PRETIVM

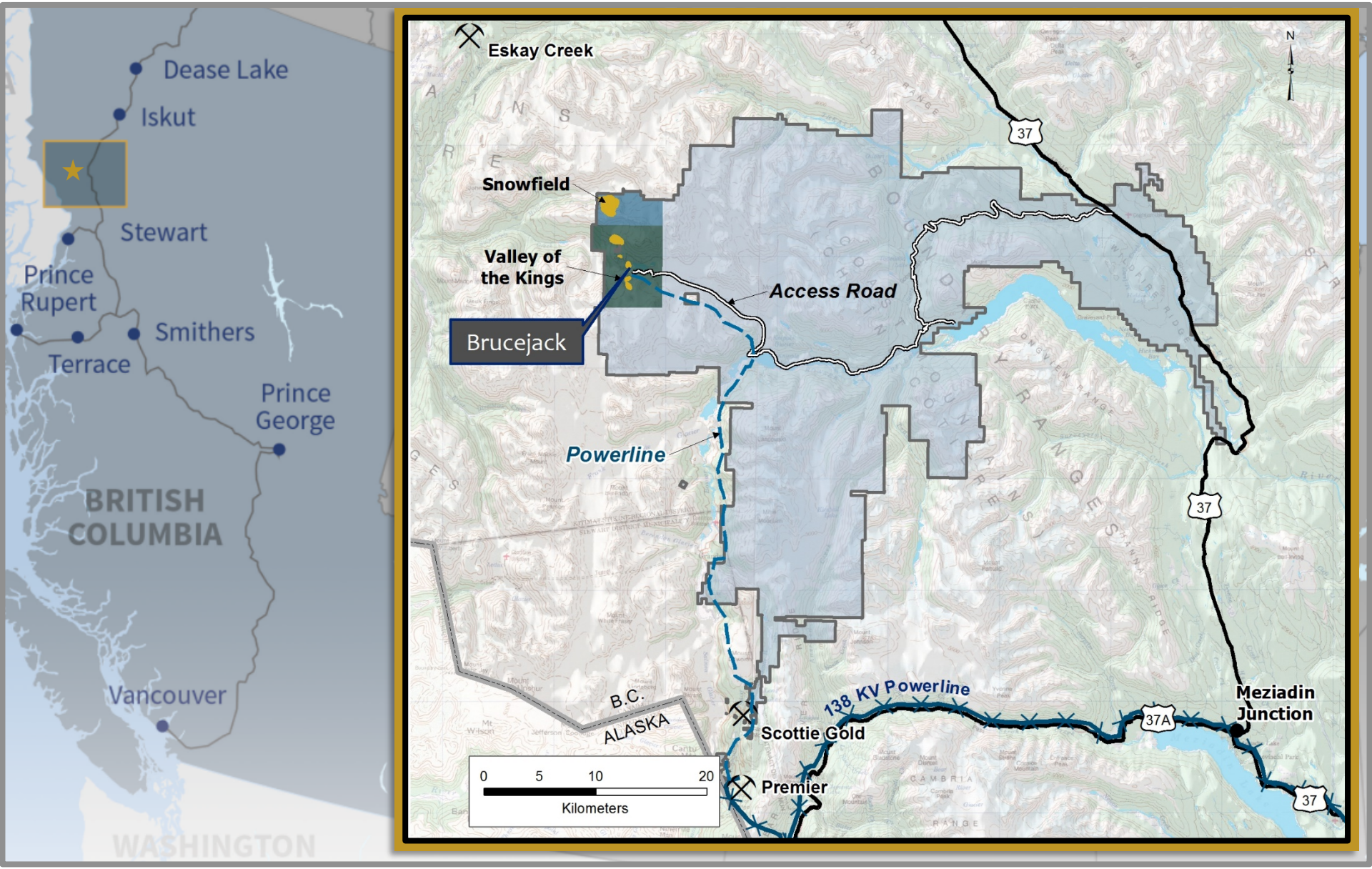
Metal Leaching and Acid Rock Drainage Prediction, Prevention and Mitigation at the Brucejack Gold Mine

