

Greater West Bench Geotechnical Review



**Regional District of Okanagan Similkameen
Electoral Area F**



- Provide an updated technical assessment of geotechnical hazards that was recommended in the 2018 Electoral Area F - OCP
- Update previous work completed in 1992 by Klohn Leonoff
- Provide technical rationale to inform the direction of land use planning policy

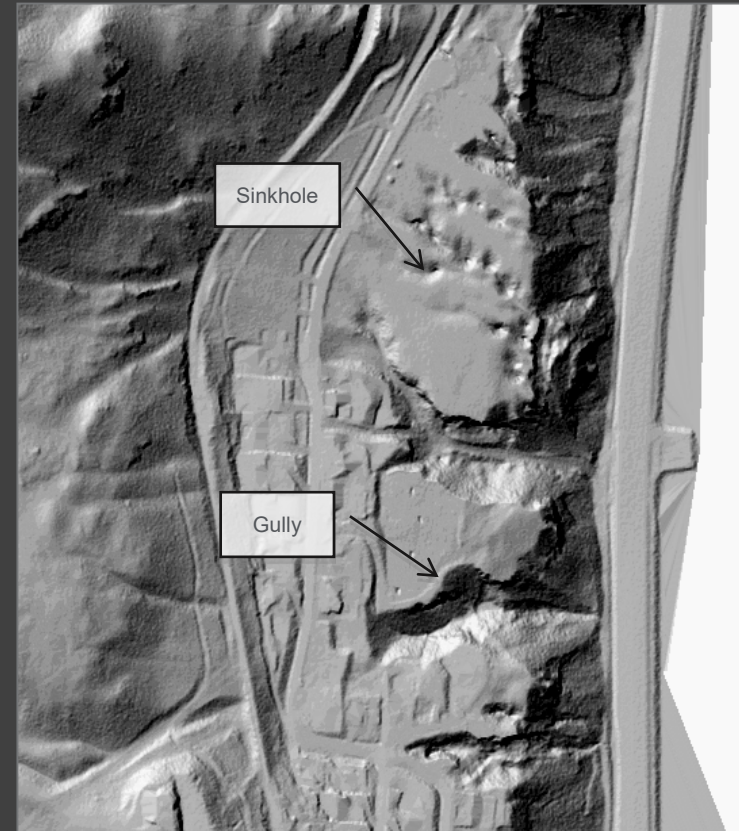


What was the purpose of the study?



