

7.0 STORMWATER ISSUES AND OPPORTUNITIES

7.1 STORMWATER ISSUES

Several drainage and stormwater issues have been identified within the study area. They relate mainly to capacity of existing structures and water quality.

7.1.1 UNDERSIZED CULVERTS

Several of the existing culverts on the Breslau and Randall Drains are undersized and impact the flood elevations upstream. Of particular concern are the following structures which appear to have the greatest impacts on upstream flood elevations:

- Breslau Drain at Woolwich Street - Structure BD-ST3, 1.50 m span x 1.20 m rise concrete box
- Randall Drain at Riverbank Drive - Structure RD-ST1, 1.50 m diameter CSP

The hydraulic assessment results reveal that the Breslau Drain Structure BD-ST3 can convey up to the 25 year event. Woolwich Road South overtopping occurs at events greater than 25 years. The flood profiles show that the backwater effect at this culvert severely impacts flood elevations up to the Fountain Street structure located approximately 550 m upstream for events 50 years and greater.

For the Randall Drain structure RD-ST1 the results show that the culvert can only convey 2 year flow prior to overtopping Riverbank Drive. The field observations show that recently some restoration work was completed at this crossing including a new CSP pipe and restoration at the culvert inlet and outlet (cemented rock protection). At the outlet the culvert is perched, which confirms the culvert is significantly undersized. It should be noted that this culvert was recently replaced. The culvert was intentionally not upsized in order to not increase frequent flood impacts to the downstream landowner.

Photographs of inlets and outlets of the above structures are shown below.

Breslau Drain at Woolwich St. S – Structure BD-ST3



BD-ST3 Structure Inlet



BD-ST3 Structure Outlet

Randall Drain at Riverbank Drive – Structure RD-ST1



RD-ST1 Structure Inlet



RD-ST1 Structure Outlet (Perched)

7.1.2 WATER QUALITY

Water quality conditions within the **Randall Drain** have been assessed as poor to fair. Conditions are highly impaired below Lonsdale Road and improve towards the mouth of the subwatershed. Of particular concern are a number of parameters at RD-LON (Lonsdale Road) including conductivity, TDS, nitrates, nitrites, chloride and sulphate. After RD-MEN (Menno Street) was established, sample results indicated that these parameters were all much lower than at RD-LON, suggesting a potential point source.

Concentrations of nutrients and chloride below Lonsdale Road were very high and some parameters (e.g., nitrate, chloride) exceeded recommended values by as much as an order of magnitude.

Water quality conditions within the **Breslau Drain** are impacted by intermittent flow conditions during the summer and fall. Monitoring near Woolwich Street indicated a high level of enrichment of nitrogen and phosphorus.

7.1.3 OTHER

Existing Field Tile Drains - There are numerous tile drain outlets to the Breslau and Randall Drains. Several tile drain outlets were identified for the Breslau and Randall Drains by the way of survey of hydraulic structures and cross sections for the development of the backwater HEC-RAS model and site investigations completed for the surface water and ground water modelling.

Clogged / buried tile drain outlets can greatly contribute to the flooding issues within the study area

Existing Gravel Pit Operations - The existing Gravel Pit operations at Breslau Drain below Woolwich Street S to the Grand River modified the natural channel of the watercourse at the confluence with the Grand River. Currently, Breslau Drain outlets to one of the gravel pit ponds before discharging to the Grand River.

Restoration and naturalization of the Breslau Drain below Woolwich Street is required upon completion of the gravel pit operations.

Existing Flooding Issues: The existing flooding issues on the boundary between Hespeler West and the Randal Drain watersheds in the area between Middle Block Road and Kossuth Road will be addressed in the Master Drainage Plan.

7.2 OPPORTUNITIES FOR IMPROVEMENTS OR ENHANCEMENTS

The following stormwater management opportunities were identified within the study area, based on the understanding of current conditions:

- The existing agricultural uses impair surface water quality (elevated nutrient loading). Proposed changes in land use and the application of stormwater management BMPs

- will improve water quality. Stormwater management ponds will provide an “Enhanced” level of protection. Together with other proposed SWM techniques (e.g. grassed swales); this treatment could result in a net improvement in runoff quality.
- The opportunity exists to integrate stormwater management facilities (e.g. ponds, grassed swales) with adjacent development and open space lands such that the facilities become enhancement features in terms of aesthetics, recreation and the natural environment.
 - The high permeability of the existing soils within the development lands provides opportunity for infiltration of stormwater runoff. Impacts of stormwater management BMPs / LID should be considered within the context of the existing wellhead protection program for the study lands.
 - Roof runoff and yard runoff from the proposed development could be directed to source control measures such as bioswales, rain barrels and rain gardens. It could also be dispersed into proposed buffer areas along watercourses and wetlands to maintain buffer / wetland hydrology. Roof runoff can also be directed to landscaped areas with increased topsoil depths, to encourage attenuation, interflow, and infiltration.
 - Replacement of the undersized culvert on the Breslau Drain at Woolwich Street will significantly reduce upstream flood elevations for more severe flood events including the Regional Storm.

Decommissioning and restoration of the currently active gravel pit below Woolwich Street S will provide an opportunity to re-establish and naturalize the Breslau Drain channel and floodplain to its confluence with the Grand River.