42 | 24 |
| 25 | 43 | 25 |
| 26 | 44 | 26 |
| 27 | 45 | 27 |
| 27.5 | 46 | 27.5 |

| | | |
|------|----|------|
| 28 | 47 | 28 |
| 29 | 48 | 29 |
| 30 | 49 | 30 |
| 31 | 50 | 31 |
| 31.5 | 51 | 31.5 |
| 32 | 52 | 32 |
| 33 | 53 | 33 |
| 34 | 54 | 34 |
| 35 | 55 | 35 |
| 36 | 56 | 36 |
| 37 | 57 | 37 |
| 38 | 58 | 38 |
| 39 | 59 | 39 |
| 40 | 60 | 40 |
| 41 | 61 | 41 |
| 42 | 62 | 42 |
| 43 | 63 | 43 |
| 44 | 64 | 44 |
| 45 | 65 | 45 |
| 46 | 66 | 46 |
| 47 | 67 | 47 |
| 48 | 68 | 48 |
| 49 | 69 | 49 |
| 50 | 70 | 50 |
| 51 | 70 | 51 |
| 52 | 71 | 52 |
| 53 | 72 | 53 |
| 54 | 73 | 54 |
| 55 | 74 | 55 |
| 56 | 74 | 56 |
| 57 | 75 | 57 |
| 58 | 76 | 58 |
| 59 | 77 | 59 |
| 60 | 78 | 60 |
| 61 | 78 | 61 |
| 62 | 79 | 62 |
| 63 | 80 | 63 |
| 64 | 81 | 64 |
| 65 | 82 | 65 |
| 66 | 82 | 66 |
| 67 | 83 | 67 |
| 68 | 84 | 68 |
| 69 | 84 | 69 |
| 70 | 85 | 70 |
| 71 | 85 | 71 |
| 72 | 86 | 72 |
| 73 | 87 | 73 |
| 74 | 88 | 74 |
| 75 | 88 | 75 |
| 76 | 89 | 76 |
| 77 | 89 | 77 |
| 78 | 90 | 78 |

| | | |
|-----|-----|-----|
| 79 | 90 | 79 |
| 80 | 91 | 80 |
| 81 | 91 | 81 |
| 82 | 92 | 82 |
| 83 | 93 | 83 |
| 84 | 93 | 84 |
| 85 | 94 | 85 |
| 86 | 94 | 86 |
| 87 | 95 | 87 |
| 88 | 95 | 88 |
| 89 | 96 | 89 |
| 90 | 96 | 90 |
| 91 | 97 | 91 |
| 92 | 97 | 92 |
| 93 | 98 | 93 |
| 94 | 98 | 94 |
| 95 | 98 | 95 |
| 96 | 99 | 96 |
| 97 | 99 | 97 |
| 98 | 99 | 98 |
| 99 | 100 | 99 |
| 100 | 100 | 100 |

Summary of values for McLarenCreek - Land Use

| Catchment | Area (Ha) | C | T _p (hr) | CN (II) | CN* (II) | X _{imp} | T _{imp} |
|-----------|-----------|------|---------------------|---------|----------|------------------|------------------|
| 100 | 316.9 | 0.33 | 2.77 | 69 | 67 | 0.02 | 0.03 |
| 200 | 55.7 | 0.22 | 1.18 | 62 | 60 | 0.02 | 0.03 |
| 300 | 300.7 | 0.33 | 2.22 | 66 | 63 | 0.04 | 0.05 |
| 400 | 59.1 | 0.24 | 1.13 | 63 | 62 | 0.03 | 0.04 |
| 500 | 958.3 | 0.36 | 2.88 | 57 | 63 | 0.01 | 0.01 |
| 600 | 55.1 | 0.29 | 1.14 | 62 | 60 | 0.02 | 0.02 |
| 700 | 93.3 | 0.26 | 0.93 | 66 | 63 | 0.04 | 0.05 |
| 800 | 84.7 | 0.31 | 1.22 | 73 | 72 | 0.05 | 0.05 |
| 900 | 75.7 | 0.36 | 1.41 | 79 | 80 | 0.04 | 0.04 |
| 1000 | 37.5 | 0.38 | 0.99 | 77 | 77 | 0.01 | 0.02 |
| 1100 | 73.6 | 0.35 | 1.37 | 81 | 81 | 0.04 | 0.05 |
| 1200 | 81.3 | 0.40 | 0.34 | 79 | 80 | 0.06 | 0.08 |
| 1300 | 70.8 | 0.53 | 0.33 | 85 | 86 | 0.04 | 0.04 |
| 1400 | 99.5 | 0.36 | 1.82 | 81 | 81 | 0.04 | 0.04 |
| 1500 | 210.6 | 0.37 | 2.09 | 79 | 80 | 0.03 | 0.03 |
| 1600 | 49.2 | 0.41 | 0.66 | 81 | 81 | 0.02 | 0.02 |
| 1700 | 19.6 | 0.45 | 0.31 | 83 | 83 | 0.11 | 0.14 |
| 1800 | 74.9 | 0.38 | 1.15 | 82 | 82 | 0.05 | 0.05 |
| 1900 | 208.7 | 0.34 | 1.90 | 80 | 80 | 0.03 | 0.03 |
| 2000 | 69.7 | 0.34 | 1.25 | 75 | 75 | 0.02 | 0.02 |
| 2100 | 96.5 | 0.35 | 1.43 | 75 | 75 | 0.02 | 0.03 |
| 2200 | 64.6 | 0.34 | 1.62 | 81 | 81 | 0.04 | 0.04 |
| 2300 | 76.6 | 0.32 | 1.16 | 79 | 80 | 0.03 | 0.03 |
| 2400 | 76.7 | 0.34 | 1.27 | 73 | 72 | 0.04 | 0.04 |

Total Area 3,309.2 Ha

CKLOP_MCLaren
Subcatchment 100

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|-------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 160195.3178 | 16.0 | 64 | 1025.3 |
| Agriculture | B | <i>Agricult-B</i> | 1560153.984 | 125.0 | 75 | 9375.0 |
| Agriculture | D | <i>Agricult-D</i> | 234894.4727 | 23.5 | 85 | 1996.6 |
| Estate Density Residential | A | <i>Estate D-A</i> | 2713.299527 | 0.3 | 51 | 13.8 |
| Estate Density Residential | B | <i>Estate D-B</i> | 121419.3944 | 12.1 | 68 | 825.7 |
| Estate Density Residential | D | <i>Estate D-D</i> | 3520.885982 | 35.4 | 84 | 2971.6 |
| Meadow | B | <i>Meadow-B</i> | 3440.180335 | 0.3 | 66 | 22.7 |
| Meadow | D | <i>Meadow-D</i> | 34508.76604 | 3.5 | 82 | 283.0 |
| NAG Agri | B | <i>NAG Agri-B</i> | 80410.21779 | 8.0 | 69 | 554.8 |
| NAG Agri | D | <i>NAG Agri-D</i> | 40740.53857 | 4.1 | 84 | 342.2 |
| Wetland | B | <i>Wetland-B</i> | 18581.41921 | 1.9 | 50 | 92.9 |
| Wetland | B | <i>Wetland-B</i> | 229059.5928 | 22.9 | 50 | 1145.3 |
| Wetland | D | <i>Wetland-D</i> | 569555.1511 | 57.0 | 50 | 2847.8 |
| Woods | B | <i>Woods-B</i> | 62209.259 | 6.2 | 60 | 373.3 |
| Woods | D | <i>Woods-D</i> | 7533.671662 | 0.8 | 79 | 59.5 |

Total Area (Ha): 316.90 Ha
Total Area * CN= 21929
Weighted CN (II) 69
CN (AMC III) 84

Note: bottom land and muck soils have been assigned HSG soil code "D"

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.16 |
| 0.01 | 1.25 |
| 0.01 | 0.23 |
| 0.17 | 0.05 |
| 0.17 | 2.06 |
| 0.17 | 6.01 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |
| 0.01 | 0.08 |
| 0.01 | 0.04 |
| 0.01 | 0.02 |
| 0.01 | 0.23 |
| 0.01 | 0.57 |
| 0.01 | 0.06 |
| 0.01 | 0.01 |

10.82
Avg T_{imp} 0.03

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.16 |
| 0.01 | 1.25 |
| 0.01 | 0.23 |
| 0.10 | 0.03 |
| 0.10 | 1.21 |
| 0.10 | 3.54 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |
| 0.01 | 0.08 |
| 0.01 | 0.04 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.06 |
| 0.01 | 0.01 |

6.65
Avg X_{imp} 0.02

| C | C * Area |
|------|----------|
| 0.22 | 3.52 |
| 0.35 | 43.75 |
| 0.55 | 12.92 |
| 0.25 | 0.07 |
| 0.25 | 3.04 |
| 0.25 | 8.84 |
| 0.28 | 0.10 |
| 0.40 | 1.38 |
| 0.28 | 2.25 |
| 0.40 | 1.63 |
| 0.25 | 0.46 |
| 0.25 | 5.73 |
| 0.35 | 19.93 |
| 0.25 | 1.56 |
| 0.35 | 0.26 |

105.44
Avg C 0.33

Assumptions

* Rural Development is allocated as Estate Density Residential

CKLOP_MCLaren
Subcatchment 200

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 348721.6139 | 34.9 | 64 | 2231.8 |
| Agriculture | B | <i>Agricult-B</i> | 50487.79579 | 5.0 | 75 | 378.7 |
| Estate Density Residential | A | <i>Estate D-A</i> | 24103.97433 | 3.6 | 51 | 185.6 |
| Estate Density Residential | B | <i>Estate D-B</i> | 17611.98199 | 1.8 | 68 | 119.8 |
| Estate Density Residential | D | <i>Estate D-D</i> | 7682.613221 | 0.8 | 84 | 64.5 |
| Meadow | A | <i>Meadow-A</i> | 25409.5853 | 2.5 | 46 | 116.9 |
| Meadow | B | <i>Meadow-B</i> | 2447.636071 | 0.2 | 66 | 16.2 |
| NAG Agri | B | <i>NAG Agri-B</i> | 12562.66905 | 1.3 | 69 | 86.7 |
| NAG Agri | D | <i>NAG Agri-D</i> | 1109.621764 | 0.1 | 84 | 9.3 |
| Wetland | B | <i>Wetland-B</i> | 8615.167848 | 0.9 | 50 | 43.1 |
| Wetland | D | <i>Wetland-D</i> | 5658.321982 | 0.6 | 50 | 28.3 |
| Woods | A | <i>Woods-A</i> | 40186.48795 | 4.0 | 36 | 144.7 |

Total Area (Ha): 55.69 Ha
Total Area * CN= 3425
Weighted CN (II) 62
CN (AMC III) 79

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.35 |
| 0.01 | 0.05 |
| 0.17 | 0.62 |
| 0.17 | 0.30 |
| 0.17 | 0.13 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.04 |

1.54
Avg T_{imp} 0.03

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.35 |
| 0.01 | 0.05 |
| 0.10 | 0.36 |
| 0.10 | 0.18 |
| 0.10 | 0.08 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.04 |

1.10
Avg X_{imp} 0.02

| C | C * Area |
|------|----------|
| 0.22 | 7.67 |
| 0.35 | 1.77 |
| 0.25 | 0.91 |
| 0.25 | 0.44 |
| 0.25 | 0.19 |
| 0.10 | 0.25 |
| 0.28 | 0.07 |
| 0.28 | 0.35 |
| 0.40 | 0.04 |
| 0.25 | 0.22 |
| 0.35 | 0.20 |
| 0.08 | 0.32 |

12.4
Avg C 0.22

Note: muck soils have been assigned HSG soil code "D"

Assumptions

* Rural Development is allocated as Estate Density Residential

CKLOP_MCLaren
Subcatchment 300

| Landuse | HSG | lookup value | Area | | CN | CN *Area |
|----------------------------|-----|--------------|-------------------|-------|----|----------|
| | | | (m ²) | (Ha) | | |
| Aggregate | A | Aggregat-A | 1030.672196 | 0.1 | 72 | 7.4 |
| Aggregate | B | Aggregat-B | 687.8801947 | 0.1 | 82 | 5.6 |
| Agriculture | A | Agricult-A | 86869.52006 | 8.7 | 64 | 556.0 |
| Agriculture | B | Agricult-B | 1124287.66 | 112.4 | 75 | 8432.2 |
| Agriculture | D | Agricult-D | 75142.87252 | 7.5 | 85 | 638.7 |
| Estate Density Residential | A | Estate D-A | 277792.8409 | 27.8 | 51 | 1416.7 |
| Estate Density Residential | B | Estate D-B | 116669.0489 | 11.7 | 68 | 793.3 |
| Estate Density Residential | D | Estate D-D | 42383.83502 | 4.2 | 84 | 356.0 |
| NAG Agri | B | NAG Agri-B | 122945.0331 | 12.3 | 69 | 848.3 |
| NAG Agri | D | NAG Agri-D | 71133.69605 | 7.1 | 84 | 597.5 |
| Open Water | D | Open Wat-D | 2870.58117 | 0.3 | 50 | 14.4 |
| Wetland | A | Wetland-A | 1631.218258 | 0.2 | 50 | 8.2 |
| Wetland | B | Wetland-B | 233548.0358 | 23.4 | 50 | 1167.7 |
| Wetland | D | Wetland-D | 461111.1689 | 46.1 | 50 | 2305.6 |
| Woods | A | Woods-A | 31380.34444 | 3.1 | 36 | 113.0 |
| Woods | B | Woods-B | 199226.5725 | 19.9 | 60 | 1195.4 |
| Roads | B | Roads-B | | 5.2 | 98 | 509.6 |
| Woods | D | Woods-D | 105665.0283 | 10.6 | 79 | 834.8 |

300.64 Ha
TotalArea * CN= 19800
Weighted CN (II) 66
CN (AMC III) 82

| T _{imp} | Timp *Area |
|------------------|------------|
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.09 |
| 0.01 | 1.12 |
| 0.01 | 0.08 |
| 0.17 | 4.72 |
| 0.17 | 1.98 |
| 0.17 | 0.72 |
| 0.01 | 0.12 |
| 0.01 | 0.07 |
| 0.00 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.23 |
| 0.01 | 0.46 |
| 0.01 | 0.03 |
| 0.01 | 0.20 |
| 0.90 | 4.68 |
| 0.01 | 0.11 |

Avg T_{imp} 0.05

| X _{imp} | Ximp *Area |
|------------------|------------|
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.09 |
| 0.01 | 1.12 |
| 0.01 | 0.08 |
| 0.10 | 2.78 |
| 0.10 | 1.17 |
| 0.10 | 0.42 |
| 0.01 | 0.12 |
| 0.01 | 0.07 |
| 0.01 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.03 |
| 0.01 | 0.20 |
| 0.90 | 4.68 |
| 0.01 | 0.11 |

Avg X_{imp} 0.04

| C | C *Area |
|------|---------|
| 0.40 | 0.04 |
| 0.40 | 0.03 |
| 0.22 | 1.91 |
| 0.35 | 39.35 |
| 0.55 | 4.13 |
| 0.25 | 6.94 |
| 0.25 | 2.92 |
| 0.25 | 1.06 |
| 0.28 | 3.44 |
| 0.40 | 2.85 |
| 1.00 | 0.29 |
| 0.08 | 0.01 |
| 0.25 | 5.84 |
| 0.35 | 16.14 |
| 0.08 | 0.25 |
| 0.25 | 4.98 |
| 1.00 | 5.20 |
| 0.35 | 3.70 |

Avg C 0.33

CKLOP_MCLaren
Subcatchment 400

| Landuse | HSG | lookup value | Area | | CN | CN *Area |
|----------------------------|-----|-------------------|-------------------|------|----|----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 2264.996549 | 0.2 | 64 | 14.5 |
| Agriculture | A | <i>Agricult-A</i> | 513151.6487 | 51.3 | 64 | 3284.2 |
| NAG Agri | B | <i>NAG Agri-B</i> | 4477.955915 | 0.4 | 69 | 30.9 |
| NAG Agri | B | <i>NAG Agri-B</i> | 2291.233137 | 0.2 | 69 | 15.8 |
| Roads | BC | <i>Roads-BC</i> | | 0.9 | 98 | 88.2 |
| Estate Density Residential | D | <i>Estate D-D</i> | 3824.949453 | 0.4 | 84 | 32.1 |
| Estate Density Residential | A | <i>Estate D-A</i> | 56205.58529 | 5.6 | 51 | 286.6 |

| | |
|-------------------------|-------------|
| 59.12 Ha | |
| TotalArea * CN= | 3752 |
| Weighted CN (II) | 63 |
| CN (AMC III) | 80 |

| T _{imp} | Timp *Area |
|------------------|------------|
| 0.01 | 0.00 |
| 0.01 | 0.51 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.90 | 0.81 |
| 0.17 | 0.07 |
| 0.17 | 0.96 |

2.35
Avg T_{imp} 0.04

| X _{imp} | Ximp *Area |
|------------------|------------|
| 0.01 | 0.00 |
| 0.01 | 0.51 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.90 | 0.81 |
| 0.10 | 0.04 |
| 0.10 | 0.56 |

1.93
Avg X_{imp} 0.03

| C | C *Area |
|------|---------|
| 0.22 | 0.05 |
| 0.22 | 11.29 |
| 0.28 | 0.13 |
| 0.28 | 0.06 |
| 1.00 | 0.90 |
| 0.25 | 0.10 |
| 0.25 | 1.41 |

13.9
Avg C 0.24

Note:muck soils have beenAssigned HSG soil code "D"

Assumptions

CKLOP_MCLaren
Subcatchment 500

| Landuse | HSG | lookup value | Area | | CN | CN *Area |
|----------------------------|-----|--------------|-------------------|-------|----|----------|
| | | | (m ²) | (Ha) | | |
| Aggregate | A | Aggregat-A | 67699.6544 | 6.8 | 72 | 487.4 |
| Aggregate | C | Aggregat-C | 22039.41459 | 2.2 | 87 | 191.7 |
| Agriculture | A | Agricult-A | 544364.3897 | 54.4 | 64 | 3483.9 |
| Agriculture | B | Agricult-B | 850081.8791 | 85.0 | 75 | 6375.6 |
| Agriculture | C | Agricult-C | 668544.7545 | 66.9 | 82 | 5482.1 |
| Agriculture | D | Agricult-D | 91020.64364 | 9.1 | 85 | 773.7 |
| Estate Density Residential | A | Estate D-A | 35296.43552 | 3.5 | 51 | 180.0 |
| Estate Density Residential | B | Estate D-B | 45898.53403 | 4.6 | 68 | 312.1 |
| Estate Density Residential | C | Estate D-C | 11663.29941 | 1.2 | 79 | 92.1 |
| Estate Density Residential | D | Estate D-D | 2198.853023 | 0.2 | 84 | 18.5 |
| Meadow | A | Meadow-A | 64127.35052 | 6.4 | 46 | 295.0 |
| NAG Agri | A | NAG Agri-A | 54355.7357 | 5.4 | 49 | 266.3 |
| NAG Agri | B | NAG Agri-B | 187914.5553 | 18.8 | 69 | 1296.6 |
| NAG Agri | C | NAG Agri-C | 13018.85965 | 1.3 | 79 | 102.8 |
| NAG Agri | D | NAG Agri-D | 38834.5993 | 3.9 | 84 | 326.2 |
| Open Water | W | Open Wat-W | 700619.6248 | 70.1 | 50 | 3503.1 |
| Wetland | A | Wetland-A | 371774.3314 | 37.2 | 50 | 1858.9 |
| Wetland | B | Wetland-B | 363985.5737 | 36.4 | 50 | 1819.9 |
| Wetland | C | Wetland-C | 801241.8859 | 80.1 | 50 | 4006.2 |
| Wetland | D | Wetland-D | 4131502.407 | 413.2 | 50 | 20657.5 |
| Roads | BC | Roads-BC | | 4.4 | 98 | 431.2 |
| Woods | A | Woods-A | 210409.8052 | 21.0 | 36 | 757.5 |
| Woods | B | Woods-B | 19738.27208 | 2.0 | 60 | 118.4 |
| Woods | C | Woods-C | 105464.6203 | 10.5 | 73 | 769.9 |
| Woods | D | Woods-D | 137890.7888 | 13.8 | 79 | 1089.3 |

958.37 Ha

TotalArea *CN= 54696

| T _{imp} | Timp *Area |
|------------------|------------|
| 0.01 | 0.07 |
| 0.01 | 0.02 |
| 0.01 | 0.54 |
| 0.01 | 0.85 |
| 0.01 | 0.67 |
| 0.01 | 0.09 |
| 0.17 | 0.60 |
| 0.17 | 0.78 |
| 0.17 | 0.20 |
| 0.17 | 0.04 |
| 0.01 | 0.06 |
| 0.01 | 0.05 |
| 0.01 | 0.19 |
| 0.01 | 0.01 |
| 0.01 | 0.04 |
| 0.00 | 0.00 |
| 0.01 | 0.37 |
| 0.01 | 0.36 |
| 0.01 | 0.80 |
| 0.01 | 4.13 |
| 0.90 | 3.96 |
| 0.01 | 0.21 |
| 0.01 | 0.02 |
| 0.01 | 0.11 |
| 0.01 | 0.14 |

14.32

Avg T_{imp} 0.01

| X _{imp} | Ximp *Area |
|------------------|------------|
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.54 |
| 0.01 | 0.85 |
| 0.01 | 0.67 |
| 0.01 | 0.09 |
| 0.10 | 0.35 |
| 0.10 | 0.46 |
| 0.10 | 0.12 |
| 0.10 | 0.02 |
| 0.01 | 0.06 |
| 0.01 | 0.05 |
| 0.01 | 0.19 |
| 0.01 | 0.01 |
| 0.01 | 0.04 |
| 0.01 | 0.70 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.90 | 3.96 |
| 0.01 | 0.21 |
| 0.01 | 0.02 |
| 0.01 | 0.11 |
| 0.01 | 0.14 |

8.60

Avg X_{imp} 0.01

| C | C *Area |
|------|---------|
| 0.40 | 2.71 |
| 0.40 | 0.88 |
| 0.22 | 11.98 |
| 0.35 | 29.75 |
| 0.35 | 23.40 |
| 0.55 | 5.01 |
| 0.25 | 0.88 |
| 0.25 | 1.15 |
| 0.25 | 0.29 |
| 0.25 | 0.05 |
| 0.10 | 0.64 |
| 0.10 | 0.54 |
| 0.28 | 5.26 |
| 0.28 | 0.36 |
| 0.40 | 1.55 |
| 1.00 | 70.06 |
| 0.08 | 2.97 |
| 0.25 | 9.10 |
| 0.25 | 20.03 |
| 0.35 | 144.60 |
| 1.00 | 4.40 |
| 0.08 | 1.68 |
| 0.25 | 0.49 |
| 0.25 | 2.64 |
| 0.35 | 4.83 |

345.3

AvgC 0.36

CKLOP_MCLaren
Subcatchment 600

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|-------------|-----|--------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Aggregate | A | Aggregat-A | 102600.3973 | 10.3 | 72 | 738.7 |
| Aggregate | B | Aggregat-B | 34494.71012 | 3.4 | 82 | 282.9 |
| Agriculture | A | Agricult-A | 158658.391 | 15.9 | 64 | 1015.4 |
| Agriculture | B | Agricult-B | 41303.33195 | 4.1 | 75 | 309.8 |
| Agriculture | D | Agricult-D | 14574.40619 | 1.5 | 85 | 123.9 |
| Meadow | A | Meadow-A | 33.32532189 | 0.0 | 46 | 0.2 |
| Meadow | A | Meadow-A | 21712.91055 | 2.2 | 46 | 99.9 |
| Meadow | D | Meadow-D | 359.1903311 | 0.0 | 82 | 2.9 |
| NAG Agri | A | NAG Agri-A | 10303.75132 | 1.0 | 49 | 50.5 |
| Wetland | A | Wetland-A | 3525.978773 | 0.4 | 50 | 17.6 |
| Wetland | D | Wetland-D | 55864.25193 | 5.6 | 50 | 279.3 |
| Wetland | D | Wetland-D | 33137.4022 | 3.3 | 50 | 165.7 |
| Roads | BC | Roads-BC | | 0.8 | 98 | 78.4 |
| Woods | A | Woods-A | 34818.41872 | 3.5 | 36 | 125.3 |
| Woods | A | Woods-A | 30523.92084 | 3.1 | 36 | 109.9 |
| Woods | B | Woods-B | 243.6546114 | 0.0 | 60 | 1.5 |
| Woods | D | Woods-D | 158.7185512 | 0.0 | 79 | 1.3 |
| Woods | D | Woods-D | 525.0917817 | 0.1 | 79 | 4.1 |

55.08 Ha

Total Area * CN= 3407

Weighted CN (II) 62

CN (AMC III) 79

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.10 |
| 0.01 | 0.03 |
| 0.01 | 0.16 |
| 0.01 | 0.04 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.06 |
| 0.01 | 0.03 |
| 0.90 | 0.72 |
| 0.01 | 0.03 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |

Avg T_{imp} 1.26
0.02

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.16 |
| 0.01 | 0.04 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.90 | 0.72 |
| 0.01 | 0.03 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |

Avg X_{imp} 1.03
0.02

| C | C * Area |
|------|----------|
| 0.40 | 4.10 |
| 0.40 | 1.38 |
| 0.22 | 3.49 |
| 0.35 | 1.45 |
| 0.55 | 0.80 |
| 0.10 | 0.00 |
| 0.10 | 0.22 |
| 0.40 | 0.01 |
| 0.10 | 0.10 |
| 0.08 | 0.03 |
| 0.35 | 1.96 |
| 0.35 | 1.16 |
| 1.00 | 0.80 |
| 0.08 | 0.28 |
| 0.08 | 0.24 |
| 0.25 | 0.01 |
| 0.35 | 0.01 |
| 0.35 | 0.02 |

Avg C 16.1
0.29

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 700

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 676680.4312 | 67.7 | 64 | 4330.8 |
| Agriculture | B | <i>Agricult-B</i> | 90192.47877 | 9.0 | 75 | 676.4 |
| Agriculture | C | <i>Agricult-C</i> | 17113.23206 | 1.7 | 82 | 140.3 |
| Agriculture | D | <i>Agricult-D</i> | 9245.229373 | 0.9 | 85 | 78.6 |
| Estate Density Residential | A | <i>Estate D-A</i> | 27955.78576 | 2.8 | 51 | 142.6 |
| Estate Density Residential | B | <i>Estate D-B</i> | 319.1747159 | 0.0 | 68 | 2.2 |
| Estate Density Residential | C | <i>Estate D-C</i> | 2322.696414 | 0.2 | 79 | 18.3 |
| Wetland | A | <i>Wetland-A</i> | 21308.79397 | 2.1 | 50 | 106.5 |
| Wetland | D | <i>Wetland-D</i> | 6518.281105 | 0.7 | 50 | 32.6 |
| Roads | BC | <i>Roads-BC</i> | | 3.2 | 98 | 313.6 |
| Woods | A | <i>Woods-A</i> | 8142.219964 | 0.8 | 36 | 29.3 |
| Woods | A | <i>Woods-A</i> | 12144.91768 | 1.2 | 36 | 43.7 |
| Woods | A | <i>Woods-A</i> | 3065.610459 | 0.3 | 36 | 11.0 |
| Woods | C | <i>Woods-C</i> | 245.4312627 | 0.0 | 73 | 1.8 |
| Woods | D | <i>Woods-D</i> | 25850.90548 | 2.6 | 79 | 204.2 |

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.68 |
| 0.01 | 0.09 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.17 | 0.48 |
| 0.17 | 0.01 |
| 0.17 | 0.04 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.90 | 2.88 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.68 |
| 0.01 | 0.09 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.10 | 0.28 |
| 0.10 | 0.00 |
| 0.10 | 0.02 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.90 | 2.88 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |

| C | C * Area |
|------|----------|
| 0.22 | 14.89 |
| 0.35 | 3.16 |
| 0.35 | 0.60 |
| 0.55 | 0.51 |
| 0.25 | 0.70 |
| 0.25 | 0.01 |
| 0.25 | 0.06 |
| 0.08 | 0.17 |
| 0.35 | 0.23 |
| 1.00 | 3.20 |
| 0.08 | 0.07 |
| 0.08 | 0.10 |
| 0.08 | 0.02 |
| 0.25 | 0.01 |
| 0.35 | 0.90 |

CKLOP_MCLaren
Subcatchment 800

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Woods | A | <i>Woods-A</i> | 8105.993516 | 0.8 | 36 | 29.2 |
| Meadow | C | <i>Meadow-C</i> | 16.30107608 | 0.0 | 77 | 0.1 |
| Woods | A | <i>Woods-A</i> | 13403.853 | 1.3 | 36 | 48.3 |
| Roads | BC | <i>Roads-BC</i> | | 2.8 | 98 | 274.4 |
| Agriculture | A | <i>Agricult-A</i> | 286475.924 | 28.6 | 64 | 1833.4 |
| Agriculture | C | <i>Agricult-C</i> | 422023.1023 | 42.2 | 82 | 3460.6 |
| Woods | A | <i>Woods-A</i> | 24925.8448 | 2.5 | 36 | 89.7 |
| Estate Density Residential | A | <i>Estate D-A</i> | 29319.77509 | 2.9 | 51 | 149.5 |
| Estate Density Residential | C | <i>Estate D-C</i> | 34855.49321 | 3.5 | 79 | 275.4 |

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.90 | 2.52 |
| 0.01 | 0.29 |
| 0.01 | 0.42 |
| 0.01 | 0.02 |
| 0.17 | 0.50 |
| 0.17 | 0.59 |

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.90 | 2.52 |
| 0.01 | 0.29 |
| 0.01 | 0.42 |
| 0.01 | 0.02 |
| 0.10 | 0.29 |
| 0.10 | 0.35 |

| C | C * Area |
|------|----------|
| 0.08 | 0.06 |
| 0.28 | 0.00 |
| 0.08 | 0.11 |
| 1.00 | 2.80 |
| 0.22 | 6.30 |
| 0.35 | 14.77 |
| 0.08 | 0.20 |
| 0.25 | 0.73 |
| 0.25 | 0.87 |

CKLOP_MCLaren
Subcatchment 900

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|--------------|-------------------------|------|-------------|-----------|
| | | | (m ²) | (Ha) | | |
| NAG Agri | C | NAG Agri-C | 25270.09709 | 2.5 | 79 | 199.6 |
| NAG Agri | D | NAG Agri-D | 12266.92527 | 1.2 | 84 | 103.0 |
| Woods | C | Woods-C | 9534.173793 | 1.0 | 73 | 69.6 |
| Woods | D | Woods-D | 25682.47133 | 2.6 | 79 | 202.9 |
| Roads | BC | Roads-BC | | 1.8 | 98 | 176.4 |
| Agriculture | B | Agricult-B | 276700.8451 | 27.7 | 75 | 2,075.3 |
| Agriculture | C | Agricult-C | 329142.2553 | 32.9 | 82 | 2,699.0 |
| Agriculture | D | Agricult-D | 24931.87959 | 2.5 | 85 | 211.9 |
| Estate Density Residential | B | Estate D-B | 13915.35221 | 1.4 | 68 | 94.6 |
| Estate Density Residential | C | Estate D-C | 20456.9144 | 2.0 | 79 | 161.6 |
| Estate Density Residential | D | Estate D-D | 977.4421761 | 0.1 | 84 | 8.2 |
| Total Area (Ha): | | | 75.69 Ha | | | |
| | | | Total Area * CN= | | 6002 | |
| | | | Weighted CN (II) | | 79 | |
| | | | CN (AMC III) | | 90 | |

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.03 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.03 |
| 0.01 | 0.03 |
| 0.90 | 1.62 |
| 0.01 | 0.28 |
| 0.01 | 0.33 |
| 0.01 | 0.02 |
| 0.17 | 0.24 |
| 0.17 | 0.35 |
| 0.17 | 0.02 |

Avg T_{imp} 2.92
0.04

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.03 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.03 |
| 0.01 | 0.03 |
| 0.90 | 1.62 |
| 0.01 | 0.28 |
| 0.01 | 0.33 |
| 0.01 | 0.02 |
| 0.10 | 0.14 |
| 0.10 | 0.20 |
| 0.10 | 0.01 |

Avg X_{imp} 2.68
0.04

| C | C * Area |
|------|----------|
| 0.28 | 0.71 |
| 0.40 | 0.49 |
| 0.25 | 0.24 |
| 0.35 | 0.90 |
| 1.00 | 1.80 |
| 0.35 | 9.68 |
| 0.35 | 11.52 |
| 0.55 | 1.37 |
| 0.25 | 0.35 |
| 0.25 | 0.51 |
| 0.25 | 0.02 |

Avg C 27.59
0.36

CKLOP_MCLaren
Subcatchment 1000

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|-------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | B | <i>Agricult-B</i> | 109295.4569 | 10.93 | 75 | 819.7 |
| Agriculture | C | <i>Agricult-C</i> | 109901.1795 | 10.99 | 82 | 901.2 |
| Agriculture | D | <i>Agricult-D</i> | 57557.428 | 5.76 | 85 | 489.2 |
| Estate Density Residential | C | <i>Estate D-C</i> | 7808.761062 | 0.78 | 79 | 61.7 |
| Estate Density Residential | D | <i>Estate D-D</i> | 5464.691974 | 0.55 | 84 | 45.9 |
| Meadow | B | <i>Meadow-B</i> | 794.1783576 | 0.08 | 66 | 5.2 |
| Meadow | D | <i>Meadow-D</i> | 9711.664192 | 0.97 | 82 | 79.6 |
| NAG Agri | C | <i>NAG Agri-C</i> | 362.3827083 | 0.04 | 79 | 2.9 |
| NAG Agri | D | <i>NAG Agri-D</i> | 12056.59542 | 1.21 | 84 | 101.3 |
| Open Water | D | <i>Open Wat-D</i> | 4506.961386 | 0.45 | 50 | 22.5 |
| Wetland | C | <i>Wetland-C</i> | 10516.69292 | 1.05 | 50 | 52.6 |
| Wetland | D | <i>Wetland-D</i> | 17067.75761 | 1.71 | 50 | 85.3 |
| Wetland | D | <i>Wetland-D</i> | 7671.653864 | 0.77 | 50 | 38.4 |
| Woods | C | <i>Woods-C</i> | 9028.435423 | 0.90 | 73 | 65.9 |
| Woods | D | <i>Woods-D</i> | 13407.83534 | 1.34 | 79 | 105.9 |

Total Area (Ha): **37.52 Ha**
Total Area * CN= **2877**
Weighted CN (II) **77**
CN (AMC III) **89**

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.11 |
| 0.01 | 0.11 |
| 0.01 | 0.06 |
| 0.17 | 0.13 |
| 0.17 | 0.09 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.00 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

0.58
Avg T_{imp} **0.02**

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.11 |
| 0.01 | 0.11 |
| 0.01 | 0.06 |
| 0.10 | 0.08 |
| 0.10 | 0.05 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

0.46
Avg X_{imp} **0.01**

| C | C * Area |
|------|----------|
| 0.35 | 3.83 |
| 0.35 | 3.85 |
| 0.55 | 3.17 |
| 0.25 | 0.20 |
| 0.25 | 0.14 |
| 0.28 | 0.02 |
| 0.40 | 0.39 |
| 0.28 | 0.01 |
| 0.40 | 0.48 |
| 1.00 | 0.45 |
| 0.25 | 0.26 |
| 0.35 | 0.60 |
| 0.35 | 0.27 |
| 0.25 | 0.23 |
| 0.35 | 0.47 |

14.35
Avg C **0.38**

CKLOP_MCLaren
Subcatchment 1000

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|-------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | B | <i>Agricult-B</i> | 109295.4569 | 10.93 | 75 | 819.7 |
| Agriculture | C | <i>Agricult-C</i> | 109901.1795 | 10.99 | 82 | 901.2 |
| Agriculture | D | <i>Agricult-D</i> | 57557.428 | 5.76 | 85 | 489.2 |
| Estate Density Residential | C | <i>Estate D-C</i> | 7808.761062 | 0.78 | 79 | 61.7 |
| Estate Density Residential | D | <i>Estate D-D</i> | 5464.691974 | 0.55 | 84 | 45.9 |
| Meadow | B | <i>Meadow-B</i> | 794.1783576 | 0.08 | 66 | 5.2 |
| Meadow | D | <i>Meadow-D</i> | 9711.664192 | 0.97 | 82 | 79.6 |
| NAG Agri | C | <i>NAG Agri-C</i> | 362.3827083 | 0.04 | 79 | 2.9 |
| NAG Agri | D | <i>NAG Agri-D</i> | 12056.59542 | 1.21 | 84 | 101.3 |
| Open Water | D | <i>Open Wat-D</i> | 4506.961386 | 0.45 | 50 | 22.5 |
| Wetland | C | <i>Wetland-C</i> | 10516.69292 | 1.05 | 50 | 52.6 |
| Wetland | D | <i>Wetland-D</i> | 17067.75761 | 1.71 | 50 | 85.3 |
| Wetland | D | <i>Wetland-D</i> | 7671.653864 | 0.77 | 50 | 38.4 |
| Woods | C | <i>Woods-C</i> | 9028.435423 | 0.90 | 73 | 65.9 |
| Woods | D | <i>Woods-D</i> | 13407.83534 | 1.34 | 79 | 105.9 |

Total Area (Ha): 37.52 Ha
Total Area * CN= 2877
Weighted CN (II) 77
CN (AMC III) 89

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.11 |
| 0.01 | 0.11 |
| 0.01 | 0.06 |
| 0.17 | 0.13 |
| 0.17 | 0.09 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.00 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

0.58
Avg T_{imp} 0.02

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.11 |
| 0.01 | 0.11 |
| 0.01 | 0.06 |
| 0.10 | 0.08 |
| 0.10 | 0.05 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

0.46
Avg X_{imp} 0.01

| C | C * Area |
|------|----------|
| 0.35 | 3.83 |
| 0.35 | 3.85 |
| 0.55 | 3.17 |
| 0.25 | 0.20 |
| 0.25 | 0.14 |
| 0.28 | 0.02 |
| 0.40 | 0.39 |
| 0.28 | 0.01 |
| 0.40 | 0.48 |
| 1.00 | 0.45 |
| 0.25 | 0.26 |
| 0.35 | 0.60 |
| 0.35 | 0.27 |
| 0.25 | 0.23 |
| 0.35 | 0.47 |

14.35
Avg C 0.38

CKLOP_MCLaren
Subcatchment 1100

| Landuse | HSG | lookup value | Area | | CN | CN * Area | T _{imp} | T _{imp} * Area | X _{imp} | X _{imp} * Area | C | C * Area |
|----------------------------|-----|--------------|-------------------------|------|-------------|-----------|----------------------------|-------------------------|------------------|-------------------------|-------------|----------|
| | | | (m ²) | (Ha) | | | | | | | | |
| Woods | C | Woods-C | 3917.583094 | 0.4 | 73 | 28.6 | 0.01 | 0.00 | 0.01 | 0.00 | 0.25 | 0.10 |
| Woods | D | Agricult-B | 8920.244879 | 0.9 | 75 | 66.9 | 0.01 | 0.01 | 0.01 | 0.01 | 0.35 | 0.31 |
| Agriculture | C | Agricult-C | 441736.732 | 44.2 | 82 | 3,622.2 | 0.01 | 0.44 | 0.01 | 0.44 | 0.35 | 15.46 |
| Woods | C | Woods-C | 54340.6631 | 5.4 | 73 | 396.7 | 0.01 | 0.05 | 0.01 | 0.05 | 0.25 | 1.36 |
| Wetland | D | Wetland-D | 393.082875 | 0.0 | 50 | 2.0 | 0.01 | 0.00 | 0.00 | 0.00 | 0.35 | 0.01 |
| Roads | BC | Roads-BC | | 2.0 | 98 | 196.0 | 0.90 | 1.80 | 0.90 | 1.80 | 1.00 | 2.00 |
| NAG Agri | C | NAG Agri-C | 90867.17909 | 9.1 | 79 | 717.9 | 0.01 | 0.09 | 0.01 | 0.09 | 0.28 | 2.54 |
| NAG Agri | D | NAG Agri-D | 63605.87344 | 6.4 | 84 | 534.3 | 0.01 | 0.06 | 0.01 | 0.06 | 0.40 | 2.54 |
| Estate Density Residential | C | Estate D-C | 43666.00675 | 4.4 | 79 | 345.0 | 0.17 | 0.74 | 0.10 | 0.44 | 0.25 | 1.09 |
| Estate Density Residential | D | Estate D-D | 8555.015486 | 0.9 | 84 | 71.9 | 0.17 | 0.15 | 0.10 | 0.09 | 0.25 | 0.21 |
| | | | 73.60 Ha | | | | | | | | | |
| | | | Total Area * CN= | | 5981 | | Avg T_{imp} | | 3.35 | | 25.6 | |
| | | | Weighted CN (II) | | 81 | | 0.05 | | 0.04 | | 0.35 | |
| | | | CN (AMC III) | | 91 | | | | | | | |

Note: muck soils have been assigned HSG soil code "D"

Assumptions

* Rural Development is allocated as Estate Density Residential

CKLOP_MCLaren
Subcatchment 1200

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 561.8300209 | 0.1 | 64 | 3.6 |
| Agriculture | B | <i>Agricult-B</i> | 99718.43368 | 10.0 | 75 | 747.9 |
| Agriculture | C | <i>Agricult-C</i> | 437143.6934 | 43.7 | 82 | 3584.6 |
| Agriculture | D | <i>Agricult-D</i> | 75793.01022 | 7.6 | 85 | 644.2 |
| Estate Density Residential | C | <i>Estate D-C</i> | 43218.48322 | 4.3 | 79 | 341.4 |
| NAG Agri | B | <i>NAG Agri-B</i> | 263.2574392 | 0.0 | 69 | 1.8 |
| NAG Agri | C | <i>NAG Agri-C</i> | 12072.51527 | 1.2 | 79 | 95.4 |
| NAG Agri | D | <i>NAG Agri-D</i> | 15839.74571 | 1.6 | 84 | 133.1 |
| Open Water | W | <i>Open Wat-W</i> | 10620.2214 | 1.1 | 50 | 53.1 |
| Open Water | W | <i>Open Wat-W</i> | 92.21356121 | 0.0 | 50 | 0.5 |
| Open Water | W | <i>Open Wat-W</i> | 5097.658296 | 0.5 | 50 | 25.5 |
| Medium Density Residential | B | <i>Medium D-B</i> | 43299.5105 | 4.3 | 74 | 320.4 |
| Medium Density Residential | C | <i>Medium D-C</i> | 16058.074 | 1.6 | 82 | 131.7 |
| Medium Density Residential | D | <i>Medium D-D</i> | 2137.598429 | 0.2 | 87 | 18.6 |
| Roads | BC | <i>Roads-BC</i> | | 2.2 | 98 | 215.6 |
| Wetland | C | <i>Wetland-C</i> | 3902.160116 | 0.4 | 50 | 19.5 |
| Wetland | D | <i>Wetland-D</i> | 3712.404863 | 0.4 | 50 | 18.6 |
| Wetland | D | <i>Wetland-D</i> | 13329.75042 | 1.3 | 50 | 66.6 |
| Wetland | D | <i>Wetland-D</i> | 8582.058311 | 0.9 | 50 | 42.9 |

Total Area (Ha): 81.34 Ha
Total Area * CN= 6465
Weighted CN (II) 79
CN (AMC III) 90

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.00 |
| 0.01 | 0.10 |
| 0.01 | 0.44 |
| 0.01 | 0.08 |
| 0.17 | 0.73 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.02 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.52 | 2.25 |
| 0.52 | 0.84 |
| 0.52 | 0.11 |
| 0.90 | 1.98 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

Avg T_{imp} 0.08

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.00 |
| 0.01 | 0.10 |
| 0.01 | 0.44 |
| 0.01 | 0.08 |
| 0.10 | 0.43 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.25 | 1.08 |
| 0.25 | 0.40 |
| 0.25 | 0.05 |
| 0.90 | 1.98 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |

Avg X_{imp} 0.06

| C | C * Area |
|------|----------|
| 0.22 | 0.01 |
| 0.35 | 3.49 |
| 0.35 | 15.30 |
| 0.55 | 4.17 |
| 0.25 | 1.08 |
| 0.28 | 0.01 |
| 0.28 | 0.34 |
| 0.40 | 0.63 |
| 1.00 | 1.06 |
| 1.00 | 0.01 |
| 1.00 | 0.51 |
| 0.45 | 1.95 |
| 0.45 | 0.72 |
| 0.45 | 0.10 |
| 1.00 | 2.20 |
| 0.25 | 0.10 |
| 0.35 | 0.13 |
| 0.35 | 0.47 |
| 0.35 | 0.30 |

Avg C 0.40

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 1300

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|-------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | B | <i>Agricult-B</i> | 261.5551799 | 0.03 | 75 | 2.0 |
| Agriculture | C | <i>Agricult-C</i> | 26578.37559 | 2.66 | 82 | 217.9 |
| Agriculture | D | <i>Agricult-D</i> | 582997.6958 | 58.30 | 85 | 4955.5 |
| Estate Density Residential | B | <i>Estate D-B</i> | 6628.248684 | 0.66 | 68 | 45.1 |
| Estate Density Residential | C | <i>Estate D-C</i> | 16059.04135 | 1.61 | 79 | 126.9 |
| Estate Density Residential | D | <i>Estate D-D</i> | 14761.8834 | 1.48 | 84 | 124.0 |
| Roads | BC | <i>Roads-BC</i> | | 1.80 | 98 | 176.4 |
| NAG Agri | D | <i>NAG Agri-D</i> | 1107.744566 | 0.11 | 84 | 9.3 |
| Woods | D | <i>Woods-D</i> | 18874.8347 | 1.89 | 79 | 149.1 |
| Woods | D | <i>Woods-D</i> | 22886.45604 | 2.29 | 79 | 180.8 |

Total Area (Ha): **70.82 Ha**
Total Area * CN= **5987**
Weighted CN (II) **85**
CN (AMC III) **94**

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.00 |
| 0.01 | 0.03 |
| 0.01 | 0.58 |
| 0.17 | 0.11 |
| 0.17 | 0.27 |
| 0.17 | 0.25 |
| 0.90 | 1.62 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.02 |

Avg T_{imp} **2.91**
0.04

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.00 |
| 0.01 | 0.03 |
| 0.01 | 0.58 |
| 0.10 | 0.07 |
| 0.10 | 0.16 |
| 0.10 | 0.15 |
| 0.90 | 1.62 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.02 |

Avg X_{imp} **2.65**
0.04

| C | C * Area |
|------|----------|
| 0.35 | 0.01 |
| 0.35 | 0.93 |
| 0.55 | 32.06 |
| 0.25 | 0.17 |
| 0.25 | 0.40 |
| 0.25 | 0.37 |
| 1.00 | 1.80 |
| 0.40 | 0.04 |
| 0.35 | 0.66 |
| 0.35 | 0.80 |

Avg C **37.2**
0.53

CKLOP_MCLaren
Subcatchment 1400

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | B | <i>Agricult-B</i> | 134587.1647 | 13.5 | 75 | 1009.4 |
| Agriculture | C | <i>Agricult-C</i> | 719713.2973 | 72.0 | 82 | 5901.6 |
| Agriculture | D | <i>Agricult-D</i> | 33282.61163 | 3.3 | 85 | 282.9 |
| Estate Density Residential | B | <i>Estate D-B</i> | 12863.65611 | 1.3 | 68 | 87.5 |
| Estate Density Residential | C | <i>Estate D-C</i> | 24359.52683 | 2.4 | 79 | 192.4 |
| Estate Density Residential | D | <i>Estate D-D</i> | 6650.967738 | 0.7 | 84 | 55.9 |
| Roads | BC | <i>Roads-BC</i> | | 2.4 | 98 | 235.2 |
| Meadow | C | <i>Meadow-C</i> | 18.60623921 | 0.0 | 77 | 0.1 |
| Woods | C | <i>Woods-C</i> | 39352.24389 | 3.9 | 73 | 287.3 |

Total Area (Ha): **99.48 Ha**
Total Area * CN= **8052**
Weighted CN (II) **81**
CN (AMC III) **91**

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.13 |
| 0.01 | 0.72 |
| 0.01 | 0.03 |
| 0.17 | 0.22 |
| 0.17 | 0.41 |
| 0.17 | 0.11 |
| 0.90 | 2.16 |
| 0.01 | 0.00 |
| 0.01 | 0.04 |

3.83
Avg T_{imp} **0.04**

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.13 |
| 0.01 | 0.72 |
| 0.01 | 0.03 |
| 0.10 | 0.13 |
| 0.10 | 0.24 |
| 0.10 | 0.07 |
| 0.90 | 2.16 |
| 0.01 | 0.00 |
| 0.01 | 0.04 |

3.53
Avg X_{imp} **0.04**

| C | C * Area |
|------|----------|
| 0.35 | 4.71 |
| 0.35 | 25.19 |
| 0.55 | 1.83 |
| 0.25 | 0.32 |
| 0.25 | 0.61 |
| 0.25 | 0.17 |
| 1.00 | 2.40 |
| 0.28 | 0.00 |
| 0.25 | 0.98 |

36.2
Avg C **0.36**

Note: muck soils have been assigned HSG soil code "D"
Muck soils have been assigned Other in the Map-App

CKLOP_MCLaren
Subcatchment 1500

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | B | <i>Agricult-B</i> | 785357.4333 | 78.5 | 75 | 5890.2 |
| Agriculture | C | <i>Agricult-C</i> | 908520.2998 | 90.9 | 82 | 7449.9 |
| Agriculture | D | <i>Agricult-D</i> | 171763.0519 | 17.2 | 85 | 1460.0 |
| Estate Density Residential | B | <i>Estate D-B</i> | 80434.69044 | 8.0 | 68 | 547.0 |
| Estate Density Residential | C | <i>Estate D-C</i> | 7470.150523 | 0.7 | 79 | 59.0 |
| NAG Agri | B | <i>NAG Agri-B</i> | 36918.55959 | 3.7 | 69 | 254.7 |
| Roads | BC | <i>Roads-BC</i> | | 3.6 | 98 | 352.8 |
| Woods | C | <i>Woods-C</i> | 23698.4578 | 2.4 | 73 | 173.0 |
| Woods | B | <i>Woods-B</i> | 198.311916 | 0.0 | 60 | 1.2 |
| Woods | C | <i>Woods-C</i> | 3988.322865 | 0.4 | 73 | 29.1 |
| Woods | D | <i>Woods-D</i> | 42797.99208 | 4.3 | 79 | 338.1 |
| Woods | C | <i>Woods-C</i> | 9272.556704 | 0.9 | 73 | 67.7 |

Total Area (Ha): 210.64 Ha
Total Area * CN= 16623
Weighted CN (II) 79
CN (AMC III) 90

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.79 |
| 0.01 | 0.91 |
| 0.01 | 0.17 |
| 0.17 | 1.37 |
| 0.17 | 0.13 |
| 0.01 | 0.04 |
| 0.90 | 3.24 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.04 |
| 0.01 | 0.01 |

6.72
Avg T_{imp} 0.03

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.79 |
| 0.01 | 0.91 |
| 0.01 | 0.17 |
| 0.10 | 0.80 |
| 0.10 | 0.07 |
| 0.01 | 0.04 |
| 0.90 | 3.24 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.04 |
| 0.01 | 0.01 |

6.10
Avg X_{imp} 0.03

| C | C * Area |
|------|----------|
| 0.35 | 27.49 |
| 0.35 | 31.80 |
| 0.55 | 9.45 |
| 0.25 | 2.01 |
| 0.25 | 0.19 |
| 0.28 | 1.03 |
| 1.00 | 3.60 |
| 0.25 | 0.59 |
| 0.25 | 0.00 |
| 0.25 | 0.10 |
| 0.35 | 1.50 |
| 0.25 | 0.23 |

77.99
Avg C 0.37

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 1600

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------------|------|-------------|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 9381.230679 | 0.9 | 64 | 60.0 |
| Agriculture | B | <i>Agricult-B</i> | 12324.48591 | 1.2 | 75 | 92.4 |
| Agriculture | C | <i>Agricult-C</i> | 128592.6146 | 12.9 | 82 | 1054.5 |
| Agriculture | D | <i>Agricult-D</i> | 191624.7505 | 19.2 | 85 | 1628.8 |
| Estate Density Residential | B | <i>Estate D-B</i> | 11198.89322 | 1.1 | 68 | 76.2 |
| Estate Density Residential | C | <i>Estate D-C</i> | 11000.56563 | 1.1 | 79 | 86.9 |
| Estate Density Residential | D | <i>Estate D-D</i> | 5578.552459 | 0.6 | 84 | 46.9 |
| Meadow | D | <i>Meadow-D</i> | 14332.61365 | 1.4 | 82 | 117.5 |
| Woods | D | <i>Woods-D</i> | 860.635876 | 0.1 | 79 | 6.8 |
| Woods | C | <i>Woods-C</i> | 51637.94103 | 5.2 | 73 | 377.0 |
| Woods | D | <i>Woods-D</i> | 55732.9665 | 5.6 | 79 | 440.3 |
| Total Area (Ha): | | | 49.23 Ha | | | |
| | | | Total Area * CN= | | 3987 | |
| | | | Weighted CN (II) | | 81 | |
| | | | CN (AMC III) | | 91 | |

| T _{imp} | T _{imp} * Area |
|----------------------------|-------------------------|
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.13 |
| 0.01 | 0.19 |
| 0.17 | 0.19 |
| 0.17 | 0.19 |
| 0.17 | 0.09 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.05 |
| 0.01 | 0.06 |
| 0.94 | |
| Avg T_{imp} | 0.02 |

| X _{imp} | X _{imp} * Area |
|----------------------------|-------------------------|
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.13 |
| 0.01 | 0.19 |
| 0.10 | 0.11 |
| 0.10 | 0.11 |
| 0.10 | 0.06 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.05 |
| 0.01 | 0.06 |
| 0.74 | |
| Avg X_{imp} | 0.02 |

| C | C * Area |
|--------------|-------------|
| 0.22 | 0.21 |
| 0.35 | 0.43 |
| 0.35 | 4.50 |
| 0.55 | 10.54 |
| 0.25 | 0.28 |
| 0.25 | 0.28 |
| 0.25 | 0.14 |
| 0.40 | 0.57 |
| 0.35 | 0.03 |
| 0.25 | 1.29 |
| 0.35 | 1.95 |
| 20.22 | |
| Avg C | 0.41 |

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 1700

| Landuse | HSG | lookup value | Area | | CN | CN * Area | T _{imp} | T _{imp} * Area | X _{imp} | X _{imp} * Area | C | C * Area |
|----------------------------|-----|-------------------|-------------------|------|------------------------------|-----------|----------------------------|-------------------------|----------------------------|-------------------------|--------------|----------|
| | | | (m ²) | (Ha) | | | | | | | | |
| Low Density Residential | C | <i>Low Dens-C</i> | 56092.72661 | 5.6 | 82 | 460.0 | 0.23 | 1.29 | 0.15 | 0.84 | 0.45 | 2.52 |
| Low Density Residential | D | <i>Low Dens-D</i> | 5073.978783 | 0.5 | 87 | 44.1 | 0.23 | 0.12 | 0.15 | 0.08 | 0.45 | 0.23 |
| Agriculture | D | <i>Agricult-D</i> | 42844.23278 | 4.3 | 85 | 364.2 | 0.01 | 0.04 | 0.01 | 0.04 | 0.55 | 2.36 |
| Estate Density Residential | D | <i>Estate D-D</i> | 19932.54332 | 2.0 | 84 | 167.4 | 0.17 | 0.34 | 0.10 | 0.20 | 0.25 | 0.50 |
| Roads | BC | <i>Roads-BC</i> | | 1.0 | 98 | 98.0 | 0.90 | 0.90 | 0.90 | 0.90 | 1.00 | 1.00 |
| Meadow | C | <i>Meadow-C</i> | 14641.55496 | 1.5 | 77 | 112.7 | 0.01 | 0.01 | 0.01 | 0.01 | 0.28 | 0.41 |
| Meadow | D | <i>Meadow-D</i> | 5076.065169 | 0.5 | 82 | 41.6 | 0.01 | 0.01 | 0.01 | 0.01 | 0.40 | 0.20 |
| NAG Agri | D | <i>NAG Agri-D</i> | 11525.61178 | 1.2 | 84 | 96.8 | 0.01 | 0.01 | 0.01 | 0.01 | 0.40 | 0.46 |
| Woods | C | <i>Woods-C</i> | 1200.929313 | 0.1 | 73 | 8.8 | 0.01 | 0.00 | 0.01 | 0.00 | 0.25 | 0.03 |
| Woods | D | <i>Woods-D</i> | 30088.3007 | 3.0 | 79 | 237.7 | 0.01 | 0.03 | 0.01 | 0.03 | 0.35 | 1.05 |
| Total Area (Ha): | | | 19.65 Ha | | Total Area * CN= 1631 | | Avg T_{imp} | 2.75 | Avg X_{imp} | 2.12 | Avg C | 8.76 |
| | | | | | Weighted CN (II) 83 | | 0.14 | | 0.11 | | 0.45 | |
| | | | | | CN (AMC III) 93 | | | | | | | |

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 1800

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Low Density Residential | C | <i>Low Dens-C</i> | 7300.485244 | 0.7 | 82 | 59.9 |
| Agriculture | A | <i>Agricult-A</i> | 1693.845902 | 0.2 | 64 | 10.8 |
| Agriculture | C | <i>Agricult-C</i> | 449017.4068 | 44.9 | 82 | 3681.9 |
| Agriculture | D | <i>Agricult-D</i> | 48291.30103 | 4.8 | 85 | 410.5 |
| Estate Density Residential | C | <i>Estate D-C</i> | 20077.63007 | 2.0 | 79 | 158.6 |
| Estate Density Residential | D | <i>Estate D-D</i> | 17654.72018 | 1.8 | 84 | 148.3 |
| Roads | BC | <i>Roads-BC</i> | | 2.7 | 98 | 264.6 |
| Meadow | C | <i>Meadow-C</i> | 7946.615714 | 0.8 | 77 | 61.2 |
| Meadow | D | <i>Meadow-D</i> | 13771.41715 | 1.4 | 82 | 112.9 |
| Meadow | C | <i>Meadow-C</i> | 10434.59231 | 1.0 | 77 | 80.3 |
| Meadow | D | <i>Meadow-D</i> | 32101.34344 | 3.2 | 82 | 263.2 |
| NAG Agri | C | <i>NAG Agri-C</i> | 51103.23704 | 5.1 | 79 | 403.7 |
| NAG Agri | D | <i>NAG Agri-D</i> | 48815.25881 | 4.9 | 84 | 410.0 |
| Woods | D | <i>Woods-D</i> | 13407.32536 | 1.3 | 79 | 105.9 |

Total Area (Ha): 74.86 Ha
Total Area * CN= 6172
Weighted CN (II) 82
CN (AMC III) 92

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.23 | 0.17 |
| 0.01 | 0.00 |
| 0.01 | 0.45 |
| 0.01 | 0.05 |
| 0.17 | 0.34 |
| 0.17 | 0.30 |
| 0.90 | 2.43 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.03 |
| 0.01 | 0.05 |
| 0.01 | 0.05 |
| 0.01 | 0.01 |

Avg T_{imp} 3.92
0.05

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.15 | 0.11 |
| 0.01 | 0.00 |
| 0.01 | 0.45 |
| 0.01 | 0.05 |
| 0.10 | 0.20 |
| 0.10 | 0.18 |
| 0.90 | 2.43 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |
| 0.01 | 0.03 |
| 0.01 | 0.05 |
| 0.01 | 0.05 |
| 0.01 | 0.01 |

Avg X_{imp} 3.59
0.05

| C | C * Area |
|------|----------|
| 0.45 | 0.33 |
| 0.22 | 0.04 |
| 0.35 | 15.72 |
| 0.55 | 2.66 |
| 0.25 | 0.50 |
| 0.25 | 0.44 |
| 1.00 | 2.70 |
| 0.28 | 0.22 |
| 0.40 | 0.55 |
| 0.28 | 0.29 |
| 0.40 | 1.28 |
| 0.28 | 1.43 |
| 0.40 | 1.95 |
| 0.35 | 0.47 |

Avg C 28.58
0.38

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 1900

| Landuse | HSG | lookup value | Area | | CN | CN *Area |
|----------------------------|-----|-------------------|-------------------|-------|----|----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 31663.68931 | 3.2 | 64 | 202.6 |
| Agriculture | B | <i>Agricult-B</i> | 94230.90051 | 9.4 | 75 | 706.7 |
| Agriculture | C | <i>Agricult-C</i> | 1198873.926 | 119.9 | 82 | 9830.8 |
| Agriculture | D | <i>Agricult-D</i> | 57065.33104 | 5.7 | 85 | 485.1 |
| Estate Density Residential | A | <i>Estate D-A</i> | 1571.118057 | 0.2 | 51 | 8.0 |
| Estate Density Residential | B | <i>Estate D-B</i> | 22022.74348 | 2.2 | 68 | 149.8 |
| Estate Density Residential | C | <i>Estate D-C</i> | 91961.51158 | 9.2 | 79 | 726.5 |
| Estate Density Residential | D | <i>Estate D-D</i> | 16839.98613 | 1.7 | 84 | 141.5 |
| Meadow | C | <i>Meadow-C</i> | 11247.95577 | 1.1 | 77 | 86.6 |
| Meadow | C | <i>Meadow-C</i> | 87448.28186 | 8.7 | 77 | 673.4 |
| Meadow | D | <i>Meadow-D</i> | 3872.657398 | 0.4 | 82 | 31.8 |
| NAG Agri | A | <i>NAG Agri-A</i> | 4.891306838 | 0.0 | 49 | 0.0 |
| NAG Agri | C | <i>NAG Agri-C</i> | 181264.0815 | 18.1 | 79 | 1432.0 |
| NAG Agri | D | <i>NAG Agri-D</i> | 69459.8925 | 6.9 | 84 | 583.5 |
| Open Water | W | <i>Open Wat-W</i> | 1277.156764 | 0.1 | 50 | 6.4 |
| Roads | BC | <i>Roads-BC</i> | | 3.1 | 98 | 303.8 |
| Woods | C | <i>Woods-C</i> | 102169.6508 | 10.2 | 73 | 745.8 |
| Woods | D | <i>Woods-D</i> | 40280.8882 | 4.0 | 79 | 318.2 |
| Woods | D | <i>Woods-D</i> | 15962.93868 | 1.6 | 79 | 126.1 |
| Woods | C | <i>Woods-C</i> | 2683.839477 | 0.3 | 73 | 19.6 |
| Woods | D | <i>Woods-D</i> | 4104.635866 | 0.4 | 79 | 32.4 |
| Woods | B | <i>Woods-B</i> | 6174.409367 | 0.6 | 60 | 37.0 |
| Woods | C | <i>Woods-C</i> | 1026.784354 | 0.1 | 73 | 7.5 |
| Woods | D | <i>Woods-D</i> | 142.14152 | 0.0 | 79 | 1.1 |
| Woods | C | <i>Woods-C</i> | 131.3641825 | 0.0 | 73 | 1.0 |
| Woods | D | <i>Woods-D</i> | 14007.78313 | 1.4 | 79 | 110.7 |

TotalArea (Ha): 208.65 Ha
TotalArea *CN= 16768
WeightedCN (II) 80
CN (AMC III) #N/A

| T _{imp} | Timp *Area |
|------------------|------------|
| 0.01 | 0.03 |
| 0.01 | 0.09 |
| 0.01 | 1.20 |
| 0.01 | 0.06 |
| 0.17 | 0.03 |
| 0.17 | 0.37 |
| 0.17 | 1.56 |
| 0.17 | 0.29 |
| 0.01 | 0.01 |
| 0.01 | 0.09 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.18 |
| 0.01 | 0.07 |
| 0.00 | 0.00 |
| 0.90 | 2.79 |
| 0.01 | 0.10 |
| 0.01 | 0.04 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |

Avg T_{imp} 6.96
0.03

| X _{imp} | Ximp *Area |
|------------------|------------|
| 0.01 | 0.03 |
| 0.01 | 0.09 |
| 0.01 | 1.20 |
| 0.01 | 0.06 |
| 0.10 | 0.02 |
| 0.10 | 0.22 |
| 0.10 | 0.92 |
| 0.10 | 0.17 |
| 0.01 | 0.01 |
| 0.01 | 0.09 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.18 |
| 0.01 | 0.07 |
| 0.01 | 0.00 |
| 0.90 | 2.79 |
| 0.01 | 0.10 |
| 0.01 | 0.04 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |

Avg X_{imp} 6.04
0.03

| C | C *Area |
|------|---------|
| 0.22 | 0.70 |
| 0.35 | 3.30 |
| 0.35 | 41.96 |
| 0.55 | 3.14 |
| 0.25 | 0.04 |
| 0.25 | 0.55 |
| 0.25 | 2.30 |
| 0.25 | 0.42 |
| 0.28 | 0.31 |
| 0.28 | 2.45 |
| 0.40 | 0.15 |
| 0.10 | 0.00 |
| 0.28 | 5.08 |
| 0.40 | 2.78 |
| 1.00 | 0.13 |
| 1.00 | 3.10 |
| 0.25 | 2.55 |
| 0.35 | 1.41 |
| 0.35 | 0.56 |
| 0.25 | 0.07 |
| 0.35 | 0.14 |
| 0.25 | 0.15 |
| 0.25 | 0.03 |
| 0.35 | 0.00 |
| 0.25 | 0.00 |
| 0.35 | 0.49 |

AvgC 71.82
0.34

Note:muck soils haveBeenAssigned HSG soilCode "D"

CKLOP_MCLaren
Subcatchment 2000

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 40368.89656 | 4.0 | 64 | 258.4 |
| Agriculture | B | <i>Agricult-B</i> | 206869.4682 | 20.7 | 75 | 1551.5 |
| Agriculture | C | <i>Agricult-C</i> | 220110.5789 | 22.0 | 82 | 1804.9 |
| Agriculture | D | <i>Agricult-D</i> | 56434.83298 | 5.6 | 85 | 479.7 |
| Estate Density Residential | A | <i>Estate D-A</i> | 14654.8942 | 1.5 | 51 | 74.7 |
| Estate Density Residential | B | <i>Estate D-B</i> | 4156.78657 | 0.4 | 68 | 28.3 |
| Estate Density Residential | C | <i>Estate D-C</i> | 9936.118956 | 1.0 | 79 | 78.5 |
| Meadow | C | <i>Meadow-C</i> | 2085.296235 | 0.2 | 77 | 16.1 |
| Meadow | D | <i>Meadow-D</i> | 13310.85257 | 1.3 | 82 | 109.1 |
| NAG Agri | A | <i>NAG Agri-A</i> | 51302.29898 | 5.1 | 49 | 251.4 |
| NAG Agri | B | <i>NAG Agri-B</i> | 269.0431676 | 0.0 | 69 | 1.9 |
| NAG Agri | C | <i>NAG Agri-C</i> | 20142.69715 | 2.0 | 79 | 159.1 |
| NAG Agri | D | <i>NAG Agri-D</i> | 4450.289627 | 0.4 | 84 | 37.4 |
| Roads | BC | <i>Roads-BC</i> | | 0.6 | 98 | 58.8 |
| Woods | A | <i>Woods-A</i> | 5955.069885 | 0.6 | 36 | 21.4 |
| Woods | B | <i>Woods-B</i> | 4301.958651 | 0.4 | 60 | 25.8 |
| Woods | C | <i>Woods-C</i> | 3869.175252 | 0.4 | 73 | 28.2 |
| Woods | D | <i>Woods-D</i> | 32912.64205 | 3.3 | 79 | 260.0 |

| | |
|-------------------------|-----------------|
| Total Area (Ha): | 69.71 Ha |
| Total Area * CN= | 5245 |
| Weighted CN (II) | 75 |
| CN (AMC III) | 88 |

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.04 |
| 0.01 | 0.21 |
| 0.01 | 0.22 |
| 0.01 | 0.06 |
| 0.17 | 0.25 |
| 0.17 | 0.07 |
| 0.17 | 0.17 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.05 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.90 | 0.54 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |

| | |
|----------------------------|-------------|
| | 1.69 |
| Avg T_{imp} | 0.02 |

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.04 |
| 0.01 | 0.21 |
| 0.01 | 0.22 |
| 0.01 | 0.06 |
| 0.10 | 0.15 |
| 0.10 | 0.04 |
| 0.10 | 0.10 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.05 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.90 | 0.54 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |

| | |
|----------------------------|-------------|
| | 1.49 |
| Avg X_{imp} | 0.02 |

| C | C * Area |
|------|----------|
| 0.22 | 0.89 |
| 0.35 | 7.24 |
| 0.35 | 7.70 |
| 0.55 | 3.10 |
| 0.25 | 0.37 |
| 0.25 | 0.10 |
| 0.25 | 0.25 |
| 0.28 | 0.06 |
| 0.40 | 0.53 |
| 0.10 | 0.51 |
| 0.28 | 0.01 |
| 0.28 | 0.56 |
| 0.40 | 0.18 |
| 1.00 | 0.60 |
| 0.08 | 0.05 |
| 0.25 | 0.11 |
| 0.25 | 0.10 |
| 0.35 | 1.15 |

| | |
|--------------|-------------|
| | 23.51 |
| Avg C | 0.34 |

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren

Assumptions

* Rural Development is allocated as Estate Density Residential - Engineer to check

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | B | <i>Agricult-B</i> | 587657.2824 | 58.8 | 75 | 4407.4 |
| Agriculture | C | <i>Agricult-C</i> | 70643.57254 | 7.1 | 82 | 579.3 |
| Agriculture | D | <i>Agricult-D</i> | 43938.26414 | 4.4 | 85 | 373.5 |
| Estate Density Residential | B | <i>Estate D-B</i> | 28880.24052 | 2.9 | 68 | 196.4 |
| Estate Density Residential | C | <i>Estate D-C</i> | 3461.216737 | 0.3 | 79 | 27.3 |
| Meadow | D | <i>Meadow-D</i> | 92.50167233 | 0.0 | 82 | 0.8 |
| NAG Agri | B | <i>NAG Agri-B</i> | 61323.44393 | 6.1 | 69 | 423.1 |
| NAG Agri | C | <i>NAG Agri-C</i> | 72342.53549 | 7.2 | 79 | 571.5 |
| NAG Agri | D | <i>NAG Agri-D</i> | 25579.58952 | 2.6 | 84 | 214.9 |
| Roads | BC | <i>Roads-BC</i> | | 1.2 | 98 | 117.6 |
| Woods | B | <i>Woods-B</i> | 12058.28261 | 1.2 | 60 | 72.3 |
| Woods | B | <i>Woods-B</i> | 46244.19045 | 4.6 | 60 | 277.5 |
| Woods | D | <i>Woods-D</i> | 464.4986901 | 0.0 | 79 | 3.7 |

Total Area (Ha): 96.47 Ha
Total Area * CN= 7265
Weighted CN (II) 75
CN (AMC III) 88

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.59 |
| 0.01 | 0.07 |
| 0.01 | 0.04 |
| 0.17 | 0.49 |
| 0.17 | 0.06 |
| 0.01 | 0.00 |
| 0.01 | 0.06 |
| 0.01 | 0.07 |
| 0.01 | 0.03 |
| 0.90 | 1.08 |
| 0.01 | 0.01 |
| 0.01 | 0.05 |
| 0.01 | 0.00 |

2.55
Avg T_{imp} 0.03

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.59 |
| 0.01 | 0.07 |
| 0.01 | 0.04 |
| 0.10 | 0.29 |
| 0.10 | 0.03 |
| 0.01 | 0.00 |
| 0.01 | 0.06 |
| 0.01 | 0.07 |
| 0.01 | 0.03 |
| 0.90 | 1.08 |
| 0.01 | 0.01 |
| 0.01 | 0.05 |
| 0.01 | 0.00 |

2.32
Avg X_{imp} 0.02

| C | C * Area |
|------|----------|
| 0.35 | 20.57 |
| 0.35 | 2.47 |
| 0.55 | 2.42 |
| 0.25 | 0.72 |
| 0.25 | 0.09 |
| 0.40 | 0.00 |
| 0.28 | 1.72 |
| 0.28 | 2.03 |
| 0.40 | 1.02 |
| 1.00 | 1.20 |
| 0.25 | 0.30 |
| 0.25 | 1.16 |
| 0.35 | 0.02 |

33.71
Avg C 0.35

Note: muck soils have been assigned HSG soil code "D"

96.47

CKLOP_MCLaren
Subcatchment 2200

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | C | <i>Agricult-C</i> | 461765.0839 | 46.2 | 82 | 3786.5 |
| Estate Density Residential | C | <i>Estate D-C</i> | 25146.64383 | 2.5 | 79 | 198.7 |
| Meadow | C | <i>Meadow-C</i> | 21444.35579 | 2.1 | 77 | 165.1 |
| Meadow | C | <i>Meadow-C</i> | 14572.15131 | 1.5 | 77 | 112.2 |
| Meadow | D | <i>Meadow-D</i> | 270.1908044 | 0.0 | 82 | 2.2 |
| NAG Agri | C | <i>NAG Agri-C</i> | 29601.87465 | 3.0 | 79 | 233.9 |
| Open Water | C | <i>Open Wat-C</i> | 0.994719414 | 0.0 | 50 | 0.0 |
| Roads | BC | <i>Roads-BC</i> | | 1.7 | 98 | 166.6 |
| Woods | C | <i>Woods-C</i> | 38.7147015 | 0.0 | 73 | 0.3 |
| Woods | C | <i>Woods-C</i> | 24680.74938 | 2.5 | 73 | 180.2 |
| Woods | C | <i>Woods-C</i> | 50328.3129 | 5.0 | 73 | 367.4 |
| Woods | D | <i>Woods-D</i> | 1422.791325 | 0.1 | 79 | 11.2 |

Total Area (Ha): 64.63 Ha
Total Area * CN= 5224
Weighted CN (II) 81
CN (AMC III) 91

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.46 |
| 0.17 | 0.43 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |
| 0.00 | 0.00 |
| 0.90 | 1.53 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.05 |
| 0.01 | 0.00 |

2.56
Avg T_{imp} 0.04

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.46 |
| 0.10 | 0.25 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.90 | 1.53 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.05 |
| 0.01 | 0.00 |

2.39
Avg X_{imp} 0.04

| C | C * Area |
|------|----------|
| 0.35 | 16.16 |
| 0.25 | 0.63 |
| 0.28 | 0.60 |
| 0.28 | 0.41 |
| 0.40 | 0.01 |
| 0.28 | 0.83 |
| 1.00 | 0.00 |
| 1.00 | 1.70 |
| 0.25 | 0.00 |
| 0.25 | 0.62 |
| 0.25 | 1.26 |
| 0.35 | 0.05 |

22.26
Avg C 0.34

Note: muck soils have been assigned HSG soil code "D"

CKLOP_MCLaren
Subcatchment 2300

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | C | <i>Agricult-C</i> | 163265.2268 | 16.3 | 82 | 1338.8 |
| Agriculture | D | <i>Agricult-D</i> | 34842.33835 | 3.5 | 85 | 296.2 |
| Agriculture | B | <i>Agricult-B</i> | 33.76382096 | 0.0 | 75 | 0.3 |
| Estate Density Residential | C | <i>Estate D-C</i> | 5434.813278 | 0.5 | 79 | 42.9 |
| Estate Density Residential | D | <i>Estate D-D</i> | 10528.84976 | 1.1 | 84 | 88.4 |
| Meadow | C | <i>Meadow-C</i> | 1104.497971 | 0.1 | 77 | 8.5 |
| Meadow | D | <i>Meadow-D</i> | 19130.23118 | 1.9 | 82 | 156.9 |
| NAG Agri | B | <i>NAG Agri-B</i> | 8508.631431 | 0.9 | 69 | 58.7 |
| NAG Agri | C | <i>NAG Agri-C</i> | 360113.5068 | 36.0 | 79 | 2844.9 |
| NAG Agri | D | <i>NAG Agri-D</i> | 14307.32026 | 1.4 | 84 | 120.2 |
| NAG Agri | D | <i>NAG Agri-D</i> | 4.265802948 | 0.0 | 84 | 0.0 |
| Roads | BC | <i>Roads-BC</i> | | 1.5 | 98 | 147.0 |
| Wetland | D | <i>Wetland-D</i> | 15823.37134 | 1.6 | 50 | 79.1 |
| Woods | C | <i>Woods-C</i> | 15812.45001 | 1.6 | 73 | 115.4 |
| Woods | C | <i>Woods-C</i> | 89149.16326 | 8.9 | 73 | 650.8 |
| Woods | D | <i>Woods-D</i> | 5540.690374 | 0.6 | 79 | 43.8 |
| Woods | D | <i>Woods-D</i> | 6854.481574 | 0.7 | 79 | 54.2 |

Total Area (Ha): 76.55 Ha
Total Area * CN= 6046
Weighted CN (II) 79
CN (AMC III) 90

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.16 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.17 | 0.09 |
| 0.17 | 0.18 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.36 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.90 | 1.35 |
| 0.01 | 0.02 |
| 0.01 | 0.02 |
| 0.01 | 0.09 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

2.36
Avg T_{imp} 0.03

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.16 |
| 0.01 | 0.03 |
| 0.01 | 0.00 |
| 0.10 | 0.05 |
| 0.10 | 0.11 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.01 |
| 0.01 | 0.36 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.90 | 1.35 |
| 0.00 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.09 |
| 0.01 | 0.01 |
| 0.01 | 0.01 |

2.23
Avg X_{imp} 0.03

| C | C * Area |
|------|----------|
| 0.35 | 5.71 |
| 0.55 | 1.92 |
| 0.35 | 0.00 |
| 0.25 | 0.14 |
| 0.25 | 0.26 |
| 0.28 | 0.03 |
| 0.40 | 0.77 |
| 0.28 | 0.24 |
| 0.28 | 10.08 |
| 0.40 | 0.57 |
| 0.40 | 0.00 |
| 1.00 | 1.50 |
| 0.35 | 0.55 |
| 0.25 | 0.40 |
| 0.25 | 2.23 |
| 0.35 | 0.19 |
| 0.35 | 0.24 |

24.83
Avg C 0.32

Note: muck soils have been assigned HSG soil code "D"

Assumptions

* Rural Development is allocated as Estate Density Residential

CKLOP_MCLaren
Subcatchment 2400

| Landuse | HSG | lookup value | Area | | CN | CN * Area |
|----------------------------|-----|-------------------|-------------------|------|----|-----------|
| | | | (m ²) | (Ha) | | |
| Agriculture | A | <i>Agricult-A</i> | 84088.35757 | 8.4 | 64 | 538.2 |
| Agriculture | B | <i>Agricult-B</i> | 3248.173983 | 0.3 | 75 | 24.4 |
| Agriculture | C | <i>Agricult-C</i> | 241604.9868 | 24.2 | 82 | 1981.2 |
| Agriculture | D | <i>Agricult-D</i> | 33374.76468 | 3.3 | 85 | 283.7 |
| Estate Density Residential | A | <i>Estate D-A</i> | 6568.317655 | 0.7 | 51 | 33.5 |
| Estate Density Residential | C | <i>Estate D-C</i> | 8209.768596 | 0.8 | 79 | 64.9 |
| Estate Density Residential | D | <i>Estate D-D</i> | 3353.074222 | 0.3 | 84 | 28.2 |
| Meadow | D | <i>Meadow-D</i> | 4336.842106 | 0.4 | 82 | 35.6 |
| NAG Agri | A | <i>NAG Agri-A</i> | 21866.30827 | 2.2 | 49 | 107.1 |
| NAG Agri | B | <i>NAG Agri-B</i> | 69607.8239 | 7.0 | 69 | 480.3 |
| NAG Agri | C | <i>NAG Agri-C</i> | 27940.64365 | 2.8 | 79 | 220.7 |
| NAG Agri | D | <i>NAG Agri-D</i> | 43037.84497 | 4.3 | 84 | 361.5 |
| Wetland | C | <i>Wetland-C</i> | 11060.65563 | 1.1 | 50 | 55.3 |
| Wetland | C | <i>Wetland-C</i> | 16328.05775 | 1.6 | 50 | 81.6 |
| Wetland | C | <i>Wetland-C</i> | 375.4883224 | 0.0 | 50 | 1.9 |
| Wetland | D | <i>Wetland-D</i> | 14389.68486 | 1.4 | 50 | 71.9 |
| Wetland | D | <i>Wetland-D</i> | 40752.4275 | 4.1 | 50 | 203.8 |
| Wetland | D | <i>Wetland-D</i> | 12901.05876 | 1.3 | 50 | 64.5 |
| Roads | BC | <i>Roads-BC</i> | | 2.4 | 98 | 235.2 |
| Woods | A | <i>Woods-A</i> | 910.3932105 | 0.1 | 36 | 3.3 |
| Woods | A | <i>Woods-A</i> | 530.2730815 | 0.1 | 36 | 1.9 |
| Woods | C | <i>Woods-C</i> | 42242.21399 | 4.2 | 73 | 308.4 |
| Woods | C | <i>Woods-C</i> | 5914.743095 | 0.6 | 73 | 43.2 |
| Woods | D | <i>Woods-D</i> | 44852.49309 | 4.5 | 79 | 354.3 |
| Woods | D | <i>Woods-D</i> | 1140.536406 | 0.1 | 79 | 9.0 |
| Woods | D | <i>Woods-D</i> | 4347.777955 | 0.4 | 79 | 34.3 |

Total Area (Ha): 76.70 Ha
Total Area * CN= 5628
Weighted CN (II) 73
CN (AMC III) 87

| T _{imp} | T _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.08 |
| 0.01 | 0.00 |
| 0.01 | 0.24 |
| 0.01 | 0.03 |
| 0.17 | 0.11 |
| 0.17 | 0.14 |
| 0.17 | 0.06 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.07 |
| 0.01 | 0.03 |
| 0.01 | 0.04 |
| 0.01 | 0.01 |
| 0.01 | 0.02 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.01 |
| 0.01 | 0.04 |
| 0.01 | 0.01 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |
| 0.01 | 0.04 |
| 0.01 | 0.00 |
| 0.01 | 0.00 |

Avg T_{imp} 3.19
0.04

| X _{imp} | X _{imp} * Area |
|------------------|-------------------------|
| 0.01 | 0.08 |
| 0.01 | 0.00 |
| 0.01 | 0.24 |
| 0.01 | 0.03 |
| 0.10 | 0.07 |
| 0.10 | 0.08 |
| 0.10 | 0.03 |
| 0.01 | 0.00 |
| 0.01 | 0.02 |
| 0.01 | 0.07 |
| 0.01 | 0.03 |
| 0.01 | 0.04 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |
| 0.00 | 0.00 |

Avg X_{imp} 2.97
0.04

| C | C * Area |
|------|----------|
| 0.22 | 1.85 |
| 0.35 | 0.11 |
| 0.35 | 8.46 |
| 0.55 | 1.84 |
| 0.25 | 0.16 |
| 0.25 | 0.21 |
| 0.25 | 0.08 |
| 0.40 | 0.17 |
| 0.10 | 0.22 |
| 0.28 | 1.95 |
| 0.28 | 0.78 |
| 0.40 | 1.72 |
| 0.25 | 0.28 |
| 0.25 | 0.41 |
| 0.25 | 0.01 |
| 0.35 | 0.50 |
| 0.35 | 1.43 |
| 0.35 | 0.45 |
| 1.00 | 2.40 |
| 0.08 | 0.01 |
| 0.08 | 0.00 |
| 0.25 | 1.06 |
| 0.25 | 0.15 |
| 0.35 | 1.57 |
| 0.35 | 0.04 |
| 0.35 | 0.15 |

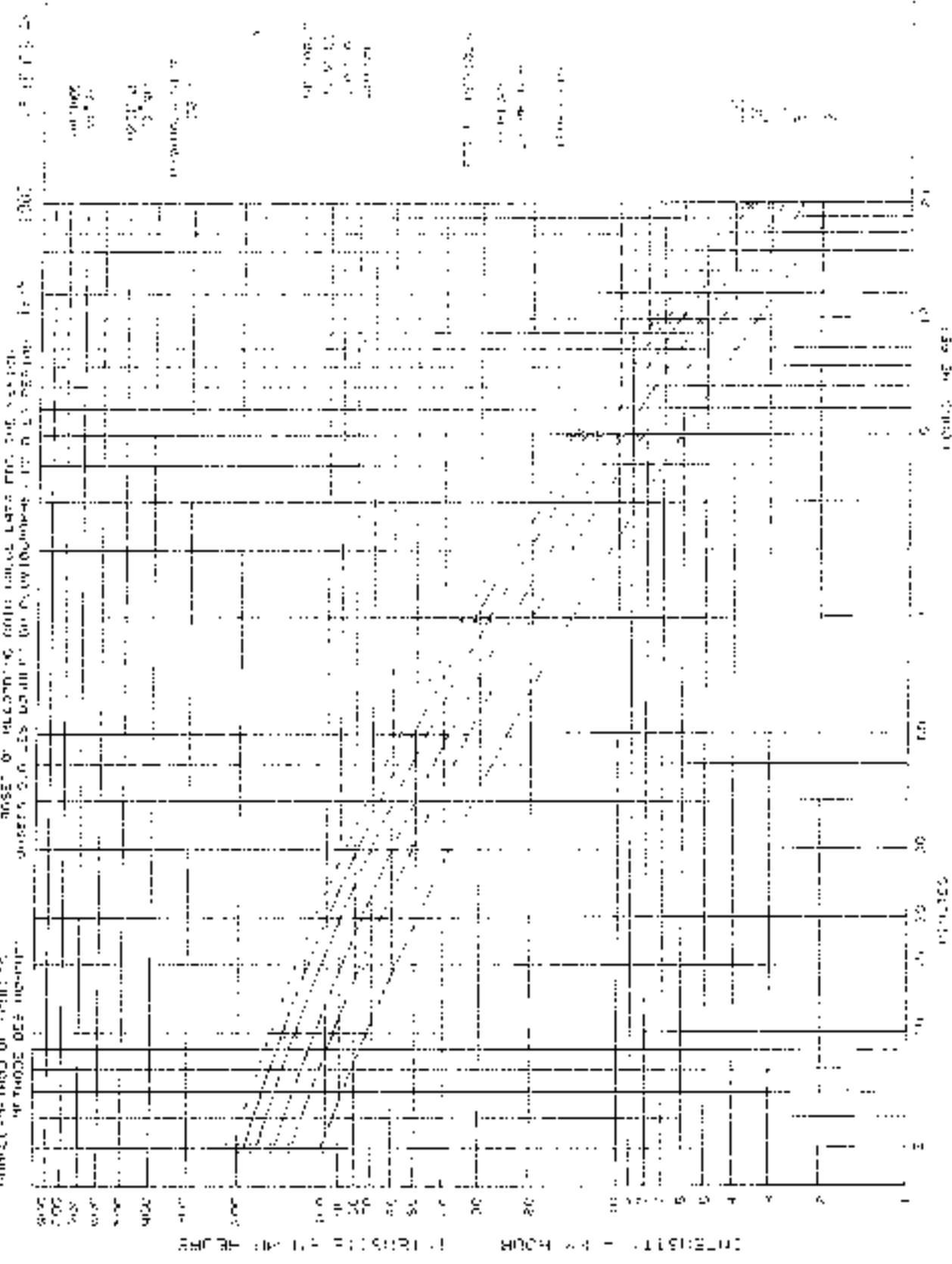
Avg C 26.01
0.34

Note: muck soils have been assigned HSG soil code "D"

Appendix B

Rainfall Data

AND 1. [Illegible] 2. [Illegible] 3. [Illegible] 4. [Illegible] 5. [Illegible] 6. [Illegible] 7. [Illegible] 8. [Illegible] 9. [Illegible] 10. [Illegible]



1000
500
200

1000
500
200

0 10 20 30 40 50 60 70 80 90 100

6164432.txt
 ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

RAINFALL INTENSITY DURATION FREQUENCY VALUES
 INTENSITE, DUREE ET FREQUENCE DES PLUIES

DATA INTEGRATION DIVISION
 LA DIVISION DU TRAITEMENT DES DONNEES

GUMBEL - METHOD OF MOMENTS/METHODE DES MOMENTS - 1990

TABLE 1 LINDSAY FILTRATION PLANT ONT 6164432

LATITUDE 4421 LONGITUDE 7844 ELEVATION/ALTITUDE 252 M

| YEAR ANNEE | 5 MIN | 10 MIN | 15 MIN | 30 MIN | 1 H | 2 H | 6 H | 12 H | 24 H |
|---------------|-------|--------|--------|--------|-------|-------|------|-------|------|
| 1965 | 14.7 | 21.6 | 22.9 | 30.7 | 31.5 | 32.5 | 55.9 | 56.1 | 56.1 |
| 1966 | 5.8 | 6.6 | 8.9 | 13.5 | 20.1 | 30.2 | 30.5 | 30.5 | 30.5 |
| 1967 | 8.4 | 11.4 | 14.5 | 15.5 | 15.5 | 18.5 | 27.4 | 39.1 | 49.0 |
| 1968 | 7.1 | 14.2 | 17.3 | 24.4 | 41.9 | 55.1 | 67.3 | 67.3 | 67.3 |
| 1969 | 4.6 | 7.1 | 8.1 | 9.4 | 12.2 | 12.4 | 23.4 | 32.5 | 40.6 |
| 1970 | 13.0 | 17.8 | 19.8 | 22.9 | 25.7 | 30.0 | 39.1 | 50.5 | 55.1 |
| 1971 | 11.9 | 13.2 | 17.0 | 19.6 | 27.9 | 33.5 | 36.6 | 37.6 | 39.1 |
| 1972 | 4.6 | 6.6 | 8.9 | 11.9 | 11.9 | 15.0 | 30.5 | 33.0 | 34.8 |
| 1973 | 7.4 | 14.5 | 15.0 | 17.5 | 19.0 | 22.4 | 31.0 | 32.3 | 43.9 |
| 1974 | 8.1 | 12.7 | 15.5 | 22.6 | 35.1 | 45.5 | 49.0 | 56.1 | 56.1 |
| 1975 | 10.4 | 15.2 | 15.5 | 27.4 | 22.4 | 29.0 | 39.1 | 39.1 | 40.1 |
| 1976 | 6.3 | 9.1 | 10.2 | 13.7 | 23.9 | 23.9 | 34.0 | 38.1 | 38.1 |
| 1977 | 9.7 | 12.7 | 14.7 | 16.6 | 21.3 | 21.6 | 35.6 | 43.4 | 43.9 |
| 1978 | 7.6 | 13.2 | 19.5 | 21.6 | 25.3 | 27.7 | 27.9 | 27.9 | 32.8 |
| 1979 | 11.0 | 13.9 | 13.9 | 14.3 | 14.1 | 16.6 | 21.0 | 34.8 | 35.2 |
| 1980 | 13.3 | 15.8 | 20.2 | 28.3 | 51.8 | 53.9 | 69.8 | 70.4 | 82.8 |
| 1981 | 7.8 | 15.2 | 19.8 | 32.4 | 33.4 | 33.7 | 35.3 | 36.0 | 36.0 |
| 1982 | 10.0 | 16.2 | 19.0 | 23.4 | 35.7 | 41.8 | 45.6 | 45.6 | 45.6 |
| 1983 | 14.0 | 18.8 | 18.8 | 20.1 | 23.8 | 23.9 | 26.4 | 27.8 | 30.9 |
| 1984 | 10.7 | 12.8 | 19.2 | 36.8 | 44.4 | 57.6 | 64.3 | 84.6 | 84.7 |
| 1985 | 7.7 | 12.8 | 17.3 | 25.2 | 27.5 | 32.4 | 42.4 | 42.4 | 42.4 |
| 1986 | 5.8 | 6.9 | 7.1 | 10.5 | 13.6 | 26.8 | 41.1 | 42.1 | 42.1 |
| 1987 | 7.1 | 8.7 | 10.3 | 14.6 | 17.3 | 20.7 | 22.7 | 22.8 | 34.1 |
| 1988 | 6.6 | 12.1 | 18.2 | 24.4 | 24.9 | 24.9 | 25.2 | 25.2 | 40.0 |
| 1989 | -99.9 | -99.9 | -99.9 | -99.9 | -99.9 | -99.9 | 99.9 | -99.9 | 48.6 |

NOTE: -99.9 INDICATES MSG DATA
 DONNEES MANQUANTES

| | | | | | | | | | |
|-------------------------|------|------|-------|------|------|------|------|------|------|
| # YRS. ANNEES | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 25 |
| MEAN MOYENNE | 8.9 | 12.9 | 15.5 | 20.5 | 25.9 | 30.4 | 39.2 | 42.3 | 46.0 |
| STD. DEV. ECART TYPE | 2.9 | 3.9 | 4.5 | 7.1 | 10.5 | 12.4 | 16.1 | 15.2 | 14.4 |
| SKFW DISSYMETRIE | .49 | .03 | -1.51 | .45 | .79 | .90 | 1.41 | 1.26 | 1.58 |
| KURTOSIS KURTOSIS | 2.58 | 1.14 | 2.57 | 3.07 | 3.55 | 3.48 | 4.93 | 4.70 | 5.40 |

NOTE: -99.9 INDICATES LESS THAN 10 YEARS OF DATA AVAILABLE
 INDIQUE MOINS DE 10 ANNEES DE DONNEES DISPONIBLES

ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

6164432.txt
 RAINFALL INTENSITY-DURATION-FREQUENCY VALUES
 INTENSITE, DUREE ET FREQUENCE DES PLUIES

GUMBEL - METHOD OF MOMENTS/METHODE DES MOMENTS - 1990

TABLE 2 LINDSAY FILTRATION PLANT ONT 6164432

LATITUDE 4421 LONGITUDE 7844 ELEVATION/ALTITUDE 252 M

RETURN PERIOD RAINFALL AMOUNTS (MM)
 PERIODE DE RETOUR QUANTITES DE PLUIE (MM)

| DURATION DUREE | 2 YR/ANS | 5 YR/ANS | 10 YR/ANS | 25 YR/ANS | 50 YR/ANS | 100 YR/ANS | # YFANS ANNEES |
|-------------------|-------------|-------------|--------------|--------------|--------------|---------------|-------------------|
| 5 MIN | 8.4 | 11.0 | 12.7 | 14.9 | 16.5 | 18.1 | 24 |
| 10 MIN | 12.2 | 15.7 | 18.0 | 20.9 | 23.1 | 25.2 | 24 |
| 15 MIN | 14.8 | 18.7 | 21.3 | 24.6 | 27.1 | 29.5 | 24 |
| 30 MIN | 19.3 | 23.6 | 27.8 | 31.1 | 34.0 | 36.8 | 24 |
| 1 H | 24.1 | 29.4 | 33.6 | 37.3 | 40.1 | 42.8 | 24 |
| 2 H | 28.4 | 34.3 | 38.6 | 42.8 | 45.6 | 48.4 | 24 |
| 6 H | 36.6 | 43.8 | 49.2 | 54.1 | 57.9 | 61.7 | 24 |
| 12 H | 39.8 | 47.2 | 52.2 | 57.4 | 61.8 | 66.1 | 24 |
| 24 H | 43.6 | 50.4 | 54.8 | 59.4 | 63.3 | 67.2 | 25 |

RETURN PERIOD RAINFALL RATES (MM/HR)-95% CONFIDENCE LIMITS
 INTENSITE DE LA PLUIE PAR PERIODE DE RETOUR (MM/H) LIMITES DE CONFIDANCE DE 95%

| DURATION DUREE | 2 YR/ANS | 5 YR/ANS | 10 YR/ANS | 25 YR/ANS | 50 YR/ANS | 100 YR/ANS |
|-------------------|----------|----------|-----------|-----------|-----------|------------|
| 5 MIN | 101.0 | 132.2 | 152.8 | 178.9 | 198.2 | 217.5 |
| | +/- 13.0 | -/- 21.8 | +/- 29.5 | -/- 39.7 | +/- 47.5 | +/- 55.4 |
| 10 MIN | 73.3 | 94.2 | 108.1 | 125.6 | 138.5 | 151.4 |
| | +/- 8.7 | -/- 14.6 | +/- 19.8 | -/- 26.7 | +/- 31.9 | +/- 37.2 |
| 15 MIN | 59.1 | 74.8 | 85.3 | 98.4 | 108.2 | 117.9 |
| | +/- 6.5 | -/- 11.0 | +/- 14.9 | -/- 20.1 | +/- 24.0 | +/- 28.0 |
| 30 MIN | 38.7 | 51.3 | 59.6 | 70.1 | 77.9 | 85.7 |
| | +/- 5.2 | -/- 8.8 | +/- 11.9 | +/- 16.0 | +/- 19.2 | +/- 22.3 |
| 1 H | 24.1 | 31.4 | 36.6 | 42.3 | 46.1 | 49.8 |
| | +/- 3.9 | +/- 6.5 | +/- 8.8 | -/- 11.8 | +/- 14.1 | +/- 16.5 |
| 2 H | 14.2 | 19.7 | 23.3 | 27.9 | 31.3 | 34.7 |
| | +/- 2.3 | +/- 3.8 | +/- 5.7 | -/- 7.0 | +/- 8.4 | +/- 9.8 |
| 6 H | 6.1 | 8.5 | 10.0 | 12.0 | 13.5 | 14.9 |
| | +/- 1.0 | +/- 1.7 | +/- 2.2 | +/- 3.0 | +/- 3.6 | +/- 4.2 |
| 12 H | 3.3 | 4.4 | 5.2 | 6.1 | 6.8 | 7.5 |
| | +/- .5 | +/- .8 | +/- 1.1 | -/- 1.4 | +/- 1.7 | +/- 2.0 |
| 24 H | 1.8 | 2.3 | 2.7 | 3.1 | 3.5 | 3.8 |
| | +/- .2 | +/- .4 | +/- .5 | -/- .7 | +/- .8 | +/- .9 |

ATMOSPHERIC ENVIRONMENT SERVICE
 SERVICE DE L'ENVIRONNEMENT ATMOSPHERIQUE

RAINFALL INTENSITY-DURATION-FREQUENCY VALUES
 INTENSITE, DUREE ET FREQUENCE DES PLUIES

GUMBEL - METHOD OF MOMENTS/METHODE DES MOMENTS - 1990

TABLE 3 LINDSAY FILTRATION PLANT ONT 6164432

LATITUDE 4421 LONGITUDE 7844 ELEVATION/ALTITUDE 252 M

6164432.TXT

INTERPOLATION EQUATION / EQUATION D'INTERPOLATION: $R = A * T ** B$
R - RAINFALL RATE / INTENSITE DE LA PLUIE (MM /HM)
T = TIME IN HOURS / TEMPS EN HEURES

| STATISTICS STATISTIQUES | 2 YR ANS | 5 YR ANS | 10 YR ANS | 25 YR ANS | 50 YR ANS | 100 YR ANS |
|-------------------------------|-------------|-------------|--------------|--------------|--------------|---------------|
| MEAN OF R MOYENNE DE R | 35.7 | 46.7 | 54.0 | 63.2 | 70.1 | 76.9 |
| STD. DEV. R ECART-TYPE | 25.1 | 45.4 | 52.1 | 60.7 | 67.1 | 73.4 |
| STD. ERROR ERREUR STANDARD | 9.4 | 12.4 | 14.5 | 17.1 | 19.0 | 21.0 |
| COEFF. (A) COEFFICIENT (A) | 20.9 | 27.8 | 32.3 | 38.0 | 42.3 | 46.5 |
| EXPONENT (B) EXPOSANT (B) | -.719 | -.713 | -.710 | -.706 | .706 | -.705 |
| MEAN % ERROR % D'ERREUR | 10.4 | 12.1 | 13.1 | 14.1 | 14.7 | 15.2 |

TABLE D-4
TIMKINS - RAINFALL DEPTHS

| Hour | Depth (mm) | Inches | Percent of 12 hour |
|-------|---------------|--------|-----------------------|
| 1st | 15 | 0.6 | 9 |
| 2nd | 20 | 0.8 | 10 |
| 3rd | 10 | 0.4 | 6 |
| 4th | 3 | 0.1 | 1 |
| 5th | 5 | 0.2 | 3 |
| 6th | 20 | 0.8 | 10 |
| 7th | 43 | 1.7 | 23 |
| 8th | 20 | 0.8 | 10 |
| 9th | 23 | 0.9 | 12 |
| 10th | 13 | 0.5 | 6 |
| 11th | 13 | 0.5 | 7 |
| 12th | 8 | 0.3 | 4 |
| TOTAL | 193 | 7.6 | |

TABLE D-5
TIMKINS - AREAL REDUCTION

| Area (km ²) | Reduction Factor Percentage |
|----------------------------|--------------------------------|
| 0 to 25 | 100 (no reduction) |
| 26 to 50 | 97 |
| 51 to 75 | 94 |
| 76 to 100 | 90 |
| 101 to 150 | 87 |
| 151 to 200 | 84 |
| 201 to 250 | 82 |
| 251 to 375 | 79 |
| 376 to 500 | 76 |
| 501 to 750 | 74 |
| 751 to 1000 | 71 |
| 1001 to 1250 | 68 |
| 1251 to 1500 | 66 |
| 1501 to 1800 | 65 |
| 1801 to 2100 | 64 |
| 2101 to 2300 | 63 |
| 2301 to 2600 | 62 |
| 2601 to 3900 | 58 |
| 3901 to 5200 | 56 |
| 5201 to 6500 | 53 |
| 6501 to 8000 | 50 |

NOTE: Reduction factor to be multiplied by the rainfall.

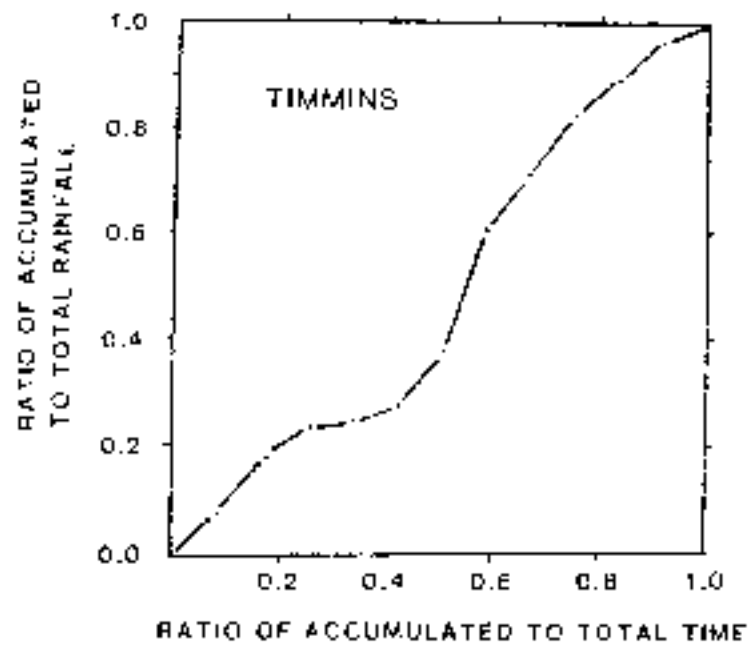
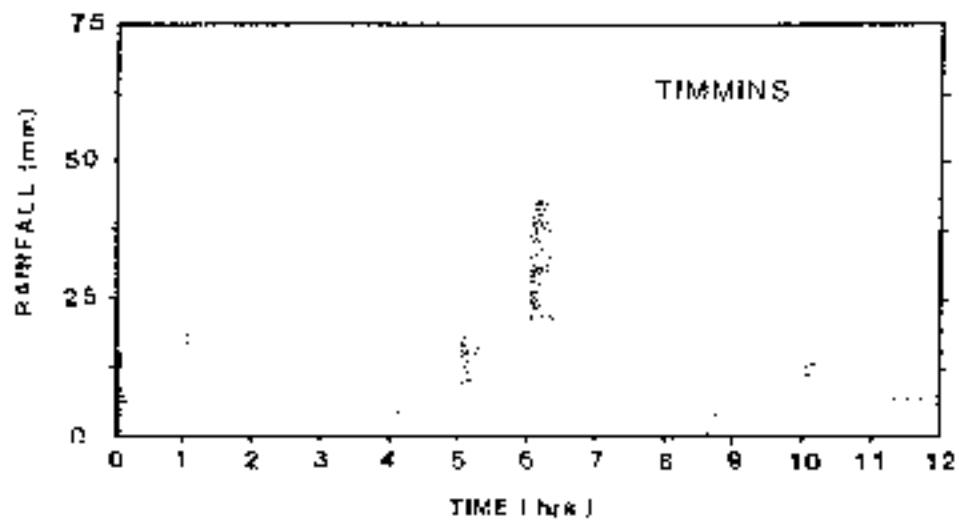


FIGURE D-4
TIMMINS STORM HYETOGRAPH
AND DIMENSIONLESS DISTRIBUTION

Design Chart 1.04: Timmins Storm

| | Depth | | Percent of 12 hour |
|-----------|-------|----------|--------------------|
| | (mm) | (inches) | |
| 1st hour | 15 | 0.6 | 6 |
| 2nd hour | 20 | 0.8 | 10 |
| 3rd hour | 10 | 0.4 | 6 |
| 4th hour | 3 | 0.1 | 1 |
| 5th hour | 5 | 0.2 | 3 |
| 6th hour | 20 | 0.8 | 10 |
| 7th hour | 43 | 1.7 | 28 |
| 8th hour | 20 | 0.8 | 10 |
| 9th hour | 23 | 0.9 | 12 |
| 10th hour | 13 | 0.5 | 6 |
| 11th hour | 13 | 0.5 | 7 |
| 12th hour | 8 | 0.3 | 4 |
| | 193 | 7.6 | 100 |

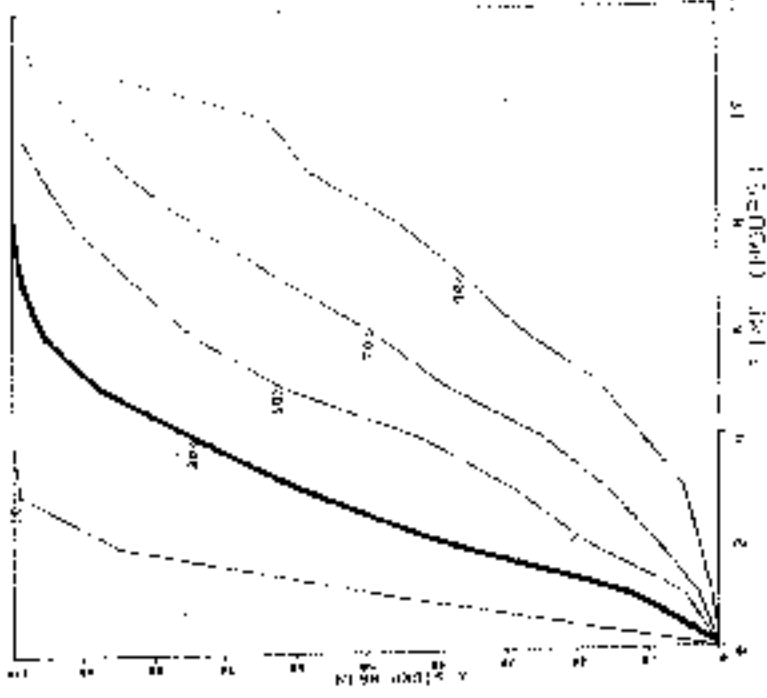
| Drainage Area (km ²) | Percentage |
|----------------------------------|------------|
| 0 to 25 | 100.0 |
| 26 to 50 | 97 |
| 51 to 75 | 94 |
| 76 to 100 | 90 |
| 101 to 150 | 87 |
| 151 to 200 | 84 |
| 201 to 250 | 82 |
| 251 to 375 | 79 |
| 376 to 500 | 76 |
| 501 to 750 | 74 |
| 751 to 1000 | 70 |
| 1001 to 1250 | 68 |
| 1251 to 1500 | 66 |
| 1501 to 1800 | 65 |
| 1801 to 2100 | 64 |
| 2101 to 2300 | 63 |
| 2301 to 2600 | 62 |
| 2601 to 3900 | 58 |
| 3901 to 5200 | 56 |
| 5201 to 6500 | 53 |
| 6501 to 8000 | 50 |

Source: Ministry of Transportation, MTC (1989)

12 HOUR STORM RAIN DISTRIBUTION

SOUTHERN OREGON

NO. OF EVENTS: 100
 COLLECTION PERCENT: 100
 UNIT: INCH
 CONCEPT: DATA - 12 HOURS WITH 1 STORM WITH 1 DURATION BOUTING



12 HOUR STORM RAIN DISTRIBUTION

NORTHERN OREGON

NO. OF EVENTS: 100
 COLLECTION PERCENT: 100
 UNIT: INCH
 CONCEPT: DATA - 12 HOURS WITH 1 STORM WITH 1 DURATION BOUTING

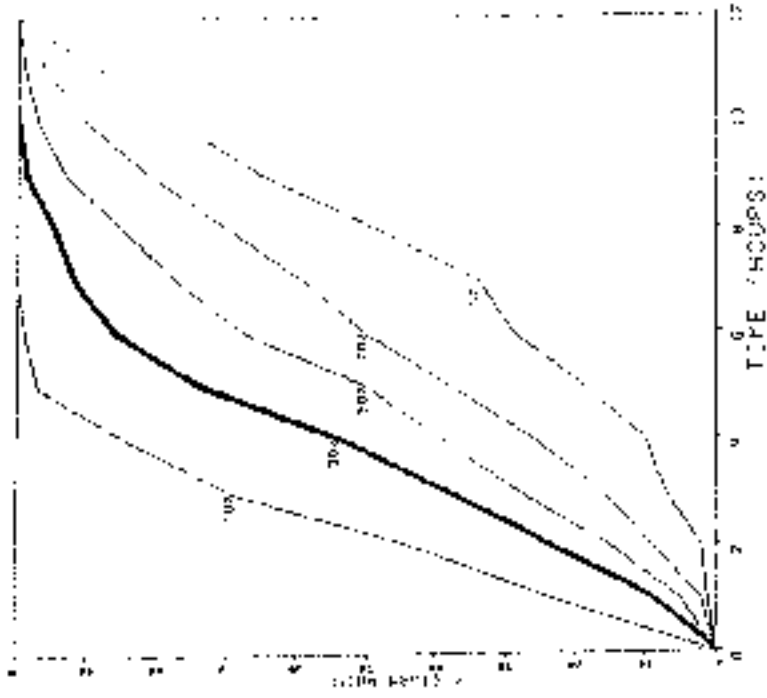


FIGURE D-7

12 - HOUR STORM DISTRIBUTION

TABLE D-8
RAINFALL DISTRIBUTIONS - PERCENT

| Type | Reference | Storm Duration | HOURS | | | | | | | | | | | | | | |
|------------------------|-------------------------------|--------------------------|-------|----|----|----|----|----|----------------|----|----|----|----|----|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| Probable Maximum Storm | Small Dams | 6 Hour | 6 | 9 | 11 | 40 | 15 | 8 | - | - | - | - | - | - | - | - | - |
| HAZE | Ministry of Natural Resources | 12 Hour | 3 | 2 | 3 | 6 | 8 | 6 | 11 | 6 | 6 | 25 | 18 | 6 | | | |
| TIMMINS | Ministry of Natural Resources | 12 Hour | 8 | 10 | 6 | 7 | 3 | 10 | 23 | 10 | 12 | 6 | 7 | 4 | | | |
| Return Period Storms | SUS 11 | 24 Hour 2 Hour Increment | 2 | 3 | 3 | 4 | 6 | 48 | 16 | 6 | 4 | 3 | 3 | 2 | | | |
| | AES, 30% Southern Ontario | 12 Hour | 15 | 25 | 22 | 14 | 12 | 8 | 8 ³ | 1 | 0 | 0 | 0 | 0 | | | |
| | AES, 30% Northern Ontario | 12 Hour | 8 | 17 | 15 | 14 | 18 | 14 | 6 | 3 | 3 | 1 | 1 | 0 | | | |

NOTE: A.E.S. distributions represent 70% of all storms for which the accumulated hourly rainfall was equal or less than shown. Consequently, only 30% of the storms had higher accumulated rainfall.