Updated Sources of Information

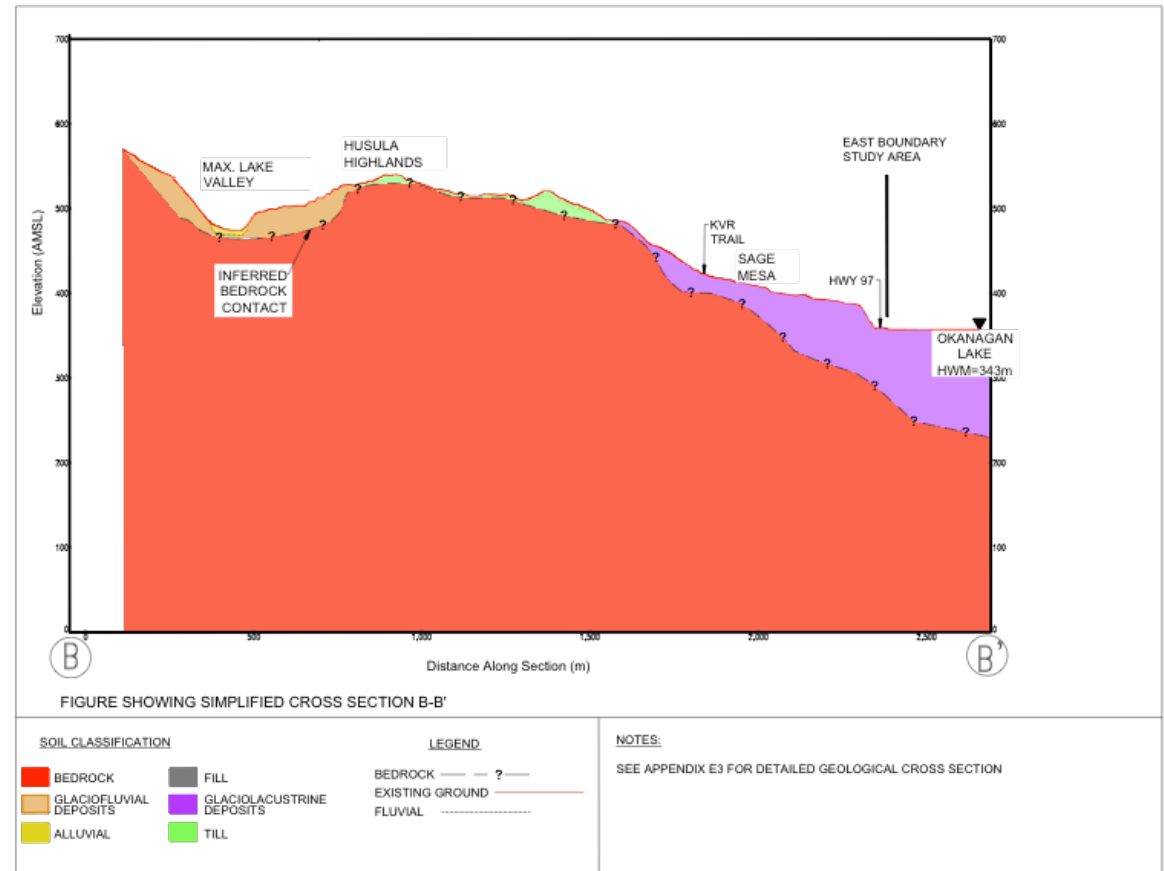
- More recent technical research (Irivani, 1999) (Pacific Hydrology, 1993)
- More recent imagery and 2018 LiDAR data
- New borehole information (MOTI)
- Field review
- Public survey (41 responses)



How was study completed?