Colleen Atherton and Alison Shaw

November 28, 2018

Brucejack Mine
Located in Northwest BC

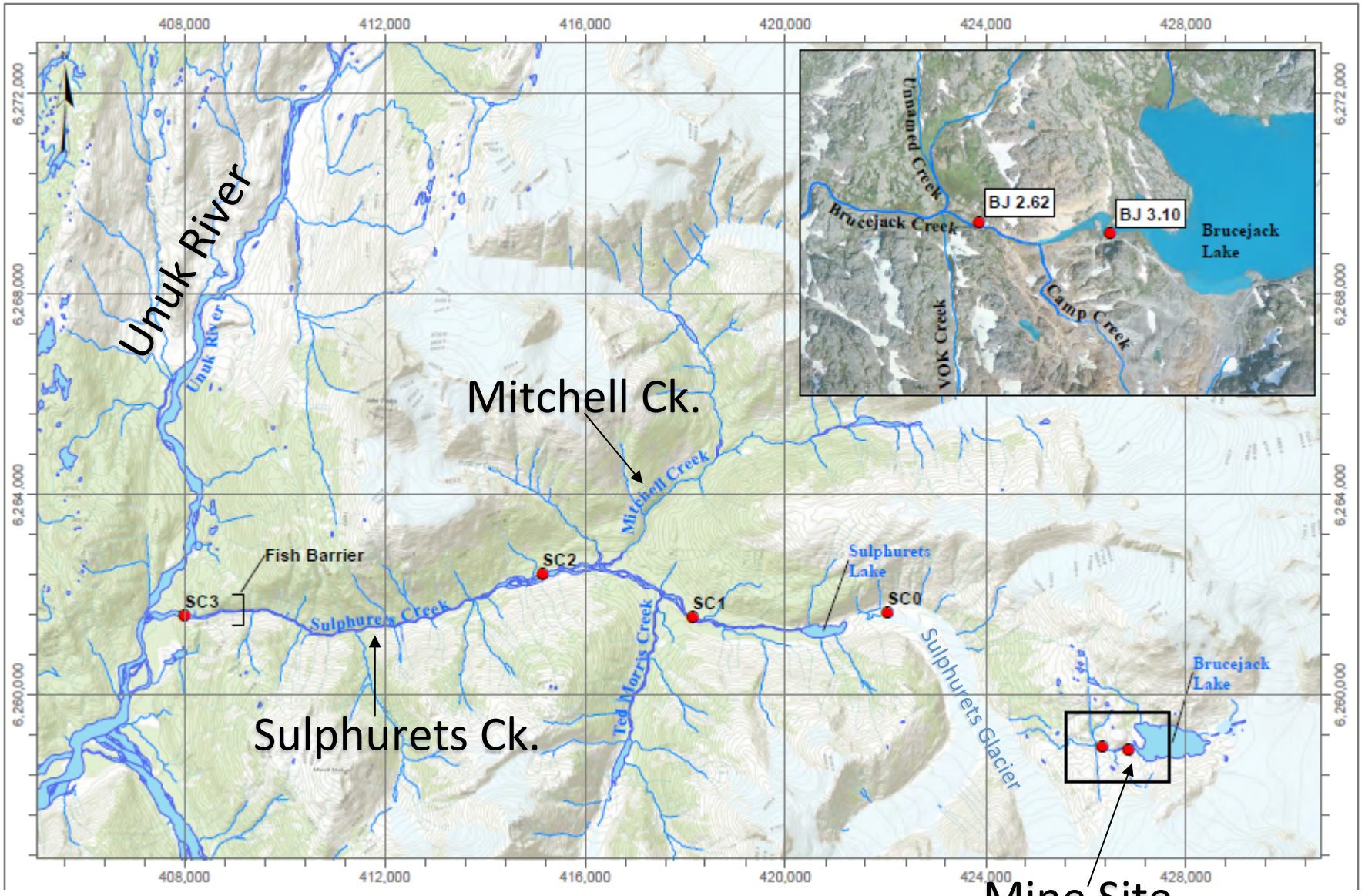
PRETIVM



Mine Site Surface Layout

PRETIVM

Receiving Environment



ARD Potential

- Volcanic arc-related epithermal vein deposit
- Large gossan
- Low pH observed seasonally in local creeks
- ABA analysis from previous operator indicated waste rock was PAG (MEND, 2005)