For other distribution see page D-16.

Appendix C
Background Studies

Tools

Home Print Export Identify

Basic Tools

Pan Zoom In Zoom Out Initial View Full Extent Bookmarks

Navigation

Distance Area Erase

Measure

Layers






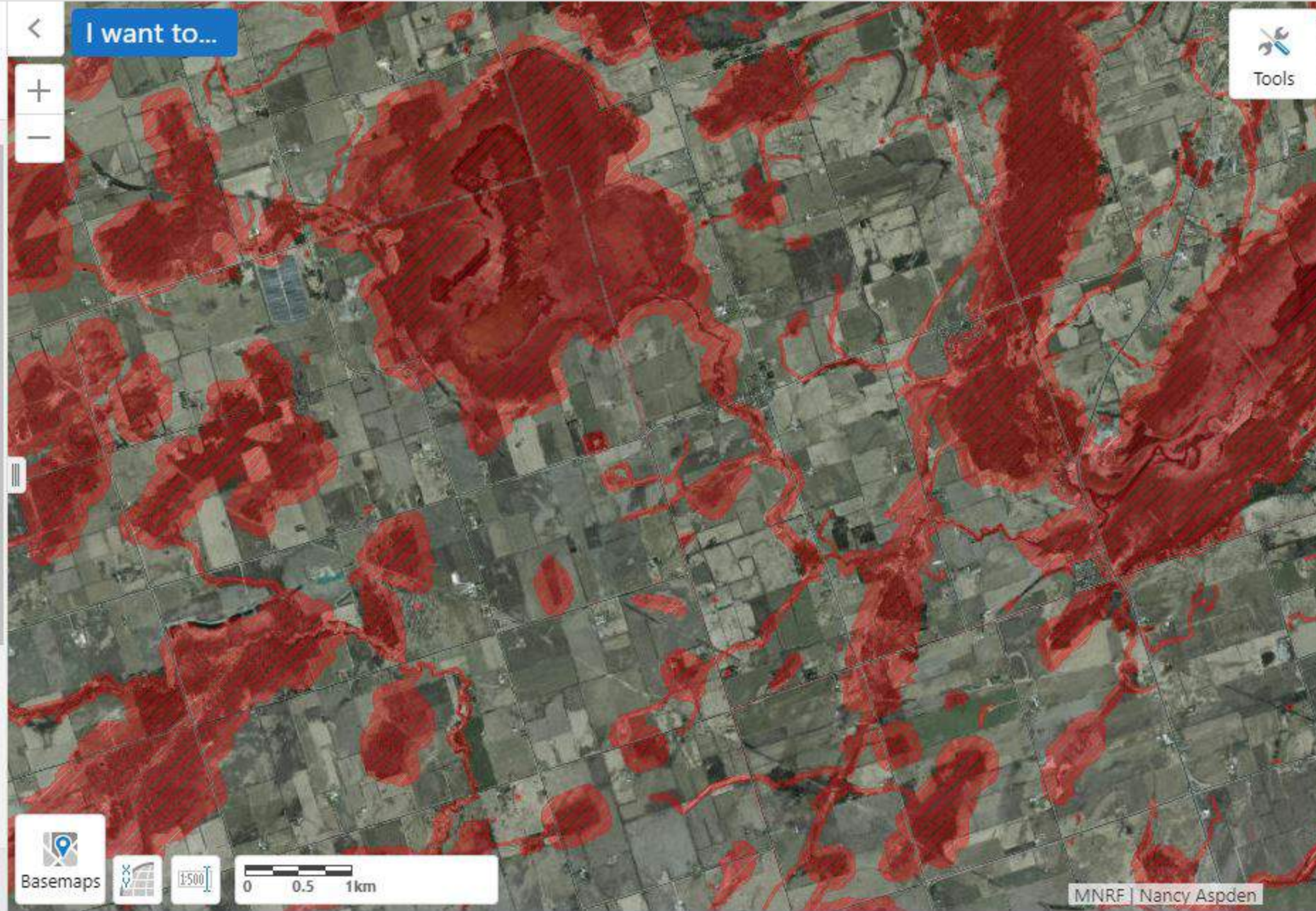
I want to...



 Tools

Filter Layers...  Filter

- krca_public1
 - Roads
 -  KRCA Watershed Boundary
 - Lower Tier Municipality
 -  Townships
 -  REGULATED AREA (Ont Reg 182/06)
 - Assessment Parcels
 - Lot and Concession
 - Subwatersheds
 - Watercourses
 - Conservation Areas Trails
 - Conservation Areas
 - Source Water Protection -



Appendix D
Subcatchment Data

| Catchment ID | Area (ha) | Travel Length (m) | From | To | Elevation (m) | | Slope (%) | Runoff Coeff | ToC (min) |
|--------------|-----------|-------------------|------|----|---------------|--------|-----------|--------------|-----------|
| | | | | | Top | Bottom | | | |
| 100 | 316.9 | 5305.96 | A | B | 299.89 | 279.44 | 0.004 | 0.33 | 249.57 |
| 200 | 55.7 | 1946.08 | F | B | 312.17 | 279.44 | 0.017 | 0.22 | 106.20 |
| 300 | 300.7 | 3839.26 | C | E | 295.64 | 277.53 | 0.005 | 0.33 | 199.42 |
| 400 | 59.1 | 1789.33 | D | E | 306.48 | 277.53 | 0.016 | 0.24 | 101.70 |
| 500 | 958.3 | 6018.7 | G | D1 | 297.27 | 274.88 | 0.004 | 0.36 | 259.27 |
| 600 | 55.1 | 1889.61 | H | J | 302.55 | 275.82 | 0.014 | 0.29 | 102.19 |
| 700 | 93.3 | 1523.77 | I | Z | 306.91 | 275.79 | 0.020 | 0.26 | 84.07 |
| 800 | 84.7 | 2115.15 | O | A1 | 299.82 | 272.98 | 0.013 | 0.31 | 110.16 |
| 900 | 75.7 | 2302.26 | Q | C1 | 287.70 | 270.62 | 0.007 | 0.36 | 126.94 |
| 1000 | 37.5 | 982.74 | N | E1 | 279.52 | 274.05 | 0.006 | 0.38 | 88.98 |
| 1100 | 73.6 | 1560.61 | L | M | 282.65 | 275.09 | 0.005 | 0.35 | 122.96 |
| 1200 | 81.3 | 912.53 | ZZ | F1 | 284.41 | 269.36 | 0.016 | 0.40 | 30.31 |
| 1300 | 70.8 | 870.91 | P1 | H1 | 280.96 | 267.53 | 0.015 | 0.53 | 29.73 |
| 1400 | 99.5 | 2584.97 | P | C1 | 281.15 | 270.62 | 0.004 | 0.36 | 164.07 |
| 1500 | 210.6 | 3273.96 | S | I1 | 279.90 | 267.60 | 0.004 | 0.37 | 188.03 |
| 1600 | 49.2 | 1603.09 | T | G1 | 286.15 | 266.29 | 0.012 | 0.41 | 59.29 |
| 1700 | 19.6 | 683.03 | Y1 | G1 | 273.93 | 266.29 | 0.011 | 0.45 | 28.27 |
| 1800 | 74.9 | 1925.87 | R | O1 | 271.97 | 252.95 | 0.010 | 0.38 | 103.17 |
| 1900 | 208.7 | 3877.14 | X | O1 | 280.83 | 252.95 | 0.007 | 0.34 | 171.06 |
| 2000 | 69.7 | 2174.62 | X1 | M1 | 285.86 | 261.83 | 0.011 | 0.34 | 112.19 |
| 2100 | 96.5 | 2575.58 | Y | N1 | 285.03 | 261.85 | 0.009 | 0.35 | 128.57 |
| 2200 | 64.6 | 2413.9 | W | O1 | 266.72 | 252.95 | 0.006 | 0.34 | 145.63 |
| 2300 | 76.6 | 1832.94 | U | K1 | 269.94 | 249.66 | 0.011 | 0.32 | 104.70 |
| 2400 | 76.7 | 1771.01 | V | L1 | 261.77 | 248.29 | 0.008 | 0.34 | 114.23 |

| Catchment ID | Route Channel | GIS Node | | Elevation | | Length (m) | Slope % |
|--------------|---------------|----------|----|-----------|--------|------------|---------|
| | | From | To | From | To | | |
| 300 | R_Channel_R1 | B | E | 279.44 | 277.53 | 1805.99 | 0.11 |
| 500 | R_Channel_R2 | E | JM | 277.43 | 275.24 | 2480.35 | 0.08 |
| 500 | R_Channel_R3 | J/Z | JM | 275.75 | 275.24 | 1387.03 | 0.04 |
| 500 | R_Channel_R4 | M | D1 | 275.09 | 274.88 | 465.55 | 0.05 |
| 500 | R_Channel_R15 | JM | D1 | 275.24 | 274.87 | 1643.10 | 0.02 |
| 1000 | R_Channel_R5 | D1 | E1 | 274.88 | 274.05 | 573.80 | 0.14 |
| 1200 | R_Channel_R6 | E1 | F1 | 274.05 | 269.36 | 931.26 | 0.50 |
| 1300 | R_Channel_R8 | B1 | H1 | 270.64 | 267.53 | 1086.79 | 0.29 |
| 1400 | R_Channel_R7 | A1 | C1 | 272.98 | 270.62 | 639.46 | 0.37 |
| 1600 | R_Channel_R9 | H1 | G1 | 267.53 | 266.29 | 993.44 | 0.12 |
| 1700 | R_Channel_R10 | F1 | G1 | 269.36 | 266.29 | 836.42 | 0.37 |

| | | | | | | | |
|------|---------------|----|----|--------|--------|---------|------|
| 1800 | R_Channel_R11 | G1 | O1 | 266.29 | 252.95 | 1496.62 | 0.89 |
| 1900 | R_Channel_R14 | M1 | J1 | 261.83 | 253.07 | 1888.03 | 0.46 |
| 2300 | R_Channel_R12 | O1 | K1 | 252.95 | 249.66 | 870.92 | 0.38 |
| 2400 | R_Channel_R13 | K1 | L1 | 249.66 | 248.29 | 1035.12 | 0.13 |

| T_p (hr) |
|------------|
| 2.77 |
| 1.18 |
| 2.22 |
| 1.13 |
| 2.88 |
| 1.14 |
| 0.93 |
| 1.22 |
| 1.41 |
| 0.99 |
| 1.37 |
| 0.34 |
| 0.33 |
| 1.82 |
| 2.09 |
| 0.66 |
| 0.31 |
| 1.15 |
| 1.90 |
| 1.25 |
| 1.43 |
| 1.62 |
| 1.16 |
| 1.27 |

Appendix E
Subcatchment Maps



**KAWARTHA
CONSERVATION**
Discover • Protect • Restore

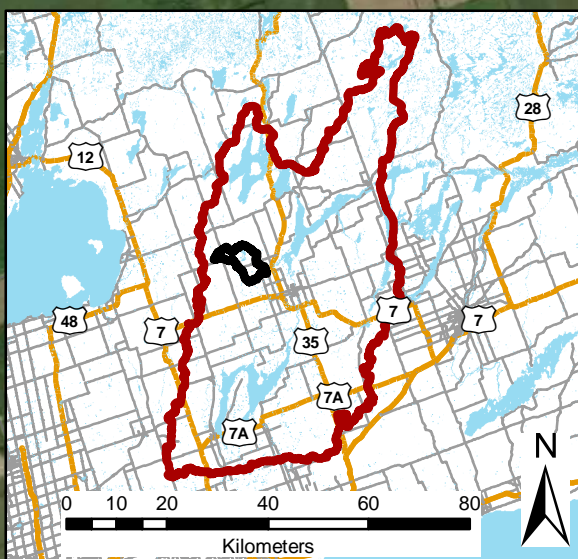
McLaren Creek Land Use

1:30,000

0 170 340 680 1,020 1,360
Meters

- Watershed Subcatchment
- KRCA Boundary
- Waterbody
- Land Use**
 - Aggregate
 - Agriculture
 - Development
 - Forest
 - Meadow
 - Open Water
 - Wetland
- Road Classification**
 - Highway
 - Arterial
 - Local Street

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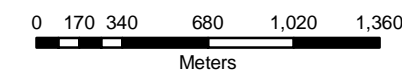




**KAWARTHA
CONSERVATION**
Discover • Protect • Restore

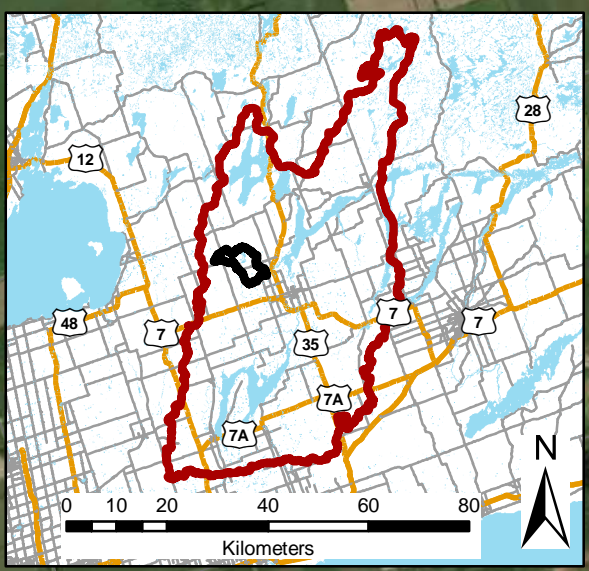
McLaren Creek Routing

1:30,000



- Watershed Subcatchment
 - KRCA Boundary
 - Waterbody
 - Hydro Nodes
- Routing**
- Travel Path
 - Routing Channel
- Road Classification**
- Highway
 - Arterial
 - Local Street

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**KAWARTHA
CONSERVATION**
Discover • Protect • Restore

McLaren Creek Soil Type

1:30,000

0 170 340 680 1,020 1,360
Meters

Watershed Subcatchment

KRCA Boundary

Waterbody

Soil Type

A

B

C

D

Open Water

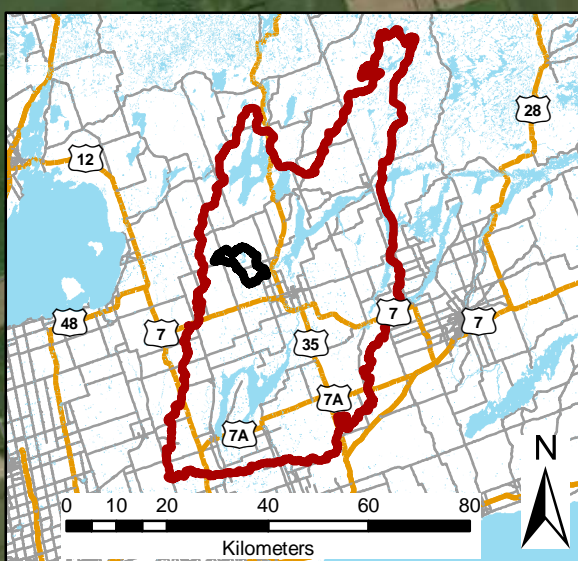
Road Classification

Highway

Arterial

Local Street

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CONSERVATION**
Discover • Protect • Restore

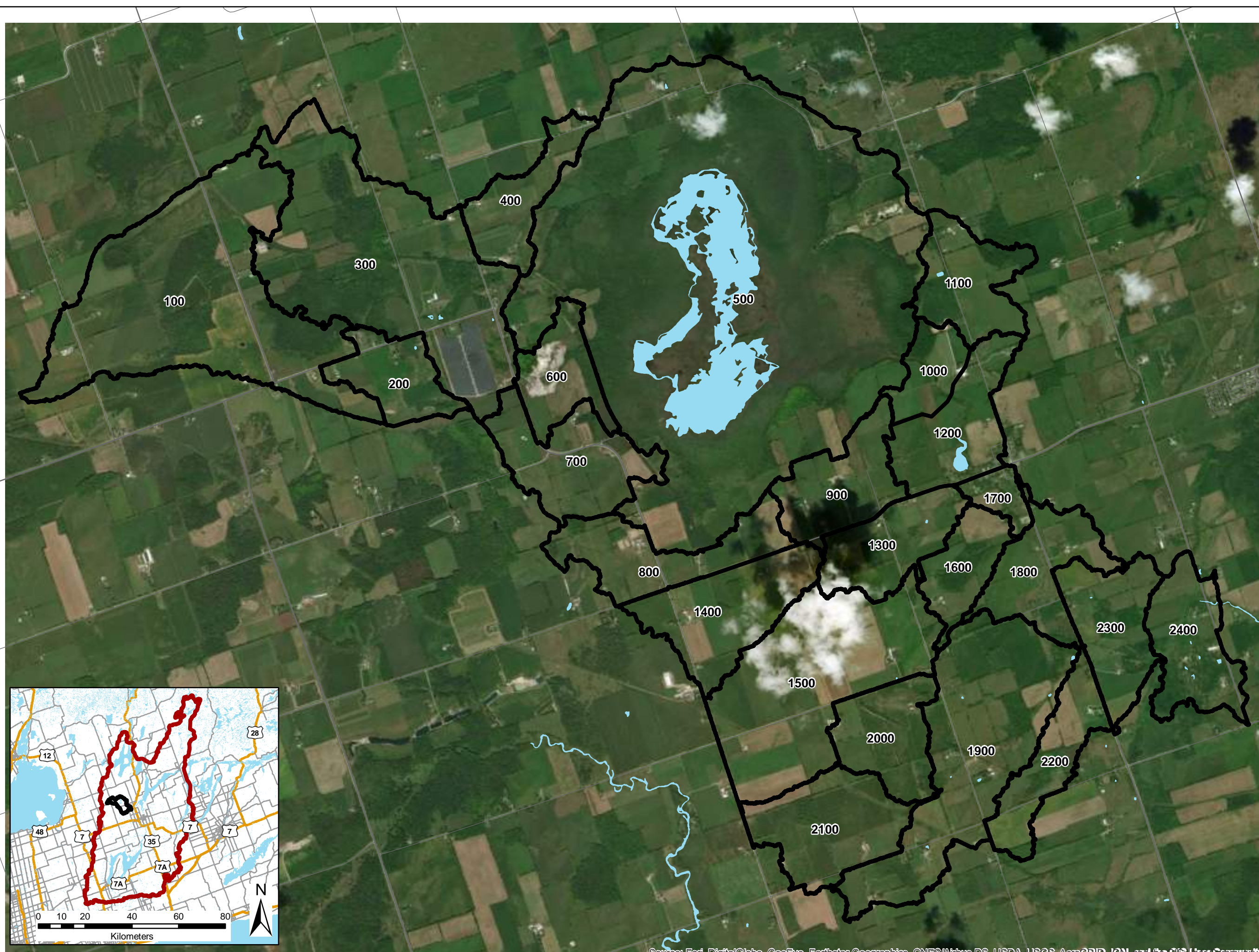
McLaren Creek Watershed Subcatchment

1:30,000

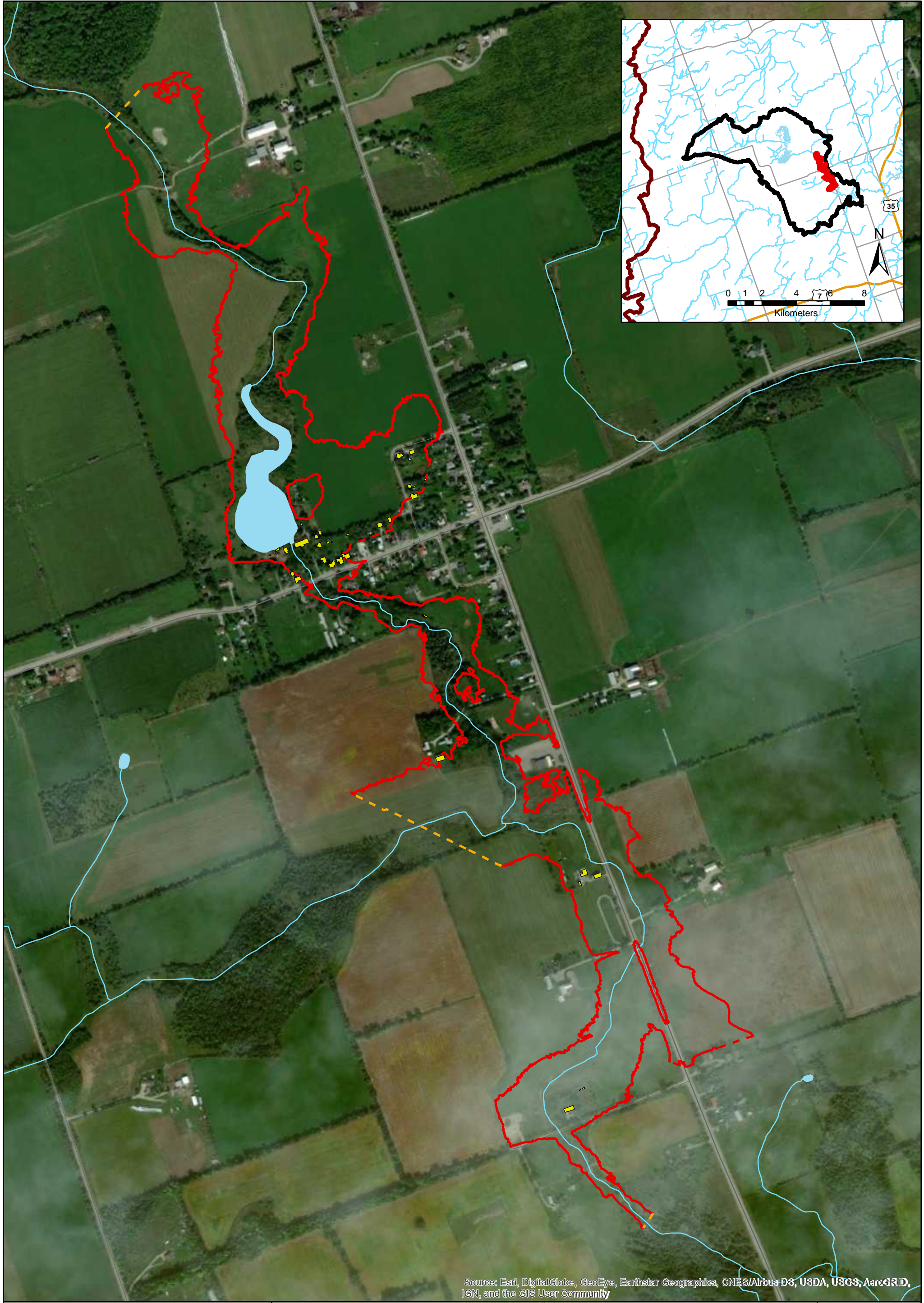
0 170 340 680 1,020 1,360
Meters

-  Watershed Subcatchment
 -  KRCA Boundary
 -  Waterbody
- Road Classification**
-  Highway
 -  Arterial
 -  Local Street



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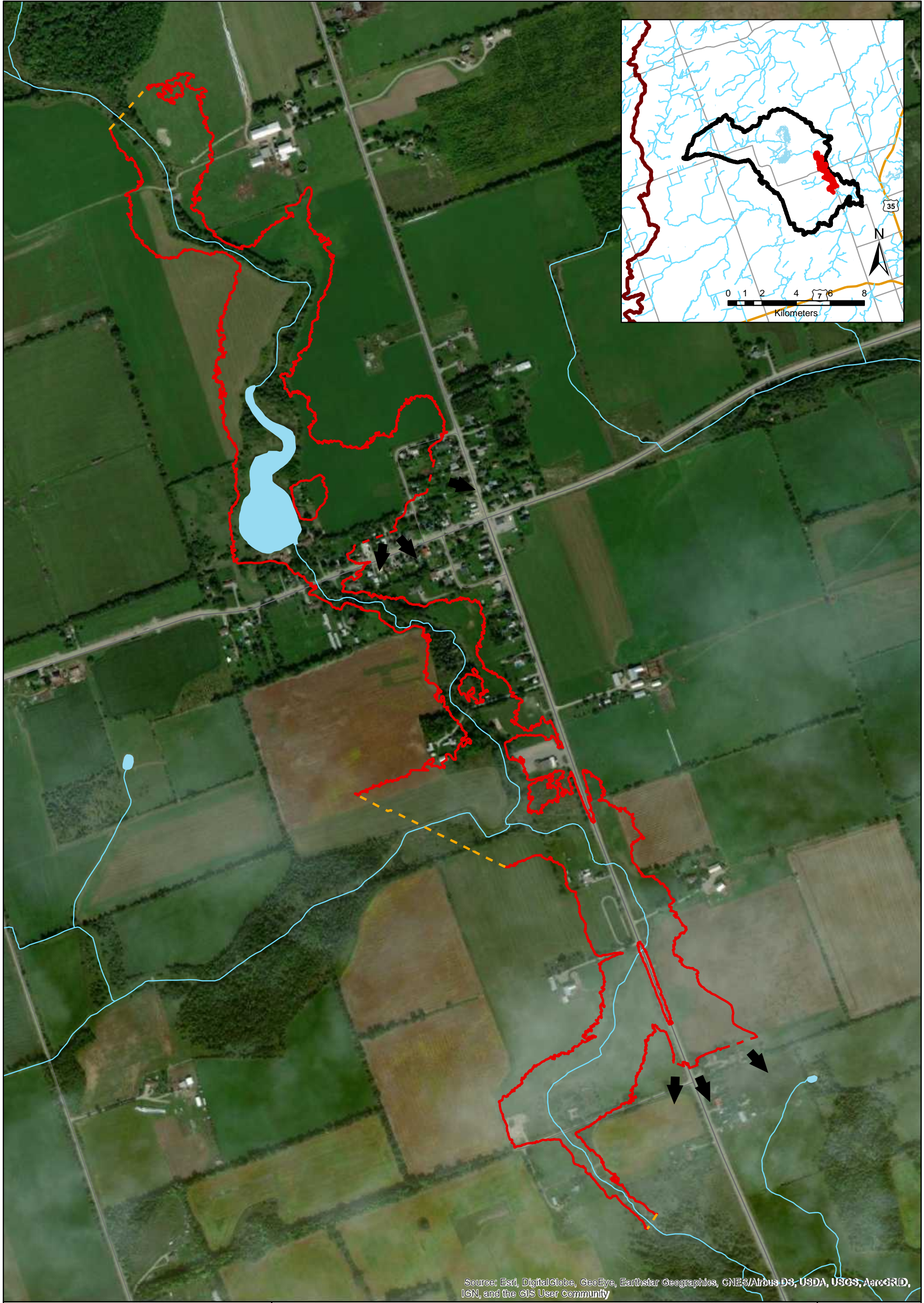
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

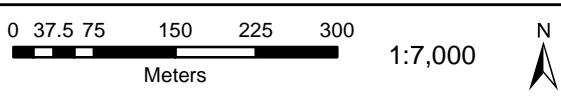
| | | | | |
|---|--|---|---|--|
| <h2>McLaren Creek Buildings in Floodplain</h2> | <ul style="list-style-type: none"> — Floodline - - - Spill Study Limit | <ul style="list-style-type: none"> Buildings in Floodplain KRCA Boundary Waterbody Watercourse | <h3>Road Classification</h3> <ul style="list-style-type: none"> Highway Arterial Local Street |  <p>KAWARTHA CONSERVATION Discover • Protect • Restore</p> |
| <p>0 37.5 75 150 225 300 Meters</p> <p style="text-align: right;">1:7,000</p> <div style="text-align: right;">  </div> | | | | |

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

McLaren Creek Floodline

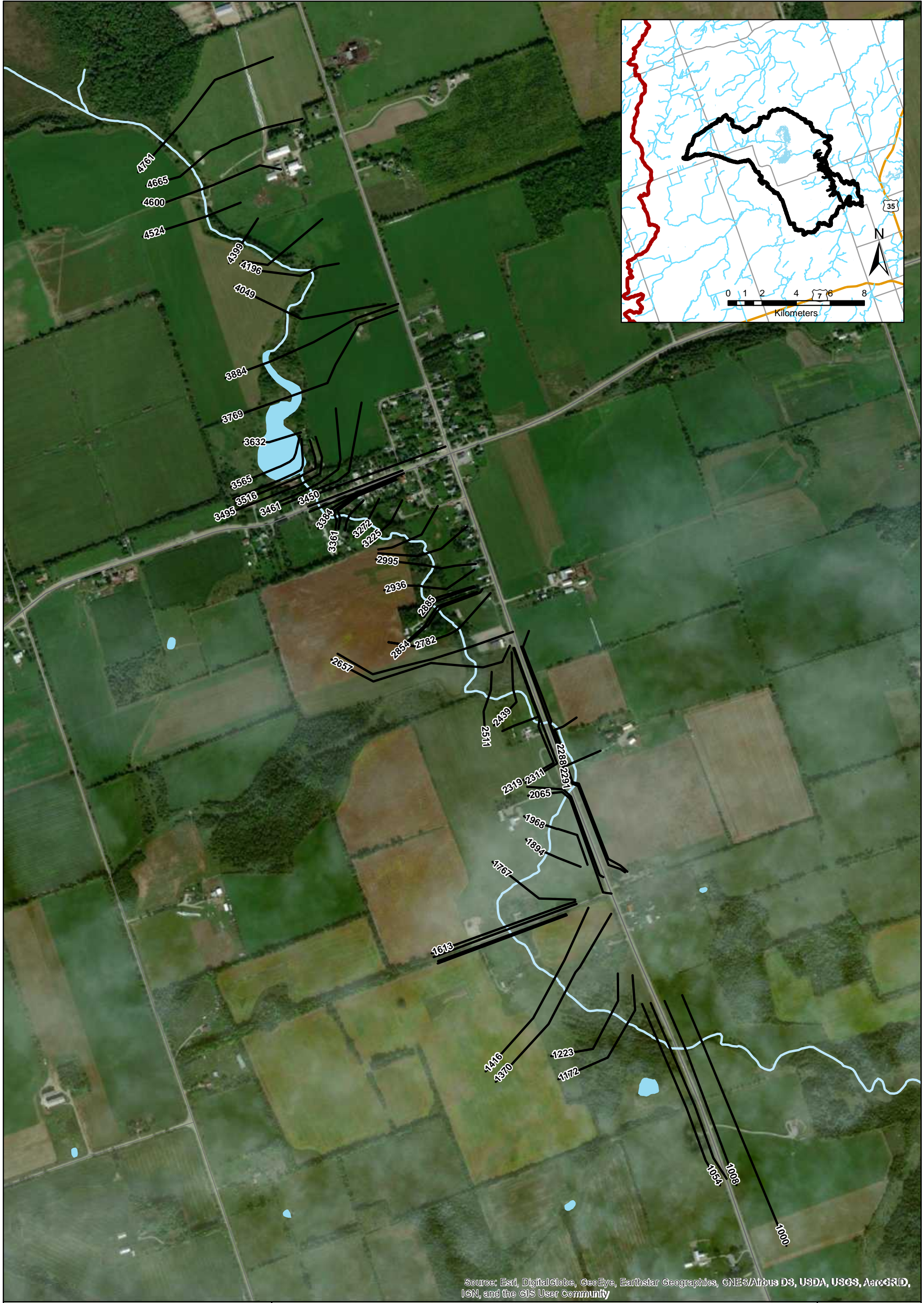


- Floodline
- - - Spill
- - - Study Limit



- KRCA Boundary
- Waterbody
- Watercourse

- ### Road Classification
- Highway
 - Arterial
 - Local Street





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

| | | | |
|--|--|---|--|
| <h2>McLaren Creek Hydraulic Model Schematic</h2> | <ul style="list-style-type: none"> Cross Section KRCA Boundary Waterbody OHN_McLaren | <h3>Road Classification</h3> <ul style="list-style-type: none"> Highway Arterial Local Street |  <p>KAWARTHA CONSERVATION Discover - Protect - Restore</p> |
| <p>0 50 100 200 300 400 Meters</p> <p style="text-align: right;">1:9,000</p> |  | | |

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Appendix F
VH Suite Outputs

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

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y M M M M O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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***** DETAILED OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
Output filename: C:\Users\jmueller\AppData\Local\Civica\VH5\42c14ce9-6b36-4c72-aa7a-4c256032f6ff\751e764-d44b-4d91-8d41-d19acaad5ae3\sce
Summary filename: C:\Users\jmueller\AppData\Local\Civica\VH5\42c14ce9-6b36-4c72-aa7a-4c256032f6ff\751e764-d44b-4d91-8d41-d19acaad5ae3\sce

DATE: 03-17-2021 TIME: 02:43:21

USER:

COMMENTS: _____

** SIMULATION : 100yr-AES-6hr **

| READ STORM | Filename: C:\Users\jmueller\AppData
| | ata\Local\Temp\
| | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
| Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |

| | | | | | | | |
|------|-------|------|-------|------|------|------|------|
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (0200) | Area (ha)= 55.70 Curve Number (CN)= 60.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.18

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 1.803

PEAK FLOW (cms)= 1.395 (i)
 TIME TO PEAK (hrs)= 3.167
 RUNOFF VOLUME (mm)= 28.268
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.315

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

| READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

```

-----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.17 26.90 | 1.67 25.10 | 3.17 5.40 | 4.67 0.00
    0.33 26.90 | 1.83 25.10 | 3.33 5.40 | 4.83 0.00
    0.50 26.90 | 2.00 25.10 | 3.50 5.40 | 5.00 0.00
    0.67 44.90 | 2.17 21.50 | 3.67 1.80 | 5.17 0.00
    0.83 44.90 | 2.33 21.50 | 3.83 1.80 | 5.33 0.00
    1.00 44.90 | 2.50 21.50 | 4.00 1.80 | 5.50 0.00
    1.17 39.50 | 2.67 14.40 | 4.17 0.00 | 5.67 0.00
    1.33 39.50 | 2.83 14.40 | 4.33 0.00 | 5.83 0.00
    1.50 39.50 | 3.00 14.40 | 4.50 0.00 | 6.00 0.00
  
```

```

-----
| CALIB |
| NASHYD ( 0100) | Area (ha)= 316.90 Curve Number (CN)= 67.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 2.77
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```

----- TRANSFORMED HYETOGRAPH -----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.083 26.90 | 1.583 25.10 | 3.083 5.40 | 4.58 0.00
    0.167 26.90 | 1.667 25.10 | 3.167 5.40 | 4.67 0.00
    0.250 26.90 | 1.750 25.10 | 3.250 5.40 | 4.75 0.00
    0.333 26.90 | 1.833 25.10 | 3.333 5.40 | 4.83 0.00
    0.417 26.90 | 1.917 25.10 | 3.417 5.40 | 4.92 0.00
    0.500 26.90 | 2.000 25.10 | 3.500 5.40 | 5.00 0.00
    0.583 44.90 | 2.083 21.50 | 3.583 1.80 | 5.08 0.00
    0.667 44.90 | 2.167 21.50 | 3.667 1.80 | 5.17 0.00
    0.750 44.90 | 2.250 21.50 | 3.750 1.80 | 5.25 0.00
    0.833 44.90 | 2.333 21.50 | 3.833 1.80 | 5.33 0.00
    0.917 44.90 | 2.417 21.50 | 3.917 1.80 | 5.42 0.00
    1.000 44.90 | 2.500 21.50 | 4.000 1.80 | 5.50 0.00
    1.083 39.50 | 2.583 14.40 | 4.083 0.00 | 5.58 0.00
    1.167 39.50 | 2.667 14.40 | 4.167 0.00 | 5.67 0.00
    1.250 39.50 | 2.750 14.40 | 4.250 0.00 | 5.75 0.00
    1.333 39.50 | 2.833 14.40 | 4.333 0.00 | 5.83 0.00
    1.417 39.50 | 2.917 14.40 | 4.417 0.00 | 5.92 0.00
    1.500 39.50 | 3.000 14.40 | 4.500 0.00 | 6.00 0.00
  
```

Unit Hyd Qpeak (cms)= 4.370

PEAK FLOW (cms)= 5.424 (i)

TIME TO PEAK (hrs)= 4.750

RUNOFF VOLUME (mm)= 34.226
TOTAL RAINFALL (mm)= 89.750
RUNOFF COEFFICIENT = 0.381

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

```

-----
| ADD HYD ( 10000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0100): 316.90 5.424 4.75 34.23
+ ID2= 2 ( 0200): 55.70 1.395 3.17 28.27
=====
ID = 3 ( 10000): 372.60 6.292 4.33 33.34

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0001)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
|-----|

```

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 60.00 | 282.95 | 0.0500 | |
| 70.00 | 281.82 | 0.0350 | Main Channel |
| 80.00 | 280.29 | 0.0350 | Main Channel |
| 90.00 | 279.48 | 0.0350 | Main Channel |
| 100.00 | 278.67 | 0.0350 | Main Channel |
| 110.00 | 279.10 | 0.0350 | Main Channel |
| 120.00 | 279.37 | 0.0350 | Main Channel |
| 130.00 | 280.55 | 0.0350 | Main Channel |
| 140.00 | 281.01 | 0.0350 | Main Channel |
| 150.00 | 281.79 | 0.0350 | Main Channel |
| 160.00 | 282.34 | 0.0350 /0.0500 | Main Channel |
| 170.00 | 282.71 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.21 | 278.88 | .142E+04 | 0.2 | 0.21 | 142.88 |
| 0.42 | 279.09 | .567E+04 | 1.1 | 0.33 | 90.01 |
| 0.63 | 279.30 | .133E+05 | 3.1 | 0.42 | 72.32 |
| 0.84 | 279.51 | .243E+05 | 7.2 | 0.54 | 56.18 |
| 1.05 | 279.72 | .371E+05 | 13.4 | 0.65 | 46.20 |
| 1.26 | 279.93 | .515E+05 | 21.4 | 0.75 | 40.05 |
| 1.47 | 280.14 | .676E+05 | 31.5 | 0.84 | 35.79 |
| 1.68 | 280.35 | .854E+05 | 43.8 | 0.93 | 32.46 |
| 1.89 | 280.56 | .104E+06 | 58.7 | 1.02 | 29.64 |
| 2.10 | 280.77 | .125E+06 | 74.0 | 1.07 | 28.22 |
| 2.31 | 280.98 | .148E+06 | 91.9 | 1.12 | 26.91 |
| 2.52 | 281.19 | .173E+06 | 114.1 | 1.19 | 25.33 |

| | | | | | |
|------|--------|----------|-------|------|-------|
| 2.73 | 281.40 | .200E+06 | 139.3 | 1.26 | 23.94 |
| 2.94 | 281.61 | .228E+06 | 167.3 | 1.32 | 22.75 |
| 3.15 | 281.82 | .258E+06 | 197.9 | 1.39 | 21.73 |
| 3.37 | 282.04 | .292E+06 | 234.3 | 1.45 | 20.74 |
| 3.59 | 282.27 | .328E+06 | 274.4 | 1.51 | 19.90 |
| 3.82 | 282.49 | .366E+06 | 323.9 | 1.60 | 18.84 |
| 4.04 | 282.71 | .408E+06 | 380.6 | 1.69 | 17.86 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (10000) | 372.60 | 6.29 | 4.33 | 33.34 | 0.79 | 0.50 |
| OUTFLOW: ID= 1 (0001) | 372.60 | 5.64 | 5.08 | 33.33 | 0.76 | 0.48 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (0300) | Area (ha)= 300.70 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.22

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |

| | | | | | | | |
|-------|-------|-------|-------|-------|------|------|------|
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 5.174

PEAK FLOW (cms)= 5.517 (i)

TIME TO PEAK (hrs)= 4.250

RUNOFF VOLUME (mm)= 30.705

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.342

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 CALIB |
 NASHYD (0400) | Area (ha)= 59.10 Curve Number (CN)= 62.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.13

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 1.998

PEAK FLOW (cms)= 1.595 (i)

TIME TO PEAK (hrs)= 3.167

RUNOFF VOLUME (mm)= 29.874

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.333

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

| ADD HYD (20000) | | | | |
|-------------------|--------|--------|-------|-------|
| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0001): | 372.60 | 5.636 | 5.08 | 33.33 |
| + ID2= 2 (0300): | 300.70 | 5.517 | 4.25 | 30.70 |
| ===== | | | | |
| ID = 3 (20000): | 673.30 | 10.854 | 4.67 | 32.16 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (20000) | | | | |
|-------------------|--------|--------|-------|-------|
| 3 + 2 = 1 | AREA | QPEAK | TPEAK | R.V. |
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (20000): | 673.30 | 10.854 | 4.67 | 32.16 |
| + ID2= 2 (0400): | 59.10 | 1.595 | 3.17 | 29.87 |

=====
ID = 1 (20000): 732.40 11.764 4.42 31.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0002)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.75 | 0.0800 |
| 50.00 | 275.40 | 0.0800 |
| 309.00 | 275.40 | 0.0800 /0.0350 Main Channel |
| 310.00 | 275.15 | 0.0350 Main Channel |
| 318.00 | 275.15 | 0.0350 Main Channel |
| 320.00 | 275.40 | 0.0350 /0.0800 Main Channel |
| 650.00 | 275.40 | 0.0800 |
| 800.00 | 275.75 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.03 | 275.18 | .635E+03 | 0.0 | 0.08 | 523.54 |
| 0.06 | 275.21 | .130E+04 | 0.1 | 0.12 | 334.64 |
| 0.09 | 275.24 | .199E+04 | 0.1 | 0.16 | 258.87 |
| 0.13 | 275.28 | .271E+04 | 0.2 | 0.19 | 216.44 |
| 0.16 | 275.31 | .346E+04 | 0.3 | 0.22 | 188.78 |
| 0.19 | 275.34 | .424E+04 | 0.4 | 0.24 | 169.07 |
| 0.22 | 275.37 | .505E+04 | 0.5 | 0.27 | 154.20 |
| 0.25 | 275.40 | .595E+04 | 0.7 | 0.29 | 143.80 |
| 0.28 | 275.43 | .540E+05 | 1.5 | 0.07 | 585.80 |
| 0.31 | 275.46 | .103E+06 | 3.2 | 0.08 | 539.62 |
| 0.35 | 275.50 | .154E+06 | 5.5 | 0.09 | 468.71 |
| 0.38 | 275.53 | .207E+06 | 8.4 | 0.10 | 412.66 |
| 0.41 | 275.56 | .261E+06 | 11.7 | 0.11 | 369.95 |
| 0.44 | 275.59 | .316E+06 | 15.6 | 0.12 | 336.78 |
| 0.47 | 275.62 | .372E+06 | 20.0 | 0.13 | 310.34 |
| 0.50 | 275.65 | .431E+06 | 24.8 | 0.14 | 288.77 |
| 0.54 | 275.69 | .490E+06 | 30.2 | 0.15 | 270.81 |
| 0.57 | 275.72 | .551E+06 | 35.9 | 0.16 | 255.61 |
| 0.60 | 275.75 | .613E+06 | 42.2 | 0.17 | 242.55 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (20000) | 732.40 | 11.76 | 4.42 | 31.97 | 0.41 | 0.11 |
| OUTFLOW: ID= 1 (0002) | 732.40 | 4.95 | 12.67 | 31.97 | 0.34 | 0.09 |

| READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

```

-----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.17 26.90 | 1.67 25.10 | 3.17 5.40 | 4.67 0.00
    0.33 26.90 | 1.83 25.10 | 3.33 5.40 | 4.83 0.00
    0.50 26.90 | 2.00 25.10 | 3.50 5.40 | 5.00 0.00
    0.67 44.90 | 2.17 21.50 | 3.67 1.80 | 5.17 0.00
    0.83 44.90 | 2.33 21.50 | 3.83 1.80 | 5.33 0.00
    1.00 44.90 | 2.50 21.50 | 4.00 1.80 | 5.50 0.00
    1.17 39.50 | 2.67 14.40 | 4.17 0.00 | 5.67 0.00
    1.33 39.50 | 2.83 14.40 | 4.33 0.00 | 5.83 0.00
    1.50 39.50 | 3.00 14.40 | 4.50 0.00 | 6.00 0.00
  
```

```

-----
| CALIB |
| NASHYD ( 0600) | Area (ha)= 55.10 Curve Number (CN)= 60.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.14
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```

---- TRANSFORMED HYETOGRAPH ----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.083 26.90 | 1.583 25.10 | 3.083 5.40 | 4.58 0.00
    0.167 26.90 | 1.667 25.10 | 3.167 5.40 | 4.67 0.00
    0.250 26.90 | 1.750 25.10 | 3.250 5.40 | 4.75 0.00
    0.333 26.90 | 1.833 25.10 | 3.333 5.40 | 4.83 0.00
    0.417 26.90 | 1.917 25.10 | 3.417 5.40 | 4.92 0.00
    0.500 26.90 | 2.000 25.10 | 3.500 5.40 | 5.00 0.00
    0.583 44.90 | 2.083 21.50 | 3.583 1.80 | 5.08 0.00
    0.667 44.90 | 2.167 21.50 | 3.667 1.80 | 5.17 0.00
    0.750 44.90 | 2.250 21.50 | 3.750 1.80 | 5.25 0.00
    0.833 44.90 | 2.333 21.50 | 3.833 1.80 | 5.33 0.00
    0.917 44.90 | 2.417 21.50 | 3.917 1.80 | 5.42 0.00
    1.000 44.90 | 2.500 21.50 | 4.000 1.80 | 5.50 0.00
    1.083 39.50 | 2.583 14.40 | 4.083 0.00 | 5.58 0.00
    1.167 39.50 | 2.667 14.40 | 4.167 0.00 | 5.67 0.00
    1.250 39.50 | 2.750 14.40 | 4.250 0.00 | 5.75 0.00
    1.333 39.50 | 2.833 14.40 | 4.333 0.00 | 5.83 0.00
    1.417 39.50 | 2.917 14.40 | 4.417 0.00 | 5.92 0.00
    1.500 39.50 | 3.000 14.40 | 4.500 0.00 | 6.00 0.00
  
```

Unit Hyd Qpeak (cms)= 1.846

PEAK FLOW (cms)= 1.403 (i)

TIME TO PEAK (hrs)= 3.167

RUNOFF VOLUME (mm)= 28.268
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.315

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 CALIB |
 NASHYD (0700) | Area (ha)= 93.30 Curve Number (CN)= 63.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.93

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |

| | | | | | | | |
|-------|-------|-------|-------|-------|------|------|------|
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 3.832

PEAK FLOW (cms)= 2.789 (i)
 TIME TO PEAK (hrs)= 2.917
 RUNOFF VOLUME (mm)= 30.704
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.342

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

```

-----
| ADD HYD ( 40000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
  ID1= 1 ( 0600): 55.10 1.403 3.17 28.27
+ ID2= 2 ( 0700): 93.30 2.789 2.92 30.70
=====
  ID = 3 ( 40000): 148.40 4.172 3.00 29.80
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0003)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
  
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
  0.00     275.80     0.0800
 175.00     275.48     0.0800 /0.0500
 400.00     275.32     0.0500
 495.00     275.32     0.0500 /0.0350 Main Channel
 496.00     274.97     0.0350   Main Channel
 501.00     274.97     0.0350   Main Channel
 502.00     275.32     0.0350 /0.0500 Main Channel
 595.00     275.54     0.0500 /0.0800
 645.00     275.80     0.0800
  
```

```

<----- TRAVEL TIME TABLE ----->
DEPTH  ELEV  VOLUME  FLOW RATE  VELOCITY  TRAV.TIME
(m)    (m)   (cu.m.) (cms)     (m/s)    (min)
0.04  275.01 .277E+03  0.0       0.06     359.96
0.08  275.05 .566E+03  0.0       0.10     230.18
0.12  275.09 .867E+03  0.1       0.13     178.15
0.16  275.13 .118E+04  0.1       0.16     149.01
0.19  275.16 .151E+04  0.2       0.18     130.02
0.23  275.20 .184E+04  0.3       0.20     116.50
  
```

| | | | | | |
|------|--------|----------|------|------|--------|
| 0.27 | 275.24 | .219E+04 | 0.3 | 0.22 | 106.29 |
| 0.31 | 275.28 | .255E+04 | 0.4 | 0.24 | 98.27 |
| 0.35 | 275.32 | .293E+04 | 0.5 | 0.25 | 91.76 |
| 0.39 | 275.36 | .104E+05 | 0.9 | 0.11 | 203.05 |
| 0.44 | 275.41 | .249E+05 | 1.7 | 0.10 | 237.81 |
| 0.48 | 275.45 | .453E+05 | 3.3 | 0.10 | 228.90 |
| 0.53 | 275.50 | .712E+05 | 5.8 | 0.11 | 203.44 |
| 0.58 | 275.55 | .101E+06 | 9.5 | 0.13 | 176.73 |
| 0.63 | 275.60 | .133E+06 | 14.1 | 0.15 | 156.52 |
| 0.68 | 275.65 | .167E+06 | 19.6 | 0.16 | 141.93 |
| 0.72 | 275.69 | .204E+06 | 26.0 | 0.18 | 130.89 |
| 0.77 | 275.74 | .243E+06 | 33.1 | 0.19 | 122.22 |
| 0.82 | 275.79 | .284E+06 | 41.2 | 0.20 | 115.20 |

<---- hydrograph ----> <-pipe / channel->

| | AREA | QPEAK | TPEAK | R.V. | MAX DEPTH | MAX VEL |
|-------------------------|--------|-------|-------|-------|-----------|---------|
| | (ha) | (cms) | (hrs) | (mm) | (m) | (m/s) |
| INFLOW : ID= 2 (40000) | 148.40 | 4.17 | 3.00 | 29.80 | 0.50 | 0.11 |
| OUTFLOW: ID= 1 (0003) | 148.40 | 1.99 | 5.75 | 29.79 | 0.44 | 0.10 |

| ADD HYD (25000)|

| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.

(ha) (cms) (hrs) (mm)

ID1= 1 (0002): 732.40 4.948 12.67 31.97
+ ID2= 2 (0003): 148.40 1.989 5.75 29.79

=====

ID = 3 (25000): 880.80 5.912 5.75 31.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0015)|

| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.80 | 0.0800 |
| 60.00 | 275.48 | 0.0800 |
| 515.00 | 275.23 | 0.0800 /0.0350 Main Channel |
| 530.00 | 275.08 | 0.0350 Main Channel |
| 535.00 | 275.23 | 0.0350 /0.0800 Main Channel |
| 755.00 | 275.31 | 0.0800 |
| 810.00 | 275.80 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH | ELEV | VOLUME | FLOW RATE | VELOCITY | TRAV.TIME |
|-------|--------|----------|-----------|----------|-----------|
| (m) | (m) | (cu.m.) | (cms) | (m/s) | (min) |
| 0.04 | 275.12 | .154E+03 | 0.0 | 0.03 | 960.18 |
| 0.08 | 275.15 | .616E+03 | 0.0 | 0.05 | 604.88 |

| | | | | | |
|------|--------|----------|------|------|--------|
| 0.11 | 275.19 | .139E+04 | 0.1 | 0.06 | 461.61 |
| 0.15 | 275.23 | .246E+04 | 0.1 | 0.07 | 381.05 |
| 0.19 | 275.27 | .913E+04 | 0.3 | 0.05 | 596.85 |
| 0.23 | 275.31 | .266E+05 | 0.6 | 0.04 | 728.30 |
| 0.26 | 275.34 | .525E+05 | 1.3 | 0.04 | 664.16 |
| 0.30 | 275.38 | .829E+05 | 2.4 | 0.05 | 586.71 |
| 0.34 | 275.42 | .118E+06 | 3.7 | 0.05 | 526.62 |
| 0.38 | 275.46 | .158E+06 | 5.5 | 0.06 | 480.34 |
| 0.42 | 275.50 | .201E+06 | 7.7 | 0.06 | 437.55 |
| 0.45 | 275.53 | .247E+06 | 10.4 | 0.07 | 395.94 |
| 0.49 | 275.57 | .293E+06 | 13.4 | 0.08 | 362.70 |
| 0.53 | 275.61 | .339E+06 | 16.8 | 0.08 | 335.65 |
| 0.57 | 275.65 | .387E+06 | 20.6 | 0.09 | 313.22 |
| 0.61 | 275.69 | .435E+06 | 24.6 | 0.09 | 294.32 |
| 0.64 | 275.72 | .483E+06 | 29.0 | 0.10 | 278.16 |
| 0.68 | 275.76 | .533E+06 | 33.6 | 0.10 | 264.16 |
| 0.72 | 275.80 | .583E+06 | 38.6 | 0.11 | 251.91 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (25000) 880.80 5.91 5.75 31.60 0.39 0.06

OUTFLOW: ID= 1 (0015) 880.80 3.42 12.83 31.60 0.33 0.05

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (0500) | Area (ha)= 958.30 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.88

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 12.709

PEAK FLOW (cms)= 14.243 (i)

TIME TO PEAK (hrs)= 4.833

RUNOFF VOLUME (mm)= 30.705

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.342

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

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (1100) | Area (ha)= 73.60 Curve Number (CN)= 81.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.37

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.052

PEAK FLOW (cms)= 2.993 (i)
 TIME TO PEAK (hrs)= 3.250
 RUNOFF VOLUME (mm)= 49.765
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.554

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

 | ROUTE CHN(0004) |
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 275.10 | 0.0500 | |
| 50.00 | 275.04 | 0.0350 | Main Channel |
| 4900.00 | 275.10 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 275.11 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.00 | 275.04 | .190E+03 | 0.0 | 0.01 | 897.50 |
| 0.01 | 275.05 | .761E+03 | 0.0 | 0.01 | 565.39 |
| 0.01 | 275.05 | .171E+04 | 0.1 | 0.02 | 431.47 |
| 0.01 | 275.05 | .304E+04 | 0.1 | 0.02 | 356.17 |
| 0.02 | 275.06 | .475E+04 | 0.3 | 0.03 | 306.94 |
| 0.02 | 275.06 | .685E+04 | 0.4 | 0.03 | 271.81 |
| 0.02 | 275.06 | .932E+04 | 0.6 | 0.03 | 245.26 |
| 0.03 | 275.07 | .122E+05 | 0.9 | 0.03 | 224.37 |
| 0.03 | 275.07 | .154E+05 | 1.2 | 0.04 | 207.43 |
| 0.03 | 275.07 | .190E+05 | 1.6 | 0.04 | 193.36 |
| 0.03 | 275.07 | .230E+05 | 2.1 | 0.04 | 181.45 |
| 0.04 | 275.08 | .274E+05 | 2.7 | 0.05 | 171.23 |
| 0.04 | 275.08 | .321E+05 | 3.3 | 0.05 | 162.33 |
| 0.04 | 275.08 | .373E+05 | 4.0 | 0.05 | 154.51 |
| 0.05 | 275.09 | .428E+05 | 4.8 | 0.05 | 147.56 |
| 0.05 | 275.09 | .487E+05 | 5.7 | 0.05 | 141.35 |
| 0.05 | 275.09 | .550E+05 | 6.7 | 0.06 | 135.75 |
| 0.06 | 275.10 | .616E+05 | 7.9 | 0.06 | 130.67 |
| 0.06 | 275.10 | .686E+05 | 9.1 | 0.06 | 125.92 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (1100) | 73.60 | 2.99 | 3.25 | 49.76 | 0.04 |
| OUTFLOW: ID= 1 (0004) | 73.60 | 1.58 | 4.58 | 49.69 | 0.03 |

| ADD HYD (30000)|

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|--------------|----------------|----------------|--------------|
| 1 + 2 = 3 | | | | |
| ID1= 1 (0015): | 880.80 | 3.422 | 12.83 | 31.60 |
| + ID2= 2 (0004): | 73.60 | 1.582 | 4.58 | 49.69 |
| ===== | | | | |
| ID = 3 (30000): | 954.40 | 3.615 | 12.83 | 32.99 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (30000)|

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|--------------|----------------|----------------|--------------|
| 3 + 2 = 1 | | | | |
| ID1= 3 (30000): | 954.40 | 3.615 | 12.83 | 32.99 |
| + ID2= 2 (0500): | 958.30 | 14.243 | 4.83 | 30.70 |
| ===== | | | | |
| ID = 1 (30000): | 1912.70 | 16.699 | 4.92 | 31.85 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0005)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 277.94 | 0.0500 | |
| 50.00 | 275.49 | 0.0350 | Main Channel |
| 100.00 | 275.08 | 0.0350 | Main Channel |
| 150.00 | 275.82 | 0.0350 | Main Channel |
| 200.00 | 276.76 | 0.0350 /0.0500 | Main Channel |
| 250.00 | 277.55 | 0.0500 | |
| 1000.00 | 277.60 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.10 | 275.18 | .571E+03 | 0.1 | 0.15 | 64.83 |
| 0.21 | 275.29 | .229E+04 | 0.9 | 0.23 | 40.84 |
| 0.31 | 275.39 | .514E+04 | 2.7 | 0.31 | 31.17 |
| 0.41 | 275.49 | .914E+04 | 5.9 | 0.37 | 25.73 |
| 0.55 | 275.63 | .159E+05 | 13.7 | 0.49 | 19.40 |
| 0.69 | 275.77 | .237E+05 | 24.4 | 0.59 | 16.20 |
| 0.83 | 275.91 | .324E+05 | 38.3 | 0.68 | 14.09 |
| 0.97 | 276.05 | .420E+05 | 55.6 | 0.76 | 12.60 |
| 1.11 | 276.19 | .524E+05 | 76.0 | 0.83 | 11.50 |
| 1.25 | 276.33 | .637E+05 | 99.7 | 0.90 | 10.64 |
| 1.39 | 276.47 | .757E+05 | 126.8 | 0.96 | 9.95 |
| 1.54 | 276.62 | .887E+05 | 157.5 | 1.02 | 9.38 |
| 1.68 | 276.76 | .102E+06 | 191.8 | 1.07 | 8.90 |
| 1.82 | 276.90 | .117E+06 | 235.9 | 1.16 | 8.27 |
| 1.96 | 277.04 | .133E+06 | 284.3 | 1.23 | 7.78 |
| 2.10 | 277.18 | .149E+06 | 337.1 | 1.30 | 7.38 |
| 2.24 | 277.32 | .167E+06 | 394.3 | 1.36 | 7.05 |
| 2.38 | 277.46 | .185E+06 | 456.0 | 1.41 | 6.77 |
| 2.52 | 277.60 | .215E+06 | 517.1 | 1.38 | 6.94 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (30000) | 1912.70 | 16.70 | 4.92 | 31.85 | 0.59 |
| OUTFLOW: ID= 1 (0005) | 1912.70 | 16.55 | 5.17 | 31.85 | 0.52 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71

| Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.17 26.90 | 1.67 25.10 | 3.17 5.40 | 4.67 0.00
0.33 26.90 | 1.83 25.10 | 3.33 5.40 | 4.83 0.00
0.50 26.90 | 2.00 25.10 | 3.50 5.40 | 5.00 0.00
0.67 44.90 | 2.17 21.50 | 3.67 1.80 | 5.17 0.00
0.83 44.90 | 2.33 21.50 | 3.83 1.80 | 5.33 0.00
1.00 44.90 | 2.50 21.50 | 4.00 1.80 | 5.50 0.00
1.17 39.50 | 2.67 14.40 | 4.17 0.00 | 5.67 0.00
1.33 39.50 | 2.83 14.40 | 4.33 0.00 | 5.83 0.00
1.50 39.50 | 3.00 14.40 | 4.50 0.00 | 6.00 0.00

| CALIB |
| NASHYD (1000) | Area (ha)= 37.50 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.99

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 26.90 | 1.583 25.10 | 3.083 5.40 | 4.58 0.00
0.167 26.90 | 1.667 25.10 | 3.167 5.40 | 4.67 0.00
0.250 26.90 | 1.750 25.10 | 3.250 5.40 | 4.75 0.00
0.333 26.90 | 1.833 25.10 | 3.333 5.40 | 4.83 0.00
0.417 26.90 | 1.917 25.10 | 3.417 5.40 | 4.92 0.00
0.500 26.90 | 2.000 25.10 | 3.500 5.40 | 5.00 0.00
0.583 44.90 | 2.083 21.50 | 3.583 1.80 | 5.08 0.00
0.667 44.90 | 2.167 21.50 | 3.667 1.80 | 5.17 0.00
0.750 44.90 | 2.250 21.50 | 3.750 1.80 | 5.25 0.00
0.833 44.90 | 2.333 21.50 | 3.833 1.80 | 5.33 0.00
0.917 44.90 | 2.417 21.50 | 3.917 1.80 | 5.42 0.00
1.000 44.90 | 2.500 21.50 | 4.000 1.80 | 5.50 0.00
1.083 39.50 | 2.583 14.40 | 4.083 0.00 | 5.58 0.00
1.167 39.50 | 2.667 14.40 | 4.167 0.00 | 5.67 0.00
1.250 39.50 | 2.750 14.40 | 4.250 0.00 | 5.75 0.00
1.333 39.50 | 2.833 14.40 | 4.333 0.00 | 5.83 0.00
1.417 39.50 | 2.917 14.40 | 4.417 0.00 | 5.92 0.00
1.500 39.50 | 3.000 14.40 | 4.500 0.00 | 6.00 0.00

Unit Hyd Qpeak (cms)= 1.447

PEAK FLOW (cms)= 1.591 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 44.718
TOTAL RAINFALL (mm)= 89.750
RUNOFF COEFFICIENT = 0.498

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

```

-----
| ADD HYD ( 50000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 1000): 37.50 1.591 2.83 44.72
+ ID2= 2 ( 0005): 1912.70 16.554 5.17 31.85
=====
ID = 3 ( 50000): 1950.20 16.921 5.08 32.09

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0006)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00
-----

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 277.14 0.0500
1000.00 275.16 0.0500 /0.0300 Main Channel
19950.00 275.00 0.0300 /0.0500 Main Channel
20000.00 277.10 0.0500

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.11 275.11 .674E+06 247.4 0.34 45.39
0.22 275.22 .249E+07 1707.4 0.64 24.31
0.33 275.33 .445E+07 4480.7 0.94 16.54
0.44 275.44 .641E+07 8225.7 1.19 12.99
0.55 275.55 .838E+07 12829.8 1.43 10.89
0.66 275.66 .104E+08 18220.9 1.64 9.47
0.77 275.77 .123E+08 24346.8 1.84 8.45
0.88 275.88 .143E+08 31167.5 2.03 7.66
0.99 275.99 .163E+08 38651.0 2.21 7.04
1.11 276.11 .183E+08 46770.9 2.38 6.53
1.22 276.22 .203E+08 55504.6 2.54 6.10
1.33 276.33 .223E+08 64833.0 2.70 5.74
1.44 276.44 .244E+08 74739.2 2.86 5.43
1.55 276.55 .264E+08 85208.2 3.01 5.16
1.66 276.66 .284E+08 96226.9 3.15 4.92
1.77 276.77 .304E+08 ***** 3.30 4.71
1.88 276.88 .325E+08 ***** 3.44 4.52
1.99 276.99 .345E+08 ***** 3.57 4.34
2.10 277.10 .366E+08 ***** 3.71 4.19

```

```

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)

```

INFLOW : ID= 2 (50000) 1950.20 16.92 5.08 32.09 0.01 0.34
 OUTFLOW: ID= 1 (0006) 1950.20 16.08 5.92 32.09 0.01 0.34

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (1200) | Area (ha)= 81.30 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.34

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |

1.417 39.50 | 2.917 14.40 | 4.417 0.00 | 5.92 0.00
 1.500 39.50 | 3.000 14.40 | 4.500 0.00 | 6.00 0.00

Unit Hyd Qpeak (cms)= 9.133

PEAK FLOW (cms)= 5.098 (i)
 TIME TO PEAK (hrs)= 1.667
 RUNOFF VOLUME (mm)= 48.438
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.540

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

 | ADD HYD (60000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 |----- (ha) (cms) (hrs) (mm)
 ID1= 1 (1200): 81.30 5.098 1.67 48.44
 + ID2= 2 (0006): 1950.20 16.079 5.92 32.09
 =====
 ID = 3 (60000): 2031.50 16.079 5.92 32.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0010)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
 |-----
 <----- DATA FOR SECTION (1.1) ----->
 Distance Elevation Manning
 0.00 269.84 0.0500
 1000.00 267.76 0.0500 /0.0350 Main Channel
 19950.00 267.77 0.0350 /0.0500 Main Channel
 20000.00 269.10 0.0500

 <----- TRAVEL TIME TABLE ----->
 DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
 (m) (m) (cu.m.) (cms) (m/s) (min)
 0.07 267.83 .104E+07 351.0 0.28 49.37
 0.14 267.90 .216E+07 1186.5 0.46 30.35
 0.21 267.97 .328E+07 2380.9 0.61 22.99
 0.28 268.04 .441E+07 3886.1 0.74 18.91
 0.35 268.11 .554E+07 5673.1 0.86 16.27
 0.42 268.18 .667E+07 7721.6 0.97 14.39
 0.49 268.25 .780E+07 10016.2 1.07 12.98
 0.56 268.32 .893E+07 12544.8 1.17 11.87
 0.63 268.39 .101E+08 15297.5 1.27 10.97
 0.71 268.47 .112E+08 18265.9 1.36 10.23
 0.78 268.54 .123E+08 21442.8 1.45 9.60
 0.85 268.61 .135E+08 24822.1 1.54 9.06
 0.92 268.68 .146E+08 28398.1 1.62 8.59

| | | | | | |
|------|--------|----------|---------|------|------|
| 0.99 | 268.75 | .158E+08 | 32166.0 | 1.70 | 8.18 |
| 1.06 | 268.82 | .169E+08 | 36121.4 | 1.78 | 7.81 |
| 1.13 | 268.89 | .181E+08 | 40260.3 | 1.86 | 7.49 |
| 1.20 | 268.96 | .192E+08 | 44579.2 | 1.94 | 7.19 |
| 1.27 | 269.03 | .204E+08 | 49074.5 | 2.01 | 6.93 |
| 1.34 | 269.10 | .215E+08 | 53743.4 | 2.09 | 6.68 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (60000) | 2031.50 | 16.08 | 5.92 | 32.75 | 0.00 | 0.28 |
| OUTFLOW: ID= 1 (0010) | 2031.50 | 15.36 | 6.75 | 32.75 | 0.00 | 0.28 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (0800) | Area (ha)= 84.70 Curve Number (CN)= 72.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.22

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |

| | | | | | | | |
|-------|-------|-------|-------|-------|------|------|------|
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.652

PEAK FLOW (cms)= 2.883 (i)

TIME TO PEAK (hrs)= 3.167

RUNOFF VOLUME (mm)= 39.136

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.436

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

| ROUTE CHN(0007)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.90 | 0.0500 | |
| 300.00 | 271.80 | 0.0350 | Main Channel |
| 1500.00 | 271.76 | 0.0350 | Main Channel |
| 2000.00 | 271.75 | 0.0350 | Main Channel |
| 4500.00 | 272.50 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 272.76 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.05 | 271.80 | .324E+05 | 7.9 | 0.16 | 67.91 |
| 0.10 | 271.85 | .956E+05 | 45.5 | 0.30 | 35.06 |
| 0.15 | 271.90 | .165E+06 | 106.4 | 0.41 | 25.82 |
| 0.20 | 271.95 | .240E+06 | 188.6 | 0.50 | 21.19 |
| 0.25 | 272.00 | .321E+06 | 291.6 | 0.58 | 18.33 |
| 0.30 | 272.05 | .408E+06 | 415.2 | 0.65 | 16.36 |
| 0.35 | 272.10 | .500E+06 | 559.8 | 0.72 | 14.89 |
| 0.40 | 272.15 | .599E+06 | 725.6 | 0.77 | 13.75 |
| 0.45 | 272.20 | .703E+06 | 913.1 | 0.83 | 12.84 |
| 0.50 | 272.25 | .814E+06 | 1122.9 | 0.88 | 12.08 |
| 0.56 | 272.31 | .930E+06 | 1355.5 | 0.93 | 11.43 |
| 0.61 | 272.36 | .105E+07 | 1611.5 | 0.98 | 10.88 |
| 0.66 | 272.41 | .118E+07 | 1891.5 | 1.03 | 10.40 |
| 0.71 | 272.46 | .131E+07 | 2196.1 | 1.07 | 9.97 |

| | | | | | |
|------|--------|----------|--------|------|------|
| 0.76 | 272.51 | .145E+07 | 2535.6 | 1.12 | 9.56 |
| 0.81 | 272.56 | .160E+07 | 2957.1 | 1.18 | 9.01 |
| 0.86 | 272.61 | .175E+07 | 3405.7 | 1.25 | 8.54 |
| 0.91 | 272.66 | .190E+07 | 3881.5 | 1.31 | 8.15 |
| 0.96 | 272.71 | .205E+07 | 4384.4 | 1.37 | 7.80 |

<---- hydrograph ----> <-pipe / channel->

| AREA | QPEAK | TPEAK | R.V. | MAX DEPTH | MAX VEL |
|------|-------|-------|------|-----------|---------|
| (ha) | (cms) | (hrs) | (mm) | (m) | (m/s) |

| | | | | | | |
|------------------------|-------|------|------|-------|------|------|
| INFLOW : ID= 2 (0800) | 84.70 | 2.88 | 3.17 | 39.14 | 0.02 | 0.16 |
| OUTFLOW: ID= 1 (0007) | 84.70 | 2.31 | 4.08 | 39.13 | 0.01 | 0.16 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (1400) | Area (ha)= 99.51 Curve Number (CN)= 81.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.82

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |

| | | | | | | | |
|-------|-------|-------|-------|-------|------|------|------|
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.088

PEAK FLOW (cms)= 3.404 (i)
 TIME TO PEAK (hrs)= 3.750
 RUNOFF VOLUME (mm)= 49.765
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.554

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

| READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

| CALIB |
 | NASHYD (0900) | Area (ha)= 75.70 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.41

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.051

PEAK FLOW (cms)= 2.952 (i)

TIME TO PEAK (hrs)= 3.333

RUNOFF VOLUME (mm)= 48.449

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.540

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

| ADD HYD (70000)|

| | AREA | QPEAK | TPEAK | R.V. |
|-------------------|--------|-------|-------|-------|
| | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (1400): | 99.51 | 3.404 | 3.75 | 49.76 |
| + ID2= 2 (0007): | 84.70 | 2.306 | 4.08 | 39.13 |
| ===== | | | | |
| ID = 3 (70000): | 184.21 | 5.675 | 3.92 | 44.88 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (70000)|

| | AREA | QPEAK | TPEAK | R.V. |
|-------------------|--------|-------|-------|-------|
| | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (70000): | 184.21 | 5.675 | 3.92 | 44.88 |
| + ID2= 2 (0900): | 75.70 | 2.952 | 3.33 | 48.45 |
| ===== | | | | |
| ID = 1 (70000): | 259.91 | 8.489 | 3.67 | 45.92 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0008)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.80 | 0.0600 | |
| 300.00 | 271.70 | 0.0350 | Main Channel |
| 1000.00 | 271.44 | 0.0350 | Main Channel |
| 1500.00 | 271.66 | 0.0350 | Main Channel |
| 2000.00 | 271.65 | 0.0350 | Main Channel |
| 4500.00 | 272.40 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 272.66 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.05 | 271.49 | .729E+04 | 0.9 | 0.14 | 134.13 |
| 0.10 | 271.54 | .292E+05 | 5.8 | 0.21 | 84.50 |
| 0.16 | 271.60 | .657E+05 | 17.0 | 0.28 | 64.48 |
| 0.21 | 271.65 | .117E+06 | 36.5 | 0.34 | 53.23 |
| 0.26 | 271.70 | .209E+06 | 65.2 | 0.34 | 53.50 |
| 0.33 | 271.77 | .358E+06 | 147.0 | 0.45 | 40.55 |
| 0.40 | 271.84 | .524E+06 | 258.5 | 0.54 | 33.82 |
| 0.47 | 271.91 | .710E+06 | 400.1 | 0.61 | 29.56 |
| 0.53 | 271.97 | .913E+06 | 572.9 | 0.68 | 26.57 |
| 0.60 | 272.04 | .114E+07 | 778.1 | 0.74 | 24.32 |
| 0.67 | 272.11 | .138E+07 | 1017.2 | 0.80 | 22.54 |
| 0.74 | 272.18 | .163E+07 | 1291.5 | 0.86 | 21.10 |
| 0.81 | 272.25 | .191E+07 | 1602.4 | 0.91 | 19.89 |
| 0.88 | 272.32 | .221E+07 | 1951.5 | 0.96 | 18.86 |
| 0.95 | 272.39 | .252E+07 | 2340.2 | 1.01 | 17.96 |
| 1.01 | 272.45 | .285E+07 | 2839.1 | 1.08 | 16.74 |
| 1.08 | 272.52 | .319E+07 | 3399.2 | 1.16 | 15.66 |
| 1.15 | 272.59 | .355E+07 | 4002.7 | 1.23 | 14.77 |
| 1.22 | 272.66 | .391E+07 | 4649.4 | 1.29 | 14.02 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (70000) | 259.91 | 8.49 | 3.67 | 45.92 | 0.12 0.23 |
| OUTFLOW: ID= 1 (0008) | 259.91 | 6.82 | 4.67 | 45.91 | 0.11 0.22 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71

| Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

| CALIB |
| NASHYD (1500) | Area (ha)= 210.60 Curve Number (CN)= 80.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 2.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 3.849

PEAK FLOW (cms)= 6.362 (i)
TIME TO PEAK (hrs)= 4.000
RUNOFF VOLUME (mm)= 48.449
TOTAL RAINFALL (mm)= 89.750
RUNOFF COEFFICIENT = 0.540

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

| READ STORM | Filename: C:\Users\jmueller\AppData
| | ata\Local\Temp\
| | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
| Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

| CALIB |
| NASHYD (1300) | Area (ha)= 70.80 Curve Number (CN)= 86.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.33

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |

1.500 39.50 | 3.000 14.40 | 4.500 0.00 | 6.00 0.00

Unit Hyd Qpeak (cms)= 8.195

PEAK FLOW (cms)= 5.371 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 56.945
TOTAL RAINFALL (mm)= 89.750
RUNOFF COEFFICIENT = 0.634

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

```

-----
| ADD HYD ( 80000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 1300): 70.80 5.371 1.58 56.94
+ ID2= 2 ( 1500): 210.60 6.362 4.00 48.45
=====
ID = 3 ( 80000): 281.40 8.110 3.08 50.59

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 80000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 ( 80000): 281.40 8.110 3.08 50.59
+ ID2= 2 ( 0008): 259.91 6.824 4.67 45.91
=====
ID = 1 ( 80000): 541.31 13.366 4.08 48.34

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0009)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 271.90 0.0500
50.00 266.74 0.0350 Main Channel
1300.00 266.68 0.0350 Main Channel
2000.00 266.77 0.0350 /0.0500 Main Channel
2100.00 271.10 0.0500

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)

```

| | | | | | |
|------|--------|----------|---------|------|--------|
| 0.06 | 266.74 | .512E+05 | 4.9 | 0.10 | 173.27 |
| 0.29 | 266.97 | .493E+06 | 196.9 | 0.40 | 41.73 |
| 0.52 | 267.20 | .940E+06 | 575.8 | 0.61 | 27.21 |
| 0.75 | 267.43 | .139E+07 | 1100.9 | 0.79 | 21.02 |
| 0.98 | 267.66 | .184E+07 | 1754.1 | 0.95 | 17.47 |
| 1.21 | 267.89 | .229E+07 | 2524.4 | 1.09 | 15.13 |
| 1.44 | 268.12 | .274E+07 | 3403.7 | 1.23 | 13.44 |
| 1.67 | 268.35 | .320E+07 | 4386.1 | 1.36 | 12.16 |
| 1.90 | 268.58 | .366E+07 | 5466.8 | 1.48 | 11.15 |
| 2.13 | 268.81 | .412E+07 | 6641.8 | 1.60 | 10.33 |
| 2.35 | 269.03 | .458E+07 | 7907.9 | 1.72 | 9.65 |
| 2.58 | 269.26 | .504E+07 | 9262.3 | 1.83 | 9.07 |
| 2.81 | 269.49 | .550E+07 | 10702.4 | 1.93 | 8.57 |
| 3.04 | 269.72 | .597E+07 | 12226.1 | 2.03 | 8.14 |
| 3.27 | 269.95 | .644E+07 | 13831.6 | 2.13 | 7.76 |
| 3.50 | 270.18 | .691E+07 | 15517.0 | 2.23 | 7.42 |
| 3.73 | 270.41 | .738E+07 | 17280.9 | 2.33 | 7.12 |
| 3.96 | 270.64 | .785E+07 | 19121.7 | 2.42 | 6.84 |
| 4.19 | 270.87 | .832E+07 | 21038.3 | 2.51 | 6.59 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (80000) 541.31 13.37 4.08 48.34 0.07 0.10
 OUTFLOW: ID= 1 (0009) 541.31 9.18 5.83 48.34 0.06 0.10

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (1700) | Area (ha)= 19.63 Curve Number (CN)= 83.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.419

PEAK FLOW (cms)= 1.378 (i)

TIME TO PEAK (hrs)= 1.583

RUNOFF VOLUME (mm)= 52.496

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.585

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

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |

1.50 39.50 | 3.00 14.40 | 4.50 0.00 | 6.00 0.00

| CALIB |
| NASHYD (1600) | Area (ha)= 49.20 Curve Number (CN)= 81.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.66

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.847

PEAK FLOW (cms)= 2.645 (i)

TIME TO PEAK (hrs)= 2.250

RUNOFF VOLUME (mm)= 49.764

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.554

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

| ADD HYD (90000) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (0010): 2031.50 15.361 6.75 32.75
+ ID2= 2 (1600): 49.20 2.645 2.25 49.76
=====

ID = 3 (90000): 2080.70 15.365 6.75 33.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 90000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 ( 90000): 2080.70 15.365 6.75 33.15
+ ID2= 2 ( 1700): 19.63 1.378 1.58 52.50
=====
ID = 1 ( 90000): 2100.33 15.365 6.75 33.33

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 90000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 90000): 2100.33 15.365 6.75 33.33
+ ID2= 2 ( 0009): 541.31 9.181 5.83 48.34
=====
ID = 3 ( 90000): 2641.64 24.246 6.42 36.41

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0011)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----

```

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.35 | 0.0500 | |
| 1.00 | 267.18 | 0.0300 | Main Channel |
| 10.00 | 267.12 | 0.0300 | Main Channel |
| 20.00 | 266.97 | 0.0300 | Main Channel |
| 30.00 | 266.99 | 0.0300 | Main Channel |
| 40.00 | 267.05 | 0.0300 | Main Channel |
| 50.00 | 266.82 | 0.0300 | Main Channel |
| 60.00 | 266.84 | 0.0300 | Main Channel |
| 70.00 | 266.80 | 0.0300 | Main Channel |
| 80.00 | 266.75 | 0.0300 | Main Channel |
| 90.00 | 266.74 | 0.0300 | Main Channel |
| 100.00 | 266.77 | 0.0300 | Main Channel |
| 110.00 | 266.62 | 0.0300 | Main Channel |
| 120.00 | 266.60 | 0.0300 | Main Channel |
| 20000.00 | 266.68 | 0.0300 /0.0500 | Main Channel |
| 21000.00 | 271.29 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.08 | 266.68 | .119E+07 | 292.8 | 0.37 | 67.80 |
| 0.32 | 266.92 | .844E+07 | 7622.0 | 1.35 | 18.45 |
| 0.57 | 267.17 | .157E+08 | 21436.9 | 2.04 | 12.22 |
| 0.81 | 267.41 | .230E+08 | 40438.3 | 2.63 | 9.49 |
| 1.05 | 267.65 | .304E+08 | 63980.7 | 3.15 | 7.91 |
| 1.29 | 267.89 | .377E+08 | 91666.6 | 3.64 | 6.86 |
| 1.54 | 268.14 | .451E+08 | ***** | 4.09 | 6.10 |
| 1.78 | 268.38 | .525E+08 | ***** | 4.52 | 5.52 |
| 2.02 | 268.62 | .599E+08 | ***** | 4.93 | 5.06 |
| 2.26 | 268.86 | .673E+08 | ***** | 5.32 | 4.69 |
| 2.51 | 269.11 | .747E+08 | ***** | 5.69 | 4.38 |
| 2.75 | 269.35 | .822E+08 | ***** | 6.06 | 4.12 |
| 2.99 | 269.59 | .897E+08 | ***** | 6.41 | 3.89 |
| 3.23 | 269.83 | .972E+08 | ***** | 6.75 | 3.70 |
| 3.48 | 270.08 | .105E+09 | ***** | 7.08 | 3.52 |
| 3.72 | 270.32 | .112E+09 | ***** | 7.40 | 3.37 |
| 3.96 | 270.56 | .120E+09 | ***** | 7.72 | 3.23 |
| 4.20 | 270.80 | .127E+09 | ***** | 8.03 | 3.11 |
| 4.45 | 271.05 | .135E+09 | ***** | 8.33 | 2.99 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (90000) | 2641.64 | 24.25 | 6.42 | 36.41 | 0.01 0.37 |
| OUTFLOW: ID= 1 (0011) | 2641.64 | 22.81 | 7.50 | 36.41 | 0.01 0.37 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |

| NASHYD (2000) | Area (ha)= 69.70 Curve Number (CN)= 75.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.25

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.130

PEAK FLOW (cms)= 2.537 (i)
 TIME TO PEAK (hrs)= 3.167
 RUNOFF VOLUME (mm)= 42.396
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.472

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

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |

| | | | | | | | |
|------|-------|------|-------|------|------|------|------|
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (2100) | Area (ha)= 96.47 Curve Number (CN)= 75.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.43

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.577

PEAK FLOW (cms)= 3.270 (i)
 TIME TO PEAK (hrs)= 3.417
 RUNOFF VOLUME (mm)= 42.396
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.472

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

 | ADD HYD (100000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)

ID1= 1 (2000): 69.70 2.537 3.17 42.40
 + ID2= 2 (2100): 96.47 3.270 3.42 42.40

=====

ID = 3 (100000): 166.17 5.793 3.33 42.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0014)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 120.00 | 257.09 | 0.0500 | |
| 130.00 | 256.88 | 0.0300 | Main Channel |
| 140.00 | 256.50 | 0.0300 | Main Channel |
| 150.00 | 256.08 | 0.0300 | Main Channel |
| 160.00 | 256.08 | 0.0300 | Main Channel |
| 170.00 | 256.06 | 0.0300 | Main Channel |
| 180.00 | 256.31 | 0.0300 | Main Channel |
| 190.00 | 256.07 | 0.0300 | Main Channel |
| 200.00 | 256.07 | 0.0300 | Main Channel |
| 210.00 | 256.46 | 0.0300 | Main Channel |
| 220.00 | 256.88 | 0.0300 | Main Channel |
| 230.00 | 257.43 | 0.0300 | Main Channel |
| 240.00 | 257.56 | 0.0300 /0.0500 | Main Channel |
| 250.00 | 257.58 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.05 | 256.11 | .238E+04 | 0.3 | 0.24 | 129.10 |
| 0.10 | 256.16 | .614E+04 | 1.3 | 0.41 | 76.93 |
| 0.15 | 256.21 | .106E+05 | 3.0 | 0.53 | 59.16 |
| 0.21 | 256.27 | .156E+05 | 5.2 | 0.63 | 49.63 |
| 0.26 | 256.32 | .213E+05 | 8.2 | 0.73 | 43.26 |
| 0.31 | 256.37 | .275E+05 | 12.2 | 0.84 | 37.56 |
| 0.36 | 256.42 | .338E+05 | 16.8 | 0.94 | 33.54 |
| 0.41 | 256.47 | .404E+05 | 22.1 | 1.03 | 30.52 |
| 0.46 | 256.52 | .473E+05 | 28.0 | 1.12 | 28.15 |
| 0.51 | 256.57 | .544E+05 | 34.5 | 1.20 | 26.26 |
| 0.56 | 256.62 | .617E+05 | 41.7 | 1.27 | 24.68 |
| 0.62 | 256.68 | .693E+05 | 49.5 | 1.35 | 23.35 |
| 0.67 | 256.73 | .771E+05 | 57.9 | 1.42 | 22.20 |
| 0.72 | 256.78 | .852E+05 | 67.0 | 1.48 | 21.21 |
| 0.77 | 256.83 | .936E+05 | 76.7 | 1.55 | 20.33 |
| 0.82 | 256.88 | .102E+06 | 87.1 | 1.61 | 19.55 |
| 0.89 | 256.95 | .114E+06 | 103.8 | 1.71 | 18.36 |
| 0.96 | 257.02 | .127E+06 | 121.8 | 1.81 | 17.39 |
| 1.03 | 257.09 | .141E+06 | 141.2 | 1.90 | 16.59 |

<---- hydrograph ----> <-pipe / channel->
 AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL

(ha) (cms) (hrs) (mm) (m) (m/s)
 INFLOW : ID= 2 (100000) 166.17 5.79 3.33 42.40 0.21 0.65
 OUTFLOW: ID= 1 (0014) 166.17 5.16 3.92 42.39 0.20 0.63

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (1800) | Area (ha)= 74.90 Curve Number (CN)= 82.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |

1.333 39.50 | 2.833 14.40 | 4.333 0.00 | 5.83 0.00
 1.417 39.50 | 2.917 14.40 | 4.417 0.00 | 5.92 0.00
 1.500 39.50 | 3.000 14.40 | 4.500 0.00 | 6.00 0.00

Unit Hyd Qpeak (cms)= 2.488

PEAK FLOW (cms)= 3.408 (i)
 TIME TO PEAK (hrs)= 3.000
 RUNOFF VOLUME (mm)= 51.119
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.570

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

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (1900) | Area (ha)= 208.66 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.90

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |

| | | | | | | | |
|-------|-------|-------|-------|-------|------|------|------|
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 4.195

PEAK FLOW (cms)= 6.748 (i)
 TIME TO PEAK (hrs)= 3.833
 RUNOFF VOLUME (mm)= 48.449
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.540

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 CALIB |
 NASHYD (2200) | Area (ha)= 64.60 Curve Number (CN)= 81.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.62

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 1.523

PEAK FLOW (cms)= 2.382 (i)

TIME TO PEAK (hrs)= 3.500

RUNOFF VOLUME (mm)= 49.765

TOTAL RAINFALL (mm)= 89.750

RUNOFF COEFFICIENT = 0.554

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

```

-----
| ADD HYD (110000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 0011): 2641.64 22.813 7.50 36.41
+ ID2= 2 ( 0014): 166.17 5.160 3.92 42.39
=====
ID = 3 (110000): 2807.81 23.751 7.25 36.76
    
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 (110000): 2807.81 23.751 7.25 36.76
+ ID2= 2 ( 1800): 74.90 3.408 3.00 51.12
=====
    
```

ID = 1 (110000): 2882.71 23.857 7.08 37.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 (110000): 2882.71 23.857 7.08 37.13
+ ID2= 2 ( 1900): 208.66 6.748 3.83 48.45
=====
ID = 3 (110000): 3091.37 27.294 4.42 37.90

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 3 (110000): 3091.37 27.294 4.42 37.90
+ ID2= 2 ( 2200): 64.60 2.382 3.50 49.76
=====
ID = 1 (110000): 3155.97 29.402 4.17 38.14

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0012)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
|-----|

```

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 251.80 | 0.0500 | |
| 90.00 | 251.22 | 0.0350 | Main Channel |
| 100.00 | 251.03 | 0.0350 | Main Channel |
| 110.00 | 250.04 | 0.0350 | Main Channel |
| 120.00 | 249.84 | 0.0350 | Main Channel |
| 130.00 | 250.15 | 0.0350 | Main Channel |
| 140.00 | 250.80 | 0.0350 | Main Channel |
| 150.00 | 250.69 | 0.0350 | Main Channel |
| 160.00 | 250.70 | 0.0350 | Main Channel |
| 170.00 | 250.63 | 0.0350 | Main Channel |
| 180.00 | 250.46 | 0.0350 | Main Channel |
| 190.00 | 250.43 | 0.0350 | Main Channel |
| 200.00 | 250.32 | 0.0350 | Main Channel |
| 210.00 | 250.53 | 0.0350 | Main Channel |
| 950.00 | 253.00 | 0.0350 /0.0500 | Main Channel |
| 1000.00 | 254.20 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.10 | 249.94 | .348E+03 | 0.1 | 0.24 | 61.32 |
| 0.20 | 250.04 | .139E+04 | 0.6 | 0.38 | 38.63 |
| 0.30 | 250.14 | .297E+04 | 1.8 | 0.53 | 27.24 |
| 0.39 | 250.23 | .486E+04 | 3.8 | 0.68 | 21.35 |
| 0.49 | 250.33 | .697E+04 | 6.2 | 0.77 | 18.79 |
| 0.59 | 250.43 | .100E+05 | 8.3 | 0.72 | 20.16 |
| 0.69 | 250.53 | .149E+05 | 12.4 | 0.73 | 20.01 |
| 0.79 | 250.63 | .221E+05 | 17.6 | 0.69 | 20.91 |
| 0.89 | 250.73 | .332E+05 | 26.0 | 0.68 | 21.28 |
| 0.99 | 250.83 | .485E+05 | 42.4 | 0.76 | 19.10 |
| 1.08 | 250.92 | .667E+05 | 65.4 | 0.85 | 17.01 |
| 1.18 | 251.02 | .875E+05 | 94.5 | 0.94 | 15.44 |
| 1.28 | 251.12 | .111E+06 | 129.3 | 1.01 | 14.32 |
| 1.38 | 251.22 | .138E+06 | 171.5 | 1.09 | 13.38 |
| 1.48 | 251.32 | .168E+06 | 223.5 | 1.16 | 12.50 |
| 1.59 | 251.43 | .208E+06 | 295.8 | 1.24 | 11.71 |
| 1.71 | 251.55 | .253E+06 | 381.4 | 1.31 | 11.07 |
| 1.83 | 251.67 | .304E+06 | 481.4 | 1.38 | 10.53 |
| 1.94 | 251.78 | .360E+06 | 596.8 | 1.44 | 10.06 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (110000) | 3155.97 | 29.40 | 4.17 | 38.14 | 0.91 |
| OUTFLOW: ID= 1 (0012) | 3155.97 | 29.10 | 4.58 | 38.14 | 0.91 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |

| NASHYD (2300) | Area (ha)= 76.60 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.522

PEAK FLOW (cms)= 3.295 (i)
 TIME TO PEAK (hrs)= 3.083
 RUNOFF VOLUME (mm)= 48.449
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.540

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

| ADD HYD (120000) | AREA | QPEAK | TPEAK | R.V. |
|-------------------|---------|--------|-------|-------|
| 1 + 2 = 3 | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0012): | 3155.97 | 29.100 | 4.58 | 38.14 |
| + ID2= 2 (2300): | 76.60 | 3.295 | 3.08 | 48.45 |
| ===== | | | | |
| ID = 3 (120000): | 3232.57 | 31.021 | 4.33 | 38.38 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0013)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 250.78 | 0.0500 | |
| 2000.00 | 249.38 | 0.0300 | Main Channel |
| 22500.00 | 249.74 | 0.0300 | Main Channel |
| 50000.00 | 249.74 | 0.0300 /0.0500 | Main Channel |
| 52500.00 | 250.49 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.06 | 249.44 | .102E+06 | 11.1 | 0.11 | 152.86 |
| 0.12 | 249.50 | .407E+06 | 70.4 | 0.18 | 96.30 |
| 0.18 | 249.56 | .915E+06 | 207.6 | 0.23 | 73.49 |
| 0.23 | 249.61 | .163E+07 | 447.1 | 0.28 | 60.66 |
| 0.29 | 249.67 | .254E+07 | 810.7 | 0.33 | 52.28 |
| 0.35 | 249.73 | .366E+07 | 1318.3 | 0.37 | 46.29 |
| 0.41 | 249.79 | .618E+07 | 1758.2 | 0.29 | 58.60 |
| 0.47 | 249.85 | .914E+07 | 3363.6 | 0.38 | 45.27 |
| 0.53 | 249.91 | .121E+08 | 5363.2 | 0.46 | 37.63 |
| 0.58 | 249.96 | .151E+08 | 7722.8 | 0.53 | 32.58 |
| 0.64 | 250.02 | .181E+08 | 10418.4 | 0.60 | 28.96 |
| 0.70 | 250.08 | .211E+08 | 13431.7 | 0.66 | 26.21 |
| 0.76 | 250.14 | .242E+08 | 16748.2 | 0.72 | 24.05 |
| 0.82 | 250.20 | .272E+08 | 20355.9 | 0.77 | 22.29 |
| 0.88 | 250.26 | .303E+08 | 24245.2 | 0.83 | 20.83 |
| 0.93 | 250.31 | .334E+08 | 28407.3 | 0.88 | 19.59 |
| 0.99 | 250.37 | .365E+08 | 32835.0 | 0.93 | 18.52 |
| 1.05 | 250.43 | .396E+08 | 37521.8 | 0.98 | 17.60 |
| 1.11 | 250.49 | .428E+08 | 42461.9 | 1.03 | 16.78 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (120000) | 3232.57 | 31.02 | 4.33 | 38.38 | 0.08 |
| OUTFLOW: ID= 1 (0013) | 3232.57 | 25.05 | 7.83 | 38.38 | 0.07 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | bf8c6530-71c4-48eb-943b-37731e5ef32b\bedf2b71
 | Ptotal= 89.75 mm | Comments: 100yr-AES-6hr

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|----------|------------|----------|------------|----------|------------|----------|------------|
| 0.17 | 26.90 | 1.67 | 25.10 | 3.17 | 5.40 | 4.67 | 0.00 |
| 0.33 | 26.90 | 1.83 | 25.10 | 3.33 | 5.40 | 4.83 | 0.00 |
| 0.50 | 26.90 | 2.00 | 25.10 | 3.50 | 5.40 | 5.00 | 0.00 |

| | | | | | | | |
|------|-------|------|-------|------|------|------|------|
| 0.67 | 44.90 | 2.17 | 21.50 | 3.67 | 1.80 | 5.17 | 0.00 |
| 0.83 | 44.90 | 2.33 | 21.50 | 3.83 | 1.80 | 5.33 | 0.00 |
| 1.00 | 44.90 | 2.50 | 21.50 | 4.00 | 1.80 | 5.50 | 0.00 |
| 1.17 | 39.50 | 2.67 | 14.40 | 4.17 | 0.00 | 5.67 | 0.00 |
| 1.33 | 39.50 | 2.83 | 14.40 | 4.33 | 0.00 | 5.83 | 0.00 |
| 1.50 | 39.50 | 3.00 | 14.40 | 4.50 | 0.00 | 6.00 | 0.00 |

 | CALIB |
 | NASHYD (2400) | Area (ha)= 76.70 Curve Number (CN)= 72.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.27

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 26.90 | 1.583 | 25.10 | 3.083 | 5.40 | 4.58 | 0.00 |
| 0.167 | 26.90 | 1.667 | 25.10 | 3.167 | 5.40 | 4.67 | 0.00 |
| 0.250 | 26.90 | 1.750 | 25.10 | 3.250 | 5.40 | 4.75 | 0.00 |
| 0.333 | 26.90 | 1.833 | 25.10 | 3.333 | 5.40 | 4.83 | 0.00 |
| 0.417 | 26.90 | 1.917 | 25.10 | 3.417 | 5.40 | 4.92 | 0.00 |
| 0.500 | 26.90 | 2.000 | 25.10 | 3.500 | 5.40 | 5.00 | 0.00 |
| 0.583 | 44.90 | 2.083 | 21.50 | 3.583 | 1.80 | 5.08 | 0.00 |
| 0.667 | 44.90 | 2.167 | 21.50 | 3.667 | 1.80 | 5.17 | 0.00 |
| 0.750 | 44.90 | 2.250 | 21.50 | 3.750 | 1.80 | 5.25 | 0.00 |
| 0.833 | 44.90 | 2.333 | 21.50 | 3.833 | 1.80 | 5.33 | 0.00 |
| 0.917 | 44.90 | 2.417 | 21.50 | 3.917 | 1.80 | 5.42 | 0.00 |
| 1.000 | 44.90 | 2.500 | 21.50 | 4.000 | 1.80 | 5.50 | 0.00 |
| 1.083 | 39.50 | 2.583 | 14.40 | 4.083 | 0.00 | 5.58 | 0.00 |
| 1.167 | 39.50 | 2.667 | 14.40 | 4.167 | 0.00 | 5.67 | 0.00 |
| 1.250 | 39.50 | 2.750 | 14.40 | 4.250 | 0.00 | 5.75 | 0.00 |
| 1.333 | 39.50 | 2.833 | 14.40 | 4.333 | 0.00 | 5.83 | 0.00 |
| 1.417 | 39.50 | 2.917 | 14.40 | 4.417 | 0.00 | 5.92 | 0.00 |
| 1.500 | 39.50 | 3.000 | 14.40 | 4.500 | 0.00 | 6.00 | 0.00 |

Unit Hyd Qpeak (cms)= 2.307

PEAK FLOW (cms)= 2.560 (i)
 TIME TO PEAK (hrs)= 3.250
 RUNOFF VOLUME (mm)= 39.136
 TOTAL RAINFALL (mm)= 89.750
 RUNOFF COEFFICIENT = 0.436

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

 | ADD HYD (130000)|

| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|---------|--------|-------|-------|
| | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0013): | 3232.57 | 25.049 | 7.83 | 38.38 |
| + ID2= 2 (2400): | 76.70 | 2.560 | 3.25 | 39.14 |
| ===== | | | | |
| ID = 3 (130000): | 3309.27 | 25.117 | 7.75 | 38.40 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

=====

=====

V V I SSSSS U U A L (v 5.1.2004)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
V V I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M M M O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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***** DETAILED OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 5.1\VO2\voin.dat
Output filename: C:\Users\charris\AppData\Local\Civica\XH5\42c14ce9-6b36-4c72-aa7a-4c256032f6ff\d5242fd7-78ac-4569-9bb8-93561e538eb3\scen
Summary filename: C:\Users\charris\AppData\Local\Civica\XH5\42c14ce9-6b36-4c72-aa7a-4c256032f6ff\d5242fd7-78ac-4569-9bb8-93561e538eb3\scen

DATE: 03-16-2021 TIME: 05:16:09

USER:

COMMENTS: _____

** SIMULATION : Timmins 94 test **

| READ STORM | Filename: C:\Users\charris\AppData
| | ata\Local\Temp\
| | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
| Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

| CALIB |
| NASHYD (0200) | Area (ha)= 55.70 Curve Number (CN)= 60.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.18

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 1.803

PEAK FLOW (cms)= 2.227 (i)

TIME TO PEAK (hrs)= 9.083

RUNOFF VOLUME (mm)= 90.018

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.496

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

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (0100) | Area (ha)= 316.90 Curve Number (CN)= 67.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.77

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 4.370

PEAK FLOW (cms)= 11.142 (i)

TIME TO PEAK (hrs)= 11.000

RUNOFF VOLUME (mm)= 103.222
 TOTAL RAINFALL (mm)= 181.420
 RUNOFF COEFFICIENT = 0.569

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

```

-----
| ADD HYD ( 10000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 0100): 316.90 11.142 11.00 103.22
+ ID2= 2 ( 0200): 55.70 2.227 9.08 90.02
=====
ID = 3 ( 10000): 372.60 12.856 10.58 101.25
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0001)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
  
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
60.00 282.95 0.0500
70.00 281.82 0.0350 Main Channel
80.00 280.29 0.0350 Main Channel
90.00 279.48 0.0350 Main Channel
100.00 278.67 0.0350 Main Channel
110.00 279.10 0.0350 Main Channel
120.00 279.37 0.0350 Main Channel
130.00 280.55 0.0350 Main Channel
140.00 281.01 0.0350 Main Channel
150.00 281.79 0.0350 Main Channel
160.00 282.34 0.0350 /0.0500 Main Channel
170.00 282.71 0.0500
  
```

```

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.21 278.88 .142E+04 0.2 0.21 142.88
0.42 279.09 .567E+04 1.1 0.33 90.01
0.63 279.30 .133E+05 3.1 0.42 72.32
0.84 279.51 .243E+05 7.2 0.54 56.18
1.05 279.72 .371E+05 13.4 0.65 46.20
1.26 279.93 .515E+05 21.4 0.75 40.05
1.47 280.14 .676E+05 31.5 0.84 35.79
1.68 280.35 .854E+05 43.8 0.93 32.46
1.89 280.56 .104E+06 58.7 1.02 29.64
2.10 280.77 .125E+06 74.0 1.07 28.22
2.31 280.98 .148E+06 91.9 1.12 26.91
2.52 281.19 .173E+06 114.1 1.19 25.33
  
```

| | | | | | |
|------|--------|----------|-------|------|-------|
| 2.73 | 281.40 | .200E+06 | 139.3 | 1.26 | 23.94 |
| 2.94 | 281.61 | .228E+06 | 167.3 | 1.32 | 22.75 |
| 3.15 | 281.82 | .258E+06 | 197.9 | 1.39 | 21.73 |
| 3.37 | 282.04 | .292E+06 | 234.3 | 1.45 | 20.74 |
| 3.59 | 282.27 | .328E+06 | 274.4 | 1.51 | 19.90 |
| 3.82 | 282.49 | .366E+06 | 323.9 | 1.60 | 18.84 |
| 4.04 | 282.71 | .408E+06 | 380.6 | 1.69 | 17.86 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (10000) | 372.60 | 12.86 | 10.58 | 101.25 | 1.03 | 0.64 |
| OUTFLOW: ID= 1 (0001) | 372.60 | 12.60 | 11.25 | 101.25 | 1.02 | 0.63 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (0300) | Area (ha)= 300.70 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.22

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 5.174

PEAK FLOW (cms)= 10.756 (i)

TIME TO PEAK (hrs)= 10.250

RUNOFF VOLUME (mm)= 95.591

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.527

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

| READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

```

-----
      TIME  RAIN | TIME  RAIN |' TIME  RAIN | TIME  RAIN
      hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
    0.17 14.10 | 3.17  2.82 | 6.17 40.42 | 9.17 12.22
    0.33 14.10 | 3.33  2.82 | 6.33 40.42 | 9.33 12.22
    0.50 14.10 | 3.50  2.82 | 6.50 40.42 | 9.50 12.22
    0.67 14.10 | 3.67  2.82 | 6.67 40.42 | 9.67 12.22
    0.83 14.10 | 3.83  2.82 | 6.83 40.42 | 9.83 12.22
    1.00 14.10 | 4.00  2.82 | 7.00 40.42 |10.00 12.22
    1.17 18.80 | 4.17  4.70 | 7.17 18.80 |10.17 12.22
    1.33 18.80 | 4.33  4.70 | 7.33 18.80 |10.33 12.22
    1.50 18.80 | 4.50  4.70 | 7.50 18.80 |10.50 12.22
    1.67 18.80 | 4.67  4.70 | 7.67 18.80 |10.67 12.22
    1.83 18.80 | 4.83  4.70 | 7.83 18.80 |10.83 12.22
    2.00 18.80 | 5.00  4.70 | 8.00 18.80 |11.00 12.22
    2.17  9.40 | 5.17 18.80 | 8.17 21.62 |11.17  7.52
    2.33  9.40 | 5.33 18.80 | 8.33 21.62 |11.33  7.52
    2.50  9.40 | 5.50 18.80 | 8.50 21.62 |11.50  7.52
    2.67  9.40 | 5.67 18.80 | 8.67 21.62 |11.67  7.52
    2.83  9.40 | 5.83 18.80 | 8.83 21.62 |11.83  7.52
    3.00  9.40 | 6.00 18.80 | 9.00 21.62 |12.00  7.52
  
```

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-----
| CALIB |
| NASHYD ( 0400) | Area (ha)= 59.10 Curve Number (CN)= 62.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.13
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```

-----
      TIME  RAIN | TIME  RAIN |' TIME  RAIN | TIME  RAIN
      hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
    0.083 14.10 | 3.083  2.82 | 6.083 40.42 | 9.08 12.22
    0.167 14.10 | 3.167  2.82 | 6.167 40.42 | 9.17 12.22
    0.250 14.10 | 3.250  2.82 | 6.250 40.42 | 9.25 12.22
    0.333 14.10 | 3.333  2.82 | 6.333 40.42 | 9.33 12.22
    0.417 14.10 | 3.417  2.82 | 6.417 40.42 | 9.42 12.22
    0.500 14.10 | 3.500  2.82 | 6.500 40.42 | 9.50 12.22
    0.583 14.10 | 3.583  2.82 | 6.583 40.42 | 9.58 12.22
    0.667 14.10 | 3.667  2.82 | 6.667 40.42 | 9.67 12.22
    0.750 14.10 | 3.750  2.82 | 6.750 40.42 | 9.75 12.22
    0.833 14.10 | 3.833  2.82 | 6.833 40.42 | 9.83 12.22
    0.917 14.10 | 3.917  2.82 | 6.917 40.42 | 9.92 12.22
    1.000 14.10 | 4.000  2.82 | 7.000 40.42 |10.00 12.22
    1.083 18.80 | 4.083  4.70 | 7.083 18.80 |10.08 12.22
    1.167 18.80 | 4.167  4.70 | 7.167 18.80 |10.17 12.22
  
```


| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 1.998

PEAK FLOW (cms)= 2.500 (i)

TIME TO PEAK (hrs)= 8.083

RUNOFF VOLUME (mm)= 93.719

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.517

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

| ADD HYD (20000)|

| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|--------|--------|-------|--------|
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0001): | 372.60 | 12.605 | 11.25 | 101.25 |
| + ID2= 2 (0300): | 300.70 | 10.756 | 10.25 | 95.59 |
| ===== | | | | |
| ID = 3 (20000): | 673.30 | 23.094 | 10.75 | 98.72 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (20000)|

| 3 + 2 = 1 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|--------|--------|-------|-------|
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (20000): | 673.30 | 23.094 | 10.75 | 98.72 |
| + ID2= 2 (0400): | 59.10 | 2.500 | 8.08 | 93.72 |

=====
ID = 1 (20000): 732.40 25.007 10.58 98.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0002)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.75 | 0.0800 |
| 50.00 | 275.40 | 0.0800 |
| 309.00 | 275.40 | 0.0800 /0.0350 Main Channel |
| 310.00 | 275.15 | 0.0350 Main Channel |
| 318.00 | 275.15 | 0.0350 Main Channel |
| 320.00 | 275.40 | 0.0350 /0.0800 Main Channel |
| 650.00 | 275.40 | 0.0800 |
| 800.00 | 275.75 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.03 | 275.18 | .635E+03 | 0.0 | 0.08 | 523.54 |
| 0.06 | 275.21 | .130E+04 | 0.1 | 0.12 | 334.64 |
| 0.09 | 275.24 | .199E+04 | 0.1 | 0.16 | 258.87 |
| 0.13 | 275.28 | .271E+04 | 0.2 | 0.19 | 216.44 |
| 0.16 | 275.31 | .346E+04 | 0.3 | 0.22 | 188.78 |
| 0.19 | 275.34 | .424E+04 | 0.4 | 0.24 | 169.07 |
| 0.22 | 275.37 | .505E+04 | 0.5 | 0.27 | 154.20 |
| 0.25 | 275.40 | .595E+04 | 0.7 | 0.29 | 143.80 |
| 0.28 | 275.43 | .540E+05 | 1.5 | 0.07 | 585.80 |
| 0.31 | 275.46 | .103E+06 | 3.2 | 0.08 | 539.62 |
| 0.35 | 275.50 | .154E+06 | 5.5 | 0.09 | 468.71 |
| 0.38 | 275.53 | .207E+06 | 8.4 | 0.10 | 412.66 |
| 0.41 | 275.56 | .261E+06 | 11.7 | 0.11 | 369.95 |
| 0.44 | 275.59 | .316E+06 | 15.6 | 0.12 | 336.78 |
| 0.47 | 275.62 | .372E+06 | 20.0 | 0.13 | 310.34 |
| 0.50 | 275.65 | .431E+06 | 24.8 | 0.14 | 288.77 |
| 0.54 | 275.69 | .490E+06 | 30.2 | 0.15 | 270.81 |
| 0.57 | 275.72 | .551E+06 | 35.9 | 0.16 | 255.61 |
| 0.60 | 275.75 | .613E+06 | 42.2 | 0.17 | 242.55 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (20000) | 732.40 | 25.01 | 10.58 | 98.32 | 0.51 | 0.14 |
| OUTFLOW: ID= 1 (0002) | 732.40 | 15.74 | 13.08 | 98.31 | 0.44 | 0.12 |

READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