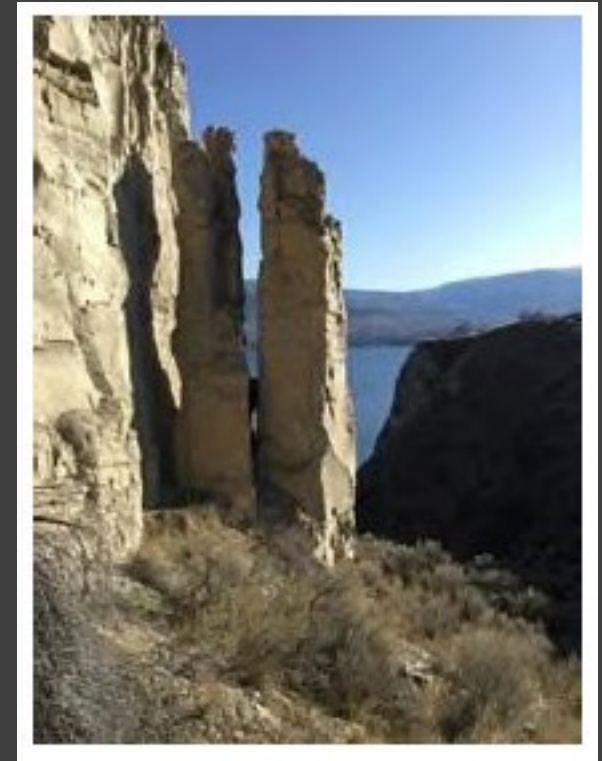


- Surficial geology
 - distribution of silts



Geotechnical Character

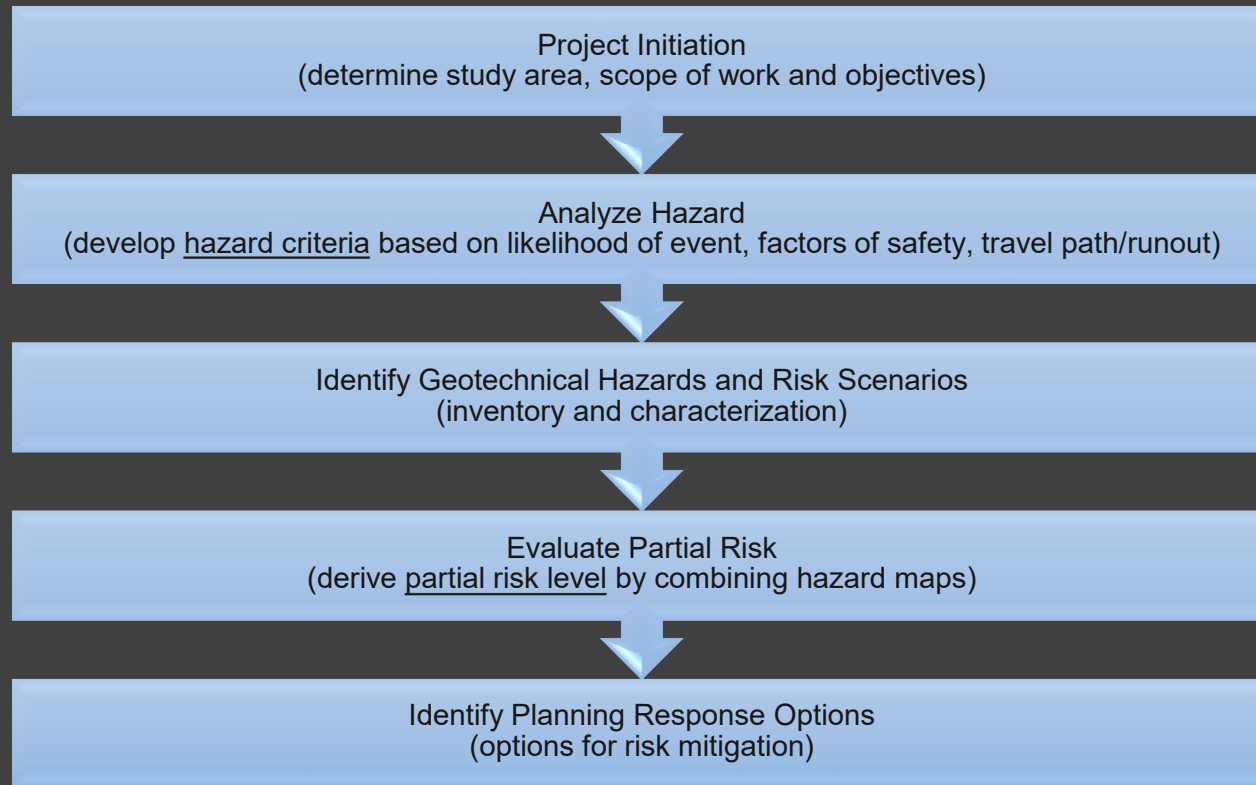
- Unique engineering material properties
 - undisturbed silts are very stable but, when wetted or disturbed, are prone to erosion, collapse, and slumping
- Groundwater regime
 - Role of the bedrock trough, southward flow



