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SOUTHERN LAKES GROUNDWATER EFFECTS MITIGATION

JUNE 2014



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Presentation Overview

1. Groundwater and infrastructure around Southern Lakes
2. Results of studies
3. Proposed mitigation approach
4. Mitigation options
5. Next steps



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Groundwater and Infrastructure Around Southern Lakes

- 2009-2011 groundwater levels collected from 20 monitoring wells
- One to two years of groundwater level data were collected
- Completed property surveys to identify type, location and elevation of shallow, below-ground property infrastructure (e.g., septic fields or crawl spaces)
- Completed a numerical groundwater model to predict potential areas of groundwater impact (AECOM 2011)



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Groundwater and Infrastructure Around Southern Lakes

- Most surveyed septic fields were situated below the average lake water levels and therefore were likely inundated regularly already
 - Yukon regulations require septic fields to be 1.2 m above “seasonal high water”
- Some crawl spaces or other property infrastructure are already below the average lake water levels
- Most areas around Marsh and Tagish lakes are not expected to be affected by higher sustained groundwater levels

(all from AECOM 2011)



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Preliminary Results

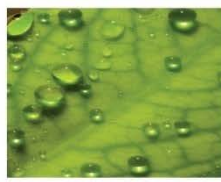
- Army Beach, South McClintock, and some properties in Old Constabulary and Tagish River identified as areas of potential groundwater impact.
- Detailed analyses for areas other than AB and SM pending
- Some existing below-ground infrastructure experience weeks to months of saturation and appear to be functioning.
- Under the project concept, the duration of saturation will increase at some properties (AECOM 2011)
- Effects to individual properties need to be determined on a site-specific basis.



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Potential effects of the Southern Lakes Enhanced Storage Concept related to groundwater

- It is expected that the Concept:
 - will not result in an increase in the maximum level of groundwater (unregulated period, i.e., summer lake level peaks, already reach higher than the conceptual full supply level in many years)
 - will result in the level of groundwater remaining higher in some areas for a longer period during the year



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Groundwater Mitigation Suggested Approach

Site-by-Site Mitigation

- Groundwater levels vary locally and sub-surface improvements vary depending on the property
- Assess and better understand individual property risks associated with potential changes in groundwater



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Groundwater Mitigation Options

Septic Retrofits and Drainage Solutions

- Initial estimate of 33 properties requiring septic field retrofits
 - Tailored retrofit designs expected for each field to meet site conditions and Yukon performance standards/regulations
- Initial estimate of 28 properties requiring drainage improvements
- Some properties will require additional/unique mitigation solutions (e.g., Old Constabulary)



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Southern Lakes Groundwater Site-by-Site Mitigation - Suggested Next Steps

1. Confirm approach to resolve information gaps
2. Broaden analyses to predict duration and level of groundwater saturation for additional properties and areas
3. Complete the identification of individual properties and areas potentially affected by groundwater
4. Confirm and complete site and property-specific infrastructure survey and inventory. Including existing infrastructure functioning under saturation.



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Southern Lakes Groundwater Site-by-Site Mitigation - Suggested Next Steps

5. Develop site-specific mitigation options
 - Engage individual property owners on mitigation options
 - Identify specific site and design constraints for septic bed retrofits meeting Yukon performance standards/regulations
 - Design drainage/GW management infrastructure
6. Implementation – Post Assessment & Permitting
 - Design, assessment and funding of site-by-site mitigation projects by YEC
 - Installation/construction of infrastructure by local contractors