```

-----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.17 14.10 | 3.17  2.82 | 6.17 40.42 | 9.17 12.22
    0.33 14.10 | 3.33  2.82 | 6.33 40.42 | 9.33 12.22
    0.50 14.10 | 3.50  2.82 | 6.50 40.42 | 9.50 12.22
    0.67 14.10 | 3.67  2.82 | 6.67 40.42 | 9.67 12.22
    0.83 14.10 | 3.83  2.82 | 6.83 40.42 | 9.83 12.22
    1.00 14.10 | 4.00  2.82 | 7.00 40.42 |10.00 12.22
    1.17 18.80 | 4.17  4.70 | 7.17 18.80 |10.17 12.22
    1.33 18.80 | 4.33  4.70 | 7.33 18.80 |10.33 12.22
    1.50 18.80 | 4.50  4.70 | 7.50 18.80 |10.50 12.22
    1.67 18.80 | 4.67  4.70 | 7.67 18.80 |10.67 12.22
    1.83 18.80 | 4.83  4.70 | 7.83 18.80 |10.83 12.22
    2.00 18.80 | 5.00  4.70 | 8.00 18.80 |11.00 12.22
    2.17  9.40 | 5.17 18.80 | 8.17 21.62 |11.17  7.52
    2.33  9.40 | 5.33 18.80 | 8.33 21.62 |11.33  7.52
    2.50  9.40 | 5.50 18.80 | 8.50 21.62 |11.50  7.52
    2.67  9.40 | 5.67 18.80 | 8.67 21.62 |11.67  7.52
    2.83  9.40 | 5.83 18.80 | 8.83 21.62 |11.83  7.52
    3.00  9.40 | 6.00 18.80 | 9.00 21.62 |12.00  7.52
  
```

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-----
| CALIB |
| NASHYD ( 0600) | Area (ha)= 55.10 Curve Number (CN)= 60.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.14
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```

-----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.083 14.10 | 3.083  2.82 | 6.083 40.42 | 9.08 12.22
    0.167 14.10 | 3.167  2.82 | 6.167 40.42 | 9.17 12.22
    0.250 14.10 | 3.250  2.82 | 6.250 40.42 | 9.25 12.22
    0.333 14.10 | 3.333  2.82 | 6.333 40.42 | 9.33 12.22
    0.417 14.10 | 3.417  2.82 | 6.417 40.42 | 9.42 12.22
    0.500 14.10 | 3.500  2.82 | 6.500 40.42 | 9.50 12.22
    0.583 14.10 | 3.583  2.82 | 6.583 40.42 | 9.58 12.22
    0.667 14.10 | 3.667  2.82 | 6.667 40.42 | 9.67 12.22
    0.750 14.10 | 3.750  2.82 | 6.750 40.42 | 9.75 12.22
    0.833 14.10 | 3.833  2.82 | 6.833 40.42 | 9.83 12.22
    0.917 14.10 | 3.917  2.82 | 6.917 40.42 | 9.92 12.22
    1.000 14.10 | 4.000  2.82 | 7.000 40.42 |10.00 12.22
    1.083 18.80 | 4.083  4.70 | 7.083 18.80 |10.08 12.22
    1.167 18.80 | 4.167  4.70 | 7.167 18.80 |10.17 12.22
  
```

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 1.846

PEAK FLOW (cms)= 2.226 (i)

TIME TO PEAK (hrs)= 8.167

RUNOFF VOLUME (mm)= 90.018

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.496

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

| READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (0700) | Area (ha)= 93.30 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.93

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 3.832

PEAK FLOW (cms)= 4.358 (i)
 TIME TO PEAK (hrs)= 7.750
 RUNOFF VOLUME (mm)= 95.591
 TOTAL RAINFALL (mm)= 181.420
 RUNOFF COEFFICIENT = 0.527

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

```

-----
| ADD HYD ( 40000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
-----
              (ha) (cms) (hrs) (mm)
  ID1= 1 ( 0600): 55.10 2.226 8.17 90.02
+ ID2= 2 ( 0700): 93.30 4.358 7.75 95.59
=====
  ID = 3 ( 40000): 148.40 6.536 7.83 93.52
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0003)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
  
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
  0.00      275.80      0.0800
 175.00     275.48     0.0800 /0.0500
 400.00     275.32     0.0500
 495.00     275.32     0.0500 /0.0350 Main Channel
 496.00     274.97     0.0350   Main Channel
 501.00     274.97     0.0350   Main Channel
 502.00     275.32     0.0350 /0.0500 Main Channel
 595.00     275.54     0.0500 /0.0800
 645.00     275.80     0.0800
  
```

```

<----- TRAVEL TIME TABLE ----->
DEPTH  ELEV  VOLUME  FLOW RATE  VELOCITY  TRAV.TIME
(m)    (m)    (cu.m.) (cms)     (m/s)    (min)
0.04  275.01  .277E+03  0.0       0.06     359.96
0.08  275.05  .566E+03  0.0       0.10     230.18
0.12  275.09  .867E+03  0.1       0.13     178.15
0.16  275.13  .118E+04  0.1       0.16     149.01
0.19  275.16  .151E+04  0.2       0.18     130.02
0.23  275.20  .184E+04  0.3       0.20     116.50
  
```

| | | | | | |
|------|--------|----------|------|------|--------|
| 0.27 | 275.24 | .219E+04 | 0.3 | 0.22 | 106.29 |
| 0.31 | 275.28 | .255E+04 | 0.4 | 0.24 | 98.27 |
| 0.35 | 275.32 | .293E+04 | 0.5 | 0.25 | 91.76 |
| 0.39 | 275.36 | .104E+05 | 0.9 | 0.11 | 203.05 |
| 0.44 | 275.41 | .249E+05 | 1.7 | 0.10 | 237.81 |
| 0.48 | 275.45 | .453E+05 | 3.3 | 0.10 | 228.90 |
| 0.53 | 275.50 | .712E+05 | 5.8 | 0.11 | 203.44 |
| 0.58 | 275.55 | .101E+06 | 9.5 | 0.13 | 176.73 |
| 0.63 | 275.60 | .133E+06 | 14.1 | 0.15 | 156.52 |
| 0.68 | 275.65 | .167E+06 | 19.6 | 0.16 | 141.93 |
| 0.72 | 275.69 | .204E+06 | 26.0 | 0.18 | 130.89 |
| 0.77 | 275.74 | .243E+06 | 33.1 | 0.19 | 122.22 |
| 0.82 | 275.79 | .284E+06 | 41.2 | 0.20 | 115.20 |

<---- hydrograph ----> <-pipe / channel->

| | AREA | QPEAK | TPEAK | R.V. | MAX DEPTH | MAX VEL |
|-------------------------|--------|--------|-------|-------|-----------|-----------|
| | (ha) | (cms) | (hrs) | (mm) | (m) | (m/s) |
| INFLOW : ID= 2 (40000) | 148.40 | 148.40 | 6.54 | 7.83 | 93.52 | 0.54 0.12 |
| OUTFLOW: ID= 1 (0003) | 148.40 | 148.40 | 4.01 | 10.75 | 93.51 | 0.50 0.10 |

| ADD HYD (25000)|

| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|--------|--------|-------|-------|
| | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0002): | 732.40 | 15.735 | 13.08 | 98.31 |
| + ID2= 2 (0003): | 148.40 | 4.010 | 10.75 | 93.51 |
| ===== | | | | |
| ID = 3 (25000): | 880.80 | 19.169 | 12.83 | 97.50 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0015)|

| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.80 | 0.0800 |
| 60.00 | 275.48 | 0.0800 |
| 515.00 | 275.23 | 0.0800 /0.0350 Main Channel |
| 530.00 | 275.08 | 0.0350 Main Channel |
| 535.00 | 275.23 | 0.0350 /0.0800 Main Channel |
| 755.00 | 275.31 | 0.0800 |
| 810.00 | 275.80 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH | ELEV | VOLUME | FLOW RATE | VELOCITY | TRAV.TIME |
|-------|--------|----------|-----------|----------|-----------|
| (m) | (m) | (cu.m.) | (cms) | (m/s) | (min) |
| 0.04 | 275.12 | .154E+03 | 0.0 | 0.03 | 960.18 |
| 0.08 | 275.15 | .616E+03 | 0.0 | 0.05 | 604.88 |

| | | | | | |
|------|--------|----------|------|------|--------|
| 0.11 | 275.19 | .139E+04 | 0.1 | 0.06 | 461.61 |
| 0.15 | 275.23 | .246E+04 | 0.1 | 0.07 | 381.05 |
| 0.19 | 275.27 | .913E+04 | 0.3 | 0.05 | 596.85 |
| 0.23 | 275.31 | .266E+05 | 0.6 | 0.04 | 728.30 |
| 0.26 | 275.34 | .525E+05 | 1.3 | 0.04 | 664.16 |
| 0.30 | 275.38 | .829E+05 | 2.4 | 0.05 | 586.71 |
| 0.34 | 275.42 | .118E+06 | 3.7 | 0.05 | 526.62 |
| 0.38 | 275.46 | .158E+06 | 5.5 | 0.06 | 480.34 |
| 0.42 | 275.50 | .201E+06 | 7.7 | 0.06 | 437.55 |
| 0.45 | 275.53 | .247E+06 | 10.4 | 0.07 | 395.94 |
| 0.49 | 275.57 | .293E+06 | 13.4 | 0.08 | 362.70 |
| 0.53 | 275.61 | .339E+06 | 16.8 | 0.08 | 335.65 |
| 0.57 | 275.65 | .387E+06 | 20.6 | 0.09 | 313.22 |
| 0.61 | 275.69 | .435E+06 | 24.6 | 0.09 | 294.32 |
| 0.64 | 275.72 | .483E+06 | 29.0 | 0.10 | 278.16 |
| 0.68 | 275.76 | .533E+06 | 33.6 | 0.10 | 264.16 |
| 0.72 | 275.80 | .583E+06 | 38.6 | 0.11 | 251.91 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (25000) 880.80 19.17 12.83 97.50 0.55 0.09
 OUTFLOW: ID= 1 (0015) 880.80 12.07 14.75 97.50 0.47 0.07

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (0500) | Area (ha)= 958.30 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.88

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 12.709

PEAK FLOW (cms)= 30.836 (i)

TIME TO PEAK (hrs)= 11.250
 RUNOFF VOLUME (mm)= 95.591
 TOTAL RAINFALL (mm)= 181.420
 RUNOFF COEFFICIENT = 0.527

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

 READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 CALIB |
 NASHYD (1100) | Area (ha)= 73.60 Curve Number (CN)= 81.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.37

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.052

PEAK FLOW (cms)= 4.131 (i)

TIME TO PEAK (hrs)= 8.583

RUNOFF VOLUME (mm)= 131.881

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.727

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

 | ROUTE CHN(0004)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 275.10 | 0.0500 | |
| 50.00 | 275.04 | 0.0350 | Main Channel |
| 4900.00 | 275.10 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 275.11 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.00 | 275.04 | .190E+03 | 0.0 | 0.01 | 897.50 |
| 0.01 | 275.05 | .761E+03 | 0.0 | 0.01 | 565.39 |
| 0.01 | 275.05 | .171E+04 | 0.1 | 0.02 | 431.47 |
| 0.01 | 275.05 | .304E+04 | 0.1 | 0.02 | 356.17 |
| 0.02 | 275.06 | .475E+04 | 0.3 | 0.03 | 306.94 |
| 0.02 | 275.06 | .685E+04 | 0.4 | 0.03 | 271.81 |
| 0.02 | 275.06 | .932E+04 | 0.6 | 0.03 | 245.26 |
| 0.03 | 275.07 | .122E+05 | 0.9 | 0.03 | 224.37 |
| 0.03 | 275.07 | .154E+05 | 1.2 | 0.04 | 207.43 |
| 0.03 | 275.07 | .190E+05 | 1.6 | 0.04 | 193.36 |
| 0.03 | 275.07 | .230E+05 | 2.1 | 0.04 | 181.45 |
| 0.04 | 275.08 | .274E+05 | 2.7 | 0.05 | 171.23 |
| 0.04 | 275.08 | .321E+05 | 3.3 | 0.05 | 162.33 |
| 0.04 | 275.08 | .373E+05 | 4.0 | 0.05 | 154.51 |
| 0.05 | 275.09 | .428E+05 | 4.8 | 0.05 | 147.56 |
| 0.05 | 275.09 | .487E+05 | 5.7 | 0.05 | 141.35 |
| 0.05 | 275.09 | .550E+05 | 6.7 | 0.06 | 135.75 |
| 0.06 | 275.10 | .616E+05 | 7.9 | 0.06 | 130.67 |
| 0.06 | 275.10 | .686E+05 | 9.1 | 0.06 | 125.92 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (1100) | 73.60 | 4.13 | 8.58 | 131.88 | 0.04 |
| OUTFLOW: ID= 1 (0004) | 73.60 | 3.09 | 10.58 | 131.81 | 0.04 |

| ADD HYD (30000)|

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|--------------|----------------|----------------|--------------|
| 1 + 2 = 3 | | | | |
| ID1= 1 (0015): | 880.80 | 12.067 | 14.75 | 97.50 |
| + ID2= 2 (0004): | 73.60 | 3.093 | 10.58 | 131.81 |
| ===== | | | | |
| ID = 3 (30000): | 954.40 | 13.716 | 14.25 | 100.14 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (30000)|

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|--------------|----------------|----------------|--------------|
| 3 + 2 = 1 | | | | |
| ID1= 3 (30000): | 954.40 | 13.716 | 14.25 | 100.14 |
| + ID2= 2 (0500): | 958.30 | 30.836 | 11.25 | 95.59 |
| ===== | | | | |
| ID = 1 (30000): | 1912.70 | 41.408 | 12.17 | 97.86 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0005)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 277.94 | 0.0500 | |
| 50.00 | 275.49 | 0.0350 | Main Channel |
| 100.00 | 275.08 | 0.0350 | Main Channel |
| 150.00 | 275.82 | 0.0350 | Main Channel |
| 200.00 | 276.76 | 0.0350 /0.0500 | Main Channel |
| 250.00 | 277.55 | 0.0500 | |
| 1000.00 | 277.60 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.10 | 275.18 | .571E+03 | 0.1 | 0.15 | 64.83 |
| 0.21 | 275.29 | .229E+04 | 0.9 | 0.23 | 40.84 |
| 0.31 | 275.39 | .514E+04 | 2.7 | 0.31 | 31.17 |
| 0.41 | 275.49 | .914E+04 | 5.9 | 0.37 | 25.73 |
| 0.55 | 275.63 | .159E+05 | 13.7 | 0.49 | 19.40 |
| 0.69 | 275.77 | .237E+05 | 24.4 | 0.59 | 16.20 |
| 0.83 | 275.91 | .324E+05 | 38.3 | 0.68 | 14.09 |
| 0.97 | 276.05 | .420E+05 | 55.6 | 0.76 | 12.60 |
| 1.11 | 276.19 | .524E+05 | 76.0 | 0.83 | 11.50 |
| 1.25 | 276.33 | .637E+05 | 99.7 | 0.90 | 10.64 |
| 1.39 | 276.47 | .757E+05 | 126.8 | 0.96 | 9.95 |
| 1.54 | 276.62 | .887E+05 | 157.5 | 1.02 | 9.38 |
| 1.68 | 276.76 | .102E+06 | 191.8 | 1.07 | 8.90 |
| 1.82 | 276.90 | .117E+06 | 235.9 | 1.16 | 8.27 |
| 1.96 | 277.04 | .133E+06 | 284.3 | 1.23 | 7.78 |
| 2.10 | 277.18 | .149E+06 | 337.1 | 1.30 | 7.38 |
| 2.24 | 277.32 | .167E+06 | 394.3 | 1.36 | 7.05 |
| 2.38 | 277.46 | .185E+06 | 456.0 | 1.41 | 6.77 |
| 2.52 | 277.60 | .215E+06 | 517.1 | 1.38 | 6.94 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (30000) | 1912.70 | 41.41 | 12.17 | 97.86 | 0.86 |
| OUTFLOW: ID= 1 (0005) | 1912.70 | 41.34 | 12.33 | 97.86 | 0.86 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d

| Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

| CALIB |
| NASHYD (1000) | Area (ha)= 37.50 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.99

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 1.447

PEAK FLOW (cms)= 2.241 (i)

TIME TO PEAK (hrs)= 7.750

RUNOFF VOLUME (mm)= 123.366

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.680

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

```

-----
| ADD HYD ( 50000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 1000): 37.50 2.241 7.75 123.37
+ ID2= 2 ( 0005): 1912.70 41.344 12.33 97.86
=====
ID = 3 ( 50000): 1950.20 42.300 12.17 98.35

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0006)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
|-----|

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 277.14 0.0500
1000.00 275.16 0.0500 /0.0300 Main Channel
19950.00 275.00 0.0300 /0.0500 Main Channel
20000.00 277.10 0.0500

```

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.11 | 275.11 | .674E+06 | 247.4 | 0.34 | 45.39 |
| 0.22 | 275.22 | .249E+07 | 1707.4 | 0.64 | 24.31 |
| 0.33 | 275.33 | .445E+07 | 4480.7 | 0.94 | 16.54 |
| 0.44 | 275.44 | .641E+07 | 8225.7 | 1.19 | 12.99 |
| 0.55 | 275.55 | .838E+07 | 12829.8 | 1.43 | 10.89 |
| 0.66 | 275.66 | .104E+08 | 18220.9 | 1.64 | 9.47 |
| 0.77 | 275.77 | .123E+08 | 24346.8 | 1.84 | 8.45 |
| 0.88 | 275.88 | .143E+08 | 31167.5 | 2.03 | 7.66 |
| 0.99 | 275.99 | .163E+08 | 38651.0 | 2.21 | 7.04 |
| 1.11 | 276.11 | .183E+08 | 46770.9 | 2.38 | 6.53 |
| 1.22 | 276.22 | .203E+08 | 55504.6 | 2.54 | 6.10 |
| 1.33 | 276.33 | .223E+08 | 64833.0 | 2.70 | 5.74 |
| 1.44 | 276.44 | .244E+08 | 74739.2 | 2.86 | 5.43 |
| 1.55 | 276.55 | .264E+08 | 85208.2 | 3.01 | 5.16 |
| 1.66 | 276.66 | .284E+08 | 96226.9 | 3.15 | 4.92 |
| 1.77 | 276.77 | .304E+08 | ***** | 3.30 | 4.71 |
| 1.88 | 276.88 | .325E+08 | ***** | 3.44 | 4.52 |
| 1.99 | 276.99 | .345E+08 | ***** | 3.57 | 4.34 |
| 2.10 | 277.10 | .366E+08 | ***** | 3.71 | 4.19 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (50000) | 1950.20 | 42.30 | 12.17 | 98.35 | 0.02 0.34 |
| OUTFLOW: ID= 1 (0006) | 1950.20 | 41.51 | 12.83 | 98.35 | 0.02 0.34 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |

| | | | | | | | |
|------|------|------|-------|------|-------|-------|------|
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (1200) | Area (ha)= 81.30 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.34

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |

2.917 9.40 | 5.917 18.80 | 8.917 21.62 | 11.92 7.52
 3.000 9.40 | 6.000 18.80 | 9.000 21.62 | 12.00 7.52

Unit Hyd Qpeak (cms)= 9.133

PEAK FLOW (cms)= 7.233 (i)
 TIME TO PEAK (hrs)= 7.000
 RUNOFF VOLUME (mm)= 129.696
 TOTAL RAINFALL (mm)= 181.420
 RUNOFF COEFFICIENT = 0.715

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

 | ADD HYD (60000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 1 (1200): 81.30 7.233 7.00 129.70
 + ID2= 2 (0006): 1950.20 41.510 12.83 98.35
 =====
 ID = 3 (60000): 2031.50 42.254 12.17 99.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0010)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

 <----- DATA FOR SECTION (1.1) ----->
 Distance Elevation Manning
 0.00 269.84 0.0500
 1000.00 267.76 0.0500 /0.0350 Main Channel
 19950.00 267.77 0.0350 /0.0500 Main Channel
 20000.00 269.10 0.0500

<----- TRAVEL TIME TABLE ----->
 DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
 (m) (m) (cu.m.) (cms) (m/s) (min)
 0.07 267.83 .104E+07 351.0 0.28 49.37
 0.14 267.90 .216E+07 1186.5 0.46 30.35
 0.21 267.97 .328E+07 2380.9 0.61 22.99
 0.28 268.04 .441E+07 3886.1 0.74 18.91
 0.35 268.11 .554E+07 5673.1 0.86 16.27
 0.42 268.18 .667E+07 7721.6 0.97 14.39
 0.49 268.25 .780E+07 10016.2 1.07 12.98
 0.56 268.32 .893E+07 12544.8 1.17 11.87
 0.63 268.39 .101E+08 15297.5 1.27 10.97
 0.71 268.47 .112E+08 18265.9 1.36 10.23
 0.78 268.54 .123E+08 21442.8 1.45 9.60
 0.85 268.61 .135E+08 24822.1 1.54 9.06
 0.92 268.68 .146E+08 28398.1 1.62 8.59

| | | | | | |
|------|--------|----------|---------|------|------|
| 0.99 | 268.75 | .158E+08 | 32166.0 | 1.70 | 8.18 |
| 1.06 | 268.82 | .169E+08 | 36121.4 | 1.78 | 7.81 |
| 1.13 | 268.89 | .181E+08 | 40260.3 | 1.86 | 7.49 |
| 1.20 | 268.96 | .192E+08 | 44579.2 | 1.94 | 7.19 |
| 1.27 | 269.03 | .204E+08 | 49074.5 | 2.01 | 6.93 |
| 1.34 | 269.10 | .215E+08 | 53743.4 | 2.09 | 6.68 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (60000) | 2031.50 | 42.25 | 12.17 | 99.61 | 0.01 | 0.28 |
| OUTFLOW: ID= 1 (0010) | 2031.50 | 41.17 | 13.33 | 99.61 | 0.01 | 0.28 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (0800) | Area (ha)= 84.70 Curve Number (CN)= 72.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.22

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.652

PEAK FLOW (cms)= 4.246 (i)

TIME TO PEAK (hrs)= 8.250

RUNOFF VOLUME (mm)= 113.097

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.623

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

 | ROUTE CHN(0007)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.90 | 0.0500 | |
| 300.00 | 271.80 | 0.0350 | Main Channel |
| 1500.00 | 271.76 | 0.0350 | Main Channel |
| 2000.00 | 271.75 | 0.0350 | Main Channel |
| 4500.00 | 272.50 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 272.76 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.05 | 271.80 | .324E+05 | 7.9 | 0.16 | 67.91 |
| 0.10 | 271.85 | .956E+05 | 45.5 | 0.30 | 35.06 |
| 0.15 | 271.90 | .165E+06 | 106.4 | 0.41 | 25.82 |
| 0.20 | 271.95 | .240E+06 | 188.6 | 0.50 | 21.19 |
| 0.25 | 272.00 | .321E+06 | 291.6 | 0.58 | 18.33 |
| 0.30 | 272.05 | .408E+06 | 415.2 | 0.65 | 16.36 |
| 0.35 | 272.10 | .500E+06 | 559.8 | 0.72 | 14.89 |
| 0.40 | 272.15 | .599E+06 | 725.6 | 0.77 | 13.75 |
| 0.45 | 272.20 | .703E+06 | 913.1 | 0.83 | 12.84 |
| 0.50 | 272.25 | .814E+06 | 1122.9 | 0.88 | 12.08 |
| 0.56 | 272.31 | .930E+06 | 1355.5 | 0.93 | 11.43 |
| 0.61 | 272.36 | .105E+07 | 1611.5 | 0.98 | 10.88 |
| 0.66 | 272.41 | .118E+07 | 1891.5 | 1.03 | 10.40 |
| 0.71 | 272.46 | .131E+07 | 2196.1 | 1.07 | 9.97 |
| 0.76 | 272.51 | .145E+07 | 2535.6 | 1.12 | 9.56 |
| 0.81 | 272.56 | .160E+07 | 2957.1 | 1.18 | 9.01 |
| 0.86 | 272.61 | .175E+07 | 3405.7 | 1.25 | 8.54 |
| 0.91 | 272.66 | .190E+07 | 3881.5 | 1.31 | 8.15 |
| 0.96 | 272.71 | .205E+07 | 4384.4 | 1.37 | 7.80 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|------------------------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (0800) | 84.70 | 4.25 | 8.25 | 113.10 | 0.03 0.16 |
| OUTFLOW: ID= 1 (0007) | 84.70 | 3.85 | 9.83 | 113.09 | 0.02 0.16 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|----------|------------|----------|------------|----------|------------|----------|------------|
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

| CALIB |
| NASHYD (1400) | Area (ha)= 99.51 Curve Number (CN)= 81.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.82

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.088

PEAK FLOW (cms)= 5.171 (i)

TIME TO PEAK (hrs)= 9.500

RUNOFF VOLUME (mm)= 131.881

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.727

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

| | |
|------------------|---|
| READ STORM | Filename: C:\Users\charris\AppData |
| | ata\Local\Temp\ |
| | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d |
| Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test |

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

| CALIB |
 | NASHYD (0900) | Area (ha)= 75.70 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.41

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.051

PEAK FLOW (cms)= 4.151 (i)

TIME TO PEAK (hrs)= 8.833

RUNOFF VOLUME (mm)= 129.727

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.715

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

| ADD HYD (70000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (1400): 99.51 5.171 9.50 131.88
+ ID2= 2 (0007): 84.70 3.853 9.83 113.09
=====

ID = 3 (70000): 184.21 9.001 9.58 123.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (70000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 (70000): 184.21 9.001 9.58 123.24
+ ID2= 2 (0900): 75.70 4.151 8.83 129.73
=====

ID = 1 (70000): 259.91 13.056 9.42 125.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0008)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->
Distance Elevation Manning
0.00 272.80 0.0600
300.00 271.70 0.0350 Main Channel
1000.00 271.44 0.0350 Main Channel
1500.00 271.66 0.0350 Main Channel
2000.00 271.65 0.0350 Main Channel
4500.00 272.40 0.0350 /0.0500 Main Channel
5000.00 272.66 0.0500

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.05 271.49 .729E+04 0.9 0.14 134.13
0.10 271.54 .292E+05 5.8 0.21 84.50
0.16 271.60 .657E+05 17.0 0.28 64.48
0.21 271.65 .117E+06 36.5 0.34 53.23
0.26 271.70 .209E+06 65.2 0.34 53.50
0.33 271.77 .358E+06 147.0 0.45 40.55

| | | | | | |
|------|--------|----------|--------|------|-------|
| 0.40 | 271.84 | .524E+06 | 258.5 | 0.54 | 33.82 |
| 0.47 | 271.91 | .710E+06 | 400.1 | 0.61 | 29.56 |
| 0.53 | 271.97 | .913E+06 | 572.9 | 0.68 | 26.57 |
| 0.60 | 272.04 | .114E+07 | 778.1 | 0.74 | 24.32 |
| 0.67 | 272.11 | .138E+07 | 1017.2 | 0.80 | 22.54 |
| 0.74 | 272.18 | .163E+07 | 1291.5 | 0.86 | 21.10 |
| 0.81 | 272.25 | .191E+07 | 1602.4 | 0.91 | 19.89 |
| 0.88 | 272.32 | .221E+07 | 1951.5 | 0.96 | 18.86 |
| 0.95 | 272.39 | .252E+07 | 2340.2 | 1.01 | 17.96 |
| 1.01 | 272.45 | .285E+07 | 2839.1 | 1.08 | 16.74 |
| 1.08 | 272.52 | .319E+07 | 3399.2 | 1.16 | 15.66 |
| 1.15 | 272.59 | .355E+07 | 4002.7 | 1.23 | 14.77 |
| 1.22 | 272.66 | .391E+07 | 4649.4 | 1.29 | 14.02 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (70000) 259.91 13.06 9.42 125.13 0.14 0.25
 OUTFLOW: ID= 1 (0008) 259.91 12.01 10.33 125.13 0.13 0.25

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |

| NASHYD (1500) | Area (ha)= 210.60 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 3.849

PEAK FLOW (cms)= 10.266 (i)

TIME TO PEAK (hrs)= 9.833

RUNOFF VOLUME (mm)= 129.727

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.715

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

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (1300) | Area (ha)= 70.80 Curve Number (CN)= 86.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.33

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 8.195

PEAK FLOW (cms)= 6.913 (i)

TIME TO PEAK (hrs)= 7.000

RUNOFF VOLUME (mm)= 142.884

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.788

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

```

-----
| ADD HYD ( 80000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 1300): 70.80 6.913 7.00 142.88
+ ID2= 2 ( 1500): 210.60 10.266 9.83 129.73
=====
ID = 3 ( 80000): 281.40 13.791 9.08 133.04

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 80000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
-----
              (ha) (cms) (hrs) (mm)
ID1= 3 ( 80000): 281.40 13.791 9.08 133.04
+ ID2= 2 ( 0008): 259.91 12.009 10.33 125.13
=====
ID = 1 ( 80000): 541.31 24.546 9.25 129.24

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0009)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
0.00      271.90      0.0500
50.00     266.74      0.0350   Main Channel
1300.00   266.68      0.0350   Main Channel
2000.00   266.77      0.0350 /0.0500 Main Channel
2100.00   271.10      0.0500

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH  ELEV  VOLUME  FLOW RATE  VELOCITY  TRAV.TIME
(m)    (m)   (cu.m.) (cms)     (m/s)    (min)
0.06  266.74 .512E+05  4.9      0.10    173.27
0.29  266.97 .493E+06  196.9    0.40    41.73
0.52  267.20 .940E+06  575.8    0.61    27.21
0.75  267.43 .139E+07  1100.9   0.79    21.02
0.98  267.66 .184E+07  1754.1   0.95    17.47
1.21  267.89 .229E+07  2524.4   1.09    15.13
1.44  268.12 .274E+07  3403.7   1.23    13.44
1.67  268.35 .320E+07  4386.1   1.36    12.16
1.90  268.58 .366E+07  5466.8   1.48    11.15
2.13  268.81 .412E+07  6641.8   1.60    10.33
2.35  269.03 .458E+07  7907.9   1.72    9.65
2.58  269.26 .504E+07  9262.3   1.83    9.07
2.81  269.49 .550E+07  10702.4  1.93    8.57
3.04  269.72 .597E+07  12226.1  2.03    8.14
3.27  269.95 .644E+07  13831.6  2.13    7.76
3.50  270.18 .691E+07  15517.0  2.23    7.42
3.73  270.41 .738E+07  17280.9  2.33    7.12
3.96  270.64 .785E+07  19121.7  2.42    6.84
4.19  270.87 .832E+07  21038.3  2.51    6.59

```

```

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 80000) 541.31 24.55 9.25 129.24 0.08 0.10
OUTFLOW: ID= 1 ( 0009) 541.31 19.91 12.00 129.24 0.08 0.10

```

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (1700) | Area (ha)= 19.63 Curve Number (CN)= 83.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.419

PEAK FLOW (cms)= 1.856 (i)

TIME TO PEAK (hrs)= 7.000

RUNOFF VOLUME (mm)= 136.197

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.751

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

 READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (1600) | Area (ha)= 49.20 Curve Number (CN)= 81.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.66

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.847

PEAK FLOW (cms)= 3.714 (i)
 TIME TO PEAK (hrs)= 7.333
 RUNOFF VOLUME (mm)= 131.879
 TOTAL RAINFALL (mm)= 181.420
 RUNOFF COEFFICIENT = 0.727

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

 | ADD HYD (90000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 1 (0010): 2031.50 41.165 13.33 99.61
 + ID2= 2 (1600): 49.20 3.714 7.33 131.88
 =====
 ID = 3 (90000): 2080.70 41.482 12.92 100.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ADD HYD (90000)|
 | 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 3 (90000): 2080.70 41.482 12.92 100.37
 + ID2= 2 (1700): 19.63 1.856 7.00 136.20
 =====
 ID = 1 (90000): 2100.33 41.514 12.75 100.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ADD HYD (90000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 1 (90000): 2100.33 41.514 12.75 100.70
 + ID2= 2 (0009): 541.31 19.914 12.00 129.24
 =====
 ID = 3 (90000): 2641.64 61.205 12.33 106.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0011)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.35 | 0.0500 | |
| 1.00 | 267.18 | 0.0300 | Main Channel |
| 10.00 | 267.12 | 0.0300 | Main Channel |
| 20.00 | 266.97 | 0.0300 | Main Channel |
| 30.00 | 266.99 | 0.0300 | Main Channel |
| 40.00 | 267.05 | 0.0300 | Main Channel |
| 50.00 | 266.82 | 0.0300 | Main Channel |
| 60.00 | 266.84 | 0.0300 | Main Channel |
| 70.00 | 266.80 | 0.0300 | Main Channel |
| 80.00 | 266.75 | 0.0300 | Main Channel |
| 90.00 | 266.74 | 0.0300 | Main Channel |
| 100.00 | 266.77 | 0.0300 | Main Channel |
| 110.00 | 266.62 | 0.0300 | Main Channel |
| 120.00 | 266.60 | 0.0300 | Main Channel |
| 20000.00 | 266.68 | 0.0300 /0.0500 | Main Channel |
| 21000.00 | 271.29 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.08 | 266.68 | .119E+07 | 292.8 | 0.37 | 67.80 |
| 0.32 | 266.92 | .844E+07 | 7622.0 | 1.35 | 18.45 |
| 0.57 | 267.17 | .157E+08 | 21436.9 | 2.04 | 12.22 |
| 0.81 | 267.41 | .230E+08 | 40438.3 | 2.63 | 9.49 |
| 1.05 | 267.65 | .304E+08 | 63980.7 | 3.15 | 7.91 |
| 1.29 | 267.89 | .377E+08 | 91666.6 | 3.64 | 6.86 |
| 1.54 | 268.14 | .451E+08 | ***** | 4.09 | 6.10 |
| 1.78 | 268.38 | .525E+08 | ***** | 4.52 | 5.52 |
| 2.02 | 268.62 | .599E+08 | ***** | 4.93 | 5.06 |
| 2.26 | 268.86 | .673E+08 | ***** | 5.32 | 4.69 |
| 2.51 | 269.11 | .747E+08 | ***** | 5.69 | 4.38 |
| 2.75 | 269.35 | .822E+08 | ***** | 6.06 | 4.12 |
| 2.99 | 269.59 | .897E+08 | ***** | 6.41 | 3.89 |
| 3.23 | 269.83 | .972E+08 | ***** | 6.75 | 3.70 |
| 3.48 | 270.08 | .105E+09 | ***** | 7.08 | 3.52 |
| 3.72 | 270.32 | .112E+09 | ***** | 7.40 | 3.37 |
| 3.96 | 270.56 | .120E+09 | ***** | 7.72 | 3.23 |
| 4.20 | 270.80 | .127E+09 | ***** | 8.03 | 3.11 |
| 4.45 | 271.05 | .135E+09 | ***** | 8.33 | 2.99 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (90000) | 2641.64 | 61.20 | 12.33 | 106.55 | 0.02 0.37 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (2000) | Area (ha)= 69.70 Curve Number (CN)= 75.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.25

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.130

PEAK FLOW (cms)= 3.654 (i)

TIME TO PEAK (hrs)= 8.250

RUNOFF VOLUME (mm)= 119.209

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.657

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

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (2100) | Area (ha)= 96.47 Curve Number (CN)= 75.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.43

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.577

PEAK FLOW (cms)= 4.887 (i)

TIME TO PEAK (hrs)= 9.083

RUNOFF VOLUME (mm)= 119.209

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.657

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

```

-----
| ADD HYD (100000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 2000): 69.70 3.654 8.25 119.21
+ ID2= 2 ( 2100): 96.47 4.887 9.08 119.21
=====
ID = 3 (100000): 166.17 8.490 8.83 119.21

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0014)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
|-----|

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
120.00     257.09      0.0500
130.00     256.88      0.0300   Main Channel
140.00     256.50      0.0300   Main Channel
150.00     256.08      0.0300   Main Channel
160.00     256.08      0.0300   Main Channel
170.00     256.06      0.0300   Main Channel
180.00     256.31      0.0300   Main Channel
190.00     256.07      0.0300   Main Channel
200.00     256.07      0.0300   Main Channel
210.00     256.46      0.0300   Main Channel
220.00     256.88      0.0300   Main Channel
230.00     257.43      0.0300   Main Channel
240.00     257.56      0.0300 /0.0500 Main Channel

```

250.00 257.58 0.0500

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.05 | 256.11 | .238E+04 | 0.3 | 0.24 | 129.10 |
| 0.10 | 256.16 | .614E+04 | 1.3 | 0.41 | 76.93 |
| 0.15 | 256.21 | .106E+05 | 3.0 | 0.53 | 59.16 |
| 0.21 | 256.27 | .156E+05 | 5.2 | 0.63 | 49.63 |
| 0.26 | 256.32 | .213E+05 | 8.2 | 0.73 | 43.26 |
| 0.31 | 256.37 | .275E+05 | 12.2 | 0.84 | 37.56 |
| 0.36 | 256.42 | .338E+05 | 16.8 | 0.94 | 33.54 |
| 0.41 | 256.47 | .404E+05 | 22.1 | 1.03 | 30.52 |
| 0.46 | 256.52 | .473E+05 | 28.0 | 1.12 | 28.15 |
| 0.51 | 256.57 | .544E+05 | 34.5 | 1.20 | 26.26 |
| 0.56 | 256.62 | .617E+05 | 41.7 | 1.27 | 24.68 |
| 0.62 | 256.68 | .693E+05 | 49.5 | 1.35 | 23.35 |
| 0.67 | 256.73 | .771E+05 | 57.9 | 1.42 | 22.20 |
| 0.72 | 256.78 | .852E+05 | 67.0 | 1.48 | 21.21 |
| 0.77 | 256.83 | .936E+05 | 76.7 | 1.55 | 20.33 |
| 0.82 | 256.88 | .102E+06 | 87.1 | 1.61 | 19.55 |
| 0.89 | 256.95 | .114E+06 | 103.8 | 1.71 | 18.36 |
| 0.96 | 257.02 | .127E+06 | 121.8 | 1.81 | 17.39 |
| 1.03 | 257.09 | .141E+06 | 141.2 | 1.90 | 16.59 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (100000) | 166.17 | 8.49 | 8.83 | 119.21 | 0.26 |
| OUTFLOW: ID= 1 (0014) | 166.17 | 8.29 | 9.42 | 119.20 | 0.26 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |

| | | | | | | | |
|------|------|------|-------|------|-------|-------|------|
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (1800) | Area (ha)= 74.90 Curve Number (CN)= 82.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |

2.833 9.40 | 5.833 18.80 | 8.833 21.62 | 11.83 7.52
 2.917 9.40 | 5.917 18.80 | 8.917 21.62 | 11.92 7.52
 3.000 9.40 | 6.000 18.80 | 9.000 21.62 | 12.00 7.52

Unit Hyd Qpeak (cms)= 2.488

PEAK FLOW (cms)= 4.564 (i)
 TIME TO PEAK (hrs)= 8.000
 RUNOFF VOLUME (mm)= 134.053
 TOTAL RAINFALL (mm)= 181.420
 RUNOFF COEFFICIENT = 0.739

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

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (1900) | Area (ha)= 208.66 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.90

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 4.195

PEAK FLOW (cms)= 10.534 (i)

TIME TO PEAK (hrs)= 9.583

RUNOFF VOLUME (mm)= 129.727

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.715

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

ata\Local\Temp\
e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

CALIB
NASHYD (2200) | Area (ha)= 64.60 Curve Number (CN)= 81.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.62

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 1.523

PEAK FLOW (cms)= 3.477 (i)

TIME TO PEAK (hrs)= 9.250

RUNOFF VOLUME (mm)= 131.881

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.727

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

| ADD HYD (110000)|

| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|---------|--------|-------|--------|
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0011): | 2641.64 | 58.768 | 13.75 | 106.55 |
| + ID2= 2 (0014): | 166.17 | 8.295 | 9.42 | 119.20 |
| ===== | | | | |
| ID = 3 (110000): | 2807.81 | 62.398 | 13.25 | 107.30 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (110000)|

| 3 + 2 = 1 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|---------|--------|-------|--------|
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (110000): | 2807.81 | 62.398 | 13.25 | 107.30 |
| + ID2= 2 (1800): | 74.90 | 4.564 | 8.00 | 134.05 |
| ===== | | | | |

ID = 1 (110000): 2882.71 63.743 12.92 108.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (110000): 2882.71 63.743 12.92 108.00
+ ID2= 2 ( 1900): 208.66 10.534 9.58 129.73
=====
ID = 3 (110000): 3091.37 70.564 12.50 109.46

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 (110000): 3091.37 70.564 12.50 109.46
+ ID2= 2 ( 2200): 64.60 3.477 9.25 131.88
=====
ID = 1 (110000): 3155.97 72.635 12.42 109.92

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0012)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----

```

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 251.80 | 0.0500 | |
| 90.00 | 251.22 | 0.0350 | Main Channel |
| 100.00 | 251.03 | 0.0350 | Main Channel |
| 110.00 | 250.04 | 0.0350 | Main Channel |
| 120.00 | 249.84 | 0.0350 | Main Channel |
| 130.00 | 250.15 | 0.0350 | Main Channel |
| 140.00 | 250.80 | 0.0350 | Main Channel |
| 150.00 | 250.69 | 0.0350 | Main Channel |
| 160.00 | 250.70 | 0.0350 | Main Channel |
| 170.00 | 250.63 | 0.0350 | Main Channel |
| 180.00 | 250.46 | 0.0350 | Main Channel |
| 190.00 | 250.43 | 0.0350 | Main Channel |
| 200.00 | 250.32 | 0.0350 | Main Channel |
| 210.00 | 250.53 | 0.0350 | Main Channel |
| 950.00 | 253.00 | 0.0350 /0.0500 | Main Channel |
| 1000.00 | 254.20 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.10 | 249.94 | .348E+03 | 0.1 | 0.24 | 61.32 |
| 0.20 | 250.04 | .139E+04 | 0.6 | 0.38 | 38.63 |
| 0.30 | 250.14 | .297E+04 | 1.8 | 0.53 | 27.24 |
| 0.39 | 250.23 | .486E+04 | 3.8 | 0.68 | 21.35 |
| 0.49 | 250.33 | .697E+04 | 6.2 | 0.77 | 18.79 |
| 0.59 | 250.43 | .100E+05 | 8.3 | 0.72 | 20.16 |
| 0.69 | 250.53 | .149E+05 | 12.4 | 0.73 | 20.01 |
| 0.79 | 250.63 | .221E+05 | 17.6 | 0.69 | 20.91 |
| 0.89 | 250.73 | .332E+05 | 26.0 | 0.68 | 21.28 |
| 0.99 | 250.83 | .485E+05 | 42.4 | 0.76 | 19.10 |
| 1.08 | 250.92 | .667E+05 | 65.4 | 0.85 | 17.01 |
| 1.18 | 251.02 | .875E+05 | 94.5 | 0.94 | 15.44 |
| 1.28 | 251.12 | .111E+06 | 129.3 | 1.01 | 14.32 |
| 1.38 | 251.22 | .138E+06 | 171.5 | 1.09 | 13.38 |
| 1.48 | 251.32 | .168E+06 | 223.5 | 1.16 | 12.50 |
| 1.59 | 251.43 | .208E+06 | 295.8 | 1.24 | 11.71 |
| 1.71 | 251.55 | .253E+06 | 381.4 | 1.31 | 11.07 |
| 1.83 | 251.67 | .304E+06 | 481.4 | 1.38 | 10.53 |
| 1.94 | 251.78 | .360E+06 | 596.8 | 1.44 | 10.06 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) | |
|-------------------------|----------------|----------------|--------------|------------------|------------------|------|
| INFLOW : ID= 2 (110000) | 3155.97 | 72.64 | 12.42 | 109.92 | 1.11 | 0.87 |
| OUTFLOW: ID= 1 (0012) | 3155.97 | 72.45 | 12.58 | 109.92 | 1.11 | 0.87 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |

| | | | | | | | |
|------|------|------|-------|------|-------|-------|------|
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (2300) | Area (ha)= 76.60 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |

3.000 9.40 | 6.000 18.80 | 9.000 21.62 | 12.00 7.52

Unit Hyd Qpeak (cms)= 2.522

PEAK FLOW (cms)= 4.504 (i)

TIME TO PEAK (hrs)= 8.000

RUNOFF VOLUME (mm)= 129.726

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.715

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

```

-----
| ADD HYD (120000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 0012): 3155.97 72.448 12.58 109.92
+ ID2= 2 ( 2300): 76.60 4.504 8.00 129.73
=====
ID = 3 (120000): 3232.57 74.356 12.42 110.39

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0013)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
  0.00    250.78    0.0500
 2000.00  249.38    0.0300 Main Channel
 22500.00 249.74    0.0300 Main Channel
 50000.00 249.74    0.0300 /0.0500 Main Channel
 52500.00 250.49    0.0500

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.06 249.44 .102E+06 11.1 0.11 152.86
0.12 249.50 .407E+06 70.4 0.18 96.30
0.18 249.56 .915E+06 207.6 0.23 73.49
0.23 249.61 .163E+07 447.1 0.28 60.66
0.29 249.67 .254E+07 810.7 0.33 52.28
0.35 249.73 .366E+07 1318.3 0.37 46.29
0.41 249.79 .618E+07 1758.2 0.29 58.60
0.47 249.85 .914E+07 3363.6 0.38 45.27
0.53 249.91 .121E+08 5363.2 0.46 37.63
0.58 249.96 .151E+08 7722.8 0.53 32.58
0.64 250.02 .181E+08 10418.4 0.60 28.96
0.70 250.08 .211E+08 13431.7 0.66 26.21
0.76 250.14 .242E+08 16748.2 0.72 24.05

```

| | | | | | |
|------|--------|----------|---------|------|-------|
| 0.82 | 250.20 | .272E+08 | 20355.9 | 0.77 | 22.29 |
| 0.88 | 250.26 | .303E+08 | 24245.2 | 0.83 | 20.83 |
| 0.93 | 250.31 | .334E+08 | 28407.3 | 0.88 | 19.59 |
| 0.99 | 250.37 | .365E+08 | 32835.0 | 0.93 | 18.52 |
| 1.05 | 250.43 | .396E+08 | 37521.8 | 0.98 | 17.60 |
| 1.11 | 250.49 | .428E+08 | 42461.9 | 1.03 | 16.78 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (120000) | 3232.57 | 74.36 | 12.42 | 110.39 | 0.12 | 0.18 |
| OUTFLOW: ID= 1 (0013) | 3232.57 | 71.42 | 13.33 | 110.39 | 0.12 | 0.18 |

 | READ STORM | Filename: C:\Users\charris\AppData
 | | ata\Local\Temp\
 | | e684de11-66b9-4ccf-a2d1-5f989234876c\5dbe706d
 | Ptotal=181.42 mm | Comments: Timmins-94 aerial reduction test

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.10 | 3.17 | 2.82 | 6.17 | 40.42 | 9.17 | 12.22 |
| 0.33 | 14.10 | 3.33 | 2.82 | 6.33 | 40.42 | 9.33 | 12.22 |
| 0.50 | 14.10 | 3.50 | 2.82 | 6.50 | 40.42 | 9.50 | 12.22 |
| 0.67 | 14.10 | 3.67 | 2.82 | 6.67 | 40.42 | 9.67 | 12.22 |
| 0.83 | 14.10 | 3.83 | 2.82 | 6.83 | 40.42 | 9.83 | 12.22 |
| 1.00 | 14.10 | 4.00 | 2.82 | 7.00 | 40.42 | 10.00 | 12.22 |
| 1.17 | 18.80 | 4.17 | 4.70 | 7.17 | 18.80 | 10.17 | 12.22 |
| 1.33 | 18.80 | 4.33 | 4.70 | 7.33 | 18.80 | 10.33 | 12.22 |
| 1.50 | 18.80 | 4.50 | 4.70 | 7.50 | 18.80 | 10.50 | 12.22 |
| 1.67 | 18.80 | 4.67 | 4.70 | 7.67 | 18.80 | 10.67 | 12.22 |
| 1.83 | 18.80 | 4.83 | 4.70 | 7.83 | 18.80 | 10.83 | 12.22 |
| 2.00 | 18.80 | 5.00 | 4.70 | 8.00 | 18.80 | 11.00 | 12.22 |
| 2.17 | 9.40 | 5.17 | 18.80 | 8.17 | 21.62 | 11.17 | 7.52 |
| 2.33 | 9.40 | 5.33 | 18.80 | 8.33 | 21.62 | 11.33 | 7.52 |
| 2.50 | 9.40 | 5.50 | 18.80 | 8.50 | 21.62 | 11.50 | 7.52 |
| 2.67 | 9.40 | 5.67 | 18.80 | 8.67 | 21.62 | 11.67 | 7.52 |
| 2.83 | 9.40 | 5.83 | 18.80 | 8.83 | 21.62 | 11.83 | 7.52 |
| 3.00 | 9.40 | 6.00 | 18.80 | 9.00 | 21.62 | 12.00 | 7.52 |

 | CALIB |
 | NASHYD (2400) | Area (ha)= 76.70 Curve Number (CN)= 72.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.27

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.10 | 3.083 | 2.82 | 6.083 | 40.42 | 9.08 | 12.22 |
| 0.167 | 14.10 | 3.167 | 2.82 | 6.167 | 40.42 | 9.17 | 12.22 |
| 0.250 | 14.10 | 3.250 | 2.82 | 6.250 | 40.42 | 9.25 | 12.22 |
| 0.333 | 14.10 | 3.333 | 2.82 | 6.333 | 40.42 | 9.33 | 12.22 |
| 0.417 | 14.10 | 3.417 | 2.82 | 6.417 | 40.42 | 9.42 | 12.22 |
| 0.500 | 14.10 | 3.500 | 2.82 | 6.500 | 40.42 | 9.50 | 12.22 |
| 0.583 | 14.10 | 3.583 | 2.82 | 6.583 | 40.42 | 9.58 | 12.22 |
| 0.667 | 14.10 | 3.667 | 2.82 | 6.667 | 40.42 | 9.67 | 12.22 |
| 0.750 | 14.10 | 3.750 | 2.82 | 6.750 | 40.42 | 9.75 | 12.22 |
| 0.833 | 14.10 | 3.833 | 2.82 | 6.833 | 40.42 | 9.83 | 12.22 |
| 0.917 | 14.10 | 3.917 | 2.82 | 6.917 | 40.42 | 9.92 | 12.22 |
| 1.000 | 14.10 | 4.000 | 2.82 | 7.000 | 40.42 | 10.00 | 12.22 |
| 1.083 | 18.80 | 4.083 | 4.70 | 7.083 | 18.80 | 10.08 | 12.22 |
| 1.167 | 18.80 | 4.167 | 4.70 | 7.167 | 18.80 | 10.17 | 12.22 |
| 1.250 | 18.80 | 4.250 | 4.70 | 7.250 | 18.80 | 10.25 | 12.22 |
| 1.333 | 18.80 | 4.333 | 4.70 | 7.333 | 18.80 | 10.33 | 12.22 |
| 1.417 | 18.80 | 4.417 | 4.70 | 7.417 | 18.80 | 10.42 | 12.22 |
| 1.500 | 18.80 | 4.500 | 4.70 | 7.500 | 18.80 | 10.50 | 12.22 |
| 1.583 | 18.80 | 4.583 | 4.70 | 7.583 | 18.80 | 10.58 | 12.22 |
| 1.667 | 18.80 | 4.667 | 4.70 | 7.667 | 18.80 | 10.67 | 12.22 |
| 1.750 | 18.80 | 4.750 | 4.70 | 7.750 | 18.80 | 10.75 | 12.22 |
| 1.833 | 18.80 | 4.833 | 4.70 | 7.833 | 18.80 | 10.83 | 12.22 |
| 1.917 | 18.80 | 4.917 | 4.70 | 7.917 | 18.80 | 10.92 | 12.22 |
| 2.000 | 18.80 | 5.000 | 4.70 | 8.000 | 18.80 | 11.00 | 12.22 |
| 2.083 | 9.40 | 5.083 | 18.80 | 8.083 | 21.62 | 11.08 | 7.52 |
| 2.167 | 9.40 | 5.167 | 18.80 | 8.167 | 21.62 | 11.17 | 7.52 |
| 2.250 | 9.40 | 5.250 | 18.80 | 8.250 | 21.62 | 11.25 | 7.52 |
| 2.333 | 9.40 | 5.333 | 18.80 | 8.333 | 21.62 | 11.33 | 7.52 |
| 2.417 | 9.40 | 5.417 | 18.80 | 8.417 | 21.62 | 11.42 | 7.52 |
| 2.500 | 9.40 | 5.500 | 18.80 | 8.500 | 21.62 | 11.50 | 7.52 |
| 2.583 | 9.40 | 5.583 | 18.80 | 8.583 | 21.62 | 11.58 | 7.52 |
| 2.667 | 9.40 | 5.667 | 18.80 | 8.667 | 21.62 | 11.67 | 7.52 |
| 2.750 | 9.40 | 5.750 | 18.80 | 8.750 | 21.62 | 11.75 | 7.52 |
| 2.833 | 9.40 | 5.833 | 18.80 | 8.833 | 21.62 | 11.83 | 7.52 |
| 2.917 | 9.40 | 5.917 | 18.80 | 8.917 | 21.62 | 11.92 | 7.52 |
| 3.000 | 9.40 | 6.000 | 18.80 | 9.000 | 21.62 | 12.00 | 7.52 |

Unit Hyd Qpeak (cms)= 2.307

PEAK FLOW (cms)= 3.794 (i)

TIME TO PEAK (hrs)= 8.417

RUNOFF VOLUME (mm)= 113.097

TOTAL RAINFALL (mm)= 181.420

RUNOFF COEFFICIENT = 0.623

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

| ADD HYD (130000)|

| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|---------|--------|-------|--------|
| | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0013): | 3232.57 | 71.422 | 13.33 | 110.39 |
| + ID2= 2 (2400): | 76.70 | 3.794 | 8.42 | 113.10 |
| ===== | | | | |
| ID = 3 (130000): | 3309.27 | 72.672 | 13.08 | 110.45 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

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

```

```

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y M M M M O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

```

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***** DETAILED OUTPUT *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
 Output filename: C:\Users\jmueller\AppData\Local\Civica\VH5\42c14ce9-6b36-4c72-aa7a-4c256032f6ff\d3474116-830a-4ce7-b4d9-bb8a742d75bf\sce
 Summary filename: C:\Users\jmueller\AppData\Local\Civica\VH5\42c14ce9-6b36-4c72-aa7a-4c256032f6ff\d3474116-830a-4ce7-b4d9-bb8a742d75bf\sce

DATE: 03-17-2021 TIME: 11:37:32

USER:

COMMENTS: _____

```

-----
*****
** SIMULATION : Timmins-97                      **
*****

```

```

-----
| READ STORM | Filename: C:\Users\jmueller\AppData
|            | ata\Local\Temp\
|            | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
| Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction
-----

```

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

| CALIB |
| NASHYD (0200) | Area (ha)= 55.70 Curve Number (CN)= 60.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.18

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 1.803

PEAK FLOW (cms)= 2.336 (i)

TIME TO PEAK (hrs)= 8.333

RUNOFF VOLUME (mm)= 94.442

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.504

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

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (0100) | Area (ha)= 316.90 Curve Number (CN)= 67.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.77

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 4.370

PEAK FLOW (cms)= 11.647 (i)

TIME TO PEAK (hrs)= 11.000

RUNOFF VOLUME (mm)= 108.034
 TOTAL RAINFALL (mm)= 187.210
 RUNOFF COEFFICIENT = 0.577

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

```

-----
| ADD HYD ( 10000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
  ID1= 1 ( 0100): 316.90 11.647 11.00 108.03
+ ID2= 2 ( 0200): 55.70 2.336 8.33 94.44
=====
  ID = 3 ( 10000): 372.60 13.444 10.58 106.00
  
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0001)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
  
```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
60.00      282.95      0.0500
70.00      281.82      0.0350   Main Channel
80.00      280.29      0.0350   Main Channel
90.00      279.48      0.0350   Main Channel
100.00     278.67      0.0350   Main Channel
110.00     279.10      0.0350   Main Channel
120.00     279.37      0.0350   Main Channel
130.00     280.55      0.0350   Main Channel
140.00     281.01      0.0350   Main Channel
150.00     281.79      0.0350   Main Channel
160.00     282.34      0.0350 /0.0500 Main Channel
170.00     282.71      0.0500
  
```

```

<----- TRAVEL TIME TABLE ----->
DEPTH  ELEV  VOLUME  FLOW RATE  VELOCITY  TRAV.TIME
(m)    (m)   (cu.m.) (cms)     (m/s)    (min)
0.21  278.88 .142E+04 0.2       0.21     142.88
0.42  279.09 .567E+04 1.1       0.33     90.01
0.63  279.30 .133E+05 3.1       0.42     72.32
0.84  279.51 .243E+05 7.2       0.54     56.18
1.05  279.72 .371E+05 13.4      0.65     46.20
1.26  279.93 .515E+05 21.4      0.75     40.05
1.47  280.14 .676E+05 31.5      0.84     35.79
1.68  280.35 .854E+05 43.8      0.93     32.46
1.89  280.56 .104E+06 58.7      1.02     29.64
2.10  280.77 .125E+06 74.0      1.07     28.22
2.31  280.98 .148E+06 91.9      1.12     26.91
2.52  281.19 .173E+06 114.1     1.19     25.33
  
```

| | | | | | |
|------|--------|----------|-------|------|-------|
| 2.73 | 281.40 | .200E+06 | 139.3 | 1.26 | 23.94 |
| 2.94 | 281.61 | .228E+06 | 167.3 | 1.32 | 22.75 |
| 3.15 | 281.82 | .258E+06 | 197.9 | 1.39 | 21.73 |
| 3.37 | 282.04 | .292E+06 | 234.3 | 1.45 | 20.74 |
| 3.59 | 282.27 | .328E+06 | 274.4 | 1.51 | 19.90 |
| 3.82 | 282.49 | .366E+06 | 323.9 | 1.60 | 18.84 |
| 4.04 | 282.71 | .408E+06 | 380.6 | 1.69 | 17.86 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (10000) | 372.60 | 13.44 | 10.58 | 106.00 | 1.05 | 0.65 |
| OUTFLOW: ID= 1 (0001) | 372.60 | 13.20 | 11.25 | 106.00 | 1.04 | 0.65 |

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9ddea7e3\49bc18a
 Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 CALIB |
 NASHYD (0300) | Area (ha)= 300.70 Curve Number (CN)= 63.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.22

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 5.174

PEAK FLOW (cms)= 11.262 (i)

TIME TO PEAK (hrs)= 10.250

RUNOFF VOLUME (mm)= 100.187

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.535

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

READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d18a7e3\fa49bc18a
 Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

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| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

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-----
```

CALIB |
 NASHYD (0400) | Area (ha)= 59.10 Curve Number (CN)= 62.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.13

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

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-----
```

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 1.998

PEAK FLOW (cms)= 2.623 (i)

TIME TO PEAK (hrs)= 8.083

RUNOFF VOLUME (mm)= 98.259

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.525

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

| ADD HYD (20000) | | | | |
|-------------------|--------|--------|-------|--------|
| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0001): | 372.60 | 13.201 | 11.25 | 106.00 |
| + ID2= 2 (0300): | 300.70 | 11.262 | 10.25 | 100.19 |
| ===== | | | | |
| ID = 3 (20000): | 673.30 | 24.190 | 10.67 | 103.40 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (20000) | | | | |
|-------------------|--------|--------|-------|--------|
| 3 + 2 = 1 | AREA | QPEAK | TPEAK | R.V. |
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (20000): | 673.30 | 24.190 | 10.67 | 103.40 |
| + ID2= 2 (0400): | 59.10 | 2.623 | 8.08 | 98.26 |

=====
ID = 1 (20000): 732.40 26.199 10.50 102.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0002)|
| IN= 2--> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.75 | 0.0800 |
| 50.00 | 275.40 | 0.0800 |
| 309.00 | 275.40 | 0.0800 /0.0350 Main Channel |
| 310.00 | 275.15 | 0.0350 Main Channel |
| 318.00 | 275.15 | 0.0350 Main Channel |
| 320.00 | 275.40 | 0.0350 /0.0800 Main Channel |
| 650.00 | 275.40 | 0.0800 |
| 800.00 | 275.75 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.03 | 275.18 | .635E+03 | 0.0 | 0.08 | 523.54 |
| 0.06 | 275.21 | .130E+04 | 0.1 | 0.12 | 334.64 |
| 0.09 | 275.24 | .199E+04 | 0.1 | 0.16 | 258.87 |
| 0.13 | 275.28 | .271E+04 | 0.2 | 0.19 | 216.44 |
| 0.16 | 275.31 | .346E+04 | 0.3 | 0.22 | 188.78 |
| 0.19 | 275.34 | .424E+04 | 0.4 | 0.24 | 169.07 |
| 0.22 | 275.37 | .505E+04 | 0.5 | 0.27 | 154.20 |
| 0.25 | 275.40 | .595E+04 | 0.7 | 0.29 | 143.80 |
| 0.28 | 275.43 | .540E+05 | 1.5 | 0.07 | 585.80 |
| 0.31 | 275.46 | .103E+06 | 3.2 | 0.08 | 539.62 |
| 0.35 | 275.50 | .154E+06 | 5.5 | 0.09 | 468.71 |
| 0.38 | 275.53 | .207E+06 | 8.4 | 0.10 | 412.66 |
| 0.41 | 275.56 | .261E+06 | 11.7 | 0.11 | 369.95 |
| 0.44 | 275.59 | .316E+06 | 15.6 | 0.12 | 336.78 |
| 0.47 | 275.62 | .372E+06 | 20.0 | 0.13 | 310.34 |
| 0.50 | 275.65 | .431E+06 | 24.8 | 0.14 | 288.77 |
| 0.54 | 275.69 | .490E+06 | 30.2 | 0.15 | 270.81 |
| 0.57 | 275.72 | .551E+06 | 35.9 | 0.16 | 255.61 |
| 0.60 | 275.75 | .613E+06 | 42.2 | 0.17 | 242.55 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (20000) | 732.40 | 26.20 | 10.50 | 102.99 | 0.51 | 0.15 |
| OUTFLOW: ID= 1 (0002) | 732.40 | 16.59 | 13.17 | 102.98 | 0.45 | 0.12 |

READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

```

-----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.17 14.55 | 3.17  2.91 | 6.17 41.71 | 9.17 12.61
    0.33 14.55 | 3.33  2.91 | 6.33 41.71 | 9.33 12.61
    0.50 14.55 | 3.50  2.91 | 6.50 41.71 | 9.50 12.61
    0.67 14.55 | 3.67  2.91 | 6.67 41.71 | 9.67 12.61
    0.83 14.55 | 3.83  2.91 | 6.83 41.71 | 9.83 12.61
    1.00 14.55 | 4.00  2.91 | 7.00 41.71 |10.00 12.61
    1.17 19.40 | 4.17  4.85 | 7.17 19.40 |10.17 12.61
    1.33 19.40 | 4.33  4.85 | 7.33 19.40 |10.33 12.61
    1.50 19.40 | 4.50  4.85 | 7.50 19.40 |10.50 12.61
    1.67 19.40 | 4.67  4.85 | 7.67 19.40 |10.67 12.61
    1.83 19.40 | 4.83  4.85 | 7.83 19.40 |10.83 12.61
    2.00 19.40 | 5.00  4.85 | 8.00 19.40 |11.00 12.61
    2.17  9.70 | 5.17 19.40 | 8.17 22.31 |11.17  7.76
    2.33  9.70 | 5.33 19.40 | 8.33 22.31 |11.33  7.76
    2.50  9.70 | 5.50 19.40 | 8.50 22.31 |11.50  7.76
    2.67  9.70 | 5.67 19.40 | 8.67 22.31 |11.67  7.76
    2.83  9.70 | 5.83 19.40 | 8.83 22.31 |11.83  7.76
    3.00  9.70 | 6.00 19.40 | 9.00 22.31 |12.00  7.76
  
```

```

-----
| CALIB |
| NASHYD ( 0600) | Area (ha)= 55.10 Curve Number (CN)= 60.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.14
  
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

```

-----
      TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
      hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
    0.083 14.55 | 3.083  2.91 | 6.083 41.71 | 9.08 12.61
    0.167 14.55 | 3.167  2.91 | 6.167 41.71 | 9.17 12.61
    0.250 14.55 | 3.250  2.91 | 6.250 41.71 | 9.25 12.61
    0.333 14.55 | 3.333  2.91 | 6.333 41.71 | 9.33 12.61
    0.417 14.55 | 3.417  2.91 | 6.417 41.71 | 9.42 12.61
    0.500 14.55 | 3.500  2.91 | 6.500 41.71 | 9.50 12.61
    0.583 14.55 | 3.583  2.91 | 6.583 41.71 | 9.58 12.61
    0.667 14.55 | 3.667  2.91 | 6.667 41.71 | 9.67 12.61
    0.750 14.55 | 3.750  2.91 | 6.750 41.71 | 9.75 12.61
    0.833 14.55 | 3.833  2.91 | 6.833 41.71 | 9.83 12.61
    0.917 14.55 | 3.917  2.91 | 6.917 41.71 | 9.92 12.61
    1.000 14.55 | 4.000  2.91 | 7.000 41.71 |10.00 12.61
    1.083 19.40 | 4.083  4.85 | 7.083 19.40 |10.08 12.61
    1.167 19.40 | 4.167  4.85 | 7.167 19.40 |10.17 12.61
  
```

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 1.846

PEAK FLOW (cms)= 2.337 (i)

TIME TO PEAK (hrs)= 8.167

RUNOFF VOLUME (mm)= 94.442

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.504

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (0700) | Area (ha)= 93.30 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.93

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 3.832

PEAK FLOW (cms)= 4.572 (i)
 TIME TO PEAK (hrs)= 7.750
 RUNOFF VOLUME (mm)= 100.187
 TOTAL RAINFALL (mm)= 187.210
 RUNOFF COEFFICIENT = 0.535

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

 | ADD HYD (40000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 1 (0600): 55.10 2.337 8.17 94.44
 + ID2= 2 (0700): 93.30 4.572 7.75 100.19
 =====
 ID = 3 (40000): 148.40 6.858 7.83 98.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0003)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.80 | 0.0800 |
| 175.00 | 275.48 | 0.0800 /0.0500 |
| 400.00 | 275.32 | 0.0500 |
| 495.00 | 275.32 | 0.0500 /0.0350 Main Channel |
| 496.00 | 274.97 | 0.0350 Main Channel |
| 501.00 | 274.97 | 0.0350 Main Channel |
| 502.00 | 275.32 | 0.0350 /0.0500 Main Channel |
| 595.00 | 275.54 | 0.0500 /0.0800 |
| 645.00 | 275.80 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.04 | 275.01 | .277E+03 | 0.0 | 0.06 | 359.96 |
| 0.08 | 275.05 | .566E+03 | 0.0 | 0.10 | 230.18 |
| 0.12 | 275.09 | .867E+03 | 0.1 | 0.13 | 178.15 |
| 0.16 | 275.13 | .118E+04 | 0.1 | 0.16 | 149.01 |
| 0.19 | 275.16 | .151E+04 | 0.2 | 0.18 | 130.02 |
| 0.23 | 275.20 | .184E+04 | 0.3 | 0.20 | 116.50 |

| | | | | | |
|------|--------|----------|------|------|--------|
| 0.27 | 275.24 | .219E+04 | 0.3 | 0.22 | 106.29 |
| 0.31 | 275.28 | .255E+04 | 0.4 | 0.24 | 98.27 |
| 0.35 | 275.32 | .293E+04 | 0.5 | 0.25 | 91.76 |
| 0.39 | 275.36 | .104E+05 | 0.9 | 0.11 | 203.05 |
| 0.44 | 275.41 | .249E+05 | 1.7 | 0.10 | 237.81 |
| 0.48 | 275.45 | .453E+05 | 3.3 | 0.10 | 228.90 |
| 0.53 | 275.50 | .712E+05 | 5.8 | 0.11 | 203.44 |
| 0.58 | 275.55 | .101E+06 | 9.5 | 0.13 | 176.73 |
| 0.63 | 275.60 | .133E+06 | 14.1 | 0.15 | 156.52 |
| 0.68 | 275.65 | .167E+06 | 19.6 | 0.16 | 141.93 |
| 0.72 | 275.69 | .204E+06 | 26.0 | 0.18 | 130.89 |
| 0.77 | 275.74 | .243E+06 | 33.1 | 0.19 | 122.22 |
| 0.82 | 275.79 | .284E+06 | 41.2 | 0.20 | 115.20 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (40000) 148.40 6.86 7.83 98.05 0.55 0.12
 OUTFLOW: ID= 1 (0003) 148.40 4.23 10.67 98.04 0.50 0.11

 | ADD HYD (25000)|

| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)

ID1= 1 (0002): 732.40 16.589 13.17 102.98
 + ID2= 2 (0003): 148.40 4.226 10.67 98.04

=====

ID = 3 (25000): 880.80 20.219 12.75 102.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0015)|

| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning |
|----------|-----------|-----------------------------|
| 0.00 | 275.80 | 0.0800 |
| 60.00 | 275.48 | 0.0800 |
| 515.00 | 275.23 | 0.0800 /0.0350 Main Channel |
| 530.00 | 275.08 | 0.0350 Main Channel |
| 535.00 | 275.23 | 0.0350 /0.0800 Main Channel |
| 755.00 | 275.31 | 0.0800 |
| 810.00 | 275.80 | 0.0800 |

<----- TRAVEL TIME TABLE ----->

| DEPTH | ELEV | VOLUME | FLOW RATE | VELOCITY | TRAV.TIME |
|-------|--------|----------|-----------|----------|-----------|
| (m) | (m) | (cu.m.) | (cms) | (m/s) | (min) |
| 0.04 | 275.12 | .154E+03 | 0.0 | 0.03 | 960.18 |
| 0.08 | 275.15 | .616E+03 | 0.0 | 0.05 | 604.88 |

| | | | | | |
|------|--------|----------|------|------|--------|
| 0.11 | 275.19 | .139E+04 | 0.1 | 0.06 | 461.61 |
| 0.15 | 275.23 | .246E+04 | 0.1 | 0.07 | 381.05 |
| 0.19 | 275.27 | .913E+04 | 0.3 | 0.05 | 596.85 |
| 0.23 | 275.31 | .266E+05 | 0.6 | 0.04 | 728.30 |
| 0.26 | 275.34 | .525E+05 | 1.3 | 0.04 | 664.16 |
| 0.30 | 275.38 | .829E+05 | 2.4 | 0.05 | 586.71 |
| 0.34 | 275.42 | .118E+06 | 3.7 | 0.05 | 526.62 |
| 0.38 | 275.46 | .158E+06 | 5.5 | 0.06 | 480.34 |
| 0.42 | 275.50 | .201E+06 | 7.7 | 0.06 | 437.55 |
| 0.45 | 275.53 | .247E+06 | 10.4 | 0.07 | 395.94 |
| 0.49 | 275.57 | .293E+06 | 13.4 | 0.08 | 362.70 |
| 0.53 | 275.61 | .339E+06 | 16.8 | 0.08 | 335.65 |
| 0.57 | 275.65 | .387E+06 | 20.6 | 0.09 | 313.22 |
| 0.61 | 275.69 | .435E+06 | 24.6 | 0.09 | 294.32 |
| 0.64 | 275.72 | .483E+06 | 29.0 | 0.10 | 278.16 |
| 0.68 | 275.76 | .533E+06 | 33.6 | 0.10 | 264.16 |
| 0.72 | 275.80 | .583E+06 | 38.6 | 0.11 | 251.91 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (25000) 880.80 20.22 12.75 102.15 0.56 0.09
 OUTFLOW: ID= 1 (0015) 880.80 12.87 14.58 102.14 0.48 0.07

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (0500) | Area (ha)= 958.30 Curve Number (CN)= 63.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.88

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 12.709

PEAK FLOW (cms)= 32.278 (i)

TIME TO PEAK (hrs)= 11.250
 RUNOFF VOLUME (mm)= 100.187
 TOTAL RAINFALL (mm)= 187.210
 RUNOFF COEFFICIENT = 0.535

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\49bc18a
 Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 CALIB |
 NASHYD (1100) | Area (ha)= 73.60 Curve Number (CN)= 81.0
 ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.37

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.052

PEAK FLOW (cms)= 4.295 (i)

TIME TO PEAK (hrs)= 8.583

RUNOFF VOLUME (mm)= 137.311

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.733

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

 | ROUTE CHN(0004)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 275.10 | 0.0500 | |
| 50.00 | 275.04 | 0.0350 | Main Channel |
| 4900.00 | 275.10 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 275.11 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.00 | 275.04 | .190E+03 | 0.0 | 0.01 | 897.50 |
| 0.01 | 275.05 | .761E+03 | 0.0 | 0.01 | 565.39 |
| 0.01 | 275.05 | .171E+04 | 0.1 | 0.02 | 431.47 |
| 0.01 | 275.05 | .304E+04 | 0.1 | 0.02 | 356.17 |
| 0.02 | 275.06 | .475E+04 | 0.3 | 0.03 | 306.94 |
| 0.02 | 275.06 | .685E+04 | 0.4 | 0.03 | 271.81 |
| 0.02 | 275.06 | .932E+04 | 0.6 | 0.03 | 245.26 |
| 0.03 | 275.07 | .122E+05 | 0.9 | 0.03 | 224.37 |
| 0.03 | 275.07 | .154E+05 | 1.2 | 0.04 | 207.43 |
| 0.03 | 275.07 | .190E+05 | 1.6 | 0.04 | 193.36 |
| 0.03 | 275.07 | .230E+05 | 2.1 | 0.04 | 181.45 |
| 0.04 | 275.08 | .274E+05 | 2.7 | 0.05 | 171.23 |
| 0.04 | 275.08 | .321E+05 | 3.3 | 0.05 | 162.33 |
| 0.04 | 275.08 | .373E+05 | 4.0 | 0.05 | 154.51 |
| 0.05 | 275.09 | .428E+05 | 4.8 | 0.05 | 147.56 |
| 0.05 | 275.09 | .487E+05 | 5.7 | 0.05 | 141.35 |
| 0.05 | 275.09 | .550E+05 | 6.7 | 0.06 | 135.75 |
| 0.06 | 275.10 | .616E+05 | 7.9 | 0.06 | 130.67 |
| 0.06 | 275.10 | .686E+05 | 9.1 | 0.06 | 125.92 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (1100) | 73.60 | 4.30 | 8.58 | 137.31 | 0.05 |
| OUTFLOW: ID= 1 (0004) | 73.60 | 3.23 | 10.50 | 137.24 | 0.04 |

| ADD HYD (30000)|

| 1 + 2 = 3 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|--------------|----------------|----------------|--------------|
| ID1= 1 (0015): | 880.80 | 12.869 | 14.58 | 102.14 |
| + ID2= 2 (0004): | 73.60 | 3.227 | 10.50 | 137.24 |
| ===== | | | | |
| ID = 3 (30000): | 954.40 | 14.598 | 14.33 | 104.85 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (30000)|

| 3 + 2 = 1 | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|-------------------|--------------|----------------|----------------|--------------|
| ID1= 3 (30000): | 954.40 | 14.598 | 14.33 | 104.85 |
| + ID2= 2 (0500): | 958.30 | 32.278 | 11.25 | 100.19 |
| ===== | | | | |
| ID = 1 (30000): | 1912.70 | 43.608 | 12.17 | 102.51 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0005)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 277.94 | 0.0500 | |
| 50.00 | 275.49 | 0.0350 | Main Channel |
| 100.00 | 275.08 | 0.0350 | Main Channel |
| 150.00 | 275.82 | 0.0350 | Main Channel |
| 200.00 | 276.76 | 0.0350 /0.0500 | Main Channel |
| 250.00 | 277.55 | 0.0500 | |
| 1000.00 | 277.60 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.10 | 275.18 | .571E+03 | 0.1 | 0.15 | 64.83 |
| 0.21 | 275.29 | .229E+04 | 0.9 | 0.23 | 40.84 |
| 0.31 | 275.39 | .514E+04 | 2.7 | 0.31 | 31.17 |
| 0.41 | 275.49 | .914E+04 | 5.9 | 0.37 | 25.73 |
| 0.55 | 275.63 | .159E+05 | 13.7 | 0.49 | 19.40 |
| 0.69 | 275.77 | .237E+05 | 24.4 | 0.59 | 16.20 |
| 0.83 | 275.91 | .324E+05 | 38.3 | 0.68 | 14.09 |
| 0.97 | 276.05 | .420E+05 | 55.6 | 0.76 | 12.60 |
| 1.11 | 276.19 | .524E+05 | 76.0 | 0.83 | 11.50 |
| 1.25 | 276.33 | .637E+05 | 99.7 | 0.90 | 10.64 |
| 1.39 | 276.47 | .757E+05 | 126.8 | 0.96 | 9.95 |
| 1.54 | 276.62 | .887E+05 | 157.5 | 1.02 | 9.38 |
| 1.68 | 276.76 | .102E+06 | 191.8 | 1.07 | 8.90 |
| 1.82 | 276.90 | .117E+06 | 235.9 | 1.16 | 8.27 |
| 1.96 | 277.04 | .133E+06 | 284.3 | 1.23 | 7.78 |
| 2.10 | 277.18 | .149E+06 | 337.1 | 1.30 | 7.38 |
| 2.24 | 277.32 | .167E+06 | 394.3 | 1.36 | 7.05 |
| 2.38 | 277.46 | .185E+06 | 456.0 | 1.41 | 6.77 |
| 2.52 | 277.60 | .215E+06 | 517.1 | 1.38 | 6.94 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) | |
|-------------------------|----------------|----------------|--------------|------------------|------------------|------|
| INFLOW : ID= 2 (30000) | 1912.70 | 43.61 | 12.17 | 102.51 | 0.88 | 0.70 |
| OUTFLOW: ID= 1 (0005) | 1912.70 | 43.53 | 12.33 | 102.51 | 0.87 | 0.70 |

| READ STORM | Filename: C:\Users\jmueller\AppData
| | ata\Local\Temp\
| | a5240712-0d10-4766-9c35-d89c9d9bea7e3\f49bc18a

| Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

| CALIB |
| NASHYD (1000) | Area (ha)= 37.50 Curve Number (CN)= 77.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.99

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 1.447

PEAK FLOW (cms)= 2.336 (i)

TIME TO PEAK (hrs)= 7.750

RUNOFF VOLUME (mm)= 128.644

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.687

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

```

-----
| ADD HYD ( 50000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 1000): 37.50 2.336 7.75 128.64
+ ID2= 2 ( 0005): 1912.70 43.533 12.33 102.51
=====
ID = 3 ( 50000): 1950.20 44.515 12.17 103.02

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0006)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
0.00 277.14 0.0500
1000.00 275.16 0.0500 /0.0300 Main Channel
19950.00 275.00 0.0300 /0.0500 Main Channel
20000.00 277.10 0.0500

```

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.11 | 275.11 | .674E+06 | 247.4 | 0.34 | 45.39 |
| 0.22 | 275.22 | .249E+07 | 1707.4 | 0.64 | 24.31 |
| 0.33 | 275.33 | .445E+07 | 4480.7 | 0.94 | 16.54 |
| 0.44 | 275.44 | .641E+07 | 8225.7 | 1.19 | 12.99 |
| 0.55 | 275.55 | .838E+07 | 12829.8 | 1.43 | 10.89 |
| 0.66 | 275.66 | .104E+08 | 18220.9 | 1.64 | 9.47 |
| 0.77 | 275.77 | .123E+08 | 24346.8 | 1.84 | 8.45 |
| 0.88 | 275.88 | .143E+08 | 31167.5 | 2.03 | 7.66 |
| 0.99 | 275.99 | .163E+08 | 38651.0 | 2.21 | 7.04 |
| 1.11 | 276.11 | .183E+08 | 46770.9 | 2.38 | 6.53 |
| 1.22 | 276.22 | .203E+08 | 55504.6 | 2.54 | 6.10 |
| 1.33 | 276.33 | .223E+08 | 64833.0 | 2.70 | 5.74 |
| 1.44 | 276.44 | .244E+08 | 74739.2 | 2.86 | 5.43 |
| 1.55 | 276.55 | .264E+08 | 85208.2 | 3.01 | 5.16 |
| 1.66 | 276.66 | .284E+08 | 96226.9 | 3.15 | 4.92 |
| 1.77 | 276.77 | .304E+08 | ***** | 3.30 | 4.71 |
| 1.88 | 276.88 | .325E+08 | ***** | 3.44 | 4.52 |
| 1.99 | 276.99 | .345E+08 | ***** | 3.57 | 4.34 |
| 2.10 | 277.10 | .366E+08 | ***** | 3.71 | 4.19 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (50000) | 1950.20 | 44.52 | 12.17 | 103.02 | 0.02 0.34 |
| OUTFLOW: ID= 1 (0006) | 1950.20 | 43.69 | 12.83 | 103.02 | 0.02 0.34 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |

| | | | | | | | |
|------|------|------|-------|------|-------|-------|------|
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (1200) | Area (ha)= 81.30 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.34

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |

2.917 9.70 | 5.917 19.40 | 8.917 22.31 | 11.92 7.76
 3.000 9.70 | 6.000 19.40 | 9.000 22.31 | 12.00 7.76

Unit Hyd Qpeak (cms)= 9.133

PEAK FLOW (cms)= 7.526 (i)
 TIME TO PEAK (hrs)= 7.000
 RUNOFF VOLUME (mm)= 135.089
 TOTAL RAINFALL (mm)= 187.210
 RUNOFF COEFFICIENT = 0.722

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

 | ADD HYD (60000)|
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 ----- (ha) (cms) (hrs) (mm)
 ID1= 1 (1200): 81.30 7.526 7.00 135.09
 + ID2= 2 (0006): 1950.20 43.689 12.83 103.02
 =====
 ID = 3 (60000): 2031.50 44.438 12.17 104.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0010)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

 <----- DATA FOR SECTION (1.1) ----->
 Distance Elevation Manning
 0.00 269.84 0.0500
 1000.00 267.76 0.0500 /0.0350 Main Channel
 19950.00 267.77 0.0350 /0.0500 Main Channel
 20000.00 269.10 0.0500

<----- TRAVEL TIME TABLE ----->
 DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
 (m) (m) (cu.m.) (cms) (m/s) (min)
 0.07 267.83 .104E+07 351.0 0.28 49.37
 0.14 267.90 .216E+07 1186.5 0.46 30.35
 0.21 267.97 .328E+07 2380.9 0.61 22.99
 0.28 268.04 .441E+07 3886.1 0.74 18.91
 0.35 268.11 .554E+07 5673.1 0.86 16.27
 0.42 268.18 .667E+07 7721.6 0.97 14.39
 0.49 268.25 .780E+07 10016.2 1.07 12.98
 0.56 268.32 .893E+07 12544.8 1.17 11.87
 0.63 268.39 .101E+08 15297.5 1.27 10.97
 0.71 268.47 .112E+08 18265.9 1.36 10.23
 0.78 268.54 .123E+08 21442.8 1.45 9.60
 0.85 268.61 .135E+08 24822.1 1.54 9.06
 0.92 268.68 .146E+08 28398.1 1.62 8.59

| | | | | | |
|------|--------|----------|---------|------|------|
| 0.99 | 268.75 | .158E+08 | 32166.0 | 1.70 | 8.18 |
| 1.06 | 268.82 | .169E+08 | 36121.4 | 1.78 | 7.81 |
| 1.13 | 268.89 | .181E+08 | 40260.3 | 1.86 | 7.49 |
| 1.20 | 268.96 | .192E+08 | 44579.2 | 1.94 | 7.19 |
| 1.27 | 269.03 | .204E+08 | 49074.5 | 2.01 | 6.93 |
| 1.34 | 269.10 | .215E+08 | 53743.4 | 2.09 | 6.68 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (60000) | 2031.50 | 44.44 | 12.17 | 104.30 | 0.01 | 0.28 |
| OUTFLOW: ID= 1 (0010) | 2031.50 | 43.31 | 13.33 | 104.30 | 0.01 | 0.28 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (0800) | Area (ha)= 84.70 Curve Number (CN)= 72.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.22

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.652

PEAK FLOW (cms)= 4.435 (i)

TIME TO PEAK (hrs)= 8.250

RUNOFF VOLUME (mm)= 118.156

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.631

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

 | ROUTE CHN(0007)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.90 | 0.0500 | |
| 300.00 | 271.80 | 0.0350 | Main Channel |
| 1500.00 | 271.76 | 0.0350 | Main Channel |
| 2000.00 | 271.75 | 0.0350 | Main Channel |
| 4500.00 | 272.50 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 272.76 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.05 | 271.80 | .324E+05 | 7.9 | 0.16 | 67.91 |
| 0.10 | 271.85 | .956E+05 | 45.5 | 0.30 | 35.06 |
| 0.15 | 271.90 | .165E+06 | 106.4 | 0.41 | 25.82 |
| 0.20 | 271.95 | .240E+06 | 188.6 | 0.50 | 21.19 |
| 0.25 | 272.00 | .321E+06 | 291.6 | 0.58 | 18.33 |
| 0.30 | 272.05 | .408E+06 | 415.2 | 0.65 | 16.36 |
| 0.35 | 272.10 | .500E+06 | 559.8 | 0.72 | 14.89 |
| 0.40 | 272.15 | .599E+06 | 725.6 | 0.77 | 13.75 |
| 0.45 | 272.20 | .703E+06 | 913.1 | 0.83 | 12.84 |
| 0.50 | 272.25 | .814E+06 | 1122.9 | 0.88 | 12.08 |
| 0.56 | 272.31 | .930E+06 | 1355.5 | 0.93 | 11.43 |
| 0.61 | 272.36 | .105E+07 | 1611.5 | 0.98 | 10.88 |
| 0.66 | 272.41 | .118E+07 | 1891.5 | 1.03 | 10.40 |
| 0.71 | 272.46 | .131E+07 | 2196.1 | 1.07 | 9.97 |
| 0.76 | 272.51 | .145E+07 | 2535.6 | 1.12 | 9.56 |
| 0.81 | 272.56 | .160E+07 | 2957.1 | 1.18 | 9.01 |
| 0.86 | 272.61 | .175E+07 | 3405.7 | 1.25 | 8.54 |
| 0.91 | 272.66 | .190E+07 | 3881.5 | 1.31 | 8.15 |
| 0.96 | 272.71 | .205E+07 | 4384.4 | 1.37 | 7.80 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|------------------------|-----------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (0800) | 84.70 | 4.43 | 8.25 | 118.16 | 0.03 | 0.16 |
| OUTFLOW: ID= 1 (0007) | 84.70 | 4.02 | 9.83 | 118.15 | 0.03 | 0.16 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|----------|------------|----------|------------|----------|------------|----------|------------|
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (1400) | Area (ha)= 99.51 Curve Number (CN)= 81.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.82

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.088

PEAK FLOW (cms)= 5.375 (i)

TIME TO PEAK (hrs)= 9.500

RUNOFF VOLUME (mm)= 137.311

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.733

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9d8ea7e3\49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

| CALIB |
 | NASHYD (0900) | Area (ha)= 75.70 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.41

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.051

PEAK FLOW (cms)= 4.318 (i)

TIME TO PEAK (hrs)= 8.750

RUNOFF VOLUME (mm)= 135.120

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.722

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

| ADD HYD (70000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (1400): 99.51 5.375 9.50 137.31
+ ID2= 2 (0007): 84.70 4.020 9.83 118.15
=====

ID = 3 (70000): 184.21 9.371 9.58 128.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (70000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 (70000): 184.21 9.371 9.58 128.50
+ ID2= 2 (0900): 75.70 4.318 8.75 135.12
=====

ID = 1 (70000): 259.91 13.587 9.42 130.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0008)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.80 | 0.0600 | |
| 300.00 | 271.70 | 0.0350 | Main Channel |
| 1000.00 | 271.44 | 0.0350 | Main Channel |
| 1500.00 | 271.66 | 0.0350 | Main Channel |
| 2000.00 | 271.65 | 0.0350 | Main Channel |
| 4500.00 | 272.40 | 0.0350 /0.0500 | Main Channel |
| 5000.00 | 272.66 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.05 | 271.49 | .729E+04 | 0.9 | 0.14 | 134.13 |
| 0.10 | 271.54 | .292E+05 | 5.8 | 0.21 | 84.50 |
| 0.16 | 271.60 | .657E+05 | 17.0 | 0.28 | 64.48 |
| 0.21 | 271.65 | .117E+06 | 36.5 | 0.34 | 53.23 |
| 0.26 | 271.70 | .209E+06 | 65.2 | 0.34 | 53.50 |
| 0.33 | 271.77 | .358E+06 | 147.0 | 0.45 | 40.55 |

| | | | | | |
|------|--------|----------|--------|------|-------|
| 0.40 | 271.84 | .524E+06 | 258.5 | 0.54 | 33.82 |
| 0.47 | 271.91 | .710E+06 | 400.1 | 0.61 | 29.56 |
| 0.53 | 271.97 | .913E+06 | 572.9 | 0.68 | 26.57 |
| 0.60 | 272.04 | .114E+07 | 778.1 | 0.74 | 24.32 |
| 0.67 | 272.11 | .138E+07 | 1017.2 | 0.80 | 22.54 |
| 0.74 | 272.18 | .163E+07 | 1291.5 | 0.86 | 21.10 |
| 0.81 | 272.25 | .191E+07 | 1602.4 | 0.91 | 19.89 |
| 0.88 | 272.32 | .221E+07 | 1951.5 | 0.96 | 18.86 |
| 0.95 | 272.39 | .252E+07 | 2340.2 | 1.01 | 17.96 |
| 1.01 | 272.45 | .285E+07 | 2839.1 | 1.08 | 16.74 |
| 1.08 | 272.52 | .319E+07 | 3399.2 | 1.16 | 15.66 |
| 1.15 | 272.59 | .355E+07 | 4002.7 | 1.23 | 14.77 |
| 1.22 | 272.66 | .391E+07 | 4649.4 | 1.29 | 14.02 |

<---- hydrograph ----> <-pipe / channel->

AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
 (ha) (cms) (hrs) (mm) (m) (m/s)

INFLOW : ID= 2 (70000) 259.91 13.59 9.42 130.43 0.14 0.26
 OUTFLOW: ID= 1 (0008) 259.91 12.51 10.25 130.43 0.13 0.25

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |

| NASHYD (1500) | Area (ha)= 210.60 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 2.09

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 3.849

PEAK FLOW (cms)= 10.675 (i)

TIME TO PEAK (hrs)= 9.833

RUNOFF VOLUME (mm)= 135.121

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.722

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

| READ STORM | Filename: C:\Users\jmueller\AppData
| | ata\Local\Temp\
| | a5240712-0d10-4766-9c35-d89c9ddea7e3\49bc18a
| Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

| CALIB |
| NASHYD (1300) | Area (ha)= 70.80 Curve Number (CN)= 86.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.33

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 8.195

PEAK FLOW (cms)= 7.171 (i)

TIME TO PEAK (hrs)= 7.000

RUNOFF VOLUME (mm)= 148.469

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.793

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

```

-----
| ADD HYD ( 80000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 1300): 70.80 7.171 7.00 148.47
+ ID2= 2 ( 1500): 210.60 10.675 9.83 135.12
=====
ID = 3 ( 80000): 281.40 14.332 9.08 138.48

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD ( 80000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
-----
              (ha) (cms) (hrs) (mm)
ID1= 3 ( 80000): 281.40 14.332 9.08 138.48
+ ID2= 2 ( 0008): 259.91 12.511 10.25 130.43
=====
ID = 1 ( 80000): 541.31 25.591 9.25 134.61

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0009)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
0.00       271.90      0.0500
50.00      266.74      0.0350   Main Channel
1300.00    266.68      0.0350   Main Channel
2000.00    266.77      0.0350 /0.0500 Main Channel
2100.00    271.10      0.0500

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH  ELEV  VOLUME  FLOW RATE  VELOCITY  TRAV.TIME
(m)    (m)   (cu.m.) (cms)     (m/s)    (min)
0.06  266.74 .512E+05  4.9      0.10     173.27
0.29  266.97 .493E+06  196.9    0.40     41.73
0.52  267.20 .940E+06  575.8    0.61     27.21
0.75  267.43 .139E+07  1100.9   0.79     21.02
0.98  267.66 .184E+07  1754.1   0.95     17.47
1.21  267.89 .229E+07  2524.4   1.09     15.13
1.44  268.12 .274E+07  3403.7   1.23     13.44
1.67  268.35 .320E+07  4386.1   1.36     12.16
1.90  268.58 .366E+07  5466.8   1.48     11.15
2.13  268.81 .412E+07  6641.8   1.60     10.33
2.35  269.03 .458E+07  7907.9   1.72     9.65
2.58  269.26 .504E+07  9262.3   1.83     9.07
2.81  269.49 .550E+07  10702.4  1.93     8.57
3.04  269.72 .597E+07  12226.1  2.03     8.14
3.27  269.95 .644E+07  13831.6  2.13     7.76
3.50  270.18 .691E+07  15517.0  2.23     7.42
3.73  270.41 .738E+07  17280.9  2.33     7.12
3.96  270.64 .785E+07  19121.7  2.42     6.84
4.19  270.87 .832E+07  21038.3  2.51     6.59

```

```

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 2 ( 80000) 541.31 25.59 9.25 134.61 0.08 0.10
OUTFLOW: ID= 1 ( 0009) 541.31 20.75 12.00 134.61 0.08 0.10

```

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (1700) | Area (ha)= 19.63 Curve Number (CN)= 83.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.31

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.419

PEAK FLOW (cms)= 1.928 (i)

TIME TO PEAK (hrs)= 7.000

RUNOFF VOLUME (mm)= 141.692

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.757

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (1600) | Area (ha)= 49.20 Curve Number (CN)= 81.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 0.66

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.847

PEAK FLOW (cms)= 3.864 (i)
 TIME TO PEAK (hrs)= 7.333
 RUNOFF VOLUME (mm)= 137.309
 TOTAL RAINFALL (mm)= 187.210
 RUNOFF COEFFICIENT = 0.733

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

| |
|--|
| ADD HYD (90000) |
| 1 + 2 = 3 AREA QPEAK TPEAK R.V. |
| ----- (ha) (cms) (hrs) (mm) |
| ID1= 1 (0010): 2031.50 43.307 13.33 104.30 |
| + ID2= 2 (1600): 49.20 3.864 7.33 137.31 |
| ===== |
| ID = 3 (90000): 2080.70 43.623 12.92 105.08 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| |
|--|
| ADD HYD (90000) |
| 3 + 2 = 1 AREA QPEAK TPEAK R.V. |
| ----- (ha) (cms) (hrs) (mm) |
| ID1= 3 (90000): 2080.70 43.623 12.92 105.08 |
| + ID2= 2 (1700): 19.63 1.928 7.00 141.69 |
| ===== |
| ID = 1 (90000): 2100.33 43.649 12.83 105.42 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| |
|--|
| ADD HYD (90000) |
| 1 + 2 = 3 AREA QPEAK TPEAK R.V. |
| ----- (ha) (cms) (hrs) (mm) |
| ID1= 1 (90000): 2100.33 43.649 12.83 105.42 |
| + ID2= 2 (0009): 541.31 20.751 12.00 134.61 |
| ===== |
| ID = 3 (90000): 2641.64 64.126 12.33 111.40 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 | ROUTE CHN(0011)|
 | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 272.35 | 0.0500 | |
| 1.00 | 267.18 | 0.0300 | Main Channel |
| 10.00 | 267.12 | 0.0300 | Main Channel |
| 20.00 | 266.97 | 0.0300 | Main Channel |
| 30.00 | 266.99 | 0.0300 | Main Channel |
| 40.00 | 267.05 | 0.0300 | Main Channel |
| 50.00 | 266.82 | 0.0300 | Main Channel |
| 60.00 | 266.84 | 0.0300 | Main Channel |
| 70.00 | 266.80 | 0.0300 | Main Channel |
| 80.00 | 266.75 | 0.0300 | Main Channel |
| 90.00 | 266.74 | 0.0300 | Main Channel |
| 100.00 | 266.77 | 0.0300 | Main Channel |
| 110.00 | 266.62 | 0.0300 | Main Channel |
| 120.00 | 266.60 | 0.0300 | Main Channel |
| 20000.00 | 266.68 | 0.0300 /0.0500 | Main Channel |
| 21000.00 | 271.29 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|-----------|----------|----------------|-----------------|----------------|-----------------|
| 0.08 | 266.68 | .119E+07 | 292.8 | 0.37 | 67.80 |
| 0.32 | 266.92 | .844E+07 | 7622.0 | 1.35 | 18.45 |
| 0.57 | 267.17 | .157E+08 | 21436.9 | 2.04 | 12.22 |
| 0.81 | 267.41 | .230E+08 | 40438.3 | 2.63 | 9.49 |
| 1.05 | 267.65 | .304E+08 | 63980.7 | 3.15 | 7.91 |
| 1.29 | 267.89 | .377E+08 | 91666.6 | 3.64 | 6.86 |
| 1.54 | 268.14 | .451E+08 | ***** | 4.09 | 6.10 |
| 1.78 | 268.38 | .525E+08 | ***** | 4.52 | 5.52 |
| 2.02 | 268.62 | .599E+08 | ***** | 4.93 | 5.06 |
| 2.26 | 268.86 | .673E+08 | ***** | 5.32 | 4.69 |
| 2.51 | 269.11 | .747E+08 | ***** | 5.69 | 4.38 |
| 2.75 | 269.35 | .822E+08 | ***** | 6.06 | 4.12 |
| 2.99 | 269.59 | .897E+08 | ***** | 6.41 | 3.89 |
| 3.23 | 269.83 | .972E+08 | ***** | 6.75 | 3.70 |
| 3.48 | 270.08 | .105E+09 | ***** | 7.08 | 3.52 |
| 3.72 | 270.32 | .112E+09 | ***** | 7.40 | 3.37 |
| 3.96 | 270.56 | .120E+09 | ***** | 7.72 | 3.23 |
| 4.20 | 270.80 | .127E+09 | ***** | 8.03 | 3.11 |
| 4.45 | 271.05 | .135E+09 | ***** | 8.33 | 2.99 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|-------------|-------------|-----------|---------------|---------------|
| INFLOW : ID= 2 (90000) | 2641.64 | 64.13 | 12.33 | 111.40 | 0.02 0.37 |

OUTFLOW: ID= 1 (0011) 2641.64 61.58 13.75 111.40 0.02 0.37

| READ STORM | Filename: C:\Users\jmueller\AppData
| | ata\Local\Temp\
| | a5240712-0d10-4766-9c35-d89c9d8ea7e3\49bc18a
| Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

| CALIB |
| NASHYD (2000) | Area (ha)= 69.70 Curve Number (CN)= 75.0
| ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 1.25

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.130

PEAK FLOW (cms)= 3.812 (i)

TIME TO PEAK (hrs)= 8.250

RUNOFF VOLUME (mm)= 124.404

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.665

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

 READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |

| | | | | | | | |
|------|-------|------|-------|------|-------|-------|-------|
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (2100) | Area (ha)= 96.47 Curve Number (CN)= 75.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.43

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |

| | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|------|
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.577

PEAK FLOW (cms)= 5.093 (i)

TIME TO PEAK (hrs)= 9.083

RUNOFF VOLUME (mm)= 124.404

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.665

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

```

-----
| ADD HYD (100000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
|-----| (ha) (cms) (hrs) (mm)
ID1= 1 ( 2000): 69.70 3.812 8.25 124.40
+ ID2= 2 ( 2100): 96.47 5.093 9.08 124.40
=====
ID = 3 (100000): 166.17 8.850 8.75 124.40

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0014)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
|-----|

```

```

<----- DATA FOR SECTION ( 1.1) ----->
Distance   Elevation   Manning
120.00    257.09     0.0500
130.00    256.88     0.0300   Main Channel
140.00    256.50     0.0300   Main Channel
150.00    256.08     0.0300   Main Channel
160.00    256.08     0.0300   Main Channel
170.00    256.06     0.0300   Main Channel
180.00    256.31     0.0300   Main Channel
190.00    256.07     0.0300   Main Channel
200.00    256.07     0.0300   Main Channel
210.00    256.46     0.0300   Main Channel
220.00    256.88     0.0300   Main Channel
230.00    257.43     0.0300   Main Channel
240.00    257.56     0.0300 /0.0500 Main Channel

```

250.00 257.58 0.0500

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.05 | 256.11 | .238E+04 | 0.3 | 0.24 | 129.10 |
| 0.10 | 256.16 | .614E+04 | 1.3 | 0.41 | 76.93 |
| 0.15 | 256.21 | .106E+05 | 3.0 | 0.53 | 59.16 |
| 0.21 | 256.27 | .156E+05 | 5.2 | 0.63 | 49.63 |
| 0.26 | 256.32 | .213E+05 | 8.2 | 0.73 | 43.26 |
| 0.31 | 256.37 | .275E+05 | 12.2 | 0.84 | 37.56 |
| 0.36 | 256.42 | .338E+05 | 16.8 | 0.94 | 33.54 |
| 0.41 | 256.47 | .404E+05 | 22.1 | 1.03 | 30.52 |
| 0.46 | 256.52 | .473E+05 | 28.0 | 1.12 | 28.15 |
| 0.51 | 256.57 | .544E+05 | 34.5 | 1.20 | 26.26 |
| 0.56 | 256.62 | .617E+05 | 41.7 | 1.27 | 24.68 |
| 0.62 | 256.68 | .693E+05 | 49.5 | 1.35 | 23.35 |
| 0.67 | 256.73 | .771E+05 | 57.9 | 1.42 | 22.20 |
| 0.72 | 256.78 | .852E+05 | 67.0 | 1.48 | 21.21 |
| 0.77 | 256.83 | .936E+05 | 76.7 | 1.55 | 20.33 |
| 0.82 | 256.88 | .102E+06 | 87.1 | 1.61 | 19.55 |
| 0.89 | 256.95 | .114E+06 | 103.8 | 1.71 | 18.36 |
| 0.96 | 257.02 | .127E+06 | 121.8 | 1.81 | 17.39 |
| 1.03 | 257.09 | .141E+06 | 141.2 | 1.90 | 16.59 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (100000) | 166.17 | 8.85 | 8.75 | 124.40 | 0.26 0.74 |
| OUTFLOW: ID= 1 (0014) | 166.17 | 8.64 | 9.42 | 124.40 | 0.26 0.74 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |

| | | | | | | | |
|------|------|------|-------|------|-------|-------|------|
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (1800) | Area (ha)= 74.90 Curve Number (CN)= 82.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.15

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |

2.833 9.70 | 5.833 19.40 | 8.833 22.31 | 11.83 7.76
 2.917 9.70 | 5.917 19.40 | 8.917 22.31 | 11.92 7.76
 3.000 9.70 | 6.000 19.40 | 9.000 22.31 | 12.00 7.76

Unit Hyd Qpeak (cms)= 2.488

PEAK FLOW (cms)= 4.746 (i)
 TIME TO PEAK (hrs)= 8.000
 RUNOFF VOLUME (mm)= 139.517
 TOTAL RAINFALL (mm)= 187.210
 RUNOFF COEFFICIENT = 0.745

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

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (1900) | Area (ha)= 208.66 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.90

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 4.195

PEAK FLOW (cms)= 10.954 (i)

TIME TO PEAK (hrs)= 9.583

RUNOFF VOLUME (mm)= 135.121

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.722

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

ata\Local\Temp\
a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|------|-------|------|-------|------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

CALIB
NASHYD (2200) | Area (ha)= 64.60 Curve Number (CN)= 81.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.62

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 1.523

PEAK FLOW (cms)= 3.613 (i)

TIME TO PEAK (hrs)= 9.250

RUNOFF VOLUME (mm)= 137.311

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.733

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

| ADD HYD (110000) | | | | |
|-------------------|---------|--------|-------|--------|
| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0011): | 2641.64 | 61.583 | 13.75 | 111.40 |
| + ID2= 2 (0014): | 166.17 | 8.639 | 9.42 | 124.40 |
| ===== | | | | |
| ID = 3 (110000): | 2807.81 | 65.330 | 13.25 | 112.17 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (110000) | | | | |
|-------------------|---------|--------|-------|--------|
| 3 + 2 = 1 | AREA | QPEAK | TPEAK | R.V. |
| ----- | (ha) | (cms) | (hrs) | (mm) |
| ID1= 3 (110000): | 2807.81 | 65.330 | 13.25 | 112.17 |
| + ID2= 2 (1800): | 74.90 | 4.746 | 8.00 | 139.52 |
| ===== | | | | |

ID = 1 (110000): 2882.71 66.727 12.92 112.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (110000): 2882.71 66.727 12.92 112.88
+ ID2= 2 ( 1900): 208.66 10.954 9.58 135.12
=====
ID = 3 (110000): 3091.37 73.792 12.50 114.38

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ADD HYD (110000)|
| 3 + 2 = 1 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 3 (110000): 3091.37 73.792 12.50 114.38
+ ID2= 2 ( 2200): 64.60 3.613 9.25 137.31
=====
ID = 1 (110000): 3155.97 75.936 12.42 114.85

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0012)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----

```

<----- DATA FOR SECTION (1.1) ----->

| Distance | Elevation | Manning | |
|----------|-----------|----------------|--------------|
| 0.00 | 251.80 | 0.0500 | |
| 90.00 | 251.22 | 0.0350 | Main Channel |
| 100.00 | 251.03 | 0.0350 | Main Channel |
| 110.00 | 250.04 | 0.0350 | Main Channel |
| 120.00 | 249.84 | 0.0350 | Main Channel |
| 130.00 | 250.15 | 0.0350 | Main Channel |
| 140.00 | 250.80 | 0.0350 | Main Channel |
| 150.00 | 250.69 | 0.0350 | Main Channel |
| 160.00 | 250.70 | 0.0350 | Main Channel |
| 170.00 | 250.63 | 0.0350 | Main Channel |
| 180.00 | 250.46 | 0.0350 | Main Channel |
| 190.00 | 250.43 | 0.0350 | Main Channel |
| 200.00 | 250.32 | 0.0350 | Main Channel |
| 210.00 | 250.53 | 0.0350 | Main Channel |
| 950.00 | 253.00 | 0.0350 /0.0500 | Main Channel |
| 1000.00 | 254.20 | 0.0500 | |

<----- TRAVEL TIME TABLE ----->

| DEPTH (m) | ELEV (m) | VOLUME (cu.m.) | FLOW RATE (cms) | VELOCITY (m/s) | TRAV.TIME (min) |
|--------------|-------------|-------------------|--------------------|-------------------|--------------------|
| 0.10 | 249.94 | .348E+03 | 0.1 | 0.24 | 61.32 |
| 0.20 | 250.04 | .139E+04 | 0.6 | 0.38 | 38.63 |
| 0.30 | 250.14 | .297E+04 | 1.8 | 0.53 | 27.24 |
| 0.39 | 250.23 | .486E+04 | 3.8 | 0.68 | 21.35 |
| 0.49 | 250.33 | .697E+04 | 6.2 | 0.77 | 18.79 |
| 0.59 | 250.43 | .100E+05 | 8.3 | 0.72 | 20.16 |
| 0.69 | 250.53 | .149E+05 | 12.4 | 0.73 | 20.01 |
| 0.79 | 250.63 | .221E+05 | 17.6 | 0.69 | 20.91 |
| 0.89 | 250.73 | .332E+05 | 26.0 | 0.68 | 21.28 |
| 0.99 | 250.83 | .485E+05 | 42.4 | 0.76 | 19.10 |
| 1.08 | 250.92 | .667E+05 | 65.4 | 0.85 | 17.01 |
| 1.18 | 251.02 | .875E+05 | 94.5 | 0.94 | 15.44 |
| 1.28 | 251.12 | .111E+06 | 129.3 | 1.01 | 14.32 |
| 1.38 | 251.22 | .138E+06 | 171.5 | 1.09 | 13.38 |
| 1.48 | 251.32 | .168E+06 | 223.5 | 1.16 | 12.50 |
| 1.59 | 251.43 | .208E+06 | 295.8 | 1.24 | 11.71 |
| 1.71 | 251.55 | .253E+06 | 381.4 | 1.31 | 11.07 |
| 1.83 | 251.67 | .304E+06 | 481.4 | 1.38 | 10.53 |
| 1.94 | 251.78 | .360E+06 | 596.8 | 1.44 | 10.06 |

<---- hydrograph ----> <-pipe / channel->

| AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) | |
|-------------------------|----------------|----------------|--------------|------------------|------------------|------|
| INFLOW : ID= 2 (110000) | 3155.97 | 75.94 | 12.42 | 114.85 | 1.12 | 0.88 |
| OUTFLOW: ID= 1 (0012) | 3155.97 | 75.75 | 12.58 | 114.85 | 1.12 | 0.88 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |

| | | | | | | | |
|------|------|------|-------|------|-------|-------|------|
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (2300) | Area (ha)= 76.60 Curve Number (CN)= 80.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.16

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |

3.000 9.70 | 6.000 19.40 | 9.000 22.31 | 12.00 7.76

Unit Hyd Qpeak (cms)= 2.522

PEAK FLOW (cms)= 4.688 (i)

TIME TO PEAK (hrs)= 8.000

RUNOFF VOLUME (mm)= 135.120

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.722

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

```

-----
| ADD HYD (120000)|
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 ( 0012): 3155.97 75.748 12.58 114.85
+ ID2= 2 ( 2300): 76.60 4.688 8.00 135.12
=====
ID = 3 (120000): 3232.57 77.725 12.42 115.33

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```

-----
| ROUTE CHN( 0013)|
| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00
-----
<----- DATA FOR SECTION ( 1.1) ----->
Distance Elevation Manning
  0.00    250.78    0.0500
 2000.00  249.38    0.0300 Main Channel
 22500.00 249.74    0.0300 Main Channel
 50000.00 249.74 0.0300 /0.0500 Main Channel
 52500.00 250.49    0.0500

```