Geotechnical Character

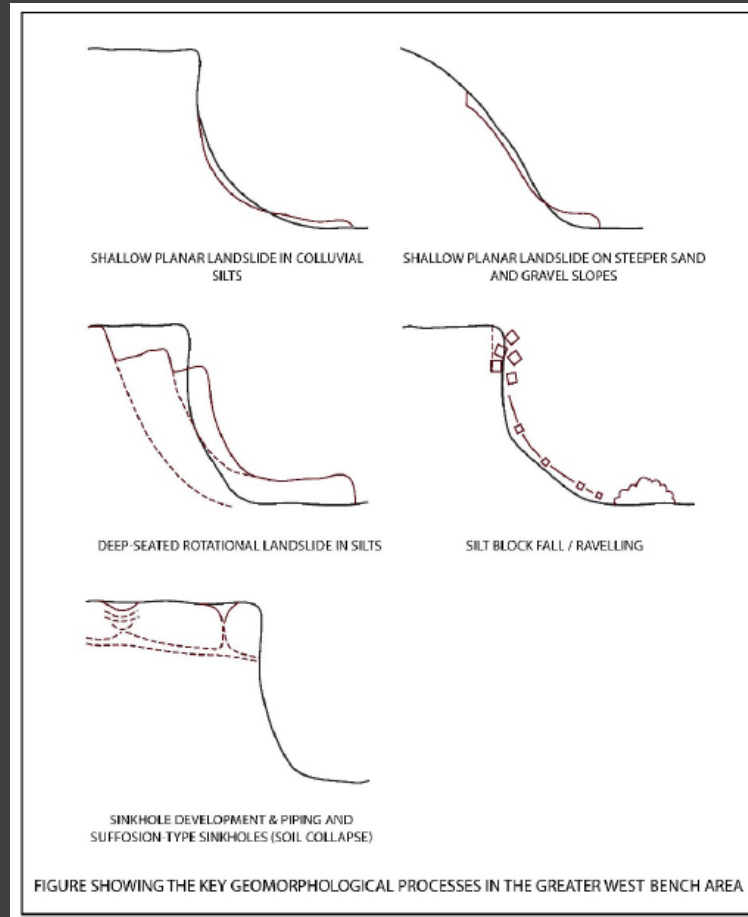


- see Map 2.0 Terrain Map



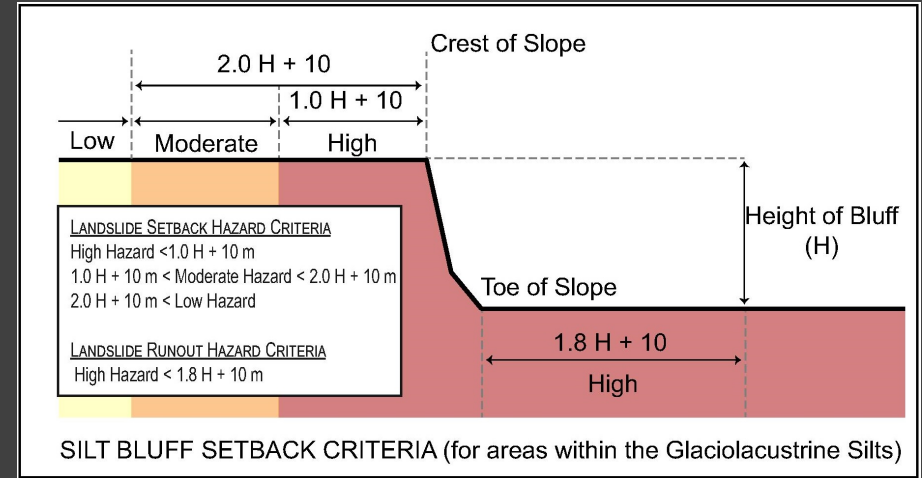
Partial Risk Assessment Process

- Shallow planar landslides
- Deep seated rotational landslides
- Silt block falls and ravelling
- Piping and sinkhole development
- Collapse/compression



Types of Geohazards

- Shallow Planar Landslides
- Deep-Seated Rotational Landslides
- Silt Block Falls or Ravelling
- Slope stability analyses to determine setback distances from slope crest
 - Factor of Safety < 1.0 = HIGH
 - $1.0 < \text{FOS} < 1.5$ = MODERATE
 - $\text{FOS} > 1.5$ = LOW



