

2.0 Groundwater Study Update

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2.1 GROUNDWATER INVESTIGATION AT SPRINGHILL/OASIS ROAD

After the completion of the pre-design studies in July 2004, a field investigation program was undertaken to identify stratigraphic conditions on the east side of the floodway channel in the vicinity of Springhill Ski Hill and near domestic wells on Oasis Road. The investigations included a reconnaissance geophysical survey and a drilling program. Investigations of the west side of the channel are planned as part of the detailed design process in 2005.

The Birds Hill sand and gravel esker complex, east of the Floodway and south of Highway 59, forms the recharge area for the Birds Hill surficial aquifer. This groundwater source supplies area domestic wells plus a municipal well system operated by the R.M. of East St. Paul for the community of Birds Hill. When the floodway was built, a clay plug was constructed on either side of the channel to truncate the narrow west extension of the esker complex which crossed the floodway. The limits of the clay plug on the east side of the channel extend beneath the Springhill Ski Hill.

Channel expansion proposed in the pre-design phase in the area upstream (south) of the Highway 59 North bridge will consist of first widening up to 70 metres into the east bench for a length of approximately 500 metres adjacent to Oasis Road and south of Springhill Ski Hill. To avoid the Springhill Ski Hill, channel expansion then crosses over to widen on the west side of the channel north from the 500 kV transmission line to the bridge.

In conjunction with the proposed widening of the channel upstream of the ski hill along Oasis Road in the vicinity of the municipal wells, care must be taken to protect against intersecting this granular deposit and impacting on the Birds Hill aquifer.

The objectives of the investigation on the east channel bank were to:

- Identify the soil types (till; clay; granular zone) and in particular potential pervious layers.
- Determine groundwater table level(s) within the east floodway bank area.
- Identify potential pervious interconnections from the aquifer into the east floodway area to be excavated.
- Evaluate the potential for impacts on the sand and gravel aquifer and possible mitigation measures.
- Address geotechnical overall slope stability (1V to 3H slope) of the east channel bank.

In conjunction with the drilling and soils investigation program conducted from September 7 to 14, 2004, a separate geophysical investigation was undertaken between September 1 to 5, 2004. The geophysical investigation, known as a Terrain Electrical Conductivity (TEC) study, was intended as a broader screening tool for use in spotting drilling locations in such a way as to maximize the subsurface

information gathered through the drilling program. The TEC surveys were conducted using Geonics EM31 and EM34 instruments. The geophysical response was reviewed in conjunction with stratigraphy determined at existing drill holes to interpret the possible limits of the main zone of the Birds Hill granular aquifer, projecting from the municipal wells, northwest towards the floodway. Four deep drill holes were then extended to channel invert or into bedrock to confirm the stratigraphy in the area of channel widening, east towards Oasis Road. The extension of the granular aquifer zone appears to project towards the downstream portion of the channel widening area, with a low permeability reworked sandy silt till material present in the upstream area. Site excavation will be necessary to confirm the actual extent of the clay plug required, but approximately half the length of the widening in the subject area (200 to 300 metres of length) is assumed to require treatment.

For more detailed information about the investigations, please refer to the report titled "Floodway Channel Drilling Investigation Program at Springhill/Oasis Road", by KGS Group, dated November 2004. The report has been submitted to Manitoba Conservation, Environmental Approvals Branch in support of the Floodway Expansion Project Supplemental Filing of the Environmental Impact Statement.