```

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME
(m) (m) (cu.m.) (cms) (m/s) (min)
0.06 249.44 .102E+06 11.1 0.11 152.86
0.12 249.50 .407E+06 70.4 0.18 96.30
0.18 249.56 .915E+06 207.6 0.23 73.49
0.23 249.61 .163E+07 447.1 0.28 60.66
0.29 249.67 .254E+07 810.7 0.33 52.28
0.35 249.73 .366E+07 1318.3 0.37 46.29
0.41 249.79 .618E+07 1758.2 0.29 58.60
0.47 249.85 .914E+07 3363.6 0.38 45.27
0.53 249.91 .121E+08 5363.2 0.46 37.63
0.58 249.96 .151E+08 7722.8 0.53 32.58
0.64 250.02 .181E+08 10418.4 0.60 28.96
0.70 250.08 .211E+08 13431.7 0.66 26.21
0.76 250.14 .242E+08 16748.2 0.72 24.05

```

| | | | | | |
|------|--------|----------|---------|------|-------|
| 0.82 | 250.20 | .272E+08 | 20355.9 | 0.77 | 22.29 |
| 0.88 | 250.26 | .303E+08 | 24245.2 | 0.83 | 20.83 |
| 0.93 | 250.31 | .334E+08 | 28407.3 | 0.88 | 19.59 |
| 0.99 | 250.37 | .365E+08 | 32835.0 | 0.93 | 18.52 |
| 1.05 | 250.43 | .396E+08 | 37521.8 | 0.98 | 17.60 |
| 1.11 | 250.49 | .428E+08 | 42461.9 | 1.03 | 16.78 |

<---- hydrograph ----> <-pipe / channel->

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) | MAX DEPTH (m) | MAX VEL (m/s) |
|-------------------------|--------------|----------------|----------------|--------------|------------------|------------------|
| INFLOW : ID= 2 (120000) | 3232.57 | 77.73 | 12.42 | 115.33 | 0.12 | 0.18 |
| OUTFLOW: ID= 1 (0013) | 3232.57 | 74.26 | 13.42 | 115.33 | 0.12 | 0.18 |

 | READ STORM | Filename: C:\Users\jmueller\AppData
 | | ata\Local\Temp\
 | | a5240712-0d10-4766-9c35-d89c9dbea7e3\f49bc18a
 | Ptotal=187.21 mm | Comments: Timmins-97 aerial reduction

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|-------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| 0.17 | 14.55 | 3.17 | 2.91 | 6.17 | 41.71 | 9.17 | 12.61 |
| 0.33 | 14.55 | 3.33 | 2.91 | 6.33 | 41.71 | 9.33 | 12.61 |
| 0.50 | 14.55 | 3.50 | 2.91 | 6.50 | 41.71 | 9.50 | 12.61 |
| 0.67 | 14.55 | 3.67 | 2.91 | 6.67 | 41.71 | 9.67 | 12.61 |
| 0.83 | 14.55 | 3.83 | 2.91 | 6.83 | 41.71 | 9.83 | 12.61 |
| 1.00 | 14.55 | 4.00 | 2.91 | 7.00 | 41.71 | 10.00 | 12.61 |
| 1.17 | 19.40 | 4.17 | 4.85 | 7.17 | 19.40 | 10.17 | 12.61 |
| 1.33 | 19.40 | 4.33 | 4.85 | 7.33 | 19.40 | 10.33 | 12.61 |
| 1.50 | 19.40 | 4.50 | 4.85 | 7.50 | 19.40 | 10.50 | 12.61 |
| 1.67 | 19.40 | 4.67 | 4.85 | 7.67 | 19.40 | 10.67 | 12.61 |
| 1.83 | 19.40 | 4.83 | 4.85 | 7.83 | 19.40 | 10.83 | 12.61 |
| 2.00 | 19.40 | 5.00 | 4.85 | 8.00 | 19.40 | 11.00 | 12.61 |
| 2.17 | 9.70 | 5.17 | 19.40 | 8.17 | 22.31 | 11.17 | 7.76 |
| 2.33 | 9.70 | 5.33 | 19.40 | 8.33 | 22.31 | 11.33 | 7.76 |
| 2.50 | 9.70 | 5.50 | 19.40 | 8.50 | 22.31 | 11.50 | 7.76 |
| 2.67 | 9.70 | 5.67 | 19.40 | 8.67 | 22.31 | 11.67 | 7.76 |
| 2.83 | 9.70 | 5.83 | 19.40 | 8.83 | 22.31 | 11.83 | 7.76 |
| 3.00 | 9.70 | 6.00 | 19.40 | 9.00 | 22.31 | 12.00 | 7.76 |

 | CALIB |
 | NASHYD (2400) | Area (ha)= 76.70 Curve Number (CN)= 72.0
 | ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
 ----- U.H. Tp(hrs)= 1.27

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

| TIME | RAIN | TIME | RAIN | TIME | RAIN | TIME | RAIN |
|-------|-------|-------|-------|-------|-------|-------|-------|
| hrs | mm/hr | hrs | mm/hr | hrs | mm/hr | hrs | mm/hr |
| 0.083 | 14.55 | 3.083 | 2.91 | 6.083 | 41.71 | 9.08 | 12.61 |
| 0.167 | 14.55 | 3.167 | 2.91 | 6.167 | 41.71 | 9.17 | 12.61 |
| 0.250 | 14.55 | 3.250 | 2.91 | 6.250 | 41.71 | 9.25 | 12.61 |
| 0.333 | 14.55 | 3.333 | 2.91 | 6.333 | 41.71 | 9.33 | 12.61 |
| 0.417 | 14.55 | 3.417 | 2.91 | 6.417 | 41.71 | 9.42 | 12.61 |
| 0.500 | 14.55 | 3.500 | 2.91 | 6.500 | 41.71 | 9.50 | 12.61 |
| 0.583 | 14.55 | 3.583 | 2.91 | 6.583 | 41.71 | 9.58 | 12.61 |
| 0.667 | 14.55 | 3.667 | 2.91 | 6.667 | 41.71 | 9.67 | 12.61 |
| 0.750 | 14.55 | 3.750 | 2.91 | 6.750 | 41.71 | 9.75 | 12.61 |
| 0.833 | 14.55 | 3.833 | 2.91 | 6.833 | 41.71 | 9.83 | 12.61 |
| 0.917 | 14.55 | 3.917 | 2.91 | 6.917 | 41.71 | 9.92 | 12.61 |
| 1.000 | 14.55 | 4.000 | 2.91 | 7.000 | 41.71 | 10.00 | 12.61 |
| 1.083 | 19.40 | 4.083 | 4.85 | 7.083 | 19.40 | 10.08 | 12.61 |
| 1.167 | 19.40 | 4.167 | 4.85 | 7.167 | 19.40 | 10.17 | 12.61 |
| 1.250 | 19.40 | 4.250 | 4.85 | 7.250 | 19.40 | 10.25 | 12.61 |
| 1.333 | 19.40 | 4.333 | 4.85 | 7.333 | 19.40 | 10.33 | 12.61 |
| 1.417 | 19.40 | 4.417 | 4.85 | 7.417 | 19.40 | 10.42 | 12.61 |
| 1.500 | 19.40 | 4.500 | 4.85 | 7.500 | 19.40 | 10.50 | 12.61 |
| 1.583 | 19.40 | 4.583 | 4.85 | 7.583 | 19.40 | 10.58 | 12.61 |
| 1.667 | 19.40 | 4.667 | 4.85 | 7.667 | 19.40 | 10.67 | 12.61 |
| 1.750 | 19.40 | 4.750 | 4.85 | 7.750 | 19.40 | 10.75 | 12.61 |
| 1.833 | 19.40 | 4.833 | 4.85 | 7.833 | 19.40 | 10.83 | 12.61 |
| 1.917 | 19.40 | 4.917 | 4.85 | 7.917 | 19.40 | 10.92 | 12.61 |
| 2.000 | 19.40 | 5.000 | 4.85 | 8.000 | 19.40 | 11.00 | 12.61 |
| 2.083 | 9.70 | 5.083 | 19.40 | 8.083 | 22.31 | 11.08 | 7.76 |
| 2.167 | 9.70 | 5.167 | 19.40 | 8.167 | 22.31 | 11.17 | 7.76 |
| 2.250 | 9.70 | 5.250 | 19.40 | 8.250 | 22.31 | 11.25 | 7.76 |
| 2.333 | 9.70 | 5.333 | 19.40 | 8.333 | 22.31 | 11.33 | 7.76 |
| 2.417 | 9.70 | 5.417 | 19.40 | 8.417 | 22.31 | 11.42 | 7.76 |
| 2.500 | 9.70 | 5.500 | 19.40 | 8.500 | 22.31 | 11.50 | 7.76 |
| 2.583 | 9.70 | 5.583 | 19.40 | 8.583 | 22.31 | 11.58 | 7.76 |
| 2.667 | 9.70 | 5.667 | 19.40 | 8.667 | 22.31 | 11.67 | 7.76 |
| 2.750 | 9.70 | 5.750 | 19.40 | 8.750 | 22.31 | 11.75 | 7.76 |
| 2.833 | 9.70 | 5.833 | 19.40 | 8.833 | 22.31 | 11.83 | 7.76 |
| 2.917 | 9.70 | 5.917 | 19.40 | 8.917 | 22.31 | 11.92 | 7.76 |
| 3.000 | 9.70 | 6.000 | 19.40 | 9.000 | 22.31 | 12.00 | 7.76 |

Unit Hyd Qpeak (cms)= 2.307

PEAK FLOW (cms)= 3.962 (i)

TIME TO PEAK (hrs)= 8.417

RUNOFF VOLUME (mm)= 118.156

TOTAL RAINFALL (mm)= 187.210

RUNOFF COEFFICIENT = 0.631

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

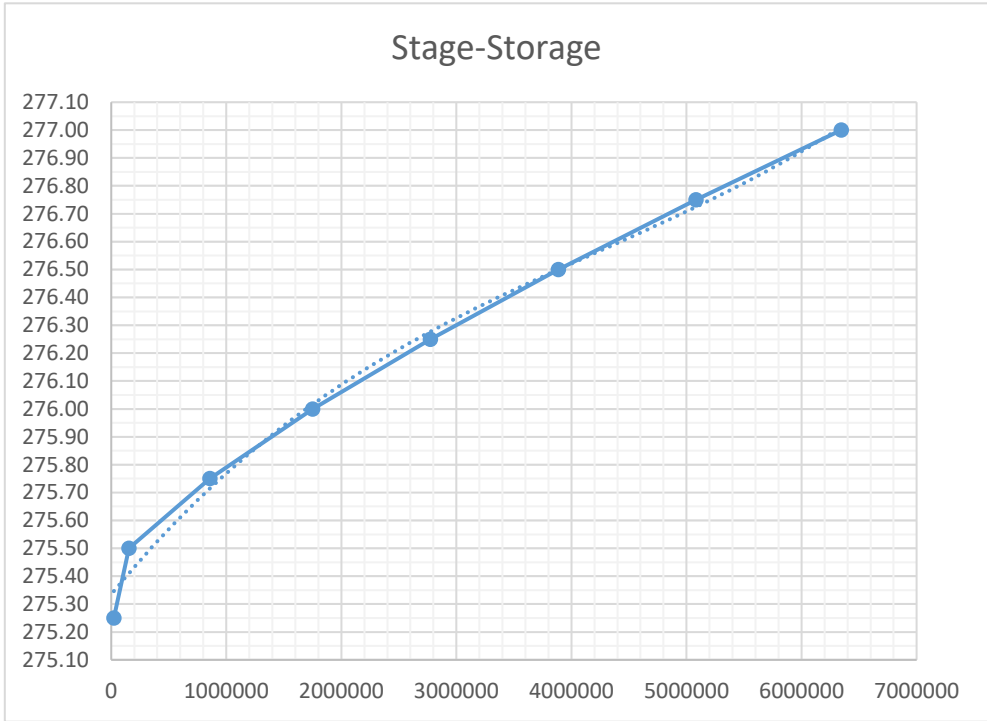
 | ADD HYD (130000)|

| 1 + 2 = 3 | AREA | QPEAK | TPEAK | R.V. |
|-------------------|---------|--------|-------|--------|
| | (ha) | (cms) | (hrs) | (mm) |
| ID1= 1 (0013): | 3232.57 | 74.264 | 13.42 | 115.33 |
| + ID2= 2 (2400): | 76.70 | 3.962 | 8.42 | 118.16 |
| ===== | | | | |
| ID = 3 (130000): | 3309.27 | 75.489 | 13.17 | 115.40 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Appendix G
Sensitivity Analysis

| Stage | Storage (m3) | Area (m2) | Storage ha-m |
|--------|--------------|-----------|--------------|
| 275.25 | 22468 | 89872 | 2.247 |
| 275.50 | 152954 | 611816 | 15.295 |
| 275.75 | 857892 | 3431568 | 85.789 |
| 276.00 | 1749096 | 6996384 | 174.910 |
| 276.25 | 2774953 | 11099811 | 277.495 |
| 276.50 | 3887965 | 15551860 | 388.796 |
| 276.75 | 5083661 | 20334644 | 508.366 |
| 277.00 | 6344197 | 25376789 | 634.420 |

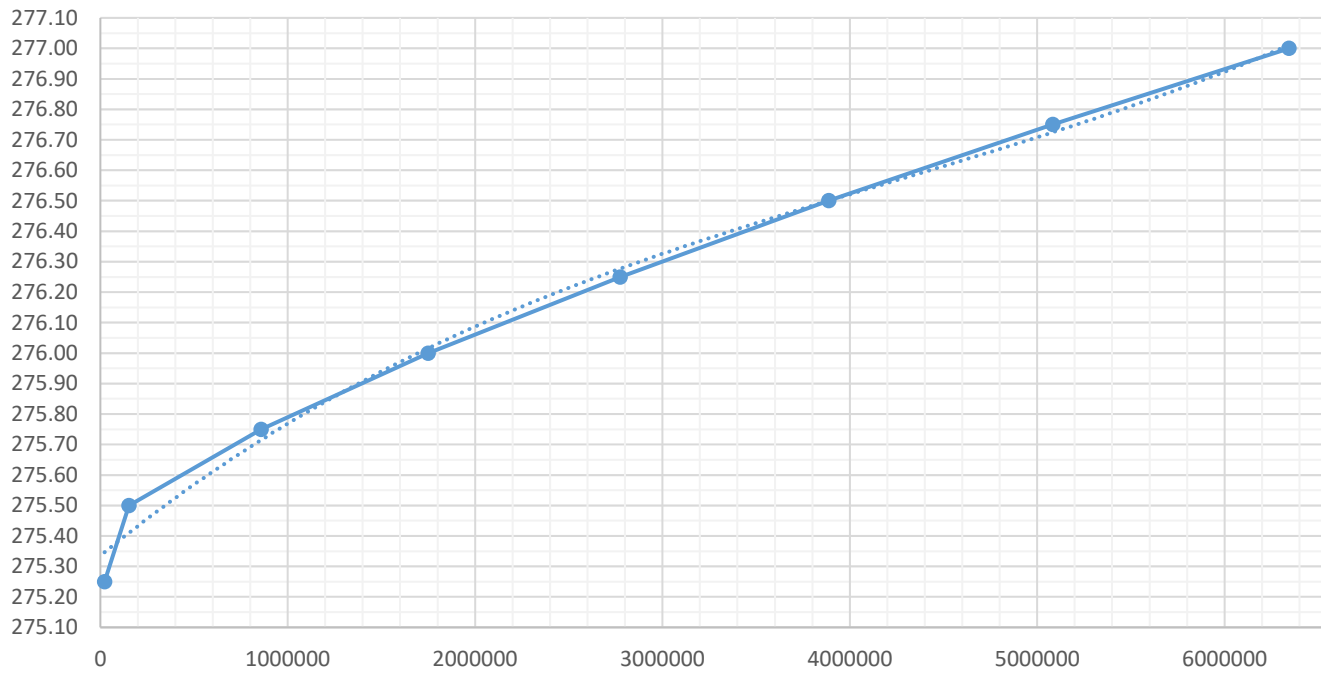


Stage-Storage-Discharge Curve for Goose Lake Wetland

| Stage | Storage (m3) | Storage ha-m | Discharge |
|---------------|---------------------|---------------------|------------------|
| 274.85 | 0 | 0.000 | 0 |
| 274.9 | 4494 | 0.449 | 0.24 |
| 275 | 4494 | 0.451 | 0.43 |
| 275.05 | 4494 | 0.452 | 0.63 |
| 275.1 | 8987 | 0.899 | 0.99 |
| 275.15 | 13481 | 1.348 | 1.6 |
| 275.2 | 17974 | 1.797 | 2.21 |
| 275.25 | 22468 | 2.247 | 2.99 |
| 275.3 | 53059 | 5.306 | 3.92 |
| 275.35 | 83650 | 8.365 | 4.84 |
| 275.4 | 114241 | 11.424 | 5.85 |
| 275.45 | 144832 | 14.483 | 6.93 |
| 275.5 | 152954 | 15.295 | 8.23 |
| 275.55 | 300000 | 30.000 | 9.84 |
| 275.6 | 400000 | 40.000 | 12.11 |
| 275.65 | 600000 | 60.000 | 14.48 |
| 275.7 | 700000 | 70.000 | 17.57 |
| 275.75 | 857892 | 85.789 | 20 |

HEC-RAS xs4761 represents controlling landform at outlet

Stage-Storage Curve for Goose Lake Wetland

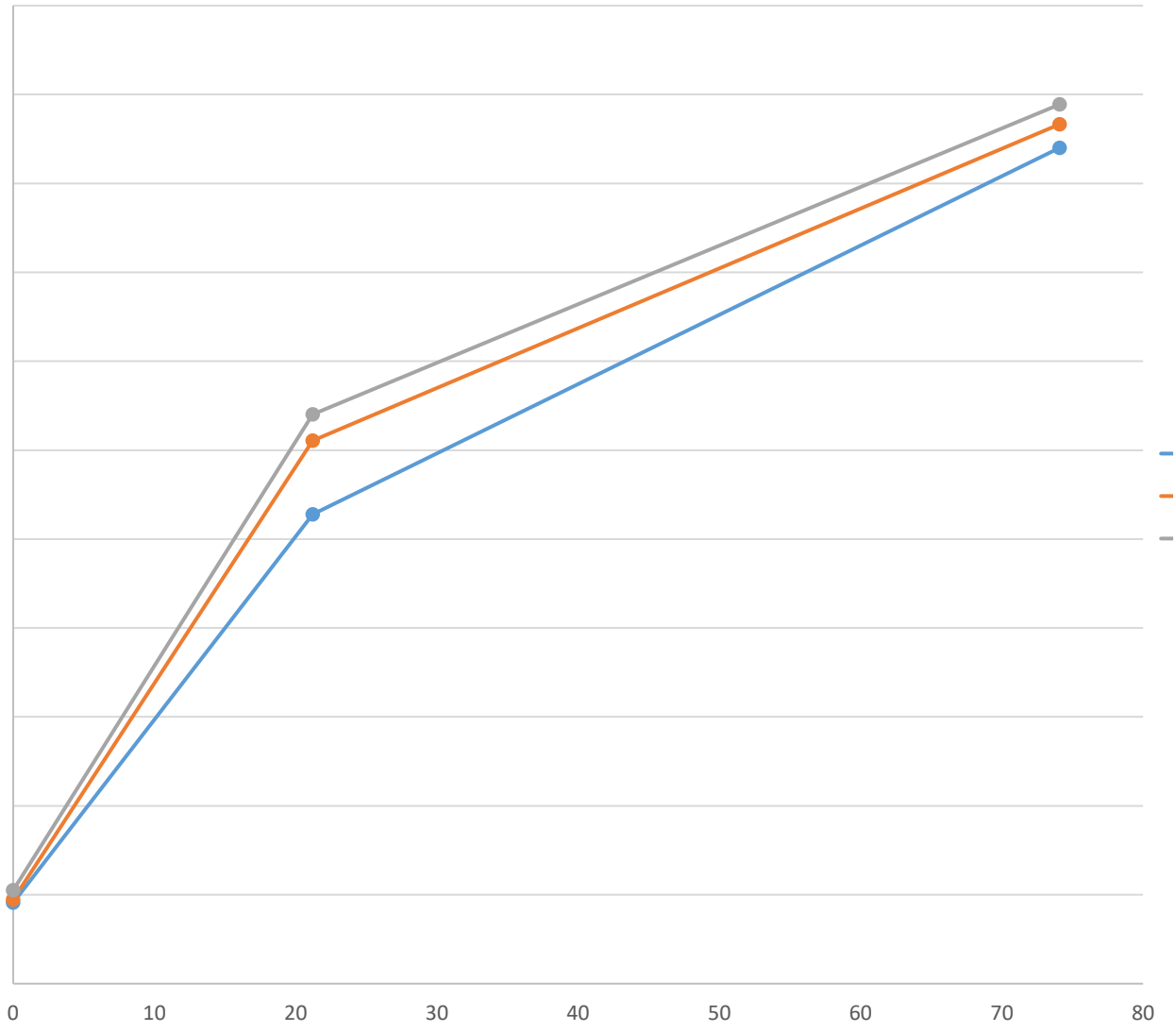


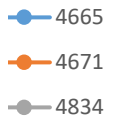


Comparison of Rating Curves for Cross Sections Above and Below XS 4671

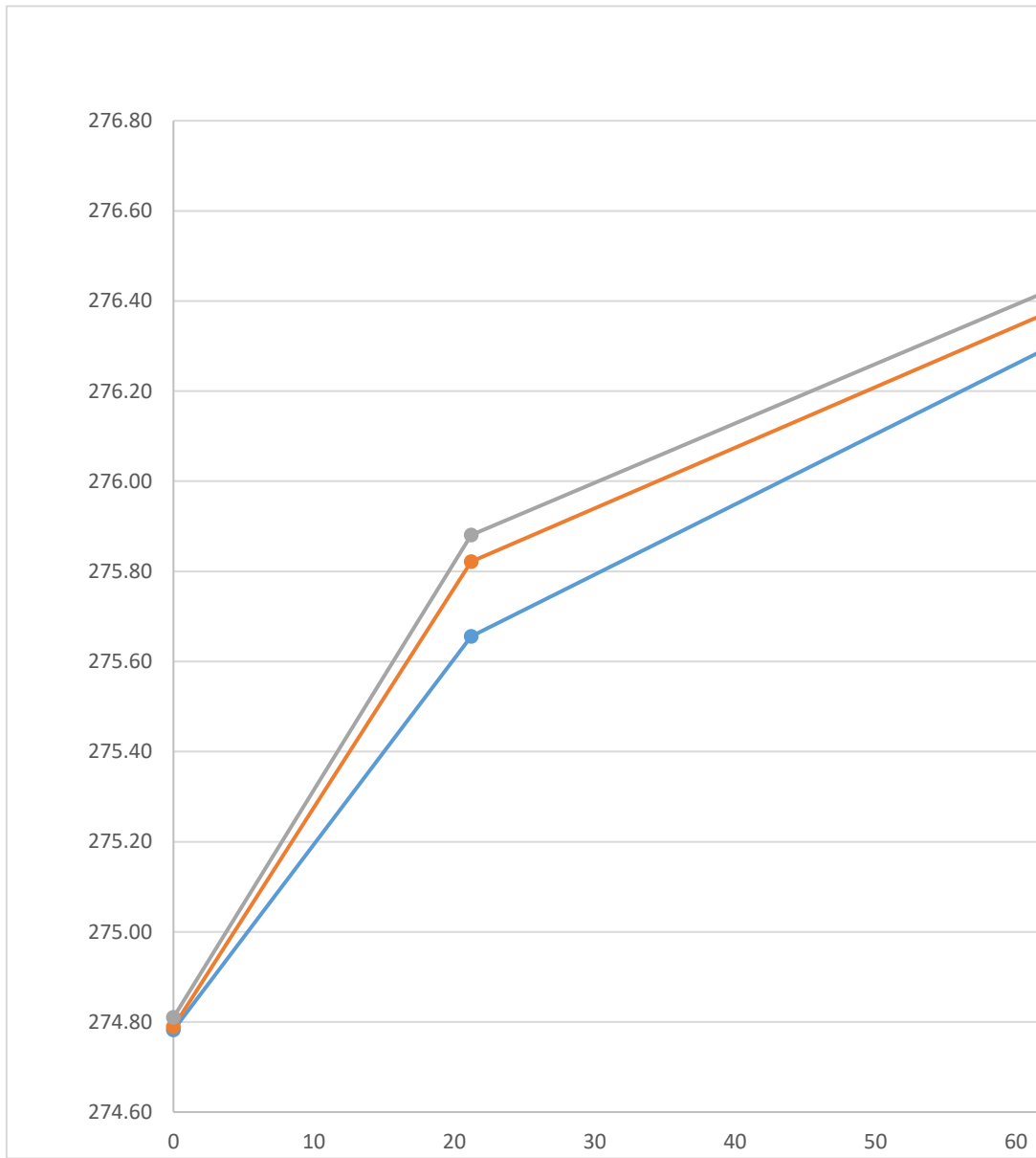
| Below 4761 | | Original | | Above 4761 | |
|------------|--------|----------|--------|------------|--------|
| 4665 | | 4671 | | 4834 | |
| x | y | x | y | x | y |
| 0 | 274.78 | 0 | 274.79 | 0 | 274.81 |
| 21.2 | 275.66 | 21.2 | 275.82 | 21.2 | 275.88 |
| 74.1 | 276.48 | 74.1 | 276.53 | 74.1 | 276.58 |

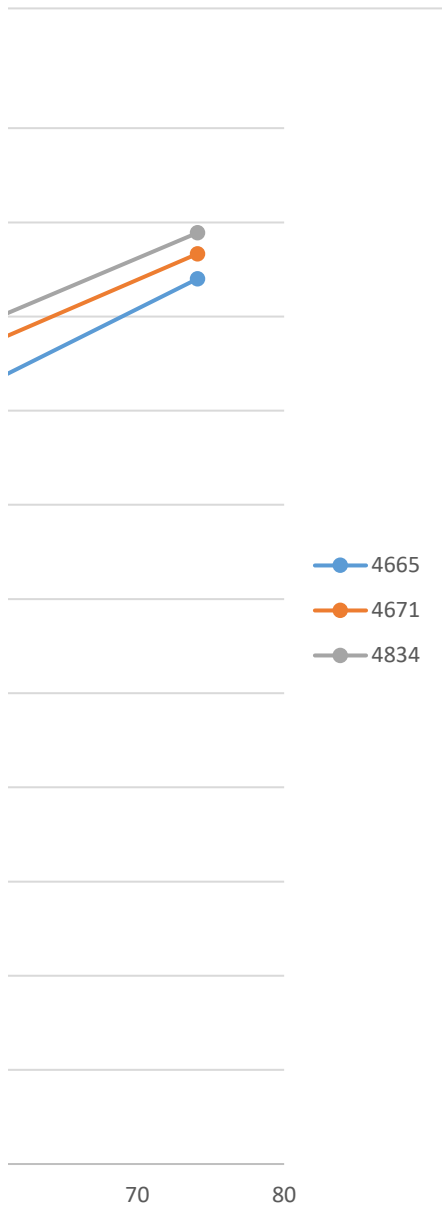






Comparison of Rating Curves for Cross Sections Above and Below XS 4671





| | | |
|-------|---------|-------|
| 4834 | | 4671 |
| 0 | 278.946 | 0 |
| 0.85 | 278.989 | 1.66 |
| 1.9 | 278.89 | 2.86 |
| 4.07 | 278.909 | 4.88 |
| 5.67 | 278.818 | 5.95 |
| 6.62 | 278.834 | 7.32 |
| 7.26 | 278.767 | 8.1 |
| 9.22 | 278.73 | 9.63 |
| 10.95 | 278.615 | 11.31 |
| 13.24 | 278.56 | 12.39 |
| 14.43 | 278.462 | 13.89 |
| 17.11 | 278.454 | 14.66 |
| 17.62 | 278.48 | 16.14 |
| 19.73 | 278.444 | 17.75 |
| 20.25 | 278.464 | 18.62 |
| 22.4 | 278.392 | 19.68 |
| 22.8 | 278.347 | 20.97 |
| 23.6 | 278.362 | 22 |
| 24.79 | 278.267 | 23.16 |
| 27.07 | 278.186 | 24.72 |
| 28.12 | 278.236 | 26.25 |
| 29.57 | 278.221 | 27.4 |
| 31.27 | 278.135 | 27.94 |
| 32.31 | 278.18 | 30.12 |
| 34.41 | 278.087 | 30.5 |
| 34.94 | 278.106 | 34.75 |
| 36.06 | 278.037 | 35.98 |
| 40.33 | 278.026 | 37.84 |
| 41.13 | 278.004 | 38.66 |
| 41.92 | 277.917 | 40.27 |
| 43.33 | 277.95 | 40.94 |
| 44.49 | 277.883 | 42.48 |
| 46.47 | 277.836 | 43.49 |
| 47.1 | 277.786 | 44.41 |
| 48.57 | 277.797 | 45.63 |
| 49.62 | 277.75 | 46.71 |
| 50.14 | 277.79 | 47.89 |
| 53.08 | 277.726 | 49.05 |
| 53.88 | 277.738 | 49.92 |
| 56.27 | 277.64 | 50.46 |
| 57.07 | 277.668 | 51 |
| 58.29 | 277.599 | 52.14 |
| 60.11 | 277.625 | 53.3 |
| 60.71 | 277.598 | 54.46 |

| | | |
|--------|---------|--------|
| 61.68 | 277.612 | 55.82 |
| 62.73 | 277.56 | 57.97 |
| 65.03 | 277.538 | 58.91 |
| 66.63 | 277.473 | 60.11 |
| 67.03 | 277.436 | 60.63 |
| 68.62 | 277.416 | 61.72 |
| 70.56 | 277.498 | 62.96 |
| 72.21 | 277.5 | 65.04 |
| 73.4 | 277.424 | 66.06 |
| 74.79 | 277.435 | 68.16 |
| 75.79 | 277.495 | 68.69 |
| 76.89 | 277.52 | 69.77 |
| 78.58 | 277.338 | 70.69 |
| 80.57 | 277.401 | 71.37 |
| 82.57 | 277.307 | 73.52 |
| 84.75 | 277.295 | 74.56 |
| 85.8 | 277.324 | 76.2 |
| 86.55 | 277.302 | 78.03 |
| 87.9 | 277.353 | 79.58 |
| 90 | 277.334 | 80.49 |
| 92.13 | 277.254 | 81.56 |
| 92.62 | 277.276 | 83.06 |
| 93.67 | 277.205 | 84.31 |
| 94.92 | 277.214 | 85.76 |
| 96.11 | 277.279 | 87.31 |
| 97.86 | 277.026 | 89.56 |
| 98.39 | 277.014 | 90.01 |
| 98.9 | 277.099 | 92.83 |
| 100.49 | 277.14 | 93.83 |
| 101.29 | 277.105 | 94.97 |
| 101.69 | 277.144 | 95.42 |
| 102 | 277.083 | 96.57 |
| 104.48 | 277.119 | 97.74 |
| 105.83 | 277.164 | 98.9 |
| 107.67 | 277.117 | 100.33 |
| 108.46 | 277.122 | 100.84 |
| 110.48 | 277.199 | 102.38 |
| 112.45 | 277.042 | 103.57 |
| 115.17 | 277.023 | 104.31 |
| 117.27 | 276.97 | 105.16 |
| 117.79 | 276.978 | 106.25 |
| 119.36 | 277.217 | 107.3 |
| 120.02 | 277.205 | 108.18 |
| 120.94 | 277.132 | 109.72 |
| 122.81 | 276.936 | 110.58 |
| 124 | 276.947 | 112.13 |
| 126.18 | 277.179 | 112.67 |

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|--------|---------|--------|
| 127.23 | 277.154 | 115.35 |
| 128.78 | 276.959 | 117.49 |
| 129.98 | 277.055 | 118.61 |
| 132.04 | 277.284 | 119.64 |
| 133.52 | 277.321 | 122.32 |
| 134.76 | 277.184 | 123.64 |
| 137.95 | 277.111 | 124.41 |
| 138.24 | 277.128 | 125.57 |
| 140.34 | 277.05 | 127.22 |
| 141.13 | 276.99 | 129.82 |
| 142.33 | 277.078 | 130.9 |
| 143.13 | 277.17 | 132.14 |
| 144.01 | 277.152 | 132.47 |
| 145.06 | 277.027 | 134.07 |
| 146.71 | 277.041 | 135.73 |
| 147.68 | 276.974 | 136.77 |
| 148.73 | 277.038 | 137.55 |
| 151.35 | 277.004 | 139.48 |
| 151.89 | 276.95 | 140.02 |
| 153.49 | 276.711 | 141.09 |
| 154.68 | 276.75 | 142.18 |
| 155.48 | 276.731 | 143.77 |
| 157.07 | 276.564 | 144.84 |
| 158.67 | 276.542 | 146.05 |
| 159.74 | 276.497 | 147.21 |
| 161.81 | 276.282 | 147.59 |
| 163.41 | 276.366 | 148.6 |
| 166.02 | 276.203 | 150.3 |
| 167.45 | 276.061 | 150.69 |
| 168.88 | 276.034 | 152.35 |
| 170.66 | 276.079 | 153.39 |
| 172.11 | 276.086 | 155.03 |
| 172.99 | 276.028 | 156.08 |
| 175.23 | 275.97 | 158.25 |
| 175.69 | 275.974 | 161.47 |
| 177.47 | 275.78 | 162.54 |
| 178.55 | 275.778 | 163.44 |
| 179.18 | 275.729 | 164.6 |
| 182.59 | 275.883 | 166.41 |
| 183.03 | 275.88 | 167.59 |
| 184.3 | 275.782 | 169.26 |
| 185.5 | 275.814 | 170.69 |
| 187.5 | 275.755 | 172.47 |
| 188.56 | 275.583 | 173.45 |
| 190.01 | 275.649 | 174.5 |
| 191.67 | 275.586 | 177.11 |
| 193.23 | 275.735 | 179.09 |

| | | |
|--------|---------|--------|
| 193.95 | 275.729 | 180.29 |
| 194.76 | 275.669 | 180.98 |
| 195.74 | 275.747 | 182.47 |
| 197.89 | 275.762 | 182.86 |
| 199.65 | 275.898 | 184.25 |
| 200.5 | 275.993 | 185.68 |
| 201.35 | 275.986 | 186.39 |
| 202.54 | 275.812 | 187.46 |
| 205.05 | 275.797 | 188.53 |
| 206.84 | 275.842 | 188.89 |
| 207.72 | 275.77 | 190.23 |
| 209.7 | 275.757 | 191.75 |
| 211.49 | 276.036 | 193.89 |
| 212.04 | 276.095 | 194.96 |
| 214.14 | 276.042 | 196.39 |
| 214.99 | 275.994 | 199.17 |
| 216.36 | 275.86 | 200.31 |
| 217.6 | 275.768 | 201.68 |
| 219.01 | 275.713 | 203.52 |
| 220.09 | 275.741 | 204.95 |
| 221.52 | 275.604 | 205.67 |
| 222.95 | 275.663 | 207.45 |
| 223.31 | 275.592 | 208.57 |
| 224.74 | 275.459 | 209.2 |
| 228.09 | 275.466 | 210.31 |
| 229.33 | 275.388 | 210.93 |
| 230.83 | 275.38 | 212.59 |
| 231.9 | 275.478 | 213.87 |
| 232.26 | 275.375 | 215.07 |
| 233.03 | 275.372 | 216.37 |
| 234.05 | 275.413 | 219.22 |
| 235.46 | 275.399 | 220.3 |
| 236.56 | 275.323 | 221.01 |
| 237.86 | 275.354 | 222.37 |
| 238.35 | 275.394 | 223.51 |
| 239.42 | 275.367 | 224.94 |
| 241.21 | 275.42 | 226.01 |
| 243.72 | 275.339 | 227.79 |
| 244.07 | 275.368 | 229.27 |
| 247.39 | 275.46 | 230.29 |
| 248.24 | 275.47 | 230.65 |
| 249.95 | 275.37 | 233.66 |
| 250.93 | 275.368 | 234.95 |
| 253.51 | 275.494 | 236.8 |
| 254.64 | 275.525 | 237.79 |
| 256.25 | 275.473 | 238.86 |
| 257.32 | 275.302 | 240.29 |

| | | |
|--------|---------|--------|
| 257.72 | 275.178 | 241.36 |
| 258.4 | 275.106 | 241.71 |
| 259.47 | 275.2 | 244.21 |
| 260.19 | 275.2 | 245.28 |
| 262.34 | 275.42 | 247.07 |
| 263.77 | 275.496 | 248.09 |
| 265.13 | 275.374 | 250.99 |
| 267.35 | 275.296 | 252.78 |
| 269.5 | 275.136 | 254.36 |
| 270.41 | 275.173 | 255.28 |
| 271.3 | 275.269 | 257.42 |
| 273.08 | 275.196 | 258.14 |
| 274.67 | 275.23 | 259.56 |
| 275.94 | 275.19 | 259.92 |
| 277.37 | 275.305 | 262.41 |
| 278.71 | 275.201 | 263.77 |
| 279.16 | 275.193 | 266.7 |
| 280.24 | 275.311 | 267.77 |
| 281.67 | 275.264 | 268.9 |
| 283.2 | 275.265 | 270.62 |
| 284.88 | 275.18 | 271.3 |
| 285.76 | 275.198 | 272.21 |
| 287.97 | 275.322 | 273.87 |
| 289.21 | 275.36 | 274.91 |
| 290.62 | 275.266 | 278.12 |
| 291.67 | 275.277 | 279.19 |
| 292.58 | 275.32 | 280.97 |
| 293.53 | 275.318 | 282.04 |
| 295.28 | 275.247 | 283.47 |
| 297.42 | 275.254 | 285.1 |
| 301.01 | 275.294 | 287.75 |
| 301.96 | 275.357 | 290.12 |
| 302.79 | 275.34 | 291.26 |
| 303.87 | 275.255 | 293.82 |
| 304.94 | 275.235 | 295.25 |
| 306.49 | 275.164 | 299.54 |
| 307.93 | 275.14 | 301.2 |
| 308.52 | 275.17 | 305.42 |
| 310.19 | 275.12 | 306.63 |
| 311.75 | 275.185 | 307.69 |
| 312.66 | 275.2 | 309.11 |
| 314.25 | 275.16 | 310.53 |
| 316.45 | 275.137 | 312.3 |
| 317.83 | 275.075 | 314.12 |
| 319.27 | 275.214 | 315.13 |
| 320.71 | 275.21 | 316.55 |
| 323.56 | 275.147 | 317.02 |

| | | |
|--------|---------|--------|
| 324.98 | 275.258 | 318.32 |
| 326.24 | 275.24 | 320.44 |
| 328.93 | 275.127 | 321.86 |
| 329.33 | 275.084 | 322.92 |
| 329.95 | 275.171 | 323.63 |
| 332.51 | 275.267 | 324.82 |
| 333.95 | 275.155 | 326.11 |
| 335.38 | 275.102 | 329.5 |
| 336.27 | 275.127 | 330.57 |
| 337.17 | 275.1 | 331.51 |
| 338.24 | 275.111 | 332.48 |
| 339.68 | 275.022 | 333.58 |
| 340.03 | 275.04 | 334.96 |
| 341.06 | 275.193 | 337.09 |
| 341.47 | 275.21 | 339.6 |
| 342.88 | 275.161 | 340.98 |
| 343.97 | 275.158 | 342.05 |
| 345.44 | 275.069 | 342.61 |
| 346.12 | 275.096 | 343.46 |
| 348.27 | 275.09 | 344.89 |
| 349.7 | 275.05 | 347 |
| 351.13 | 275.1 | 348.78 |
| 351.55 | 275.152 | 349.48 |
| 353.4 | 275.18 | 350.19 |
| 354.64 | 275.28 | 351.96 |
| 355.87 | 275.233 | 354.92 |
| 356.5 | 275.151 | 355.59 |
| 356.86 | 275.21 | 356.57 |
| 360.19 | 275.282 | 356.91 |
| 361.16 | 275.275 | 357.66 |
| 362.23 | 275.317 | 358.34 |
| 364.02 | 275.31 | 359.05 |
| 364.52 | 275.36 | 361.17 |
| 367.25 | 275.217 | 361.88 |
| 368.32 | 275.223 | 362.93 |
| 369.31 | 275.127 | 364.43 |
| 369.75 | 275.164 | 365.19 |
| 370.69 | 275.325 | 366.69 |
| 371.87 | 275.343 | 367.44 |
| 373.16 | 275.305 | 368.97 |
| 374.43 | 275.412 | 370.03 |
| 376.24 | 275.425 | 370.98 |
| 377.48 | 275.508 | 371.65 |
| 378.7 | 275.45 | 371.8 |
| 379.78 | 275.36 | 371.96 |
| 380.49 | 275.381 | 372.86 |
| 382.95 | 275.177 | 372.99 |

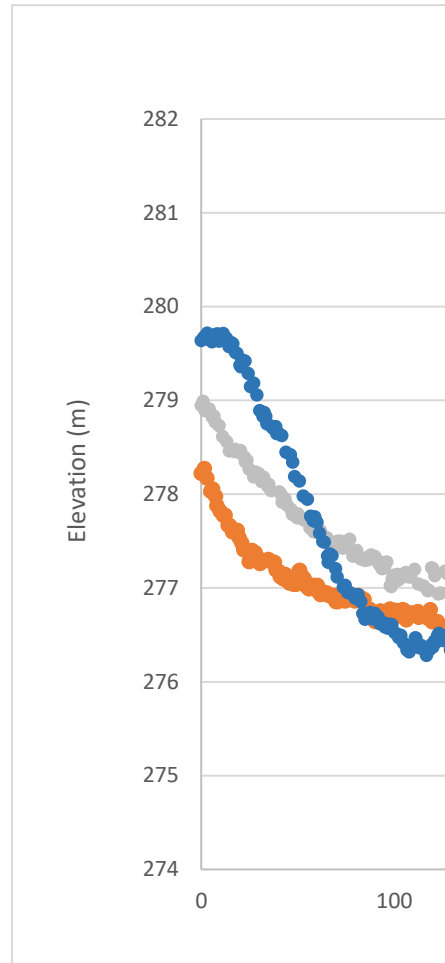
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|--------|---------|--------|
| 383.65 | 275.163 | 373.47 |
| 384.79 | 275.267 | 373.57 |
| 387.3 | 275.226 | 373.92 |
| 388.92 | 275.35 | 374.22 |
| 389.77 | 275.33 | 375 |
| 390.52 | 275.243 | 375.34 |
| 391.24 | 275.214 | 375.47 |
| 392.91 | 275.27 | 375.73 |
| 394.82 | 275.392 | 376.48 |
| 395.38 | 275.367 | 376.76 |
| 396.61 | 275.24 | 377.23 |
| 397.68 | 275.345 | 378.74 |
| 399.08 | 275.527 | 379.24 |
| 400.32 | 275.483 | 379.49 |
| 401.26 | 275.401 | 380.65 |
| 402.33 | 275.381 | 381.69 |
| 403.77 | 275.295 | 382.36 |
| 405.56 | 275.27 | 384.19 |
| 406.63 | 275.425 | 385.7 |
| 407.85 | 275.444 | 386.37 |
| 408.78 | 275.5 | 387.02 |
| 409.85 | 275.491 | 388.09 |
| 412.36 | 275.56 | 390.03 |
| 413.9 | 275.487 | 393.04 |
| 414.5 | 275.431 | 393.76 |
| 415.35 | 275.255 | 394.4 |
| 416.37 | 275.242 | 395.53 |
| 417.6 | 275.407 | 395.88 |
| 418.81 | 275.389 | 396.4 |
| 420.69 | 275.473 | 398.3 |
| 422.39 | 275.39 | 398.72 |
| 424.18 | 275.424 | 399.75 |
| 425.97 | 275.302 | 400.84 |
| 427.4 | 275.051 | 401.31 |
| 428.1 | 275.13 | 402.43 |
| 429.85 | 275.033 | 403.67 |
| 430.7 | 274.946 | 404.74 |
| 433.13 | 274.82 | 407.11 |
| 435.5 | 274.81 | 408.99 |
| 436.35 | 274.9 | 409.34 |
| 437.97 | 275.141 | 410.4 |
| 438.86 | 275.199 | 411.79 |
| 440.65 | 275.117 | 413.24 |
| 441.68 | 275.254 | 414.11 |
| 442.44 | 275.302 | 415.01 |
| 443.15 | 275.163 | 416.07 |
| 443.49 | 275.047 | 416.78 |

| | | |
|--------|---------|--------|
| 443.87 | 275.241 | 417.87 |
| 446.62 | 275.373 | 419.26 |
| 447.45 | 275.518 | 419.61 |
| 448.88 | 275.637 | 420.49 |
| 451.03 | 275.676 | 421.03 |
| 451.39 | 275.751 | 421.83 |
| 452.17 | 275.813 | 422.39 |
| 452.82 | 275.773 | 422.8 |
| 454.61 | 275.832 | 423.83 |
| 456.04 | 275.742 | 425.28 |
| 457.13 | 275.521 | 426.51 |
| 458.91 | 275.736 | 427.4 |
| 460.34 | 275.785 | 427.76 |
| 461.41 | 275.919 | 428.11 |
| 461.77 | 275.916 | 429.16 |
| 463.2 | 276.027 | 430.24 |
| 465.35 | 276.148 | 431.3 |
| 467.36 | 276.19 | 432.01 |
| 467.86 | 276.289 | 433.07 |
| 469.29 | 276.41 | 435.18 |
| 470.72 | 276.501 | 436.26 |
| 473.16 | 276.592 | 437.88 |
| 475.38 | 276.752 | 439.22 |
| 475.88 | 276.815 | 440.56 |
| 476.45 | 276.81 | 441.2 |
| 478.1 | 276.988 | 442.56 |
| 479.3 | 277.04 | 442.99 |
| 480.39 | 277.186 | 443.69 |
| 481.11 | 277.219 | 444.76 |
| 482.9 | 277.418 | 445.46 |
| 484.41 | 277.557 | 446.58 |
| 485.76 | 277.634 | 449.01 |
| 486.84 | 277.76 | 449.25 |
| 487.19 | 277.699 | 450.23 |
| 489.34 | 277.902 | 450.78 |
| 491.85 | 278.019 | 451.13 |
| 492.85 | 278.125 | 451.84 |
| 494 | 278.135 | 452.49 |
| 494.76 | 278.194 | 452.9 |
| 495.43 | 278.162 | 453.27 |
| 497.2 | 278.218 | 454 |
| 498.05 | 278.326 | 455.03 |
| 499.01 | 278.5 | 455.94 |
| 501.16 | 278.63 | 457.28 |
| 503.31 | 278.677 | 458.62 |
| 505.1 | 278.832 | 459.63 |
| 506.49 | 278.899 | 459.99 |

| | | |
|--------|---------|--------|
| 507.96 | 278.916 | 460.77 |
| 509.39 | 279.073 | 461.76 |
| 510.81 | 279.08 | 462.46 |
| 512.55 | 279.17 | 463.17 |
| 513.33 | 279.282 | 463.78 |
| 514.05 | 279.274 | 464.24 |
| 515.75 | 279.36 | 464.94 |
| 516.55 | 279.38 | 465.98 |
| 518.22 | 279.327 | 467.07 |
| 519.78 | 279.48 | 467.98 |
| 521.31 | 279.573 | 469.55 |
| 522.54 | 279.685 | 469.8 |
| 524.39 | 279.627 | 470.61 |
| 525.86 | 279.756 | 471.33 |
| 527.3 | 279.775 | 472 |
| 528.01 | 279.872 | 473.8 |
| 530.57 | 279.991 | 474.51 |
| 533.01 | 280.188 | 475.57 |
| 533.38 | 280.188 | 476.28 |
| 534.82 | 280.313 | 477.54 |
| 536.61 | 280.283 | 477.69 |
| 539.47 | 280.384 | 479.11 |
| 541.53 | 280.515 | 480.03 |
| 544.48 | 280.725 | 480.53 |
| 546 | 280.72 | 480.88 |
| 546.65 | 280.781 | 481.59 |
| 547.93 | 280.816 | 482.43 |

4665

| | | |
|---------|-------|---------|
| 278.222 | 0 | 279.64 |
| 278.274 | 1.44 | 279.677 |
| 278.171 | 2.04 | 279.655 |
| 278.03 | 3.1 | 279.718 |
| 278.055 | 5.59 | 279.623 |
| 277.977 | 6.42 | 279.695 |
| 277.879 | 8.21 | 279.71 |
| 277.819 | 9.23 | 279.63 |
| 277.777 | 10.16 | 279.65 |
| 277.776 | 11.4 | 279.713 |
| 277.67 | 12.24 | 279.65 |
| 277.665 | 13.07 | 279.661 |
| 277.598 | 14.31 | 279.572 |
| 277.59 | 15.4 | 279.619 |
| 277.615 | 16.39 | 279.604 |
| 277.532 | 17.63 | 279.513 |
| 277.479 | 18.47 | 279.502 |
| 277.406 | 20.03 | 279.375 |
| 277.402 | 20.54 | 279.36 |
| 277.282 | 21.37 | 279.429 |
| 277.399 | 22.62 | 279.419 |
| 277.34 | 24.28 | 279.287 |
| 277.375 | 25.53 | 279.146 |
| 277.309 | 27.19 | 279.183 |
| 277.259 | 28.85 | 279.058 |
| 277.306 | 30.3 | 278.89 |
| 277.28 | 31.85 | 278.829 |
| 277.275 | 32.59 | 278.871 |
| 277.194 | 33.39 | 278.831 |
| 277.176 | 33.9 | 278.752 |
| 277.122 | 36.03 | 278.729 |
| 277.096 | 36.98 | 278.702 |
| 277.144 | 38.53 | 278.719 |
| 277.085 | 39.04 | 278.647 |
| 277.053 | 40.08 | 278.65 |
| 277.099 | 41.72 | 278.624 |
| 277.04 | 43.8 | 278.447 |
| 277.039 | 46.14 | 278.42 |
| 277.09 | 47.26 | 278.343 |
| 277.176 | 48.29 | 278.188 |
| 277.19 | 50.86 | 278.14 |
| 277.126 | 52.88 | 277.981 |
| 277.1 | 55.01 | 277.946 |
| 277.019 | 56.68 | 277.767 |



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|---------|--------|---------|
| 276.99 | 57.92 | 277.718 |
| 277.03 | 58.75 | 277.758 |
| 277.012 | 60 | 277.699 |
| 277.028 | 61.24 | 277.584 |
| 276.962 | 62.91 | 277.497 |
| 276.928 | 63.71 | 277.49 |
| 276.961 | 65.4 | 277.341 |
| 276.946 | 65.81 | 277.275 |
| 276.919 | 66.64 | 277.363 |
| 276.901 | 67.7 | 277.345 |
| 276.923 | 69.55 | 277.205 |
| 276.854 | 70.4 | 277.119 |
| 276.853 | 73.47 | 277.009 |
| 276.903 | 74.5 | 277.029 |
| 276.913 | 75.79 | 276.95 |
| 276.863 | 77.03 | 276.949 |
| 276.875 | 79.1 | 276.921 |
| 276.93 | 79.64 | 276.893 |
| 276.86 | 81.18 | 276.93 |
| 276.867 | 82.72 | 276.856 |
| 276.92 | 83.67 | 276.727 |
| 276.884 | 84.78 | 276.667 |
| 276.877 | 85.75 | 276.724 |
| 276.768 | 86.83 | 276.712 |
| 276.773 | 87.41 | 276.738 |
| 276.693 | 88.66 | 276.67 |
| 276.644 | 89.93 | 276.73 |
| 276.755 | 91.56 | 276.69 |
| 276.732 | 92.39 | 276.619 |
| 276.631 | 94.03 | 276.633 |
| 276.628 | 95.05 | 276.584 |
| 276.749 | 95.57 | 276.601 |
| 276.775 | 96.55 | 276.572 |
| 276.703 | 97.38 | 276.615 |
| 276.763 | 98.69 | 276.608 |
| 276.694 | 100.19 | 276.523 |
| 276.76 | 101.52 | 276.506 |
| 276.721 | 102.28 | 276.471 |
| 276.771 | 103.35 | 276.495 |
| 276.759 | 104.62 | 276.414 |
| 276.66 | 106.58 | 276.339 |
| 276.732 | 107.72 | 276.318 |
| 276.707 | 108.7 | 276.391 |
| 276.735 | 110.82 | 276.47 |
| 276.712 | 111.21 | 276.467 |
| 276.75 | 112.76 | 276.362 |
| 276.686 | 113.92 | 276.387 |

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|---------|--------|---------|
| 276.704 | 115.47 | 276.34 |
| 276.678 | 116.63 | 276.282 |
| 276.769 | 117.79 | 276.35 |
| 276.64 | 118.33 | 276.344 |
| 276.644 | 119.4 | 276.4 |
| 276.61 | 119.94 | 276.37 |
| 276.543 | 120.9 | 276.44 |
| 276.541 | 121.54 | 276.423 |
| 276.493 | 122.45 | 276.497 |
| 276.549 | 123.15 | 276.518 |
| 276.594 | 124.22 | 276.471 |
| 276.57 | 125.82 | 276.44 |
| 276.599 | 127.1 | 276.494 |
| 276.532 | 129.06 | 276.339 |
| 276.569 | 129.81 | 276.31 |
| 276.541 | 131.75 | 276.418 |
| 276.556 | 133.31 | 276.33 |
| 276.5 | 134.08 | 276.409 |
| 276.458 | 135.63 | 276.397 |
| 276.512 | 135.91 | 276.366 |
| 276.5 | 137.64 | 276.407 |
| 276.45 | 139.11 | 276.324 |
| 276.546 | 141.33 | 276.249 |
| 276.525 | 142.22 | 276.33 |
| 276.546 | 143.38 | 276.387 |
| 276.52 | 144.54 | 276.36 |
| 276.544 | 145.32 | 276.273 |
| 276.508 | 146.09 | 276.306 |
| 276.538 | 147.25 | 276.171 |
| 276.468 | 148.82 | 276.149 |
| 276.528 | 150.74 | 276.194 |
| 276.525 | 152.31 | 276.104 |
| 276.56 | 153.07 | 276.14 |
| 276.45 | 155.8 | 276.159 |
| 276.48 | 156.84 | 276.1 |
| 276.45 | 158.45 | 276.159 |
| 276.5 | 160.07 | 276.12 |
| 276.48 | 160.82 | 276.124 |
| 276.53 | 162.66 | 276.206 |
| 276.51 | 164.39 | 276.103 |
| 276.517 | 166.25 | 276.18 |
| 276.488 | 166.63 | 276.127 |
| 276.494 | 168.18 | 276.072 |
| 276.535 | 168.61 | 276.031 |
| 276.54 | 169.68 | 276.129 |
| 276.482 | 171.28 | 276.13 |
| 276.378 | 172.36 | 276.09 |

| | | |
|---------|--------|---------|
| 276.441 | 173.61 | 276.087 |
| 276.392 | 175.03 | 276.053 |
| 276.352 | 176.32 | 276.107 |
| 276.372 | 177.7 | 276.094 |
| 276.301 | 179.42 | 276.144 |
| 276.32 | 179.81 | 276.188 |
| 276.284 | 181.45 | 276.122 |
| 276.343 | 182.54 | 276.05 |
| 276.369 | 185.63 | 276.106 |
| 276.317 | 187.18 | 276.074 |
| 276.282 | 188.73 | 276.004 |
| 276.36 | 189.41 | 276.026 |
| 276.248 | 190.66 | 276.117 |
| 276.175 | 191.44 | 276.114 |
| 276.289 | 192.6 | 276.042 |
| 276.18 | 193.74 | 276.02 |
| 276.271 | 195.62 | 276.052 |
| 276.231 | 197.14 | 276.03 |
| 276.249 | 197.69 | 276.063 |
| 276.338 | 200.2 | 275.982 |
| 276.337 | 201.81 | 275.99 |
| 276.262 | 202.7 | 275.961 |
| 276.337 | 203.42 | 275.886 |
| 276.34 | 204.49 | 275.927 |
| 276.267 | 205.52 | 275.881 |
| 276.305 | 206.49 | 275.906 |
| 276.346 | 207.71 | 275.839 |
| 276.278 | 209.15 | 275.839 |
| 276.244 | 210.24 | 275.88 |
| 276.321 | 211.87 | 275.829 |
| 276.36 | 212.63 | 275.784 |
| 276.276 | 213.4 | 275.807 |
| 276.308 | 214.94 | 275.793 |
| 276.317 | 216.48 | 275.709 |
| 276.276 | 217.26 | 275.63 |
| 276.289 | 219.55 | 275.627 |
| 276.354 | 219.94 | 275.65 |
| 276.347 | 222.1 | 275.64 |
| 276.381 | 223.01 | 275.602 |
| 276.343 | 224.46 | 275.584 |
| 276.37 | 226.41 | 275.585 |
| 276.256 | 227.63 | 275.62 |
| 276.338 | 228.78 | 275.694 |
| 276.252 | 230.18 | 275.654 |
| 276.296 | 230.7 | 275.67 |
| 276.3 | 231.8 | 275.599 |
| 276.266 | 233.47 | 275.647 |

| | | |
|---------|--------|---------|
| 276.278 | 234.55 | 275.589 |
| 276.323 | 237.62 | 275.546 |
| 276.347 | 238.87 | 275.578 |
| 276.325 | 239.88 | 275.52 |
| 276.399 | 240.96 | 275.547 |
| 276.321 | 241.5 | 275.53 |
| 276.237 | 242.73 | 275.557 |
| 276.314 | 243.39 | 275.515 |
| 276.291 | 244.93 | 275.476 |
| 276.245 | 245.69 | 275.478 |
| 276.205 | 246.88 | 275.529 |
| 276.15 | 248 | 275.47 |
| 276.177 | 248.77 | 275.48 |
| 276.159 | 250.66 | 275.368 |
| 276.21 | 252.27 | 275.451 |
| 276.252 | 253.35 | 275.4 |
| 276.227 | 254.92 | 275.406 |
| 276.29 | 255.51 | 275.48 |
| 276.286 | 258.35 | 275.4 |
| 276.209 | 260.09 | 275.303 |
| 276.22 | 261.15 | 275.305 |
| 276.151 | 262.11 | 275.253 |
| 276.18 | 262.96 | 275.28 |
| 276.16 | 264.7 | 275.218 |
| 276.237 | 265.59 | 275.216 |
| 276.172 | 266.12 | 275.268 |
| 276.242 | 267.18 | 275.22 |
| 276.187 | 267.89 | 275.28 |
| 276.206 | 269.55 | 275.213 |
| 276.113 | 270.37 | 275.242 |
| 276.168 | 271.43 | 275.217 |
| 276.122 | 272.87 | 275.14 |
| 276.142 | 273.92 | 275.154 |
| 276.07 | 274.82 | 275.135 |
| 275.924 | 276.4 | 275.162 |
| 275.92 | 276.71 | 275.205 |
| 275.95 | 278.11 | 275.262 |
| 275.85 | 279.23 | 275.26 |
| 275.892 | 280.65 | 275.346 |
| 275.864 | 282.43 | 275.387 |
| 275.78 | 283.49 | 275.375 |
| 275.846 | 284.2 | 275.289 |
| 275.786 | 284.55 | 275.382 |
| 275.791 | 285.62 | 275.474 |
| 275.82 | 287.04 | 275.469 |
| 275.785 | 290.53 | 275.371 |
| 275.74 | 292.35 | 275.478 |

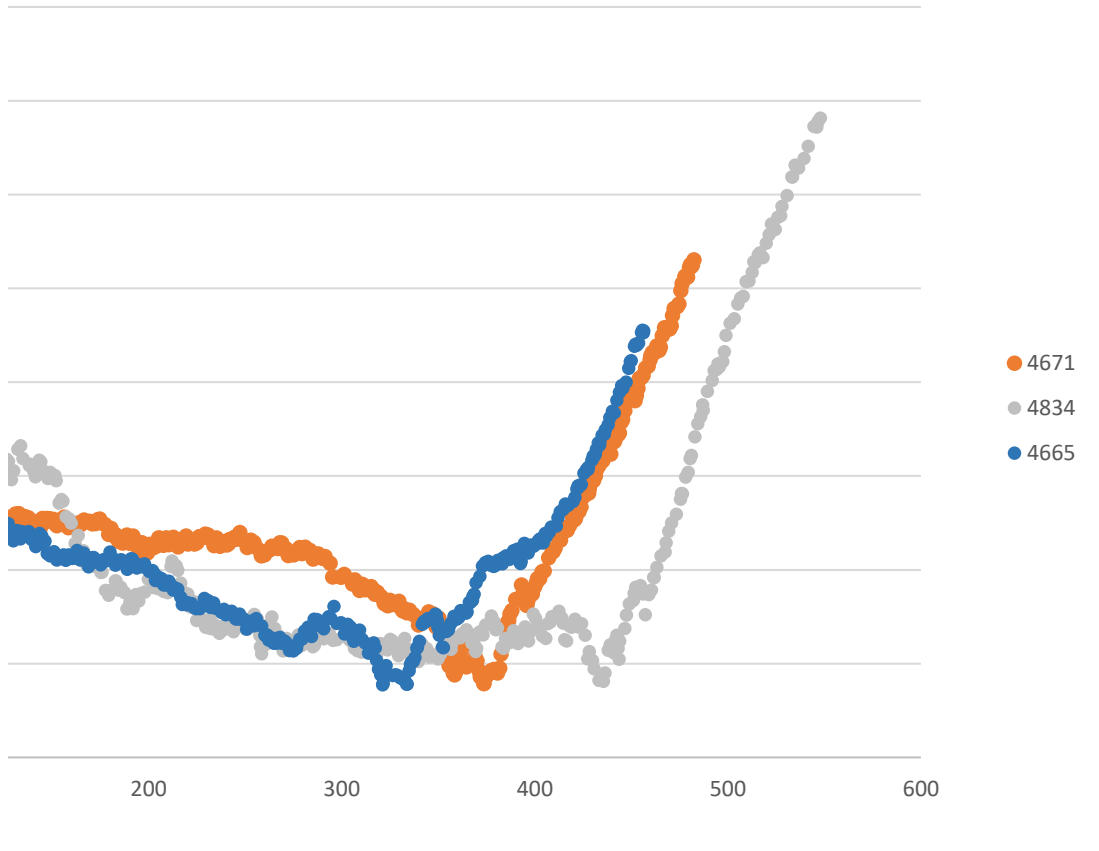
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|---------|--------|---------|
| 275.758 | 293.26 | 275.5 |
| 275.713 | 294.13 | 275.484 |
| 275.639 | 295.9 | 275.61 |
| 275.656 | 297.32 | 275.428 |
| 275.618 | 299.45 | 275.436 |
| 275.674 | 301.28 | 275.315 |
| 275.63 | 302.28 | 275.341 |
| 275.664 | 302.99 | 275.417 |
| 275.592 | 304.46 | 275.389 |
| 275.563 | 305.47 | 275.279 |
| 275.582 | 306.18 | 275.236 |
| 275.543 | 308.19 | 275.333 |
| 275.57 | 309.07 | 275.356 |
| 275.52 | 310.5 | 275.259 |
| 275.41 | 311.86 | 275.222 |
| 275.454 | 313.68 | 275.111 |
| 275.445 | 315.87 | 275.183 |
| 275.49 | 316.47 | 275.222 |
| 275.481 | 317.18 | 275.167 |
| 275.551 | 317.88 | 275.035 |
| 275.53 | 318.94 | 274.941 |
| 275.392 | 320.01 | 274.879 |
| 275.401 | 321.08 | 274.775 |
| 275.483 | 321.43 | 274.792 |
| 275.371 | 322.91 | 274.98 |
| 275.023 | 323.92 | 274.885 |
| 274.975 | 326.4 | 274.873 |
| 274.968 | 327.46 | 274.879 |
| 275.008 | 327.93 | 274.877 |
| 274.898 | 328.53 | 274.875 |
| 274.879 | 329.59 | 274.863 |
| 274.917 | 330.16 | 274.848 |
| 275.117 | 331.47 | 274.834 |
| 275.154 | 332.77 | 274.81 |
| 274.972 | 333.45 | 274.782 |
| 274.966 | 333.85 | 274.782 |
| 275.01 | 334.77 | 274.924 |
| 275.212 | 335.43 | 274.993 |
| 275.256 | 335.97 | 275.017 |
| 275.079 | 337.04 | 275.022 |
| 275.03 | 337.75 | 275.065 |
| 274.928 | 338.72 | 275.162 |
| 274.865 | 339.17 | 275.177 |
| 274.855 | 340.04 | 275.239 |
| 274.854 | 341.65 | 275.419 |
| 274.858 | 342.36 | 275.45 |
| 274.848 | 342.76 | 275.44 |

| | | |
|---------|--------|---------|
| 274.789 | 344.13 | 275.456 |
| 274.789 | 344.48 | 275.48 |
| 274.838 | 345.97 | 275.467 |
| 274.862 | 346.26 | 275.487 |
| 274.871 | 346.97 | 275.485 |
| 274.884 | 348.38 | 275.527 |
| 274.885 | 348.9 | 275.517 |
| 274.888 | 349.45 | 275.459 |
| 274.906 | 349.8 | 275.385 |
| 274.908 | 350.43 | 275.301 |
| 274.923 | 351.97 | 275.175 |
| 274.936 | 352.56 | 275.17 |
| 274.913 | 353.35 | 275.35 |
| 274.931 | 354.27 | 275.342 |
| 274.9 | 355.12 | 275.362 |
| 274.952 | 355.48 | 275.399 |
| 275.102 | 356.58 | 275.433 |
| 275.378 | 357.96 | 275.504 |
| 275.44 | 358.31 | 275.483 |
| 275.457 | 359.38 | 275.474 |
| 275.529 | 360.46 | 275.491 |
| 275.564 | 361.5 | 275.564 |
| 275.684 | 362.57 | 275.55 |
| 275.839 | 363.49 | 275.558 |
| 275.75 | 364.38 | 275.537 |
| 275.724 | 364.79 | 275.551 |
| 275.623 | 366.01 | 275.654 |
| 275.622 | 366.4 | 275.65 |
| 275.67 | 367.23 | 275.679 |
| 275.745 | 367.64 | 275.674 |
| 275.744 | 367.84 | 275.715 |
| 275.818 | 368.45 | 275.74 |
| 275.864 | 369.52 | 275.863 |
| 275.907 | 371.41 | 275.929 |
| 275.905 | 372.84 | 276.038 |
| 275.977 | 374.27 | 276.078 |
| 275.988 | 375.7 | 276.091 |
| 276.127 | 376.99 | 276.048 |
| 276.196 | 378.56 | 276.036 |
| 276.193 | 379.43 | 276.045 |
| 276.229 | 379.89 | 276.079 |
| 276.358 | 380.71 | 276.1 |
| 276.315 | 381.46 | 276.068 |
| 276.389 | 382.28 | 276.08 |
| 276.44 | 383.09 | 276.063 |
| 276.45 | 383.57 | 276.127 |
| 276.422 | 384.04 | 276.107 |

| | | |
|---------|--------|---------|
| 276.47 | 385.12 | 276.15 |
| 276.579 | 386.75 | 276.11 |
| 276.586 | 388.19 | 276.15 |
| 276.535 | 388.79 | 276.203 |
| 276.552 | 389.75 | 276.153 |
| 276.638 | 390.41 | 276.173 |
| 276.66 | 390.82 | 276.221 |
| 276.621 | 392.04 | 276.086 |
| 276.67 | 392.45 | 276.068 |
| 276.784 | 392.87 | 276.092 |
| 276.819 | 393.9 | 276.228 |
| 276.83 | 394.48 | 276.281 |
| 276.818 | 395.45 | 276.216 |
| 276.866 | 396.51 | 276.179 |
| 276.93 | 398.14 | 276.264 |
| 276.951 | 399.36 | 276.251 |
| 277.002 | 401.16 | 276.278 |
| 277.068 | 401.8 | 276.312 |
| 277.11 | 402.61 | 276.331 |
| 277.16 | 403.43 | 276.328 |
| 277.23 | 403.83 | 276.288 |
| 277.282 | 404.24 | 276.287 |
| 277.234 | 405.3 | 276.386 |
| 277.361 | 405.82 | 276.351 |
| 277.37 | 406.86 | 276.4 |
| 277.454 | 407.49 | 276.402 |
| 277.438 | 408.42 | 276.455 |
| 277.459 | 411.01 | 276.466 |
| 277.576 | 411.97 | 276.553 |
| 277.603 | 413.08 | 276.62 |
| 277.696 | 414.64 | 276.647 |
| 277.817 | 415.68 | 276.701 |
| 277.852 | 417.19 | 276.689 |
| 277.881 | 419.7 | 276.728 |
| 277.866 | 420.76 | 276.774 |
| 277.826 | 421.73 | 276.86 |
| 277.804 | 422.42 | 276.896 |
| 277.858 | 423 | 276.89 |
| 277.926 | 423.97 | 276.91 |
| 277.932 | 425.39 | 277.027 |
| 278.04 | 426.61 | 277.071 |
| 278.046 | 427.42 | 277.069 |
| 278.072 | 427.6 | 277.094 |
| 278.15 | 429.46 | 277.169 |
| 278.17 | 430.06 | 277.212 |
| 278.24 | 430.71 | 277.21 |
| 278.28 | 431.23 | 277.234 |

| | | |
|---------|--------|---------|
| 278.318 | 431.75 | 277.286 |
| 278.311 | 432.71 | 277.354 |
| 278.337 | 433.52 | 277.33 |
| 278.388 | 433.64 | 277.356 |
| 278.373 | 434.86 | 277.436 |
| 278.338 | 435.96 | 277.446 |
| 278.373 | 436.5 | 277.491 |
| 278.497 | 437.97 | 277.546 |
| 278.58 | 438.81 | 277.622 |
| 278.56 | 440.05 | 277.691 |
| 278.587 | 441.08 | 277.672 |
| 278.566 | 442.47 | 277.807 |
| 278.602 | 443.65 | 277.89 |
| 278.712 | 444.91 | 277.964 |
| 278.785 | 445.63 | 277.935 |
| 278.806 | 447.23 | 278.002 |
| 278.833 | 448.57 | 278.148 |
| 278.977 | 449.37 | 278.219 |
| 279.05 | 449.79 | 278.228 |
| 279.108 | 451.52 | 278.384 |
| 279.13 | 451.97 | 278.404 |
| 279.121 | 452.64 | 278.392 |
| 279.223 | 453.67 | 278.416 |
| 279.252 | 455.1 | 278.531 |
| 279.23 | 455.6 | 278.553 |
| 279.247 | 456.12 | 278.527 |
| 279.304 | 456.38 | 278.547 |

Cross-Section Plots



Sensitivity Analysis of Hydrology Parameters

| | | Cn plus 20% | Difference to Base |
|---------------|---------------------|-------------|--------------------|
| 100-yrAES-6hr | 30000 | 14.20 | -2.47 |
| 100-yrAES-6hr | 50000 | 14.54 | -2.38 |
| 100-yrAES-6hr | 60000 | 14.29 | -1.79 |
| 100-yrAES-6hr | 90000 | 22.07 | -2.18 |
| 100-yrAES-6hr | 110000 | 26.95 | -2.45 |
| | Average Diff | | |

| | | Cn plus 20% | Difference to Base |
|-----------------------------|---------------------|-------------|--------------------|
| Timmins-97 aerial reduction | 30000 | 55.38 | 11.77 |
| Timmins-97 aerial reduction | 50000 | 56.48 | 11.96 |
| Timmins-94 aerial reduction | 60000 | 53.95 | 11.69 |
| Timmins-94 aerial reduction | 90000 | 76.63 | 15.42 |
| Timmins-94 aerial reduction | 110000 | 89.56 | 16.93 |
| | Average Diff | | |

| % | Cn minus 20% | Difference to Base | % | la plus 50% |
|-------------|--------------|--------------------|-------------|-------------|
| -15% | 11.50 | -5.18 | -31% | 14.20 |
| -14% | 11.64 | -5.28 | -31% | 14.54 |
| -11% | 11.02 | -5.06 | -31% | 14.29 |
| -9% | 16.16 | -8.09 | -33% | 22.07 |
| -8% | 19.23 | -10.17 | -35% | 26.95 |
| -11% | | | -32% | |

| | Cn minus 20% | Difference to Base | | la plus 50% |
|------------|--------------|--------------------|-------------|-------------|
| 27% | 32.78 | -10.83 | -25% | 42.88 |
| 27% | 33.53 | -10.98 | -25% | 43.79 |
| 28% | 31.66 | -10.59 | -25% | 41.51 |
| 25% | 46.21 | -14.99 | -24% | 60.26 |
| 23% | 55.48 | -17.15 | -24% | 71.59 |
| 26% | | | -25% | |

| % | la minus 50% | % | RoutingFLGHT minus 2 | % |
|-------------|--------------|-----------|----------------------|-----------|
| -15% | 17.50 | 5% | 17.43 | 5% |
| -14% | 17.73 | 5% | 17.70 | 5% |
| -11% | 16.85 | 5% | 17.14 | 7% |
| -9% | 25.37 | 5% | 26.65 | 10% |
| -8% | 30.67 | 4% | 32.82 | 12% |
| -11% | | 5% | | 7% |
| | la minus 50% | | | |
| -2% | 44.33 | 2% | 47.56 | 9% |
| -2% | 45.27 | 2% | 48.51 | 9% |
| -2% | 43.00 | 2% | 46.28 | 10% |
| -2% | 62.14 | 2% | 66.95 | 9% |
| -1% | 73.66 | 1% | 80.22 | 10% |
| -2% | | 2% | | 9% |

| Routing | FLGHT plus : | % | BASE | River Station |
|---------|--------------|------------|-------|---------------|
| | 16.25 | -2% | 16.67 | 4761 |
| | 16.41 | -3% | 16.92 | 4399 |
| | 15.28 | -5% | 16.08 | 3450 |
| | 22.29 | -8% | 24.25 | 2511 |
| | 26.98 | -8% | 29.4 | 1054 |
| | | -5% | | |
| | 40.87 | -6% | 43.61 | 4761 |
| | 41.82 | -6% | 44.52 | 4399 |
| | 39.50 | -7% | 42.25 | 3450 |
| | 56.60 | -8% | 61.21 | 2511 |
| | 66.29 | -9% | 72.64 | 1054 |
| | | -7% | | |

| | | Node | Area (ha) | River Station |
|---|---|-------------------|--------------|---------------|
| Flows with Route Channel within wetland | U/S of Goose Lake Wetland | 20000 | 732.4 | NA |
| | Node within Goose Lake | 25000 | 880.8 | NA |
| | D/S of Goose Lake Wetland | 30000 | 1912.7 | 4761 |
| | U/S of Cambray | 50000 | 1950.2 | 4399 |
| | Cambray Road | 60000 | 2031.5 | 3450 |
| | Confluence S of Community Centre | 90000 | 2641.6 | 2511 |
| | Elm Tree Road South Culvert | 110000 | 3156 | 1054 |
| | Flows with Route Reservoir within wetland | Goose Lake Proper | <i>20000</i> | <i>1912.7</i> |
| Route Reservoir for Goose Lake | | RR2 | 1912.7 | 4761 |
| U/S of Cambray | | 50000 | 1950.2 | 4399 |
| Cambray Road | | 60000 | 2031.5 | 3450 |
| Confluence S of Community Centre | | 90000 | 2641.6 | 2511 |
| Elm Tree Road South Culvert | | 110000 | 3156 | 1054 |

OFAT results at Cambray Road (Node 60000)

| Event | | | | | | |
|-------------|-------------|--------------|--------------|--------------|--------------|--------------|
| 2yr | 5yr | 10yr | 25yr | 50yr | 100yr | Regional |
| 2.00 | 3.97 | 5.58 | 7.85 | 9.73 | 11.76 | 26.20 |
| 1.24 | 1.98 | 2.77 | 3.75 | 4.73 | 5.91 | 20.22 |
| 3.05 | 5.88 | 8.13 | 11.29 | 13.91 | 16.70 | 43.61 |
| 3.04 | 5.91 | 8.18 | 11.44 | 14.15 | 16.92 | 44.42 |
| 2.88 | 5.59 | 7.75 | 10.83 | 13.40 | 16.08 | 44.44 |
| 4.58 | 8.69 | 11.93 | 16.52 | 20.30 | 24.25 | 61.21 |
| 6.01 | 11.25 | 15.20 | 20.64 | 24.93 | 29.40 | 72.64 |
| <i>4.15</i> | <i>8.81</i> | <i>12.65</i> | <i>18.15</i> | <i>22.71</i> | <i>27.58</i> | <i>66.25</i> |
| 3.92 | 8.32 | 10.08 | 11.76 | 13.72 | 14.81 | 23.22 |
| 3.89 | 8.32 | 10.14 | 11.99 | 13.74 | 14.82 | 23.22 |
| 3.68 | 7.85 | 10.00 | 11.87 | 13.58 | 14.77 | 23.07 |
| 5.33 | 10.81 | 14.13 | 17.35 | 20.03 | 22.56 | 43.19 |
| 6.15 | 11.68 | 15.85 | 21.41 | 25.63 | 29.96 | 61.80 |

OFAT at Ca
MoinShaw:
Flow

AreaLimit

Q1.25

Q2

Q5

Q10

Q20

Q50

Q100

Q200

Q500

4.61 5.86 7.03 8.44 10.31 11.95

mbray Road

1985IndexExpectedProbabilityAdjustment

Results (m³/s)

Drainage Area Parameter not in range for model.

4.22

4.61

5.86

7.03

8.44

10.31

11.95

13.59

16.41

| Event | Node | PkFlow (cms) |
|--------------|--------|--------------|
| 2yr-AES-6hr | 30000 | 3.05 |
| 2yr-AES-6hr | 50000 | 3.04 |
| 2yr-AES-6hr | 60000 | 2.88 |
| 2yr-AES-6hr | 90000 | 4.58 |
| 2yr-AES-6hr | 110000 | 6.01 |
| 5yr-AES-6hr | 30000 | 5.88 |
| 5yr-AES-6hr | 50000 | 5.91 |
| 5yr-AES-6hr | 60000 | 5.59 |
| 5yr-AES-6hr | 90000 | 8.69 |
| 5yr-AES-6hr | 110000 | 11.25 |
| 10yr-AES-6hr | 30000 | 8.13 |
| 10yr-AES-6hr | 50000 | 8.18 |
| 10yr-AES-6hr | 60000 | 7.75 |
| 10yr-AES-6hr | 90000 | 11.93 |
| 10yr-AES-6hr | 110000 | 15.20 |
| 25yr-AES-6hr | 30000 | 11.29 |
| 25yr-AES-6hr | 50000 | 11.44 |
| 25yr-AES-6hr | 60000 | 10.83 |
| 25yr-AES-6hr | 90000 | 16.52 |
| 25yr-AES-6hr | 110000 | 20.64 |
| 50yr-AES-6hr | 30000 | 13.91 |
| 50yr-AES-6hr | 50000 | 14.15 |
| 50yr-AES-6hr | 60000 | 13.40 |
| 50yr-AES-6hr | 90000 | 20.30 |
| 50yr-AES-6hr | 110000 | 24.93 |

McLaren Water Surface Elevation Base Model

McLaren Water Surfac

| Reach | River Sta | Profile | W.S. Elev (m) | Reach | River Sta |
|---------|------------|-----------------|------------------|---------|------------|
| ML-Main | 4761 30000 | Timmins RC | 276.12 | ML-Main | 4761 30000 |
| ML-Main | | 4665 Timmins RC | 276.02 | ML-Main | 4665 |
| ML-Main | | 4600 Timmins RC | 275.95 | ML-Main | 4600 |
| ML-Main | | 4524 Timmins RC | 275.91 | ML-Main | 4524 |
| ML-Main | 4399 50000 | Timmins RC | 275.44 | ML-Main | 4399 50000 |
| ML-Main | | 4303 Timmins RC | 275.17 | ML-Main | 4303 |
| ML-Main | | 4196 Timmins RC | 275.02 | ML-Main | 4196 |
| ML-Main | | 4049 Timmins RC | 274.7 | ML-Main | 4049 |
| ML-Main | | 3884 Timmins RC | 274.32 | ML-Main | 3884 |
| ML-Main | | 3769 Timmins RC | 274.21 | ML-Main | 3769 |
| ML-Main | | 3632 Timmins RC | 274.16 | ML-Main | 3632 |
| ML-Main | | 3565 Timmins RC | 274.16 | ML-Main | 3565 |
| ML-Main | | 3531 Timmins RC | 274.16 | ML-Main | 3531 |
| ML-Main | | 3521 | Inl Struct | ML-Main | 3521 |
| ML-Main | | 3516 Timmins RC | 271.98 | ML-Main | 3516 |
| ML-Main | | 3495 Timmins RC | 271.97 | ML-Main | 3495 |
| ML-Main | | 3476 Timmins RC | 272.07 | ML-Main | 3476 |
| ML-Main | | 3461 Timmins RC | 272.03 | ML-Main | 3461 |
| ML-Main | 3450 60000 | Timmins RC | 272.03 | ML-Main | 3450 60000 |
| ML-Main | | 3429 Timmins RC | 271.95 | ML-Main | 3429 |
| ML-Main | 3423 MCL06 | | Bridge | ML-Main | 3423 MC |
| ML-Main | | 3415 Timmins RC | 271.65 | ML-Main | 3415 |
| ML-Main | | 3384 Timmins RC | 271.15 | ML-Main | 3384 |
| ML-Main | | 3361 Timmins RC | 271.14 | ML-Main | 3361 |
| ML-Main | 3356 MCL05 | | Bridge | ML-Main | 3356 MC |
| ML-Main | | 3350 Timmins RC | 270.21 | ML-Main | 3350 |
| ML-Main | | 3326 Timmins RC | 270.25 | ML-Main | 3326 |
| ML-Main | | 3272 Timmins RC | 269.86 | ML-Main | 3272 |
| ML-Main | | 3225 Timmins RC | 269.33 | ML-Main | 3225 |
| ML-Main | | 3109 Timmins RC | 268.74 | ML-Main | 3109 |
| ML-Main | | 3036 Timmins RC | 268.57 | ML-Main | 3036 |
| ML-Main | | 2995 Timmins RC | 268.51 | ML-Main | 2995 |
| ML-Main | | 2936 Timmins RC | 268.25 | ML-Main | 2936 |
| ML-Main | | 2885 Timmins RC | 268.11 | ML-Main | 2885 |
| ML-Main | | 2875 Timmins RC | 268.04 | ML-Main | 2875 |
| ML-Main | 2869 MCL04 | | Culvert | ML-Main | 2869 MC |
| ML-Main | | 2862 Timmins RC | 267.92 | ML-Main | 2862 |
| ML-Main | | 2854 Timmins RC | 267.68 | ML-Main | 2854 |
| ML-Main | | 2782 Timmins RC | 267.13 | ML-Main | 2782 |
| ML-Main | | 2725 Timmins RC | 267.25 | ML-Main | 2725 |
| ML-Main | | 2657 Timmins RC | 267.24 | ML-Main | 2657 |
| ML-Main | 2511 90000 | Timmins RC | 266.92 | ML-Main | 2511 90000 |
| ML-Main | | 2439 Timmins RC | 266.93 | ML-Main | 2439 |

| | | | | | | |
|---------|------|--------|-----------------|-----------|---------|-------------|
| ML-Main | | | 2341 Timmins RC | 266.88 | ML-Main | 2341 |
| ML-Main | | | 2319 Timmins RC | 266.89 | ML-Main | 2319 |
| ML-Main | | | 2311 Timmins RC | 266.89 | ML-Main | 2311 |
| ML-Main | 2299 | MCL03 | | Culvert | ML-Main | 2299 MC |
| ML-Main | | | 2291 Timmins RC | 266.77 | ML-Main | 2291 |
| ML-Main | | | 2288 Timmins RC | 266.77 | ML-Main | 2288 |
| ML-Main | | | 2263 Timmins RC | 266.76 | ML-Main | 2263 |
| ML-Main | | | 2161 Timmins RC | 266.7 | ML-Main | 2161 |
| ML-Main | | | 2107 Timmins RC | 266.71 | ML-Main | 2107 |
| ML-Main | | | 2102 Timmins RC | 266.71 | ML-Main | 2102 |
| ML-Main | 2088 | MCL01 | | Culvert | ML-Main | 2088 MC |
| ML-Main | | | 2071 Timmins RC | 266.3 | ML-Main | 2071 |
| ML-Main | | | 2065 Timmins RC | 264.97 | ML-Main | 2065 |
| ML-Main | | | 1968 Timmins RC | 264.96 | ML-Main | 1968 |
| ML-Main | | | 1894 Timmins RC | 264.62 | ML-Main | 1894 |
| ML-Main | | | 1767 Timmins RC | 264.08 | ML-Main | 1767 |
| ML-Main | | | 1613 Timmins RC | 264.08 | ML-Main | 1613 |
| ML-Main | | | 1603 Timmins RC | 264.08 | ML-Main | 1603 |
| ML-Main | | | 1595 | Bridge | ML-Main | 1595 |
| ML-Main | | | 1588 Timmins RC | 263.18 | ML-Main | 1588 |
| ML-Main | | | 1583 Timmins RC | 262.41 | ML-Main | 1583 |
| ML-Main | | | 1416 Timmins RC | 260.83 | ML-Main | 1416 |
| ML-Main | | | 1370 Timmins RC | 259.63 | ML-Main | 1370 |
| ML-Main | | | 1223 Timmins RC | 256.27 | ML-Main | 1223 |
| ML-Main | | | 1172 Timmins RC | 255.29 | ML-Main | 1172 |
| ML-Main | 1054 | 110000 | Timmins RC | 254.35 | ML-Main | 1054 110000 |
| ML-Main | | | 1042 Timmins RC | 254.34 | ML-Main | 1042 |
| ML-Main | | | 1025 | Mult Open | ML-Main | 1025 |
| ML-Main | | | 1008 Timmins RC | 253.79 | ML-Main | 1008 |
| ML-Main | | | 1000 Timmins RC | 253.3 | ML-Main | 1000 |

e Elevation Peakflow plus 30%

McLaren Water Surface Elevation Peakflow minus 30%

| Profile | W.S. Elev (m) | Base-PkFlow | Reach | River Sta | Profile | W.S. Elev (m) | Base-PkFlow |
|------------|------------------|-------------|---------|-----------|-------------------|------------------|-------------|
| Timmins +3 | 276.31 | -0.19 | ML-Main | 4761 | 30(Timmins -30% | 275.95 | 0.17 |
| Timmins +3 | 276.23 | -0.21 | ML-Main | | 4665 Timmins -30% | 275.81 | 0.21 |
| Timmins +3 | 276.19 | -0.24 | ML-Main | | 4600 Timmins -30% | 275.72 | 0.23 |
| Timmins +3 | 276.16 | -0.25 | ML-Main | | 4524 Timmins -30% | 275.68 | 0.23 |
| Timmins +3 | 275.49 | -0.05 | ML-Main | 4399 | 50(Timmins -30% | 275.33 | 0.11 |
| Timmins +3 | 275.26 | -0.09 | ML-Main | | 4303 Timmins -30% | 275.07 | 0.1 |
| Timmins +3 | 275.12 | -0.1 | ML-Main | | 4196 Timmins -30% | 274.91 | 0.11 |
| Timmins +3 | 274.81 | -0.11 | ML-Main | | 4049 Timmins -30% | 274.56 | 0.14 |
| Timmins +3 | 274.43 | -0.11 | ML-Main | | 3884 Timmins -30% | 274.2 | 0.12 |
| Timmins +3 | 274.3 | -0.09 | ML-Main | | 3769 Timmins -30% | 274.11 | 0.1 |
| Timmins +3 | 274.23 | -0.07 | ML-Main | | 3632 Timmins -30% | 274.08 | 0.08 |
| Timmins +3 | 274.22 | -0.06 | ML-Main | | 3565 Timmins -30% | 274.08 | 0.08 |
| Timmins +3 | 274.22 | -0.06 | ML-Main | | 3531 Timmins -30% | 274.08 | 0.08 |
| | Inl Struct | | ML-Main | | | Inl Struct | |
| Timmins +3 | 272.26 | -0.28 | ML-Main | | 3516 Timmins -30% | 271.98 | 0 |
| Timmins +3 | 272.02 | -0.05 | ML-Main | | 3495 Timmins -30% | 272.04 | -0.07 |
| Timmins +3 | 272.18 | -0.11 | ML-Main | | 3476 Timmins -30% | 272.09 | -0.02 |
| Timmins +3 | 272.14 | -0.11 | ML-Main | | 3461 Timmins -30% | 272.07 | -0.04 |
| Timmins +3 | 272.13 | -0.1 | ML-Main | 3450 | 60(Timmins -30% | 272.07 | -0.04 |
| Timmins +3 | 272.05 | -0.1 | ML-Main | | 3429 Timmins -30% | 272.05 | -0.1 |
| L06 | Bridge | | ML-Main | 3423 | MCL06 | Bridge | |
| Timmins +3 | 271.81 | -0.16 | ML-Main | | 3415 Timmins -30% | 270.87 | 0.78 |
| Timmins +3 | 271.23 | -0.08 | ML-Main | | 3384 Timmins -30% | 271.06 | 0.09 |
| Timmins +3 | 271.21 | -0.07 | ML-Main | | 3361 Timmins -30% | 271.05 | 0.09 |
| L05 | Bridge | | ML-Main | 3356 | MCL05 | Bridge | |
| Timmins +3 | 270.35 | -0.14 | ML-Main | | 3350 Timmins -30% | 269.78 | 0.43 |
| Timmins +3 | 270.43 | -0.18 | ML-Main | | 3326 Timmins -30% | 270.05 | 0.2 |
| Timmins +3 | 270 | -0.14 | ML-Main | | 3272 Timmins -30% | 269.61 | 0.25 |
| Timmins +3 | 269.43 | -0.1 | ML-Main | | 3225 Timmins -30% | 269.21 | 0.12 |
| Timmins +3 | 268.88 | -0.14 | ML-Main | | 3109 Timmins -30% | 268.59 | 0.15 |
| Timmins +3 | 268.71 | -0.14 | ML-Main | | 3036 Timmins -30% | 268.4 | 0.17 |
| Timmins +3 | 268.64 | -0.13 | ML-Main | | 2995 Timmins -30% | 268.34 | 0.17 |
| Timmins +3 | 268.35 | -0.1 | ML-Main | | 2936 Timmins -30% | 268.14 | 0.11 |
| Timmins +3 | 268.22 | -0.11 | ML-Main | | 2885 Timmins -30% | 268.05 | 0.06 |
| Timmins +3 | 268.12 | -0.08 | ML-Main | | 2875 Timmins -30% | 267.91 | 0.13 |
| L04 | Culvert | | ML-Main | 2869 | MCL04 | Culvert | |
| Timmins +3 | 267.99 | -0.07 | ML-Main | | 2862 Timmins -30% | 267.81 | 0.11 |
| Timmins +3 | 267.78 | -0.1 | ML-Main | | 2854 Timmins -30% | 267.58 | 0.1 |
| Timmins +3 | 267.39 | -0.26 | ML-Main | | 2782 Timmins -30% | 266.99 | 0.14 |
| Timmins +3 | 267.37 | -0.12 | ML-Main | | 2725 Timmins -30% | 267.09 | 0.16 |
| Timmins +3 | 267.36 | -0.12 | ML-Main | | 2657 Timmins -30% | 267.08 | 0.16 |
| Timmins +3 | 267.01 | -0.09 | ML-Main | 2511 | 90(Timmins -30% | 266.83 | 0.09 |
| Timmins +3 | 267.02 | -0.09 | ML-Main | | 2439 Timmins -30% | 266.84 | 0.09 |

| | | | | | | |
|------------|-----------|-------|---------|-----------------------|-----------|------|
| Timmins +3 | 266.95 | -0.07 | ML-Main | 2341 Timmins -30% | 266.81 | 0.07 |
| Timmins +3 | 266.96 | -0.07 | ML-Main | 2319 Timmins -30% | 266.82 | 0.07 |
| Timmins +3 | 266.96 | -0.07 | ML-Main | 2311 Timmins -30% | 266.81 | 0.08 |
| L03 | Culvert | | ML-Main | 2299 MCL03 | Culvert | |
| Timmins +3 | 266.85 | -0.08 | ML-Main | 2291 Timmins -30% | 266.68 | 0.09 |
| Timmins +3 | 266.85 | -0.08 | ML-Main | 2288 Timmins -30% | 266.68 | 0.09 |
| Timmins +3 | 266.84 | -0.08 | ML-Main | 2263 Timmins -30% | 266.67 | 0.09 |
| Timmins +3 | 266.74 | -0.04 | ML-Main | 2161 Timmins -30% | 266.64 | 0.06 |
| Timmins +3 | 266.77 | -0.06 | ML-Main | 2107 Timmins -30% | 266.64 | 0.07 |
| Timmins +3 | 266.76 | -0.05 | ML-Main | 2102 Timmins -30% | 266.64 | 0.07 |
| L01 | Culvert | | ML-Main | 2088 MCL01 | Culvert | |
| Timmins +3 | 266.3 | 0 | ML-Main | 2071 Timmins -30% | 266.3 | 0 |
| Timmins +3 | 265.54 | -0.57 | ML-Main | 2065 Timmins -30% | 264.81 | 0.16 |
| Timmins +3 | 265.08 | -0.12 | ML-Main | 1968 Timmins -30% | 264.79 | 0.17 |
| Timmins +3 | 264.72 | -0.1 | ML-Main | 1894 Timmins -30% | 264.48 | 0.14 |
| Timmins +3 | 264.17 | -0.09 | ML-Main | 1767 Timmins -30% | 263.95 | 0.13 |
| Timmins +3 | 264.15 | -0.07 | ML-Main | 1613 Timmins -30% | 263.97 | 0.11 |
| Timmins +3 | 264.15 | -0.07 | ML-Main | 1603 Timmins -30% | 263.97 | 0.11 |
| | Bridge | | ML-Main | 1595 | Bridge | |
| Timmins +3 | 263.18 | 0 | ML-Main | 1588 Timmins -30% | 262.93 | 0.25 |
| Timmins +3 | 262.63 | -0.22 | ML-Main | 1583 Timmins -30% | 262.08 | 0.33 |
| Timmins +3 | 261.07 | -0.24 | ML-Main | 1416 Timmins -30% | 260.58 | 0.25 |
| Timmins +3 | 259.76 | -0.13 | ML-Main | 1370 Timmins -30% | 259.49 | 0.14 |
| Timmins +3 | 256.43 | -0.16 | ML-Main | 1223 Timmins -30% | 256.08 | 0.19 |
| Timmins +3 | 255.42 | -0.13 | ML-Main | 1172 Timmins -30% | 255.14 | 0.15 |
| Timmins +3 | 254.43 | -0.08 | ML-Main | 1054 11(Timmins -30% | 254.25 | 0.1 |
| Timmins +3 | 254.43 | -0.09 | ML-Main | 1042 Timmins -30% | 254.25 | 0.09 |
| | Mult Open | | ML-Main | 1025 | Mult Open | |
| Timmins +3 | 254.02 | -0.23 | ML-Main | 1008 Timmins -30% | 253.54 | 0.25 |
| Timmins +3 | 253.42 | -0.12 | ML-Main | 1000 Timmins -30% | 253.19 | 0.11 |
| | Min | -0.57 | | | Min | -0.1 |
| | Max | 0 | | | Max | 0.78 |

McLaren Water Surface Elevation Mn plus 20%

McLaren Water Surfac

| Reach | River Sta | Profile | W.S. Elev (m) | | Reach | River Sta |
|---------|-----------|---------------|------------------|-------|---------|-----------|
| ML-Main | 4761 | 300 Timmins R | 276.22 | -0.1 | ML-Main | 4761 300 |
| ML-Main | 4665 | Timmins R | 276.12 | -0.1 | ML-Main | 4665 |
| ML-Main | 4600 | Timmins R | 276.06 | -0.11 | ML-Main | 4600 |
| ML-Main | 4524 | Timmins R | 276.01 | -0.1 | ML-Main | 4524 |
| ML-Main | 4399 | 500 Timmins R | 275.54 | -0.1 | ML-Main | 4399 500 |
| ML-Main | 4303 | Timmins R | 275.24 | -0.07 | ML-Main | 4303 |
| ML-Main | 4196 | Timmins R | 275.09 | -0.07 | ML-Main | 4196 |
| ML-Main | 4049 | Timmins R | 274.78 | -0.08 | ML-Main | 4049 |
| ML-Main | 3884 | Timmins R | 274.39 | -0.07 | ML-Main | 3884 |
| ML-Main | 3769 | Timmins R | 274.24 | -0.03 | ML-Main | 3769 |
| ML-Main | 3632 | Timmins R | 274.17 | -0.01 | ML-Main | 3632 |
| ML-Main | 3565 | Timmins R | 274.16 | 0 | ML-Main | 3565 |
| ML-Main | 3531 | Timmins R | 274.16 | 0 | ML-Main | 3531 |
| ML-Main | 3521 | Inl Struct | | | ML-Main | 3521 |
| ML-Main | 3516 | Timmins R | 271.98 | 0 | ML-Main | 3516 |
| ML-Main | 3495 | Timmins R | 272.01 | -0.04 | ML-Main | 3495 |
| ML-Main | 3476 | Timmins R | 272.1 | -0.03 | ML-Main | 3476 |
| ML-Main | 3461 | Timmins R | 272.05 | -0.02 | ML-Main | 3461 |
| ML-Main | 3450 | 600 Timmins R | 272.05 | -0.02 | ML-Main | 3450 600 |
| ML-Main | 3429 | Timmins R | 271.97 | -0.02 | ML-Main | 3429 |
| ML-Main | 3423 | MCL06 | Bridge | | ML-Main | 3423 MC |
| ML-Main | 3415 | Timmins R | 271.65 | 0 | ML-Main | 3415 |
| ML-Main | 3384 | Timmins R | 271.17 | -0.02 | ML-Main | 3384 |
| ML-Main | 3361 | Timmins R | 271.15 | -0.01 | ML-Main | 3361 |
| ML-Main | 3356 | MCL05 | Bridge | | ML-Main | 3356 MC |
| ML-Main | 3350 | Timmins R | 270.31 | -0.1 | ML-Main | 3350 |
| ML-Main | 3326 | Timmins R | 270.32 | -0.07 | ML-Main | 3326 |
| ML-Main | 3272 | Timmins R | 269.86 | 0 | ML-Main | 3272 |
| ML-Main | 3225 | Timmins R | 269.45 | -0.12 | ML-Main | 3225 |
| ML-Main | 3109 | Timmins R | 268.84 | -0.1 | ML-Main | 3109 |
| ML-Main | 3036 | Timmins R | 268.65 | -0.08 | ML-Main | 3036 |
| ML-Main | 2995 | Timmins R | 268.58 | -0.07 | ML-Main | 2995 |
| ML-Main | 2936 | Timmins R | 268.32 | -0.07 | ML-Main | 2936 |
| ML-Main | 2885 | Timmins R | 268.14 | -0.03 | ML-Main | 2885 |
| ML-Main | 2875 | Timmins R | 268.04 | 0 | ML-Main | 2875 |
| ML-Main | 2869 | MCL04 | Culvert | | ML-Main | 2869 MC |
| ML-Main | 2862 | Timmins R | 267.92 | 0 | ML-Main | 2862 |
| ML-Main | 2854 | Timmins R | 267.87 | -0.19 | ML-Main | 2854 |
| ML-Main | 2782 | Timmins R | 267.21 | -0.08 | ML-Main | 2782 |
| ML-Main | 2725 | Timmins R | 267.3 | -0.05 | ML-Main | 2725 |
| ML-Main | 2657 | Timmins R | 267.29 | -0.05 | ML-Main | 2657 |
| ML-Main | 2511 | 900 Timmins R | 266.99 | -0.07 | ML-Main | 2511 900 |
| ML-Main | 2439 | Timmins R | 266.96 | -0.03 | ML-Main | 2439 |

| | | | | | | | |
|---------|------|------------|------------|--------|---------|---------|----------|
| ML-Main | 2341 | Timmins RC | 266.89 | -0.01 | ML-Main | 2341 | |
| ML-Main | 2319 | Timmins RC | 266.89 | 0 | ML-Main | 2319 | |
| ML-Main | 2311 | Timmins RC | 266.89 | 0 | ML-Main | 2311 | |
| ML-Main | 2299 | MCL03 | Culvert | | ML-Main | 2299 MC | |
| ML-Main | 2291 | Timmins RC | 266.79 | -0.02 | ML-Main | 2291 | |
| ML-Main | 2288 | Timmins RC | 266.79 | -0.02 | ML-Main | 2288 | |
| ML-Main | 2263 | Timmins RC | 266.78 | -0.02 | ML-Main | 2263 | |
| ML-Main | 2161 | Timmins RC | 266.7 | 0 | ML-Main | 2161 | |
| ML-Main | 2107 | Timmins RC | 266.71 | 0 | ML-Main | 2107 | |
| ML-Main | 2102 | Timmins RC | 266.71 | 0 | ML-Main | 2102 | |
| ML-Main | 2088 | MCL01 | Culvert | | ML-Main | 2088 MC | |
| ML-Main | 2071 | Timmins RC | 266.3 | 0 | ML-Main | 2071 | |
| ML-Main | 2065 | Timmins RC | 265.48 | -0.51 | ML-Main | 2065 | |
| ML-Main | 1968 | Timmins RC | 265.05 | -0.09 | ML-Main | 1968 | |
| ML-Main | 1894 | Timmins RC | 264.7 | -0.08 | ML-Main | 1894 | |
| ML-Main | 1767 | Timmins RC | 264.13 | -0.05 | ML-Main | 1767 | |
| ML-Main | 1613 | Timmins RC | 264.08 | 0 | ML-Main | 1613 | |
| ML-Main | 1603 | Timmins RC | 264.08 | 0 | ML-Main | 1603 | |
| ML-Main | 1595 | | Bridge | | ML-Main | 1595 | |
| ML-Main | 1588 | Timmins RC | 263.18 | 0 | ML-Main | 1588 | |
| ML-Main | 1583 | Timmins RC | 262.42 | -0.01 | ML-Main | 1583 | |
| ML-Main | 1416 | Timmins RC | 260.83 | 0 | ML-Main | 1416 | |
| ML-Main | 1370 | Timmins RC | 259.78 | -0.15 | ML-Main | 1370 | |
| ML-Main | 1223 | Timmins RC | 256.33 | -0.06 | ML-Main | 1223 | |
| ML-Main | 1172 | Timmins RC | 255.35 | -0.06 | ML-Main | 1172 | |
| ML-Main | 1054 | 11C | Timmins RC | 254.35 | 0 | ML-Main | 1054 11C |
| ML-Main | 1042 | Timmins RC | 254.34 | 0 | ML-Main | 1042 | |
| ML-Main | 1025 | | Mult Open | | ML-Main | 1025 | |
| ML-Main | 1008 | Timmins RC | 253.8 | -0.01 | ML-Main | 1008 | |
| ML-Main | 1000 | Timmins RC | 253.3 | 0 | ML-Main | 1000 | |
| | | | Min | -0.51 | | | |
| | | | Max | 0 | | | |

e Elevation Mn minus 20%

McLaren Water Surface Elevation No Dam

| Profile | W.S. Elev (m) | | Reach | River Sta | Profile | W.S. Elev (m) | |
|------------|------------------|-------|---------|-----------|----------------|------------------|-------|
| Timmins RC | 276.02 | 0.1 | ML-Main | 4761 | 30C Timmins RC | 276.12 | 0 |
| Timmins RC | 275.94 | 0.08 | ML-Main | 4665 | Timmins RC | 276.02 | 0 |
| Timmins RC | 275.87 | 0.08 | ML-Main | 4600 | Timmins RC | 275.95 | 0 |
| Timmins RC | 275.85 | 0.06 | ML-Main | 4524 | Timmins RC | 275.91 | 0 |
| Timmins RC | 275.33 | 0.11 | ML-Main | 4399 | 50C Timmins RC | 275.44 | 0 |
| Timmins RC | 275.09 | 0.08 | ML-Main | 4303 | Timmins RC | 275.17 | 0 |
| Timmins RC | 274.96 | 0.06 | ML-Main | 4196 | Timmins RC | 275.02 | 0 |
| Timmins RC | 274.6 | 0.1 | ML-Main | 4049 | Timmins RC | 274.71 | -0.01 |
| Timmins RC | 274.26 | 0.06 | ML-Main | 3884 | Timmins RC | 274.25 | 0.07 |
| Timmins RC | 274.19 | 0.02 | ML-Main | 3769 | Timmins RC | 273.97 | 0.24 |
| Timmins RC | 274.16 | 0 | ML-Main | 3632 | Timmins RC | 273.74 | 0.42 |
| Timmins RC | 274.16 | 0 | ML-Main | 3565 | Timmins RC | 273.72 | 0.44 |
| Timmins RC | 274.16 | 0 | ML-Main | 3531 | Timmins RC | 273.52 | 0.64 |
| | Inl Struct | | ML-Main | 3516 | Timmins RC | 271.44 | |
| Timmins RC | 271.98 | 0 | | | | | |
| Timmins RC | 271.94 | 0.03 | ML-Main | 3495 | Timmins RC | 271.97 | 0 |
| Timmins RC | 272.05 | 0.02 | ML-Main | 3476 | Timmins RC | 272.07 | 0 |
| Timmins RC | 272.01 | 0.02 | ML-Main | 3461 | Timmins RC | 272.03 | 0 |
| Timmins RC | 272.01 | 0.02 | ML-Main | 3450 | 60C Timmins RC | 272.03 | 0 |
| Timmins RC | 271.93 | 0.02 | ML-Main | 3429 | Timmins RC | 271.95 | 0 |
| L06 | Bridge | | ML-Main | 3423 | MCL06 | Bridge | |
| Timmins RC | 271.65 | 0 | ML-Main | 3415 | Timmins RC | 271.65 | 0 |
| Timmins RC | 271.13 | 0.02 | ML-Main | 3384 | Timmins RC | 271.15 | 0 |
| Timmins RC | 271.13 | 0.01 | ML-Main | 3361 | Timmins RC | 271.14 | 0 |
| L05 | Bridge | | ML-Main | 3356 | MCL05 | Bridge | |
| Timmins RC | 270.2 | 0.01 | ML-Main | 3350 | Timmins RC | 270.23 | -0.02 |
| Timmins RC | 270.18 | 0.07 | ML-Main | 3326 | Timmins RC | 270.27 | -0.02 |
| Timmins RC | 269.86 | 0 | ML-Main | 3272 | Timmins RC | 269.8 | 0.06 |
| Timmins RC | 269.25 | 0.08 | ML-Main | 3225 | Timmins RC | 269.37 | -0.04 |
| Timmins RC | 268.63 | 0.11 | ML-Main | 3109 | Timmins RC | 268.74 | 0 |
| Timmins RC | 268.49 | 0.08 | ML-Main | 3036 | Timmins RC | 268.57 | 0 |
| Timmins RC | 268.43 | 0.08 | ML-Main | 2995 | Timmins RC | 268.51 | 0 |
| Timmins RC | 268.18 | 0.07 | ML-Main | 2936 | Timmins RC | 268.25 | 0 |
| Timmins RC | 268.1 | 0.01 | ML-Main | 2885 | Timmins RC | 268.11 | 0 |
| Timmins RC | 268.04 | 0 | ML-Main | 2875 | Timmins RC | 268.04 | 0 |
| L04 | Culvert | | ML-Main | 2869 | MCL04 | Culvert | |
| Timmins RC | 267.92 | 0 | ML-Main | 2862 | Timmins RC | 267.92 | 0 |
| Timmins RC | 267.64 | 0.04 | ML-Main | 2854 | Timmins RC | 267.67 | 0.01 |
| Timmins RC | 267.15 | -0.02 | ML-Main | 2782 | Timmins RC | 267.31 | -0.18 |
| Timmins RC | 267.2 | 0.05 | ML-Main | 2725 | Timmins RC | 267.25 | 0 |
| Timmins RC | 267.19 | 0.05 | ML-Main | 2657 | Timmins RC | 267.24 | 0 |
| Timmins RC | 266.86 | 0.06 | ML-Main | 2511 | 90C Timmins RC | 266.92 | 0 |
| Timmins RC | 266.92 | 0.01 | ML-Main | 2439 | Timmins RC | 266.93 | 0 |

| | | | | | | | | |
|------------|-----------|-------|---------|------|------------|------------|--------|---|
| Timmins RC | 266.88 | 0 | ML-Main | 2341 | Timmins RC | 266.88 | 0 | |
| Timmins RC | 266.89 | 0 | ML-Main | 2319 | Timmins RC | 266.89 | 0 | |
| Timmins RC | 266.89 | 0 | ML-Main | 2311 | Timmins RC | 266.89 | 0 | |
| L03 | Culvert | | ML-Main | 2299 | MCL03 | Culvert | | |
| Timmins RC | 266.75 | 0.02 | ML-Main | 2291 | Timmins RC | 266.77 | 0 | |
| Timmins RC | 266.75 | 0.02 | ML-Main | 2288 | Timmins RC | 266.77 | 0 | |
| Timmins RC | 266.75 | 0.01 | ML-Main | 2263 | Timmins RC | 266.76 | 0 | |
| Timmins RC | 266.69 | 0.01 | ML-Main | 2161 | Timmins RC | 266.7 | 0 | |
| Timmins RC | 266.71 | 0 | ML-Main | 2107 | Timmins RC | 266.71 | 0 | |
| Timmins RC | 266.71 | 0 | ML-Main | 2102 | Timmins RC | 266.71 | 0 | |
| L01 | Culvert | | ML-Main | 2088 | MCL01 | Culvert | | |
| Timmins RC | 266.3 | 0 | ML-Main | 2071 | Timmins RC | 266.3 | 0 | |
| Timmins RC | 264.97 | 0 | ML-Main | 2065 | Timmins RC | 264.97 | 0 | |
| Timmins RC | 264.83 | 0.13 | ML-Main | 1968 | Timmins RC | 264.96 | 0 | |
| Timmins RC | 264.51 | 0.11 | ML-Main | 1894 | Timmins RC | 264.62 | 0 | |
| Timmins RC | 264.02 | 0.06 | ML-Main | 1767 | Timmins RC | 264.08 | 0 | |
| Timmins RC | 264.08 | 0 | ML-Main | 1613 | Timmins RC | 264.08 | 0 | |
| Timmins RC | 264.08 | 0 | ML-Main | 1603 | Timmins RC | 264.08 | 0 | |
| | Bridge | | ML-Main | 1595 | | Bridge | | |
| Timmins RC | 263.18 | 0 | ML-Main | 1588 | Timmins RC | 263.18 | 0 | |
| Timmins RC | 262.4 | 0.01 | ML-Main | 1583 | Timmins RC | 262.41 | 0 | |
| Timmins RC | 260.83 | 0 | ML-Main | 1416 | Timmins RC | 260.84 | -0.01 | |
| Timmins RC | 259.53 | 0.1 | ML-Main | 1370 | Timmins RC | 259.63 | 0 | |
| Timmins RC | 256.15 | 0.12 | ML-Main | 1223 | Timmins RC | 256.27 | 0 | |
| Timmins RC | 255.18 | 0.11 | ML-Main | 1172 | Timmins RC | 255.29 | 0 | |
| Timmins RC | 254.34 | 0.01 | ML-Main | 1054 | 110 | Timmins RC | 254.35 | 0 |
| Timmins RC | 254.34 | 0 | ML-Main | 1042 | Timmins RC | 254.35 | -0.01 | |
| | Mult Open | | ML-Main | 1025 | | Mult Open | | |
| Timmins RC | 253.79 | 0 | ML-Main | 1008 | Timmins RC | 253.79 | 0 | |
| Timmins RC | 253.3 | 0 | ML-Main | 1000 | Timmins RC | 253.3 | 0 | |
| | Min | -0.02 | | | Min | | -0.18 | |
| | Max | 0.13 | | | Max | | 0.64 | |

McLaren Water Surface Elevation Base Model

McLaren Water Surfac

| Reach | River Sta | Profile | W.S. Elev (m) | Reach | River Sta |
|---------|------------|-----------------|------------------|---------|------------|
| ML-Main | 4761 30000 | Timmins RC | 276.12 | ML-Main | 4761 30000 |
| ML-Main | | 4665 Timmins RC | 276.02 | ML-Main | 4665 |
| ML-Main | | 4600 Timmins RC | 275.95 | ML-Main | 4600 |
| ML-Main | | 4524 Timmins RC | 275.91 | ML-Main | 4524 |
| ML-Main | 4399 50000 | Timmins RC | 275.44 | ML-Main | 4399 50000 |
| ML-Main | | 4303 Timmins RC | 275.17 | ML-Main | 4303 |
| ML-Main | | 4196 Timmins RC | 275.02 | ML-Main | 4196 |
| ML-Main | | 4049 Timmins RC | 274.7 | ML-Main | 4049 |
| ML-Main | | 3884 Timmins RC | 274.32 | ML-Main | 3884 |
| ML-Main | | 3769 Timmins RC | 274.21 | ML-Main | 3769 |
| ML-Main | | 3632 Timmins RC | 274.16 | ML-Main | 3632 |
| ML-Main | | 3565 Timmins RC | 274.16 | ML-Main | 3565 |
| ML-Main | | 3531 Timmins RC | 274.16 | ML-Main | 3531 |
| ML-Main | | 3521 | Inl Struct | ML-Main | 3521 |
| ML-Main | | 3516 Timmins RC | 271.98 | ML-Main | 3516 |
| ML-Main | | 3495 Timmins RC | 271.97 | ML-Main | 3495 |
| ML-Main | | 3476 Timmins RC | 272.07 | ML-Main | 3476 |
| ML-Main | | 3461 Timmins RC | 272.03 | ML-Main | 3461 |
| ML-Main | 3450 60000 | Timmins RC | 272.03 | ML-Main | 3450 60000 |
| ML-Main | | 3429 Timmins RC | 271.95 | ML-Main | 3429 |
| ML-Main | 3423 MCL06 | | Bridge | ML-Main | 3423 MC |
| ML-Main | | 3415 Timmins RC | 271.65 | ML-Main | 3415 |
| ML-Main | | 3384 Timmins RC | 271.15 | ML-Main | 3384 |
| ML-Main | | 3361 Timmins RC | 271.14 | ML-Main | 3361 |
| ML-Main | 3356 MCL05 | | Bridge | ML-Main | 3356 MC |
| ML-Main | | 3350 Timmins RC | 270.21 | ML-Main | 3350 |
| ML-Main | | 3326 Timmins RC | 270.25 | ML-Main | 3326 |
| ML-Main | | 3272 Timmins RC | 269.86 | ML-Main | 3272 |
| ML-Main | | 3225 Timmins RC | 269.33 | ML-Main | 3225 |
| ML-Main | | 3109 Timmins RC | 268.74 | ML-Main | 3109 |
| ML-Main | | 3036 Timmins RC | 268.57 | ML-Main | 3036 |
| ML-Main | | 2995 Timmins RC | 268.51 | ML-Main | 2995 |
| ML-Main | | 2936 Timmins RC | 268.25 | ML-Main | 2936 |
| ML-Main | | 2885 Timmins RC | 268.11 | ML-Main | 2885 |
| ML-Main | | 2875 Timmins RC | 268.04 | ML-Main | 2875 |
| ML-Main | 2869 MCL04 | | Culvert | ML-Main | 2869 MC |
| ML-Main | | 2862 Timmins RC | 267.92 | ML-Main | 2862 |
| ML-Main | | 2854 Timmins RC | 267.68 | ML-Main | 2854 |
| ML-Main | | 2782 Timmins RC | 267.13 | ML-Main | 2782 |
| ML-Main | | 2725 Timmins RC | 267.25 | ML-Main | 2725 |
| ML-Main | | 2657 Timmins RC | 267.24 | ML-Main | 2657 |
| ML-Main | 2511 90000 | Timmins RC | 266.92 | ML-Main | 2511 90000 |
| ML-Main | | 2439 Timmins RC | 266.93 | ML-Main | 2439 |

| | | | | | | |
|---------|------|--------|-----------------|-----------|---------|-------------|
| ML-Main | | | 2341 Timmins RC | 266.88 | ML-Main | 2341 |
| ML-Main | | | 2319 Timmins RC | 266.89 | ML-Main | 2319 |
| ML-Main | | | 2311 Timmins RC | 266.89 | ML-Main | 2311 |
| ML-Main | 2299 | MCL03 | | Culvert | ML-Main | 2299 MC |
| ML-Main | | | 2291 Timmins RC | 266.77 | ML-Main | 2291 |
| ML-Main | | | 2288 Timmins RC | 266.77 | ML-Main | 2288 |
| ML-Main | | | 2263 Timmins RC | 266.76 | ML-Main | 2263 |
| ML-Main | | | 2161 Timmins RC | 266.7 | ML-Main | 2161 |
| ML-Main | | | 2107 Timmins RC | 266.71 | ML-Main | 2107 |
| ML-Main | | | 2102 Timmins RC | 266.71 | ML-Main | 2102 |
| ML-Main | 2088 | MCL01 | | Culvert | ML-Main | 2088 MC |
| ML-Main | | | 2071 Timmins RC | 266.3 | ML-Main | 2071 |
| ML-Main | | | 2065 Timmins RC | 264.97 | ML-Main | 2065 |
| ML-Main | | | 1968 Timmins RC | 264.96 | ML-Main | 1968 |
| ML-Main | | | 1894 Timmins RC | 264.62 | ML-Main | 1894 |
| ML-Main | | | 1767 Timmins RC | 264.08 | ML-Main | 1767 |
| ML-Main | | | 1613 Timmins RC | 264.08 | ML-Main | 1613 |
| ML-Main | | | 1603 Timmins RC | 264.08 | ML-Main | 1603 |
| ML-Main | | | 1595 | Bridge | ML-Main | 1595 |
| ML-Main | | | 1588 Timmins RC | 263.18 | ML-Main | 1588 |
| ML-Main | | | 1583 Timmins RC | 262.41 | ML-Main | 1583 |
| ML-Main | | | 1416 Timmins RC | 260.83 | ML-Main | 1416 |
| ML-Main | | | 1370 Timmins RC | 259.63 | ML-Main | 1370 |
| ML-Main | | | 1223 Timmins RC | 256.27 | ML-Main | 1223 |
| ML-Main | | | 1172 Timmins RC | 255.29 | ML-Main | 1172 |
| ML-Main | 1054 | 110000 | Timmins RC | 254.35 | ML-Main | 1054 110000 |
| ML-Main | | | 1042 Timmins RC | 254.34 | ML-Main | 1042 |
| ML-Main | | | 1025 | Mult Open | ML-Main | 1025 |
| ML-Main | | | 1008 Timmins RC | 253.79 | ML-Main | 1008 |
| ML-Main | | | 1000 Timmins RC | 253.3 | ML-Main | 1000 |

e Elevation Peakflow plus 30%

McLaren Water Surface Elevation Peakflow minus 30%

| Profile | W.S. Elev (m) | Base-PkFlow | Reach | River Sta | Profile | W.S. Elev (m) | Base-PkFlow |
|------------|------------------|-------------|---------|-----------|------------------|------------------|-------------|
| Timmins +3 | 276.31 | -0.19 | ML-Main | 4761 | 30(Timmins -30% | 275.95 | 0.17 |
| Timmins +3 | 276.23 | -0.21 | ML-Main | 4665 | Timmins -30% | 275.81 | 0.21 |
| Timmins +3 | 276.19 | -0.24 | ML-Main | 4600 | Timmins -30% | 275.72 | 0.23 |
| Timmins +3 | 276.16 | -0.25 | ML-Main | 4524 | Timmins -30% | 275.68 | 0.23 |
| Timmins +3 | 275.49 | -0.05 | ML-Main | 4399 | 50(Timmins -30% | 275.33 | 0.11 |
| Timmins +3 | 275.26 | -0.09 | ML-Main | 4303 | Timmins -30% | 275.07 | 0.1 |
| Timmins +3 | 275.12 | -0.1 | ML-Main | 4196 | Timmins -30% | 274.91 | 0.11 |
| Timmins +3 | 274.81 | -0.11 | ML-Main | 4049 | Timmins -30% | 274.56 | 0.14 |
| Timmins +3 | 274.43 | -0.11 | ML-Main | 3884 | Timmins -30% | 274.2 | 0.12 |
| Timmins +3 | 274.3 | -0.09 | ML-Main | 3769 | Timmins -30% | 274.11 | 0.1 |
| Timmins +3 | 274.23 | -0.07 | ML-Main | 3632 | Timmins -30% | 274.08 | 0.08 |
| Timmins +3 | 274.22 | -0.06 | ML-Main | 3565 | Timmins -30% | 274.08 | 0.08 |
| Timmins +3 | 274.22 | -0.06 | ML-Main | 3531 | Timmins -30% | 274.08 | 0.08 |
| | Inl Struct | | ML-Main | 3521 | | Inl Struct | |
| Timmins +3 | 272.26 | -0.28 | ML-Main | 3516 | Timmins -30% | 271.98 | 0 |
| Timmins +3 | 272.02 | -0.05 | ML-Main | 3495 | Timmins -30% | 272.04 | -0.07 |
| Timmins +3 | 272.18 | -0.11 | ML-Main | 3476 | Timmins -30% | 272.09 | -0.02 |
| Timmins +3 | 272.14 | -0.11 | ML-Main | 3461 | Timmins -30% | 272.07 | -0.04 |
| Timmins +3 | 272.13 | -0.1 | ML-Main | 3450 | 60(Timmins -30% | 272.07 | -0.04 |
| Timmins +3 | 272.05 | -0.1 | ML-Main | 3429 | Timmins -30% | 272.05 | -0.1 |
| L06 | Bridge | | ML-Main | 3423 | MCL06 | Bridge | |
| Timmins +3 | 271.81 | -0.16 | ML-Main | 3415 | Timmins -30% | 270.87 | 0.78 |
| Timmins +3 | 271.23 | -0.08 | ML-Main | 3384 | Timmins -30% | 271.06 | 0.09 |
| Timmins +3 | 271.21 | -0.07 | ML-Main | 3361 | Timmins -30% | 271.05 | 0.09 |
| L05 | Bridge | | ML-Main | 3356 | MCL05 | Bridge | |
| Timmins +3 | 270.35 | -0.14 | ML-Main | 3350 | Timmins -30% | 269.78 | 0.43 |
| Timmins +3 | 270.43 | -0.18 | ML-Main | 3326 | Timmins -30% | 270.05 | 0.2 |
| Timmins +3 | 270 | -0.14 | ML-Main | 3272 | Timmins -30% | 269.61 | 0.25 |
| Timmins +3 | 269.43 | -0.1 | ML-Main | 3225 | Timmins -30% | 269.21 | 0.12 |
| Timmins +3 | 268.88 | -0.14 | ML-Main | 3109 | Timmins -30% | 268.59 | 0.15 |
| Timmins +3 | 268.71 | -0.14 | ML-Main | 3036 | Timmins -30% | 268.4 | 0.17 |
| Timmins +3 | 268.64 | -0.13 | ML-Main | 2995 | Timmins -30% | 268.34 | 0.17 |
| Timmins +3 | 268.35 | -0.1 | ML-Main | 2936 | Timmins -30% | 268.14 | 0.11 |
| Timmins +3 | 268.22 | -0.11 | ML-Main | 2885 | Timmins -30% | 268.05 | 0.06 |
| Timmins +3 | 268.12 | -0.08 | ML-Main | 2875 | Timmins -30% | 267.91 | 0.13 |
| L04 | Culvert | | ML-Main | 2869 | MCL04 | Culvert | |
| Timmins +3 | 267.99 | -0.07 | ML-Main | 2862 | Timmins -30% | 267.81 | 0.11 |
| Timmins +3 | 267.78 | -0.1 | ML-Main | 2854 | Timmins -30% | 267.58 | 0.1 |
| Timmins +3 | 267.39 | -0.26 | ML-Main | 2782 | Timmins -30% | 266.99 | 0.14 |
| Timmins +3 | 267.37 | -0.12 | ML-Main | 2725 | Timmins -30% | 267.09 | 0.16 |
| Timmins +3 | 267.36 | -0.12 | ML-Main | 2657 | Timmins -30% | 267.08 | 0.16 |
| Timmins +3 | 267.01 | -0.09 | ML-Main | 2511 | 90(Timmins -30% | 266.83 | 0.09 |
| Timmins +3 | 267.02 | -0.09 | ML-Main | 2439 | Timmins -30% | 266.84 | 0.09 |

| | | | | | | |