Landslide - Hazard Criteria

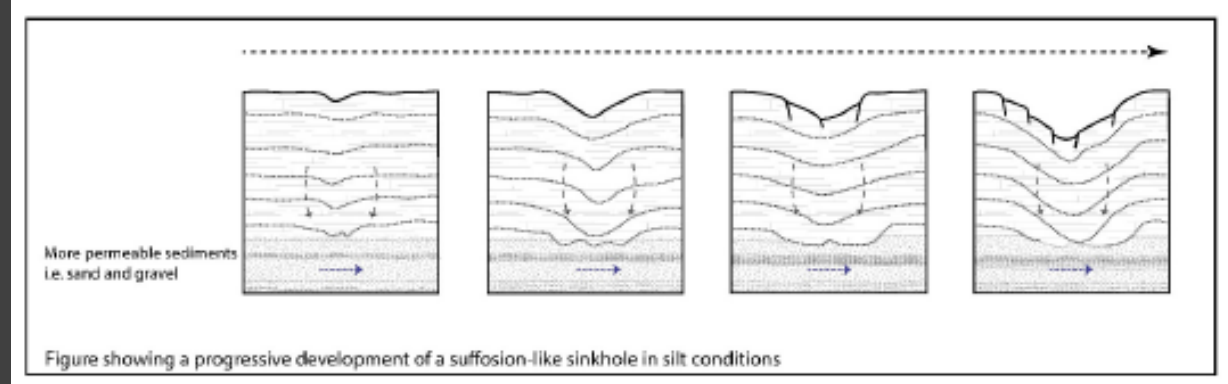
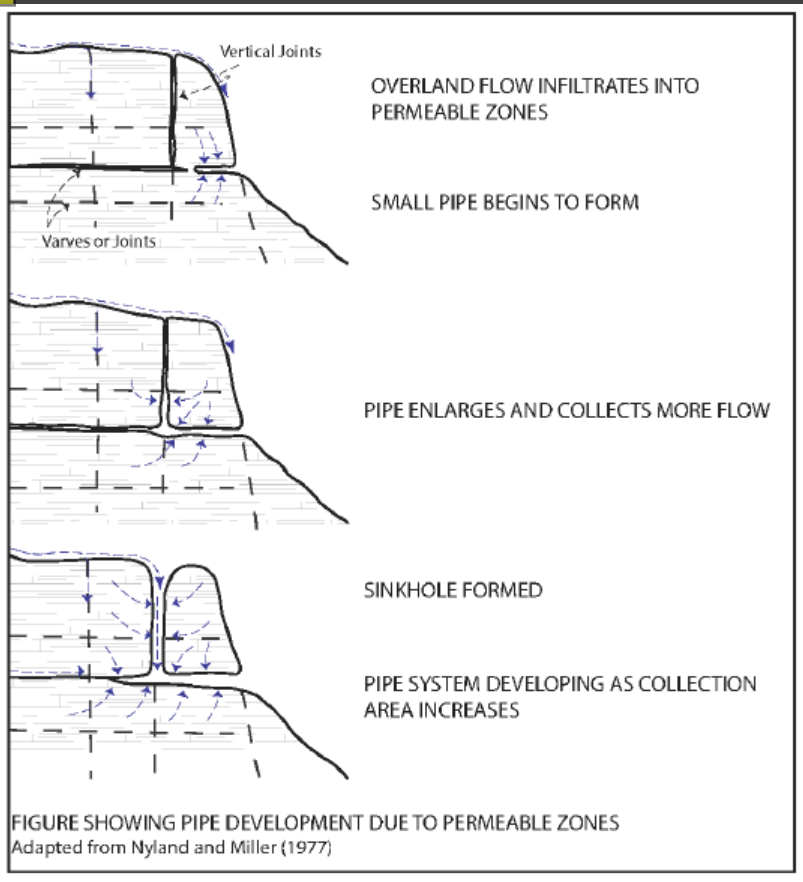