ARD Prevention & Mitigation

PRETIVM

- Metal Leaching/ Acid Rock Drainage Management Plan
  - Water Quality model developed to predict effects
  - Minimize bedrock disturbance
  - Confirm and document geochemical assumptions
  - Triggers for further investigation

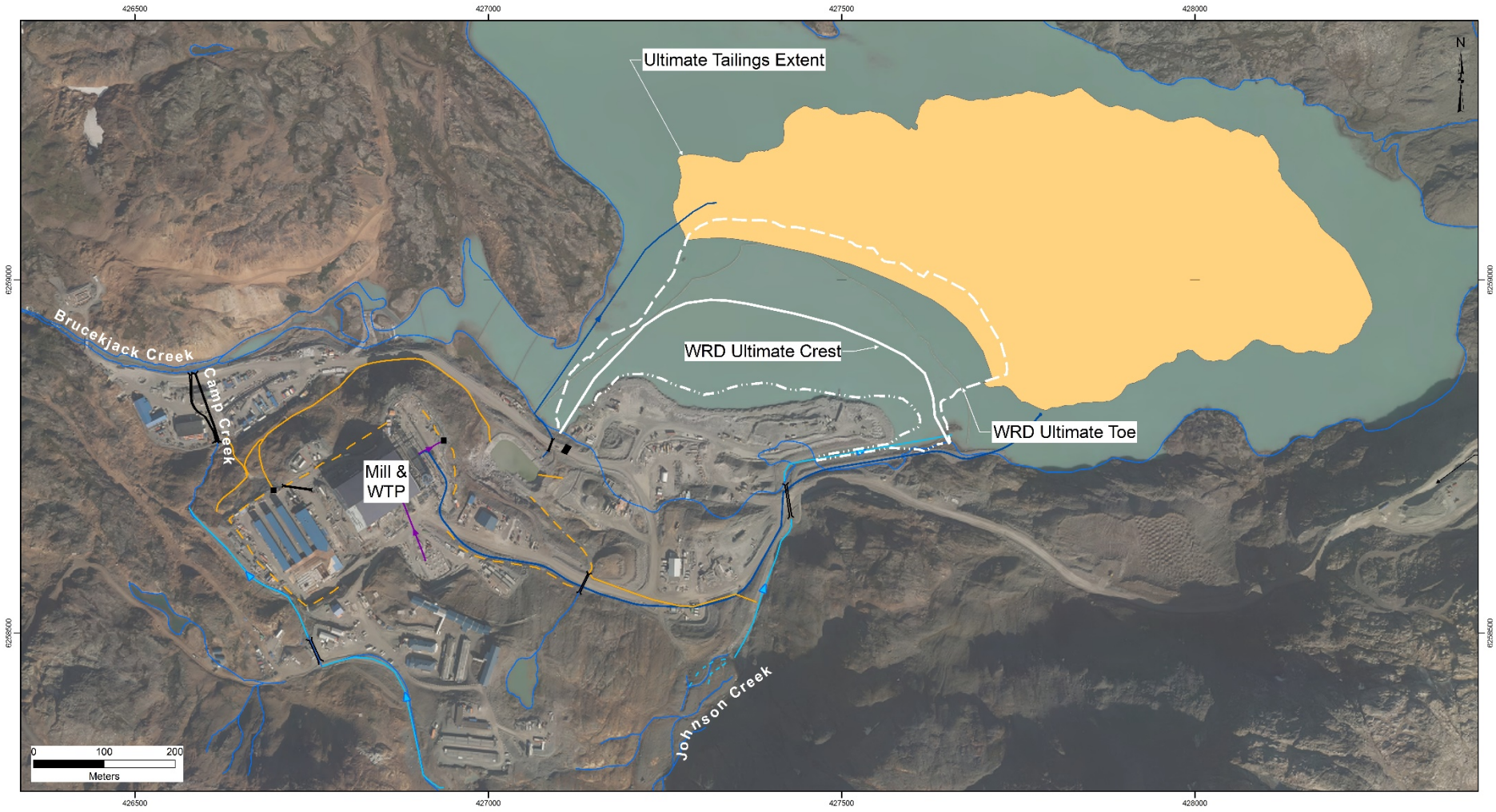
ARD Prevention

PRETIVM