|------------|-----------|-------|---------|-----------------------|-----------|------|
| Timmins +3 | 266.95 | -0.07 | ML-Main | 2341 Timmins -30% | 266.81 | 0.07 |
| Timmins +3 | 266.96 | -0.07 | ML-Main | 2319 Timmins -30% | 266.82 | 0.07 |
| Timmins +3 | 266.96 | -0.07 | ML-Main | 2311 Timmins -30% | 266.81 | 0.08 |
| L03 | Culvert | | ML-Main | 2299 MCL03 | Culvert | |
| Timmins +3 | 266.85 | -0.08 | ML-Main | 2291 Timmins -30% | 266.68 | 0.09 |
| Timmins +3 | 266.85 | -0.08 | ML-Main | 2288 Timmins -30% | 266.68 | 0.09 |
| Timmins +3 | 266.84 | -0.08 | ML-Main | 2263 Timmins -30% | 266.67 | 0.09 |
| Timmins +3 | 266.74 | -0.04 | ML-Main | 2161 Timmins -30% | 266.64 | 0.06 |
| Timmins +3 | 266.77 | -0.06 | ML-Main | 2107 Timmins -30% | 266.64 | 0.07 |
| Timmins +3 | 266.76 | -0.05 | ML-Main | 2102 Timmins -30% | 266.64 | 0.07 |
| L01 | Culvert | | ML-Main | 2088 MCL01 | Culvert | |
| Timmins +3 | 266.3 | 0 | ML-Main | 2071 Timmins -30% | 266.3 | 0 |
| Timmins +3 | 265.54 | -0.57 | ML-Main | 2065 Timmins -30% | 264.81 | 0.16 |
| Timmins +3 | 265.08 | -0.12 | ML-Main | 1968 Timmins -30% | 264.79 | 0.17 |
| Timmins +3 | 264.72 | -0.1 | ML-Main | 1894 Timmins -30% | 264.48 | 0.14 |
| Timmins +3 | 264.17 | -0.09 | ML-Main | 1767 Timmins -30% | 263.95 | 0.13 |
| Timmins +3 | 264.15 | -0.07 | ML-Main | 1613 Timmins -30% | 263.97 | 0.11 |
| Timmins +3 | 264.15 | -0.07 | ML-Main | 1603 Timmins -30% | 263.97 | 0.11 |
| | Bridge | | ML-Main | 1595 | Bridge | |
| Timmins +3 | 263.18 | 0 | ML-Main | 1588 Timmins -30% | 262.93 | 0.25 |
| Timmins +3 | 262.63 | -0.22 | ML-Main | 1583 Timmins -30% | 262.08 | 0.33 |
| Timmins +3 | 261.07 | -0.24 | ML-Main | 1416 Timmins -30% | 260.58 | 0.25 |
| Timmins +3 | 259.76 | -0.13 | ML-Main | 1370 Timmins -30% | 259.49 | 0.14 |
| Timmins +3 | 256.43 | -0.16 | ML-Main | 1223 Timmins -30% | 256.08 | 0.19 |
| Timmins +3 | 255.42 | -0.13 | ML-Main | 1172 Timmins -30% | 255.14 | 0.15 |
| Timmins +3 | 254.43 | -0.08 | ML-Main | 1054 11(Timmins -30% | 254.25 | 0.1 |
| Timmins +3 | 254.43 | -0.09 | ML-Main | 1042 Timmins -30% | 254.25 | 0.09 |
| | Mult Open | | ML-Main | 1025 | Mult Open | |
| Timmins +3 | 254.02 | -0.23 | ML-Main | 1008 Timmins -30% | 253.54 | 0.25 |
| Timmins +3 | 253.42 | -0.12 | ML-Main | 1000 Timmins -30% | 253.19 | 0.11 |
| | Min | -0.57 | | | Min | -0.1 |
| | Max | 0 | | | Max | 0.78 |

McLaren Water Surface Elevation Mn plus 20%

McLaren Water Surfac

| Reach | River Sta | Profile | W.S. Elev (m) | | Reach | River Sta |
|---------|-----------|---------------|------------------|-------|---------|-----------|
| ML-Main | 4761 | 30C Timmins R | 276.22 | -0.1 | ML-Main | 4761 30C |
| ML-Main | 4665 | Timmins R | 276.12 | -0.1 | ML-Main | 4665 |
| ML-Main | 4600 | Timmins R | 276.06 | -0.11 | ML-Main | 4600 |
| ML-Main | 4524 | Timmins R | 276.01 | -0.1 | ML-Main | 4524 |
| ML-Main | 4399 | 50C Timmins R | 275.54 | -0.1 | ML-Main | 4399 50C |
| ML-Main | 4303 | Timmins R | 275.24 | -0.07 | ML-Main | 4303 |
| ML-Main | 4196 | Timmins R | 275.09 | -0.07 | ML-Main | 4196 |
| ML-Main | 4049 | Timmins R | 274.78 | -0.08 | ML-Main | 4049 |
| ML-Main | 3884 | Timmins R | 274.39 | -0.07 | ML-Main | 3884 |
| ML-Main | 3769 | Timmins R | 274.24 | -0.03 | ML-Main | 3769 |
| ML-Main | 3632 | Timmins R | 274.17 | -0.01 | ML-Main | 3632 |
| ML-Main | 3565 | Timmins R | 274.16 | 0 | ML-Main | 3565 |
| ML-Main | 3531 | Timmins R | 274.16 | 0 | ML-Main | 3531 |
| ML-Main | 3521 | Inl Struct | | | ML-Main | 3521 |
| ML-Main | 3516 | Timmins R | 271.98 | 0 | ML-Main | 3516 |
| ML-Main | 3495 | Timmins R | 272.01 | -0.04 | ML-Main | 3495 |
| ML-Main | 3476 | Timmins R | 272.1 | -0.03 | ML-Main | 3476 |
| ML-Main | 3461 | Timmins R | 272.05 | -0.02 | ML-Main | 3461 |
| ML-Main | 3450 | 60C Timmins R | 272.05 | -0.02 | ML-Main | 3450 60C |
| ML-Main | 3429 | Timmins R | 271.97 | -0.02 | ML-Main | 3429 |
| ML-Main | 3423 | MCL06 | Bridge | | ML-Main | 3423 MC |
| ML-Main | 3415 | Timmins R | 271.65 | 0 | ML-Main | 3415 |
| ML-Main | 3384 | Timmins R | 271.17 | -0.02 | ML-Main | 3384 |
| ML-Main | 3361 | Timmins R | 271.15 | -0.01 | ML-Main | 3361 |
| ML-Main | 3356 | MCL05 | Bridge | | ML-Main | 3356 MC |
| ML-Main | 3350 | Timmins R | 270.31 | -0.1 | ML-Main | 3350 |
| ML-Main | 3326 | Timmins R | 270.32 | -0.07 | ML-Main | 3326 |
| ML-Main | 3272 | Timmins R | 269.86 | 0 | ML-Main | 3272 |
| ML-Main | 3225 | Timmins R | 269.45 | -0.12 | ML-Main | 3225 |
| ML-Main | 3109 | Timmins R | 268.84 | -0.1 | ML-Main | 3109 |
| ML-Main | 3036 | Timmins R | 268.65 | -0.08 | ML-Main | 3036 |
| ML-Main | 2995 | Timmins R | 268.58 | -0.07 | ML-Main | 2995 |
| ML-Main | 2936 | Timmins R | 268.32 | -0.07 | ML-Main | 2936 |
| ML-Main | 2885 | Timmins R | 268.14 | -0.03 | ML-Main | 2885 |
| ML-Main | 2875 | Timmins R | 268.04 | 0 | ML-Main | 2875 |
| ML-Main | 2869 | MCL04 | Culvert | | ML-Main | 2869 MC |
| ML-Main | 2862 | Timmins R | 267.92 | 0 | ML-Main | 2862 |
| ML-Main | 2854 | Timmins R | 267.87 | -0.19 | ML-Main | 2854 |
| ML-Main | 2782 | Timmins R | 267.21 | -0.08 | ML-Main | 2782 |
| ML-Main | 2725 | Timmins R | 267.3 | -0.05 | ML-Main | 2725 |
| ML-Main | 2657 | Timmins R | 267.29 | -0.05 | ML-Main | 2657 |
| ML-Main | 2511 | 90C Timmins R | 266.99 | -0.07 | ML-Main | 2511 90C |
| ML-Main | 2439 | Timmins R | 266.96 | -0.03 | ML-Main | 2439 |

| | | | | | | | |
|---------|------|------------|------------|--------|---------|---------|----------|
| ML-Main | 2341 | Timmins RC | 266.89 | -0.01 | ML-Main | 2341 | |
| ML-Main | 2319 | Timmins RC | 266.89 | 0 | ML-Main | 2319 | |
| ML-Main | 2311 | Timmins RC | 266.89 | 0 | ML-Main | 2311 | |
| ML-Main | 2299 | MCL03 | Culvert | | ML-Main | 2299 MC | |
| ML-Main | 2291 | Timmins RC | 266.79 | -0.02 | ML-Main | 2291 | |
| ML-Main | 2288 | Timmins RC | 266.79 | -0.02 | ML-Main | 2288 | |
| ML-Main | 2263 | Timmins RC | 266.78 | -0.02 | ML-Main | 2263 | |
| ML-Main | 2161 | Timmins RC | 266.7 | 0 | ML-Main | 2161 | |
| ML-Main | 2107 | Timmins RC | 266.71 | 0 | ML-Main | 2107 | |
| ML-Main | 2102 | Timmins RC | 266.71 | 0 | ML-Main | 2102 | |
| ML-Main | 2088 | MCL01 | Culvert | | ML-Main | 2088 MC | |
| ML-Main | 2071 | Timmins RC | 266.3 | 0 | ML-Main | 2071 | |
| ML-Main | 2065 | Timmins RC | 265.48 | -0.51 | ML-Main | 2065 | |
| ML-Main | 1968 | Timmins RC | 265.05 | -0.09 | ML-Main | 1968 | |
| ML-Main | 1894 | Timmins RC | 264.7 | -0.08 | ML-Main | 1894 | |
| ML-Main | 1767 | Timmins RC | 264.13 | -0.05 | ML-Main | 1767 | |
| ML-Main | 1613 | Timmins RC | 264.08 | 0 | ML-Main | 1613 | |
| ML-Main | 1603 | Timmins RC | 264.08 | 0 | ML-Main | 1603 | |
| ML-Main | 1595 | | Bridge | | ML-Main | 1595 | |
| ML-Main | 1588 | Timmins RC | 263.18 | 0 | ML-Main | 1588 | |
| ML-Main | 1583 | Timmins RC | 262.42 | -0.01 | ML-Main | 1583 | |
| ML-Main | 1416 | Timmins RC | 260.83 | 0 | ML-Main | 1416 | |
| ML-Main | 1370 | Timmins RC | 259.78 | -0.15 | ML-Main | 1370 | |
| ML-Main | 1223 | Timmins RC | 256.33 | -0.06 | ML-Main | 1223 | |
| ML-Main | 1172 | Timmins RC | 255.35 | -0.06 | ML-Main | 1172 | |
| ML-Main | 1054 | 11C | Timmins RC | 254.35 | 0 | ML-Main | 1054 11C |
| ML-Main | 1042 | Timmins RC | 254.34 | 0 | ML-Main | 1042 | |
| ML-Main | 1025 | | Mult Open | | ML-Main | 1025 | |
| ML-Main | 1008 | Timmins RC | 253.8 | -0.01 | ML-Main | 1008 | |
| ML-Main | 1000 | Timmins RC | 253.3 | 0 | ML-Main | 1000 | |
| | | | Min | -0.51 | | | |
| | | | Max | 0 | | | |

e Elevation Mn minus 20%

McLaren Water Surface Elevation No Dam

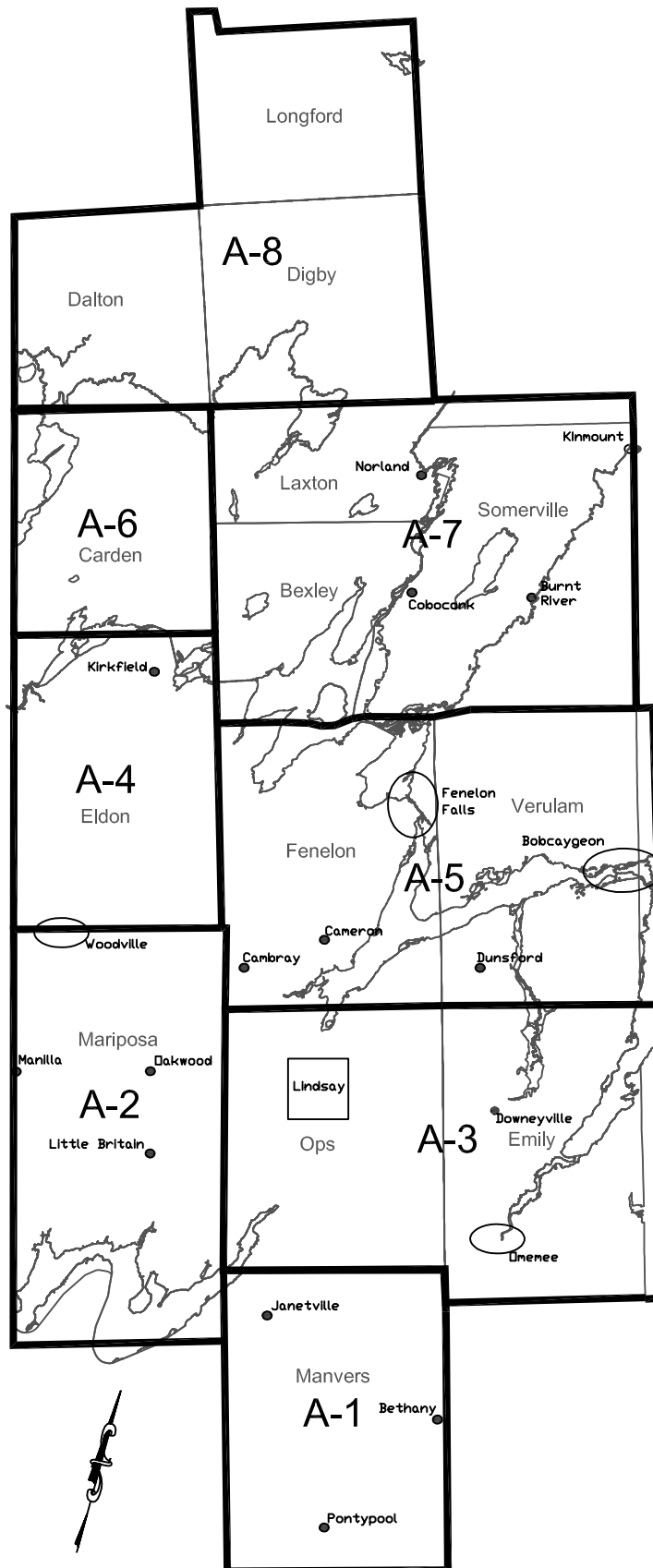
| Profile | W.S. Elev (m) | | Reach | River Sta | Profile | W.S. Elev (m) | |
|------------|------------------|-------|---------|-----------|----------------|------------------|-------|
| Timmins RC | 276.02 | 0.1 | ML-Main | 4761 | 30C Timmins RC | 276.12 | 0 |
| Timmins RC | 275.94 | 0.08 | ML-Main | 4665 | Timmins RC | 276.02 | 0 |
| Timmins RC | 275.87 | 0.08 | ML-Main | 4600 | Timmins RC | 275.95 | 0 |
| Timmins RC | 275.85 | 0.06 | ML-Main | 4524 | Timmins RC | 275.91 | 0 |
| Timmins RC | 275.33 | 0.11 | ML-Main | 4399 | 50C Timmins RC | 275.44 | 0 |
| Timmins RC | 275.09 | 0.08 | ML-Main | 4303 | Timmins RC | 275.17 | 0 |
| Timmins RC | 274.96 | 0.06 | ML-Main | 4196 | Timmins RC | 275.02 | 0 |
| Timmins RC | 274.6 | 0.1 | ML-Main | 4049 | Timmins RC | 274.71 | -0.01 |
| Timmins RC | 274.26 | 0.06 | ML-Main | 3884 | Timmins RC | 274.25 | 0.07 |
| Timmins RC | 274.19 | 0.02 | ML-Main | 3769 | Timmins RC | 273.97 | 0.24 |
| Timmins RC | 274.16 | 0 | ML-Main | 3632 | Timmins RC | 273.74 | 0.42 |
| Timmins RC | 274.16 | 0 | ML-Main | 3565 | Timmins RC | 273.72 | 0.44 |
| Timmins RC | 274.16 | 0 | ML-Main | 3531 | Timmins RC | 273.52 | 0.64 |
| | Inl Struct | | ML-Main | 3516 | Timmins RC | 271.44 | |
| Timmins RC | 271.98 | 0 | | | | | |
| Timmins RC | 271.94 | 0.03 | ML-Main | 3495 | Timmins RC | 271.97 | 0 |
| Timmins RC | 272.05 | 0.02 | ML-Main | 3476 | Timmins RC | 272.07 | 0 |
| Timmins RC | 272.01 | 0.02 | ML-Main | 3461 | Timmins RC | 272.03 | 0 |
| Timmins RC | 272.01 | 0.02 | ML-Main | 3450 | 60C Timmins RC | 272.03 | 0 |
| Timmins RC | 271.93 | 0.02 | ML-Main | 3429 | Timmins RC | 271.95 | 0 |
| L06 | Bridge | | ML-Main | 3423 | MCL06 | Bridge | |
| Timmins RC | 271.65 | 0 | ML-Main | 3415 | Timmins RC | 271.65 | 0 |
| Timmins RC | 271.13 | 0.02 | ML-Main | 3384 | Timmins RC | 271.15 | 0 |
| Timmins RC | 271.13 | 0.01 | ML-Main | 3361 | Timmins RC | 271.14 | 0 |
| L05 | Bridge | | ML-Main | 3356 | MCL05 | Bridge | |
| Timmins RC | 270.2 | 0.01 | ML-Main | 3350 | Timmins RC | 270.23 | -0.02 |
| Timmins RC | 270.18 | 0.07 | ML-Main | 3326 | Timmins RC | 270.27 | -0.02 |
| Timmins RC | 269.86 | 0 | ML-Main | 3272 | Timmins RC | 269.8 | 0.06 |
| Timmins RC | 269.25 | 0.08 | ML-Main | 3225 | Timmins RC | 269.37 | -0.04 |
| Timmins RC | 268.63 | 0.11 | ML-Main | 3109 | Timmins RC | 268.74 | 0 |
| Timmins RC | 268.49 | 0.08 | ML-Main | 3036 | Timmins RC | 268.57 | 0 |
| Timmins RC | 268.43 | 0.08 | ML-Main | 2995 | Timmins RC | 268.51 | 0 |
| Timmins RC | 268.18 | 0.07 | ML-Main | 2936 | Timmins RC | 268.25 | 0 |
| Timmins RC | 268.1 | 0.01 | ML-Main | 2885 | Timmins RC | 268.11 | 0 |
| Timmins RC | 268.04 | 0 | ML-Main | 2875 | Timmins RC | 268.04 | 0 |
| L04 | Culvert | | ML-Main | 2869 | MCL04 | Culvert | |
| Timmins RC | 267.92 | 0 | ML-Main | 2862 | Timmins RC | 267.92 | 0 |
| Timmins RC | 267.64 | 0.04 | ML-Main | 2854 | Timmins RC | 267.67 | 0.01 |
| Timmins RC | 267.15 | -0.02 | ML-Main | 2782 | Timmins RC | 267.31 | -0.18 |
| Timmins RC | 267.2 | 0.05 | ML-Main | 2725 | Timmins RC | 267.25 | 0 |
| Timmins RC | 267.19 | 0.05 | ML-Main | 2657 | Timmins RC | 267.24 | 0 |
| Timmins RC | 266.86 | 0.06 | ML-Main | 2511 | 90C Timmins RC | 266.92 | 0 |
| Timmins RC | 266.92 | 0.01 | ML-Main | 2439 | Timmins RC | 266.93 | 0 |

| | | | | | | | | |
|------------|-----------|-------|---------|------|------------|------------|--------|---|
| Timmins RC | 266.88 | 0 | ML-Main | 2341 | Timmins RC | 266.88 | 0 | |
| Timmins RC | 266.89 | 0 | ML-Main | 2319 | Timmins RC | 266.89 | 0 | |
| Timmins RC | 266.89 | 0 | ML-Main | 2311 | Timmins RC | 266.89 | 0 | |
| L03 | Culvert | | ML-Main | 2299 | MCL03 | Culvert | | |
| Timmins RC | 266.75 | 0.02 | ML-Main | 2291 | Timmins RC | 266.77 | 0 | |
| Timmins RC | 266.75 | 0.02 | ML-Main | 2288 | Timmins RC | 266.77 | 0 | |
| Timmins RC | 266.75 | 0.01 | ML-Main | 2263 | Timmins RC | 266.76 | 0 | |
| Timmins RC | 266.69 | 0.01 | ML-Main | 2161 | Timmins RC | 266.7 | 0 | |
| Timmins RC | 266.71 | 0 | ML-Main | 2107 | Timmins RC | 266.71 | 0 | |
| Timmins RC | 266.71 | 0 | ML-Main | 2102 | Timmins RC | 266.71 | 0 | |
| L01 | Culvert | | ML-Main | 2088 | MCL01 | Culvert | | |
| Timmins RC | 266.3 | 0 | ML-Main | 2071 | Timmins RC | 266.3 | 0 | |
| Timmins RC | 264.97 | 0 | ML-Main | 2065 | Timmins RC | 264.97 | 0 | |
| Timmins RC | 264.83 | 0.13 | ML-Main | 1968 | Timmins RC | 264.96 | 0 | |
| Timmins RC | 264.51 | 0.11 | ML-Main | 1894 | Timmins RC | 264.62 | 0 | |
| Timmins RC | 264.02 | 0.06 | ML-Main | 1767 | Timmins RC | 264.08 | 0 | |
| Timmins RC | 264.08 | 0 | ML-Main | 1613 | Timmins RC | 264.08 | 0 | |
| Timmins RC | 264.08 | 0 | ML-Main | 1603 | Timmins RC | 264.08 | 0 | |
| | Bridge | | ML-Main | 1595 | | Bridge | | |
| Timmins RC | 263.18 | 0 | ML-Main | 1588 | Timmins RC | 263.18 | 0 | |
| Timmins RC | 262.4 | 0.01 | ML-Main | 1583 | Timmins RC | 262.41 | 0 | |
| Timmins RC | 260.83 | 0 | ML-Main | 1416 | Timmins RC | 260.84 | -0.01 | |
| Timmins RC | 259.53 | 0.1 | ML-Main | 1370 | Timmins RC | 259.63 | 0 | |
| Timmins RC | 256.15 | 0.12 | ML-Main | 1223 | Timmins RC | 256.27 | 0 | |
| Timmins RC | 255.18 | 0.11 | ML-Main | 1172 | Timmins RC | 255.29 | 0 | |
| Timmins RC | 254.34 | 0.01 | ML-Main | 1054 | 110 | Timmins RC | 254.35 | 0 |
| Timmins RC | 254.34 | 0 | ML-Main | 1042 | Timmins RC | 254.35 | -0.01 | |
| | Mult Open | | ML-Main | 1025 | | Mult Open | | |
| Timmins RC | 253.79 | 0 | ML-Main | 1008 | Timmins RC | 253.79 | 0 | |
| Timmins RC | 253.3 | 0 | ML-Main | 1000 | Timmins RC | 253.3 | 0 | |
| | Min | -0.02 | | | | Min | -0.18 | |
| | Max | 0.13 | | | | Max | 0.64 | |

(m)

Appendix H
OP and Secondary Plan Maps

City of Kawartha Lakes Official Plan Schedule A Key Map



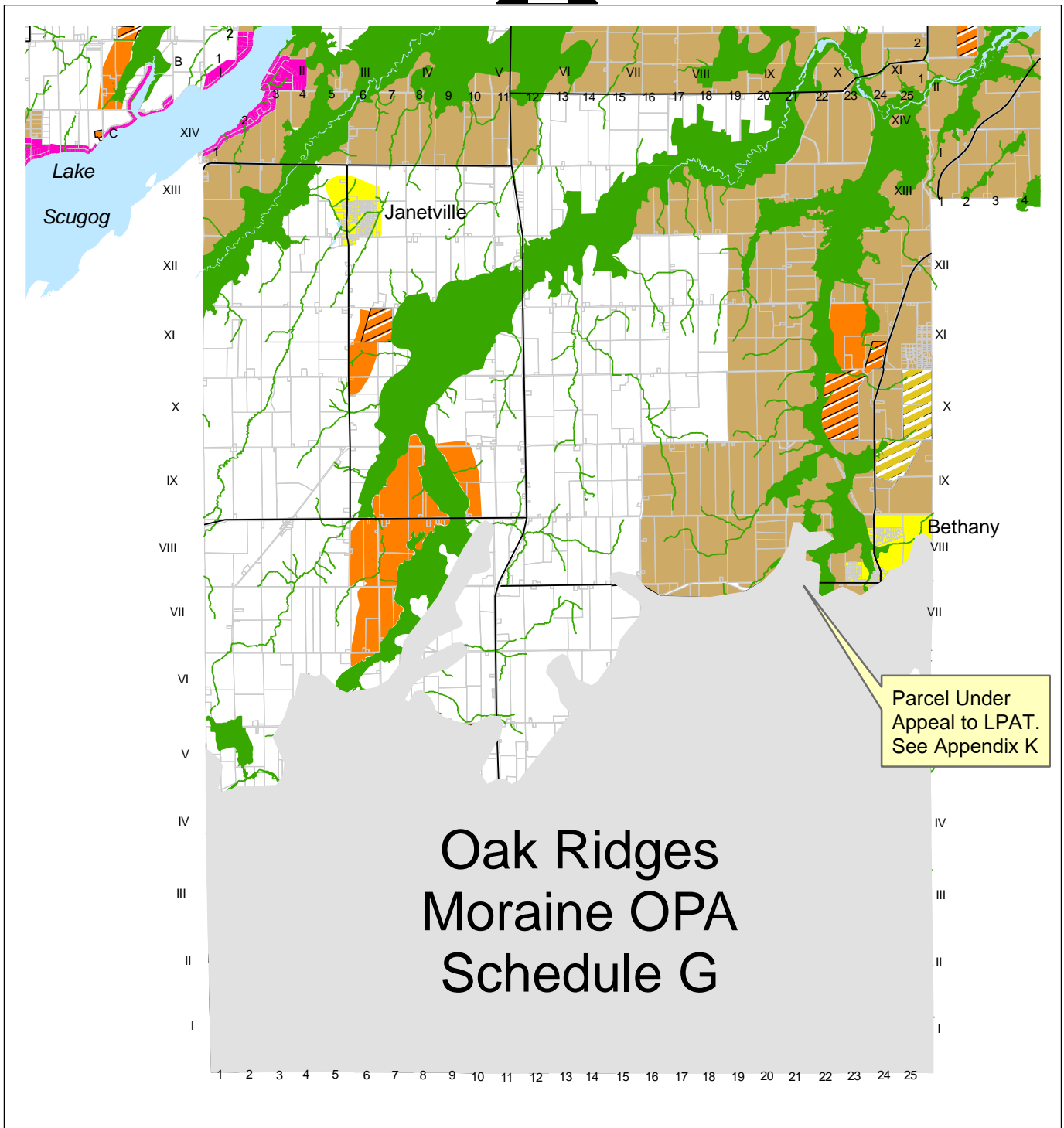
City of Kawartha Lakes Official Plan

Schedule A-1

March 17, 2011

(Geographic Township of Manvers)

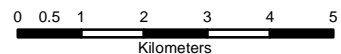
A-3



Oak Ridges Moraine OPA Schedule G

Land Use Designations

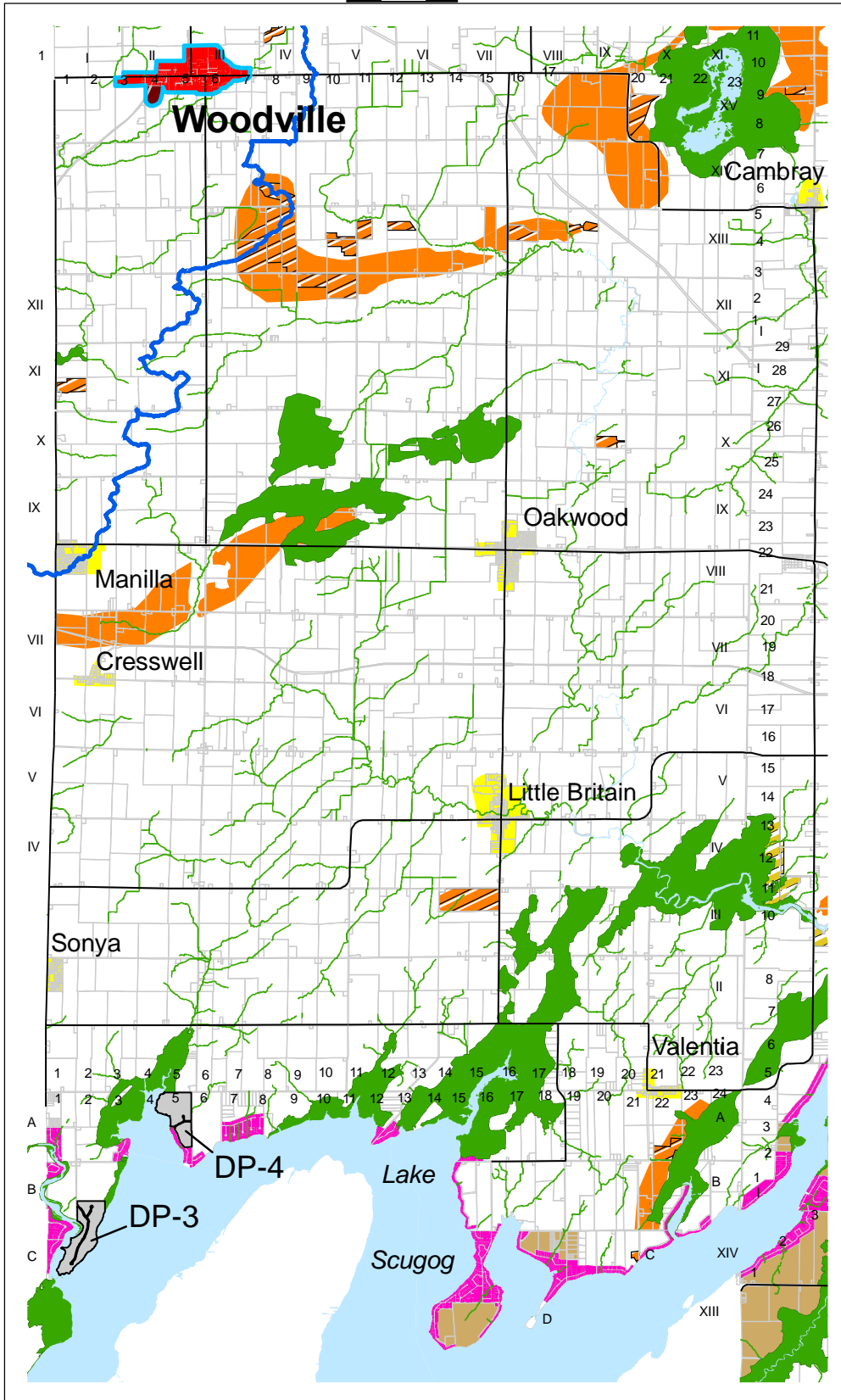
| | |
|--------------------------|--|
| Prime Agricultural | Aggregate |
| Rural | Open Space |
| Environmental Protection | Sand and Gravel Resource |
| Urban Settlement Area | Development Plan Area |
| Hamlet Settlement Area | Abandoned Mine Constraint |
| Waterfront | Urban Settlement Boundary |
| Highway Commercial | Lake Simcoe Source Water Protection Boundary |
| Tourist Commercial | SP-1 (Specific Lake Policy Area) |
| Industrial | |



City of Kawartha Lakes Official Plan Schedule A-2

March 17, 2011
(Geographic Township of Mariposa)

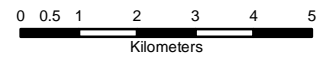
A-4



Land Use Designations

- Prime Agricultural
- Rural
- Environmental Protection
- Urban Settlement Area
- Hamlet Settlement Area
- Waterfront
- Highway Commercial
- Tourist Commercial
- Industrial
- Aggregate
- Open Space
- Sand and Gravel Resource
- Development Plan Area
- Abandoned Mine Constraint
- Urban Settlement Boundary
- Lake Simcoe Source Water Protection Boundary
- SP-1 (Specific Lake Policy Area)

A-3

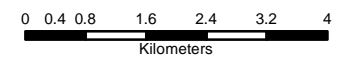
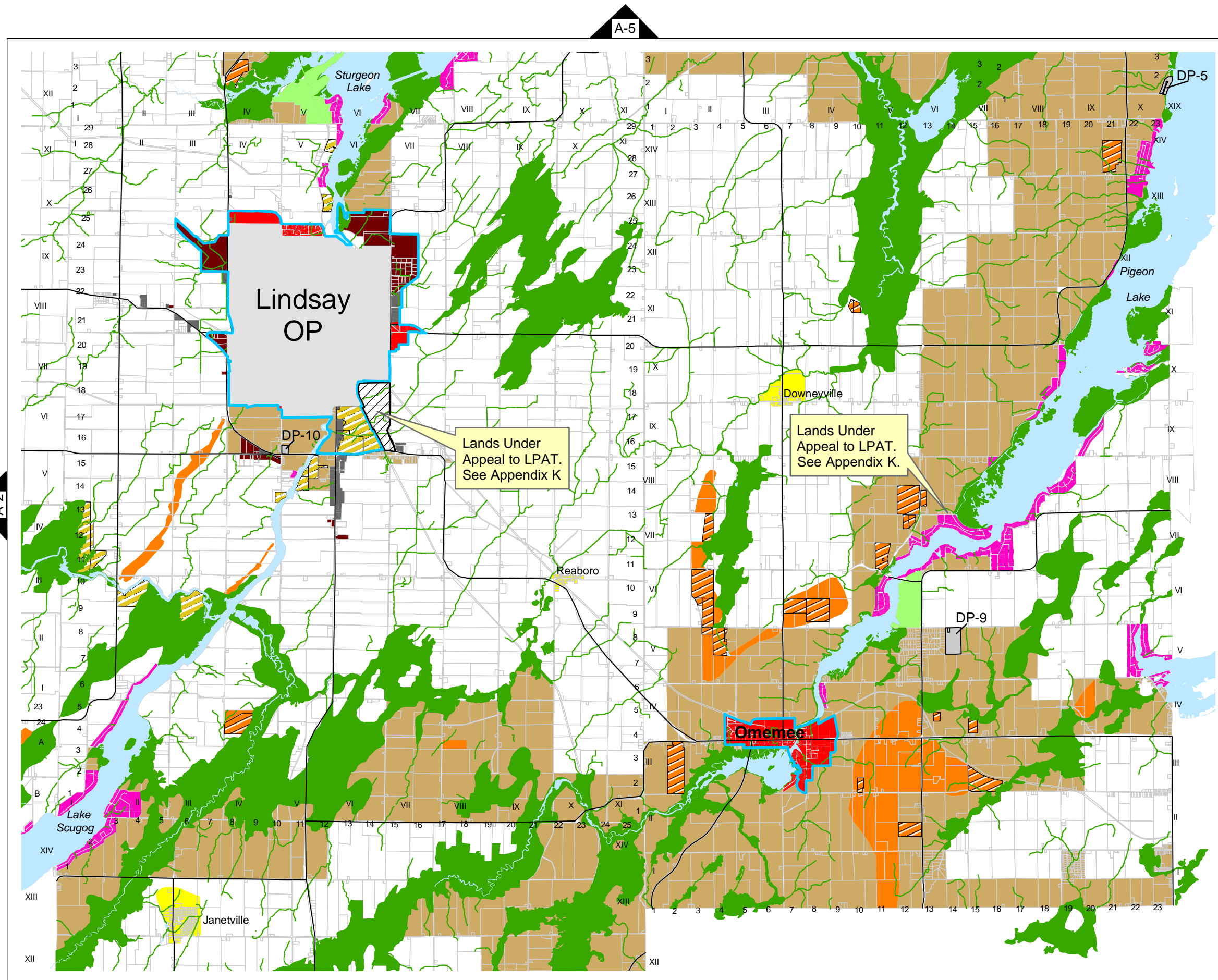


City of Kawartha Lakes Official Plan Schedule A-3

March 17, 2011
(Geographic Townships of Ops and Emily)

Land Use Designations

-  Prime Agricultural
-  Rural
-  Environmental Protection
-  Urban Settlement Area
-  Hamlet Settlement Area
-  Waterfront
-  Highway Commercial
-  Tourist Commercial
-  Industrial
-  Aggregate
-  Open Space
-  Sand and Gravel Resource
-  Development Plan Area
-  Abandoned Mine Constraint
-  Urban Settlement Boundary
-  Lake Simcoe Source Water Protection Boundary
-  SP-1 (Specific Lake Policy Area)



A-5

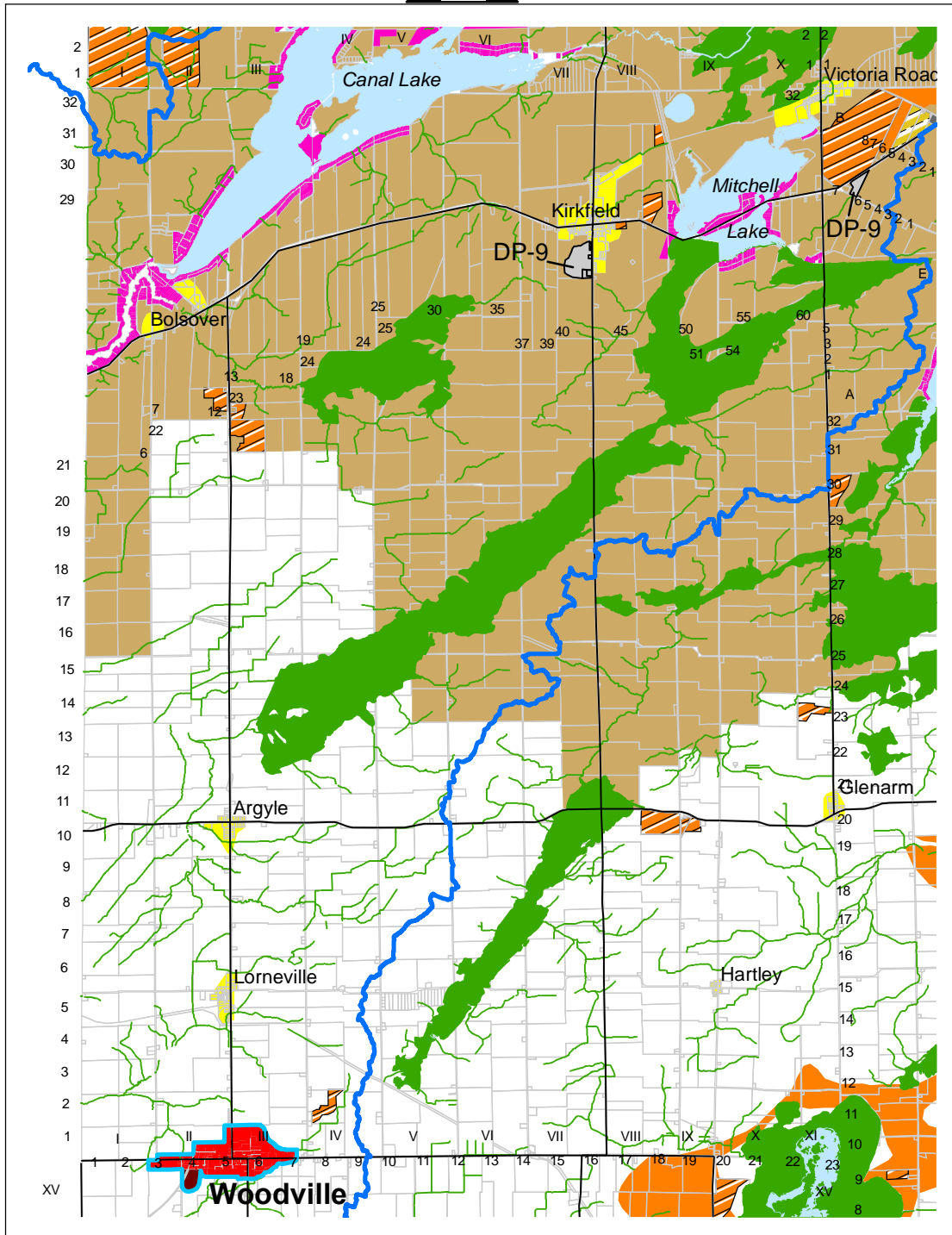
A-2

A-1

City of Kawartha Lakes Official Plan Schedule A-4

March 17, 2011
(Geographic Township of Eldon)

A-6

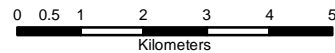


A-5

Land Use Designations

| | |
|--------------------------|--|
| Prime Agricultural | Aggregate |
| Rural | Open Space |
| Environmental Protection | Sand and Gravel Resource |
| Urban Settlement Area | Development Plan Area |
| Hamlet Settlement Area | Abandoned Mine Constraint |
| Waterfront | Urban Settlement Boundary |
| Highway Commercial | Lake Simcoe Source Water Protection Boundary |
| Tourist Commercial | SP-1 (Specific Lake Policy Area) |
| Industrial | |

A-2



City of Kawartha Lakes

Official Plan

Schedule A-5

March 17, 2011
(Geographic Townships of Fenelon and Verulam)

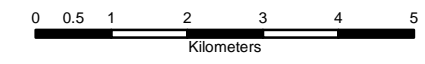
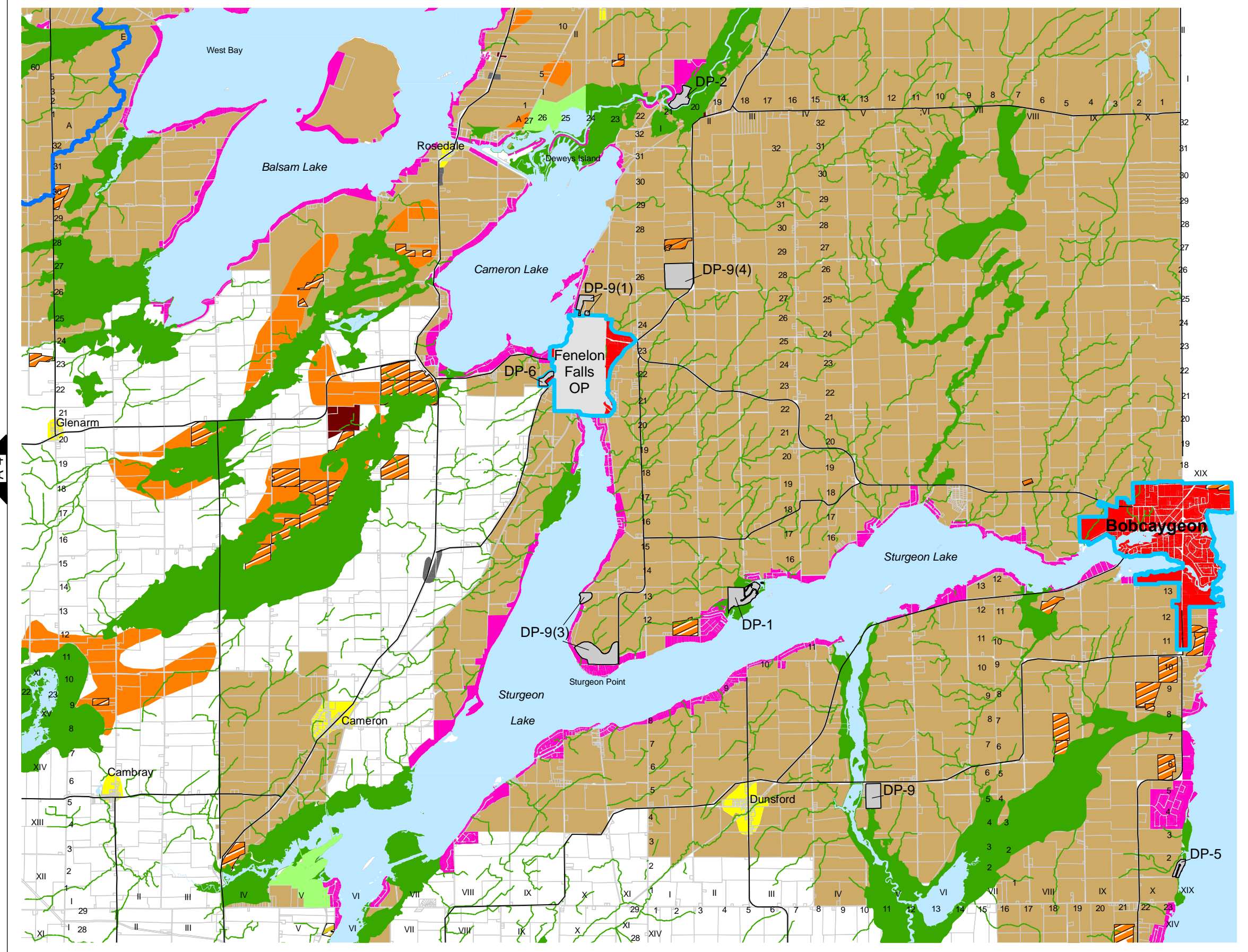
Land Use Designations

-  Prime Agricultural
-  Rural
-  Environmental Protection
-  Urban Settlement Area
-  Hamlet Settlement Area
-  Waterfront
-  Highway Commercial
-  Tourist Commercial
-  Industrial
-  Aggregate
-  Open Space
-  Sand and Gravel Resource
-  Development Plan Area
-  Abandoned Mine Constraint
-  Urban Settlement Boundary
-  Lake Simcoe Source Water Protection Plan Boundary
-  SP-1 (Specific Lake Policy Area)

A-7

A-3

A-4



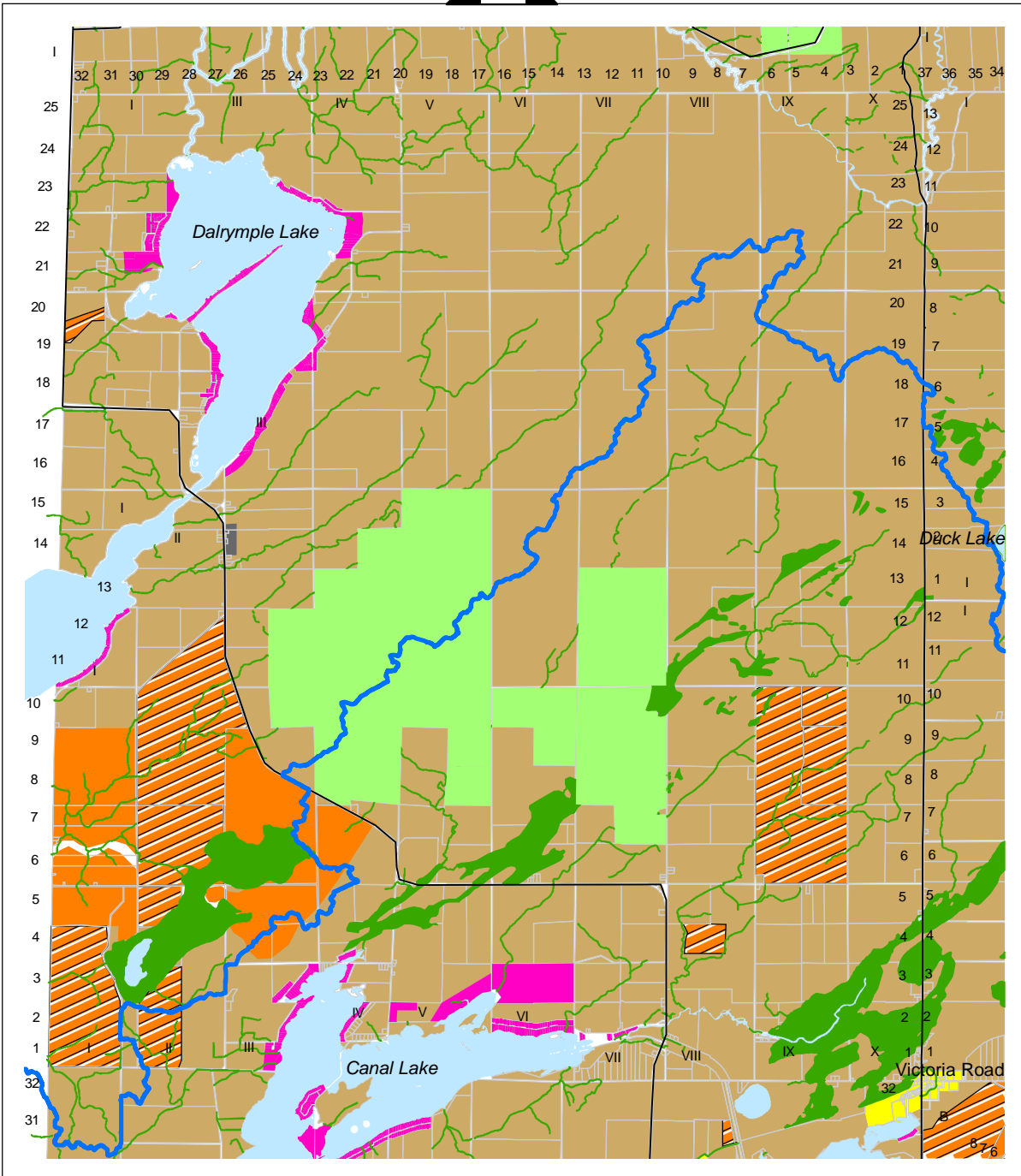
City of Kawartha Lakes Official Plan

Schedule A-6

March 17, 2011

(Geographic Township of Carden)

A-8



A-7

Land Use Designations

| | |
|--------------------------|--|
| Prime Agricultural | Aggregate |
| Rural | Open Space |
| Environmental Protection | Sand and Gravel Resource |
| Urban Settlement Area | Development Plan Area |
| Hamlet Settlement Area | Abandoned Mine Constraint |
| Waterfront | Urban Settlement Boundary |
| Highway Commercial | Lake Simcoe Source Water Protection Boundary |
| Tourist Commercial | SP-1 (Specific Lake Policy Area) |
| Industrial | |

A-4



City of Kawartha Lakes

Official Plan

Schedule A-7

March 17, 2011
 (Geographic Townships of
 Laxton, Bexley and Somerville)

Land Use Designations

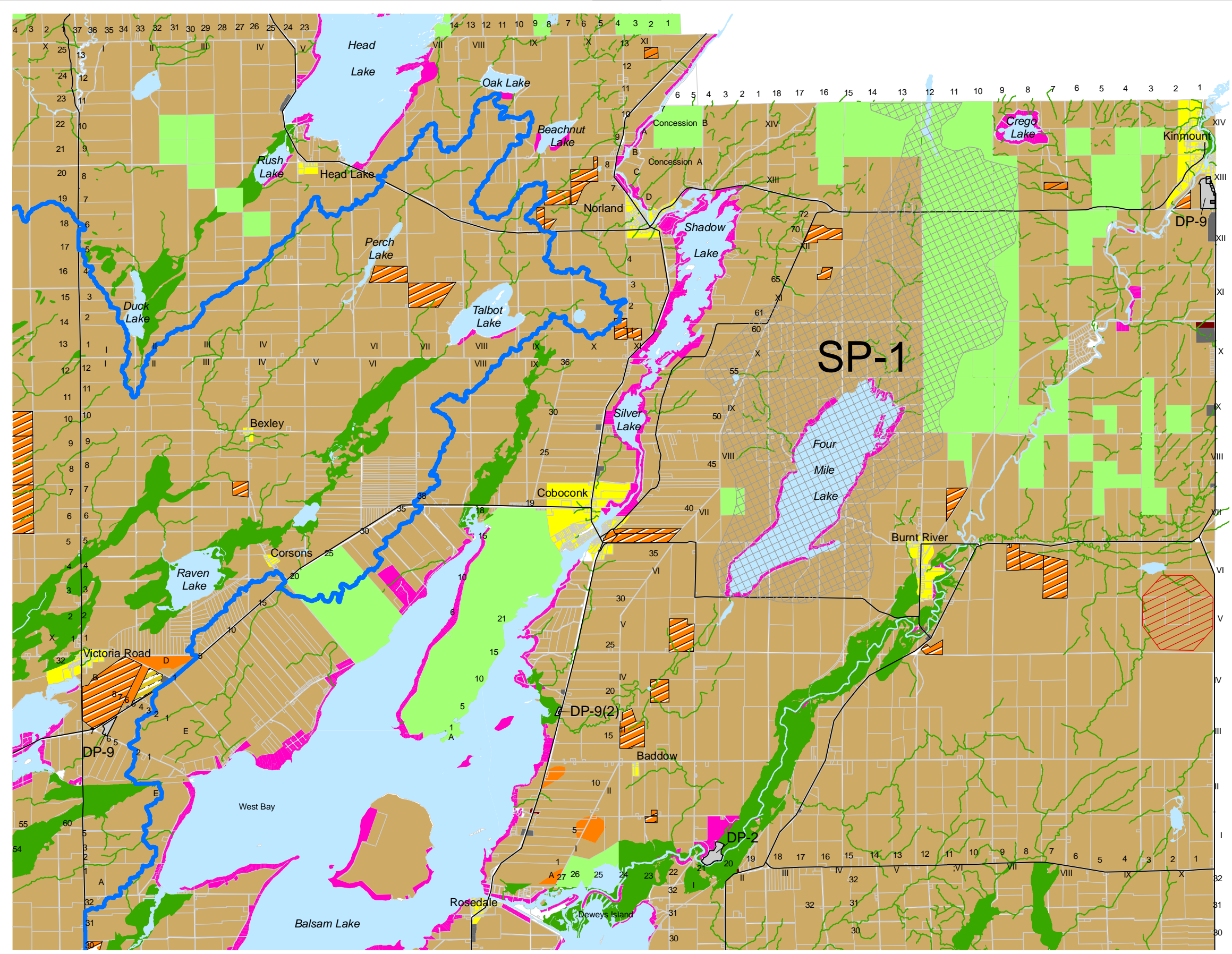
-  Prime Agricultural
-  Rural
-  Environmental Protection
-  Urban Settlement Area
-  Hamlet Settlement Area
-  Waterfront
-  Highway Commercial
-  Tourist Commercial
-  Industrial
-  Aggregate
-  Open Space
-  Sand and Gravel Resource
-  Development Plan Area
-  Abandoned Mine Constraint
-  Urban Settlement Boundary
-  Lake Simcoe Source Water Protection Boundary
-  SP-1 (Specific Lake Policy Area)



A-8

A-5

SP-1



A-6

City of Kawartha Lakes

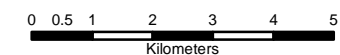
Official Plan

Schedule A-8

March 17, 2001
(Geographic Townships of Dalton, Digby and Longford)

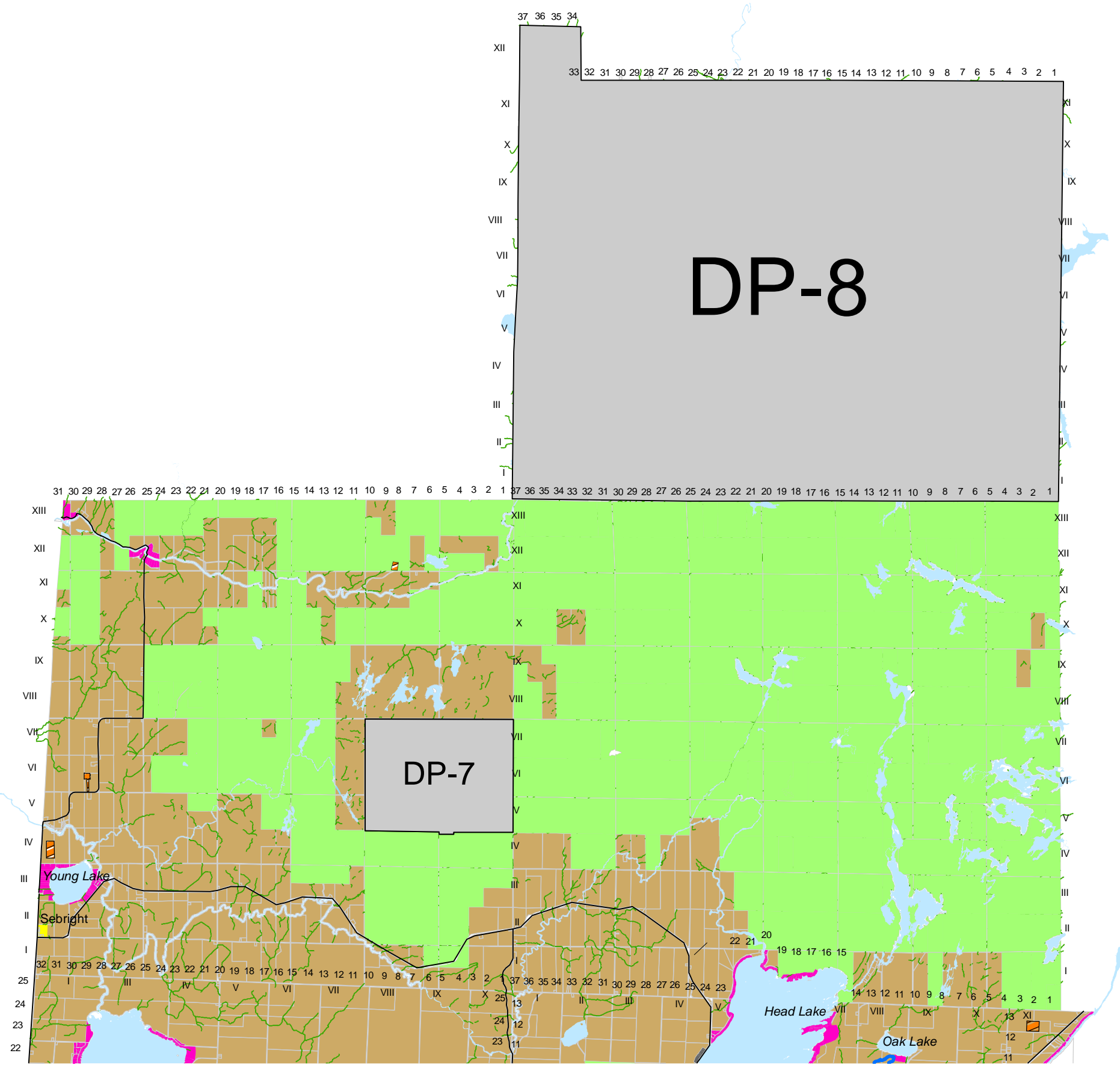
Land Use Designations

-  Prime Agricultural
-  Rural
-  Environmental Protection
-  Urban Settlement Area
-  Hamlet Settlement Area
-  Waterfront
-  Highway Commercial
-  Tourist Commercial
-  Industrial
-  Aggregate
-  Open Space
-  Sand and Gravel Resource
-  Development Plan Area
-  Abandoned Mine Constraint
-  Urban Settlement Boundary
-  Lake Simcoe Source Water Protection Boundary
-  SP-1 (Specific Lake Policy Area)



DP-8

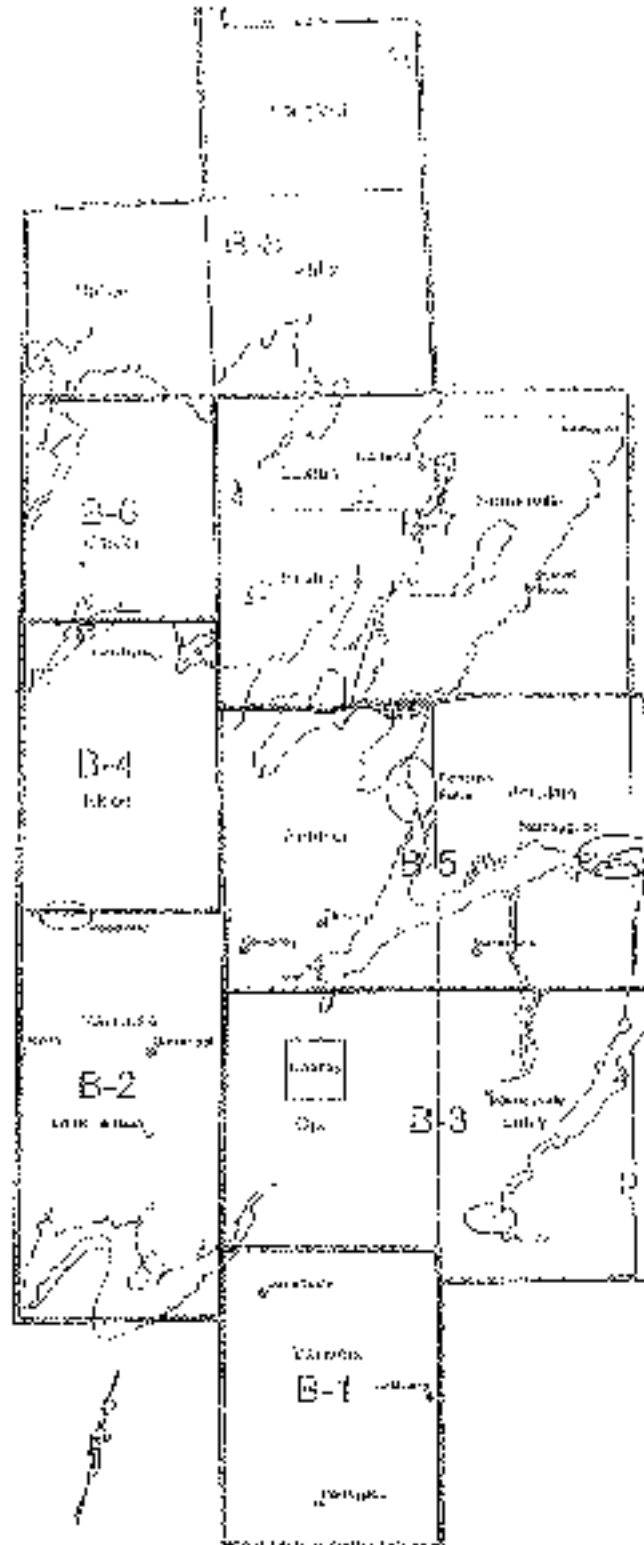
DP-7



A-6

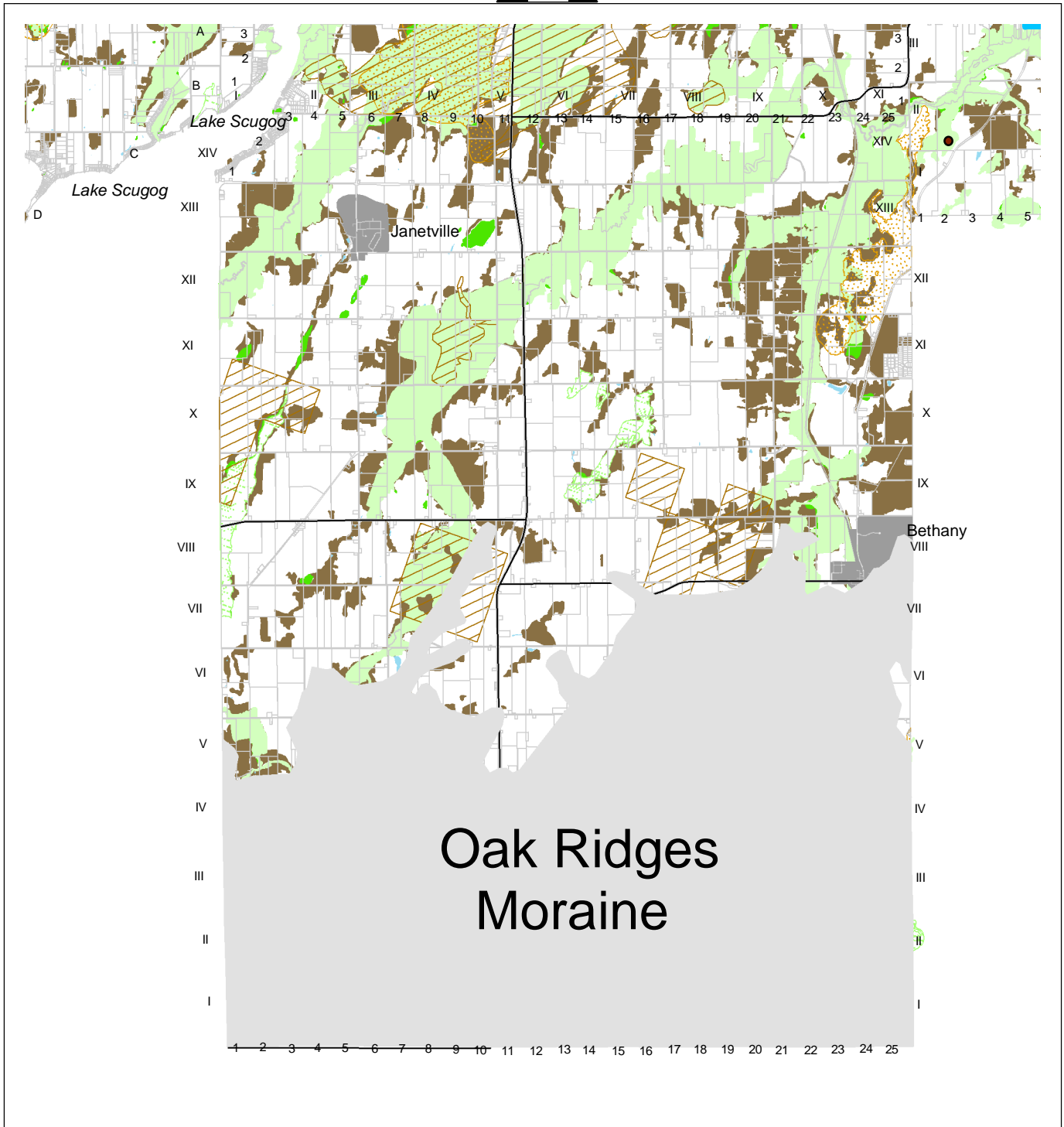
A-7

City of Kawartha Lakes
Official Plan Schedule B
Key Map



City of Kawartha Lakes Official Plan Schedule B-1 March 17, 2011 (Geographic Township of Manvers)

B-3



Natural Heritage Features

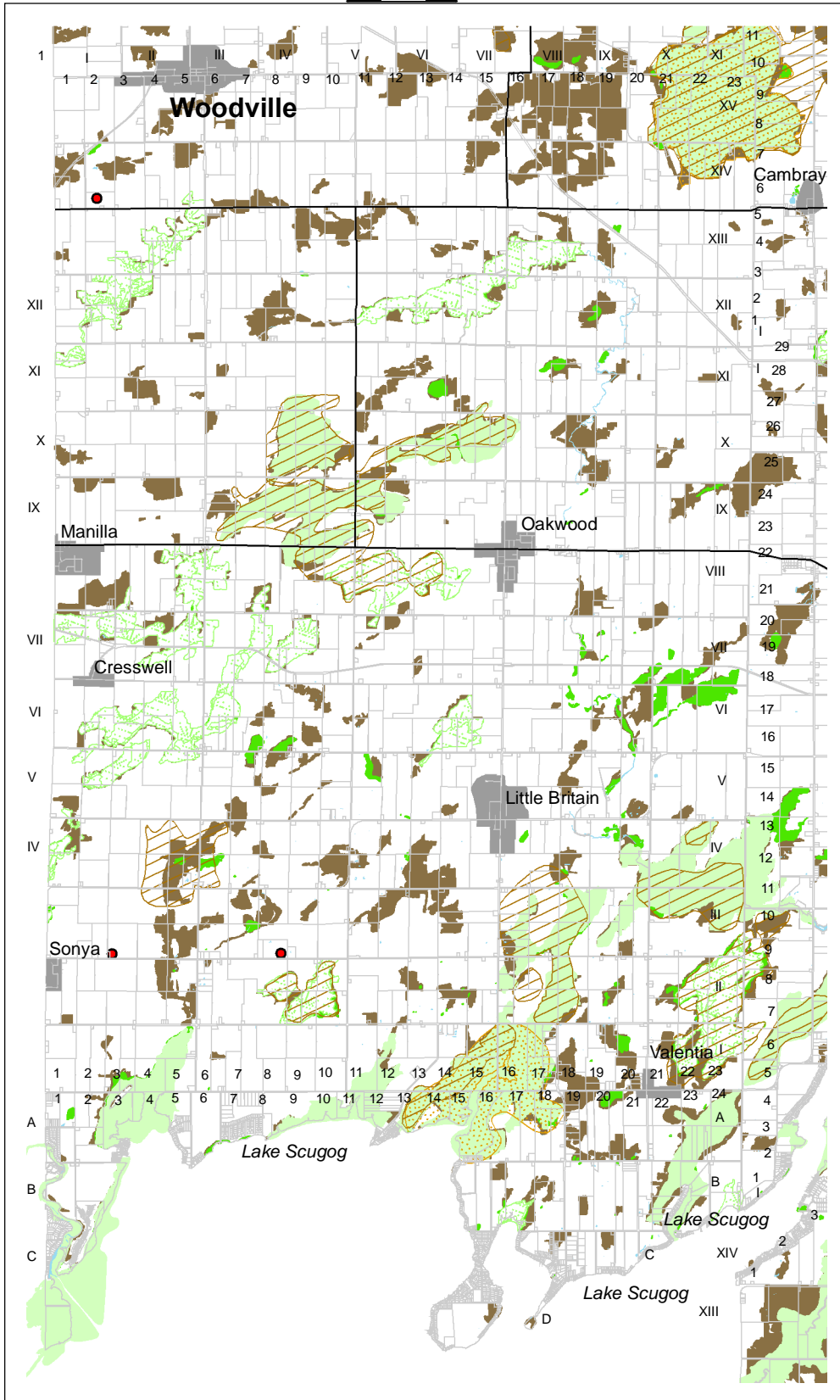
- | | | | |
|--|-----------------------------------|--|------------------------------|
| | ANSI | | Significant Woodlands |
| | Locally Significant Wetlands | | Significant Wildlife Habitat |
| | Provincially Significant Wetlands | | Petroleum Well |
| | Unevaluated Wetlands | | |
| | Waterbodies | | |



City of Kawartha Lakes Official Plan Schedule B-2

March 17, 2011
(Geographic Township of Mariposa)

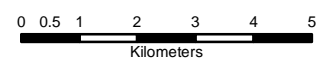
B-4



Natural Heritage Features

-  ANSI
-  Locally Significant Wetlands
-  Provincially Significant Wetlands
-  Unevaluated Wetlands
-  Waterbodies
-  Significant Woodlands
-  Significant Wildlife Habitat
-  Petroleum Well

B-3

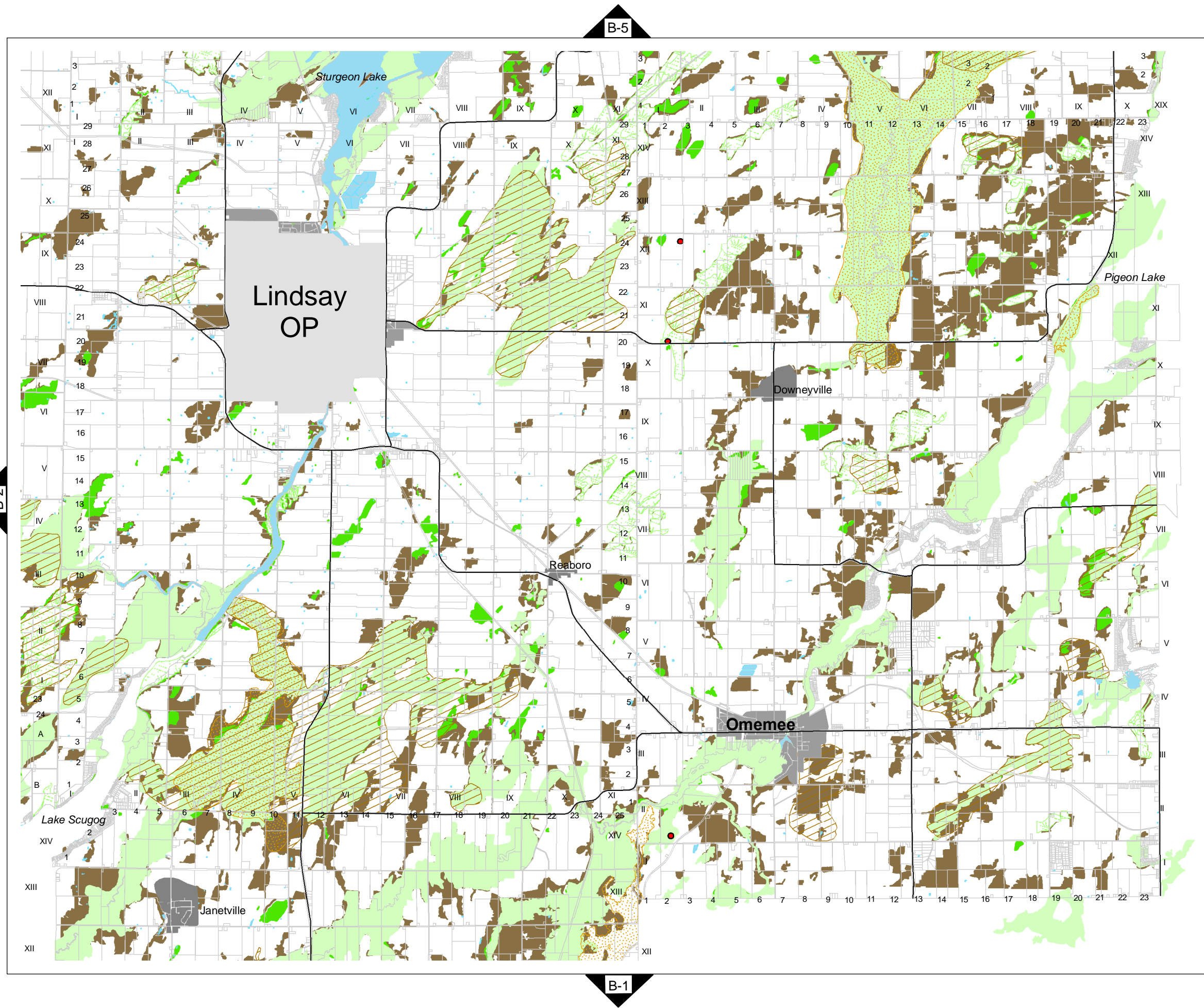


City of Kawartha Lakes



Official Plan

Schedule B-3

March 17, 2011
(Geographic Townships of Ops and Emily)



Natural Heritage Features

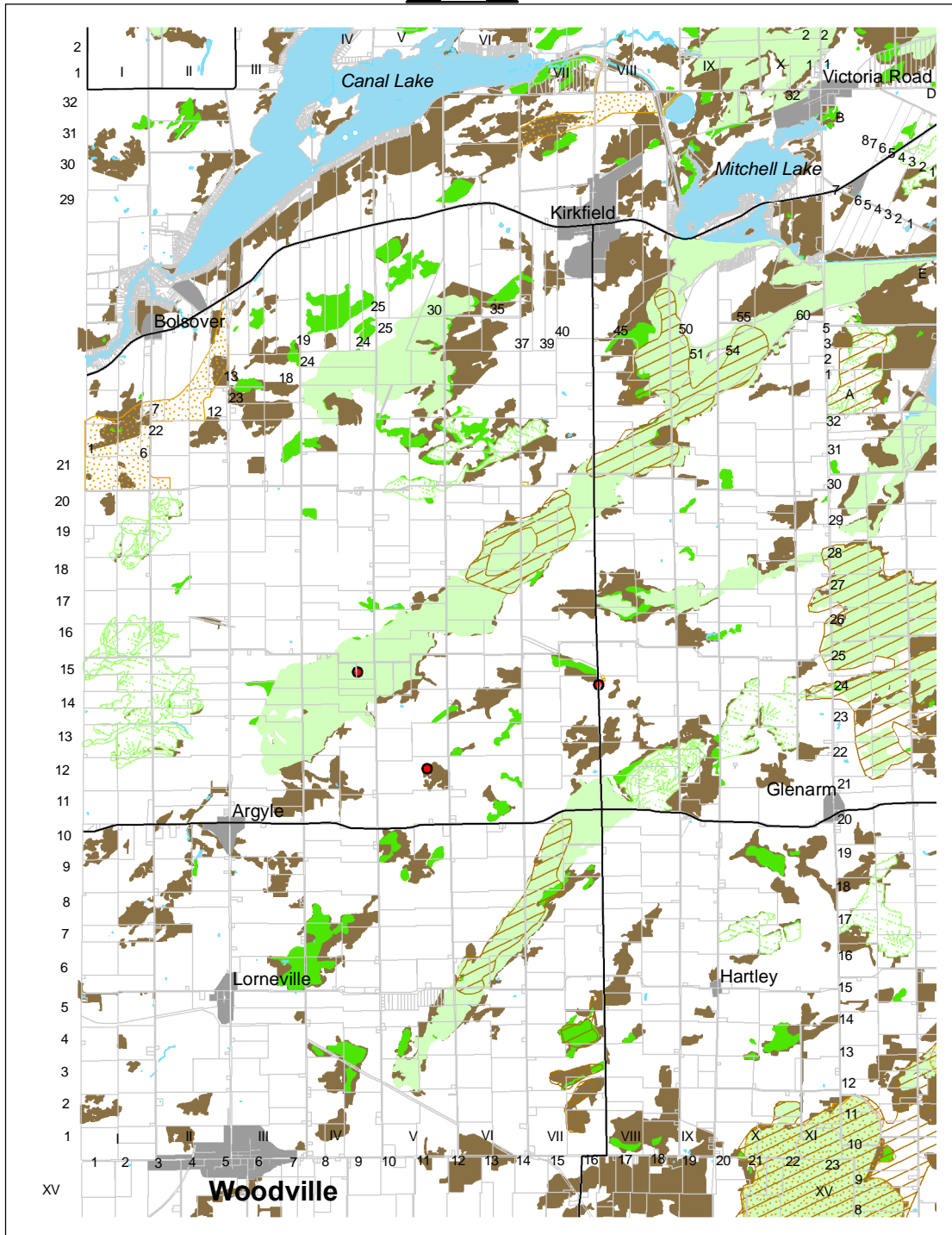
-  ANSI
-  Locally Significant Wetlands
-  Provincially Significant Wetlands
-  Unevaluated Wetlands
-  Waterbodies
-  Significant Woodlands
-  Significant Wildlife Habitat
-  Petroleum Well



City of Kawartha Lakes Official Plan Schedule B-4

March 17, 2011
(Geographic Township of Eldon)

B-6



B-5

B-2

Natural Heritage Features

- | | | | |
|--|-----------------------------------|--|------------------------------|
| | ANSI | | Significant Woodlands |
| | Locally Significant Wetlands | | Significant Wildlife Habitat |
| | Provincially Significant Wetlands | | Petroleum Well |
| | Unevaluated Wetland | | |
| | Waterbodies | | |

0 0.5 1 2 3 4 5
Kilometers










City of Kawartha Lakes

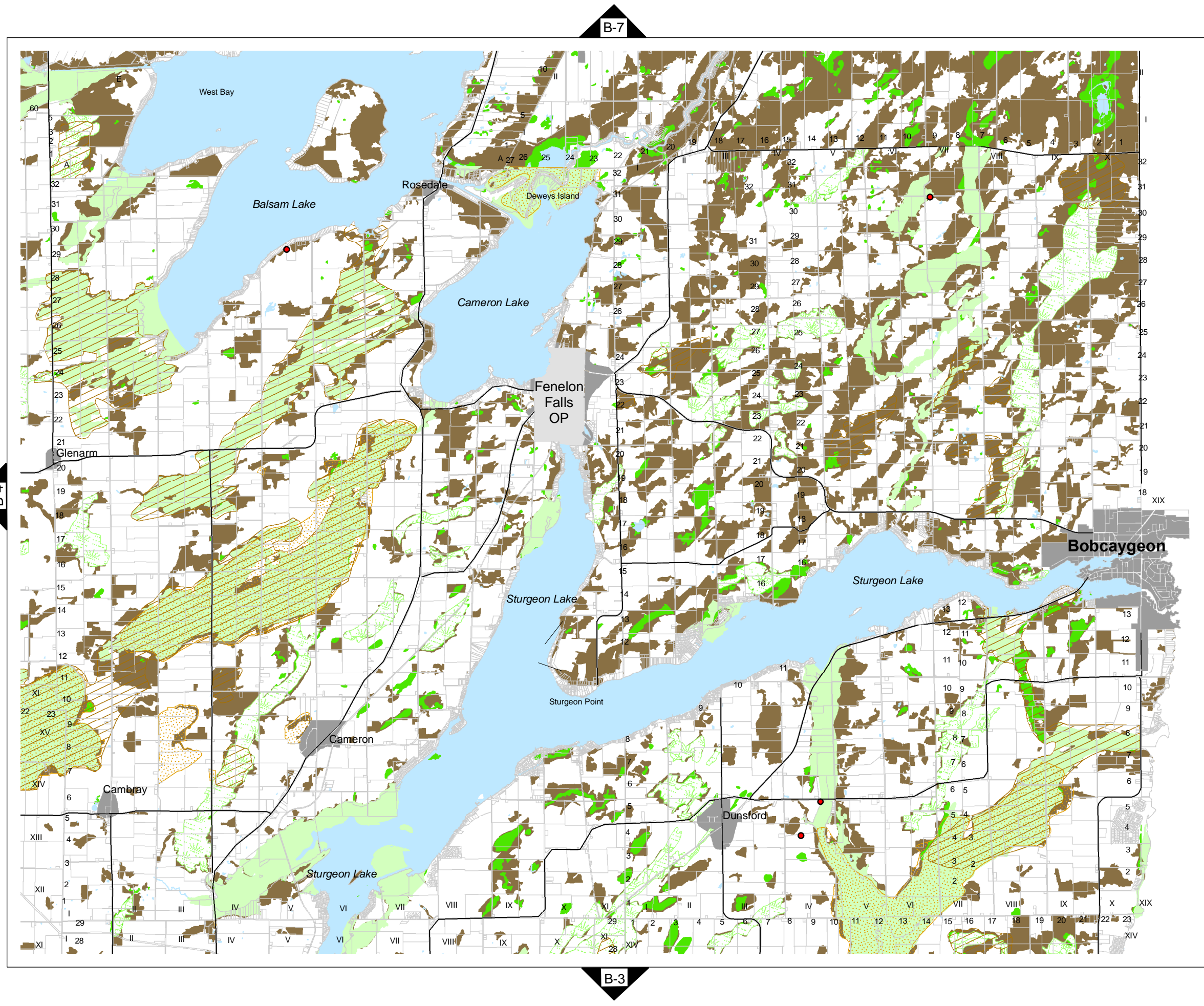
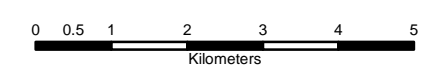
Official Plan

Schedule B-5

March 17, 2011
(Geographic Townships of Fenelon and Verulam)

Natural Heritage Features

-  ANSI
-  Locally Significant Wetlands
-  Provincially Significant Wetlands
-  Unevaluated Wetlands
-  Waterbodies
-  Significant Woodlands
-  Significant Wildlife Habitat
-  Petroleum Well



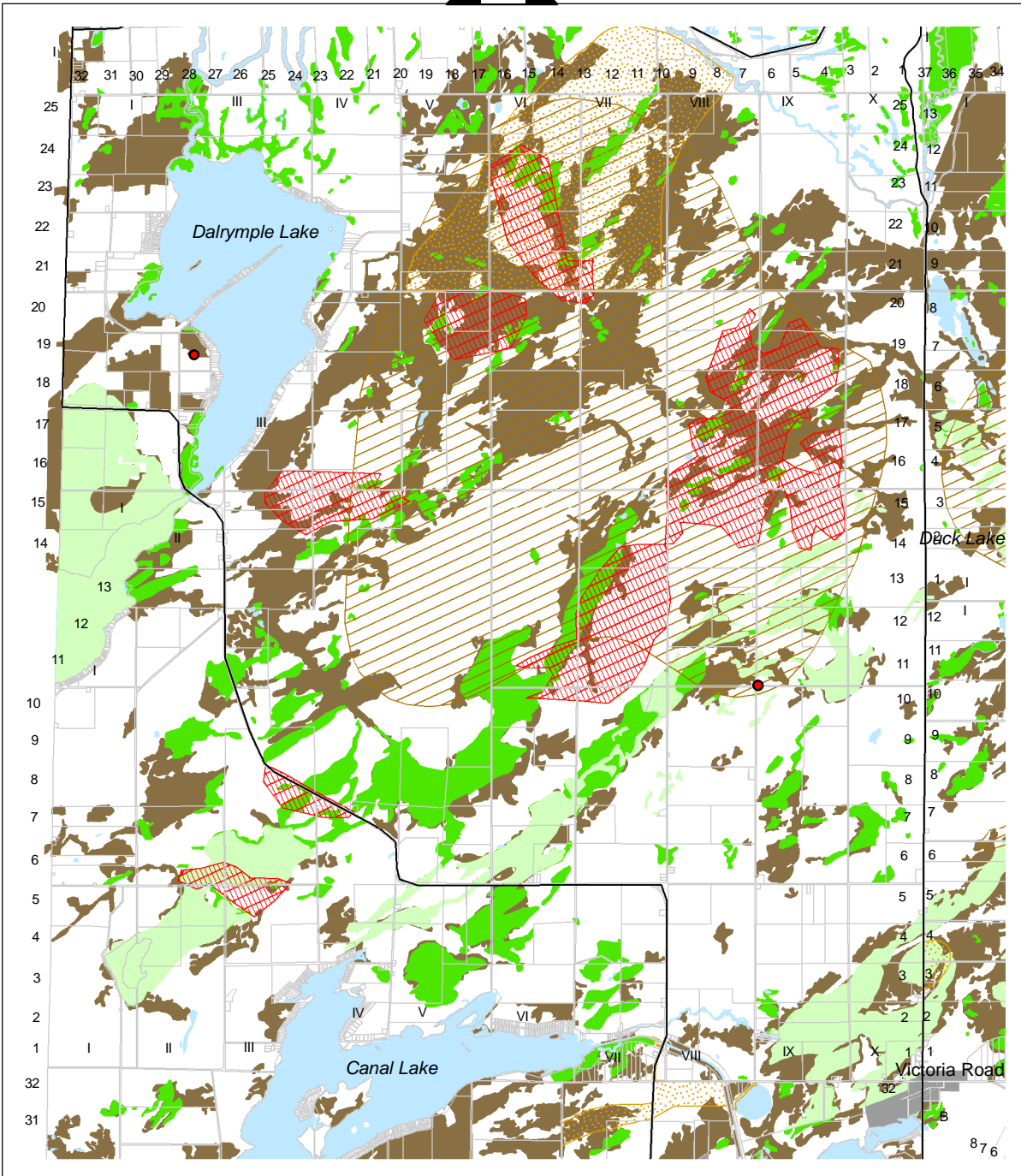
City of Kawartha Lakes Official Plan

Schedule B-6

March 17, 2011

(Geographic Township of Carden)









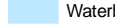
B-8



B-7

B-4

Natural Heritage Features

- | | | | |
|---|-----------------------------------|---|------------------------------|
|  | Alvars |  | Significant Woodlands |
|  | ANSI |  | Significant Wildlife Habitat |
|  | Locally Significant Wetlands |  | Petroleum_Well_u17 |
|  | Provincially Significant Wetlands | | |
|  | Unevaluated Wetlands | | |
|  | Waterbodies | | |





City of Kawartha Lakes

Official Plan

Schedule B-7

March 17, 2011
(Geographic Townships of
Laxton, Bexley and Somerville)

Natural Heritage Features

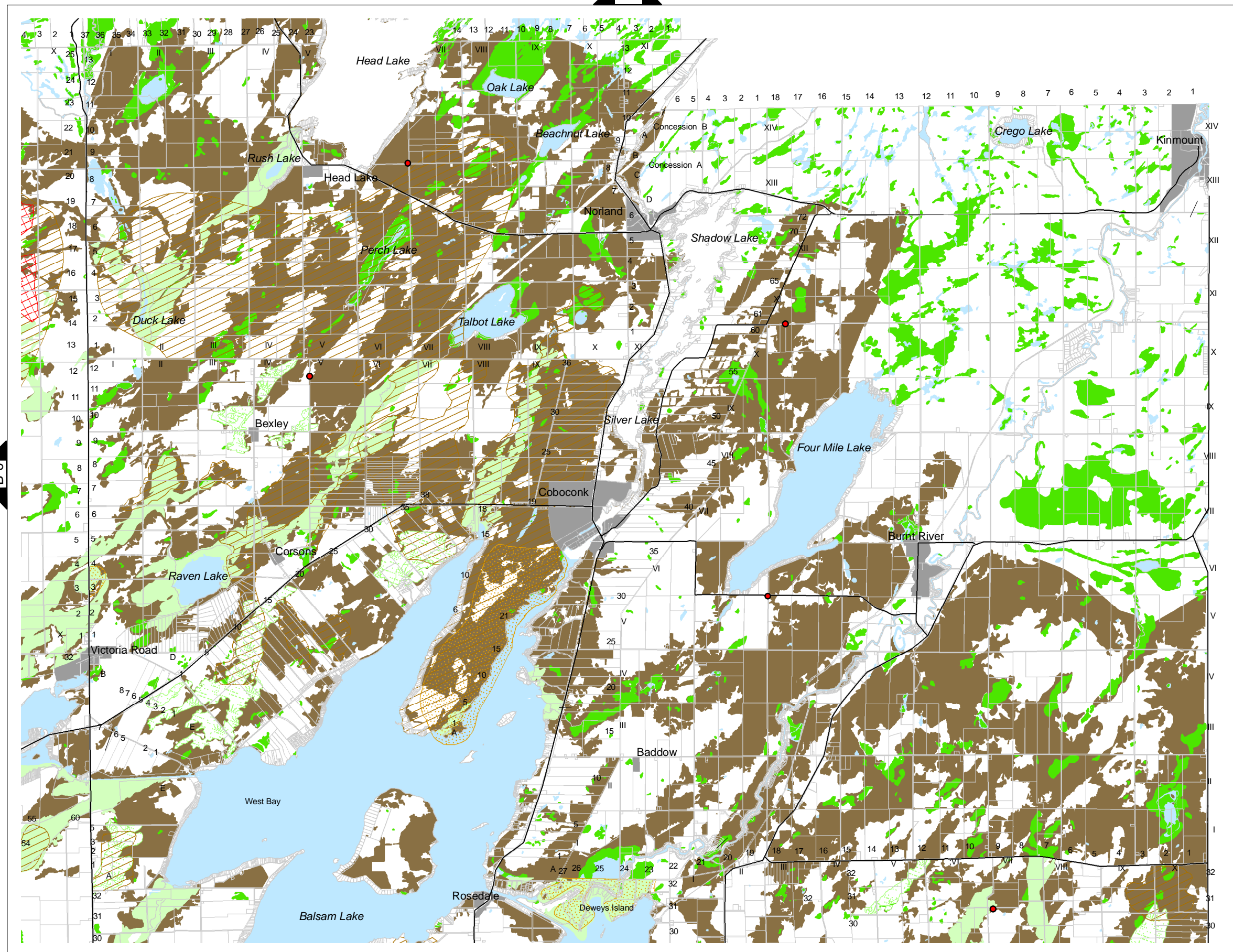
-  Alvars
-  ANSI
-  Locally Significant Wetlands
-  Provincially Significant Wetlands
-  Unevaluated Wetlands
-  Waterbodies
-  Significant Woodlands
-  Significant Wildlife Habitat
-  Petroleum Well



B-8

B-5

B-6




City of Kawartha Lakes

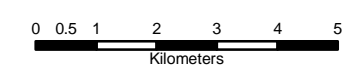
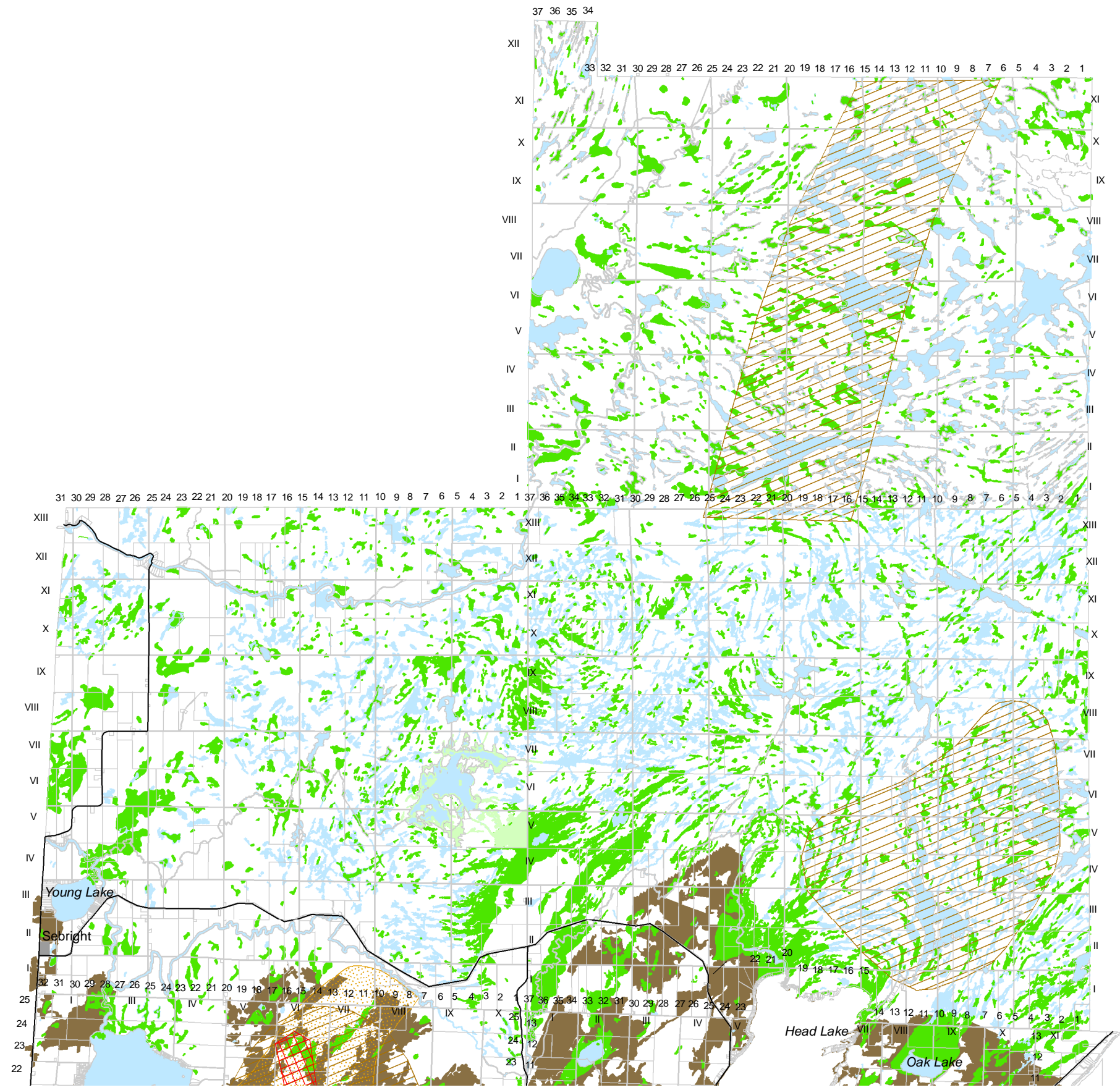
Official Plan

Schedule B-8

March 17, 2011
(Geographic Townships of Dalton, Digby and Longford)

Natural Heritage Features

-  Alvars
-  ANSI
-  Locally Significant Wetlands
-  Provincially Significant Wetlands
-  Unevaluated Wetlands
-  Waterbodies
-  Significant Woodlands
-  Significant Wildlife Habitat
-  Petroleum Well

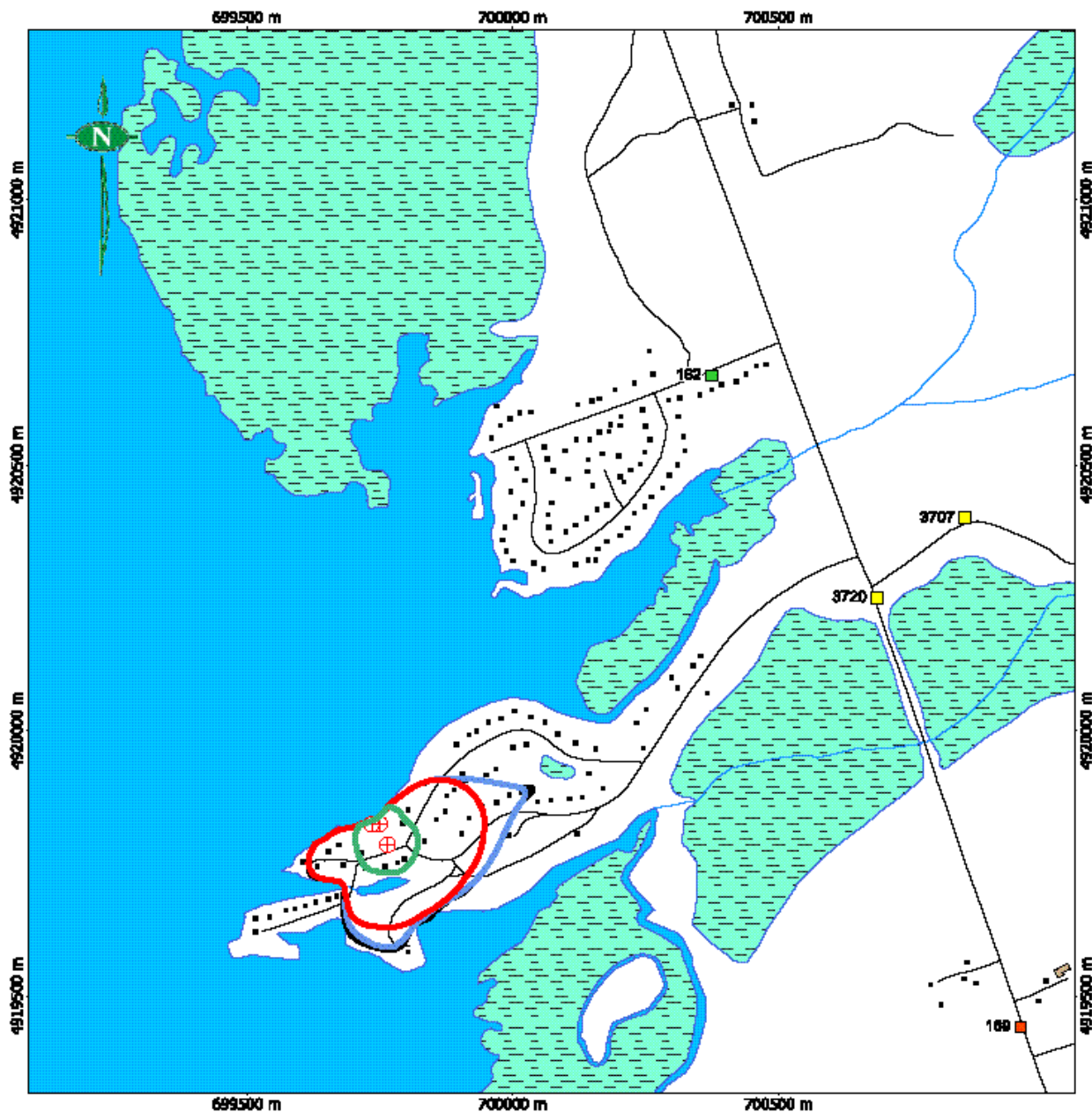


B-6

B-7

Schedules "C" - Wellhead Protection Zones

Schedule "C-1" - Birch Point Wellhead Protection Zones



| | | | |
|--|--|---|--|
| Contaminant Source Inventory ■ A11 Agriculture, Forestry, Fishing, and Hunting ■ O01 Other Services except Public Administration ■ U21 Utilities | | □ 1243 Contaminant Source Code - see Appendix D for complete list and descriptions | Capture Zones — 2 year — 10 year — 25 year 50 day |
|--|--|---|--|

Data Credits: NRVIS/OBM - MOE, MNM and MNR

April, 2004



FIGURE 11

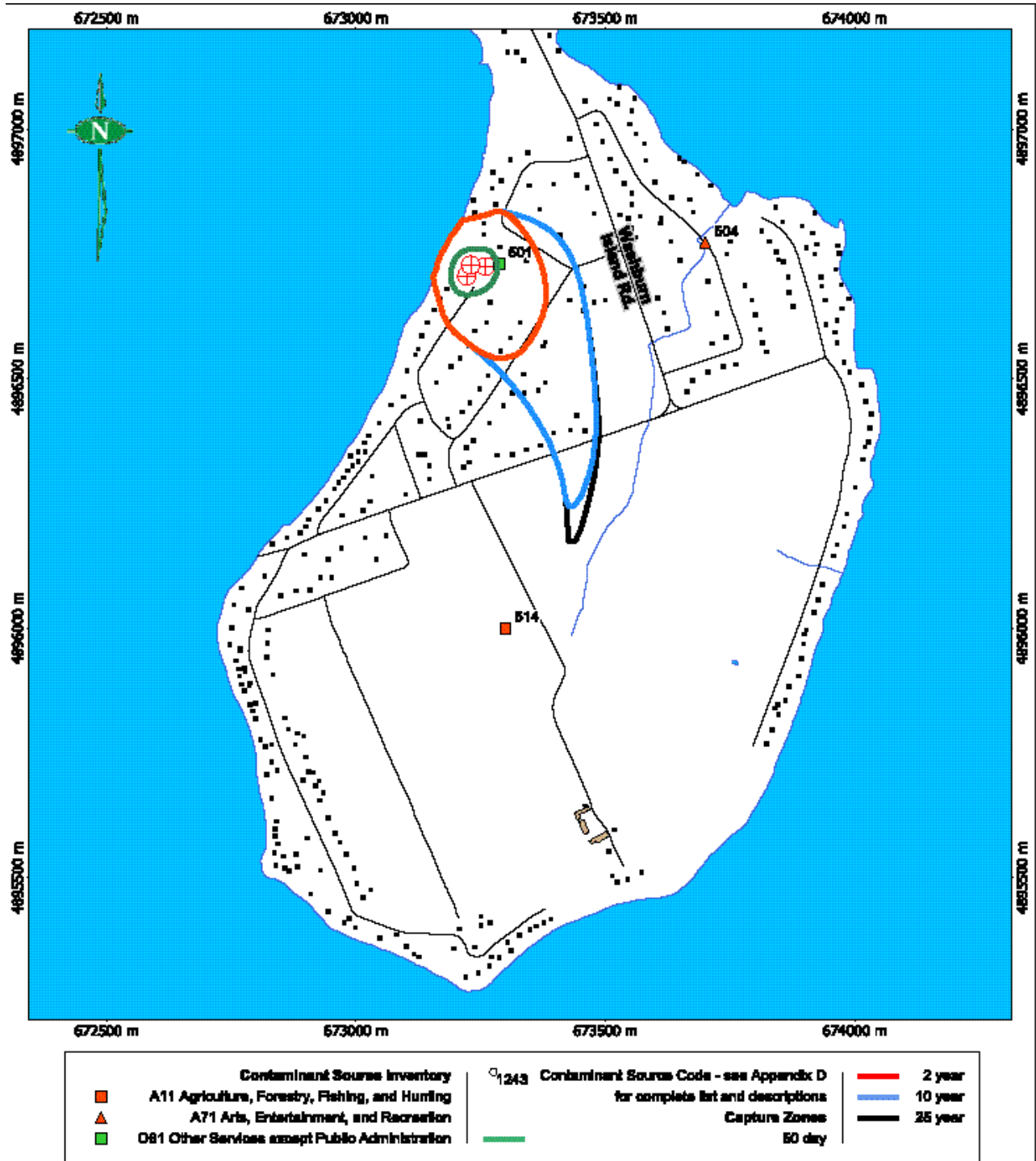
CAPTURE ZONES AND CONTAMINANT SOURCES

WELLHEAD PROTECTION - BIRCH POINT

City of Kawartha Lakes



Schedule "C-2" – Canadiana Shores Wellhead Protection Zones



Data Credits: NRVIS/OBM - MOE, MNM and MNR

April, 2004

0 1:10000 750 m

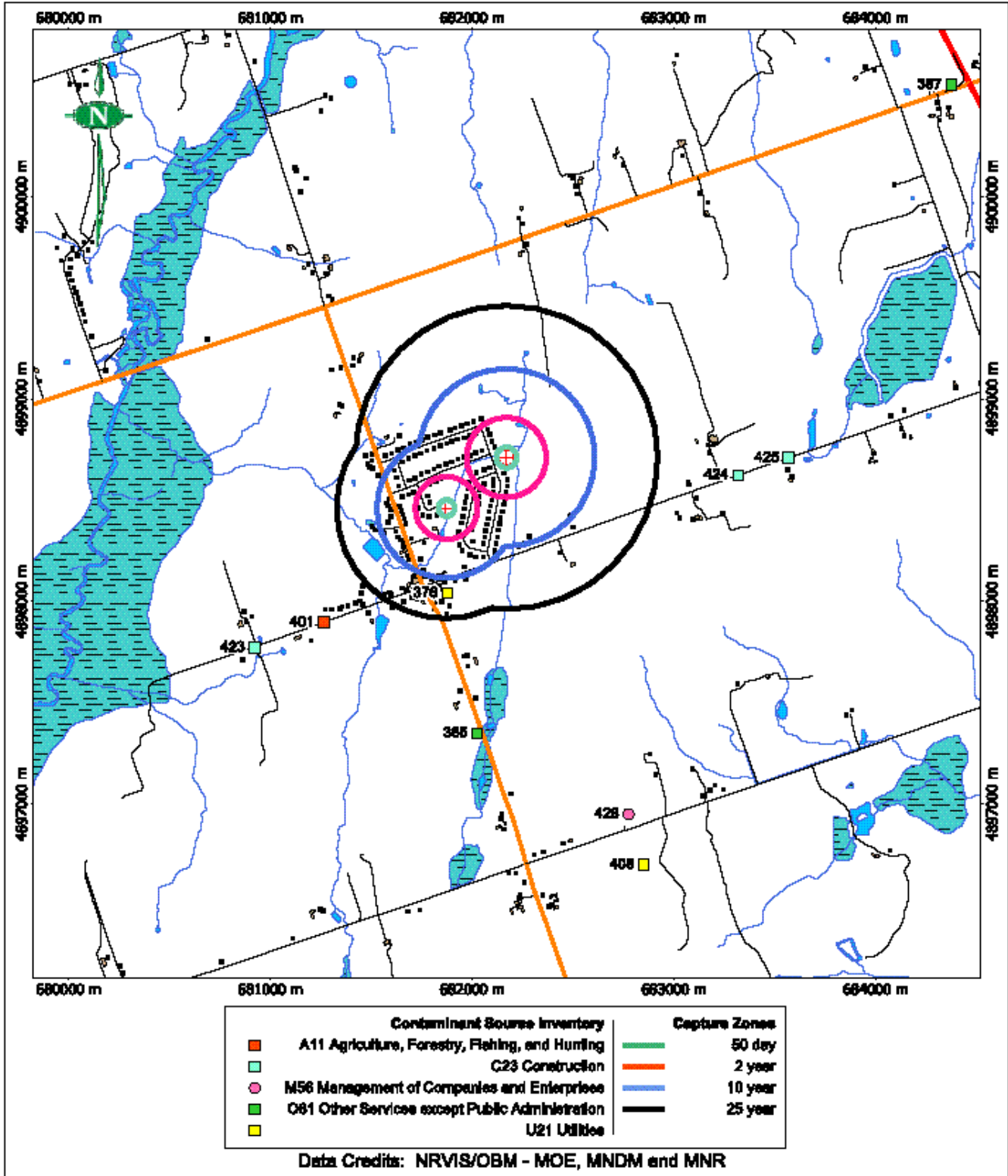
FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES
WELLHEAD PROTECTION - CANADIANA SHORES

City of Kawartha Lakes

 Morrison Environmental Limited
 Groundwater Consultants

Schedule "C-3" – Janetville Wellhead Protection Zones



April, 2004

0 1:25000 1000 m

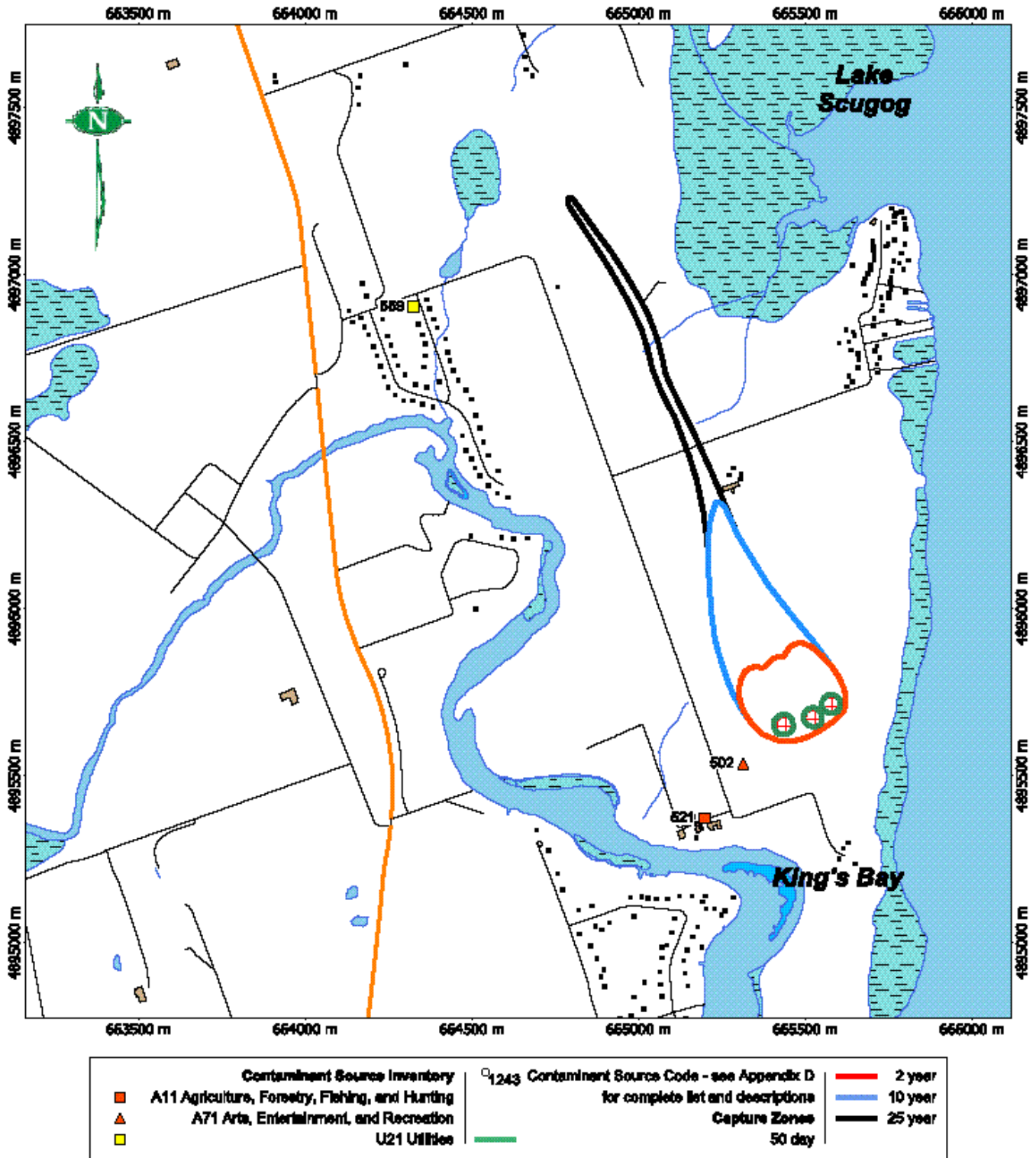
FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES
WELLHEAD PROTECTION - JANETVILLE

City of Kawartha Lakes



Schedule "C-4" – King's Bay Wellhead Protection Zones



Data Credits: NRVIS/OBM - MOE, MNDM and MNR

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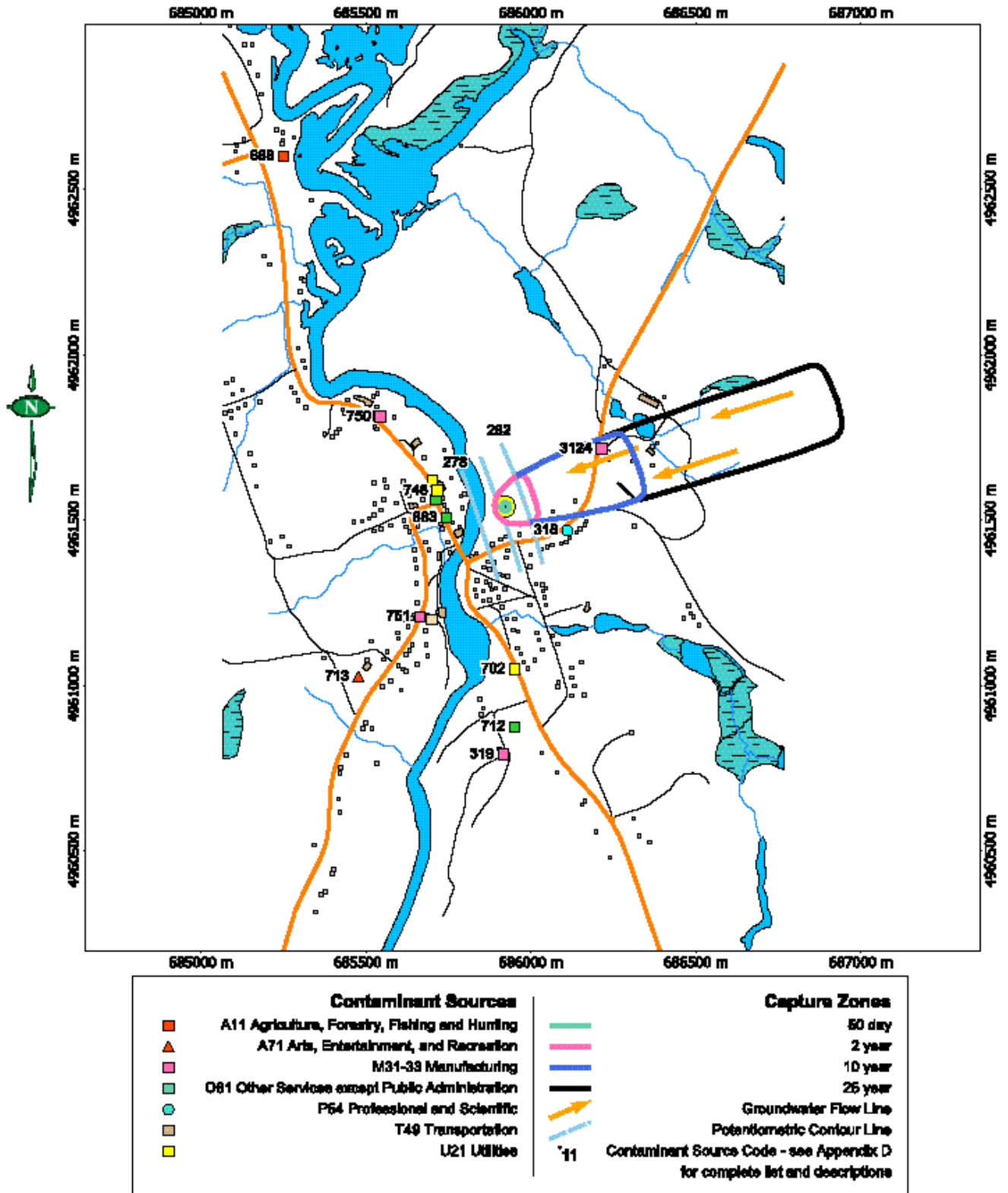
April, 2004

FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES WELLHEAD PROTECTION - KING'S BAY

City of Kawartha Lakes

Schedule "C-5" – Kinmount East Wellhead Protection Zones



November, 2003

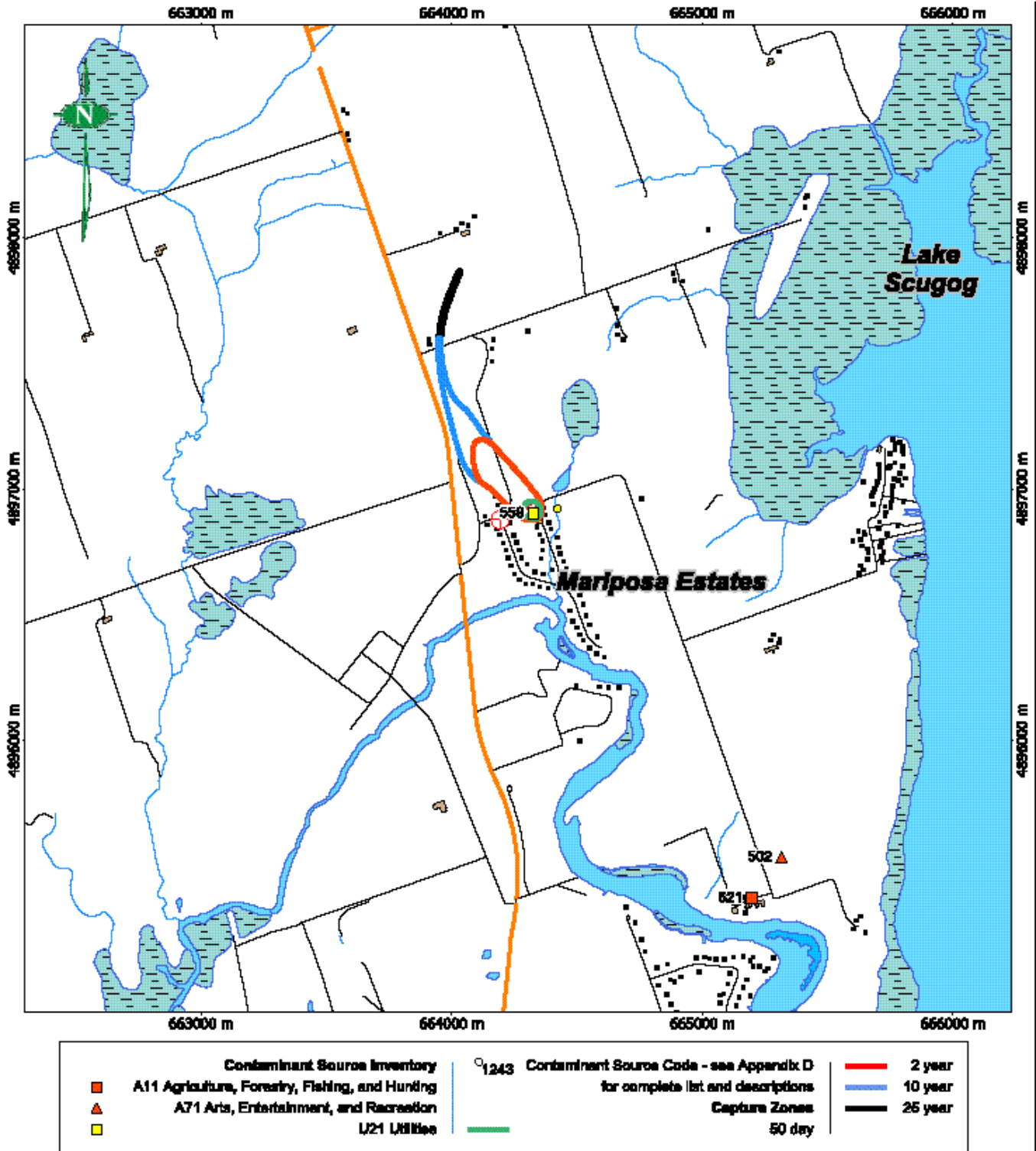
1:15000
 500 m

FIGURE 10

CAPTURE ZONES AND CONTAMINANT SOURCES
WELLHEAD PROTECTION - KINMOUNT EAST HILL
 City of Kawartha Lakes



Schedule "C-6" – Mariposa Estates Wellhead Protection Zones



April, 2004

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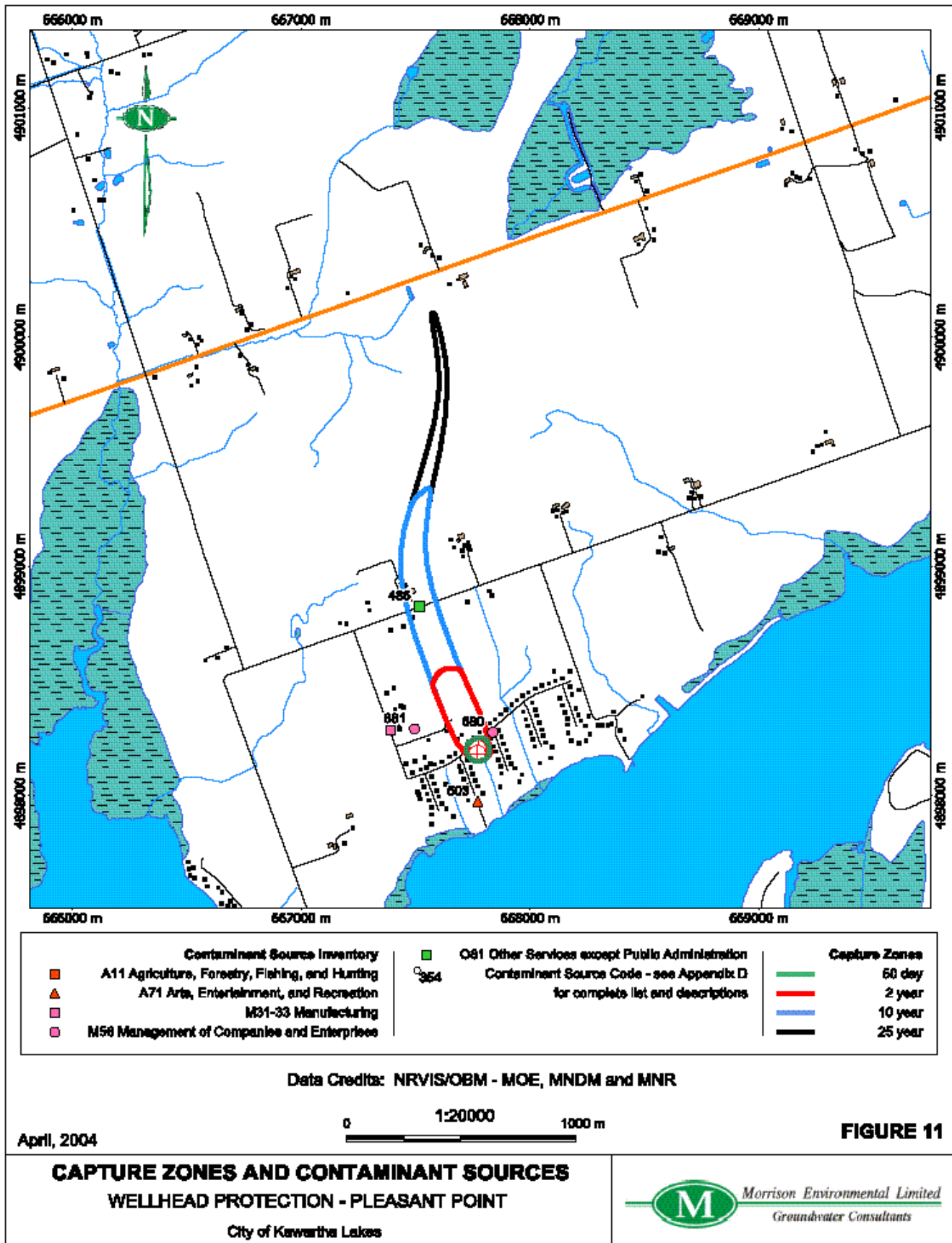
FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES
WELLHEAD PROTECTION - MARIPOSA ESTATES

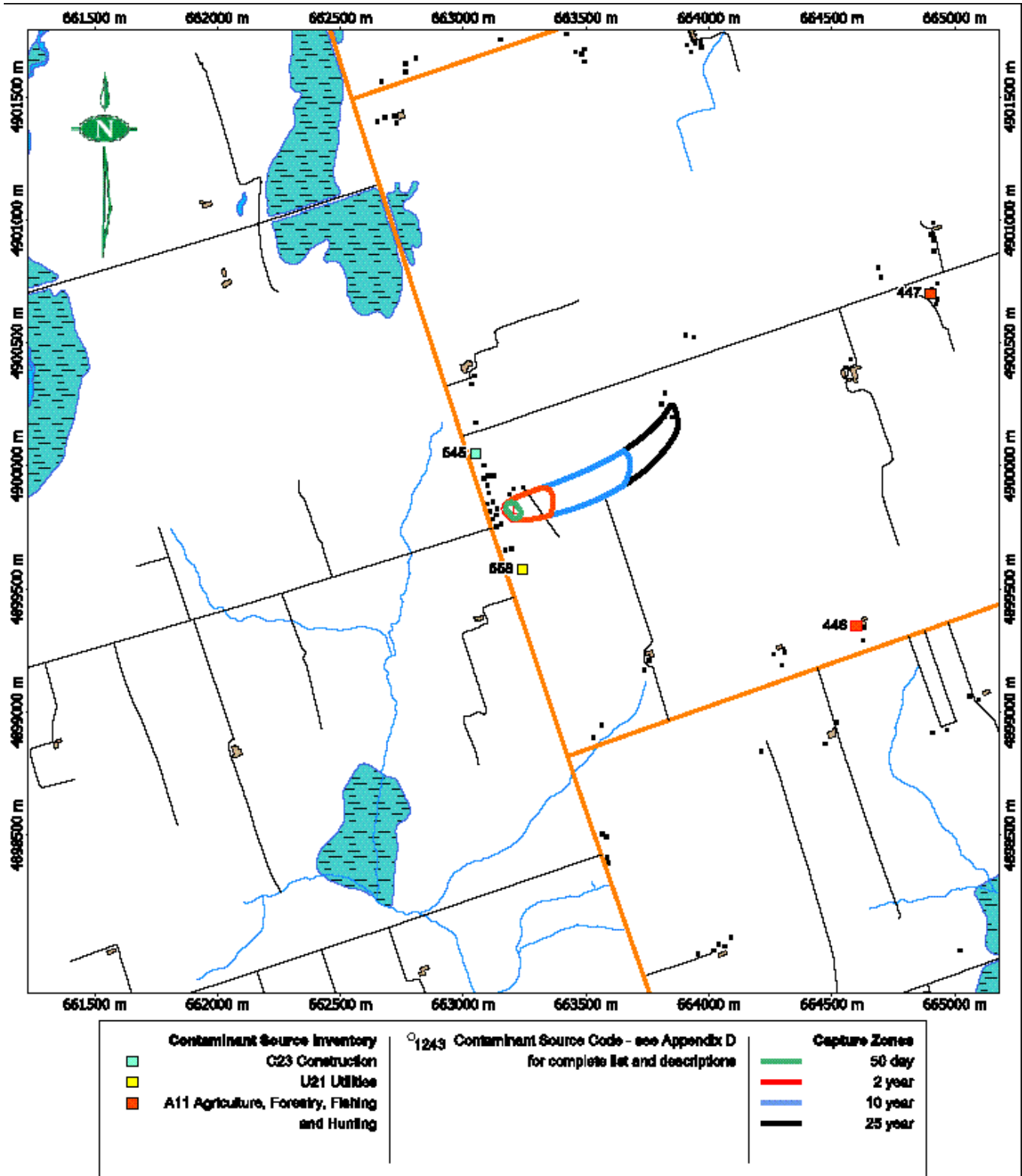
City of Kawartha Lakes

 Morrison Environmental Limited
 Groundwater Consultants

Schedule "C-7" – Pleasant Point Wellhead Protection Zones



Schedule "C-8" – Sonya Wellhead Protection Zones



Data Credits: NRVIS/OBM - MOE, MNDM and MNR

April, 2004

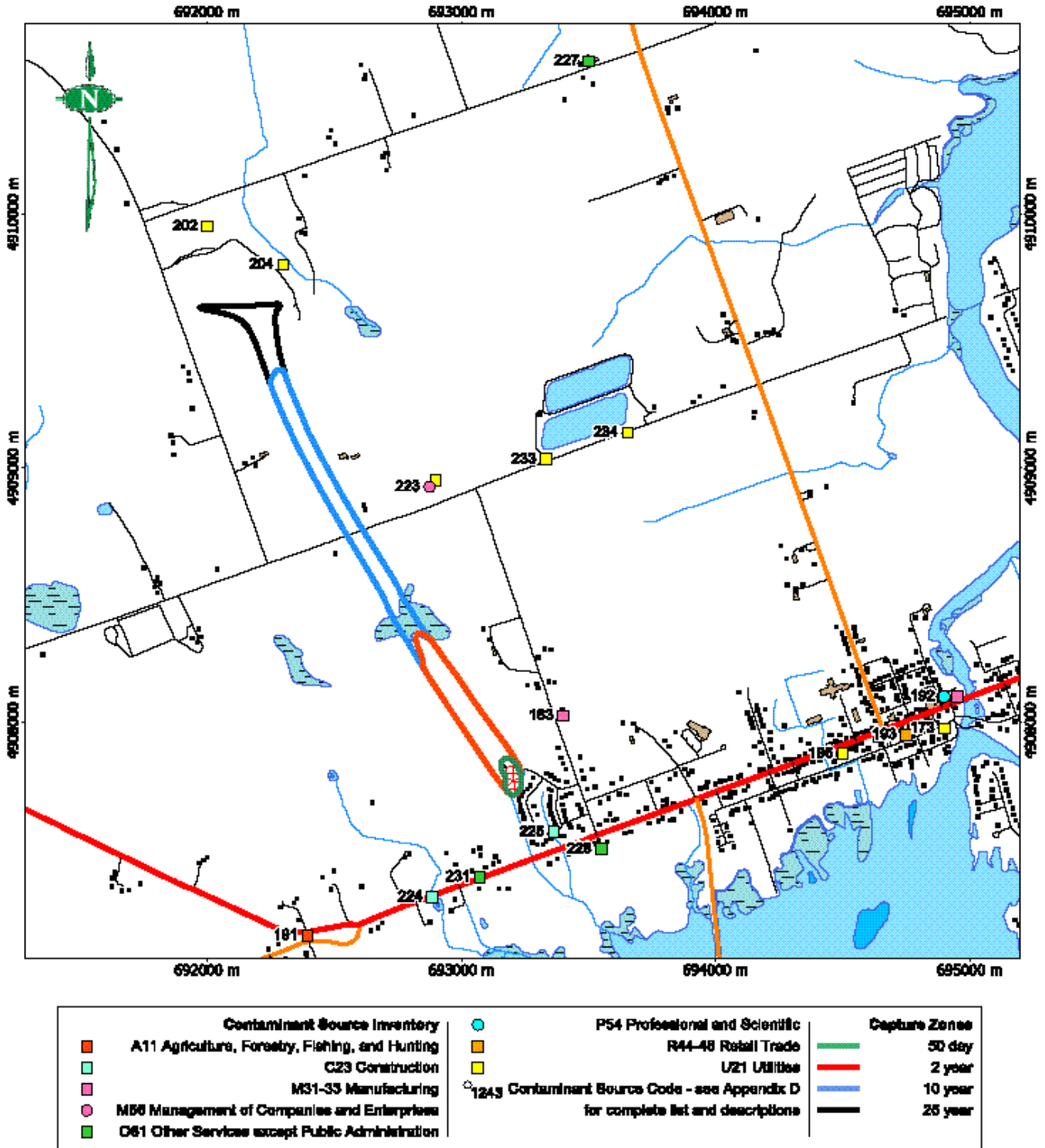
FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES
WELLHEAD PROTECTION - SONYA

City of Kawartha Lakes



Schedule "C-9" – Victoria Glen - Omemee Wellhead Protection Zones



Data Credits: NRVIS/OBM - MOE, MNDM and MNR

April, 2004



FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES WELLHEAD PROTECTION - OMEMEE-VICTORIA GLEN

City of Kawartha Lakes



Schedule "C-10" – Victoria Place Wellhead Protection Zones

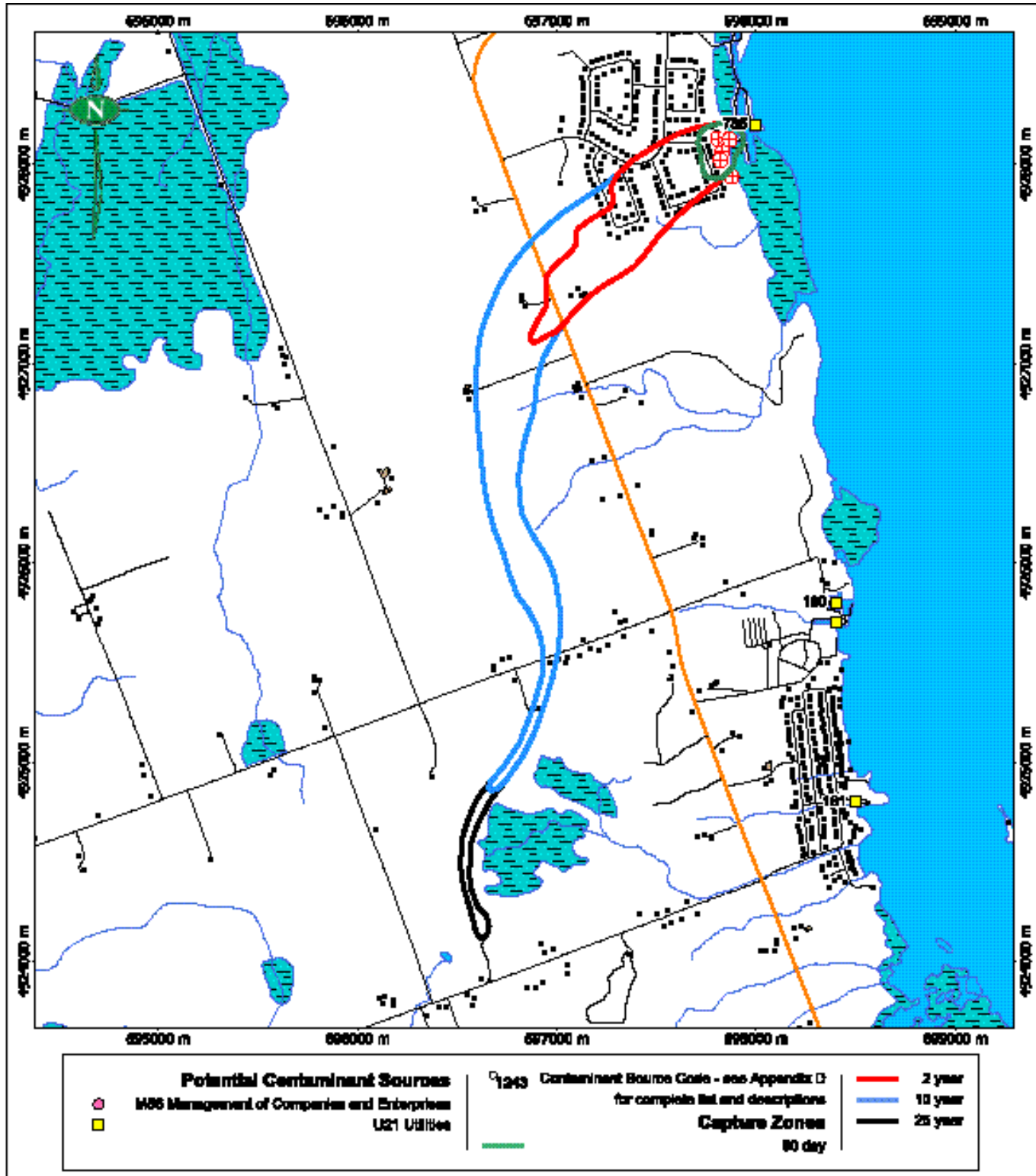
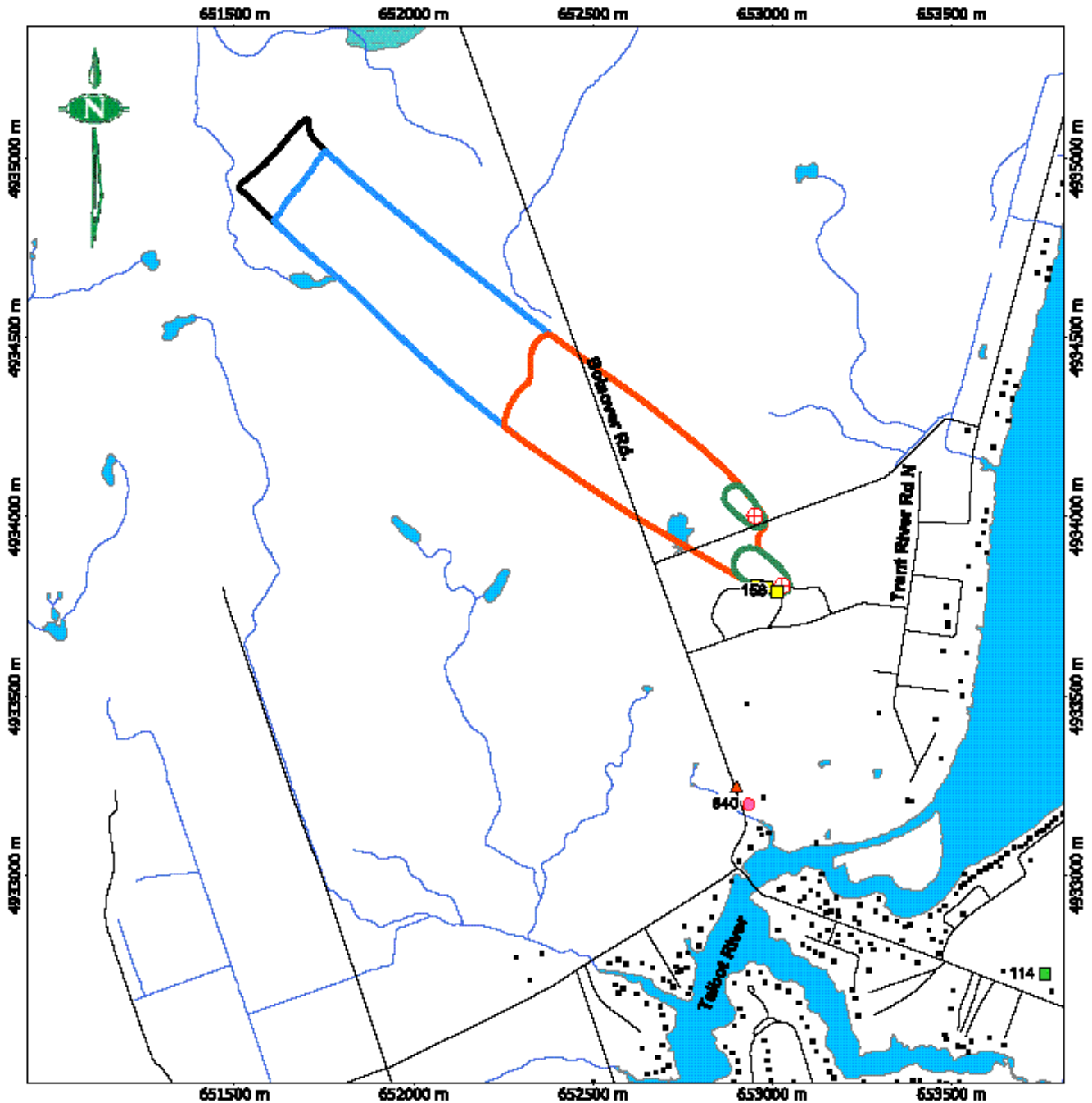


FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES
WELLHEAD PROTECTION - VICTORIA PLACE
 City of Kawartha Lakes



Schedule "C-11" – Western Trent/Palmina Wellhead Protection Zones



| | | |
|--|--|--|
| <ul style="list-style-type: none"> ▲ Contaminant Source Inventory ● A71 Arts, Entertainment, and Recreation ○ M59 Management of Companies and Enterprises ■ O81 Other Services except Public Administration ■ U21 Utilities | <ul style="list-style-type: none"> ○ 1234 Contaminant Source Code - see Appendix D for complete list and descriptions | <ul style="list-style-type: none"> — 10 year Capture Zones — 25 year Capture Zones — 60 day — 2 year |
|--|--|--|

Data Credits: NRVIS/OBM - MOE, MNDM and MNR

April, 2004

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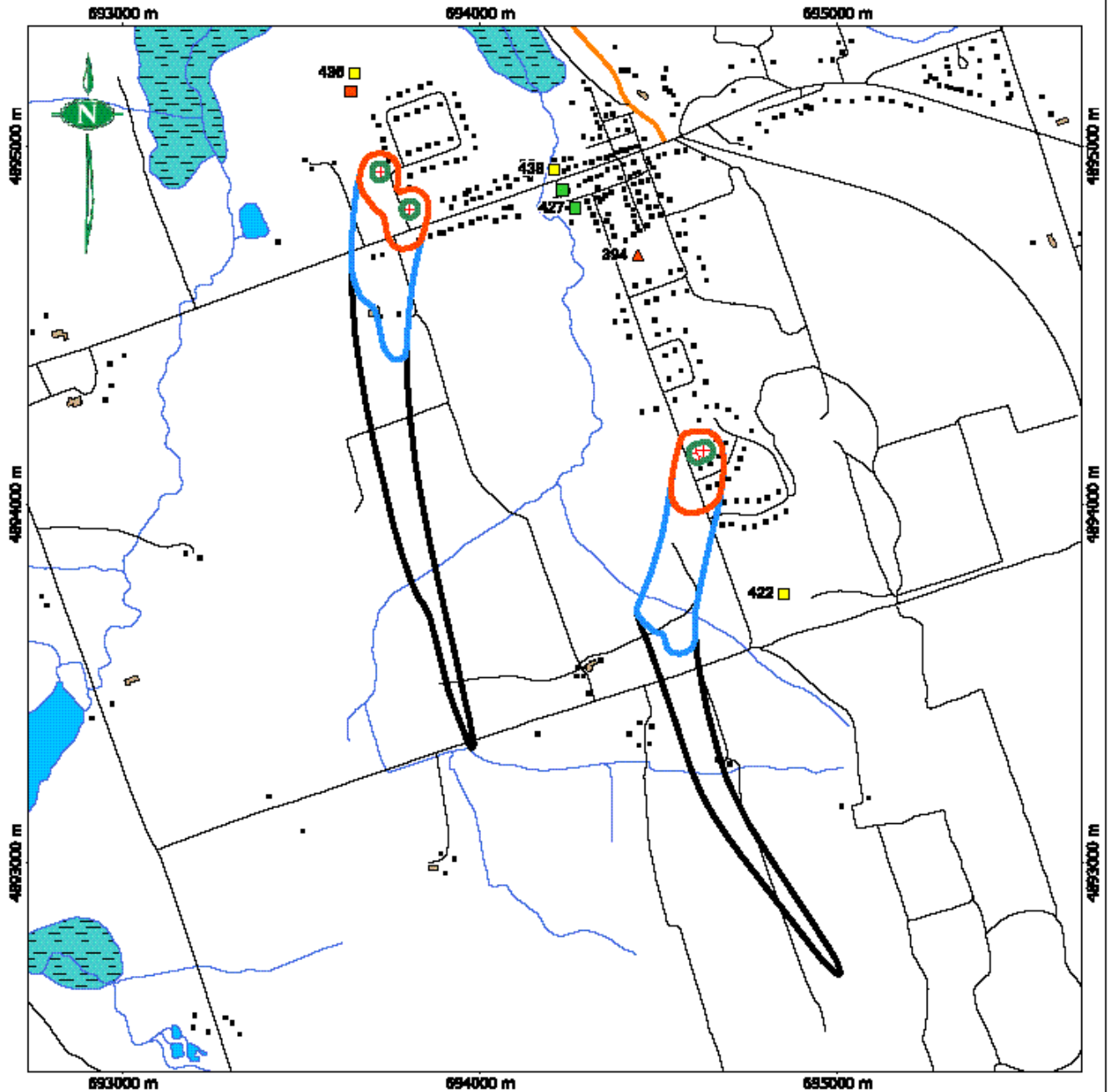
FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES WELLHEAD PROTECTION - WESTERN TRENT/PALMINA

City of Kawartha Lakes



Schedule "C-12" – Woodfield-Sundance/Manorview Wellhead Protection Zones



| | | | |
|--|--|--|---|
| <p>Contaminant Source Inventory</p> <ul style="list-style-type: none"> ■ A11 Agriculture, Forestry, Fishing, and Hunting ▲ A71 Arts, Entertainment, and Recreation ■ O81 Other Services except Public Administration ■ U21 Utilities | | <p>C1243 Contaminant Source Code - see Appendix D for complete list and descriptions</p> | <p>— 2 year</p> <p>— 10 year</p> <p>— 25 year</p> <p>— 60 day</p> |
|--|--|--|---|

Data Credits: NRVIS/OBM - MOE, MNDM and MNR

April, 2004

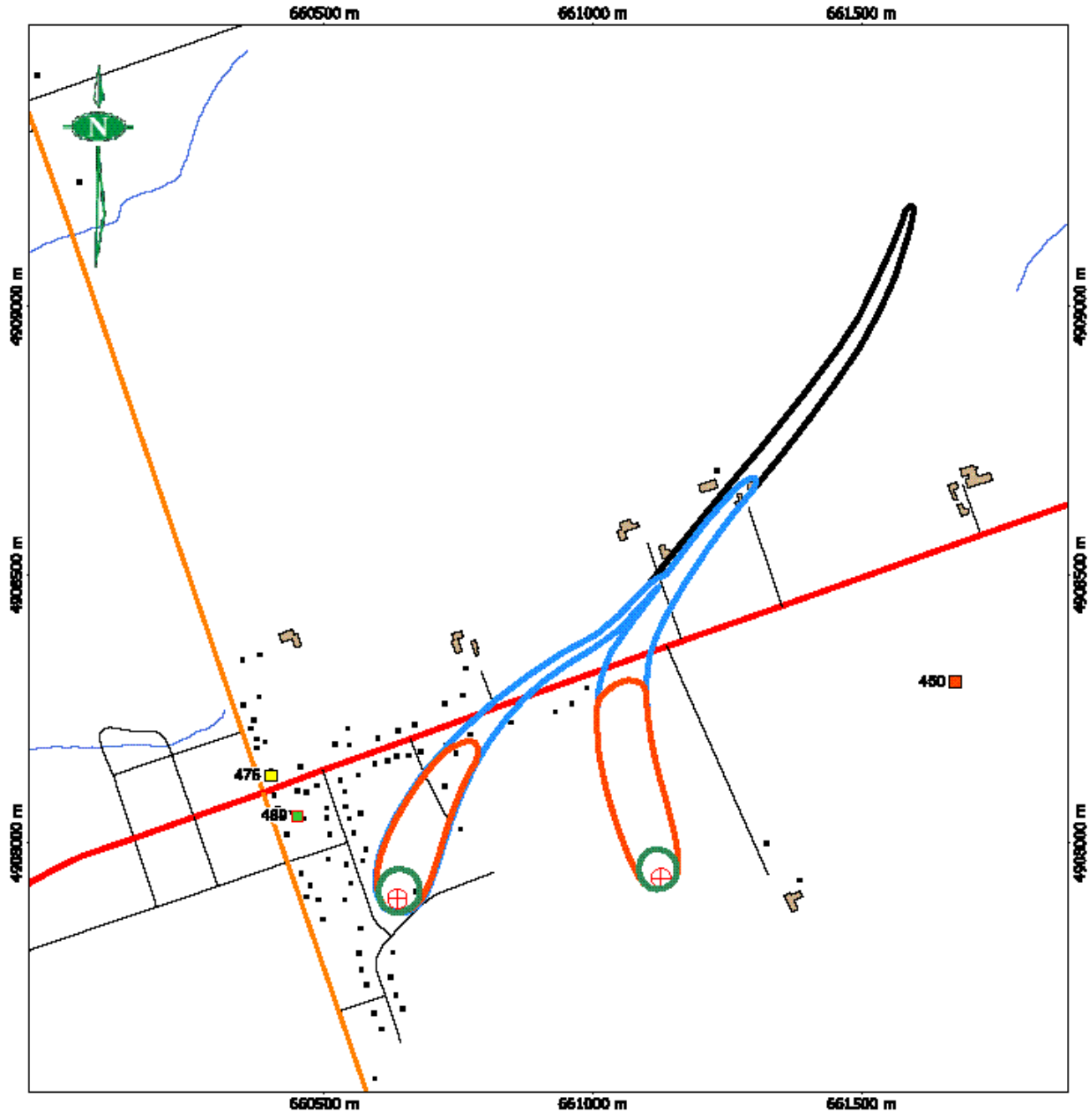


FIGURE 11

CAPTURE ZONES AND CONATMINANT SOURCES
WELLHEAD PROTECTION - WOODFIELD-SUNDANCE/MANORVIEW
 City of Kawartha Lakes



Schedule "C-13" – Woods of Manilla Wellhead Protection Zones



| | | | |
|------------------------------|---|--|---------|
| Contaminant Source Inventory | | 1243 Contaminant Source Code - see Appendix D for complete list and descriptions | 2 year |
| Orange square | A11 Agriculture, Forestry, Fishing, and Hunting | | 10 year |
| Green square | O81 Other Services except Public Administration | | 25 year |
| Yellow square | U21 Utilities | | 50 day |
| Green circle with cross | | | |

Data Credits: NRVIS/OBM - MOE, MNDM and MNR

0 1:10000 1000 m

April, 2004

FIGURE 11

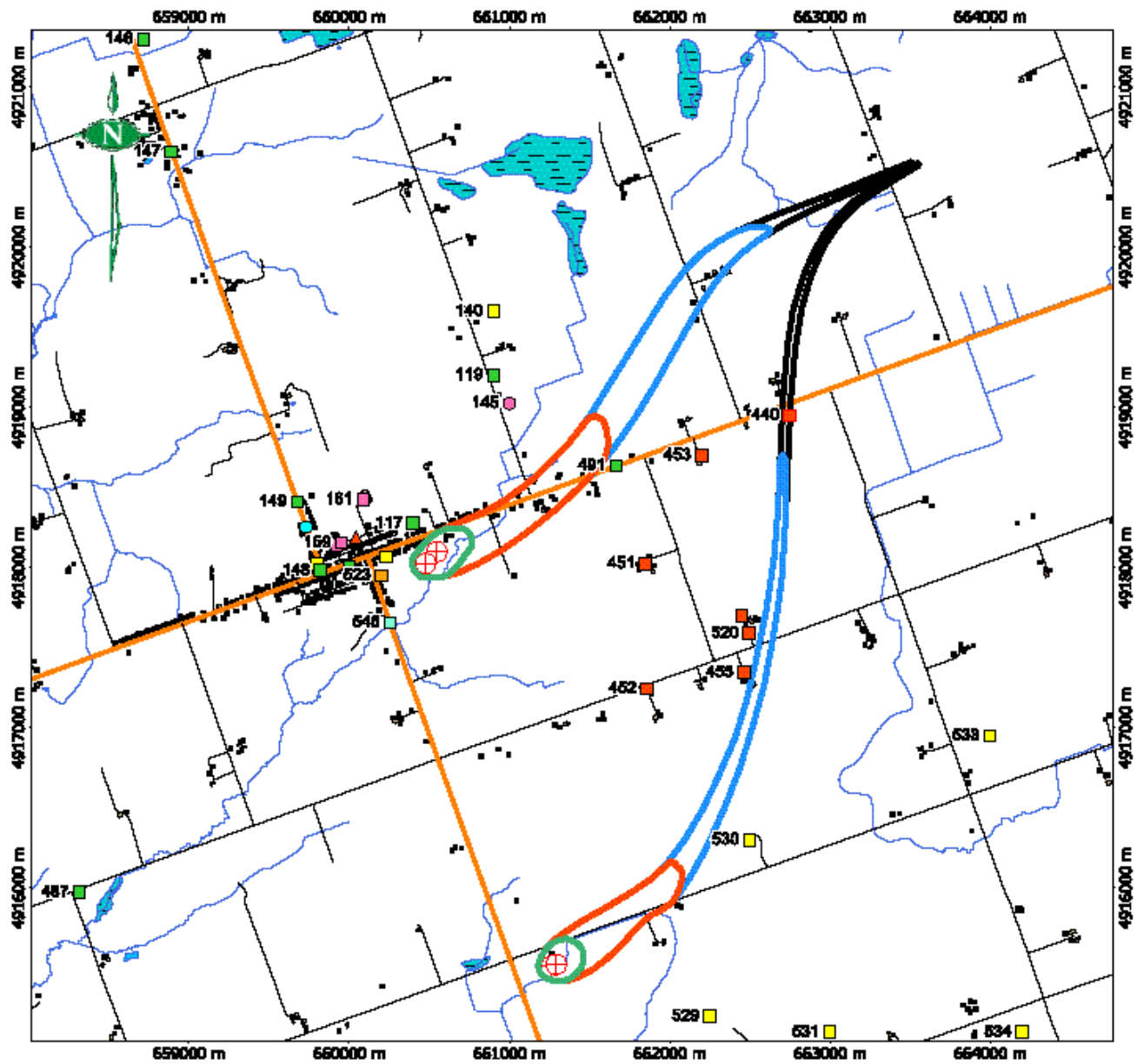
CAPTURE ZONES AND CONTAMINANT SOURCES

WELLHEAD PROTECTION - WOODS OF MANILLA 1 & 2

City of Kawartha Lakes



Schedule "C-14" – Woodville Wellhead Protection Zones



| | | | |
|--|--|---|--|
| Contaminant Source Inventory A11 Agriculture, Forestry, Fishing, and Hunting A71 Arts, Entertainment, and Recreation C23 Construction M31-33 Manufacturing M58 Management of Companies and Enterprises | | O81 Other Services except Public Administration P64 Professional and Scientific R44-48 Retail Trade U21 Utilities Contaminant Source Code - see Appendix D for complete list and descriptions | Capture Zones 60 day 2 year 10 year 25 year |
|--|--|---|--|

Data Credits: NRVIS/OBM - MOE, MNDM and MNR

April, 2004

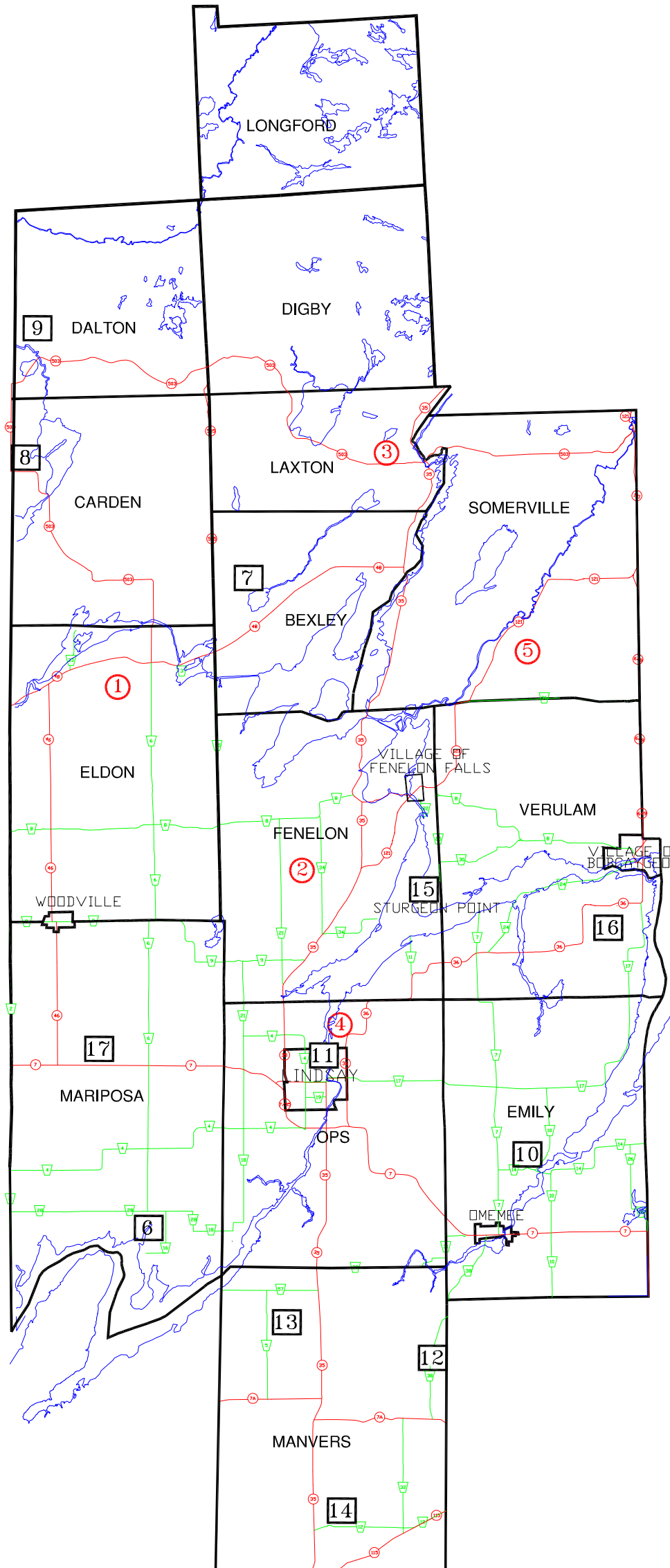


FIGURE 11

CAPTURE ZONES AND CONTAMINANT SOURCES WELLHEAD PROTECTION - WOODVILLE

City of Kawartha Lakes



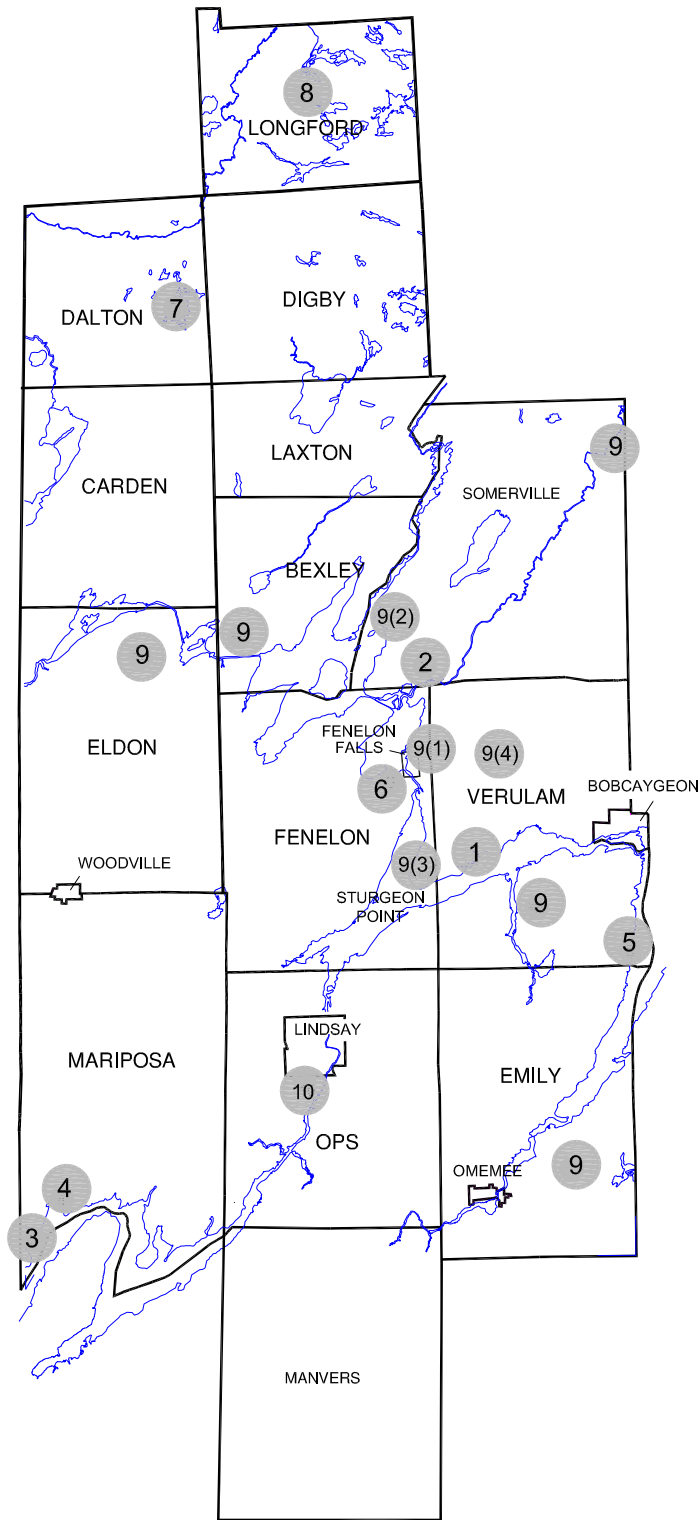


| LEGEND | |
|--------|--------------------|
| ACTIVE | |
| ① | Eldon |
| ② | Fenelon |
| ③ | Laxton |
| ④ | Lindsay/Ops |
| ⑤ | Somerville |
| CLOSED | |
| ⑥ | Mariposa South |
| ⑦ | Bexley |
| ⑧ | Carden |
| ⑨ | Dalton |
| ⑩ | Emily |
| ⑪ | Lindsay St. North |
| ⑫ | Manvers/Bethany |
| ⑬ | Manvers/Janetville |
| ⑭ | Manvers/Pontypool |
| ⑮ | Sturgeon Point |
| ⑯ | Verulam |
| ⑰ | Mariposa North |

 PROVINCIAL HIGHWAYS
 COUNTY ROADS

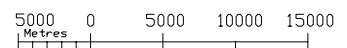
City of Kawartha Lakes
 Official Plan
 Schedule D
 Waste Management Facilities



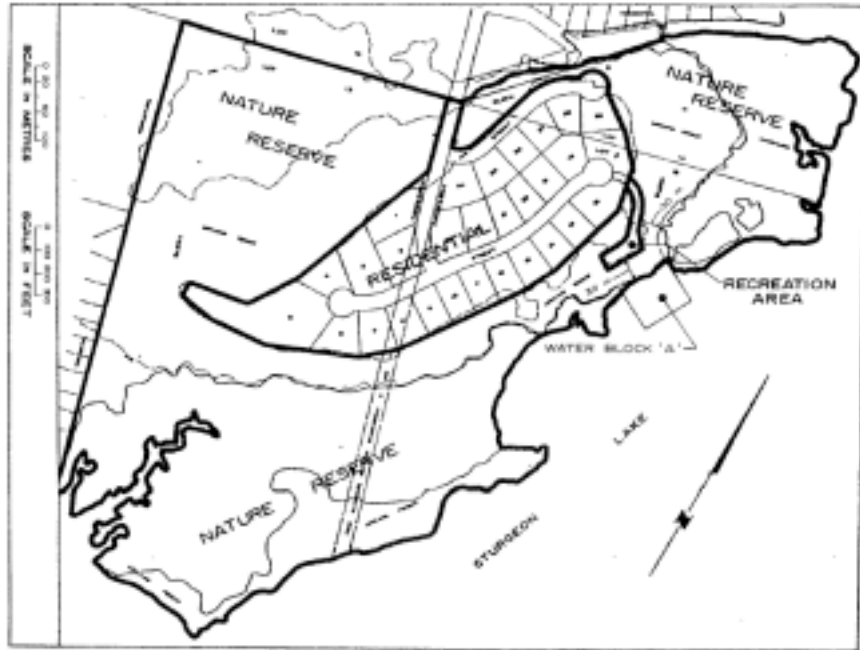


| LEGEND | |
|--------|--------------------------------|
| 1 | DP- 1 Moore Subdivision |
| 2 | DP- 2 Black Bear |
| 3 | DP- 3 Kings Bay |
| 4 | DP- 4 Gilson Point |
| 5 | DP- 5 Szakacsi Subdivision |
| 6 | DP- 6 564711 Ontario Inc. |
| 7 | DP- 7 Cranberry Lake |
| 8 | DP- 8 Longford Reserve Area |
| 9 | DP- 9 General Policy |
| 9 | DP- 9(1,2,3,4) Specific Policy |
| 10 | DP-10 Angeline St. S. - Hwy. 7 |

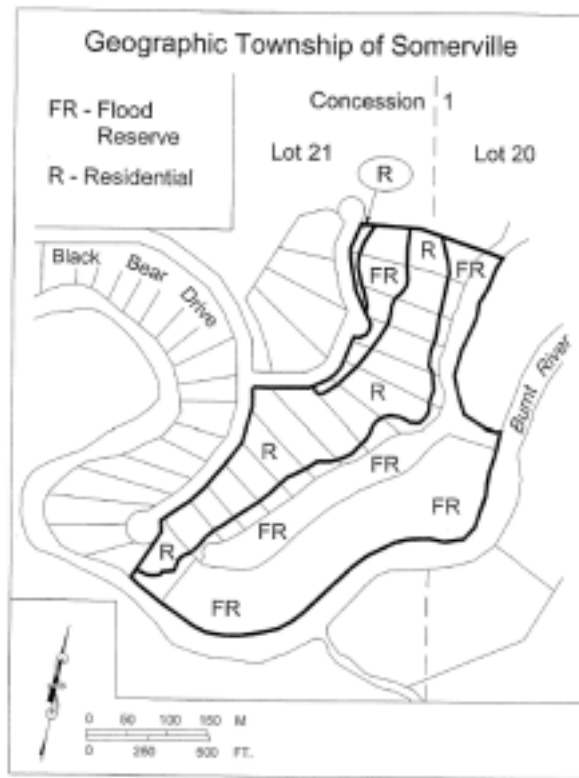
City of Kawartha Lakes
 Official Plan
 Schedule E
 Development Plans



Development Plan Area One (DP-1) Schedule - Moore Subdivision; Verulam



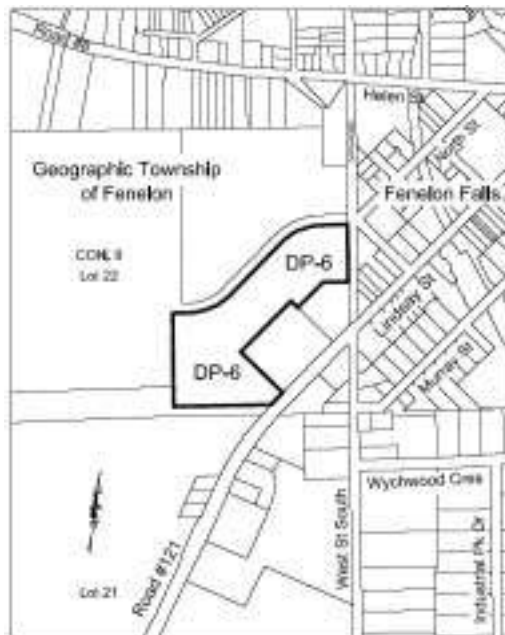
Development Plan Area Two (DP-2) Schedule - Black Bear Subdivision; Somerville



Development Plan Area Five (DP-5) Schedule - Szakacsi Subdivision, Verulam

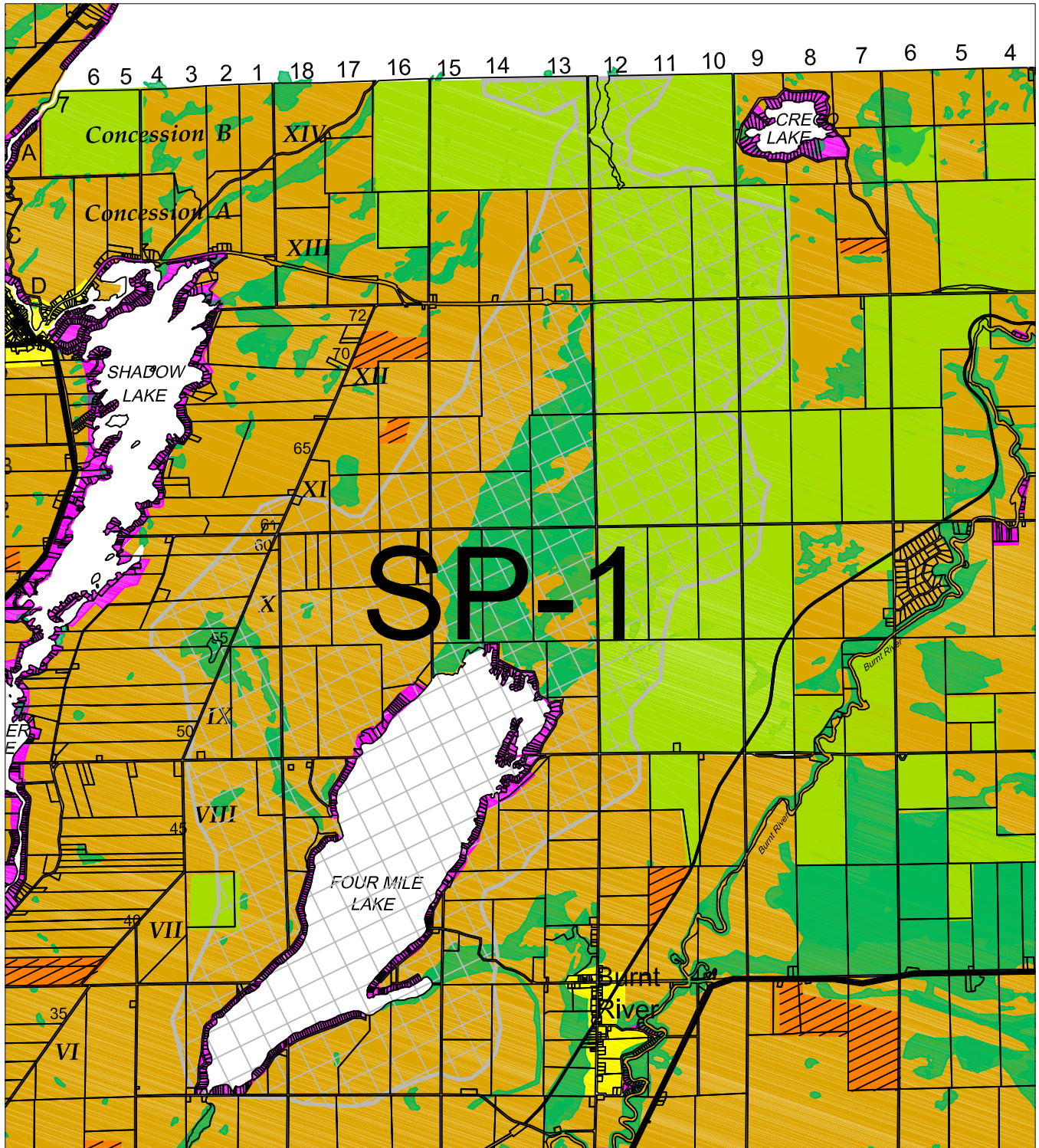


Development Plan Area Six (DP-6) Schedule - 564711 Ontario Inc., Fenelon



Special Policy Lake Plan Area - SP-1

Four Mile Lake Watershed and Corben Creek Area

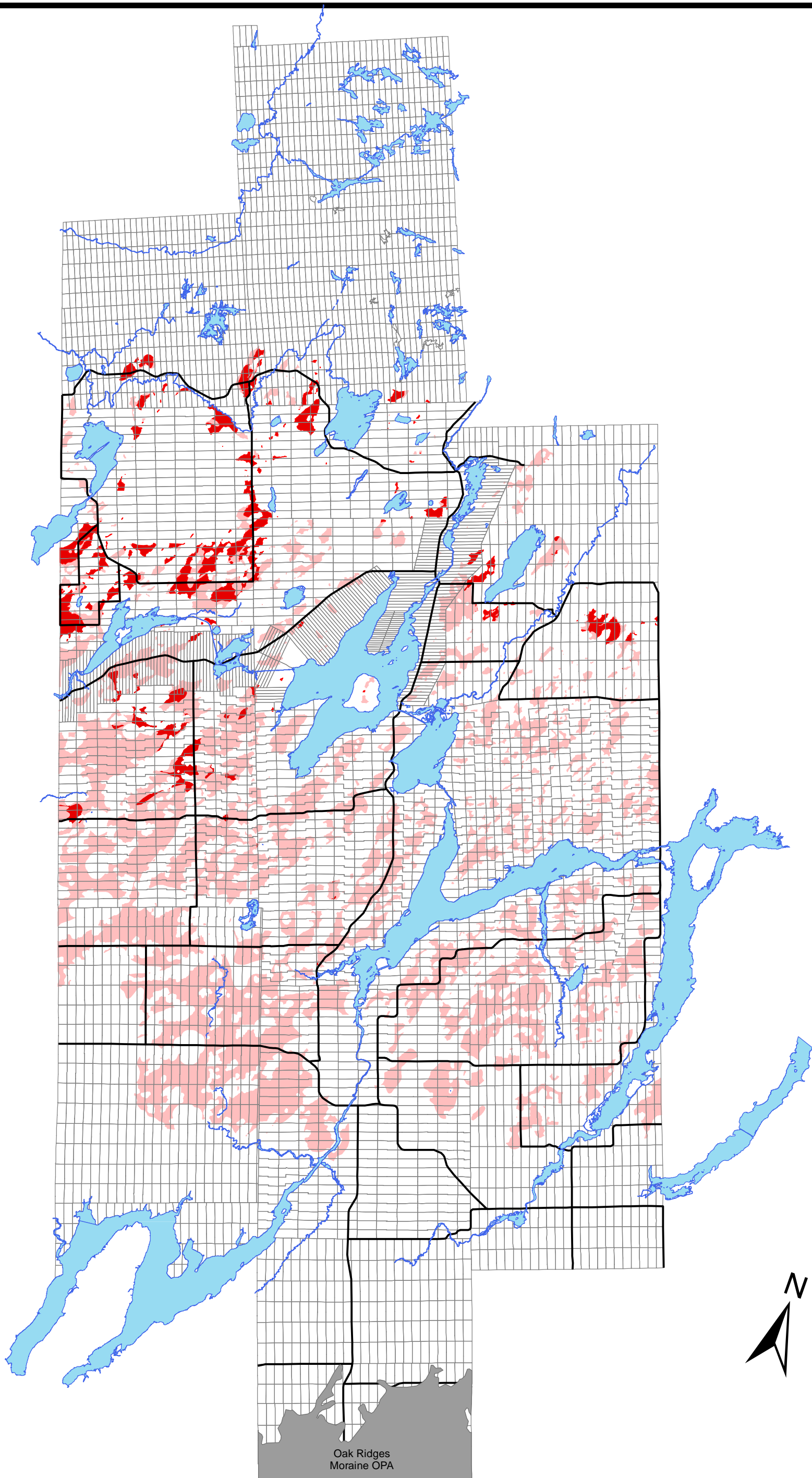


Land Use Designations

- | | | |
|--------------------------|--------------------|--------------------------|
| Prime Agricultural | Highway Commercial | Mobile Home Park |
| Rural | Tourist Commercial | Open Space |
| Countryside | Industrial | Special Policy Lake Area |
| Environmental Protection | Aggregate | Roads |
| Urban | Resort Estate | |
| Hamlet | | |
| Waterfront | | |

Schedule F





March 17, 2011

Bedrock Resource
Constraint Overlay

- 1 to 8m
- High Potential (less than 1m)

**This Schedule is
under appeal.
See Appendix K**

City of Kawartha Lakes Official Plan Schedule H Bedrock Resource Constraint Overlay



THE CORPORATION OF THE

TOWNSHIP OF FENELON

BY-LAW NUMBER: 12-95

A ZONING BY-LAW

Being a By-law, pursuant to Section 34 of the Planning Act, R.S.O. 1990, as amended, to regulate the use of land, the location and use of buildings or structures, the type of construction and the height, bulk, size, floor area, spacing, character and minimum opening elevations of buildings or structures and the provision of parking and loading area facilities in the Township of Fenelon.

WHEREAS it is considered desirable to control the use of land, the erection and use of buildings or structures in defined areas of the TOWNSHIP OF FENELON in accordance with Section 34 of the Planning Act, R.S.O. 1990, as amended, and in conformity with the Official Plan of the County of Victoria;

NOW THEREFORE the Council of the Corporation of the TOWNSHIP OF FENELON enacts the following By-law:

PART 1 - TITLE AND AREA RESTRICTED

1.1 TITLE

1.1.1 This By-law shall be known as the "Zoning By-law" of the Township of Fenelon.

1.2 AREA RESTRICTED

1.2.1 Schedules A, B, C, D, E, F and G attached hereto, with the notations, zone boundaries, symbols and references shown thereon illustrate the area to which this By-law applies and are hereby declared to be part of this By-law. The lands affected by this By-law may hereinafter be referred to as the "area zoned".

1.2.2 No building or structure shall hereafter be erected or altered, no lot shall hereafter be created, and the use of any building, structure or lot shall not hereafter be changed in whole or in part except in conformity with the provisions of this By-law.

PART 2 - DEFINITIONS

In this By-law, unless the context otherwise requires, the following terms when used shall have the meanings assigned to them as follows:

ABATTOIR means a building or part of a building where livestock are slaughtered for commercial consumption. A refrigerated offal room, meat cutting, curing or smoking operation and a retail/wholesale outlet are considered to be normal accessory uses.

ACCESSORY BUILDING means a detached building or structure on the same lot as the main building devoted exclusively to an accessory use. For the purpose of this By-law swimming pools shall be considered an accessory building or structure.

ACCESSORY USE means a use subordinate and naturally, customarily and normally incidental to and exclusively devoted to a main use of land or building and located on the same lot.

AGRICULTURAL PRODUCE STORAGE FACILITY means a building or structure used for the storage of agricultural produce and may include facilities for wholesale distribution or an accessory retail outlet for the sale of such agricultural produce to the general public.

AGRICULTURAL USE means a use of land, buildings or structures for the purpose of forestry, field crops, fruit farming, market gardening, dairying, animal husbandry, aquaculture, poultry or beekeeping, and such uses as are customarily and normally related to agriculture.

AGRICULTURALLY RELATED COMMERCIAL USE means a use directly related to agriculture and requiring proximity to farm operations and includes such uses as animal husbandry services, produce or grain storage facilities or farm machinery sales and service outlets.

AIRPORT means any area of land, water (including the frozen surface thereof) or other supporting surface used or intended to be used, either in whole or in part, for the arrival and departure, movement, servicing, parking or storing of aircraft and the receiving and discharging of passengers or cargo including any buildings, installations and equipment in connection therewith.

AIRSTRIP means any land used for the purpose of landing, parking, storing, taxiing or taking off of a maximum of three private aircraft.

ALTER when used in reference to a building, structure or part thereof, means:

- (a) to change any one or more of the internal or external dimensions of such building or structure; or
- (b) to change the use of such building or structure; or
- (c) to change the number of uses or dwelling units contained therein.

ALTER when used in reference to a lot means:

- (a) to change any dimension or area, relating to such lot, which is required within this By-law including lot coverage, setbacks, parking and landscaping; or
- (b) to change the use of such lots; or
- (c) to change the number of uses located thereon.

AMUSEMENT MACHINE means any mechanical, electronic or computerized machine or device or any combination thereof intended for use as a game, entertainment or amusement which is offered for use to the public by any person for profit or gain and shall include a pinball machine, television game, shooting gallery, video game or other similar device but shall not include billiard or pool tables, games of chance as defined by the Criminal Code or any machine used only for the purpose of vending merchandise or services or playing recorded music.

ANIMAL HOSPITAL means a building or part thereof in which facilities are provided for the treatment or prevention of disease and injury to animals where shelter may be provided within the building during the period of treatment.

AQUACULTURE means the breeding of aquatic forms of life in natural or artificial bodies of water for the purpose of wholesale distribution or retail sale on-site.

ATTACHED means a building otherwise complete in itself, which depends for structural support, or complete enclosure, upon a division wall or walls shared in common with an adjacent building or buildings.

ATTIC OR ROOF SPACE means the space between the roof and the ceiling of the top storey or between a dwarf wall and a sloping roof.

BASEMENT means a storey or storeys of a building located below the first storey.

BASEMENT, WALK-OUT, means that portion of a building which is partly below grade but which has more than fifty percent of the finished floor area not more than 0.6 metres below the average finished grade and which has an entrance at or above the adjacent finished grade.

BED AND BREAKFAST ESTABLISHMENT means a private dwelling that is not part of or used in conjunction with any other tourist establishment and in which there are a maximum of three guest rooms for rent to the travelling or vacationing public, whether rented regularly, seasonally or occasionally.

BLENDING OPERATION means the importation of aggregate material to an active extraction site for the purpose of mixing or blending with aggregate extracted on-site, but in any case a blending operation does not include or constitute a transfer station.

BLOCK means the smallest unit of land the boundaries of which consists entirely of public streets, shorelines, railroads, public parks, or any combination thereof.

BOARDING, LODGING OR ROOMING HOUSE means a dwelling licenced pursuant to a by-law passed under the Municipal Act, R.S.O. 1990, as amended in which the proprietor supplies either room or room and board for monetary gain, to more than two but not more than six persons exclusive of the lessee owner thereof or members of the household and which is not open to the general public and is not defined or licenced as a group home under any statutes or regulations of the Provincial or Federal governments.

BOAT HOUSE means an accessory building or structure which is designed or used for the sheltering or storage of a boat or other forms of water transportation and accessory thereof but excluding human habitation and not including any other use in conjunction with human habitation.

BUILDING means a structure occupying an area greater than 5 square metres consisting of a wall, roof and floor, or any one or more of them, or a structural system servicing the function thereof. Any tent, awning, bin, bunk, platform, vessel or vehicle used for the shelter, accommodation support or enclosure of persons, animals, materials, farm produce or equipment shall be deemed a "building". When used herein as a reference to a use of a "building", it may also be interpreted to be the use of part of a building".

BUILDING, MAIN, means the building in which is carried on the principal purpose for which the lot is used.

BUILDING SUPPLY OUTLET means a retail or wholesale store for the sale of building materials, products or accessories and which may include a lumber yard and ancillary outside storage of materials.

BUSINESS, PROFESSIONAL OR ADMINISTRATIVE OFFICE means a building or part of a building in which one or more persons are employed in the management, direction or conducting of a business or where professionally qualified persons and their staff serve clients or

patients who seek advice, consultation or treatment and shall include the administrative offices of a non-profit or charitable organization.

BY-LAW ENFORCEMENT OFFICER means an official or an employee of the Municipality from time to time charged by the Corporation with the duty of administering and enforcing the provisions contained herein.

CABIN, PRIVATE means a building, for sleeping accommodation, which contains no cooking or sanitary facilities and which is an accessory use to a dwelling unit.

CAMPING LOT means a parcel of land within a trailer camp or tourist camp provided for the exclusive use of the lessee or tenant of such land for the seasonal or temporary occupancy of one travel trailer, park model trailer or tent, where permitted, for recreation or vacationing purposes.

CELLAR means that portion of a building between two floor levels which is partly or entirely underground but has more than one-half of its height, from finished floor to underside of floor joists of the storey next above, below finished grade.

CLUB, CHARITABLE OR SERVICE means a non-profit, non-commercial organization or association of persons, whether incorporated or not, united with some common interest in undertaking or supporting social, cultural, recreational and welfare programs for the common betterment of the community and shall also mean, where the context requires, a suite owned or occupied by the members of such an association within which the activities of the members, or supported by the organization, are conducted.

CLUB, PRIVATE means a commercial undertaking or profit oriented enterprise which provides social, recreational or personal services for groups or individuals with some common interest, and shall also mean a non-profit organization or association of persons united by a common interest in an activity which is of a personal interest nature rather than being directly oriented to the provision or support of a community service, e.g. health club, gun club, archery club.

CONSERVATION USE means a use which preserves, protects or improves any feature of the natural environment through a program of maintenance and management administered by a Conservation Authority, public authority, private groups or individuals.

CONSTRUCT means to do anything in the erection, installation or extension or material alteration or repair of a building or structure and includes the installation of a building unit fabricated or moved from elsewhere, and "construction" has a corresponding meaning.

CONTRACTOR'S YARD means a lot, building or structure where equipment and materials of a contractor are stored or where a contractor

performs shop or assembly work but does not include any other use or activity otherwise defined herein.

CORPORATION means the Corporation of the TOWNSHIP OF FENELON.

COTTAGE ESTABLISHMENT means a tourist establishment containing two or more buildings designed for human habitation which may or may not be equipped with a kitchen.

COUNCIL means the Municipal "Council" of the Corporation of the TOWNSHIP OF FENELON.

COUNTY means the Corporation of the County of Victoria.

CUSTOM WORKSHOP means a building or part thereof used by a person or persons for the manufacture in small quantities of made to measure clothes or articles and shall include upholstering, repair, refinishing of antiques and other art objects, but shall not include metal spinning, furniture manufacturing and the like.

DAYLIGHTING TRIANGLE means that part of a corner lot adjacent to the intersection of the exterior lot lines measured from such intersection the distance required by this By-law along each such street line and joining such points with a straight line. The triangular shaped land between the intersecting lines and the straight line joining the points the required distance along the street lines shall be known as the "daylighting triangle".

DAYCARE CENTRE, DAY NURSERY OR NURSERY SCHOOL means a "day nursery" as defined by the Day Nurseries Act, R.S.O. 1990, as amended.

DEMOLISHED means, with respect to a building, the complete demolition or removal of the roof together with any two exterior walls; or, where the entire roof is not removed, the complete demolition of more than 50%; of an existing structure exclusive of a basement or crawl space.

DEMOLITION means the doing of anything in the removal of a building or structure or any material part thereof.

DOCK means a structure which is designed or used for the mooring of a boat or other form of water transportation which stretches along the side of or projects into a body of water such as a river or lake.

DRUGLESS PRACTITIONER means a person who practices the treatment of any ailment, disease, defect or disability of the human body by manipulation, adjustment, manual or electro-therapy or by a similar method within the meaning of the Drugless Practitioners Act, R.S.O. 1990, as amended.

DRY CLEANING DEPOT means a building or portion thereof used for the purpose of receiving articles or goods of fabric to be subjected to

the process of dry cleaning, dry dying or cleaning elsewhere and for the pressing and distribution of any such articles or goods which have been subjected to any such process.

DRY CLEANING ESTABLISHMENT means a building, or portion thereof where dry cleaning, dry dyeing, cleaning or pressing of articles or goods of fabric is carried on where only nonflammable solvents are or can be used.

DWELLING means a building, occupied or capable of being occupied as a home, residence or sleeping place by one or more persons, containing one or more dwelling units, including boarding, lodging or rooming houses but not including motels, hotels, tents, truck campers, travel trailers, or mobile camper trailers.

DWELLING UNIT means a suite operated as a housekeeping unit used or intended to be used as a domicile by one or more persons and containing cooking, eating, living, sleeping and sanitary facilities for the exclusive use of the occupants.

DWELLING, APARTMENT, means a building containing three or more dwelling units which have a common entrance from the street level and the occupants of which have the right to use in common, halls and/or stairs and/or elevators and yards.

DWELLING, BACHELOR APARTMENT, means a dwelling unit in an apartment building or converted dwelling designated for occupancy by one or two persons and consisting of a bed-living room, a kitchen or kitchenette and a bathroom.

DWELLING, CONVERTED, means a dwelling existing at the time of the passing of this By-law which because of size or design can be converted by partition and the addition of sanitary facilities into more than one dwelling unit.

DWELLING, DUPLEX, means a building that is divided horizontally into two dwelling units each of which has an independent entrance either directly or through a common vestibule.

DWELLING, FOURPLEX, means a building that consists of two duplex dwellings attached to each other vertically.

DWELLING, MAISONETTE, means a building that is divided into three or more dwelling units, each of which has independent entrances, one to a common corridor and the other directly to the outside yard area adjacent to the said dwelling unit.

DWELLING, SEMI-DETACHED, means a building that is divided vertically into two dwelling units each of which has an independent entrance either directly or through a common vestibule.

DWELLING, SINGLE DETACHED, means a completely detached dwelling unit, but shall not include a mobile home.

DWELLING, TOWN HOUSE, means a building that is divided vertically into three or more dwelling units, each of which has independent entrances, to a front and rear yard immediately abutting the front and rear walls of each dwelling unit.

DWELLING, TRIPLEX, means a building that is divided horizontally into three separate dwelling units each of which has an independent entrance either directly from the outside or through a common vestibule.

DWELLING, VACATION, means a single detached dwelling used for recreation purposes that is not used for continuous habitation or as a permanent residence.

ERECT means to build, construct, reconstruct, alter or relocate and without limiting the generality of the foregoing shall be taken to include any preliminary physical operation such as excavating, grading, piling, cribbing, filling, draining or structurally altering any existing building or structure by an addition, deletion, enlargement or extension.

ESTABLISHED BUILDING LINE means the average distance from the street line to existing main buildings, located on the same side of the street and within 150 metres of a lot, where a minimum of three main buildings have been built prior to the date of passing of this By-law.

EXISTING means "existing" as of the date of the passing of this By-law.

FACTORY OUTLET means a building or part of a building where the products manufactured by an industry, located on the same lot, are kept for wholesale or retail sale, and which does not exceed fifteen percent of the gross floor area of the building within which the industry is located.

FARM PRODUCE OUTLET means a use accessory to an agricultural use which consists of the retail sale of agricultural products, exclusive of meat or fish, produced by an agricultural operation conducted on the same lot.

FAST FOOD FACILITY, MOBILE, means a trailer or vehicle which has been modified, in accordance with the requirements of the Haliburton, Kawartha, Pine Ridge District Health Unit, for the purposes of the preparation and sale of fast foods.

FERTILIZER MIXING PLANT means a building or a complex of buildings where chemical compounds are mixed, treated or otherwise processed for fertilizer, and may be packaged and warehoused. Without limiting the

generality of the foregoing, a mixing plant may include ancillary activities such as administrative or business offices and an outlet for the sale of the processed product, seeds, agricultural chemicals and other similar agricultural supplies to the general public.

FINISHED GRADE means with reference to a building or structure, the average elevation of the finished grade of the ground immediately surrounding such structures at all exterior walls, exclusive in both cases of any artificial embankment or entrenchment and when used with reference to a street, road or highway means the elevation of the street, road or highway established by the Corporation or other road authority.

FITNESS CENTRE means a building or part thereof which is used for the purpose of a gymnasium, massage room, steam room, sunroom or swimming pool.

FLOOR AREA means the space on any storey of a building between exterior walls and required firewalls, including the space occupied by interior walls and partitions, but not including exits and vertical service spaces that pierce the storey and excluding, in the case of a dwelling, any room not habitable in all seasons of the year.

FLOOR AREA, GROSS, means the total area of all floors above finished grade measured between the outside surfaces of exterior walls or between the outside surfaces of exterior walls and the centre line of firewalls except that, in any other occupancy than a residential occupancy, where an access or a building service penetrates a firewall, measurements shall not be taken to the centre line of such firewall.

FLOOR AREA, GROSS, LEASABLE, means the total floor area of a commercial or industrial building or structure exclusive of any internal common areas and/or common mechanical or service rooms.

FORESTRY means the management, development and cultivation of timber resources exclusive of the actual processing of such timber resources.

GARAGE, PRIVATE, means an enclosed structure for the storage of one or more motor vehicles in which no business, occupation, or service is conducted for profit.

GARAGE, PUBLIC, means a building or place other than a private garage where motor vehicles are kept or stored for remuneration or repair, or a building or place used as a motor vehicle repair shop. This definition shall not include an automobile washing establishment, automobile sales establishment or service station.

GARDEN MARKET means a food store for the retail sale of farm produce and agricultural products with outside display permitted.

GARDEN AND NURSERY SUPPLY OUTLET means a building, structure or lot for the growing or displaying of flowers, fruits, vegetables, plants, shrubs, trees or other vegetation which is sold to the public at retail and shall also include the sale or rental of such goods, products or equipment normally associated with gardening or landscaping.

GROUP HOME means a single housekeeping unit in a residential dwelling in which three to ten residents, excluding staff of the receiving household, live under responsible supervision and who, by reason of their emotional, mental, social, or physical condition or legal status, require a group living arrangement for their well being. A group home shall be licenced or approved for funding by the Provincial Government.

GUEST ROOM means a room or suite of rooms which contain no facilities for cooking, and which are used or maintained for the accommodation of an individual or individuals to whom hospitality is extended for compensation.

HABITABLE ROOM means a room in a dwelling used or intended to be used primarily for human occupancy and shall include a room designed for living, sleeping, eating or preparing food, including a den, library, sewing room or enclosed sunroom.

HEALTH CENTRE means a building or portion thereof where Health professionals, specified by the Regulated Health Professions Act, S.O. 1991, as amended, provide diagnosis and treatment to the general public, without overnight accommodation, and includes reception areas, offices, snack bar, laboratory, x-ray, minor operating and rehabilitation rooms, and a pharmaceutical dispensary, provided that all such uses have access only from the interior of the building.

HEIGHT means the vertical distance on a main building or structure between the finished grade, and

- (a) the highest point of the roof surface, or the parapet, whichever is the greater, of a flat roof; or
- (b) the mean level between eaves and ridge of a gabled, hip, gambrel or mansard roof, or other type of pitched roof. In calculating the "height" of a building or structure, roof constructions such as bulkheads, penthouses, and similar construction enclosing equipment or stairs and which are less than six metres in height and do not occupy more than 30 percent of the area of the roof upon which they are located, and any ornamental roof construction such as towers, steeples or chimneys shall be disregarded.

HEREAFTER means after the date of the passing of any applicable provision of this By-law.

HEREIN means in this By-law, and shall not be limited to any particular section of this By-law.

HIGH WATER MARK means the highest elevation of the water surface of a body of water or a watercourse, including seasonal flooding, as evidenced by changes in shoreline vegetation or residual water marks left on buildings, structures, vegetation or other shoreline features as a result of flood events.

HOME FOR THE AGED means a "home" within the meaning of the Homes for the Aged and Rest Homes Act, R.S.O. 1990, as amended, which is operated by the County or Municipality or a "charitable home for the aged" as defined by the Charitable Institutions Act R.S.O. 1990, as amended.

HOME IMPROVEMENT SUPPLY OUTLET means a retail or wholesale store within a wholly enclosed building for the sale of home improvement products and accessories.

HOME OCCUPATION means an accessory use of part of a dwelling or part of any accessory building for gainful employment secondary to and compatible with a domestic household and which is carried on by members of the household residing in the dwelling unit.

HOTEL means a tourist establishment containing therein guest rooms served by a common entrance, generally from the street level. Accessory uses may include accommodation for permanent staff, a beverage room, dining room, meeting rooms and conference and recreational facilities.

HOUSEHOLD means an individual person or a group of two or more persons who reside together as a single, independent and separate housekeeping unit and may include up to two roomers or boarders.

INDUSTRY, DRY, means an industry which does not require the consumption or use of water or the discharge of industrial liquid wastes, wash or cooling water or process waste as part of the industrial process and which requires the disposal of only the domestic wastes of employees.

INDUSTRY, HEAVY, means an industry, assembly, manufacturing, or processing plant, exclusive of a sand or gravel pit, which is land intensive, or predominantly conducted in an open or unenclosed space, or which by its nature generates large volumes of truck traffic; uses and/or stores bulk quantities of hazardous or flammable materials; usually or commonly discharges noise, odours, smoke or particulate matter or vibration beyond the property boundaries; and require extensive buffering. Examples of such uses are steel mills, steel fabricating, metal or rubber recovery plants, foundries, pesticide manufacturing and refineries.

INDUSTRY, LIGHT, means an industry which is conducted and wholly contained within an enclosed building the operation of which does not produce emissions of noise, odour, smoke or particulate matter or vibration which are detectable beyond any lot line. Examples of such uses are light assembly, electronics, warehousing and industrial malls.

INDUSTRY, MEDIUM, means an industry, assembly, manufacturing or processing plant which is predominantly conducted within a wholly enclosed building but which may also involve a limited amount of open or unenclosed storage areas and the discharge of noise, odour, particulate matter or smoke, or vibration which is detectable beyond the property boundaries. Examples of such uses are sheet metal, plastic, fibre glass or wood fabricating operations; motor vehicle body repair shops; and food processing facilities.

INFRASTRUCTURE means physical structures which form the foundation for development and include sewage and water lines and pumping stations, electric power transmission lines and transformers, communication transmission lines and relay towers, transit or transportation corridors and appurtenant facilities, oil and gas pipelines and appurtenant facilities and recycling drop off sites. Infrastructure does not include any related administrative facility, building or structure nor does it include land, buildings or structures for treatment of Water, sewage or wastes, production of electric power, production of communication of transmissions, or the production of oil or gas.

INSTITUTIONAL USE means facilities serving the community including schools, churches, hospitals, nursing homes and recreation centres.

ISLAND, means a piece of land completely surrounded by water having no access to the mainland via a causeway, bridge or any other physical connection capable of transferring motor vehicles.

KENNEL means a place, whether enclosed or not, where dogs are kept for purposes of breeding, boarding or commercial purposes.

LANDSCAPING means any combination of trees, shrubs, flowers, grass or other horticultural elements, decorative stonework, paving, screening or other architectural elements, all of which are designed to enhance the visual amenity of a property or to provide a screen to mitigate any objectionable aspects that may detrimentally affect adjacent land.

LANDSCAPED OPEN SPACE means the open, unobstructed space at grade on a lot accessible by walking, from the street on which the lot is located, and used exclusively for landscaping and includes any surfaced walk, patio or similar area but does not include any driveway or ramp, any curb, retaining wall, parking space or any open space contained within any building or structure.

LAUNDRY means a building or part thereof in which the business of a laundry is conducted by means of one or more washers, and drying, ironing, finishing and incidental equipment and in which only water and detergents or soaps are or can be used and includes a coin-operated laundry and dry cleaning depot.

LAWN AND GARDEN EQUIPMENT SALES AND SERVICE ESTABLISHMENT means a building and/or lot used for the display, sale and/or rental of lawn and garden tractors, mowers and equipment and/or the servicing, repair, cleaning and greasing of these products and the sale of accessory and related parts and products including lubrication oils but not including motor fuels.

LIVESTOCK HOUSING CAPACITY means the total number of livestock that can be accommodated in a livestock facility at any one time.

LIVESTOCK FACILITIES means barns, buildings or structures where animals are housed and shall also include beef feed lots and associated manure storage facilities.

LIVESTOCK UNIT means the value or equivalent value for various types of animals based upon manure production and production cycles.

LOADING SPACE means an unencumbered area of land which is provided and maintained on the same lot upon which the principal use is located and which area is provided for the temporary parking of one commercial motor vehicle while merchandise or materials are being loaded or unloaded from such vehicle.

LODGE means a tourist establishment providing temporary accommodation to people engaged in hunting, fishing, recreational activities and the vacationing public by providing meals and sleeping accommodation containing guest rooms or cottages, but shall not include any establishment otherwise defined or classified herein.

LOT means a parcel or tract of land, the title of which is legally conveyable.

LOT, CORNER, means a lot situated at the intersection of two streets or two parts of the same street of which the two adjacent sides upon the street line or street lines includes an angle of not more than 135 degrees or where such adjacent sides are curved, the angle included by the adjacent sides shall be deemed to be the angle formed by the intersection of the tangents to the street lines drawn through the extremities of the interior lot lines.

LOT, INTERIOR, means a lot other than a corner or a through lot.

LOT, ISLAND, means a lot fronting on a body of water, being a part of or encompassing the whole island, whether or not occupied by a building or structure.

LOT, THROUGH, means a lot bounded on two opposite sides by streets provided, however, that if any lot qualifies as being both a "corner lot" and a "through lot" as defined, such lot shall be deemed to be a corner lot.

LOT AREA means the total horizontal area within the lot lines of a lot excluding the horizontal area of such lot below the normal water level of any abutting body of water.

LOT COVERAGE means that percentage of the lot area covered by all buildings or structures above ground level and shall not include that portion of such lot area which is occupied by a building or portion thereof which is completely below ground level.

LOT DEPTH means the horizontal distance between the front and rear lot lines. If the front and rear lot lines are not parallel, "lot depth" means the length of a straight line joining the middle of the front lot line with the middle of the rear lot line. When there is no rear lot line, "lot depth" means the length of a straight line joining the middle of the front lot line with the apex of the triangle formed by the side lot lines.

LOT FRONTAGE means the horizontal distance abutting an improved public street between the side lot lines measured along the front lot line. Where the front lot line is not a straight line, or where the side lot lines are not parallel, the "lot frontage" is to be measured by a line equal to the minimum front yard measured back from and parallel to the chord of the "lot frontage" and for the purpose of this paragraph, the chord of the "lot frontage" is a straight line joining the two points where the side lot lines intersect the front lot line, and a sight triangle shall be considered part of the lot for the purposes of calculating the "lot frontage". In the case of a corner lot the shorter of the frontages shall be deemed the "lot frontage".

LOT LINE means any boundary of a lot.

LOT LINE, EXTERIOR, means a side lot line which abuts the street on a corner lot.

LOT LINE, FRONT, means, except in the case of a corner lot, an island lot or through lot, the line dividing the lot from the street. In the case of a corner lot, the shorter boundary line abutting the street shall be deemed the "front lot line". Where each of such lot lines are of equal length, the "front lot line" shall be deemed to be the "front lot line" as established in the block by prior construction. In the case of an island lot, the "shore lot line" shall be deemed to be the "front lot line".

LOT LINE, REAR, means the lot line farthest from or opposite to the front lot line. In the case of a through lot, the "rear lot line"

shall mean the "rear lot line" as established in the block by prior construction.

LOT LINE, SHORE, means any lot line or portion thereof which abuts a lake or river.

LOT LINE, SIDE, means a lot line other than a front or rear lot line.

MARINA means a building, structure or place containing docking facilities and located on a navigable waterway where boats and boat accessories are berthed, stored, serviced, repaired or kept for sale and where facilities for the sale of marine fuels and lubricants may be provided.

MARINA, DRY-LAND, means a building, structure, or place where boats and boat accessories are stored, serviced, repaired or kept for sale.

MINIMUM DISTANCE SEPARATION means:

i) for siting new residential, institutional, commercial, industrial or recreational uses

- the distance between the nearest part of a livestock facility and a lot line for a lot having an area of 1 hectare or less; or
- the distance between the nearest part of a livestock facility and the main wall of the dwelling unit on a separate lot larger than 1 hectare; or
- to the zone boundary of land zoned to permit a specified non-agricultural use.

ii) for siting new or altered livestock facilities:

- the distance between the nearest part of a livestock facility and the main wall of the dwelling unit or a separate lot; or
- to the boundary of an area zoned to permit a specified non-agricultural use.

MOBILE HOME means a dwelling unit, built to C.S.A. Standard Z240, designed for transportation, after fabrication, on public roads on its own wheels, or on a flatbed or other trailer which is used or designed such that it:

- arrives at the site where it is to be occupied as a permanent residential dwelling unit which is complete and ready for occupancy save for minor and incidental unpacking and assembly and may be located on wheels, jacks or a permanent foundation;
- has a width greater than 2.6 metres (8.6 feet) when in transit mode;

- has a floor area greater than 50 square metres (540 square feet) and width of 4 metres (13 feet) or more when in set up mode;
- generally requires connection to permanent utilities for the operation of installed fixtures and appliances.

MOBILE HOME PARK means an establishment comprising land or premises under single ownership designed and intended for residential use where residence is exclusively for two or more mobile or modular homes, but does not include a trailer camp or park.

MOBILE HOME SITE means a parcel of land within a mobile home park used to accommodate one mobile or modular home and for the exclusive use of the lessee or tenant of such area.

MODULAR HOME means a single detached dwelling, constructed to CSA standard A277, which may be fabricated in two or more sections which cannot function independently from one another and are designed for transportation on streets on a flatbed or other trailer. Upon arrival at the site, the sections are placed on a foundation and are assembled to form one complete dwelling unit and generally are not intended to be dismantled and relocated.

MOTEL means a tourist establishment containing guest rooms, each of which has a separate entrance from outside the building. Accessory uses may include accommodation for permanent staff, a beverage room, dining room, meeting room, and recreational facilities for the guests.

MOTOR VEHICLE means an automobile, truck, motorcycle, and any other vehicle propelled or driven otherwise than by muscular power, but does not include railways or other "motor vehicles" running only upon rails, a motorized snow vehicle, all terrain vehicles (ATV's), farm tractor, self-propelled implement of husbandry or road building machine within the meaning of the Highway Traffic Act, R.S.O. 1990, as amended.

MOTOR VEHICLE, COMMERCIAL, means any "commercial motor vehicle" within the meaning of the Highway Traffic Act, R.S.O. 1990, as amended.

MOTOR VEHICLE, UNLICENCED, means a motor vehicle which is unregistered for the current year under the Highway Traffic Act, R.S.O. 1990, as amended.