Example landslide sites

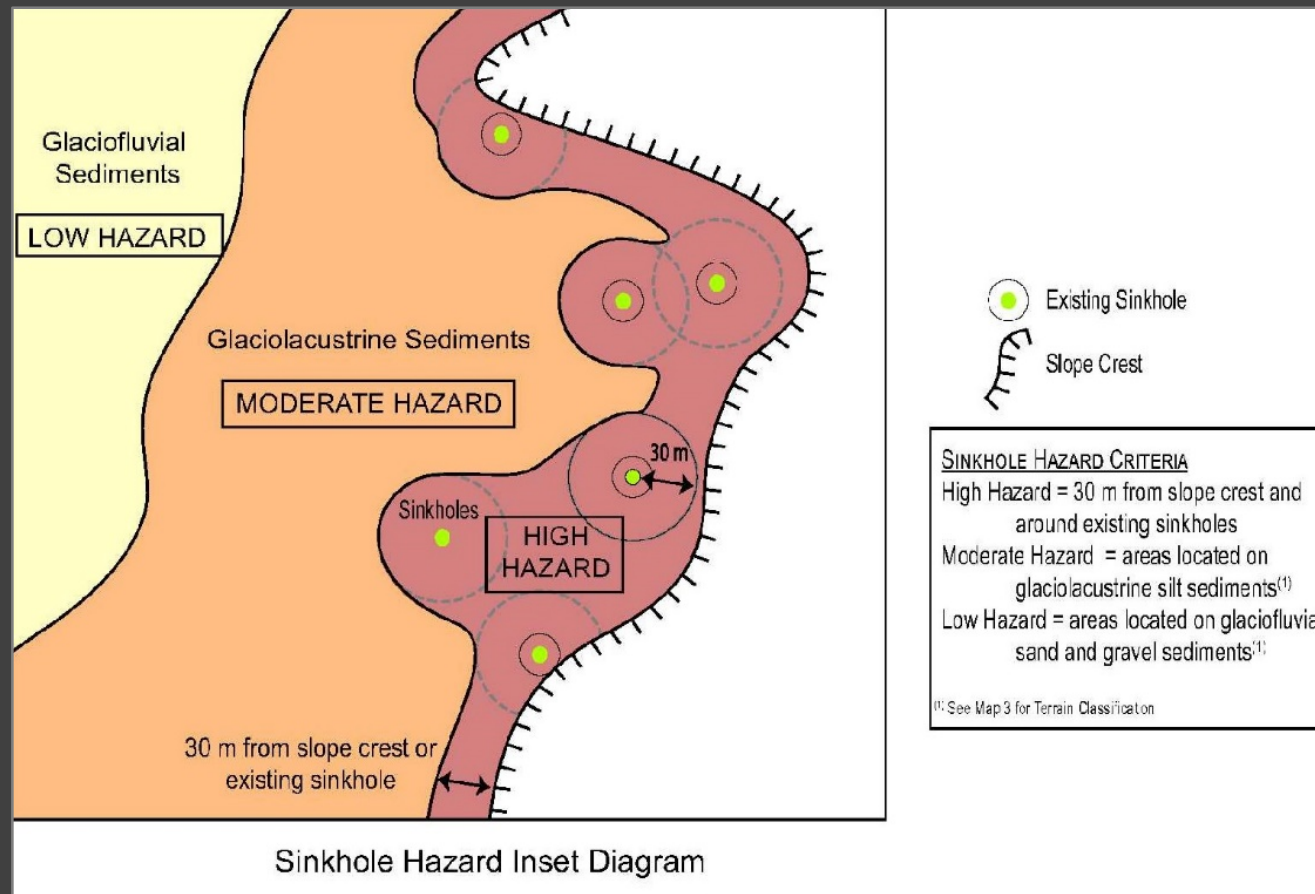




- See Map 3.0 Landslide Hazard Zones



Geohazards – Piping and Sinkhole Development



Sinkhole Hazard Criteria



Example sinkhole sites





- See Map 4.0 Sinkhole Hazard Zones



- Criteria for Collapsible/Compressible Soils Hazard
- **High** = areas of historic fill
- **Moderate** = areas located within silts
- **Low** = areas located within sand and gravel sediments



- See Map 5.0 Compressible Soils Hazard Zones



Geotechnical Constraints Zone	Criteria	Likelihood of a Damaging Geohazard Event Affecting a Parcel
Zone A	<ul style="list-style-type: none">All three hazard types (i.e., landslide, sinkhole, and collapsible/compressible soils) are rated low	Low
Zone B	<ul style="list-style-type: none">Any <u>one</u> of the three hazard types (i.e., landslide, sinkhole, and collapsible/compressible soils) are rated moderate.	Moderate
Zone C	<ul style="list-style-type: none">Any <u>one</u> of the three hazard types (i.e., landslide, sinkhole, and collapsible/compressible soils) are rated high	High

A Geotechnical Constraints Map was created on this basis by combining the three geohazard maps into one and is presented in Appendix B, Map 6.0. The zones, interpreted in the following section, form the basis for guiding development decisions.

Geotechnical Constraints Zone Map





- See Map 6.0 Geotechnical Constraints Zones



- Develop Land Use Management Policies for Hazard Lands
 - Incorporate Study Results into Current ByLaws
 - Develop Geotechnical Report Requirements
 - Soil Removal and Deposition Bylaw
 - Develop Specific Land Use Activity BMPs
 - Public Education and Outreach
- Address Data Gaps
 - Incidence Tracking and Data Management
 - Subsurface Soils Investigation
 - Additional Groundwater Investigation and Monitoring
 - Update the 1994 Wastewater Management Plan
 - Improve Stormwater Management Practices
 - Periodic Review of Geohazard Conditions

Recommendations



**Regional District of Okanagan Similkameen
Electoral Area F**

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