MOTOR VEHICLE BODY REPAIR SHOP means a building or structure used for the painting or repairing of motor vehicle bodies, and in conjunction with which there may be towing service and motor vehicle rentals for customers while the motor vehicle is under repair, but shall not include any other establishment otherwise defined or classified in this By-law.

MOTOR VEHICLE FUEL BAR means one or more pump islands, each consisting of one or more motor fuel pumps, and a shelter having a floor area of

not more than 12 square metres which shall not be used for sale of any products other than required for the operation of motor vehicles, but shall not include any other establishment otherwise defined or classified in this By-law.

MOTOR VEHICLE SALES ESTABLISHMENT means a building or part thereof and/or lot used for the display and sale of new and/or used motor vehicles, automotive accessories and related products and the leasing or renting of motor vehicles, but shall not include any other automotive use defined in this By-law.

MOTOR VEHICLE SERVICE STATION means a building or part thereof used for the retail sale of lubrication oils, motor fuels, motor vehicle accessories and may include the servicing and minor repairing essential to the actual operation of motor vehicles but excluding an automobile washing establishment or automotive sales establishment.

MOTOR VEHICLE WASHING ESTABLISHMENT means a building or part thereof used for the operation of motor vehicle washing equipment which is automatic, semi-automatic and/or coin operated.

MOTORIZED MOBILE HOME means any motor vehicle so constructed as to be a self-contained, self-propelled unit, capable of being utilized for the living, sleeping or eating accommodation of persons.

MOTORIZED SNOW VEHICLE means a "motorized snow vehicle" within the meaning of the Motorized Snow Vehicles Act, R.S.O. 1990, as amended.

MULTIPLE RESIDENTIAL means a residential building or structure containing three or more dwelling units.

MUNICIPAL SEWERS means sanitary sewers supplied by the Municipality, a public utilities commission or a municipal authority.

MUNICIPAL WATER means water supplied by the Municipality, a public utilities commission or a municipal authority.

MUNICIPALITY means the Corporation of the TOWNSHIP OF FENELON.

NON-COMPLYING means that the building or structure does not meet the setback, yard or other provisions or requirements contained herein for the zone in which the building or structure is located, as of the date of passing of this By-law.

NON-CONFORMING USE means the use of land, buildings or structures for a purpose which is not included with the permitted uses herein for the zone in which such land, building, or structure is located, as of the date of passing of this By-law.

NURSING HOME means a "nursing home" within the meaning of the Nursing Homes Act, R.S.O. 1990, as amended.

PARK, PRIVATE, means any open space or recreational area, other than a public park, containing therein one or more swimming pools, wading pools, refreshment rooms, tennis courts, bowling greens, gardens, golf courses, ski areas or similar open space uses. This definition shall not include a mobile home park or trailer park.

PARK, PUBLIC, means any open space or recreational area, owned or controlled by a public authority and may include therein neighbourhood, community, regional and special parks or areas and may contain one or more athletic fields, field houses, bleachers, swimming pools, botanical gardens, zoological gardens, bandstands, skating rinks, tennis courts, bowling greens, boat liveries, bathing stations, refreshment rooms, fair grounds, golf courses or similar uses.

PARKING LOT means an open area, other than a street, used for the temporary parking of two or more motor vehicles and available for public use whether free, for compensation or as an accommodation for clients, visitors, customers or residents.

PARKING SPACE means an area exclusive of driveways or aisles, for the temporary parking or storage of motor vehicles and which has adequate access to permit ingress or egress of a motor vehicle to and from a street by means of driveways, aisles, manoeuvring areas or similar areas, no part of which is used for the temporary parking or storage of one or more motor vehicles.

PATIO means an area of on-ground stone, brick, concrete or cement slab work no higher than the immediately adjacent finished grade.

PERMITTED means "permitted" by this By-law.

PERSON means an individual, association, firm, partnership, corporation, trust, incorporated company, organization, trustee or agent, and the heirs, executors or other legal representatives of a "person" to whom the context can apply according to law.

PIT, PEAT, means land or land under water from which peat is being or has been removed by means of an open excavation. It shall not include an excavation incidental to the erection of a building or structure for which a building permit has been granted, by the Corporation, or an excavation incidental to the construction of any public works.

PIT, SAND AND GRAVEL means land or land under water from which unconsolidated aggregate is being or has been excavated, and that has not been rehabilitated, but does not mean land or land under water excavated for which a building permit has been granted by the Corporation or an excavation incidental to the construction of any public work.

PLACE OF AMUSEMENT means any establishment or part thereof containing more than three amusement machines which are operated for gain and made available for entertainment or amusement of the general public. This definition shall not include:

- (a) Suite(s) which are licenced under the Liquor Licencing Act,
- (b) Establishments which sell amusement machines,
- (c) Establishments where the amusement machines are made available as an accessory use provided that the floor area occupied by the amusement machines does not exceed 5% of the total leasable floor area of the establishment but in no case shall the number of amusement machines which are accessory to another use exceed three,
- (d) Any suite(s) with amusement machines which are considered contrary to the Criminal Code of Canada, and
- (e) A recreational establishment or place of assembly.

PLACE OF ASSEMBLY means a building, or part thereof, in which facilities are provided for such purposes as meeting for civic, educational, political, religious, social, recreational or athletic purposes and shall include a banquet hall or club.

PLACE OF WORSHIP means a building dedicated to religious worship and may include such accessory uses as a nursery school, convent, monastery or hall or auditorium.

PORTABLE ASPHALT PLANT means a facility with equipment designed to heat and dry aggregate and to mix aggregate with bituminous asphalt to produce asphalt paving material which is not of permanent construction but is designed to be dismantled and moved to another location as required and includes stockpiling and storage of bulk materials used in the process.

PREMISES means the area of a building or part thereof and/or land or part thereof used for residential or business purposes. In a multiple tenancy building, occupied by more than one business or dwelling unit, each area shall be considered a separate "premises".

PUBLIC AUTHORITY means Federal, Provincial, County or Municipal agencies, and includes any commission, board, authority or department established by such agencies and includes any telephone company, power utility, cable television system and natural gas piped distribution system.

PUBLIC SERVICE means a use of land for the health, safety and convenience of the general public. A public service shall include police, ambulance or fire stations, libraries, water treatment plants, community centres, recreational facilities, public administrative facilities but shall not include works depots or yards, waste disposal, waste processing or waste transfer waste sites.

PUBLIC USE means a use of land, buildings or structures for infrastructure or a public service.

QUARRY means a "quarry" as defined by the Aggregate Resources Act, R.S.O. 1990, as amended.

RECREATIONAL ESTABLISHMENT means a suite for recreational pursuits such as billiards, bowling, curling, dancing, roller or ice skating, theatre or cinema.

RECREATIONAL USE, ACTIVE, means a recreational use or activity which is conducted within a building or requires alteration of natural, soil or topographical features and includes such activities as golf courses, playing fields, trailer parks, campgrounds and conservation areas involving built structures.

RECREATIONAL USE, PASSIVE, means an activity or use of land carried out for recreational purposes which does not require the construction of buildings or the alteration of natural, soil or topographical features and includes open space and environmental areas.

RECYCLING DEPOT means enclosed or unenclosed premises for the sorting, processing, or temporary storage of recyclable materials such as glass, tins, paper, plastic and other non-hazardous recyclable materials but does not include unlicensed motor vehicles, trees, tires, metal, salvage, liquids or hazardous wastes.

REGIONAL STORM FLOOD ELEVATION means the contour elevation, based on Canadian Geodetic Survey Datum, to which a water body will rise during a Regional Storm as defined by the Province.

RESTAURANT means a building or structure or part thereof where food is prepared and offered for sale to the public for consumption within the building or structure but does not include a drive-in restaurant.

RESTAURANT, DRIVE-IN, means a restaurant where facilities are available to serve food to the customer for consumption in the customer's motor vehicle parked in an area located on the same lot or at another location not on the same lot.

RESTORATION means the replacement of a component or a part, of an existing building or structure, when such component or part is in an unsafe condition or is in such a state of wear or disrepair that it is unsuitable for the purpose or function it is intended to serve and, with respect to the whole of a building or structure, means repairs which are not so extensive as to render the building demolished, as defined herein.

SALVAGE YARD means premises where goods and materials are processed for further use and stored wholly or partly in the open and may include a scrap metal yard, a motor vehicle wrecking yard, and the

ancillary retail or wholesale of rebuilt, refabricated or restored parts or materials.

SCHOOL, COMMERCIAL, means a school conducted for gain, including secretarial school, language school, driving school, and the like but shall not include a day nursery.

SCHOOL, ELEMENTARY, means an educational facility established under the jurisdiction of the Ministry of Education for grade 8 or equivalent and under.

SCHOOL, NURSERY, means the same as a Day Care Centre.

SCHOOL, SECONDARY, means an educational facility established under the jurisdiction of the Minister of Education for grade 9 or equivalent and above.

SCRAP YARD means premises for the storage and/or handling or processing of scrap material, which, without limiting the generality of the foregoing, shall include waste paper, rags, bones, bottles, used bicycles, unlicensed motor vehicles, tires, metal and/or other scrap material and salvage.

SEASONAL FARM RESIDENTIAL USE means a structure or structures for the housing of seasonal farm employees for no more than eight months per seasonal worker, but in no event shall be used for year round occupancy. B/L 2007-289

SEASONAL USE OR OCCUPANCY means the use of a building or structure, between May first and October thirty-first in any year, for the temporary accommodation of the vacationing or travelling public which involves an accommodation unit or a camp site that is leased, rented or occupied in a manner that does not qualify the occupant or tenant as a permanent resident.

SERVICE SHOP means a building or part thereof used primarily for the repair of household articles and shall include radio, television and appliance repair shops but shall not include industrial, manufacturing or motor vehicle repair shops.

SERVICE SHOP, PERSONAL, means a building or part thereof in which persons are employed in furnishing services and otherwise administering to the individual and personal needs of persons, and without limiting the generality of the foregoing, may include hair styling and beauty salons, shoe repair, and shoe shining shops, but excludes any manufacturing or fabrication of goods for sale.

SETBACK means the distance between a lot line and the nearest main wall of any building, structure, excavation or open storage use on the lot.

SEWAGE SYSTEM, COMMUNAL, means a system of sewage collection municipally or privately owned which serves a minimum of 6 dwelling units.

SHOPPING CENTRE means a group of non-residential uses predominantly retail commercial in nature and designed, developed and managed as a unit by a single owner or tenant, or a group of owners or tenants and distinguished from a business area comprising unrelated individual business uses.

STORE, CONVENIENCE, means a retail store supplying groceries or other daily household necessities to the immediately surrounding area.

STORE, RETAIL, means a building or part thereof in which goods, wares, merchandise, substances, articles or things are offered or kept for sale directly to the public and includes the renting or leasing of goods or articles used within a dwelling.

STOREY means that portion of a building which is situated between the top of any floor and the top of the floor next above it, and if there is no floor above it, that portion between the top of such floor and the ceiling above it. A storey shall include a walk-out basement.

STOREY, FIRST, means the lowest storey of a building closest to finished grade having its ceiling 1.8 metres or more above average finished grade.

STREET, ROAD OR HIGHWAY means a "highway" within the meaning of the Highway Traffic Act, R.S.O. 1990, as amended, and shall include the entire right-of-way but shall exclude a lane or private right-of-way.

STREET ACCESS means that any lot having a lot line or portion thereof which is also a street line shall be deemed to have "street access" provided that an access point can be obtained.

STREET, IMPROVED PUBLIC, means a street, assumed by the Corporation, County or Province which has been constructed in such a manner so as to permit its use by normal vehicular traffic and maintained to provide year-round access.

STREET LINE means the dividing line between a lot and a street.

STRUCTURE means anything that is erected, built or constructed of parts joined together with a fixed location on the ground, or attached to something having a fixed location in or on the ground but does not include fences which do not exceed 2 metres in height.

STRUCTURAL ALTERATIONS means any change in the supporting members of a building such as bearing walls, columns, beams, girders and partitions.

SUITE means a single room or series of rooms of complimentary use, occupied as a single ownership, tenancy, rental or guest accommodation, and includes dwelling units, individual guest rooms or accommodation units in motels, hotels, tourist establishments, boarding houses, rooming houses and dormitories as well as individual stores and individual or complimentary rooms under a single business or personal service occupancy.

SWIMMING POOL means a structure which creates an artificial body of water, of more than 10 square metres in area, used for bathing, swimming or diving but shall not include ponds.

TEA ROOM means a restaurant where only non-alcoholic beverages, pastries and bakery goods are served.

TILLABLE HECTARES means the total area of land contained within a lot that can be used as pasture or worked or cultivated for the production of grain, forage or food crops.

TOURIST ESTABLISHMENT means a building or buildings designed for the accommodation of the travelling or vacationing public for gain or profit.

TRAILER means any vehicle that is at any time drawn upon a highway by a motor vehicle, and shall be considered a separate vehicle and not part of the motor vehicle by which it is drawn, except an implement of husbandry, another motor vehicle or any device or apparatus not designed to transport persons or property, temporarily drawn, propelled or moved upon such highway.

TRAILER, MOBILE CAMPER, means any vehicle in which the assembly can be erected, while stationary, using the trailer body and related components for support and utilized for the temporary recreational living, and sleeping accommodation, with or without cooking facilities, which is collapsible and compact while being drawn by a motor vehicle.

TRAILER, PARK MODEL means a trailer, built to C.S.A. Standard Z241, constructed on a single chassis mounted on wheels which is used or designed such that it:

- provides recreational living accommodation, on a seasonal basis, notwithstanding that it may be jacked up and its running gear removed;
- may be relocated from time to time;
- is more than 2.6 metres (8.6 feet) in width when in transit mode;
- has a gross floor area, including lofts, not exceeding 50 square metres (540 feet) and a width not greater than 4 metres (13.1 feet) a length not greater than 12.2 metres (40 feet) when in set up mode; and

- generally is not a fully self contained unit and may require connection to permanent utilities for the operation of installed fixtures and appliances.

TRAILER, TRAVEL means a trailer built on a single chassis, mounted on wheels that is used or designed such that it:

- provides portable living accommodations, on a seasonal basis, for recreational and vacationing purposes, notwithstanding that such trailer may be jacked up and its running gear removed;
- is of such size and weight as not to require a Special Permit under Section 110 of the Highway Traffic Act R.S.O. 1990;
- is not more than 2.6 metres (8.6 feet) wide when in transit mode;
- has a gross floor area less than 37.2 square metres (400 square feet) and a length of 12.2 metres (40 feet) or less when in set up mode;
- is a self contained unit requiring no permanent servicing hook ups for electricity, water supply or sewage disposal; and
- shall not include a park model trailer or a mobile home.

TRAILER CAMP OR PARK means an establishment, licensed by the authority having jurisdiction, consisting of camping lots and comprising land used or maintained as grounds for the camping or parking of travel trailers, park model trailers, motorized mobile homes, truck campers or tents for recreational or vacation use and designed for seasonal occupancy only.

TRANSFER STATION, AGGREGATE means the importation of aggregate material into an exhausted aggregate excavation site for the purpose of storage, or for crushing and storage while awaiting transfer to the market or another aggregate site.

TRANSFER STATION, WASTE means premises for the temporary storage of garbage and waste materials awaiting transfer to a permanent solid waste disposal facility and may include a recycling depot.

TRUCK CAMPER means any unit so constructed that it may be attached upon a motor vehicle, as a separate unit, and capable of being utilized for the temporary recreational living, sleeping or eating accommodation of individuals.

TRUCK TERMINAL means a building, structure or place where trucks or transports are rented, leased, kept for hire, or stored or parked for remuneration, or from which trucks or transports, stored or parked on the property, are dispatched for hire as common carriers, or which is a bonded warehouse.

USE means, when used as a noun, the purpose for which a lot or building or structure, or any combination thereof is designed, arranged, intended, occupied or maintained and "uses" shall have

corresponding meanings. "Use" when used as a verb, "to use" or "used" shall have corresponding meanings.

VISUAL SCREENING, HIGH LEVEL, means trees which will attain a minimum height of 8 metres at maturity.

VISUAL SCREENING, LOW LEVEL, means any combination of vegetation, trees or fencing which will provide visual screening to a minimum height of 1.8 metres.

WALL, END, means a main wall that forms the side of a building.

WALL, FACE, means a main wall that forms the front or rear of a building.

WALL, MAIN, means the exterior front, side or rear wall of a building and shall include all structural members essential to the support of a fully or partially enclosed space or roof, where such members are nearer to a lot line than the said exterior wall.

WAREHOUSE means a building where wares or goods are stored, but shall not include a retail store.

WATERCOURSE means the natural channel for a perennial or intermittent stream of water.

WATER LEVEL, HIGH means the flood plain elevation of the surface of a body of water or a watercourse based upon Canadian Geodetic Survey Datum, and the Regional Storm Flood Elevation or, in the absence of such information, the highest 100 year water level, as determined by the Conservation Authority with jurisdiction or the Ministry of Natural Resources (refer to Section 3.18.1.3 herein), or in the absence of a Regional Storm Flood Elevation or a 100 year water level, the high water mark.

WATER LEVEL, NORMAL means the usual summer elevation of the water surface of a body of water or a watercourse as maintained for navigational purposes, based upon Canadian Geodetic Survey Datum as established, or recorded by the Conservation Authority with jurisdiction or the Ministry of Natural Resources, or in the absence of a controlled elevation, the usual elevation of the water surface of a body of water or watercourse exclusive of seasonal flooding.

WATER SETBACK means a yard extending the full width of a lot between the normal water level of lakes or rivers and the nearest main wall of any building, structure, excavation or open storage use on the lot and "minimum water setback" means the minimum depth of a "water setback" on a lot between the normal water level and the nearest main wall of any building, structure, excavation or open storage use on the lot.

WATER SYSTEM, COMMUNAL, means a system of water supply municipally or privately owned which serves a minimum of 6 dwelling units.

WAYSIDE PIT OR QUARRY means a temporary pit or quarry opened and used by a public road authority solely for the purpose of a particular project or contract of a particular project or contract of road construction and not located on the road right-of-way.

YARD means an open, uncovered space on a lot appurtenant to a building (except a court) and unoccupied by buildings or structures except as specifically permitted elsewhere in this By-law. In determining "yard" measurements, the minimum horizontal distance from the respective lot lines shall be used. Where a daylighting triangle is provided for a corner lot, the minimum "yard" requirement from the hypotenuse of the daylighting triangle shall be the lesser of the "yards" required along the exterior lot lines.

YARD, EXTERIOR, means the side yard of a corner lot which side yard extends from the front yard to the rear yard between the exterior lot line and the nearest main wall of the main building or structure.

YARD, FRONT, means a yard extending across the full width of a lot between the front lot line and the nearest main wall of any building or structure on the lot and "minimum front yard" means the minimum depth of a "front yard" on a lot between the front lot line and the nearest main wall of the main building(s) or structure on the lot.

YARD, REAR, means a yard extending across the full width of a lot between the rear lot line and the nearest main wall of any building or structure on the lot; and the minimum rear yard means the minimum depth of a "rear yard" on a lot between the rear lot line and the nearest main wall of the main building(s) or structure on the lot.

YARD, INTERIOR SIDE, means a side yard other than an exterior side yard.

YARD, SIDE, means a yard extending from the front yard to the rear yard of a lot between a side lot line and the nearest main wall of any building or structure on the lot; and "minimum side yard" means the minimum width of a "side yard" on a lot between a side lot line and the nearest main wall of the main building(s) or structure on the lot.

ZONE means a designated area of land use and the corresponding provisions as shown on the schedules of this By-law.

PART 3 - GENERAL PROVISIONS

3.1 ACCESSORY BUILDINGS, STRUCTURES AND USES

3.1.1 PERMITTED USES

3.1.1.1 Where this By-law provides that a lot may be used or a building or structure may be erected or used for a purpose, that purpose shall include any accessory building or accessory use, but shall not include the following:

- (a) any occupation for gain or profit conducted within or accessory to a dwelling unit or on the lot, except as in this By-law is specifically permitted; or,
- (b) any building used for human habitation, except as in this By-law is specifically permitted.

3.1.2 LOCATION

3.1.2.1 Except as otherwise provided herein or within a specific zone, any accessory building which is not part of the main building shall only be erected in an interior side or rear yard.

3.1.2.2 An accessory building may be erected not closer than 1.2 metres from a rear lot line and 1.2 metres from the side lot line nor closer to a street than the required front yard setback for the zone in which it is located and shall not be closer than 1.2 metres to a residential building located on the same lot.

3.1.2.3 Notwithstanding article 3.1.2.2, an unenclosed, detached deck may be constructed within 1.2 metres of a residential building. Any deck constructed within 0.5 metres of a residential building will be considered an extension of the main building for the purposes of determining yard or setbacks in any zone and shall not constitute a separate accessory structure with respect to the provisions of article 3.1.3.3.

3.1.2.4 Where a lot fronts on a navigable waterway, a private garage shall be permitted between the main building on the lot and the street line, provided such private garage complies with the yard provisions of the applicable zone.

3.1.3 LOT COVERAGE AND HEIGHT

3.1.3.1 Except as otherwise provided for herein, the total lot coverage of all accessory buildings and structures,

excluding private garages attached to the main building and outdoor swimming pools, shall not exceed 8 percent of the lot area to a maximum of 225 square metres.

3.1.3.2 The height of an accessory building or structure, in a residential zone or to a residential use, shall not exceed 5 metres (16.4 ft.). Further, the height of such accessory building or structure shall be measured as the mean level between eaves and ridge of a gabled, hip, gambrel or mansard roof, or other type of pitched roof. (B/L 2002-139)

3.1.3.3 A maximum of three accessory buildings or structures, excluding outdoor swimming pools, shall be permitted on a lot in any class of residential zone.

3.1.4 YARD REQUIREMENTS

3.1.4.1 Notwithstanding the minimum yard provisions of this By-law, the following accessory structures and setbacks may be permitted:

- (a) sills, belt courses, cornices, chimney breasts, bay windows, cantilevered floor areas, pilasters or parapets may project into any yard a distance of not more than 0.6 metres;
- (b) eaves or gutters on a main building may project into any yard a distance of not more than 0.6 metres;
- (c) balconies, canopies, unenclosed porches or decks and steps may project into any yard a distance of not more than 1.5 metres provided that a required side yard is not reduced to below 1.5 metres and further provided that a porch or deck which is, at any point, more than 1.2 metres above the adjacent finished grade shall comply with the yard requirements of the applicable zone for a main building;
- (d) unenclosed fire escapes may project into any yard a distance of not more than 1.5 metres;
- (e) ramps for handicapped access may project into any yard a distance of not more than 1.8 metres; and
- (f) fences, free-standing walls, flag poles, clothes poles, diving boards, antennae, light standards, garden trellises, retaining walls, patios and similar accessory structures and appurtenances, hedges, shrubs and trees are permitted in any yard.

- (g) Notwithstanding clause 3.1.4 (f) no structures or vegetation that is more than 0.75 metres in height shall be permitted within three metres of any street line if such structure or vegetation will impede vision between a height of 0.75 metres and 2.5 metres above the centreline grade of an access from any street to a lot.

3.1.5 BOAT HOUSE, PUMP HOUSE OR DOCKING FACILITIES

- 3.1.5.1 Notwithstanding any other provisions of this By-law, a boat house, pump house, or docking facility may be erected and used in a yard fronting on a navigable waterway provided that the approval of any other governmental authority having jurisdiction within this area has been obtained and further provided the location complies with the required minimum side yard for accessory buildings or structures.

- 3.1.5.2 A boat house or dock located within the water setback, including any boat launching ramp or boat rail system, shall not be permitted to project beyond the shore lot line if such projection will obstruct or interfere with access to the water from an adjacent lot.

- 3.1.5.3 A boat house shall be limited to one storey and shall not exceed a height of 4.5 metres. For the purposes of this article, height shall be measured as the vertical distance from:

- (a) the normal water level for a building or structure constructed, in whole or in part, adjacent to or within 3 metres of a lake or river; or,
- (b) the finished grade for a building or structure all of which is constructed more than 3 metres from a shore lot line

3.1.6 CABINS

- 3.1.6.1 Where a zone permits a private cabin a maximum of 1 private cabin, having a maximum floor area of 30 square metres, may be permitted as an accessory use to a permitted dwelling unit provided the lot upon which they are situated conforms to the minimum lot area and frontage requirements of the zone.

3.1.7 POOLS

- 3.1.7.1 A swimming pool with either a surface area exceeding 7.5 square metres or a depth exceeding 0.75 metres shall be enclosed with a fence not less than 1.2 metres in height.

3.2 DAYLIGHTING TRIANGLE

3.2.1 Notwithstanding any other provisions of this By-law, in all zones, on a corner lot, no fence, hedge, shrub, bush or tree or any building or structure, vegetation or lot grading shall be permitted to exceed a height greater than 0.75 metres above finished grade of the travelled portion of the streets that abut the lot within the triangular area included within the street lines for a distance of 6 metres from their point of intersection. No sign shall be permitted within or to overhang the required daylighting triangle.

3.3 ESTABLISHED BUILDING LINE

3.3.1 Notwithstanding the front yard provisions of this By-law, where a permitted building or structure is to be erected on a lot, where there is an established building line, such permitted building or structure may be erected closer to the street line, than required by this By-law provided such permitted building or structure is not erected closer to the street line, than the established building line.

3.3.2 Where a lot fronts onto a Provincial Highway or a County Road the provisions of subsection 3.3.1 shall not apply unless the lot is located within a General Commercial (C1) Zone.

3.4 EXISTING BUILDINGS, STRUCTURES AND USES

3.4.1 NON-CONFORMING USES

3.4.1.1 No person shall use any land or erect or use any building or structure except in conformity with the provisions of this By-law respecting the zone in which such land, building or structure is or is to be located, unless such use existed before the date of the passing of this By-law and was in conformity with and not prohibited by an existing By-law in force at the date of passage of this By-law.

3.4.2 NON-COMPLYING USES

3.4.2.1 Nothing in this By-law shall prevent the extension, enlargement, reconstruction or structural alteration of a building or structure that legally existed prior to the date of passing of this By-law and which does not comply with the zone provisions or requirements contained herein, provided that the extension, enlargement, reconstruction or structural alteration complies with the appropriate lot area, setback and parking requirements of this By-law.

3.4.2.2 Where an existing building or structure is closer to a lot line than the required yard requirements, any extension to the building or structure shall be required to comply with the minimum yard requirements of the applicable zone.

3.4.3 PERMITTED EXTERIOR EXTENSION

3.4.3.1 A building, which at the date of passing of this By-law was used for a purpose not permitted within the zone in which it is located, shall not be enlarged or extended unless such building is thereafter to be used for a purpose permitted within such zone, and complies with all requirements of this By-law for such zone.

3.4.4 RESTORATION TO A SAFE CONDITION

3.4.4.1 Nothing in this By-law shall prevent the strengthening or restoration to a safe condition of any building or structure or part thereof, lawfully used on the date of passing of this By-law, provided that the strengthening or restoration does not increase the building height, size or volume or change the use of such building or structure, except such minor changes as may be expressly required for the restoration of the building or structure to a safe condition.

3.4.5 BUILDING PERMIT ISSUED

3.4.5.1 The provisions of this By-law shall not apply to prevent the erection or use, for a purpose prohibited by this By-law of any building or structure, a permit for which has prior to the date of passing of this By-law been issued by the Chief Building Official, as long as the building or structure when erected is used and continues to be used for the purpose for which it was erected and provided the erection of such building or structure is commenced within 6 months after the date of the passing of this By-law.

3.4.6 DISCONTINUED USE

3.4.6.1 Any non-conforming use of land, building or structure which is discontinued or not used for an interval of more than 9 months shall not be resumed nor shall such non-conforming use be changed to any other non-conforming use.

3.4.7 DAMAGED BUILDINGS

3.4.7.1 Nothing in this By-law shall prevent the rebuilding or repair of any building or structure that is damaged or destroyed by causes beyond the control of the owner subsequent to the date of passing of this By-law, provided

that the dimensions of the original building or structure are not increased and the use of the building or structure is not altered, provided such rebuilding or repair is conducted within two years.

3.5 FENCES

3.5.1 No persons shall construct a fence, exceeding 2 metres in height, in any zone, other than an Industrial or Agricultural Zone.

3.5.2 Article 3.1.4.1, clause (g) shall apply to fences located within three metres of any street line.

3.6 FRONTAGE ON PUBLIC STREET

3.6.1 Except as provided for in this section, no persons shall erect any building or structure in any zone, unless the lot upon which such building or structure is to be erected has a lot line which abuts and obtains direct access onto an improved public street and which is maintained to provide year-round access.

3.6.2 Notwithstanding subsection 3.6.1, a building or structure may be erected and used on the following lots which do not have frontage on an improved public street;

3.6.2.1 An island lot in a residential zone category;

3.6.2.2 A lot within a registered plan of subdivision in which the street has not been assumed by the Municipality but in which the street is to be assumed under the terms of a subdivision agreement; and

3.6.2.3 A lot within the "Limited Service Residential" or a "Limited Service Residential Exception" Zone.

3.7 HEIGHT EXCEPTION

3.7.1 Notwithstanding the height provisions herein contained, nothing in this By-law shall apply to prevent the erection, alteration, or use of the following accessory buildings or structures provided the main use is a use permitted within the zone in which it is located; a barn, a church spire, a belfry, a flag pole, a clock tower, a chimney, a water tank, a windmill, a radio or television tower or antenna, air conditioner duct, elevator equipment room, grain elevator, silo or corn crib.

3.8 HOLDING SYMBOL (H)

3.8.1 Unless otherwise specified within the applicable zone provisions, where the zone symbol, shown on Schedule A to this By-law, is followed by the holding symbol "(H)", the use of lands so zoned shall be limited to existing uses, conservation or forestry uses exclusive of buildings or structures. At such time as the holding symbol is removed, by amendment to this By-law, the lot may be used in accordance with the applicable zone provisions.

3.9 HOME OCCUPATIONS

3.9.1 The following requirements shall apply to any zone wherein a home occupation is permitted.

3.9.1.1 The home occupation shall be clearly secondary to the main use of the lot and shall not change the residential character of a dwelling unit or the lot upon which it is located;

3.9.1.2 The home occupation shall not create or become a public nuisance due to noise, dust, traffic or parking;

3.9.1.3 The home occupation shall not interfere with television or radio reception on adjacent lots;

3.9.1.4 There shall be no goods, wares or merchandise offered or exposed for sale, or sold or kept for sale in the dwelling, and no mechanical or other equipment used or kept except those customarily employed in a residential dwelling for domestic or household purposes or for use by a dentist, drugless practitioner or physician;

3.9.1.5 The home occupation shall not occupy more than 25 percent of the gross floor area of the dwelling unit whether or not such home occupation is located within the dwelling or within an accessory structure;

3.9.1.6 Parking shall be provided in accordance with subsection 3.14 of this By-law;

3.9.1.7 There shall be no outside storage of goods or materials associated with the home occupation.

3.10 LANDSCAPING

3.10.1 In any zone, all landscaping shall be in accordance with the definition of landscaping and shall be maintained in a healthy condition and shall be neat and orderly in appearance.

3.10.2 Where a Residential Mobile Home Park, Commercial or Industrial zone abuts any zone, other than any class of Residential Mobile Home Park, Commercial or Industrial zone, a landscaped buffer not less than 6 metres in width shall be provided within the Residential Mobile Home Park, Commercial or Industrial zone boundary. In addition to any other provision of this By-law, such landscaping shall provide high and low level visual screening and consist of both evergreen and deciduous planting. Notwithstanding the above, a landscaped buffer in a Residential Mobile Home Park Commercial zone may be reduced in width to 3 metres where a coniferous hedge or opaque fence, 1.8 metres in height, is provided in conjunction with the landscaping.

3.10.3 A 1.5 metre landscaped buffer shall be provided between any public street and parking or outside display areas.

3.11 LOT AREA AND FRONTAGE LESS THAN REQUIRED

3.11.1 Notwithstanding the minimum lot area and/or the minimum lot frontage required herein, where a lot has less lot area and/or lot frontage than required herein at the date of passing of this By-law or where such lot is created as a result of expropriation or a portion of a lot is acquired by a public authority, such smaller lot may be used and a building or structure may be erected, altered or used on such smaller lot provided that the use is permitted and the setback, yard, lot coverage, parking and landscaping requirements of the zone in which it is located are complied with, and that said lot has a minimum lot frontage of 12 metres and a minimum lot area of 745 square metres.

3.11.2 Where a lot has less lot area and/or lot frontage than required herein at the date of passing of this By-law and, as a result of a consent, is increased in size but continues to have less lot area and/or lot frontage than required herein, subsection 3.11.1 shall continue to apply.

3.12 MULTIPLE USES

3.12.1 Where any land or building is used for more than one purpose, all provisions of this By-law relating to each use shall be complied with. Where a multiple use is located within or adjacent to any class of Residential Zone, landscaping will be provided in accordance with Section 3.10.

3.13 MULTIPLE ZONES ON A LOT

3.13.1 Where a lot which existed at the date of passing of this By-law is located within two or more zones the provisions of the applicable zone, save and except lot area and lot frontage, shall apply to each portion of such lot provided the lot as a whole has a minimum frontage of 15 metres. In such instances, the zone boundary shall be considered a lot line for the purposes of interpreting and applying the "zone" and "general" provisions of this By-law.

3.13.2 Notwithstanding article 3.13.1 no lot shall be created within any zone unless the lot created and the remnant lot comply with the minimum lot area and lot frontage requirements of the applicable zone.

3.14 PARKING AND LOADING FACILITIES

3.14.1 OFF-STREET PARKING

3.14.1.1 Off-street parking spaces and areas shall be provided for every building and structure to be erected or used for any purpose hereinafter set forth in accordance with the parking space requirements set out in article 3.14.1.2.

(a) Handicapped parking spaces shall be provided where ten or more parking spaces are required on a lot and, unless otherwise specified, shall be provided on the basis of 1.0 percent of all required parking spaces. Such spaces shall be sized, signed and reserved for handicapped parking.

(b) Where the calculation of the parking space requirement does not result in a whole number the requirement shall always be rounded up to the next whole number.

| 3.14.1.2 | <u>Use</u> | <u>Minimum Number of Parking Spaces Required</u> |
|----------|---|--|
| | Animal Hospital, or Veterinarian | 5 per Veterinarian |
| | Bank, Financial Institution | 1 per 20 sq. m of g.f.a. |
| | Business, Professional or Other Office | 1 per 30 sq. m of g.f.a. |
| | Bowling Alley, Curling Rink | 3 per lane or curling sheet plus 1 per 9 sq. m of |

| | |
|---|--|
| | g.f.a. devoted to a restaurant |
| Day Nursery, Day Care Centre | 1.5 per classroom or teaching area |
| Dry Cleaning Establishment, Laundry | 1 per 20 sq. m of g.f.a. or 1 per washing machine whichever is greater |
| <u>Use</u> | <u>Minimum Number of Parking Spaces Required</u> |
| Home for the Aged | 0.75 per bed of which 5% shall be handicapped |
| Home Occupation | 1 per 30 sq. m of g.f.a. of dwelling devoted to home occupation |
| Hospital | 1 for every 4 beds or 1 per 100 sq. m of g.f.a., whichever is greater, of which 5% shall be handicapped |
| Hotel, Motel, Motor Hotel, Tourist Home, Lodge, Tourist Establishment | 1.25 per guest room, or cottage plus 1 per 9 sq. m of g.f.a. devoted to a restaurant |
| Industrial, Manufacturing Processing, Fabricating Warehousing, Wholesaling, Storage | 1 per 40 sq. m of g.f.a. for "light" or "dry-light" industries 1 per 100 sq. m of g.f.a. for all others |
| Library, Museum | 1 per 30 sq. m of g.f.a. |
| Marina | 1 per 20 sq. m of g.f.a. plus 1 per boat slip |
| Marina, Dry-land | 1 per 20 sq. m of g.f.a. |
| Health Centre or Offices for Health Care Professionals | 5 per practitioner, of which 5% shall be handicapped |
| Motor Vehicle Sales Establishment, Motor Vehicle Service Station, Public Storage | 1 per 20 sq. m of g.f.a. with a minimum of 5 spaces |

| | |
|---|---|
| Nursing Home | 0.5 per bed of which 5% shall be handicapped |
| <u>Use</u> | <u>Minimum Number of Parking Spaces Required</u> |
| Place of Assembly, Place of Worship, Funeral Home | 1 per 5 fixed seats, 1 per 3 m of bench seating or 1 per 9 sq. m of g.f.a. whichever is greater, of which 5% shall be handicapped |
| Residential Apartment, Fourplex, Triplex, Town House or Converted Dwelling | 1.5 per dwelling unit of which 25% shall be for visitor parking |
| Dwelling in a non-residential building | 2 per unit |
| Boarding or Lodging House | 1 per guest room |
| Residential other than specified herein | 2 per unit |
| Restaurant | 1 per 5 sq. m of g.f.a. dedicated to patron use |
| Restaurant, Drive-In | 1 per 5 sq. m of g.f.a. dedicated to patron use with a minimum of 10 spaces |
| Retail Commercial Establishment, Personal Service Shop, Service Shop, Dry Cleaning Depot | 1 per 30 sq. m of g.f.a. |
| Schools, Elementary | 1.5 per classroom or teaching area |
| Schools, Secondary or Commercial or Community College | 4 per classroom or teaching area |
| Supermarket, Food Store | 1 per 20 sq. m of g.f.a |
| Shopping Centre | 1 per 20 sq. m of g.l.f.a. |

Trailer Camp 1.5 per camping lot

Uses other than those specified 1 per 30 sq. m of g.f.a.

- 3.14.1.3 The parking lot shall have visible boundaries and the parking spaces clearly defined with the layout of spaces appropriately marked on the ground or signed.
- 3.14.1.4 Parking spaces, parking lots and driveways connecting the parking spaces to a street shall be maintained with a stable surface which is treated so as to prevent the raising of dust. Such parking spaces, parking lots and driveways shall, before being used, be constructed of crushed stone, gravel, asphalt, brick, concrete or similar material.
- 3.14.1.5 A parking space shall be rectangular in shape having a minimum width of 2.8 metres and a minimum length of 6 metres.
- 3.14.1.6 Notwithstanding article 3.14.1.5 parking spaces for the handicapped shall be rectangular in shape having a minimum width of 4 metres unless adjacent to another designated handicapped space in which case a width of 3.5 metres shall be permitted. Handicapped parking spaces shall be located in proximity to building entrances and handicapped access ramps, walkways or elevators.
- 3.14.1.7 Notwithstanding article 3.14.1.5, a parking space used for parallel parking shall have a minimum width of 2.4 metres and a minimum length of 7 metres.
- 3.14.1.8 Each parking space shall have adequate access to the street as described within the definitions of parking space. Notwithstanding this provision, where a dwelling unit has exclusive use of a private garage and/or driveway and 2 parking spaces are required for the said dwelling unit for the use by the one household, then the two parking spaces can abut end to end, so that one motor vehicle must be moved to enable the second one to have access to the street.
- 3.14.1.9 Unless otherwise provided for elsewhere in this By-law, all parking shall be located on the same lot as the use for which it is intended to serve.
- 3.14.1.10 If the use of a lot is for a place of assembly, the parking lot may be located on a separate lot not more than 150 metres from the location it is intended to serve.

3.14.1.11 The width of the aisle in a parking lot shall be based on the angle of the parking spaces to the aisle. If the angle of parking is different on each side of the aisle, then the aisle width shall be based on the parking spaces requiring the widest aisle width. The aisle requirements are as follows:

| <u>Angle of Parking Space to Aisle</u> | <u>Minimum Aisle Width</u> |
|---|----------------------------|
| Parallel parking or less than 30 degrees | 3.5 metres |
| Equal to or greater than 30 degrees but less than 50 degrees | 4.0 metres |
| Equal to or greater than 50 degrees but less than 70 degrees | 5.5 metres |
| Equal to or greater than 70 degrees but less than or equal to 90 degrees | 7.0 metres |

3.14.1.12 When a building or structure has insufficient parking on the date of passing of this By-law to conform to the requirements herein, this By-law shall not be interpreted to require that the deficiency be made up prior to the construction of any addition; however, any addition shall provide the necessary parking required under this By-law.

3.14.1.13 No parking lot access shall be located closer than 15 metres from the limits of the right-of-way at the street intersection.

3.14.1.14 Where a building or structure accommodates more than one type of use, the parking requirements shall be the sum of the requirement of the separate uses.

3.14.1.15 No persons shall, in any Residential zone, use any lot for the parking or storage of more than one commercial motor vehicle and/or trailer in excess of 5 tonnes gross weight.

3.14.2 OFF-STREET LOADING SPACE REQUIREMENTS

3.14.2.1 For every building or structure hereafter erected, or for every addition to an existing building, in a Commercial or Industrial zone involving the frequent shipping loading or unloading of persons, animals, goods, wares or merchandise there shall be provided and maintained by the owner of the building at the premises, loading facilities on land; that is not part of a highway, parking lot, or required driveway,

comprised of one or more loading spaces 12 metres long, 4 metres wide and having a vertical clearance of at least 4.5 metres with access to a street and according to the floor area of the building or structure as follows:

| <u>Floor Area of Buildings</u> | <u>Minimum Number of Loading Spaces</u> |
|--|---|
| 300 square metres or less | no loading spaces |
| 301 square metres up to and including 2000 square metres | 1 loading space |
| 2001 square metres and over | 2 loading spaces |

3.14.2.2 In addition, no loading space or platform or loading door shall be located in any yard or wall of any building or structure which adjoins or faces a street. In addition to automobile parking lots, parking lot(s) for the use of commercial and industrial traffic shall be provided but shall not be located in any yard flanking a street.

3.14.2.3 Where an addition to an existing building has the effect of increasing total floor area to 301 square metres or greater, the provisions herein shall apply.

3.14.2.4 The driveways and loading spaces shall be maintained with a stable surface which is treated so as to prevent the raising of dust or loose particles. Before being used, they shall be constructed of one or more of the following: crushed stone, slab, gravel, crushed brick (or tile) cinders, asphalt, concrete, or Portland cement binder, for a combined depth of at least 0.15 metres and with provisions for drainage facilities.

3.15 PUBLIC USES PERMITTED

3.15.1 STREETS AND INFRASTRUCTURE

3.15.1.1 The provisions of this By-law shall not apply to prevent the use of land for streets, recreational trails and infrastructure or to prevent the construction, maintenance or repair of such streets, recreational trails or infrastructure.

3.15.2 BY-LAW REQUIREMENTS

3.15.2.1 Notwithstanding subsection 3.15.1, any building appurtenant to infrastructure shall comply with the general provisions of this By-law as contained in Section 3 hereof as well as

the applicable zone provisions for the lot upon which such use is located.

- 3.15.2.2 Notwithstanding subsection 3.15.1, communication relay towers shall only be permitted in the Agricultural (A1) zone unless otherwise specifically permitted.

3.15.3 INFRASTRUCTURE IN RESIDENTIAL ZONES

- 3.15.3.1 Notwithstanding subsection 3.15.1, any electric power transformer station or water or sewage pumping station, which is located in a residential zone, shall be enclosed in a building designed, located and maintained in general harmony with the permitted residential buildings in such zone.

3.15.4 PROVISIONS IN RESIDENTIAL ZONES

- 3.15.4.1 Notwithstanding subsection 3.15.1, any above ground non-recreational public use which is located in a Residential zone shall be enclosed in a building designed, located and maintained in general harmony with the permitted residential buildings in such zone.

- 3.15.4.2 Notwithstanding article 3.15.4.1, electrical power facilities in a residential zone shall be subject to the provisions of subsection 3.10.2 applicable to a commercial zone.

3.16 REDUCTION OF REQUIREMENTS

- 3.16.1 No persons shall change the purpose for which any land or building is used or erect any new building or addition to any existing building if the effect of such action is to cause the original, adjoining or remaining buildings or structures to be in contravention of this By-law.

3.17 RELOCATED BUILDINGS

- 3.17.1 In all zones, no buildings, residential or otherwise, shall be moved within the area covered by this By-law or shall be moved into the limits of the area covered by this By-law without a permit from the Chief Building Official.

3.18 SPECIAL SETBACKS OR RESTRICTIONS

3.18.1 ENVIRONMENTAL PROTECTION ZONE SETBACKS AND RESTRICTIONS

- 3.18.1.1 Except as otherwise specifically provided for herein, the minimum setback for all buildings and structures from any class of Environmental Protection Zone shall be the

applicable yard requirement or a setback of 15 metres whichever is greater.

3.18.1.2 No opening to any residential dwelling unit shall be permitted below a minimum opening elevation equal to the high water level, for an adjacent body of water, watercourse or lake, plus 0.3 metre freeboard.

3.18.1.3 For the purpose of establishing minimum opening elevations the following high water levels shall apply:

| | | |
|-----|---------------|---------|
| (a) | Balsam Lake | 256.5 m |
| (b) | Cameron Lake | 255.7 m |
| (c) | Sturgeon Lake | 248.4 m |

3.18.1.4 Notwithstanding any other provisions of this By-law no dwelling shall be permitted within:

- (a) 470 metres of waste disposal site or sanitary landfill site except in accordance with Policies and Guidelines established by the Ministry of Environment;
- (b) 90 metres of the limit of extraction for a licenced gravel pit on land zoned M3;

3.18.2 DWELLING UNIT RESTRICTION

3.18.2.1 Except as specifically provided for within the applicable zone provisions, and notwithstanding article 3.13.1 a maximum of one dwelling unit per lot shall be permitted.

3.18.3 THROUGH LOTS

3.18.3.1 A through lot shall be subject to the front yard setback and other requirements contained herein on each street in accordance with the provisions of the zone or zones in which such lot is located.

3.18.3.2 In the case of a through lot having lot lines of equal length on each street, accessory buildings may be located in only one yard adjoining a street, but no closer to the street line than the minimum front yard requirement.

3.18.4 INDUSTRIAL AND RESIDENTIAL SETBACKS AND RESTRICTIONS

3.18.4.1 In addition to the landscaping requirements of Section 3.10 and notwithstanding the yard requirements of any zone,

- (a) Industrial uses shall be separated from residential lots based upon the following minimum setbacks:

| | | |
|-------|-----------------|-------|
| (i) | light industry | 60 m |
| (ii) | medium industry | 90 m |
| (iii) | heavy industry | 300 m |

3.18.5 MINIMUM DISTANCE SEPARATION

3.18.5.1 Notwithstanding any other yard or setback provisions of this By-law to the contrary, no non-farm residential, institutional, commercial, industrial or recreational use, located on a separate lot and permitted by a CF, RR1, RR2, RR3, LSR, RM, C2, C3, C4, M1, M2, A1 or A2 Zone, shall be erected or altered unless it complies with the minimum distance separation calculated using Form 1 being Schedule 'H' to this By-law.

3.18.5.2 Notwithstanding any other yard or setback provisions of this By-law to the contrary, no livestock facility or manure storage site shall be erected or altered unless it complies with the minimum distance separation calculated using Form 2 being Schedule 'I' to this By-law.

3.18.5.3 The provisions of article 3.18.5.1 shall not apply to lots existing as of the date of the passing of this By-law which are less than 4 hectares in area.

3.19 TEMPORARY USES PERMITTED

3.19.1 Nothing in this By-law shall prevent the use of land or the use or erection of a building or structure for a scaffold or other temporary building or structure including a sales or rental office, incidental to construction in progress until such construction has been finished or discontinued for a period of 90 days.

3.19.2 In the case of a temporary sales or rental office, parking shall be provided in accordance with Section 3.14 hereof.

3.19.3 The use of temporary living quarters on a lot in any class of agricultural or residential zone may be permitted, on a temporary basis, for a period not to exceed 9 months, while a permitted residential dwelling unit is under construction. Such temporary living quarters shall be removed from the lot immediately after the expiry of the 9 month period or upon occupancy of the new dwelling, whichever occurs first.

3.20 UNLICENCED MOTOR VEHICLES

3.20.1 Other than in a scrap yard or as otherwise specifically provided for herein, no lot or part of a lot shall be used for the storage of unlicensed motor vehicles or parts of motor vehicles unless they are stored in a private garage or

in one location not exceeding 45 contiguous square metres in area which is not visible from a public street or an abutting lot.

3.21 SEASONAL FARM RESIDENTIAL USE

In the Agricultural (A1) Zone, a seasonal farm residential use shall be permitted subject to the following:

- 3.21.1 The property on which the seasonal farm residential use is located has to be classed as a farm by MPAC and be on a lot of at least 20 hectares.
 - 3.21.2 The seasonal farm residential use cannot exceed 250 square metres in area and may be contained in more than one building.
 - 3.21.3 A covenant be registered on title that the residence will be used only for seasonal farm residential use.
 - 3.21.4 That the seasonal farm residential use shall not exceed eight months per seasonal worker in each calendar year.
- B/L 2007-289

PART 4 - ZONES AND ZONING MAPS

4.1 ZONES

4.1.1 For the purpose of this By-law, the following zones shall be and the same are established within the defined areas on Schedule A to this By-law:

| Part | Zone <u>Symbol</u> | Zone Title | Zone <u>Classification</u> |
|------|-----------------------|------------------------------|-------------------------------|
| 5 | EP | Environmental Protection | Environmental |
| 6 | AP | Aggregate Protection | Resource |
| 7 | CF | Community Facility | Community |
| 8 | A1 | Agricultural | Agricultural |
| 9 | A2 | Rural General | Agricultural |
| 10 | HR | Hamlet Residential | Residential |
| 11 | RR1 | Rural Residential Type One | Residential |
| 12 | RR2 | Rural Residential Type Two | Residential |
| 13 | RR3 | Rural Residential Type Three | Residential |
| 14 | RM | Residential Mobile Home Park | Residential |
| 15 | LSR | Limited Service Residential | Residential |
| 16 | C1 | General Commercial | Commercial |
| 17 | C2 | Highway Commercial | Commercial |
| 18 | C3 | Tourist Commercial | Commercial |
| 19 | C4 | Campground Commercial | Commercial |
| 20 | M1 | Restricted Industrial | Industrial |
| 21 | M2 | General Industrial | Industrial |
| 22 | M3 | Extractive Industrial | Industrial |
| 23 | M4 | Disposal Industrial | Industrial |

4.2 ZONING MAPS

4.2.1 The extent and boundaries of the said zones are shown on Schedules A, B, C, D, E, F and G attached hereto and may be cited as the "Zoning Map" and are declared hereby to form part of this By-law. Such zones may be referred to by the appropriate Zone symbols.

4.3 SPECIAL EXCEPTIONS

4.3.1 Where a zone contains special exceptions, which are indicated on Schedules A, B, C, D, E, F and G by a zone symbol followed by a hyphen and a numeral, a lot so zoned shall be subject to the special exceptions described in the text for the applicable zone. Where there is a conflict between a special exception and any other section of this By-law, the special exception shall apply. Where the special exception is silent, on any matter, all provisions of this By-law or the applicable zone shall continue to apply.

4.4 ZONE AND GENERAL PROVISIONS

4.4.1 The provisions of this By-law shall be held to be the "minimum" requirements except where the word "maximum" is used in which case the maximum requirement shall apply.

PART 5 - ENVIRONMENTAL PROTECTION (EP) ZONE

5.1 USES PERMITTED

5.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in an Environmental Protection (EP) Zone, except for the following uses:

5.1.1.1 Conservation uses

5.1.1.2 Bird or Wildlife Sanctuaries

5.1.1.3 Flood and Erosion Control Works and Docks

5.2 PROHIBITION OF BUILDING CONSTRUCTION

5.2.1 In an Environmental Protection (EP) Zone, no person shall hereafter erect any building or structure, except a boat dock accessory to a main use on the lot or on a separate lot within 100 metres of the shoreline or structures for flood and erosion control.

5.3 ENVIRONMENTAL PROTECTION EXCEPTION ZONES

5.3.1 ENVIRONMENTAL PROTECTION EXCEPTION ONE (EP-1) ZONE

Notwithstanding subsection 5.1.1, land zoned "EP-1", may also be used for agricultural uses, however, no buildings or structures shall be permitted.

5.3.2 ENVIRONMENTAL PROTECTION EXCEPTION TWO (EP-2) ZONE

5.3.2.1 Notwithstanding article 5.2.1, on land zoned EP-2 only an existing dock shall be permitted.

5.3.3 ENVIRONMENTAL PROTECTION EXCEPTION THREE (EP-3) ZONE

Reserved (D06-29-057)

5.3.4 ENVIRONMENTAL PROTECTION EXCEPTION FOUR (EP-4) ZONE

5.3.4.1 Notwithstanding subsection 5.1, an area zoned EP-4 a boathouse may be constructed and used provided it does not exceed 78 sq.m. in area.
(B/L 2007-152)

5.3.5 ENVIRONMENTAL PROTECTION EXCEPTION FIVE (EP-5) ZONE

5.3.5.1 Notwithstanding subsections 3.1.2, 5.1 and 5.2, on land zoned "EP-5" one accessory building to a maximum of

37 sq.m. and a covered or uncovered bridge at the shoreline to a maximum of 16 sq.m. shall be permitted.

5.3.5.2 Notwithstanding subsection 3.1.2, land zoned "EP-5" shall be subject to the following requirements:

- i. minimum front yard 15 m.
- ii minimum rear yard 15.5 m.
- iii. minimum side yard on north 3 m.
- iv. minimum side yard on south 15.5 m.
- v. minimum water setback 15.5 m.
- vi. a covered or uncovered bridge is regulated to the existing location at the time of passing of this by-law.

(B/L 2013-073)

PART 6 - AGGREGATE PROTECTION (AP) ZONE

6.1 USES PERMITTED

6.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure in an Aggregate Protection (AP) Zone, except for the following uses.

6.1.1.1 Agricultural or Forestry

6.1.1.2 Conservation Uses

6.1.1.3 Dwelling Unit on an existing lot of record

6.1.1.4 Wayside Pit

6.2 ZONE PROVISIONS

6.2.1 No person shall hereafter change the use of any building or land or erect or use any building or structure, in the Aggregate Protection (AP) Zone, except in conformity with the following zone provisions:

6.2.1.1 Lot Area (min.) 25 ha

6.2.1.2 Lot Frontage (min.) 120 m

6.2.1.3 Yard Requirements (min.)

(a) front 30 m

(b) interior side 9 m

(c) exterior side 30 m

(d) rear 25 m

(e) building for animal husbandry or a manure storage site shall be subject to the provisions of article 3.18.5.2;

(f) permitted dwelling units shall be subject to the provisions of article 11.2.1.3.

6.2.1.4 Lot Coverage (max.) 5 %

6.2.1.5 Building Height (max.)

(a) building accessory to a farm - no restriction

(b) all others 10 m

6.3 AGGREGATE PROTECTION EXCEPTION ZONES

6.3.1 Aggregate Protection Exception One (AP-1) Zone

6.3.1.1 In addition to the uses permitted in Section 9.1, on lands zoned AP-1, a Garden Suite is also permitted and is subject to the following provisions:

- a. The Garden Suite shall be permitted for a maximum period of twenty (20) years commencing on the date that the AP-1 Zone is in effect.

On land zoned AP-1 (H), the removal of the (H) holding symbol shall be in accordance with the following:

- i) the owner shall enter into a development agreement with the City which will detail control measures related to the Garden Suite, including, but not limited to, temporary servicing, location and removal and decommissioning.

PART 7 - COMMUNITY FACILITY (CF) ZONE

7.1 USES PERMITTED

7.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Community Facility (CF) Zone, except for the following uses:

7.1.1.1 Uses permitted by Section 5.1

7.1.1.2 Cemeteries

7.1.1.3 Municipal Buildings or Structures, Community Centres, Arenas, Libraries, Museums, Public Parks, Curling Rinks

7.1.1.4 Hospitals, Health or Health Centres

7.1.1.5 Places of Worship

7.1.1.6 Elementary Schools, Secondary Schools

7.1.1.7 Day nurseries

7.1.1.8 Clubs

7.1.1.9 Public uses

7.2 ZONE PROVISIONS

7.2.1 No person shall hereafter erect or use any building or structure, in a Community Facility (CF) Zone, except in conformity with the following zone provisions:

7.2.1.1 Lot Area (min.) 1.0 ha

7.2.1.2 Lot Frontage (min.) 30 m

7.2.1.3 Yard Requirements (min.)
(a) front 7.5 m
(b) interior side 4.5 m
(c) exterior side 7.5 m
(d) rear 7.5 m

7.2.1.4 Lot Coverage (max.) 50 %

7.2.1.5 Building Height (max.) 11 m

7.2.1.6 Gross Floor Area no minimum

7.2.1.7 Landscaped Open Space (min.) 30 %

7.3 COMMUNITY FACILITY EXCEPTION ZONES

7.3.1 COMMUNITY FACILITY EXCEPTION ONE (CF-1) ZONE

7.3.1.1 Notwithstanding subsection 7.1.1 land zoned "CF-1" may only be used for gardens and parks.

7.3.2 COMMUNITY FACILITY EXCEPTION TWO (CF-2) ZONE

7.3.2.1 Notwithstanding subsection 7.1.1 land zoned "CF-2" may only be used for a cemetery.

7.3.3 COMMUNITY FACILITY EXCEPTION THREE (CF-3) ZONE

7.3.3.1 Notwithstanding subsection 7.1.1 land zoned "CF-3" may only be used for one or more of the following uses:

- (a) baseball or softball diamond
- (b) golf putting green
- (c) miniature golf course
- (d) playground
- (e) playing fields
- (f) shuffle boards
- (g) tennis courts

7.3.4 COMMUNITY FACILITY EXCEPTION FOUR (CF-4) ZONE

7.3.4.1 Notwithstanding subsection 7.1.1 land zoned "CF-4" may only be used for the following uses:

- (a) park
- (b) place of worship

7.3.4.2 Notwithstanding articles 7.2.1.1, 7.2.1.2, 7.2.1.3 and 7.2.1.4 land zoned "CF-4" shall be subject to the following zone provisions:

- (a) lot area (min.) 5 ha
- (b) lot frontage (min.) 450 m
- (c) yard requirements
 - (i) front yard (min.)
 - place of worship 45 m
 - other uses 15 m
 - (ii) interior side yard
 - place of worship (min.) 50 m
 - place of worship (max.) 115 m
 - other uses (min.) 15 m

| | |
|-------------------------|------|
| (iii) rear yard (min.) | |
| - place of worship | 45 m |
| - other uses | 15 m |
| (d) lot coverage (max.) | 10 % |

PART 8 - AGRICULTURAL (A1) ZONE

8.1 USES PERMITTED

8.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in an Agricultural (A1) Zone, except for the following uses:

8.1.1.1 Airstrip

8.1.1.2 Agricultural, Market Garden Farm or Forestry Uses

8.1.1.3 Agricultural produce storage facility or seasonal fruit flower or farm produce outlet for goods grown or produced on the property.

8.1.1.4 Bed and Breakfast Establishment

8.1.1.5 Home Occupation

8.1.1.6 Kennels and the boarding of domestic animals

8.1.1.7 Single Detached Dwelling

8.1.1.8 Riding or Boarding Stables

8.1.1.9 Wayside Pit

8.1.1.10 Seasonal Farm Residential Use is subject to Section 3.21 of the General Provisions

8.2 ZONE PROVISIONS

8.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in an Agricultural (A1) Zone, except in conformity with the following zone provisions:

8.2.1.1 Lot Area (min.) 25 ha

8.2.1.2 Lot Frontage (min.) 230 m

8.2.1.3 Yard Requirements (min.)

(a) front 30 m

(b) interior side 9 m

(c) exterior side 15 m

(d) rear

(i) public use 7.5 m

(ii) all other uses 25 m

(e) kennel setback 45 m or 150 m from an existing dwelling on an abutting lot whichever is greater.

- (f) building for animal husbandry or manure storage site shall be subject to the provisions of article 3.18.5.2.
 - (g) dwelling units shall be subject to the provisions of article 11.2.1.3
- 8.2.1.4 Lot Coverage (max.) 5 %
- 8.2.1.5 Building Height (max.)
- (a) building accessory to a farm - No restriction
 - (b) all others 11 m
- 8.2.1.6 Gross Floor Area per dwelling (min.) 93 sq. m
- 8.2.1.7 Notwithstanding subsections 8.1.1 and 8.2.1 an existing lot or a lot which was or is created by consent which has a lot area of 1.0 hectares or less shall only be used in accordance with Sections 11.1 and 11.2 of this By-law.
- 8.2.1.8 In the case of an accessory building being used for the parking or storage of school buses or commercial motor vehicles on a lot in an agricultural zone, the maximum height of such building shall be 5 metres and the total floor area for all accessory buildings on the lot shall not exceed 150 square metres.
- 8.2.1.9 Where an existing lot having less lot area or frontage than required is located in any agricultural zone, subsection 3.11.1 shall not apply to permit the establishment of a non-residential use on a lot having an area of less than 1 hectare.
- 8.2.1.10 Where a lot is created by consent in an agricultural zone the retained lot shall be deemed to be an existing non-complying lot and the provisions of subsections 3.4.1 and 3.4.2 shall apply.
- 8.2.1.11 Notwithstanding article 8.1.1.7 and subsection 3.18.2, a second single detached dwelling may be erected or a single detached dwelling, existing at the date of passing of this By-law, may be changed to a converted dwelling having a maximum of two dwelling units subject to the following requirements.
- (a) the lot is being used for agriculture
 - (b) the lot has a minimum area of 38 hectares
 - (c) the lot has a minimum of 25 hectares in the A1 Zone
 - (d) the second dwelling is located within 30 metres of the principal dwelling

- (e) the second dwelling is located not closer than 10 metres to the principal dwelling.

8.3 AGRICULTURAL EXCEPTION ZONES

8.3.1 AGRICULTURAL EXCEPTION ONE (A1-1) ZONE

- 8.3.1.1 Notwithstanding article 8.2.1.1 land zoned "A1-1" shall have a minimum lot area of 18 ha.

8.3.2 AGRICULTURAL EXCEPTION TWO (A1-2) ZONE

- 8.3.2.1 Notwithstanding articles 8.2.1.1 and 8.2.1.2 land zoned "A1-2" shall be subject to the following zone provisions:

- (a) lot area (min.) 4 ha
- (b) lot frontage (min.) 100 m

8.3.3 AGRICULTURAL EXCEPTION THREE (A1-3) ZONE

- 8.3.3.1 Notwithstanding articles 8.2.1.1 and 8.2.1.2 land zoned "A1-3" shall be subject to the following zone provisions:

- (a) lot area (min.) 6 ha
- (b) lot frontage (min.) 160 m

8.3.4 AGRICULTURAL EXCEPTION FOUR (A1-4) ZONE

- 8.3.4.1 deleted by amendment

- 8.3.4.2 deleted by amendment

8.3.5 AGRICULTURAL EXCEPTION FIVE (A1-5) ZONE

- 8.3.5.1 Notwithstanding Section 8.1, land zoned "A1-5" may also be used for a honey processing and packaging facility including accessory retail sales of honey.

- 8.3.5.2 Notwithstanding articles 8.2.1.3, 3.14.1.2 and 3.14.2.1, land zoned "A1-5" shall be subject to the following zone provisions:

- (a) front yard (min.) 15 m
- (b) side yard (min.) 6 m
- (c) parking spaces (min.) 1 per 30 sq.m
- (d) loading spaces (min.) 1
- (e) Outdoor storage of equipment or materials shall be located in the rear yard in one contiguous area which does not exceed 3% of the lot area.

8.3.6 AGRICULTURAL EXCEPTION SIX (A1-6) ZONE

8.3.6.1 Notwithstanding article 8.2.1.3 clauses (a) and (g), on land zoned "A1-6" the minimum front yard shall be 40 metres.

8.3.7 AGRICULTURAL EXCEPTION SEVEN (A1-7) ZONE

8.3.7.1 Notwithstanding subsection 8.1.1, land zoned "A1-7" may also be used for the following uses:

- (a) driving range
- (b) mini-golf facility
- (c) a snack bar accessory to the uses in clauses '(a)' and '(b)' above.

8.3.7.2 Notwithstanding any provision of subsection 8.2.1 to the contrary, land zoned "A1-7" shall be subject to the following zone provisions:

- (a) Minimum setback for a driving range tee off site 60 m
- (b) No mini-golf facility, parking area, or accessory building shall be located within 100 metres of the northern property boundary.
- (c) Maximum lot coverage for a mini golf facility 4000 sq.m
- (d) Maximum floor area for a snack bar 25 sq.m
- (e) In addition to existing buildings or structures, the Maximum floor area for buildings used in conjunction with a driving range or mini-golf facility and/or a driving range shall be 100 sq.m
- (f) Minimum number of parking spaces:
 - i. for a driving range 1 per tee-off site
 - ii. for a mini-golf facility 1 per hole
 - iii. Notwithstanding clauses "i" and "ii" the minimum number of spaces shall be 15
- (g) Notwithstanding the second sentence of article 3.14.1.4, on land zoned "A1-7" half of all parking spaces in excess of 20 spaces may be provided in a grass covered overflow parking area.
- (h) For the purpose of the "A1-7" zone a snack bar means a building, structure or part thereof, wherein prepackaged convenience or confection food is retailed and which may also involve the preparation and sale of convenience foods such as soup, sandwiches, hamburgers, french fries, muffins and donuts.
(B/L 61-00)

8.3.8 AGRICULTURAL EXCEPTION EIGHT (A1-8) ZONE

8.3.8.1 Notwithstanding subsection 8.1.1, land zoned "A1-8" may also be used for the following uses:

- (a) Agricultural Education Centre
- (b) Accessory buildings and structures, which may include greenhouses, demonstration structures for alternative building techniques, and additional training and boarding facilities.

8.3.8.2 Notwithstanding any provision of subsection 8.2.1 to the contrary, land zoned "A1-8" shall be subject to the following zone provisions:

- (a) Minimum lot frontage 190 metres
- (b) Minimum Lot Area 19 hectares
- (c) No Agricultural Education Facility, or accessory building shall be located within 65 metres of front lot line.
- (d) Maximum floor area for an Agricultural Education Centre 400 sq.m
- (e) Minimum number of parking spaces:
 - (i) for an Agricultural Education Centre, the minimum number of spaces shall be 30.
- (f) For the purpose of the "A1-8" zone an Agricultural Education Centre means a building, structure or part thereof, wherein meeting rooms; workshop areas; housing for participants and students together with related service facilities (washrooms, kitchen and dining area); associated staff quarters; an office and information centre; and library are located, for the purposes of providing training in organic agricultural methods and technologies and in the production of value-added agricultural products. The Centre shall be secondary to the main agricultural use on the subject property.
- (g) A landscaped buffer not less than 6 metres in width, which provides high level and low level visual screening and consisting of both evergreen and deciduous species shall be provided and maintained in a healthy condition between the Agricultural Education Centre, accessory buildings and parking areas and any abutting residential uses This buffer may include existing vegetation.
- (h) Any additional boarding facilities, constructed as accessory buildings to the main Agricultural Education Centre, shall be constructed only where it has been demonstrated that the approvals for additional private servicing have been filed with the municipality. Additional parking spaces shall be provided at a rate of 1 per guest room.
(By-law 37-99)

8.3.9 AGRICULTURAL EXCEPTION NINE (A1-9) ZONE

8.3.9.1 Notwithstanding subsection 8.1, land zoned "A1-9" may be used for a Retail Farm Products Outlet and Bakery which is a facility for the retail sale of agricultural products originating on the farm property or from neighbouring farm operations within the municipality. The farm products may include produce such as fruits and vegetables; live or cut flowers, plants and herbs; dairy products; eggs produced on the same lot or produced off-site and graded; honey; maple syrup; and meat products. The bakery will produce various baked goods for retail sale within the facility. The retail farm products outlet and bakery shall be secondary to the main agricultural use on the subject property.

8.3.9.2 Notwithstanding articles 8.2.1.1, 8.2.1.2, and 3.14.1.2, land zoned A1-9 shall be subject to the following zone provisions:

- | | |
|---------------------------|--------------|
| (a) lot area | 2.3 hectares |
| (b) lot frontage | 150 metres |
| (c) lot depth | 160 metres |
| (d) parking spaces (min.) | 10 |
- (By-Law 38-99)

8.3.9.3 A private community school consisting of a temporary one storey building with a maximum lot coverage of 100 sq metres shall also be permitted in the A1-9 zone subject to a minimum setback of 15 metres from any lot line or zone boundary.

Pursuant to Section 39 of the Planning Act R.S.O. 1990, as amended, the provisions of this article shall have effect for a period of 3 years ending on the 27th day of October, 2003.
(B/L 62-00)

8.3.10 AGRICULTURAL EXCEPTION TEN (A1-10) ZONE

8.3.10.1 Notwithstanding subsections 8.1 and 8.2, land zoned A1-10 may also be used for private school and accessory uses subject to the following provisions:

- | | |
|----------------------------|--------|
| a) Lot Area (max) | 1.5 ha |
| b) Lot Frontage (min) | 90 m |
| c) Yard Requirements (min) | |
| i) front | 6 m |
| ii) interior side | 6 m |
| iii) rear | 30 m |
| iv) lot coverage | 15% |

(B/L 2010-043)

8.3.11 AGRICULTURAL EXCEPTION ELEVEN (A1-11) ZONE

- 8.3.11.1 Notwithstanding subsection 3.18.2.1 and in addition to the uses permitted in 8.1.1, on land zoned "A1-11" not more than five (5) single detached dwellings are permitted.
(B/L 2002-166)

8.3.12 AGRICULTURAL EXCEPTION TWELVE (A1-12) ZONE

- 8.3.12.1 In addition to the uses permitted in subsection 8.1.1, land zoned "A1-12" may also be used for the following uses:

Repair of agricultural equipment, the sale of parts for agricultural equipment, and the assembly and repair of fabric covers for agricultural buildings, and the maximum g.f.a. permitted for these uses shall not exceed a total of 1,500 sq. m.
(B/L 2003-74)

8.3.13 AGRICULTURAL EXCEPTION THIRTEEN (A1-13) ZONE

In addition to article 8.1.1.3, on land zoned A1-13, a farm produce outlet may also sell seasonal farm produce grown off-site; such outlet and related outside display area shall not exceed 37.16 sq. m.
(B/L 2004-142)

8.3.14 AGRICULTURAL EXCEPTION FOURTEEN (A1-14) ZONE

- a. Notwithstanding subsection 8.1, on land zoned A1-14 a private school is a permitted use; and
- b. Notwithstanding subsection 8.2, the minimum front yard setback for a private school from Mark Road, shall be 152m (500 ft.).
(B/L 2005-126)

8.3.15 AGRICULTURAL EXCEPTION FIFTEEN (A1-15(H)) ZONE

Notwithstanding the permitted uses in the Agricultural (A1) Zone, within the Agricultural Exception Fifteen (A1-15) Zone, the following shall apply:

Definition:

Soil Processing and Screening Facility: the process of mixing topsoil with other types of landscaping material such as sand

and sawdust to create an amended soil for landscaping purposes. Screening includes depositing the soil through machinery that separates the fine soil particles from any rock, sticks and/or other unwanted debris.

Permitted Uses:

Notwithstanding the permitted uses in subsection 8.1, on land zoned A1-15, the following use is permitted:

- a. Soil processing and screening facility which excludes any retail sales of the landscaping material on site.

Zone Provisions:

Notwithstanding subsection 8.2.1.1, on land zoned A1-15, the following requirement shall apply:

- a. The total lot area is restricted to a maximum of 2.43 ha.

On land zoned A1-15(H), removal of the holding symbol shall be in accordance with the following:

- a. The owner shall enter into a site plan agreement for the proposed development that addresses machinery placement, storage and traffic.

(B/L 2012-111)

8.3.16 AGRICULTURAL EXCEPTION SIXTEEN (A1-16) ZONE

Notwithstanding subsection 8.2.1.7, on land zoned A1-16 the following is also permitted:

- a. A kennel accessory to the existing residential use containing no more than 8 dogs and shall only operate from the existing residential dwelling.

(B/L 2013-239)

8.3.17 AGRICULTURAL EXCEPTION SEVENTEEN (A1-17) ZONE

Despite the permitted uses in Section 8.1.1, residential uses are not permitted on the property.

(B/L 2013-258)

8.3.18 **AGRICULTURAL EXCEPTION EIGHTEEN (A1-18) ZONE**
(Reserved D06-29-077)

PART 9 - RURAL GENERAL (A2) ZONE

9.1 USES PERMITTED

9.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural General (A2) Zone except for a maximum of three of the following uses:

9.1.1.1 Abattoir

9.1.1.2 Animal Hospital or Veterinary Clinic

9.1.1.3 Any use permitted in the A1 Zone subject to the provisions of section 8.2

9.1.1.4 Auction or Sale Barn

9.1.1.5 Cemetery

9.1.1.6 Farm Equipment Sales and Service

9.1.1.7 Feedmill

9.1.1.8 Fur Bearing Animal Farm

9.1.1.9 Grain Cleaning Plant

9.1.1.10 Grain Drying and Storage Facility

9.1.1.11 Landscaping or Excavating Business

9.1.1.12 Nursery or Commercial Greenhouse

9.1.1.13 Tack Shop

9.1.1.14 Taxidermy Establishment

9.2 ZONE PROVISIONS

9.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural General (A2) Zone, except in conformity with the following zone provisions:

9.2.1.1 Lot Area (min.) 2.0 ha

9.2.1.2 Lot Frontage (min.) 60 m

- 9.2.1.3 Yard Requirements (min.)
- (a) front 15 m
 - (b) interior side 8 m
 - (c) exterior side 15 m
 - (d) rear 8 m
 - (e) setback from a residential use
not on the same lot or a
residential zone 20 m
- 9.2.1.4 Lot Coverage (max.) 25 %
- 9.2.1.5 Building Height (max.) 11 m
- 9.2.1.6 Gross Floor Area (min.) no minimum
- 9.2.1.7 Landscaped Open Space (min.) 20 %
- 9.2.1.8 Density (max. per lot)
- (a) separate premises/suites 2
- 9.2.1.9 The provisions of articles 8.2.1.8 through 8.2.1.11 also apply to land zoned "A2".
- 9.3 RURAL GENERAL EXCEPTION ZONES
- 9.3.1 RURAL GENERAL EXCEPTION ONE (A2-1) ZONE
- 9.3.1.1 Notwithstanding Section 9.1, land zoned "A2-1" may only be used for the following uses:
- (a) agricultural use
 - (b) nurseries or commercial greenhouses
 - (c) a dwelling unit as a secondary use to the above noted permitted uses
- 9.3.1.2 Notwithstanding articles 9.2.1.1 and 9.2.1.4 and clauses 9.2.1.3 (b) and (d), land zoned "A2-1" shall be subject to the following zone provisions:
- (a) lot area (min.) 30 ha
 - (b) yard requirements (min.)
 - (i) rear 430 m
 - (ii) interior south side 15 m from 01 Zone
 - (iii) interior north side 225 m
 - (c) lot coverage (max.) 6%

PART 10 - HAMLET RESIDENTIAL (HR) ZONE

10.1 USES PERMITTED

10.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Hamlet Residential (HR) Zone, except for the following uses:

10.1.1.1 Single Detached Dwelling

10.1.1.2 Home Occupation

10.1.1.3 Park

10.1.1.4 School

10.2 ZONE PROVISIONS

10.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Hamlet Residential (HR) Zone, except in conformity with the following zone provisions:

| | | |
|----------|---|---|
| 10.2.1.1 | Lot Area (min. per d.u.) | |
| | (a) Communal or municipal water supply | 1400 sq. m |
| | (b) Individual water supply and sewage disposal | 2000 sq. m |
| 10.2.1.2 | Lot Frontage (min.) | |
| | (a) Communal or municipal water supply | 25 m |
| | (b) Individual water supply and sewage disposal | 30 m |
| 10.2.1.3 | Yard Requirements (min.) | |
| | (a) front | 7.5 m |
| | (b) interior side | 3 m on one side, 1.3 m on opposite side or 2.3 m for 2 storey |
| | (c) exterior side | 7.5 m |
| | (d) rear | 7.5 m |
| 10.2.1.4 | Lot Coverage (max.) | 30 % |
| 10.2.1.5 | Building Height (max.) | 11 m |
| 10.2.1.6 | Gross Floor Area (min. per d.u.) | |
| | (a) single detached dwelling | 93 sq. m |

- 10.2.1.7 Landscaped Open Space (min.) 25 %
- 10.2.1.8 Density (max. per lot) 1 d.u.
- 10.2.1.9 Notwithstanding subsections 10.1.1 and 10.2.1, an elementary or secondary school shall only be permitted in accordance with the zone provisions of Section 7.2.
- 10.2.1.10 The total lot coverage of all accessory buildings and structures, exclusive of a private garage attached to the main building and outdoor swimming pools, shall not exceed 50% of the required minimum floor area for a residential dwelling or 50% of the main building gross floor area, whichever is greater, but in no case shall it exceed 8% of the total lot area.

10.3 HAMLET RESIDENTIAL EXCEPTION ZONES

10.3.1 HAMLET RESIDENTIAL EXCEPTION ONE (HR-1) ZONE

- 10.3.1.1 Notwithstanding article 10.2.1.2, and clause 10.2.1.3 (d), land zoned HR-1 shall be subject to the following zone provisions:

- (i) lot frontage (min.) 26 m
(ii) rear yard (min.) 30 m

10.3.2 HAMLET RESIDENTIAL EXCEPTION TWO (HR-2) ZONE

- 10.3.2.1 Notwithstanding article 10.2.1.4 and in addition to the other provisions of subsection 10.2.1, land zoned HR-2 shall be subject to the following zone provisions:

- (i) lot coverage (max.) 10%
(ii) exterior opening elevation (min.) 269.78 C.G.S.

10.3.3 HAMLET RESIDENTIAL EXCEPTION THREE (HR-3) ZONE

- 10.3.3.1 In addition to the provisions of Section 10.2 land zoned HR-3 shall also be subject to the following zone provisions:

- (i) exterior opening elevation (min.) 269.78 m C.G.S.

10.3.4 HAMLET RESIDENTIAL EXCEPTION FOUR (HR-4) ZONE

- 10.3.4.1 Notwithstanding article 10.2.1.2 (b) land zone HR-4 shall have a minimum lot frontage of 27 m. (B/L 2004-39)

10.3.5 HAMLET RESIDENTIAL EXCEPTION FIVE (HR-5) ZONE

10.3.5.1 Notwithstanding the provisions contained in Section 10.2.1.1 (b) and 10.2.1.3 (b), lands zoned HR-5 shall be subject to the following provisions:

- | | | |
|-------------|-------------------------------------|--|
| (i) | Lot Area (minimum) | 1,800 sq.m. |
| (ii) | Interior Side Yard (minimum) | 3.0 m on one side, 1.2 m on opposite side |
- (By-Law 2008-210)**

PART 11 - RURAL RESIDENTIAL TYPE ONE (RR1) ZONE

11.1 USES PERMITTED

11.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural Residential Type One (RR1) Zone, except for the following uses:

11.1.1.1 Single Detached Dwelling

11.1.1.2 A Home Occupation

11.1.1.3 Public Park

11.2 ZONE PROVISIONS

11.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural Residential Type One (RR1) Zone, except in conformity with the following zone provisions:

11.2.1.1 Lot Area (min.) 2800 sq. m

11.2.1.2 Lot Frontage (min.) 38 m

11.2.1.3 Yard Requirements (min.)

| | |
|-------------------|------------------------|
| (a) front | 7.5 m |
| (b) interior side | 3 m on one side |
| (i) one storey | 1.3 m on opposite side |
| (ii) all others | 2.3 m on opposite side |
| (c) exterior side | 7.5 m |
| (d) rear | 7.5 m |

11.2.1.4 Lot Coverage (max.) 30 %

11.2.1.5 Building Height (max.) 11 m

11.2.1.6 Gross Floor Area (min. per d.u.) 93 sq. m

11.2.1.7 Landscaped Open Space (min.) 30 %

11.2.1.8 Density (max. per lot) 1 d.u.

11.3 RURAL RESIDENTIAL TYPE ONE EXCEPTION ZONES

11.3.1 RURAL RESIDENTIAL TYPE ONE EXCEPTION ONE (RR1-1) ZONE

11.3.1.1 Notwithstanding article 11.2.1.1 land zoned "RR1-1" shall have a minimum lot area of 4000 square metres.

11.3.2 RURAL RESIDENTIAL TYPE ONE EXCEPTION TWO (RR1-2) ZONE

11.3.2.1 Notwithstanding subsection 11.1.1 land zoned "RR1-2" may also be used for a boarding house.

11.3.3 RURAL RESIDENTIAL TYPE ONE EXCEPTION THREE (RR1-3) ZONE

11.3.3.1 Notwithstanding subsection 11.1.1 land zoned "RR1-3" may only be used for the following uses:

- (a) one single detached dwelling
- (b) a workshop and showroom for the construction and sale of wooden cabinets

11.3.3.2 Notwithstanding subsection 11.2.1 land zoned "RR1-3" shall also be subject to the following zone provisions:

- (a) workshop and showroom combined shall not exceed a maximum gross floor area equal to 45% of the total floor area of all buildings
- (b) the workshop shall be located in an accessory building located in the rear yard
- (c) the showroom shall be located in the garage of the single detached dwelling
- (d) the showroom and workshop shall be subject to the parking provisions of article 3.14.1.2 applicable to retail commercial and industrial uses respectively.

11.3.4 RURAL RESIDENTIAL TYPE ONE EXCEPTION FOUR (RR1-4) ZONE

Not Used

11.3.5 RURAL RESIDENTIAL TYPE ONE EXCEPTION FIVE (RR1-5) ZONE

11.3.5.1 Notwithstanding subsection 11.1.1 land zoned "RR1-5" may also be used for the retail sales of arts and crafts within an enclosed building and a maximum gross floor area of 90 square metres.

11.3.6 RURAL RESIDENTIAL TYPE ONE EXCEPTION SIX (RR1-6) ZONE

11.3.6.1 Notwithstanding articles 11.2.1.1 and 11.2.1.2 land zoned "RR1-6" shall be subject to the following zone provisions:

- | | |
|-------------------------|--------|
| (a) lot area (min.) | 8.0 ha |
| (b) lot frontage (min.) | 168 m |

11.3.7 RURAL RESIDENTIAL TYPE ONE EXCEPTION SEVEN (RR1-7) ZONE

11.3.7.1 Notwithstanding articles 11.2.1.1, 11.2.1.2, 11.2.1.3 and 11.2.1.4 land zoned "RR1-7" shall be subject to the following zone provisions:

- | | |
|------------------------------|--------|
| (a) lot area (min.) | 2.1 ha |
| (b) lot frontage (min.) | 125 m |
| (c) yard requirements (min.) | |
| (i) front | 125 m |
| (ii) rear | 10 m |
| (iii) interior north side | 25 m |
| (iv) interior south side | 75 m |
| (v) water setback | 15 m |
| (d) lot coverage (max.) | 2 % |

11.3.8 RURAL RESIDENTIAL TYPE ONE EXCEPTION EIGHT (RR1-8) ZONE

11.3.8.1 Notwithstanding subsection 11.2.1 land zoned "RR1-8" shall also be subject to the following zone provisions:

- (a) minimum exterior opening elevation of the dwelling shall be equal to or greater than the road from which it takes its access.
- (b) the dwelling unit shall be constructed using a slab-on-grade configuration.

11.3.9 RURAL RESIDENTIAL TYPE ONE EXCEPTION NINE (RR1-9) ZONE

11.3.9.1 Notwithstanding articles 11.2.1.1, 11.2.1.2, 11.2.1.3 and 11.2.1.4 land zoned "RR1-9" shall be subject to the following zone provisions:

- | | |
|---------------------------|------------|
| (a) lot area (min.) | 7500 sq. m |
| (b) lot frontage (min.) | 70 m |
| (c) yard requirements | |
| (i) front (min.) | 30 m |
| (ii) interior side (min.) | 7.5 m |
| (iii) rear (min.) | 7.5 m |
| (iv) rear (max.) | 38 m |
| (d) lot coverage (max.) | 10 % |

11.3.10 RURAL RESIDENTIAL TYPE ONE EXCEPTION TEN (RR1-10) ZONE

11.3.10.1 Notwithstanding articles 11.2.1.1, 11.2.1.2, 11.2.1.3 and 11.2.1.4 land zoned "RR1-10" shall be subject to the following zone provisions:

- | | |
|--------------------------|------------|
| (a) lot area (min.) | 6500 sq. m |
| (b) lot frontage (min.) | 70 m |
| (c) yard requirements | |
| (i) interior side (min.) | 7.5 m |
| (ii) rear (min.) | 7.5 m |
| (iii) rear (max.) | 33.5 m |
| (d) lot coverage (max.) | 10 % |

11.3.11 RURAL RESIDENTIAL TYPE ONE EXCEPTION ELEVEN (RR1-11) ZONE

11.3.11.1 Notwithstanding articles 11.2.1.1, 11.2.1.2, 11.2.1.3 and 11.2.1.4 land zoned "RR1-11" shall be subject to the following zone provisions:

- | | |
|--------------------------|------------|
| (a) lot area (min.) | 9000 sq. m |
| (b) lot frontage (min.) | 70 m |
| (c) yard requirements | |
| (i) interior side (min.) | 7.5 m |
| (ii) rear (min.) | 7.5 m |
| (iii) rear (max.) | 55 m |
| (d) lot coverage (max.) | 10 % |

11.3.12 RURAL RESIDENTIAL TYPE ONE EXCEPTION TWELVE (RR1-12) ZONE

11.3.12.1 Notwithstanding articles 11.2.1.1 and 11.2.1.2 land zoned "RR1-12" shall be subject to the following zone provisions:

- | | |
|-------------------------|------------|
| (a) lot area (min.) | 1900 sq. m |
| (b) lot frontage (min.) | 15 m |

11.3.13 RURAL RESIDENTIAL TYPE ONE EXCEPTION THIRTEEN (RR1-13) ZONE

11.3.13.1 Notwithstanding subsections 11.1.1 land zoned "RR1-13" may also be used for a welding shop located within a wholly enclosed building.

11.3.13.2 Notwithstanding Section 3.1 and subsection 11.2.1 land zoned "RR1-13" shall also be subject to the following zone provisions applicable to a permitted welding shop.

- | | |
|--|-----------|
| (a) front yard (min.) | 7.5 m |
| (b) interior side yard (min.) | 3 m |
| (c) rear yard (min.) | 7.5 m |
| (d) gross floor area (max.) | 110 sq. m |
| (e) outdoor storage of materials or equipment shall be prohibited. | |

11.3.14 RURAL RESIDENTIAL TYPE ONE EXCEPTION FOURTEEN (RR1-14) ZONE

11.3.14.1 Notwithstanding subsection 11.1.1 land zoned "RR1-14" may also be used for a welding shop located within a wholly enclosed building.

11.3.14.2 Notwithstanding Section 3.1 and subsection 11.2.1 land zoned "RR1-14" shall also be subject to the following zone provisions applicable to a permitted welding shop:

- | | |
|---|-----------|
| (a) front yard (min.) | 30 m |
| (b) interior side yard (min.) | 7.5 m |
| (c) rear yard (min.) | 30 m |
| (d) gross floor area (max.) | 150 sq. m |
| (e) outside storage of materials or equipment shall be prohibited | |

11.3.15 RURAL RESIDENTIAL TYPE ONE EXCEPTION FIFTEEN (RR1-15) ZONE

11.3.15.1 Notwithstanding subsection 11.1.1 land zoned "RR1-15" shall only be used for a building accessory to a single detached dwelling. A single detached dwelling shall not be permitted.

11.3.15.2 Notwithstanding articles 11.2.1, 11.2.1.2 and 11.2.1.3 land zoned "RR1-15" shall be subject to the following zone provisions:

- | | |
|--|-----------|
| (a) lot area (min.) | 950 sq. m |
| (b) lot frontage (min.) | 10 m |
| (c) the provisions of Section 3.1.2.2 shall apply to the location of such accessory building | |

11.3.16 RURAL RESIDENTIAL TYPE ONE EXCEPTION SIXTEEN (RR1-16) ZONE

11.3.16.1 Notwithstanding articles 11.2.1.1, 11.2.1.2 and 11.2.1.4 land zoned "RR1-16" shall be subject to the following zone provisions:

- | | |
|-------------------------|------------|
| (a) lot area (min.) | 6500 sq. m |
| (b) lot frontage (min.) | 95 m |
| (c) lot coverage (max.) | 10 % |

11.3.17 RURAL RESIDENTIAL TYPE ONE EXCEPTION SEVENTEEN (RR1-17) ZONE

11.3.17.1 Notwithstanding article 11.2.1.1 land zoned "RR1-17" shall have a minimum lot area of 5500 square metres.

11.3.18 RURAL RESIDENTIAL TYPE ONE EXCEPTION EIGHTEEN (RR1-18) ZONE

11.3.18.1 Notwithstanding Section 11.1 and 11.2, land zoned "RR1-18" shall only be used for landscaping and uses accessory to a single detached dwelling.

11.3.19 RURAL RESIDENTIAL TYPE ONE EXCEPTION NINETEEN (RR1-19) ZONE

11.3.19.1 Despite articles 11.2.1.1 and 11.2.1.4, land zoned RR1-18 shall be subject to the following zone provisions:

- | | | |
|-----|--------------|----------|
| (a) | lot area | 3.76 ha. |
| (b) | lot coverage | 10% |

(B/L 2005-232)

11.3.20 RURAL RESIDENTIAL TYPE ONE EXCEPTION TWENTY (RR1-20) ZONE

11.3.20.1 Notwithstanding subsection 11.1.1, land zoned RR1-20 may only be used for the following uses:

- (a) One single detached dwelling;
- (b) Uses normally accessory to a single detached dwelling;
- (c) Access to the property shall be to the satisfaction of the Ministry of Transportation of Ontario.

(B/L 2006-172)

PART 12 - RURAL RESIDENTIAL TYPE TWO (RR2) ZONE

12.1 USES PERMITTED

12.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural Residential Type Two (RR2) Zone, except for the following uses:

12.1.1.1 Single detached dwelling

12.1.1.2 Home Occupation

12.1.1.3 Public Park

12.2 ZONE PROVISIONS

12.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural Residential Type Two (RR2) Zone, except in conformity with the following zone provisions:

| | | |
|----------|--|------------------------|
| 12.2.1.1 | Lot Area (min.) | |
| | (a) serviced with municipal or communal water system | 1400 sq. m |
| | (b) serviced with private well and septic system | 2000 sq. m |
| 12.2.1.2 | Lot Frontage (min.) | |
| | (a) serviced with municipal or communal water system | 25 m |
| | (b) serviced with private well and septic system | 30 m |
| | (c) with shore lot line | 35 m |
| 12.2.1.3 | Yard Requirements (min.) | |
| | (a) front | 7.5 m |
| | (b) interior side | 3 m on one side |
| | (i) one storey | 1.3 m on opposite side |
| | (ii) all others | 2.3 m on opposite side |
| | (c) exterior side | 7.5 m |
| | (d) rear | 7.5 m |
| 12.2.1.4 | Lot Coverage (max.) | 30 % |
| 12.2.1.5 | Building Height (max.) | 11 m |
| 12.2.1.6 | Gross Floor Area (min.) | 93 sq. m |

| | | |
|----------|---|--------|
| 12.2.1.7 | Landscaped Open Space (min.) | 30 % |
| 12.2.1.8 | Density (max. per lot) | 1 d.u. |
| 12.3 | <u>RURAL RESIDENTIAL TYPE TWO EXCEPTION ZONES</u> | |
| | "Reserved" | |

PART 13 - RURAL RESIDENTIAL TYPE THREE (RR3) ZONE

13.1 USES PERMITTED

13.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural Residential Type Three (RR3) Zone, except for the following uses:

13.1.1.1 Vacation dwelling or a single detached dwelling

13.1.1.2 Home Occupation

13.1.1.3 Public Park

13.2 ZONE PROVISIONS

13.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Rural Residential Type Three (RR3) Zone, except in conformity with the following zone provisions:

13.2.1.1 Lot Area (min.)

- | | |
|--|------------|
| (a) serviced with municipal or communal water system | 1400 sq. m |
| (b) serviced with private well and septic system | 2000 sq. m |

13.2.1.2 Lot Frontage (min.)

- | | |
|--|------|
| (a) serviced with municipal or communal water system | 25 m |
| (b) serviced with private well and septic system | 30 m |
| (c) with shore lot line regardless of services | 35 m |

13.2.1.3 Yard Requirements (min.)

- | | |
|-------------------|------------------------|
| (a) front | 7.5 m |
| (b) interior side | 3 m on one side |
| (i) one storey | 1.3 m on opposite side |
| (ii) all others | 2.3 m on opposite side |
| (c) exterior side | 7.5 m |
| (d) rear | 7.5 m |
| (e) water setback | 15 m |

13.2.1.4 Lot Coverage (max.) 30 %

- 13.2.1.5 Building Height (max.) 11 m
- 13.2.1.6 Gross Floor Area (min.) 93 sq. m
- 13.2.1.7 Landscaped Open Space 30 %

13.3 RURAL RESIDENTIAL TYPE THREE EXCEPTION ZONES

13.3.1 RURAL RESIDENTIAL TYPE THREE EXCEPTION ONE (RR3-1) ZONE

13.3.1.1 Notwithstanding subsection 13.1.1 and article 3.1.2.2 land zoned "RR3-1" shall only be used for a private tennis court and buildings accessory to a single detached dwelling. A single detached dwelling or vacation dwelling shall not be permitted. The provisions of article 13.2.1.3 shall apply to such accessory buildings.

13.3.2 RURAL RESIDENTIAL TYPE THREE EXCEPTION TWO (RR3-2) ZONE

13.3.2.1 Notwithstanding article 13.2.1.1 land zoned "RR3-2" shall have a minimum lot area of 1998 square metres.

13.3.3 RURAL RESIDENTIAL TYPE THREE EXCEPTION THREE (RR3-3) ZONE

13.3.3.1 Notwithstanding article 13.2.1.2 land zoned "RR3-3" shall have a minimum lot frontage of 30.5 metres.

13.3.4 RURAL RESIDENTIAL TYPE THREE EXCEPTION FOUR (RR3-4) ZONE

13.3.4.1 Notwithstanding articles 13.2.1.1 and 13.2.1.2 land zoned "RR3-4" shall be subject to the following zone provisions:

- (a) lot area (min.) 7500 sq. m
- (b) lot frontage (min.) 89 m

13.3.5 RURAL RESIDENTIAL TYPE THREE EXCEPTION FIVE (RR3-5) ZONE

13.3.5.1 Notwithstanding subsection 13.1.1 land zoned "RR3-5" shall only be used for a private tennis court and buildings accessory to a single detached dwelling. A single detached dwelling or vacation dwelling shall not be permitted.

13.3.5.2 Notwithstanding articles 3.1.2.2 and 13.2.1.3 land zoned RR3-5 shall be subject to the following zone provisions:

- (a) front yard (min.) 16.8 m
- (b) interior side yard (min.) 3.0 m
- (c) rear yard (min.) 3.0 m

13.3.6 RURAL RESIDENTIAL TYPE THREE EXCEPTION SIX (RR3-6) ZONE

13.3.6.1 Notwithstanding article 3.1.5.1 on land zoned "RR3-6" no buildings or structures including boat houses, shall be permitted within 15 metres of the shoreline but boat docking facilities which are not enclosed by a building or structure shall be permitted.

13.3.7 RURAL RESIDENTIAL TYPE THREE EXCEPTION SEVEN (RR3-7) ZONE

13.3.7.1 Notwithstanding articles 13.2.1.1 and 13.2.1.2 land zoned "RR3-7" shall be subject to the following zone provisions:

- | | |
|-------------------------|------------|
| (a) lot area (min.) | 9000 sq. m |
| (b) lot frontage (min.) | 70 m |

13.3.8 RURAL RESIDENTIAL TYPE THREE EXCEPTION EIGHT (RR3-8) ZONE

13.3.8.1 Notwithstanding article 13.2.1.2 land zoned "RR3-8" shall have a minimum lot frontage of 28 metres.

13.3.9 RURAL RESIDENTIAL TYPE THREE EXCEPTION NINE (RR3-9) ZONE

13.3.9.1 Notwithstanding articles 13.2.1.1 and 13.2.1.2, land zoned "RR3-9" shall be subject to the following zone provisions:

- | | |
|-------------------------|------------|
| (a) lot area (min.) | 1050 sq. m |
| (b) lot frontage (min.) | 20 m |

13.3.10 RURAL RESIDENTIAL TYPE THREE EXCEPTION TEN (RR3-10) ZONE

13.3.10.1 Notwithstanding clause 13.2.1.3 (e), on land zoned "RR3-10" the minimum water setback shall be 20 metres from the normal water level of 247.8 metres.

13.3.11 RURAL RESIDENTIAL TYPE THREE EXCEPTION ELEVEN (RR3-11) ZONE

13.3.11.1 Notwithstanding clause 13.2.1.1 (b) and article 13.2.1.4, land zoned "RR3-11" shall be subject to the following zone provisions:

- | | |
|---|------------|
| (a) lot area (min.) | 1300 sq. m |
| (b) lot coverage (max.) | 15% |
| (c) gross floor area for single detached dwelling (max.) | 155 sq. m |

13.3.12 RURAL RESIDENTIAL TYPE THREE EXCEPTION TWELVE (RR3-12) ZONE

13.3.12.1 Notwithstanding article 13.1, land zoned "RR3-12" may also be used for a dock rental business and associated parking

with no enclosed buildings and no expansion of the existing docking facilities.

13.3.12.2 Notwithstanding article 13.2.1.2 clause (c), on land zoned "RR3-12" the minimum lot frontage shall be 25 m.

13.3.13 RURAL RESIDENTIAL TYPE THREE EXCEPTION THIRTEEN (RR3-13) ZONE

13.3.13.1 Notwithstanding article 13.2.1.2 clause (c), on land zoned "RR3-13" the minimum lot frontage shall be 18 m.
(By-Law 28-99)

13.3.14 RURAL RESIDENTIAL TYPE THREE EXCEPTION FOURTEEN (RR3-14) ZONE

13.3.14.1 Notwithstanding the definition of "rear lot line" or articles 13.2.1.1, 13.2.1.2, and 13.2.1.4, land zoned RR3-14 shall be subject to the following zone provisions:

- (a) lot area (min.) 1,100 sq.m
- (b) lot frontage (min.) 13 m
- (c) lot coverage (max.) 15 %
- (d) the rear lot line shall be the lot line closest to and roughly parallel with the shoreline of the dredged canal to the north.
(B/L 63-00)

13.3.15 RURAL RESIDENTIAL TYPE THREE EXCEPTION FIFTEEN (RR3-15) ZONE

13.3.15.1 Notwithstanding article 13.2.1.2 (c) land zoned "RR3-15" shall be subject to the following zone provisions:

- (a) lot frontage (min.) 14.6 m
 - (b) shore lot line (min.) 57.0 m
- (B/L 64-00)

13.3.16 RURAL RESIDENTIAL TYPE THREE EXCEPTION SIXTEEN (RR3-16) ZONE

13.3.16.1 Notwithstanding article 13.2.1.2, land zoned "RR3-16" shall have a minimum lot frontage of 21 metres.
(B/L 2001-153)

13.3.17 RURAL RESIDENTIAL TYPE THREE EXCEPTION SEVENTEEN (RR3-17) ZONE

13.3.17.1 Notwithstanding articles 13.2.1.1, 13.2.1.3(e) and 3.1.5 on land zoned "RR3-17", the following requirements shall apply and override any other requirements that may conflict with them:

- (a) Minimum lot size - 4,500 sq. m.
- (b) Minimum water setback for all habitable buildings - 30 m. from the normal highwater level of Balsam Lake, which is 256.5 metres.
- (c) Within the water setback, one dry double wide boat house together with a marine railway with the boathouse shall be permitted provided the boathouse does not exceed 9.2 m x 9.2 m plus the roof overhangs not exceeding 76 cm on each side.
- (d) A 15 metre buffer shall be maintained adjacent to Balsam Lake and the only permitted uses within this buffer shall be the above noted boathouse, docking facilities, wells, a water line and a maximum of two walkways not exceeding 1.2 metres in width. Septic beds shall not be permitted within the buffer area. Within the 15 metre buffer, natural vegetation, native to Ontario, including ground cover, wildflowers, shrubs and trees will be required and conventional lawns shall not be permitted. The exception to this is any boathouse, marine railway or walkway that is permitted within the buffer.
(B/L 2003-08)

13.3.18 RURAL RESIDENTIAL TYPE THREE EXCEPTION EIGHTEEN (RR3-18)
ZONE

13.3.18.1 Notwithstanding articles 13.2.1.1, 13.2.1.3(e) and 3.1.5 on land zoned "RR3-18", the following requirements shall apply and override any other requirements that may conflict with them:

- (a) Minimum lot size - 4,400 sq. m.
- (b) Minimum water setback for all habitable buildings - 30 m. from the normal high water level of Balsam Lake, which is 256.5 metres.
- (c) Within the water setback, one dry double wide boat house together with a marine railway with the boathouse shall be permitted provided the boathouse does not exceed 9.2 m x 9.2 m plus the roof overhangs not exceeding 76 cm on each side.
- (d) A 30 metre buffer shall be maintained adjacent to Balsam Lake and the only permitted uses within this buffer shall be the above noted boathouse, docking facilities and a maximum of two walkways not exceeding 1.2 metres in width. Septic beds shall not be permitted within the buffer area. Within the 30 metre buffer, natural vegetation, native to Ontario, including ground cover, wildflowers, shrubs and trees will be required and conventional lawns shall not be permitted. The exception to this is any boathouse,

marine railway or walkway that is permitted within the buffer.
(B/L 2006-088)

13.3.19 RURAL RESIDENTIAL TYPE THREE EXCEPTION NINETEEN (RR3-19) ZONE

13.3.19.1 Notwithstanding Part 2 - Definitions and Articles 3.1.6, 3.1.6.1, and 13.1 on land zoned "RR3-19", a private cabin having a maximum gross floor area of 68 sq.m. and containing cooking and sanitary facilities shall be permitted.

(By-Law 2008-209)

13.3.20 RURAL RESIDENTIAL TYPE THREE EXCEPTION TWENTY (RR3-20) ZONE

Textual Amendment: By-law No. 12-95 of the geographic Township of Fenelon is further amended to add the following section to Section 13.3:

Rural Residential Type Three Exception Twenty (RR3-20) Zone

In addition to the provisions of Section 2 and Subsections 3.1 and 13.2, land zoned RR3-20 shall also be subject to the following provisions:

1.0 Definitions

Improved Public Street, means a street assumed by the Corporation, County, or Province, or a private condominium roadway which has been constructed in such a manner so as to permit its use by normal vehicular traffic and maintained to provide year-round access.

2.0 Regulations

Existing accessory (barn) building:

| | |
|-------------------------------------|-----------|
| Front yard setback (min.) | 2.5 m |
| Exterior side yard setback (min.) | 4.5 m |
| Gross ground floor area (max.) | 300 sq.m. |
| Height (max.) | 10 m |
| Shoreline right-of-way width (min.) | 7 m." |

B/L 2009-239

13.3.21 RURAL RESIDENTIAL TYPE THREE EXCEPTION TWENTY-ONE (RR3-21) ZONE

Rural Residential Type Three Exception Twenty-One (RR3-21) Zone

Notwithstanding the provisions of subsection 2 and 13.2, land zoned RR3-21 shall be subject to the following provisions:

1.0 Definitions

Improved Public Street, means a street assumed by the Corporation, County, or Province, or a private condominium roadway which has been constructed in such a manner so as to permit its use by normal vehicular traffic and maintained to provide year-round access.

2.0 Regulations

Shoreline lot frontage (min) 31 m.”

B/L 2009-239

13.3.22 RURAL RESIDENTIAL TYPE THREE EXCEPTION TWENTY-TWO (RR3-22) ZONE

Rural Residential Type Three Exception Twenty-Two (RR3-22) Zone

Notwithstanding the provisions of subsection 13.2, land zoned RR3-22 shall be subject to the following provisions:

Lot area (min) 2.5 ha

Shoreline right-of-way width (min.) 7 m

B/L 2009-239

PART 14 - RESIDENTIAL MOBILE HOME PARK (RM) ZONE

14.1 USES PERMITTED

14.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Residential Mobile Home Park (RM) Zone, except for the following uses:

14.1.1.1 Mobile Home Park

14.1.1.2 Recreational and retail facilities accessory to a Mobile Home Park

14.2 ZONE PROVISIONS

14.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Residential Mobile Home Park (RM) Zone, except in conformity with the following zone provisions:

14.2.1.1 Lot Area (min.) 4 ha

14.2.1.2 Lot Frontage (min.) 100 m

14.2.1.3 Yard Requirements (min.)

- (a) front 15 m
- (b) interior side 8 m
- (c) exterior side 15 m
- (d) rear 8 m

14.2.1.4 Lot coverage (Max.) 30 %

14.2.1.5 Mobile Home Site Standards

- (a) site area (min.) 460 sq.m
- (b) site frontage (min.) 12 m
- (c) front yard (min.) 5 m
- (d) rear yard (min.) 4 m
- (e) interior side yard (min.) 1.2 m one side,
3 m other side
- (f) exterior side yard (min.) 3 m
- (g) site coverage (max.) 40 %

14.2.1.6 Each mobile home site shall be permanently delineated by stakes fencing or hedges.

14.2.1.7 Each mobile or modular home shall be erected on a concrete slab on grade or a concrete or concrete block foundation. Where located on a concrete slab skirting shall be installed to screen the undercarriage.

- 14.2.1.8 Accessory structures such as patios, porches, additions, skirting and storage facilities shall be factory prefabricated or constructed to an equivalent standard to maintain or enhance the character of the mobile or modular home.
- 14.2.1.9 Each mobile home park shall be landscaped in accordance with Section 3.10.
- 14.2.1.10 A landscaped recreation area equal to 5% of the total area of the mobile home park or 1 hectare per 300 units, whichever is greater, shall be provided within the mobile home park.
- 14.2.1.11 A communal television antenna and distribution system shall be provided in the mobile home park. Individual antennas or satellite dishes shall be prohibited.
- 14.2.1.12 Access roads within the mobile home park shall have an asphalt surface and a minimum width of 7.5 metres to permit two way traffic. Parking on internal access roads shall be prohibited.
- 14.2.1.13 No mobile or modular home may be erected or used unless the mobile home site upon which it is to be located is serviced by a communal water and communal sewage disposal system.

14.3 RESIDENTIAL MOBILE HOME PARK EXCEPTION ZONES

"Reserved"

PART 15 - LIMITED SERVICE RESIDENTIAL (LSR) ZONE

15.1 PERMITTED USES

15.1.1 No person shall hereafter change the use of any building, structure or land or erect and use any building or structure in a Limited Service Residential (LSR) Zone, except for one of the following uses:

15.1.1.1 Vacation dwelling

15.1.1.2 Single detached dwelling

15.2 ZONE PROVISIONS

15.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure in a Limited Service Residential (LSR) Zone except in conformity with the following zone provisions:

| | | |
|----------|--|------------------------|
| 15.2.1.1 | Lot Area (min.) | |
| | (a) serviced with municipal or communal water | 1400 sq. m |
| | (b) serviced with private well and septic system | 2000 sq. m |
| 15.2.1.2 | Lot Frontage (min.) | |
| | (a) serviced with municipal or communal water | 25 m |
| | (b) serviced with private well and septic system | 30 m |
| | (c) with shore lot line regardless of services | 35 m |
| 15.2.1.3 | Yard requirements (min.) | |
| | (a) front | 7.5 m |
| | (b) interior side | 3 m on one side |
| | (i) one storey | 1.3 m on opposite side |
| | (ii) all others | 2.3 m on opposite side |
| | (c) exterior side | 7.5 m |
| | (d) rear | 7.5 m |
| | (e) water setback | 15 m |
| 15.2.1.4 | Lot Coverage (max.) | 30 % |
| 15.2.1.5 | Building height (max.) | 11 m |
| 15.2.1.6 | Gross Floor Area (min.) | 93 sq. m |

- 15.2.1.7 Landscaped open space 30 %
- 15.2.1.8 Density (max. per lot) 1 d.u.
- 15.3 LSR EXCEPTION ZONES
- 15.3.1 LIMITED SERVICE RESIDENTIAL EXCEPTION ONE (LSR-1) ZONE
- 15.3.1.1 Notwithstanding subsection 15.1.1 land zoned "LSR-1" may only be used for a vacation dwelling.
- 15.3.2 LIMITED SERVICE RESIDENTIAL EXCEPTION TWO (LSR-2) ZONE
- 15.3.2.1 Notwithstanding subsection 15.1.1 land zoned "LSR-2" may also be used for a home occupation.
- 15.3.3 LIMITED SERVICE RESIDENTIAL EXCEPTION THREE (LSR-3) ZONE
- 15.3.3.1 Notwithstanding article 15.2.1.2 land zoned "LSR-3" shall have a minimum lot frontage of 25 metres.
- 15.3.4 LIMITED SERVICE RESIDENTIAL EXCEPTION FOUR (LSR-4) ZONE
- 15.3.4.1 Notwithstanding articles 3.18.1.1, 15.2.1.1, 15.2.1.2, 15.2.1.3 and 15.2.1.4, land zoned "LSR-4" shall be subject to the following zone provisions:
- | | |
|------------------------------|-------|
| (a) lot area (min.) | 1 ha |
| (b) lot frontage (min.) | 102 m |
| (c) yard requirements (min.) | |
| (i) front | 15 m |
| (ii) side | 3 m |
| (iii) rear | 3 m |
| (d) lot coverage (max.) | 20 % |
- 15.3.5 LIMITED SERVICE RESIDENTIAL EXCEPTION FIVE (LSR-5) ZONE
- 15.3.5.1 Notwithstanding articles 3.18.1.1, 15.2.1.1, 15.2.1.2, 15.2.1.3 and 15.2.1.4, land zoned "LSR-5" shall be subject to the following zone provisions:
- | | |
|------------------------------|------------|
| (a) lot area (min.) | 4000 sq. m |
| (b) lot frontage (min.) | 40 m |
| (c) yard requirements (min.) | |
| (i) front | 15 m |
| (ii) side | 3 m |
| (iii) rear | 3 m |
| (d) lot coverage (max.) | 20 % |

15.3.6 LIMITED SERVICE RESIDENTIAL EXCEPTION SIX (LSR-6) ZONE

Notwithstanding the definitions of the terms "front lot line" and "exterior lot line", for the purpose of the LSR-6 Zone the shore lot line shall be the front lot line and the southern boundary shall be considered an exterior lot line.

15.3.7 LIMITED SERVICE RESIDENTIAL EXCEPTION SEVEN (LSR-7) ZONE

15.3.7.1 Notwithstanding the definition of "Accessory Building" and "Accessory Use", on land zoned Limited Service Residential Exception Seven "(LSR-7)", any form of dwelling is not permitted; buildings, structures and uses accessory to adjacent developed residential lots are permitted.
(B/L 2004-223)

15.3.8 LIMITED SERVICE RESIDENTIAL EXCEPTION EIGHT (LSR-8) ZONE

15.3.8.1 Notwithstanding subsections 15.1.1, 15.2.1.1 and 15.2.1.2, land zoned LSR-8 may only be used for a vacation dwelling and shall be subject to the following zone provisions:

- a) lot area (min.) 1,214 sq.m.
- b) lot frontage (min.) 20 m.

All other provisions of the LSR Zone shall apply.

On land zoned LSR-8(H1), the removal of the (H1) holding symbol shall be in accordance with the following:

- i) that the Health Unit confirms that the site can be adequately serviced in relation to the existing wells, setbacks and the floodplain of Sturgeon Lake.
- ii) the owner shall prepare a drainage and grading plan to the satisfaction of Engineering Division
(B/L2009-226)

15.3.9 LIMITED SERVICE RESIDENTIAL EXCEPTION NINE(LSR-9) ZONE

15.3.9.1 Notwithstanding the definition of "Front Lot Line", on land zoned LSR-9, the lot line abutting Camp St. shall be deemed to be the Front Lot Line.

15.3.9.2 Notwithstanding subsections 3.1.2.4, 3.18.2.1, 15.2.1.3 (a) and (c), 15.2.1.8, land zoned LSR-9 shall be subject to the following provisions:

- (a) yard requirements (min.)

- | | | |
|-------|--------------------------------|--------|
| (i) | front (detached garage) | 1.3 m. |
| (ii) | front (south dwelling) | 5 m. |
| (iii) | exterior side (south dwelling) | 5.5 m. |
| (iv) | exterior side (north dwelling) | 4.5 m. |
| (b) | Density (max. per lot) | 2 d.u. |

(B/L 2013-110)

PART 16 - GENERAL COMMERCIAL (C1) ZONE

16.1 USES PERMITTED

16.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a General Commercial (C1) Zone, except for the following uses:

16.1.1.1 Animal Hospital or Veterinary Clinic

16.1.1.2 Banks, Financial Institutions

16.1.1.3 Bed and Breakfast Establishment

16.1.1.4 Business or Professional Offices

16.1.1.5 Commercial Schools

16.1.1.6 Clubs

16.1.1.7 Dry Cleaning and Laundry Depot

16.1.1.8 Funeral Parlour

16.1.1.9 Health Centre

16.1.1.10 Motor Vehicle Service Station or Fuel Bar

16.1.1.11 Museum, Library

16.1.1.12 Parking lots

16.1.1.13 Recreational Establishment

16.1.1.14 Restaurant, Soda Fountains, Lunch Counters

16.1.1.15 Retail Stores, service shops and personal service shops

16.1.1.16 Taxi stand

16.1.1.17 Upholstering and furniture repair

16.1.1.18 Dwelling unit as part of a building containing a permitted non-residential use.

16.2 ZONE PROVISIONS

16.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a General Commercial (C1) Zone, except in conformity with the following zone provisions:

16.2.1.1 Lot Area (min.) 1400 sq. m

16.2.1.2 Lot Frontage (min.) 25 m

16.2.1.3 Yard Requirements (min.)

(a) front 2 m

(b) interior side

(i) nil for an interior side yard where the building has a common wall with the building on an adjacent lot.

(ii) All others 1.5 m

(c) exterior side 6 m

(d) rear 9 m

16.2.1.4 Lot Coverage (max.) 30 %

16.2.1.5 Building Height (max.) 11 m

16.2.1.6 Gross Floor Area (min.)

(a) bachelor apartment 35 sq. m

(b) all other residential units 55 sq. m plus 14 sq. m for each habitable room, in excess of 4

(c) all other uses no minimum

16.2.1.7 Landscaped Open Space (min.) 10 %

16.2.1.8 Density (max. per lot)

(a) residential 1 d.u.

16.3 GENERAL COMMERCIAL EXCEPTION ZONES

16.3.1 GENERAL COMMERCIAL EXCEPTION (C1-1) ZONE

16.3.1.1 Notwithstanding subsection 16.1 land zoned "C1-1" may only be used for a convenience store and an accessory dwelling unit.

16.3.2 GENERAL COMMERCIAL EXCEPTION (C1-2) ZONE

16.3.2.1 Notwithstanding subsection 16.1 land zoned "C1-2" may only be used for the following uses:

- (a) one dwelling unit
- (b) a motel containing a maximum of three units
- (c) a maximum of three commercial suites which may be a retail store, service shop, restaurant or an art, craft or antique store

16.3.2.2 Notwithstanding articles 16.2.1.1, 16.2.1.2 and 16.2.1.3 land zoned "C1-2" shall be subject to the following zone provisions:

- | | |
|------------------------------|------------|
| (a) lot area (min.) | 3000 sq. m |
| (b) lot frontage (min.) | 45 m |
| (c) yard requirements (min.) | |
| (i) front | 11.5 m |
| (ii) interior side | 2 m |
| (iii) exterior side | 11.5 m |
| (iv) rear | 4 m |

16.3.3 GENERAL COMMERCIAL EXCEPTION THREE (C1-3) ZONE

16.3.3.1 Notwithstanding subsection 16.1.1, land zoned "C1-3" shall only be used for the following uses:

- (a) a bed and breakfast establishment
- (b) a business or professional office
- (c) a retail store
- (d) a service shop or personal service shop
- (e) a dwelling unit in a building containing another permitted use.

16.3.3.2 Notwithstanding article 16.2.1.4, on land zoned "C1-3" the maximum lot coverage shall be 20%.

16.3.4 GENERAL COMMERCIAL EXCEPTION FOUR (C1-4) ZONE

16.3.4.1 In addition to the uses permitted by subsection 16.1, on land zoned C1-4 a detached dwelling and a motor vehicle sales establishment are also permitted uses.
(B/L 2007-118)

PART 17 - HIGHWAY COMMERCIAL (C2) ZONE

17.1 USES PERMITTED

17.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Highway Commercial (C2) Zone, except for one or a maximum of two of the following uses:

17.1.1.1 Animal Hospital or Veterinary Clinic

17.1.1.2 Bed and Breakfast Establishment

17.1.1.3 Hotels, Motels, or Motor hotels

17.1.1.4 Motor vehicle sales establishment, motor vehicle service station, motor vehicle fuel bar, dry-land marina

17.1.1.5 Recreational establishment

17.1.1.6 Restaurant, drive-in restaurant

17.1.1.7 Retail sales establishment, within a wholly enclosed building, for:

- (a) furniture, home furnishings and home decorating supplies
- (b) major appliances
- (c) recreational equipment
- (d) garden and nursery supplies
- (e) farm, business or institutional equipment and machinery
- (f) arts, crafts, antiques

17.1.1.8 Retail sales and service establishment, with outside display or storage, for:

- (a) motor vehicles, marine and recreational vehicles and accessories, trailers, boats and motorized snow vehicles
- (b) building and home improvement supplies

17.1.1.9 Tourist Information Centre

17.1.1.10 One dwelling unit as part of a building containing another permitted use

17.2 ZONE PROVISIONS

17.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Highway Commercial (C2) Zone, except in conformity with the following zone provisions:

17.2.1.1 Lot Area (min.) 4000 sq. m

17.2.1.2 Lot Frontage (min.) 45 m

17.2.1.3 Yard Requirements (min.)

- (a) front 6 m
- (b) interior side 12 m
- (c) exterior side 12 m
- (d) rear 12 m

17.2.1.4 Lot Coverage (max.)

- (a) hotel, motel or motor hotel 33 %
- (b) all other uses 30 %

17.2.1.5 Building Height (max.) 11 m

17.2.1.6 Gross Floor Area (min.)

- (a) Residential units - 55 sq. m plus 14 sq. m for each habitable room in excess of 4
- (b) All other uses no minimum

17.2.1.7 Landscaped Open Space (min.) 20 %

17.2.1.8 Density (max. per lot)

- (a) Residential 1 d.u.

17.2.2 Motor Vehicle Service Stations and Fuel Bars

17.2.2.1 No portion of any fuel pump island or fuel pump island canopy, shall be located closer than 6 metres from any street line or daylighting triangle or 15 metres from any dwelling unit.

17.2.2.2 The minimum distance between access driveways shall be 9 metres.

17.2.2.3 The interior angle of intersection between an access driveway and the street shall not be less than 45 degrees nor greater than 90 degrees.

17.2.2.4 All repair and mechanical servicing of motor vehicles shall be conducted within a wholly enclosed building.

17.3 HIGHWAY COMMERCIAL EXCEPTION ZONES

17.3.1 HIGHWAY COMMERCIAL EXCEPTION ONE (C2-1) ZONE

17.3.1.1 Notwithstanding subsection 17.1.1 land zoned "C2-1" may only be used for the following uses:

- (a) motor vehicle service station
- (b) motor vehicle sales establishment
- (c) restaurant
- (d) retail sale of agricultural products including farm produce (B/L 2008-168)

17.3.1.2 Notwithstanding subsection 3.10.2 and articles 17.2.1.1, 17.2.1.2, 17.2.1.3 and 17.2.1.4 land zoned "C2-1" shall be subject to the following zone provisions:

- (a) lot area (min.) 4500 sq. m
- (b) lot frontage (min.) 110 m
- (c) yard requirements (min.)
 - (i) interior side 18 m
 - (ii) exterior side 18 m
 - (iii) rear 8 m
- (d) lot coverage (max.) 10 %
- (e) a landscaped buffer having a minimum width of 3 metres shall be provided and maintained in the side and rear yards.

17.3.2 HIGHWAY COMMERCIAL EXCEPTION TWO (C2-2) ZONE

17.3.2.1 Notwithstanding subsection 17.1.1 land zoned C2-2 may be used for all uses permitted in the C2 zone with the exception of a hotel, motel or motor hotel.

17.3.2.2 Notwithstanding articles 17.2.1.1, 17.2.1.2, 17.2.1.3 and 17.2.1.4 land zoned "C2-2" shall be subject to the following zone provisions:

- (a) lot area (min.) 1.8 ha
- (b) lot frontage (min.) 115 m
- (c) yard requirements (min.)
 - (i) front 15 m
 - (ii) interior side 15 m
 - (iii) exterior side 15 m
 - (iv) rear 15 m
- (d) lot coverage (max.) 5 %

17.3.2.3 For the purpose of the C2-2 Zone, there shall be no more than one outdoor storage area which shall be one contiguous area with clearly visible boundaries as identified through the use of fencing or a change in landscaping treatment. An

outdoor storage area shall be subject to all yard and setback provisions of the C2-2 Zone.

17.3.3 HIGHWAY COMMERCIAL EXCEPTION THREE (C2-3) ZONE

17.3.3.1 Notwithstanding subsection 17.1.1 land zoned "C2-3" may only be used for the retail sale of art and craft objects and antiques within a dwelling unit.

17.3.4 HIGHWAY COMMERCIAL EXCEPTION FOUR (C2-4) ZONE

17.3.4.1 Notwithstanding subsection 17.1.1 land zoned "C2-4" may only be used for the retail sale of art and craft objects and antiques and one dwelling unit.

17.3.4.2 Notwithstanding article 17.2.1.1 land zoned "C2-4" shall have a minimum lot area of 3000 sq. m.

17.3.5 HIGHWAY COMMERCIAL EXCEPTION FIVE (C2-5) ZONE

17.3.5.1 Notwithstanding subsection 17.1.1 land zoned "C2-5" may also be used for a taxidermy shop.

17.3.6 HIGHWAY COMMERCIAL EXCEPTION SIX (C2-6) ZONE

17.3.6.1 Notwithstanding subsection 17.1.1 land zoned C2-6 may be used for all uses permitted in the C2 zone with the exception of a restaurant, hotel, motel or motor hotel.

17.3.6.2 Notwithstanding articles 17.2.1.1, 17.2.1.2, 17.2.1.3 and 17.2.1.4 land zoned "C2-6" shall be subject to the following zone provisions.

| | |
|-------------------------|------------|
| (a) lot area (min.) | 9000 sq. m |
| (b) lot frontage (min.) | 82.5 |
| (c) front yard (min.) | 15 m |
| (d) side yard (min.) | 7.6 m |
| (e) rear yard (min.) | 15 m |
| (f) lot coverage (max.) | 10 % |

17.3.6.3 For the purpose of the C2-6 Zone, there shall be no more than one outdoor storage area per lot which shall be one contiguous area with clearly visible boundaries as identified through the use of fencing or a change in landscaping treatment. The provisions of clause 3.10, in respect of landscaping, shall apply to the C2-6 zone where it abuts land subject to a holding symbol. An outdoor storage area shall be subject to all yard and setback provisions of the C2-6 Zone.

17.3.6.4 Notwithstanding article 3.8.1, land zoned "C2-6" with a holding (H) symbol may be used for a tree or garden nursery with no buildings or structures.

17.3.7 HIGHWAY COMMERCIAL EXCEPTION SEVEN (C2-7) ZONE

17.3.7.1 Notwithstanding subsection 17.1.1 land zoned "C2-7" may only be used for a retail store for one of the following uses:

- (a) major appliances
- (b) home furnishings
- (c) home improvement and farm supplies
- (d) general hardware, sporting goods and building supplies

17.3.7.2 Notwithstanding articles 17.2.1.1, 17.2.1.2 and 17.2.1.3 land zoned "C2-7" shall be subject to the following zone provisions.

- | | |
|-------------------------|------------|
| (a) lot area (min.) | 7500 sq. m |
| (b) lot frontage (min.) | 40 m |
| (c) front yard (min.) | 43 m |
| (d) side yard (min.) | 12 m |
| (e) rear yard (min.) | 12 m |

17.3.8 HIGHWAY COMMERCIAL EXCEPTION EIGHT (C2-8) ZONE

17.3.8.1 Notwithstanding subsection 17.1.1 land zoned "C2-8" may only be used for the following uses:

- (a) retail store for the sale of automotive parts and accessories, hardware, sporting goods, seasonal merchandise
- (b) outdoor garden centre and sales area
- (c) motor vehicle service station and fuel bar
- (d) propane dispensing facility

17.3.9 HIGHWAY COMMERCIAL EXCEPTION NINE (C2-9) ZONE

17.3.9.1 Notwithstanding subsection 17.1.1 land zoned "C2-9" may only be used for the following uses:

- (a) art, craft, gift, speciality or antique shop, boutique
- (b) motor vehicle service station and motor vehicle gasoline bar
- (c) field or district office for real estate or sale and distribution of promotional products
- (d) furniture store patio, handcrafted or wicker furniture
- (e) garden market
- (f) photography studio
- (g) recreational establishment
- (h) rental business
- (i) restaurant, drive-in restaurant
- (j) retail store with outdoor display for the sale and servicing of fishing, hunting, scuba or camping equipment and supplies, sporting goods, boats and

marine products and accessories, motorized snow vehicles, motorcycles, nursery and landscaping supplies, speciality home improvement products, woodstoves, fireplaces and accessories

- (k) service shop excluding a barber shop or hairdresser
- (l) small goods distribution centre
- (m) tourist information centre

17.3.9.2 Notwithstanding articles 17.2.1.1, 17.2.1.2 and 17.2.1.3 land zoned "C2-9" shall be subject to the following zone provisions.

- | | |
|-------------------------|-----------|
| (a) lot area (min.) | 790 sq. m |
| (b) lot frontage (min.) | 35 m |
| (c) side yard (min.) | 5 m |
| (d) rear yard (min.) | 2 m |

17.3.10 HIGHWAY COMMERCIAL EXCEPTION TEN (C2-10) ZONE

17.3.10.1 Notwithstanding Section 17.1 land zoned "C2-10" may only be used for one of the following uses:

- (a) motor vehicles sales establishments;
- (b) tourist information centre;
- (c) retail sales within wholly enclosed buildings of the following:
 - (i) major electrical appliances
 - (ii) art and craft objects and antiques
 - (iii) broadloom and draperies
 - (iv) furniture, lamps and mirrors
 - (v) gymnasium equipment and sporting goods;
- (d) retail sales of the following where outdoor storage and display is permitted:
 - (i) motor vehicles, trailers, motorized snow vehicles, boats and accessories
 - (ii) equipment and machinery for farming
 - (iii) lumber and building supplies; and
- (e) home improvement supply outlet

17.3.10.2 Notwithstanding Section 17.2, land zoned "C2-10" shall be subject to the following zone provisions:

- | | |
|-------------------------|------------|
| (a) lot area (min.) | 3000 sq. m |
| (b) lot frontage (min.) | 45 m |
| (c) front yard (min.) | 6 m |
| (d) side yard (min.) | 12 m |
| (e) rear yard (min.) | 12 m |
| (f) height (max.) | 11 m |
| (g) lot coverage (max.) | 30 % |

17.3.11 HIGHWAY COMMERCIAL EXCEPTION ELEVEN (C2-11) ZONE

17.3.11.1 Notwithstanding Section 17.1 land zoned "C2-11" may only be used for one of the following uses:

- (a) motor vehicle service station;
- (b) motor vehicle sales establishment;
- (c) restaurant;
- (d) small engine repair shop;
- (e) motor vehicle and marine parts sales

17.3.11.2 Notwithstanding articles 17.2.1.1 and 17.2.1.2, land zoned "C2-11" shall be subject to the following zone provisions:

- (a) Lot area (min.) 3000 sq. m
- (b) Lot frontage (min.) 85 m
- (c) Section 3.4 shall apply to existing non-complying buildings or structures.

17.3.12 HIGHWAY COMMERCIAL EXCEPTION TWELVE (C2-12) ZONE

17.3.12.1 Notwithstanding subsection 17.1.1, on land zoned C2-12, a convenience store and refreshment vehicle are permitted uses and a maximum of three uses are permitted. A recreational establishment, hotel, motel, motor hotel, restaurant or drive-in restaurant are not permitted.

Refreshment Vehicle includes any vehicle (whether propelled by a motor or by the application of force by a Person or animal) which is used for the storage or preparation of food or drink intended for immediate consumption by the public.
B/L 2011-151

17.3.13 HIGHWAY COMMERCIAL EXCEPTION THIRTEEN (C2-13) ZONE

17.3.13.1 Notwithstanding subsection 17.1, on land zoned "C2-13" a maximum of 4 uses may be permitted and shall be limited to the following:

- i. building supply and equipment rental outlet;
- ii. rental storage units;
- iii. retail sale of garden and nursery supplies; and
- iv. one dwelling unit in a building containing another permitted use.

17.3.13.2 Notwithstanding article 17.2.1.4, on land zoned "C2-13", the maximum lot coverage shall be 20%.

17.3.14 HIGHWAY COMMERCIAL EXCEPTION FOURTEEN (C2-14) ZONE

17.3.14.1 Notwithstanding subsection 17.1.1, land zoned C2-14 may only

be used for the following uses:

- (a) retail sales establishment, within a wholly enclosed building, for:
 - i. furniture and home decorating supplies
 - ii. major appliances
 - iii. arts, crafts and antiques
- (b) retail sales establishment, with outside display and storage, for recreational equipment, exclusive of any vehicle or equipment identified in article 17.1.1.8 (a).
- (c) one dwelling unit in a building containing another permitted use

17.3.14.2 Notwithstanding subsection 3.10.2 and any provision of subsection 17.2.1 to the contrary, land zoned "C2-14" shall be subject to the following zone provisions:

- (a) lot frontage (min.) 12 m
- (b) lot coverage for outdoor storage and display (max.) 10 %
- (c) In lieu of providing vegetative screening or a fence, as per subsection 3.10.2, an outdoor storage area may be enclosed with an opaque fence which provides a visual screen to a height of 2 metres, but the width of the landscaped buffer area at the property boundary, as specified under subsection 3.10.2, shall continue to apply.
- (d) The existing building shall retain its non-complying status with respect to the new use and shall be subject to the provisions of article 3.4.2.1.

17.3.14.3 There shall be no more than one outdoor storage area which shall be one contiguous area with clearly visible boundaries as identified through the use of fencing or a change in landscaping treatment.

17.3.15 HIGHWAY COMMERCIAL EXCEPTION FIFTEEN (C2-15) ZONE

17.3.15.1 In addition to the uses permitted by article 17.1, land zoned "C2-15" may also be used for the following:

- ii. self-service storage facility;
- iii. a fenced outside storage area;

and all other relevant provisions shall apply.

(By-Law 2005-19)

17.3.16 HIGHWAY COMMERCIAL EXCEPTION SIXTEEN (C2-16) ZONE

17.3.16.1 Notwithstanding subsection 3.10.3, articles 17.2.1.1, 17.2.1.3 and 17.2.1.4, land zoned "C2-16" shall be subject to the following zone provisions:

- (a) lot area (minimum) 2,200 m²
- (b) yard requirements (minimum)
 - (i) front yard 4.5 m
 - (ii) exterior side yard 0.9 m
 - iii) rear yard 7.0 m
- (c) a landscaped buffer having a minimum width of 0.5 metres shall be provided and maintained between any public street and parking or outside display areas.
(B/L 2005-234)

17.3.17 HIGHWAY COMMERCIAL EXCEPTION SEVENTEEN (C2-17) ZONE

17.3.17.1 Notwithstanding the uses permitted in article 17.1, on land zoned "C2-17", the permitted uses shall be limited to the following:

- i. self-service storage facility;
- ii. a fenced outdoor storage area;
- iii. a single detached dwelling;

All other provisions of the By-Law shall continue to apply.

17.3.17.2 That lands zoned "C2-17" will be subject to site plan control.
(B/L 2008-011)

17.3.18 HIGHWAY COMMERCIAL EXCEPTION EIGHTEEN (C2-18) ZONE

17.3.18.1 In addition to the permitted uses in Section 17.1, on land zoned C2-18 the following uses are also permitted:

- i. convenience store;
- ii. a single detached dwelling existing on the property on the date of the passing of this by-law;
- iii. more than one dwelling unit existing on the property on the date of the passing of this by-law;

- iv. the location of a dwelling unit shall not be restricted to being part of a building containing another permitted use.

On land zoned C2-18(H), removal of the holding symbol shall be in accordance with the following:

- i. The owner shall enter into a site plan agreement for the proposed development that addresses site servicing, stormwater management, traffic, landscaping, and illumination.
(B/L 2012-159)

17.3.19 HIGHWAY COMMERCIAL EXCEPTION NINETEEN (C2-19) ZONE

17.3.19.1 Notwithstanding the provisions contained in Section 17.1 and Section 17.2, lands zoned C2-19 may also be used for the purposes of a propane bulk fuel storage facility subject to the following provisions:

- (i) Rear Yard (minimum) 7.5 metres
(B/L 2012-157)

PART 18 - TOURIST COMMERCIAL (C3) ZONE

18.1 USES PERMITTED

18.1.1 No person shall hereafter change the use of any building, structure or land or erect and use any building or structure in a Tourist Commercial (C3) Zone, except for one or more of the following uses:

18.1.1.1 Marina

18.1.1.2 Boat and marine motor sales and service

18.1.1.3 Restaurant

18.1.1.4 Motorized snow vehicle sales and service

18.1.1.5 Boat rentals

18.1.1.6 Hotel, Motel, Cottage Establishment, Lodge

18.1.1.7 Golf Course and Club

18.1.1.8 Ancillary retail

18.1.1.9 One dwelling unit as part of a building containing another permitted use

18.2 ZONE PROVISIONS

18.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Tourist Commercial (C3) Zone, except in conformity with the following zone provisions:

18.2.1.1 Lot Area (min.) 4000 sq. m

18.2.1.2 Lot Frontage (min.) 60 m

18.2.1.3 Yard Requirements (min.)

| | |
|-------------------|-------|
| (a) front | 25 m |
| (b) interior side | 6 m |
| (c) exterior side | 7.5 m |
| (d) rear | 7.5 m |

18.2.1.4 Lot Coverage (max.) 30 %

18.2.1.5 Building Height (max.) 11 m

18.2.1.6 Gross Floor Area (min.)
(a) residential unit - 55 sq. m plus 14 sq. m for each habitable room in excess of 4
(b) all other uses no minimum

18.2.1.7 Landscaped Open Space (min.) 25 %

18.2.1.8 Density (max. per lot)
(a) residential 1 d.u.

18.2.1.9 Notwithstanding articles 3.18.1.1 and 18.2.1.3, a marina does not require a water setback provided that it is connected to a water supply system and waste disposal system.

18.3 TOURIST COMMERCIAL EXCEPTION ZONES

18.3.1 TOURIST COMMERCIAL EXCEPTION ONE (C3-1) ZONE

18.3.1.1 Notwithstanding subsection 18.1.1 land zoned "C3-1" may only be used for the parking of motor vehicles and enclosed or open boat storage facilities.

18.3.2 TOURIST COMMERCIAL EXCEPTION TWO (C3-2) ZONE

18.3.2.1 Notwithstanding subsection 18.1.1 land zoned "C3-2" may only be used for the parking of motor vehicles and enclosed or open boat storage facilities.

18.3.2.2 Notwithstanding subsection 3.10.2 on land zoned "C3-2" landscaping shall include existing trees and vegetation maintained as a buffer having a depth of 17 metres in the front yard and 6 metres in the easterly interior side yard save and except for one access driveway which shall not exceed a width of 10 metres.

18.3.3 TOURIST COMMERCIAL EXCEPTION THREE (C3-3) ZONE

18.3.3.1 Notwithstanding subsection 18.1.1 land zoned "C3-3" may only be used for a convertible boat top and upholstery service shop, and associated boat storage, and two dwelling units.

18.3.3.2 Notwithstanding articles 3.18.1.1, 18.2.1.1, 18.2.1.2 and 18.2.1.3 land zoned "C3-3" shall be subject to the following zone provisions:

(a) lot area (min.) 3500 sq. m
(b) lot frontage (min.) 40 m

- (c) yard requirements (min.)
 - (i) interior side yard west side 6.0 m
 - (ii) interior side yard east side 3.0 m
 - (iii) water setback for convertible boat top and upholstery service shop shall be nil provided it is connected to a water supply system and waste disposal system.

18.3.4 TOURIST COMMERCIAL EXCEPTION FOUR (C3-4) ZONE

18.3.4.1 Notwithstanding articles 18.2.1.2 and 18.2.1.4, clauses 18.2.1.3 (a) and (b), and the definition of the term "Front Lot Line", land zoned "C3-4" shall be subject to the following zone provisions:

- (a) lot frontage (min.) 25 m
- (b) yard requirements (min.)
 - (i) front yard 15 m
 - (ii) interior side yard 3 m
- (c) lot coverage (max.) 15 %
- (d) the shore lot line shall be the front lot line.

18.3.5 TOURIST COMMERCIAL EXCEPTION FIVE (C3-5) ZONE

18.3.5.1 Notwithstanding subsection 18.1.1, land zoned "C3-5" may also be used for a real estate office.

18.3.6 TOURIST COMMERCIAL EXCEPTION SIX (C3-6) ZONE

- a) Notwithstanding subsection 18.1, land zoned C3-6, shall only be used for a marina within a vacant land condominium plan where facilities for the sale of marine fuels and lubricants are prohibited. Accessory uses and structures including washroom facilities, a pool and maintenance structures are also permitted.

18.3.7 TOURIST COMMERCIAL EXCEPTION SEVEN (C3-7) ZONE

- a) Notwithstanding subsection 18.1, land zoned C3-7, shall only be used for a residential vacant land condominium plan together with a condominium road.
- b) Notwithstanding subsections 18.2.1 through 18.2.1.9, land zoned C3-7 shall be subject to the following requirements:
 - i. minimum unit frontage on a common element road 15 m.
 - ii. minimum unit frontage on a municipal road 54 m.
 - iii. minimum unit area on a common element road 2700 sq.m.
 - iv. minimum unit area on a municipal road 3760 sq.m.

| | | |
|-------|---|--------|
| v. | maximum number of residential units | 18 |
| vi. | minimum unit front yard setback | 25 m. |
| vii. | minimum unit interior side yard setback | 3.5 m. |
| viii. | minimum unit exterior side yard setback | 7.5 m. |
| ix. | minimum rear yard setback | 25 m. |
| x. | maximum lot coverage | 30% |

c) Notwithstanding Subsection 3.6.1, a building or structure maybe erected if a lot line abuts and obtains direct access onto an improved private condominium road.

d) All other zone requirements in subsection 18.2 shall apply.

On land zoned C3(H), C3-6(H) and C3-7(H) the removal of the (H) holding symbol shall be in accordance with the following:

- i) the owner shall enter into a site plan agreement for any development or redevelopment on the property.

PART 19 - CAMPGROUND COMMERCIAL (C4) ZONE

19.1 USES PERMITTED

19.1.1 No person shall hereafter change the use of any building, structure or land or erect and use any building or structure in a Campground Commercial (C4) Zone except for one or more of the following uses:

19.1.1.1 Trailer camp or park

19.1.1.2 Private or public park

19.1.1.3 Ancillary retail uses

19.1.1.4 A dwelling unit accessory to the above-noted permitted uses provided that the setback and yard requirements of the RR2 Zone are met.

19.2 ZONE PROVISIONS

19.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure in a Campground Commercial (C4) Zone, except in conformity with the following zone provisions:

19.2.1.1 Lot Area (min.) 8000 sq. m

19.2.1.2 Lot Frontage (min.) 60 m

19.2.1.3 Yard Requirements (min.)
(a) front 25 m
(b) interior side 4.5 m
(c) exterior side 25 m
(d) rear 4.5 m

19.2.1.4 Lot Coverage (max.) 30 %

19.2.1.5 Building Height (max.) 11 m

19.2.1.6 Gross Floor Area (min.)
(a) residential unit 93 sq. m
(b) all other uses no minimum

19.2.1.7 Density (max.)
(a) residential 1 d.u. per lot
(b) camping lots 20 per ha

- 19.2.1.8 Ancillary Retail
(a) Gross Floor Area (max.) 1 sq. m per camping lot or 50 sq. m whichever is greater.
- 19.2.1.9 Landscaped Open Space 25 %
- 19.2.1.10 Minimum Water Setback 15 m
- 19.2.1.11 Camping lot Requirements
- | | |
|--|-----------|
| (a) area (min) | 200 sq. m |
| (b) frontage (min) | 10 m |
| (c) depth (min) | 15 m |
| (d) front yard (min) | 5 m |
| (e) side yard (min) | 1.5 m |
| (f) rear yard | |
| i) with window in the rear facing wall | 3 m |
| ii) with no window in the rear facing wall | 2 m |
| (g) coverage (max) | 30 % |
- 19.2.1.12 Accessory Structures per camping lot (max.) 1
- 19.2.1.13 Size of accessory structure on camping lot (max.) 10 sq. m
- 19.2.1.14 A premanufactured enclosed structure may be added to a travel trailer, park model trailer or camper trailer provided it is no wider than, and does not extend beyond the end walls of, the original trailer or camper unit and the floor area does not exceed 30 square metres.
- 19.2.1.15 Travel trailers, park model trailers, camper trailers or truck campers shall only be occupied and used on a seasonal basis between May 1st and Oct 31st inclusive of the same calendar year.
- 19.2.1.16 Notwithstanding clause 19.2.1.3 (a), on an existing camping lot in an existing trailer park the minimum setback from a public road allowance shall be the existing setback or 3.5 metres whichever is greater.

19.3 CAMPGROUND COMMERCIAL EXCEPTION ZONES

19.3.1 CAMPGROUND COMMERCIAL EXCEPTION ONE (C4-1) ZONE

- 19.3.1.1 Notwithstanding subsection 19.1.1, land zoned "C4-1" may also be used for a cottage establishment.

PART 20 - RESTRICTED INDUSTRIAL (M1) ZONE

20.1 USES PERMITTED

20.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Restricted Industrial (M1) Zone, except for the following uses:

20.1.1.1 Light industry or dry-light industry which may include such uses as:

- (a) custom workshop
- (b) factory outlet
- (c) home improvement supply outlet
- (d) industrial mall
- (e) laundry or dry cleaning establishment
- (f) light manufacturing and assembly plants
- (g) printing establishment
- (h) warehousing

20.1.1.2 Dry-land marina

20.1.1.3 Motor vehicle parts, sales and service establishment

20.1.1.4 Public garage

20.1.1.5 Business or professional office accessory to a permitted use

20.2 ZONE PROVISIONS

20.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a Restricted Industrial (M1) Zone, except in conformity with the following zone provisions:

20.2.1.1 Lot Area (min.) 4000 sq. m

20.2.1.2 Lot Frontage (min.) 30 m

20.2.1.3 Yard Requirements (min.)

- (a) front 15 m
- (b) interior side - 10 m or 3 m if abutting a lot in an industrial or commercial zone classification
- (c) exterior side 10 m
- (d) rear 10 m

20.2.1.4 Lot Coverage (max.) 40 %

20.2.1.5 Building Height (max.) 11 m

- 20.2.1.6 Gross Floor Area no minimum
- 20.2.1.7 Landscaped Open Space (min.) 10 %
- 20.2.1.8 Outside storage not permitted

20.3 RESTRICTED INDUSTRIAL EXCEPTION ZONES

20.3.1 RESTRICTED INDUSTRIAL EXCEPTION ONE (M1-1) ZONE

20.3.1.1 Notwithstanding subsection 20.1.1 land zoned "M1-1" may only be used for a boat and furniture repair business and one dwelling unit with a minimum gross floor area of 93 square metres.

20.3.2 RESTRICTED INDUSTRIAL EXCEPTION TWO (M1-2) ZONE

20.3.2.1 Notwithstanding subsection 20.1.1 land zoned "M1-2" may only be used for light manufacturing or assembly plant.

20.3.3 RESTRICTED INDUSTRIAL EXCEPTION THREE (M1-3) ZONE

20.3.3.1 Notwithstanding subsection 20.1.1 land zoned "M1-3" may only be used for an equipment and machinery repair and maintenance shop and storage establishment contained within a wholly enclosed building.

20.3.4 RESTRICTED INDUSTRIAL EXCEPTION FOUR (M1-4) ZONE

20.3.4.1 Notwithstanding subsection 20.1.1 land zoned "M1-4" may only be used for the following uses conducted within a wholly enclosed building.

- (a) motor vehicle engine and body repair shop
- (b) machine or welding shop
- (c) boat and marine sales and repair

20.3.4.2 Notwithstanding subsection 3.10.2 land zoned "M1-4" shall have a landscaped buffer consisting of existing trees and vegetation or a planting of coniferous trees having a minimum height of 2 metres.

20.3.5 RESTRICTED INDUSTRIAL EXCEPTION FIVE (M1-5) ZONE

20.3.5.1 Notwithstanding subsection 20.1.1 land zoned "M1-5" may only be used for the following uses:

- (a) one single detached dwelling
- (b) a custom woodworking shop and materials storage in a wholly enclosed building;

- (c) a retail sales and showroom area for the sale of products manufactured or assembled in the woodworking shop and accessories.

20.3.5.2 Notwithstanding articles 20.2.1.1, 20.2.1.2, 20.2.1.4 and 20.2.1.6 land zoned "M1-5" shall be subject to the following zone provisions:

- (a) lot area (min.) 2.2 ha
- (b) lot frontage (min.) 100 m
- (c) lot coverage (max.) 5 %
- (d) retail sales and showroom G.F.A (max.) 250 sq.m
- (e) woodworking shop and storage G.F.A.(max.) 400 sq.m
- (f) gross floor area per dwelling (min.) 93 sq.m

20.3.6 RESTRICTED INDUSTRIAL EXCEPTION SIX (M1-6) ZONE

20.3.6.1 Notwithstanding subsection 20.1.1 land zoned "M1-6" may only be used for the following uses conducted within a wholly enclosed building:

- (a) repair and service of small engines, powered equipment, snowmobiles, lawn and garden equipment, farm machinery and boats not exceeding 4 metres in length,
- (b) retail sale of small engines, powered equipment, snowmobiles and lawn and garden equipment.

20.3.6.2 Notwithstanding subsection 3.10.2 and articles 20.2.1.6 and 20.2.1.9 land zoned "M1-6" shall be subject to the following zone provisions:

- (a) the floor area devoted to retail sales shall not exceed 25% of the gross floor area of the building
- (b) outside storage of equipment awaiting repair or service shall be in the rear yard only
- (c) outside storage areas shall be screened from the public street by a landscaped buffer or fencing

20.3.7 RESTRICTED INDUSTRIAL EXCEPTION SEVEN (M1-7) ZONE

20.3.7.1 Notwithstanding subsection 20.1.1 land zoned "M1-7" may only be used for wholly enclosed boat storage and one single detached dwelling.

20.3.7.2 Notwithstanding subsection 3.10.2 and articles 20.2.1.3 the land zoned "M1-7" shall be subject to the following zone provisions.

- (a) front yard (min.) 60 m

- (b) interior side yard (min.) 7 m
- (c) rear yard (min.) 180 m
- (d) landscaping shall be provided in all yards.
- (e) max lot coverage for boat storage 940 sq. m
- (f) gross floor area per dwelling (min.) 93 sq.m

20.3.8 RESTRICTED INDUSTRIAL EXCEPTION EIGHT (M1-8) ZONE

20.3.8.1 Notwithstanding subsection 20.1.1 land zoned "M1-8" may only be used for boat or marine supply, storage, repair and related sales.

20.3.8.2 Notwithstanding articles 20.1.1.1 and 20.1.1.4 land zoned "M1-8" shall be subject to the following zone provisions:

- (a) lot area (min.) 8000 sq. m
- (b) lot coverage (max.) 50 %

20.3.9 RESTRICTED INDUSTRIAL EXCEPTION NINE (M1-9) ZONE

20.3.9.1 Notwithstanding subsection 20.1.1, or article 20.2.1.8, land zoned M1-9 may only be used for the following uses within a wholly enclosed building:

- (a) furniture manufacturing
- (b) factory outlet
- (c) home improvement supply outlet
- (d) warehousing
- (e) dry-land marina
- (f) motor vehicle parts, sales and service establishment
- (g) public garage
- (h) business or professional office accessory to a permitted use
- (i) the only outdoor storage permitted shall be one storage and display area for watercraft accessory to a dry-land marina provided said storage area is wholly enclosed with a fence not less than 2 metres in height, is visually screened from adjacent residential lots and encompasses not more than 30 % of the lot.
(B/L 64-00)

PART 21 - GENERAL INDUSTRIAL (M2) ZONE

21.1 USES PERMITTED

21.1.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a General Industrial (M2) Zone, except for the following uses:

21.1.1.1 All uses permitted in a Restricted Industrial (M1) Zone

21.1.1.2 Medium industry which may include such uses as:

- (a) agricultural produce storage facility
- (b) bulk fuel storage
- (c) building supply and equipment depot and sales
- (d) contractor's yard
- (e) concrete mixing plant
- (f) farm implement sales and service
- (g) feed mills
- (h) food processing plant
- (i) machine or welding shop
- (j) manufacturing involving plastics, wood, fiberglass or sheet metal
- (k) motor vehicle body repair shop
- (l) seed cleaning plant
- (m) truck, transport or transportation depot
- (n) works depots or yards

21.1.1.3 Outside storage accessory to a permitted use

21.2 ZONE PROVISIONS

21.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure, in a General Industrial (M2) Zone, except in conformity with the following zone provisions:

21.2.1.1 Lot Area (min.) 4000 sq. m

21.2.1.2 Lot Frontage (min.) 30 m

21.2.1.3 Yard Requirements (min.)

- (a) front 15 m
- (b) interior side - 30 m or 3 m if abutting a lot in an industrial or commercial zone classification
- (c) exterior side 10 m
- (d) rear 10 m

21.2.1.4 Lot Coverage (max.) 50 %

- 21.2.1.5 Building Height (max.) 11 m
- 21.2.1.6 Gross Floor Area no minimum
- 21.2.1.7 Landscaped Open Space (min.) 10 %
- 21.2.1.8 Outside storage accessory to a permitted use, shall be permitted within a fenced, interior side or rear yard only, shall not be permitted within 30 metres of a lot line and the lot coverage of all buildings and outside storage combined shall not exceed 60%. Where the lot abuts a lot in an industrial or commercial zone classification the lot line setback may be reduced to 3 metres.
- 21.3 GENERAL INDUSTRIAL (M2) EXCEPTION ZONES
- 21.3.1 GENERAL INDUSTRIAL EXCEPTION ONE (M2-1) ZONE
- 21.3.1.1 Notwithstanding subsection 21.1.1 land zoned "M2-1" may only be used for a farm and heavy equipment repair and service shop and one dwelling unit.
- 21.3.1.2 Notwithstanding articles 21.2.1.3 and 21.2.1.9 land zoned "M2-1" shall be subject to the following zone provisions:
- (a) outside storage of farm or heavy equipment or materials shall not be permitted in the front yard and shall have a rear and interior side yard of 11 metres and 3 metres respectively.
 - (b) gross floor area per dwelling (min.) 93 sq.m
- (NOTE: "(a) front yard (min.)183 m" - deleted by By-Law 2004-39)
- 21.3.2 GENERAL INDUSTRIAL EXCEPTION TWO (M2-2) ZONE
- 21.3.2.1 Notwithstanding subsection 21.1.1 land zoned "M2-2" may only be used for a well drilling business.
- 21.3.3 GENERAL INDUSTRIAL EXCEPTION THREE (M2-3) ZONE
- 21.3.3.1 Notwithstanding subsection 21.1.1 land zoned "M2-3" may only be used for a scrap or salvage yard.
- 21.3.3.2 Notwithstanding subsection 3.10.2 land zoned "M2-3" shall have a landscaped buffer or opaque fence with a minimum height of 2 metres located around the perimeter of the land being used.

21.3.4 GENERAL INDUSTRIAL EXCEPTION FOUR (M2-4) ZONE

21.3.4.1 Notwithstanding subsection 21.1.1, land zoned "M2-4" may also be used for a recycling depot.

PART 22 - EXTRACTIVE INDUSTRIAL (M3) ZONE

22.1 USES PERMITTED

22.1.1 No person shall hereafter change the use of any building, structure or land or erect and use any building or structure in an Extractive Industrial (M3) Zone, except for the following use:

22.1.1.1 Sand and gravel pit

22.2 ZONE PROVISIONS

22.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any structure or building except in conformity with the following requirements:

22.2.1.1 Lot Area (min.) 10 ha

22.2.1.2 Lot Frontage (min.) 180 m

22.2.1.3 Yard Requirements (min.)

- (a) front 30 m
- (b) interior side 15 m
- (c) exterior side 30 m
- (d) rear 15 m
- (e) setback from a residential dwelling unit on a separate lot 90 m

22.3 EXTRACTIVE INDUSTRIAL EXCEPTION ZONES

22.3.1 EXTRACTIVE INDUSTRIAL EXCEPTION ONE (M3-1) ZONE

22.3.1.1 Notwithstanding subsection 22.1.1 land zoned "M3-1" may only be used for a sand and gravel pit and associated aggregate crushing, screening and blending operations.

22.3.1.2 The provisions of articles 22.2.1.1 and 22.2.1.2 shall not apply to land zoned "M3-1".

22.3.1.3 Notwithstanding subsection 22.2.1 land zoned "M3-1" shall also be subject to the following zone provisions.

- (a) Blending operations shall only be permitted within an area extending 200 metres north from the south lot line and 350 metres east from the west lot line of the property.
- (b) A minimum vertical separation of 2 metres shall be provided between aggregate extraction or processing operations and the highest elevation of the groundwater table as it is found at any given point on the site.

- (c) no permitted aggregate extraction activities shall occur within 250 metres of the northeast corner of the lot prior to August 15, 2011. Thereafter, permitted aggregate activities of extraction, crushing and screening may occur within 250 metres of the northeast corner except during the period of May 15 to August 15 in any given year.

22.3.2 EXTRACTIVE INDUSTRIAL EXCEPTION TWO (M3-2) ZONE

- 22.3.2.1 Notwithstanding subsection 21.1.1 and the definition of accessory use, on land zoned "M3-2" accessory uses shall be limited to equipment or plant associated with excavation, moving, screening, crushing, blending, mixing, stockpiling, weighing and haulage of on-site granular material. An asphalt plant or a concrete batching plant shall not be permitted as an accessory use.

22.3.3 EXTRACTIVE INDUSTRIAL EXCEPTION THREE (M3-3) ZONE

- 22.3.3.1 Notwithstanding subsection 21.1.1, land zoned "M3-3" may also be used for an asphalt plant, a concrete batching plant and aggregate recycling.

22.3.4 EXTRACTIVE INDUSTRIAL EXCEPTION FOUR (M3-4) ZONE

- 22.3.4.1 Notwithstanding subsection 22.1.1, land zoned "M3-4" may also be used for Agricultural uses and a single detached dwelling which shall be subject to the provisions of Section 8.2.
- 22.3.4.2 Notwithstanding subsection 22.2.1, on land zoned "M3-4" no excavation setback shall be required where the "M3-4" zone abuts a separate lot zoned and licenced for a sand and gravel pit.
- 22.3.4.3 A minimum vertical separation of 1.5 metres shall be maintained between aggregate extraction and processing operations and the highest elevation of the groundwater table as it is found at any given point within the "M3-4" zone.

22.3.5 EXTRACTIVE INDUSTRIAL EXCEPTION FIVE (M3-5) ZONE

- 22.3.5.1 Not withstanding subsection 22.1.1., land zoned "M3-5" may also be used for Agricultural uses which shall be subject to the provisions of Section 8.2.
- 22.3.5.2 Notwithstanding subsection 22.2.1 on land zoned "M3-5" no excavation setback shall be required where the "M3-5" zone

abuts a separate lot zoned and licensed for a sand and gravel pit.

- 22.3.5.3 A minimum vertical separation of 1.5 metres shall be maintained between aggregate extraction and processing operations and the highest elevation of the groundwater table as it is found at any given point within the "M3-5" zone.

By-Law 2010-025

PART 23 - DISPOSAL INDUSTRIAL (M4) ZONE

23.1 USES PERMITTED

23.1.1 No person shall hereafter change the use of any building, structure or land or erect and use any building or structure in an Disposal Industrial (M4) Zone, except for one of the following uses:

23.1.1.1 A sanitary landfill site

23.1.1.2 A waste transfer station

23.2 ZONE PROVISIONS

23.2.1 No person shall hereafter change the use of any building, structure or land or erect or use any building or structure in a Disposal Industrial (M4) Zone except in conformity with the following zone provisions:

23.2.1.1 Lot Area (min.)

| | |
|-------------------|--------|
| (a) landfill | 10 ha |
| (b) transfer site | 1.0 ha |

23.2.1.2 Lot Frontage (min.)

| | |
|-------------------|-------|
| (a) landfill | 150 m |
| (b) transfer site | 60 m |

23.2.1.3 Yard Requirements (min.)

| | |
|----------------------------------|------|
| (a) front yard | 30 m |
| (b) interior side yard | 30 m |
| (c) exterior side yard | 30 m |
| (d) rear yard | 30 m |
| (e) for transfer site, all yards | 10 m |

23.2.1.4 All permitted uses shall be enclosed by an opaque fence a minimum of 2.0 metres in height or a landscaped buffer at least 6 metres wide with an unpierced hedgerow of evergreens at least 2.0 metres in height.

23.3 DISPOSAL INDUSTRIAL EXCEPTION ZONES

"Reserved"

PART 24 - INTERPRETATION

24.1 SCOPE

24.1.1 In their interpretation and application, the provisions of this By-law shall be held to be the minimum requirement adopted for the promotion of public health, safety, convenience and general welfare.

24.2 SYMBOLS

24.2.1 The symbols used on the schedule attached hereto refer to the appropriate zones and zone exceptions established by this By-law.

24.3 DEFINED

24.3.1 The extent and boundaries of all zones are shown on the Schedules attached hereto, and all such zones are hereby defined as areas to which the provisions of this By-law shall respectively apply.

24.4 INTERPRETATION OF ZONE BOUNDARIES

24.4.1 Where the boundaries of any zone, as shown on the attached schedule are uncertain, the following provisions shall apply:

- (a) Where a zone boundary is indicated as following a street or lane, the boundary shall be the centre line of such street or lane.
- (b) Where a zone boundary is indicated as approximately following lot lines shown on a registered plan of subdivision or lots registered in the appropriate Registry Office or Land Titles Office, the boundary shall follow such lot lines.
- (c) Where a street, lane, railroad or railway right-of-way, or watercourse is included on the zoning map, they shall, unless otherwise indicated, be included in the zone of the adjoining property on either side thereof.
- (d) Where a street, lane, railroad or railway right-of-way, electrical transmission line right-of-way, or watercourse is included on the zoning maps and serves as a boundary between two or more different zones, a line midway on such street, lane, right-of-way or watercourse and extending in the general direction of the long division thereof shall

be considered the boundary between zones unless specifically indicated otherwise.

- (e) Where a zone boundary is indicated as following the limits of the Municipality, the limits shall be the boundary.
- (f) Where none of the above provisions apply, the said zone boundary shall be scaled from the attached Schedules at the scale indicated.

24.5 CERTAIN WORDS

24.5.1 In this By-law words used in the present tense include future; words in the singular number include the plural; words in the plural include the singular number; and the word "used" includes "arranged, designed, or intended to be used"; the word "shall" is mandatory and not directory.

24.6 MEASUREMENT

24.6.1 The Metric system of measurement shall be the only standard to be applied in this By-law. The non-metric equivalents are included as Appendix "A" as a general guide for reference purposes only and does not form part of this By-law.

24.7 ABBREVIATIONS

24.7.1 The following abbreviations, where used in this By-law, shall have the same meaning as if the word were printed in full:

| | | |
|----------|---|--------------------------------|
| d.u. | - | dwelling unit |
| ha | - | hectare |
| sq. m | - | square metre |
| m | - | metre |
| min. | - | minimum |
| max. | - | maximum |
| g.f.a. | - | gross floor area |
| g.l.f.a. | - | gross leaseable floor area |
| C.G.S. | - | Canadian Geodetic Survey Datum |

24.8 COMPLIANCE WITH OTHER LAWS

24.8.1 This By-law shall not be effective to reduce or mitigate any restrictions lawfully imposed by a Federal, Provincial, County or Governmental Authority having jurisdiction to impose such restrictions.

PART 25 - ADMINISTRATION AND VALIDITY

25.1 ENFORCEMENT

25.1.1 No permit for the use of land or for the erection or use of any building or structure and no certificate of occupancy or approval of application for any municipal license within the jurisdiction of the Council shall be issued or given where the proposed building, structure or use is in violation of any provisions of this By-law.

25.2 INSPECTION OF PREMISES

25.2.1 Where a By-law Enforcement Officer, believes, on reasonable grounds, that this By-law is being contravened, the By-law Enforcement Officer or any person acting under his or her instructions may, upon producing proper identification, enter and inspect any property on or in respect of which he or she believes the contravention is occurring.

25.2.2 Notwithstanding Clause 25.2.1, except under the authority of a Search Warrant issued under Section 49(3) of the Planning Act, a By-law Enforcement Officer or any person acting under his or her instructions shall not enter any room or place actually used as a dwelling without requesting and obtaining the consent of the occupier, first having informed the occupier that the right of entry may be refused and entry made only under the authority of a Search Warrant.

25.3 CONTINUATION OF EXISTING REGULATIONS

25.3.1 All By-laws in force within the Municipality prohibiting or regulating the use of land or buildings or structures shall be and the same are hereby amended insofar as it is necessary to give effect to the provisions of this By-law and the provisions of this By-law shall govern, provided however, where this By-law does not apply, existing Municipal By-laws shall remain in full force and effect.

25.4 VIOLATION PENALTY

25.4.1 Pursuant to Section 67 of the Planning Act, R.S.O 1990, every person or persons who contravenes any of the provisions of this By-law is guilty of an offence, and on conviction is liable;

25.4.1.1 on a first conviction to a fine of not more than \$20,000.00 and;

25.4.1.2 on a subsequent conviction to a fine of not more than \$10,000.00 for each day or part thereof upon which the

contravention has continued after the day on which such person was first convicted.

25.4.2 Pursuant to Section 67 of the Planning Act, R.S.O. 1990, where a corporation is convicted of the contravention of any of the provisions of this By-law, the maximum penalty that may be imposed is;

25.4.2.1 on a first conviction a fine of not more than \$50,000.00 and;

25.4.2.2 on a subsequent conviction a fine of not more than \$25,000.00 for each day or part thereof upon which the contravention has continued after the day on which the corporation was first convicted.

25.4.3 Each day that the person, persons or corporation contravenes any provisions of this By-law, shall constitute a separate offence.

25.4.4 Where a conviction is entered in respect of any contravention of this By-law, in addition to any other remedy or any penalty provided by this By-law, the court in which the conviction has been entered, and any court of competent jurisdiction thereafter, may make an order prohibiting the continuation or repetition of the offence by the person or corporation.

25.5 REPEAL OF EXISTING ZONING BY-LAWS

Restricted Area By-law, 3062-77, 09-78 and 02-79, 04-88 and 16-88, all as amended, of the Corporation of the TOWNSHIP OF FENELON are hereby repealed.

25.6 VALIDITY

25.6.1 Should any section, clause or provision of this By-law be declared by a court of competent jurisdiction to be invalid, the same shall not effect the validity of this By-law as a whole or any part thereof, other than the part so declared to be invalid.

25.6.2 This By-law shall take effect from the date of passing thereof, subject to the provisions of Section 34 of the Planning Act.

READ a first time this 20th day of MARCH, 1995

READ a second time this 20th day of MARCH, 1995

READ a third time and passed this 20th day of MARCH, 1995

"DAVID MURRAY"

Reeve

"NANCY WRIGHT-LAKING"

Clerk

MINIMUM DISTANCE SEPARATION (MDS)
CALCULATION SHEET FOR NON-AGRICULTURAL USES

USES: To determine the required minimum distance separation (MDS) for non-agricultural uses establishing in proximity to livestock facilities.

The following information is to be completed as it relates to livestock operations within 120 metres of the proposed non-agricultural use.

APPLICANT'S NAME: _____ TELEPHONE: _____
 ADDRESS: _____ FAX: _____
 LOCATION - TOWNSHIP: _____ LOT: _____ CON.: _____
 FILE #: _____ DATE: _____ EVALUATOR: _____

ASSESSMENT OF THE LIVESTOCK FACILITY

STEP 1 - TOTAL LIVESTOCK UNITS

To calculate the Total Livestock Units, complete the table below based on the information in Table 1.

| COLUMN 1 | COLUMN 2 | COLUMN 3 | COLUMN 4 | COLUMN 5 |
|-----------------------------|----------------------|--|---|--|
| Type of Livestock | Animal Group Table 1 | Housing Capacity of Livestock Facility | No. of Animals / Livestock Unit Table 1 | No. of Livestock Units Column 3 / Column 4 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| (A) = Total Livestock Units | | | | (A) |

If there are more than 300 livestock units, reference must be made to the full set of tables available from any O.M.A.F.A. office.

STEP 2 - LAND BASE ASSESSMENT (B)

No. of tillable ha on site ___ x 5 = ____ (B) Potential Livestock Units (Maximum of (B) is 150 Livestock Units)

Enter the Greater of (A) Total Livestock Units, from Step 1 or (B) Land Base Assessment, from Step 2: _____ (Use this figure to enter Column 1 of Table 2)

Minimum Distance Separation req'd from Livestock Facility = _____ m.
 (from Table 2)

Actual distance as estimated from livestock facility = _____ m.

Minimum Distance Separation required from Manure Storage = _____ m.
 (from Table 3)

Actual distance as estimated from manure storage = _____ m.

STEP 4 - CONCLUSION

if the actual distance separation is less than the required minimum distance separation the application DOES NOT COMPLY with the By-law.

This application MEETS () DOES NOT MEET () the required MDS for the livestock facility.

TABLE 1 ANIMAL GROUPS

| ANIMAL GROUP 1 | ANIMAL GROUP 2 | ANIMAL GROUP 3 | ANIMAL GROUP 4 | ANIMALGROUP 5 |
|--|--|---|---|--|
| 1 Livestock Unit equals | 1 Livestock Unit equals | 1 Livestock Unit equals | 1 Livestock Unit equals | 1 Livestock Unit equals |
| 200 Chicken Broilers 1 Dairy Cow ^{1,2} (tie stall) 1 Horse ³ | 4 Adult Sheep ³ 1 Beef Cow confinement 2 Heifers confinement 10 Feeder Lambs 100 Ducks 5 Emu 3 Ostrich 500 Pullets 50 Turkeys (>10 kg) 75 Turkeys (5-10 kg) 100 Turkeys(<5kg) | 1 Beef Cow ¹ yard/Barn 2 Beef Feeder Yard/Barn 1 Dairy Cow ^{1,2} (Free stall) 2 Dairy Heifers yard/Barn 4 Adult Goats ³ 10 Feeder Goats 40 Adult Rabbits ⁴ 3 Red Veal <300 kg 125 Chicken Breeder Layers 75 Turkey Breeder Layers | 50 Adult Mink ⁴ 10 Adult Fox ³ 125 Caged Layers | 4 Feeder Hogs 4 Sows/Boars ⁵ 20 Weaners 4-30 kg 6 White Veal |

¹ Includes calf to 150 kg, ² Multiply the number of milking cows by 1.5 to account for dry cows, heifers and calves on the same farm,

³ Includes offspring until weaned, ⁴ Includes offspring to market size, ⁵ Includes offspring to 4 kg.

Select Animal group 1, 2, 3, 4 or 5, depending on type of animals on farm. If there are animals from different groups, select the highest group number. The group number is used when referring to Table 2.

STEP 4: TABLE 2. MINIMUM DISTANCE SEPARATION FROM LIVESTOCK FACILITY

Read across appropriate line from Column 1 to respective Animal Group and Land Use Type. This number is the Minimum Distance Separation requirement in metres from a livestock facility.

| COLUMN 1 | TYPE "A" LAND USE | | | | | TYPE "B" LAND USE | | | | |
|---|--|-----|-----|-----|-----|--|-----|-----|-----|-----|
| | To permit: | | | | | To permit: | | | | |
| | <ul style="list-style-type: none"> Up to 3 rural residential lots, either by consent or by plan of subdivision the severance of an existing dwelling passive recreational the building of a dwelling on an existing lot of record agriculturally related commercial industrial | | | | | <ul style="list-style-type: none"> residential subdivision active recreational institutional commercial urban expansion multiple residential or result in a Rural Cluster | | | | |
| Greater of Livestock Units (a) or Potential Livestock Units (b) | Animal Group | | | | | Animal Group | | | | |
| | (1) | (2) | (3) | (4) | (5) | (1) | (2) | (3) | (4) | (5) |
| 1-5 | 39 | 42 | 48 | 60 | 85 | 73 | 78 | 90 | 112 | 160 |
| 10 | 55 | 60 | 68 | 85 | 98 | 104 | 112 | 128 | 160 | 183 |
| 15 | 65 | 70 | 80 | 100 | 115 | 122 | 132 | 151 | 188 | 215 |
| 20 | 72 | 78 | 89 | 111 | 127 | 135 | 146 | 167 | 208 | 238 |
| 25 | 78 | 84 | 95 | 119 | 136 | 146 | 157 | 179 | 224 | 256 |
| 30 | 82 | 88 | 101 | 126 | 144 | 154 | 166 | 189 | 237 | 271 |
| 35 | 86 | 92 | 106 | 132 | 151 | 161 | 173 | 198 | 247 | 283 |
| 40 | 89 | 96 | 110 | 137 | 157 | 167 | 180 | 206 | 257 | 294 |
| 45 | 92 | 99 | 113 | 142 | 162 | 173 | 186 | 213 | 266 | 304 |
| 50 | 95 | 102 | 117 | 146 | 167 | 178 | 192 | 219 | 274 | 313 |
| 55 | 98 | 105 | 120 | 150 | 172 | 183 | 197 | 225 | 282 | 322 |
| 60 | 100 | 108 | 123 | 154 | 176 | 188 | 202 | 231 | 289 | 330 |
| 65 | 102 | 110 | 126 | 158 | 180 | 192 | 207 | 236 | 295 | 338 |
| 70 | 105 | 113 | 129 | 161 | 184 | 196 | 211 | 241 | 302 | 345 |
| 75 | 107 | 115 | 131 | 164 | 188 | 200 | 215 | 246 | 308 | 352 |
| 80 | 109 | 117 | 134 | 167 | 191 | 204 | 219 | 251 | 313 | 358 |
| 85 | 111 | 119 | 136 | 170 | 194 | 207 | 223 | 255 | 319 | 364 |
| 90 | 112 | 121 | 138 | 173 | 198 | 211 | 227 | 259 | 324 | 370 |
| 95 | 114 | 123 | 140 | 176 | 201 | 214 | 230 | 263 | 329 | 376 |
| 100 | 116 | 125 | 143 | 178 | 204 | 217 | 234 | 267 | 334 | 382 |
| 110 | 119 | 128 | 146 | 183 | 209 | 223 | 240 | 275 | 343 | 392 |
| 120 | 122 | 131 | 150 | 188 | 214 | 229 | 246 | 281 | 352 | 402 |
| 130 | 125 | 134 | 154 | 192 | 219 | 234 | 252 | 288 | 360 | 411 |
| 140 | 127 | 137 | 157 | 196 | 224 | 239 | 257 | 294 | 368 | 420 |
| 150 | 130 | 140 | 160 | 200 | 228 | 244 | 262 | 300 | 375 | 428 |
| 160 | 133 | 143 | 164 | 205 | 234 | 250 | 269 | 307 | 384 | 439 |
| 170 | 136 | 147 | 168 | 210 | 240 | 256 | 275 | 314 | 393 | 449 |
| 180 | 139 | 150 | 172 | 214 | 245 | 262 | 282 | 322 | 402 | 460 |
| 190 | 143 | 154 | 175 | 219 | 251 | 268 | 288 | 329 | 411 | 470 |
| 200 | 146 | 157 | 179 | 224 | 256 | 273 | 294 | 336 | 420 | 480 |
| 210 | 149 | 160 | 183 | 229 | 262 | 279 | 301 | 344 | 429 | 491 |
| 220 | 152 | 164 | 187 | 234 | 267 | 285 | 307 | 351 | 439 | 501 |
| 230 | 155 | 167 | 191 | 239 | 273 | 291 | 313 | 358 | 448 | 512 |
| 240 | 158 | 171 | 195 | 244 | 278 | 297 | 320 | 365 | 457 | 522 |
| 250 | 162 | 174 | 199 | 248 | 284 | 303 | 326 | 373 | 466 | 532 |
| 260 | 165 | 177 | 203 | 253 | 290 | 309 | 332 | 380 | 475 | 543 |
| 270 | 168 | 181 | 207 | 258 | 295 | 315 | 339 | 387 | 484 | 553 |
| 280 | 171 | 184 | 210 | 263 | 301 | 321 | 345 | 395 | 493 | 564 |
| 290 | 174 | 188 | 214 | 268 | 306 | 327 | 352 | 402 | 502 | 574 |
| 300 | 177 | 191 | 218 | 273 | 312 | 333 | 358 | 409 | 511 | 584 |

TABLE 3. MINIMUM DIDSTANCE SEPARATION FROM MANURE STORAGE

The following table is used to calculate MDS requirements from manure storages associated with livestock facilities.

Using the resulting MDS distance from Table 2, read across the appropriate line to Column 1, 2, 3 or 4. Select the distance under the appropriate Land Use Type.

This is the MINIMUM DISTANCE SEPARATION REQUIREMENT from the manure storage of a livestock facility for the establishment of a non-farm use.

Column 1:Roofed or covered manure storage. Includes covered concrete and steel tanks, storages under fully slatted floors, in-barn solid manure packs, and roofed manure storages.

Column 2:Open solid manure pile on concrete slab including any associated runoff control and storage.

Column 3:Open concrete or steel tank, silo or yard runoff storage.

Column 4:Open, earth-sided storage OR earth-sided storage with concrete floor.

MANURE STORAGE DISTANCE

| Distance for Livestock Facility from Table 2 (Step 3) | Column 1 | | Column 2 | | Column 3 | | Column 4 | |
|---|-------------------|-------------------|--------------------|-------------------|---|-------------------|------------------------|-------------------|
| | Covered Tank | | Open Solid Storage | | Open Liquid Tank Silo and Yard Runoff Storage | | Earthen Manure Storage | |
| | Type "A" Land Use | Type "B" Land Use | Type "A" Land Use | Type "B" Land Use | Type "A" Land Use | Type "B" Land Use | Type "A" Land Use | Type "B" Land Use |
| 40 | 40 | - | 55 | - | 119 | - | 324 | - |
| 45 | 45 | - | 60 | - | 123 | - | 326 | - |
| 50 | 50 | - | 65 | - | 127 | - | 328 | - |
| 55 | 55 | - | 70 | - | 132 | - | 331 | - |
| 60 | 60 | - | 74 | - | 136 | - | 333 | - |
| 65 | 65 | - | 79 | - | 140 | - | 335 | - |
| 70 | 70 | 70 | 84 | 103 | 144 | 241 | 337 | 686 |
| 75 | 75 | 75 | 89 | 107 | 149 | 246 | 339 | 689 |
| 80 | 80 | 80 | 94 | 112 | 153 | 250 | 342 | 691 |
| 85 | 85 | 85 | 99 | 117 | 157 | 254 | 344 | 693 |
| 90 | 90 | 90 | 103 | 122 | 161 | 258 | 346 | 695 |
| 95 | 95 | 95 | 108 | 127 | 165 | 263 | 348 | 698 |
| 100 | 100 | 100 | 113 | 132 | 170 | 267 | 351 | 700 |
| 110 | 110 | 110 | 123 | 141 | 178 | 275 | 355 | 704 |
| 120 | 120 | 120 | 133 | 151 | 187 | 284 | 359 | 709 |
| 130 | 130 | 130 | 142 | 161 | 195 | 292 | 364 | 713 |
| 140 | 440 | 140 | 152 | 171 | 203 | 301 | 368 | 717 |
| 150 | 150 | 150 | 162 | 180 | 212 | 309 | 373 | 722 |
| 160 | 160 | 160 | 172 | 190 | 220 | 318 | 377 | 726 |
| 170 | 170 | 170 | 181 | 200 | 229 | 326 | 382 | 731 |
| 180 | 180 | 180 | 191 | 209 | 237 | 335 | 386 | 735 |
| 190 | 190 | 190 | 201 | 219 | 246 | 343 | 390 | 740 |
| 200 | 200 | 200 | 210 | 229 | 254 | 351 | 395 | 744 |
| 210 | 210 | 210 | 220 | 239 | 263 | 360 | 399 | 749 |
| 220 | 220 | 220 | 230 | 248 | 271 | 368 | 404 | 753 |
| 230 | 230 | 230 | 239 | 258 | 280 | 377 | 408 | 757 |
| 240 | 240 | 240 | 249 | 268 | 288 | 385 | 413 | 762 |
| 260 | 260 | 260 | 268 | 287 | 305 | 402 | 421 | 771 |
| 280 | 280 | 280 | 288 | 307 | 322 | 419 | 430 | 780 |
| 300 | 300 | 300 | 307 | 326 | 339 | 436 | 439 | 788 |
| 320 | 320 | 320 | 327 | 346 | 356 | 453 | 448 | 797 |
| 340 | 340 | 340 | 346 | 365 | 372 | 470 | 457 | 806 |
| 360 | 360 | 360 | 366 | 385 | 389 | 487 | 466 | 815 |
| 380 | 380 | 380 | 385 | 404 | 406 | 504 | 475 | 825 |
| 400 | 400 | 400 | 404 | 423 | 423 | 521 | 483 | 833 |
| 450 | 450 | 450 | 453 | 472 | 465 | 563 | 506 | 855 |
| 500 | 500 | 500 | 501 | 520 | 508 | 605 | 528 | 877 |
| 550 | 550 | 550 | 550 | 569 | 550 | 648 | 550 | 899 |

Factor C: Percentage increase. (Step 2) (Table 3) FACTOR C: [_____]

Factor D: Type of manure system (Solid=0.7, Liquid=0.8) FACTOR D: [_____]

Step 4

Building Base Distance (From Step 3 - A X B X C X D) Base Distance F: [_____]
(insert below)

Step 5

Manure Storage Base Distance (F from Step 4) Table 4 Base Distance S: [_____]
(insert below)

Step 6

MINIMUM DISTANCE SEPARATION SUMMARY:

BUILDING: 'F' [] MANURE STORAGE 'S' []

| Column 1 | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 |
|--|----------|------------------------------------|---------------------|------------------------------------|---------------------|
| Neighbouring Land use or boundary | Factor | Distance "F" Step 4 x Column 2 (m) | Actual Distance (m) | Distance 'S' Step 5 x Column 2 (m) | Actual Distance (m) |
| Nearest Neighbour's Dwelling | 1.0 | | | | |
| Areas Zoned for Agriculturally related Commercial Passive Recreation or Industrial use | 1.0 | | | | |
| Areas Zoned for Residential, Institutional, Active Recreation or Commercial Use | 2.0 | | | | |
| Nearest Side or Rear Lot line | 0.2 | | | | |
| Nearest Exterior Side or Front Lot Line | 0.25 | | | | |

TABLE 1: FACTOR 'A' (Barn Odour Potential)
and Animals per Livestock Unit (based on housing capacity)

| Animals per Livestock Unit | | | | Factor A |
|----------------------------|-----|--------------------------------|-------------------------|----------|
| BEEF | 1 | Beef Cow ¹ | (barn confinement) | 0.7 |
| | 1 | " " | (barn with yard) | 0.8 |
| | 2 | Beef Feeders | (barn confinement) | 0.7 |
| | 2 | Beef Feeders | (barn with yard) | 0.8 |
| CHICKEN | 125 | Caged Layers | (manure stored in barn) | 1.0 |
| | 125 | Caged Layers | (daily manure removal) | 0.8 |
| | 125 | Chicken Breeder Layers | | 0.8 |
| | 200 | Chicken Broilers/Roasters | | 0.65 |
| | 500 | Pullets (replacement layers) | | 0.7 |
| DAIRY | 1 | Milking Cow ^{1,2} | (tie-stall) | 0.65 |
| | 1 | " " | (free-stall) | 0.7 |
| | 2 | Dairy Heifers | (barn confinement) | 0.7 |
| | 2 | " " | (barn with yard) | 0.8 |
| DUCK | 100 | Ducks | | 0.7 |
| EMU | 5 | Emu | | 0.7 |
| FOX | 40 | Adult Fox ⁴ | | 1.1 |
| GOAT | 4 | Adult Goats ³ | | 0.7 |
| | 10 | Feeder Goats (>20 kg) | | 0.7 |
| HORSE | 1 | Horse ³ | | 0.65 |
| MINK | 80 | Adult Mink ⁴ | | 1.1 |
| OSTRICH | 3 | Ostrich | | 0.7 |
| RABBIT | 40 | Adult Rabbits ⁴ | | 0.8 |
| SHEEP | 4 | Adult Sheep ⁵ | | 0.7 |
| | 10 | Feeder Lambs (>20 kg) | | 0.7 |
| SWINE | 5 | Sows/Boars | | 1.0 |
| | 4 | Feeder Hogs (30-120 kg) | | 1.0 |
| | 20 | Weaners (4-30 kg) ⁵ | | 1.0 |
| TURKEY | 50 | Meat Turkeys (>10 kg) | | 0.7 |
| | 75 | Meat Turkeys (5-10 kg) | | 0.7 |
| | 75 | Turkey Breeder Layers | | 0.8 |
| | 100 | Meat Turkeys (<5 kg) | | 0.7 |
| | 500 | Pullets (replacement breeders) | | 0.7 |
| VEAL | 6 | White Veal | | 1.0 |
| | 3 | Red Veal (<300 kg) | | 0.8 |

Notes: For all other animals/poultry use 1 livestock unit per 450 kg housed at one time (A=0.8)

¹ Includes calf to 150 kg.

² A dairy/cow-calf farm usually has milking cows, dry cows, heifers and calves, Multiply the number of milking/nursing cows by 1.5 to account for the followers when they are all kept on the same farm.

³ Includes offspring until weaned

⁴ Includes offspring to market size

⁵ Multiply number of sows by 2.4 to determine the number of weaners.

TABLE 2:

FACTOR 'B'

(Final Livestock Units).

| Livestock Units | Factor B | Livestock Units | Factor B | Livestock Units | Factor B | Livestock Units | Factor B | | | | |
|-----------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|-----|-------|---|------|
| 5 | - | 107 | 95 | - | 313 | 500 | - | 578 | 1600 | - | 821 |
| 6 | - | 119 | 100 | - | 318 | 520 | - | 585 | 1650 | - | 829 |
| 7 | - | 129 | 110 | - | 327 | 540 | - | 592 | 1700 | - | 836 |
| 8 | - | 138 | 120 | - | 335 | 560 | - | 598 | 1750 | - | 844 |
| 9 | - | 145 | 130 | - | 343 | 580 | - | 605 | 1800 | - | 851 |
| 10 | - | 152 | 140 | - | 350 | 600 | - | 611 | 1850 | - | 858 |
| 12 | - | 164 | 150 | - | 357 | 620 | - | 617 | 1900 | - | 865 |
| 14 | - | 175 | 160 | - | 366 | 640 | - | 623 | 1950 | - | 872 |
| 16 | - | 183 | 170 | - | 374 | 660 | - | 629 | 2000 | - | 879 |
| 18 | - | 191 | 180 | - | 383 | 680 | - | 635 | 2100 | - | 892 |
| 20 | - | 198 | 190 | - | 392 | 700 | - | 640 | 2200 | - | 905 |
| 22 | - | 205 | 200 | - | 400 | 720 | - | 646 | 2300 | - | 917 |
| 24 | - | 210 | 210 | - | 409 | 740 | - | 651 | 2400 | - | 929 |
| 26 | - | 216 | 220 | - | 418 | 760 | - | 656 | 2500 | - | 941 |
| 28 | - | 221 | 230 | - | 426 | 780 | - | 661 | 2600 | - | 952 |
| 30 | - | 225 | 240 | - | 435 | 800 | - | 666 | 2700 | - | 963 |
| 32 | - | 230 | 250 | - | 444 | 850 | - | 679 | 2800 | - | 974 |
| 34 | - | 234 | 260 | - | 452 | 900 | - | 690 | 2900 | - | 985 |
| 36 | - | 238 | 270 | - | 461 | 950 | - | 702 | 3000 | - | 995 |
| 38 | - | 241 | 280 | - | 470 | 1000 | - | 713 | 3200 | - | 1015 |
| 40 | - | 245 | 290 | - | 478 | 1050 | - | 723 | 3400 | - | 1034 |
| 45 | - | 253 | 300 | - | 487 | 1100 | - | 733 | 3600 | - | 1053 |
| 50 | - | 261 | 320 | - | 501 | 1150 | - | 743 | 3800 | - | 1071 |
| 55 | - | 268 | 340 | - | 512 | 1200 | - | 753 | 4000 | - | 1088 |
| 60 | - | 275 | 360 | - | 522 | 1250 | - | 762 | 4200 | - | 1105 |
| 65 | - | 281 | 380 | - | 531 | 1300 | - | 771 | 4400 | - | 1121 |
| 70 | - | 287 | 400 | - | 540 | 1350 | - | 780 | 4600 | - | 1136 |
| 75 | - | 293 | 420 | - | 548 | 1400 | - | 789 | 4800 | - | 1152 |
| 80 | - | 298 | 440 | - | 556 | 1450 | - | 797 | 5000 | - | 1166 |
| 85 | - | 304 | 460 | - | 564 | 1500 | - | 805 | 7500 | - | 1326 |
| 90 | - | 309 | 480 | - | 571 | 1550 | - | 813 | 10000 | - | 1455 |

TABLE 3: FACTOR 'C' (Percentage Increase).

| Livestock Units | Factor C | Livestock Units | Factor C | Percentage Increase | Factor C | | | |
|-----------------|----------|-----------------|----------|---------------------|----------|-----|---|------|
| 0-50 | - | 0.70 | 120 | - | 0.86 | 280 | - | 1.03 |
| 55 | - | 0.72 | 130 | - | 0.88 | 300 | - | 1.04 |
| 60 | - | 0.73 | 140 | - | 0.90 | 325 | - | 1.05 |
| 65 | - | 0.75 | 150 | - | 0.91 | 350 | - | 1.06 |
| 70 | - | 0.76 | 160 | - | 0.92 | 375 | - | 1.07 |
| 75 | - | 0.77 | 170 | - | 0.94 | 400 | - | 1.08 |
| 80 | - | 0.78 | 180 | - | 0.95 | 425 | - | 1.09 |
| 85 | - | 0.79 | 190 | - | 0.96 | 450 | - | 1.10 |
| 90 | - | 0.81 | 200 | - | 0.97 | 500 | - | 1.11 |
| 95 | - | 0.82 | 220 | - | 0.99 | 550 | - | 1.12 |
| 100 | - | 0.83 | 240 | - | 1.00 | 650 | - | 1.13 |
| 110 | - | 0.85 | 260 | - | 1.02 | 700 | - | 1.14 |

Note: For new livestock farms or if the % increase is greater than 700 percent, use Factor C=1.14

TABLE 4 SITING DISTANCES FOR MANURE STORAGE (metres).

Column 1: Roofed or covered manure storage. Includes covered concrete and steel tanks, storages under fully slotted floors, in-barn solid manure packs, and roofed manure storages.

Column 2: Open sided manure pile on concrete slab including any associated runoff control and storage.

Column 3: Open concrete or steel tank, silo for liquid manure, milkhouse waste, or yard runoff storage.

Column 4: Open liquid manure earth-sided storage or earth-sided storage with concrete floor.

| Minimum Base Distance 'F' for the Building (m) | Column 1 | Column 2 | Column 3 | Column 4 |
|---|---------------------------------------|----------------------------------|---|--------------------------------------|
| | Covered Tank or Storage (m) | Open Solid Storage (m) | Open Liquid Tank, Silo, Milkhouse Waste and Yard Runoff Storage (m) | Earthen Manure Storage (m) |
| 40 | 40 | 55 | 119 | 324 |
| 45 | 45 | 60 | 123 | 326 |
| 50 | 50 | 65 | 128 | 328 |
| 55 | 55 | 70 | 132 | 331 |
| 60 | 60 | 74 | 136 | 333 |
| 65 | 65 | 79 | 140 | 335 |
| 70 | 70 | 84 | 144 | 337 |
| 75 | 75 | 89 | 149 | 340 |
| 80 | 80 | 94 | 153 | 342 |
| 85 | 85 | 99 | 157 | 344 |
| 90 | 90 | 104 | 161 | 346 |
| 95 | 95 | 108 | 166 | 348 |
| 100 | 100 | 113 | 170 | 351 |
| 105 | 105 | 118 | 174 | 353 |
| 110 | 110 | 123 | 178 | 355 |
| 115 | 115 | 128 | 182 | 357 |
| 120 | 120 | 133 | 187 | 360 |
| 125 | 125 | 138 | 191 | 362 |
| 130 | 130 | 142 | 195 | 364 |
| 135 | 135 | 147 | 199 | 366 |
| 140 | 140 | 152 | 204 | 368 |
| 145 | 145 | 157 | 208 | 371 |
| 150 | 150 | 162 | 212 | 373 |
| 160 | 160 | 172 | 220 | 377 |
| 170 | 170 | 181 | 229 | 382 |
| 180 | 180 | 191 | 237 | 386 |
| 190 | 190 | 201 | 246 | 391 |
| 200 | 200 | 210 | 254 | 395 |
| 210 | 210 | 220 | 263 | 399 |
| 220 | 220 | 230 | 271 | 404 |
| 230 | 230 | 239 | 280 | 408 |
| 240 | 240 | 249 | 288 | 413 |
| 260 | 260 | 269 | 305 | 422 |
| 280 | 280 | 288 | 322 | 430 |
| 300 | 300 | 307 | 339 | 439 |
| 320 | 320 | 327 | 356 | 448 |
| 340 | 340 | 346 | 373 | 457 |
| 360 | 360 | 366 | 389 | 466 |
| 380 | 380 | 385 | 406 | 475 |
| 400 | 400 | 404 | 423 | 484 |
| 420 | 420 | 424 | 440 | 492 |
| 440 | 440 | 443 | 457 | 501 |
| 460 | 460 | 463 | 474 | 510 |
| 480 | 480 | 482 | 491 | 519 |
| 500 | 500 | 502 | 508 | 528 |
| 550 | 550 | 550 | 550 | 550 |

APPENDIX "A" - METRIC CONVERSION

1) Linear Measurements (rounded)

| <u>Metres</u> | | <u>Feet</u> | <u>Metres</u> | | <u>Feet</u> |
|---------------|---|-------------|---------------|---|-------------|
| 0.15 | - | 0.5 | 18.0 | - | 59.0 |
| 0.50 | - | 1.6 | 20.0 | - | 65.6 |
| 0.60 | - | 2.0 | 25.0 | - | 82.0 |
| 0.75 | - | 2.5 | 30.0 | - | 98.4 |
| 1.0 | - | 3.3 | 35.0 | - | 114.9 |
| 1.2 | - | 4.0 | 38.0 | - | 124.7 |
| 1.3 | - | 4.3 | 40.0 | - | 131.2 |
| 1.5 | - | 5.0 | 43.0 | - | 141.1 |
| 1.8 | - | 6.0 | 45.0 | - | 147.6 |
| 2.0 | - | 6.6 | 50.0 | - | 164.0 |
| 2.3 | - | 7.5 | 55.0 | - | 180.5 |
| 2.5 | - | 8.2 | 60.0 | - | 196.9 |
| 3.0 | - | 9.9 | 70.0 | - | 229.7 |
| 3.5 | - | 11.5 | 75.0 | - | 246.1 |
| 4.0 | - | 13.1 | 100.0 | - | 328.1 |
| 4.5 | - | 14.8 | 115.0 | - | 377.3 |
| 5.0 | - | 16.4 | 120.0 | - | 393.7 |
| 5.5 | - | 18.0 | 125.0 | - | 410.1 |
| 6.0 | - | 19.7 | 163.0 | - | 534.8 |
| 6.5 | - | 21.3 | 180.0 | - | 590.6 |
| 7.0 | - | 23.0 | 200.0 | - | 656.2 |
| 7.5 | - | 24.6 | 230.0 | - | 754.6 |
| 8.0 | - | 26.3 | 300.0 | - | 984.3 |
| 9.0 | - | 29.5 | 450.0 | - | 1476.4 |
| 10.0 | - | 32.8 | | | |
| 11.0 | - | 36.0 | | | |
| 11.5 | - | 37.7 | | | |
| 12.0 | - | 39.4 | | | |
| 15.0 | - | 49.2 | | | |
| 17.0 | - | 55.8 | | | |

2) Area Measurements

| <u>Sq Metres</u> | | <u>Sq Feet</u> | <u>Hectares</u> | | <u>Acres</u> |
|------------------|---|----------------|-----------------|---|--------------|
| 35 | - | 376.8 | 1 | - | 2.5 |
| 55 | - | 592.0 | 1.8 | - | 4.5 |
| 65 | - | 699.7 | 2 | - | 4.9 |
| 93 | - | 1001.1 | 4 | - | 9.9 |
| 100 | - | 1076.4 | 5 | - | 12.4 |
| 110 | - | 1184.1 | 18 | - | 44.5 |
| 150 | - | 1614.6 | 25 | - | 61.8 |
| 200 | - | 2152.9 | 40 | - | 98.8 |
| 300 | - | 3229.3 | | | |
| 460 | - | 4951.6 | | | |
| 1400 | - | 15069.9 | | | |
| 1900 | - | 20452.1 | | | |
| 2000 | - | 21528.5 | | | |
| 2800 | - | 30139.9 | | | |
| 3000 | - | 32292.8 | | | |
| 3500 | - | 37674.9 | | | |
| 4000 | - | 43057.1 | | | |
| 5600 | - | 60279.9 | | | |
| 6500 | - | 69967.7 | | | |
| 7500 | - | 80731.9 | | | |
| 8000 | - | 86114.1 | | | |
| 9000 | - | 96878.4 | | | |

Appendix I
Structure Photo Inventory Record

McLarens Creek

Structure Photo Inventory

February 2021



List of Figures

Structure 1 : First Box Culvert Under Elm Tree Road Adjacent to 2215 Elm Tree Road.....4

Structure 2: Private Driveway Box Culvert at 2220 Elm Tree Road.....5

Structure 3: Second Culvert Under Elm Tree Road Adjacent to 2231 Elm Tree Road.....6

Structure 4: Private Driveway Box Culvert at 2273 Elm Tree Road.....7

Structure 5: Private Driveway Box Culvert at 455 Cambray Road.....8

Structure 6: Bridge Under Cambray Road.....9

Structure 7: McLarens Creek Dam at 460 Cambray Road.....10

Structure 8: Large Culvert Under Elmtree Road.....14

Appendix
Structure Photo Inventory Record

Structure 1: First Box Culvert Under Elm Tree Road Adjacent to 2215 Elm Tree Rd

HecRas #: MCL01

Upstream Invert Elevation: 264.10 m

Downstream Invert Elevation: 264.06 m

Structure Length: 36.05 m

Span: 5.50 m

Rise: 1.65 m

Structure Type/Shape: Box Culvert

Material: Concrete

Bottom Material: Open Bottom



Upstream facing Downstream



Downstream facing Upstream



Looking in culvert from Downstream Side

Structure 2: Private Driveway Box Culvert at 2220 Elm Tree Road

HecRas #: MCL02

Upstream Invert Elevation: 264.18 m

Downstream Invert Elevation: 264.20 m

Structure Length: 5.58 m

Span: 3.74 m

Rise: 1.30 m

Structure Type/Shape: Box Culvert

Material: Concrete

Bottom Material: Open Bottom



Upstream facing Downstream



Downstream facing Upstream



Upstream Looking into Culvert

Structure 3: Second Culvert Under Elm Tree Road Adjacent to 2231 Elm Tree Rd

HecRas #: MCL03

Upstream Invert Elevation: 264.62 m

Downstream Invert Elevation: 264.66 m

Structure Length: 13.96 m

Span: 5.50 m

Rise: 1.15 m

Structure Type/Shape: Box Culvert

Material: Concrete

Bottom Material: Open Bottom



Upstream facing Downstream



Downstream facing Upstream



Downstream facing Upstream

Structure 4: Private Driveway Box Culvert at 2273 Elm Tree Road

HecRas #: MCL04

Upstream Invert Elevation: 266.22 m

Downstream Invert Elevation: 266.18 m

Structure Length: 6.76 m

Span: 2.67 m

Rise: 1.0 m

Structure Type/Shape: Box Culvert

Material: Concrete

Bottom Material: Open Bottom



Upstream facing Downstream



Downstream facing Upstream



Upstream Looking in Culvert

Structure 5: Private Driveway Box Culvert at 455 Cambray Road

HecRas #: MCL05

Upstream Invert Elevation: 268.69 m

Downstream Invert Elevation: 268.59m

Structure Length: 5.22 m

Span: 3.1 m

Rise: 1.35 m

Structure Type/Shape: Box Culvert

Material: Concrete

Bottom Material: Open Bottom (Bed Rock)



Upstream Facing Downstream



Downstream facing Upstream



Upstream looking in culvert

Structure 6: Bridge Under Cambray Road

HecRas #: MCL06

Upstream Invert Elevation: 269.05 m

Downstream Invert Elevation: 269.00 m

Structure Length: 12.10 m

Span: 3.50 m

Rise: 2.20 m

Structure Type/Shape: Box Culvert

Material: Concrete

Bottom Material: Open Bottom



Upstream facing Downstream



Downstream Facing Upstream



Upstream End of Culvert

Structure 7: McLarens Creek Dam at 460 Cambray Road

HecRas #: MCL07

Span: 4.70 m

Rise: From top of log to base of dam it is approximately 3.5 m

Structure Type/Shape: Circular Culvert

Material: Corrugated Metal

Bottom Material: Same as top & sides



On top of dam looking down



Downstream facing Upstream



Downstream looking upstream towards dam



Top of logs



Top of dam



Top of Dam



Top of Dam looking Downstream



Top of Dam looking upstream

Structure 8: Large Corrugated Culvert Under Elmtree Road

HecRas #: MCL08

Upstream Invert Elevation: 251.21m

Downstream Invert Elevation: 251.25 m

Structure Length: 14.39m

Span: 2.75m

Rise: 2.15m

Structure Type/Shape: Circular Culvert

Material: Corrugated Metal

Bottom Material: Same as top and sides / silted in



Upstream facing Downstream



Downstream Facing Upstream



Upstream End of Culvert

Appendix J
HEC RAS Output

| Reach | River Sta | | Profile | Q Total (m3/s) | W.S. Elev (m) |
|---------|-----------|-------|----------------|-------------------|------------------|
| ML-Main | 4761 | 30000 | Timmins | 43.61 | 276.15 |
| ML-Main | 4761 | 30000 | 100yr AES- 6hr | 16.7 | 275.75 |
| ML-Main | | 4665 | Timmins | 43.61 | 276.07 |
| ML-Main | | 4665 | 100yr AES- 6hr | 16.7 | 275.59 |
| ML-Main | | 4600 | Timmins | 43.61 | 276.02 |
| ML-Main | | 4600 | 100yr AES- 6hr | 16.7 | 275.44 |
| ML-Main | | 4524 | Timmins | 43.61 | 275.99 |
| ML-Main | | 4524 | 100yr AES- 6hr | 16.7 | 275.39 |
| ML-Main | 4399 | 50000 | Timmins | 44.42 | 275.59 |
| ML-Main | 4399 | 50000 | 100yr AES- 6hr | 16.92 | 275.2 |
| ML-Main | | 4303 | Timmins | 44.42 | 275.2 |
| ML-Main | | 4303 | 100yr AES- 6hr | 16.92 | 274.89 |
| ML-Main | | 4196 | Timmins | 44.42 | 275.02 |
| ML-Main | | 4196 | 100yr AES- 6hr | 16.92 | 274.71 |
| ML-Main | | 4049 | Timmins | 44.42 | 274.71 |
| ML-Main | | 4049 | 100yr AES- 6hr | 16.92 | 274.36 |
| ML-Main | | 3884 | Timmins | 44.42 | 274.24 |
| ML-Main | | 3884 | 100yr AES- 6hr | 16.92 | 273.96 |
| ML-Main | | 3769 | Timmins | 44.42 | 273.88 |
| ML-Main | | 3769 | 100yr AES- 6hr | 16.92 | 273.6 |
| ML-Main | | 3632 | Timmins | 44.42 | 273.5 |
| ML-Main | | 3632 | 100yr AES- 6hr | 16.92 | 273.5 |
| ML-Main | | 3576 | Timmins | 44.42 | 273.52 |
| ML-Main | | 3576 | 100yr AES- 6hr | 16.92 | 273.51 |
| ML-Main | | 3553 | Timmins | 44.42 | 273.52 |
| ML-Main | | 3553 | 100yr AES- 6hr | 16.92 | 273.5 |
| ML-Main | | 3533 | Timmins | 44.42 | 273.44 |
| ML-Main | | 3533 | 100yr AES- 6hr | 16.92 | 273.5 |
| ML-Main | | 3519 | | Inl Struct | |
| ML-Main | | 3508 | Timmins | 44.42 | 271.91 |

| | | | | | |
|---------|------|-------|---------------------|--------|--------|
| ML-Main | | | 3508 100yr AES- 6hr | 16.92 | 271.21 |
| ML-Main | | | 3495 Timmins | 44.42 | 271.95 |
| ML-Main | | | 3495 100yr AES- 6hr | 16.92 | 271.22 |
| ML-Main | | | 3476 Timmins | 44.42 | 272.08 |
| ML-Main | | | 3476 100yr AES- 6hr | 16.92 | 271.24 |
| ML-Main | | | 3461 Timmins | 44.42 | 272.02 |
| ML-Main | | | 3461 100yr AES- 6hr | 16.92 | 271.17 |
| ML-Main | 3450 | 60000 | Timmins | 44.44 | 272.03 |
| ML-Main | 3450 | 60000 | 100yr AES- 6hr | 16.08 | 271.19 |
| ML-Main | | | 3429 Timmins | 44.44 | 271.98 |
| ML-Main | | | 3429 100yr AES- 6hr | 16.08 | 270.99 |
| ML-Main | 3423 | MCL06 | | Bridge | |
| ML-Main | | | 3415 Timmins | 44.44 | 271.65 |
| ML-Main | | | 3415 100yr AES- 6hr | 16.08 | 270.61 |
| ML-Main | | | 3384 Timmins | 44.44 | 271.01 |
| ML-Main | | | 3384 100yr AES- 6hr | 16.08 | 270.71 |
| ML-Main | | | 3361 Timmins | 44.44 | 270.98 |
| ML-Main | | | 3361 100yr AES- 6hr | 16.08 | 270.7 |
| ML-Main | 3356 | MCL05 | | Bridge | |
| ML-Main | | | 3350 Timmins | 44.44 | 270.2 |
| ML-Main | | | 3350 100yr AES- 6hr | 16.08 | 269.47 |
| ML-Main | | | 3326 Timmins | 44.44 | 270.23 |
| ML-Main | | | 3326 100yr AES- 6hr | 16.08 | 269.56 |
| ML-Main | | | 3272 Timmins | 44.44 | 269.8 |
| ML-Main | | | 3272 100yr AES- 6hr | 16.08 | 269.29 |
| ML-Main | | | 3225 Timmins | 44.44 | 269.46 |
| ML-Main | | | 3225 100yr AES- 6hr | 16.08 | 268.96 |
| ML-Main | | | 3109 Timmins | 44.44 | 268.72 |
| ML-Main | | | 3109 100yr AES- 6hr | 16.08 | 268.33 |
| ML-Main | | | 3036 Timmins | 44.44 | 268.6 |
| ML-Main | | | 3036 100yr AES- 6hr | 16.08 | 268.15 |

| | | | | | |
|---------|------|-------|---------------------|---------|--------|
| ML-Main | | | 2995 Timmins | 44.44 | 268.52 |
| ML-Main | | | 2995 100yr AES- 6hr | 16.08 | 268.06 |
| ML-Main | | | 2936 Timmins | 44.44 | 268.27 |
| ML-Main | | | 2936 100yr AES- 6hr | 16.08 | 267.94 |
| ML-Main | | | 2885 Timmins | 44.44 | 268.12 |
| ML-Main | | | 2885 100yr AES- 6hr | 16.08 | 267.87 |
| ML-Main | | | 2875 Timmins | 44.44 | 268.05 |
| ML-Main | | | 2875 100yr AES- 6hr | 16.08 | 267.83 |
| ML-Main | 2869 | MCL04 | | Culvert | |
| ML-Main | | | 2862 Timmins | 44.44 | 267.95 |
| ML-Main | | | 2862 100yr AES- 6hr | 16.08 | 267.28 |
| ML-Main | | | 2854 Timmins | 44.44 | 267.8 |
| ML-Main | | | 2854 100yr AES- 6hr | 16.08 | 267.19 |
| ML-Main | | | 2782 Timmins | 44.44 | 267.24 |
| ML-Main | | | 2782 100yr AES- 6hr | 16.08 | 266.87 |
| ML-Main | | | 2725 Timmins | 44.44 | 267.27 |
| ML-Main | | | 2725 100yr AES- 6hr | 16.08 | 266.92 |
| ML-Main | | | 2657 Timmins | 44.44 | 267.26 |
| ML-Main | | | 2657 100yr AES- 6hr | 16.08 | 266.91 |
| ML-Main | 2511 | 90000 | Timmins | 61.21 | 266.9 |
| ML-Main | 2511 | 90000 | 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | | | 2439 Timmins | 61.21 | 266.93 |
| ML-Main | | | 2439 100yr AES- 6hr | 24.25 | 266.75 |
| ML-Main | | | 2341 Timmins | 61.21 | 266.88 |
| ML-Main | | | 2341 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | | | 2319 Timmins | 61.21 | 266.89 |
| ML-Main | | | 2319 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | | | 2311 Timmins | 61.21 | 266.89 |
| ML-Main | | | 2311 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | 2299 | MCL03 | | Culvert | |

| | | | | |
|---------|------|----------------|---------|--------|
| ML-Main | 2291 | Timmins | 61.21 | 266.77 |
| ML-Main | 2291 | 100yr AES- 6hr | 24.25 | 266.7 |
| ML-Main | 2288 | Timmins | 61.21 | 266.77 |
| ML-Main | 2288 | 100yr AES- 6hr | 24.25 | 266.7 |
| ML-Main | 2263 | Timmins | 61.21 | 266.76 |
| ML-Main | 2263 | 100yr AES- 6hr | 24.25 | 266.7 |
| ML-Main | 2161 | Timmins | 61.21 | 266.7 |
| ML-Main | 2161 | 100yr AES- 6hr | 24.25 | 266.69 |
| ML-Main | 2107 | Timmins | 61.21 | 266.71 |
| ML-Main | 2107 | 100yr AES- 6hr | 24.25 | 266.69 |
| ML-Main | 2102 | Timmins | 61.21 | 266.71 |
| ML-Main | 2102 | 100yr AES- 6hr | 24.25 | 266.69 |
| ML-Main | 2088 | MCL01 | | |
| | | | Culvert | |
| ML-Main | 2071 | Timmins | 61.21 | 266.3 |
| ML-Main | 2071 | 100yr AES- 6hr | 24.25 | 266.26 |
| ML-Main | 2065 | Timmins | 61.21 | 265.49 |
| ML-Main | 2065 | 100yr AES- 6hr | 24.25 | 265.02 |
| ML-Main | 1968 | Timmins | 61.21 | 265.12 |
| ML-Main | 1968 | 100yr AES- 6hr | 24.25 | 264.58 |
| ML-Main | 1894 | Timmins | 61.21 | 264.73 |
| ML-Main | 1894 | 100yr AES- 6hr | 24.25 | 264.34 |
| ML-Main | 1767 | Timmins | 61.21 | 264.14 |
| ML-Main | 1767 | 100yr AES- 6hr | 24.25 | 263.77 |
| ML-Main | 1613 | Timmins | 61.21 | 264.07 |
| ML-Main | 1613 | 100yr AES- 6hr | 24.25 | 263.81 |
| ML-Main | 1603 | Timmins | 61.21 | 264.07 |
| ML-Main | 1603 | 100yr AES- 6hr | 24.25 | 263.81 |
| ML-Main | 1595 | | | |
| | | | Bridge | |
| ML-Main | 1588 | Timmins | 61.21 | 263.18 |
| ML-Main | 1588 | 100yr AES- 6hr | 24.25 | 262.51 |
| ML-Main | 1534 | Timmins | 61.21 | 262.4 |

| | | | | | |
|---------|------|--------|----------------|-----------|--------|
| ML-Main | | 1534 | 100yr AES- 6hr | 24.25 | 261.96 |
| ML-Main | | 1416 | Timmins | 61.21 | 260.98 |
| ML-Main | | 1416 | 100yr AES- 6hr | 24.25 | 260.45 |
| ML-Main | | 1370 | Timmins | 61.21 | 259.95 |
| ML-Main | | 1370 | 100yr AES- 6hr | 24.25 | 259.49 |
| ML-Main | | 1223 | Timmins | 61.21 | 256.48 |
| ML-Main | | 1223 | 100yr AES- 6hr | 24.25 | 255.92 |
| ML-Main | | 1172 | Timmins | 61.21 | 255.46 |
| ML-Main | | 1172 | 100yr AES- 6hr | 24.25 | 255.08 |
| ML-Main | 1054 | 110000 | Timmins | 72.64 | 254.35 |
| ML-Main | 1054 | 110000 | 100yr AES- 6hr | 29.96 | 254.02 |
| ML-Main | | 1042 | Timmins | 72.64 | 254.35 |
| ML-Main | | 1042 | 100yr AES- 6hr | 29.96 | 253.81 |
| ML-Main | | 1025 | | Mult Open | |
| ML-Main | | 1008 | Timmins | 72.64 | 253.87 |
| ML-Main | | 1008 | 100yr AES- 6hr | 29.96 | 253.32 |
| ML-Main | | 1000 | Timmins | 72.64 | 253.42 |
| ML-Main | | 1000 | 100yr AES- 6hr | 29.96 | 253.02 |

Appendix K
DTM Data Assessment Report

| Reach | River Sta | | Profile | Q Total (m3/s) | W.S. Elev (m) |
|---------|-----------|-------|----------------|-------------------|------------------|
| ML-Main | 4761 | 30000 | Timmins | 43.61 | 276.15 |
| ML-Main | 4761 | 30000 | 100yr AES- 6hr | 16.7 | 275.75 |
| ML-Main | | 4665 | Timmins | 43.61 | 276.07 |
| ML-Main | | 4665 | 100yr AES- 6hr | 16.7 | 275.59 |
| ML-Main | | 4600 | Timmins | 43.61 | 276.02 |
| ML-Main | | 4600 | 100yr AES- 6hr | 16.7 | 275.44 |
| ML-Main | | 4524 | Timmins | 43.61 | 275.99 |
| ML-Main | | 4524 | 100yr AES- 6hr | 16.7 | 275.39 |
| ML-Main | 4399 | 50000 | Timmins | 44.42 | 275.59 |
| ML-Main | 4399 | 50000 | 100yr AES- 6hr | 16.92 | 275.2 |
| ML-Main | | 4303 | Timmins | 44.42 | 275.2 |
| ML-Main | | 4303 | 100yr AES- 6hr | 16.92 | 274.89 |
| ML-Main | | 4196 | Timmins | 44.42 | 275.02 |
| ML-Main | | 4196 | 100yr AES- 6hr | 16.92 | 274.71 |
| ML-Main | | 4049 | Timmins | 44.42 | 274.71 |
| ML-Main | | 4049 | 100yr AES- 6hr | 16.92 | 274.36 |
| ML-Main | | 3884 | Timmins | 44.42 | 274.24 |
| ML-Main | | 3884 | 100yr AES- 6hr | 16.92 | 273.96 |
| ML-Main | | 3769 | Timmins | 44.42 | 273.88 |
| ML-Main | | 3769 | 100yr AES- 6hr | 16.92 | 273.6 |
| ML-Main | | 3632 | Timmins | 44.42 | 273.5 |
| ML-Main | | 3632 | 100yr AES- 6hr | 16.92 | 273.5 |
| ML-Main | | 3576 | Timmins | 44.42 | 273.52 |
| ML-Main | | 3576 | 100yr AES- 6hr | 16.92 | 273.51 |
| ML-Main | | 3553 | Timmins | 44.42 | 273.52 |
| ML-Main | | 3553 | 100yr AES- 6hr | 16.92 | 273.5 |
| ML-Main | | 3533 | Timmins | 44.42 | 273.44 |
| ML-Main | | 3533 | 100yr AES- 6hr | 16.92 | 273.5 |
| ML-Main | | 3519 | | Inl Struct | |
| ML-Main | | 3508 | Timmins | 44.42 | 271.91 |

| | | | | | |
|---------|------|-------|---------------------|--------|--------|
| ML-Main | | | 3508 100yr AES- 6hr | 16.92 | 271.21 |
| ML-Main | | | 3495 Timmins | 44.42 | 271.95 |
| ML-Main | | | 3495 100yr AES- 6hr | 16.92 | 271.22 |
| ML-Main | | | 3476 Timmins | 44.42 | 272.08 |
| ML-Main | | | 3476 100yr AES- 6hr | 16.92 | 271.24 |
| ML-Main | | | 3461 Timmins | 44.42 | 272.02 |
| ML-Main | | | 3461 100yr AES- 6hr | 16.92 | 271.17 |
| ML-Main | 3450 | 60000 | Timmins | 44.44 | 272.03 |
| ML-Main | 3450 | 60000 | 100yr AES- 6hr | 16.08 | 271.19 |
| ML-Main | | | 3429 Timmins | 44.44 | 271.98 |
| ML-Main | | | 3429 100yr AES- 6hr | 16.08 | 270.99 |
| ML-Main | 3423 | MCL06 | | Bridge | |
| ML-Main | | | 3415 Timmins | 44.44 | 271.65 |
| ML-Main | | | 3415 100yr AES- 6hr | 16.08 | 270.61 |
| ML-Main | | | 3384 Timmins | 44.44 | 271.01 |
| ML-Main | | | 3384 100yr AES- 6hr | 16.08 | 270.71 |
| ML-Main | | | 3361 Timmins | 44.44 | 270.98 |
| ML-Main | | | 3361 100yr AES- 6hr | 16.08 | 270.7 |
| ML-Main | 3356 | MCL05 | | Bridge | |
| ML-Main | | | 3350 Timmins | 44.44 | 270.2 |
| ML-Main | | | 3350 100yr AES- 6hr | 16.08 | 269.47 |
| ML-Main | | | 3326 Timmins | 44.44 | 270.23 |
| ML-Main | | | 3326 100yr AES- 6hr | 16.08 | 269.56 |
| ML-Main | | | 3272 Timmins | 44.44 | 269.8 |
| ML-Main | | | 3272 100yr AES- 6hr | 16.08 | 269.29 |
| ML-Main | | | 3225 Timmins | 44.44 | 269.46 |
| ML-Main | | | 3225 100yr AES- 6hr | 16.08 | 268.96 |
| ML-Main | | | 3109 Timmins | 44.44 | 268.72 |
| ML-Main | | | 3109 100yr AES- 6hr | 16.08 | 268.33 |
| ML-Main | | | 3036 Timmins | 44.44 | 268.6 |
| ML-Main | | | 3036 100yr AES- 6hr | 16.08 | 268.15 |

| | | | | | |
|---------|------|-------|---------------------|---------|--------|
| ML-Main | | | 2995 Timmins | 44.44 | 268.52 |
| ML-Main | | | 2995 100yr AES- 6hr | 16.08 | 268.06 |
| ML-Main | | | 2936 Timmins | 44.44 | 268.27 |
| ML-Main | | | 2936 100yr AES- 6hr | 16.08 | 267.94 |
| ML-Main | | | 2885 Timmins | 44.44 | 268.12 |
| ML-Main | | | 2885 100yr AES- 6hr | 16.08 | 267.87 |
| ML-Main | | | 2875 Timmins | 44.44 | 268.05 |
| ML-Main | | | 2875 100yr AES- 6hr | 16.08 | 267.83 |
| ML-Main | 2869 | MCL04 | | Culvert | |
| ML-Main | | | 2862 Timmins | 44.44 | 267.95 |
| ML-Main | | | 2862 100yr AES- 6hr | 16.08 | 267.28 |
| ML-Main | | | 2854 Timmins | 44.44 | 267.8 |
| ML-Main | | | 2854 100yr AES- 6hr | 16.08 | 267.19 |
| ML-Main | | | 2782 Timmins | 44.44 | 267.24 |
| ML-Main | | | 2782 100yr AES- 6hr | 16.08 | 266.87 |
| ML-Main | | | 2725 Timmins | 44.44 | 267.27 |
| ML-Main | | | 2725 100yr AES- 6hr | 16.08 | 266.92 |
| ML-Main | | | 2657 Timmins | 44.44 | 267.26 |
| ML-Main | | | 2657 100yr AES- 6hr | 16.08 | 266.91 |
| ML-Main | 2511 | 90000 | Timmins | 61.21 | 266.9 |
| ML-Main | 2511 | 90000 | 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | | | 2439 Timmins | 61.21 | 266.93 |
| ML-Main | | | 2439 100yr AES- 6hr | 24.25 | 266.75 |
| ML-Main | | | 2341 Timmins | 61.21 | 266.88 |
| ML-Main | | | 2341 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | | | 2319 Timmins | 61.21 | 266.89 |
| ML-Main | | | 2319 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | | | 2311 Timmins | 61.21 | 266.89 |
| ML-Main | | | 2311 100yr AES- 6hr | 24.25 | 266.74 |
| ML-Main | 2299 | MCL03 | | Culvert | |

| | | | | |
|---------|------|---------------------|-------|---------|
| ML-Main | | 2291 Timmins | 61.21 | 266.77 |
| ML-Main | | 2291 100yr AES- 6hr | 24.25 | 266.7 |
| ML-Main | | 2288 Timmins | 61.21 | 266.77 |
| ML-Main | | 2288 100yr AES- 6hr | 24.25 | 266.7 |
| ML-Main | | 2263 Timmins | 61.21 | 266.76 |
| ML-Main | | 2263 100yr AES- 6hr | 24.25 | 266.7 |
| ML-Main | | 2161 Timmins | 61.21 | 266.7 |
| ML-Main | | 2161 100yr AES- 6hr | 24.25 | 266.69 |
| ML-Main | | 2107 Timmins | 61.21 | 266.71 |
| ML-Main | | 2107 100yr AES- 6hr | 24.25 | 266.69 |
| ML-Main | | 2102 Timmins | 61.21 | 266.71 |
| ML-Main | | 2102 100yr AES- 6hr | 24.25 | 266.69 |
| ML-Main | 2088 | MCL01 | | Culvert |
| ML-Main | | 2071 Timmins | 61.21 | 266.3 |
| ML-Main | | 2071 100yr AES- 6hr | 24.25 | 266.26 |
| ML-Main | | 2065 Timmins | 61.21 | 265.49 |
| ML-Main | | 2065 100yr AES- 6hr | 24.25 | 265.02 |
| ML-Main | | 1968 Timmins | 61.21 | 265.12 |
| ML-Main | | 1968 100yr AES- 6hr | 24.25 | 264.58 |
| ML-Main | | 1894 Timmins | 61.21 | 264.73 |
| ML-Main | | 1894 100yr AES- 6hr | 24.25 | 264.34 |
| ML-Main | | 1767 Timmins | 61.21 | 264.14 |
| ML-Main | | 1767 100yr AES- 6hr | 24.25 | 263.77 |
| ML-Main | | 1613 Timmins | 61.21 | 264.07 |
| ML-Main | | 1613 100yr AES- 6hr | 24.25 | 263.81 |
| ML-Main | | 1603 Timmins | 61.21 | 264.07 |
| ML-Main | | 1603 100yr AES- 6hr | 24.25 | 263.81 |
| ML-Main | | 1595 | | Bridge |
| ML-Main | | 1588 Timmins | 61.21 | 263.18 |
| ML-Main | | 1588 100yr AES- 6hr | 24.25 | 262.51 |
| ML-Main | | 1534 Timmins | 61.21 | 262.4 |

| | | | | | |
|---------|------|--------|----------------|-----------|--------|
| ML-Main | | 1534 | 100yr AES- 6hr | 24.25 | 261.96 |
| ML-Main | | 1416 | Timmins | 61.21 | 260.98 |
| ML-Main | | 1416 | 100yr AES- 6hr | 24.25 | 260.45 |
| ML-Main | | 1370 | Timmins | 61.21 | 259.95 |
| ML-Main | | 1370 | 100yr AES- 6hr | 24.25 | 259.49 |
| ML-Main | | 1223 | Timmins | 61.21 | 256.48 |
| ML-Main | | 1223 | 100yr AES- 6hr | 24.25 | 255.92 |
| ML-Main | | 1172 | Timmins | 61.21 | 255.46 |
| ML-Main | | 1172 | 100yr AES- 6hr | 24.25 | 255.08 |
| ML-Main | 1054 | 110000 | Timmins | 72.64 | 254.35 |
| ML-Main | 1054 | 110000 | 100yr AES- 6hr | 29.96 | 254.02 |
| ML-Main | | 1042 | Timmins | 72.64 | 254.35 |
| ML-Main | | 1042 | 100yr AES- 6hr | 29.96 | 253.81 |
| ML-Main | | 1025 | | Mult Open | |
| ML-Main | | 1008 | Timmins | 72.64 | 253.87 |
| ML-Main | | 1008 | 100yr AES- 6hr | 29.96 | 253.32 |
| ML-Main | | 1000 | Timmins | 72.64 | 253.42 |
| ML-Main | | 1000 | 100yr AES- 6hr | 29.96 | 253.02 |