- Mine designed and constructed to prevent/minimize ARD generation
  - Core infrastructure platforms ~30 ha.
- Management strategies
  - Minimize surface excavation
  - No PAG rock permitted for use in surface construction
  - Place all waste rock under permanent water cover

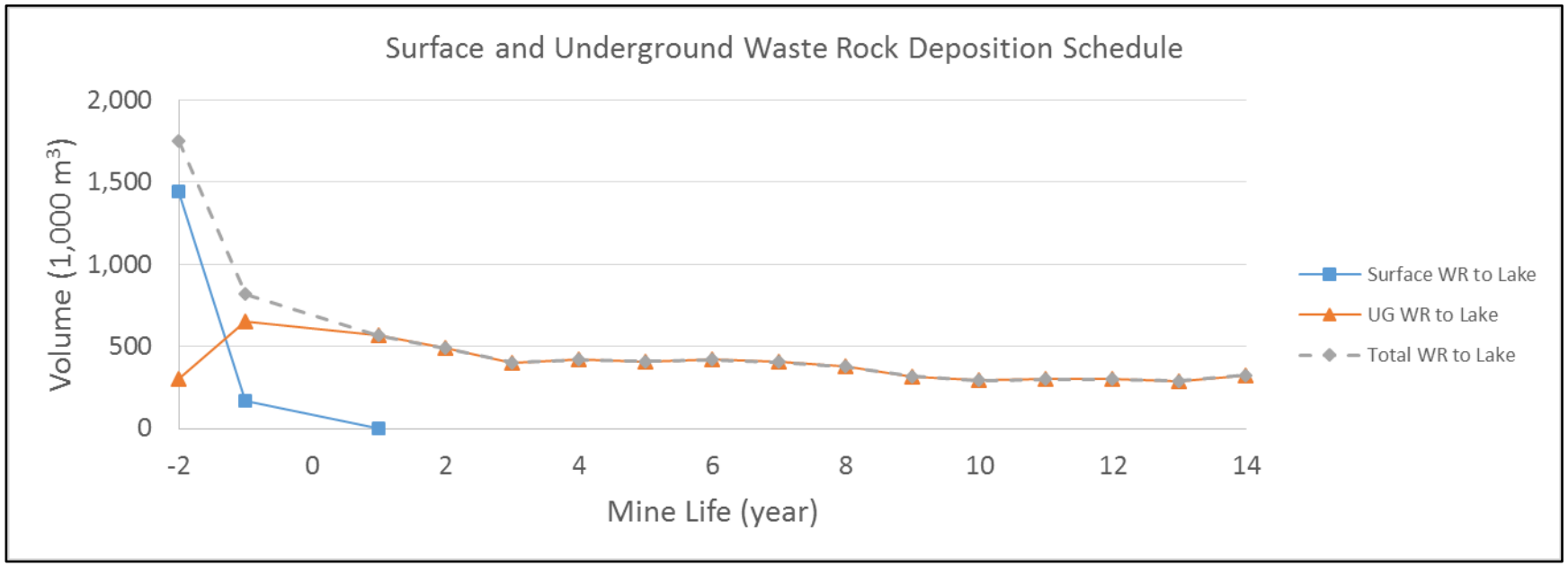
Waste Rock Deposition

PRETIVM

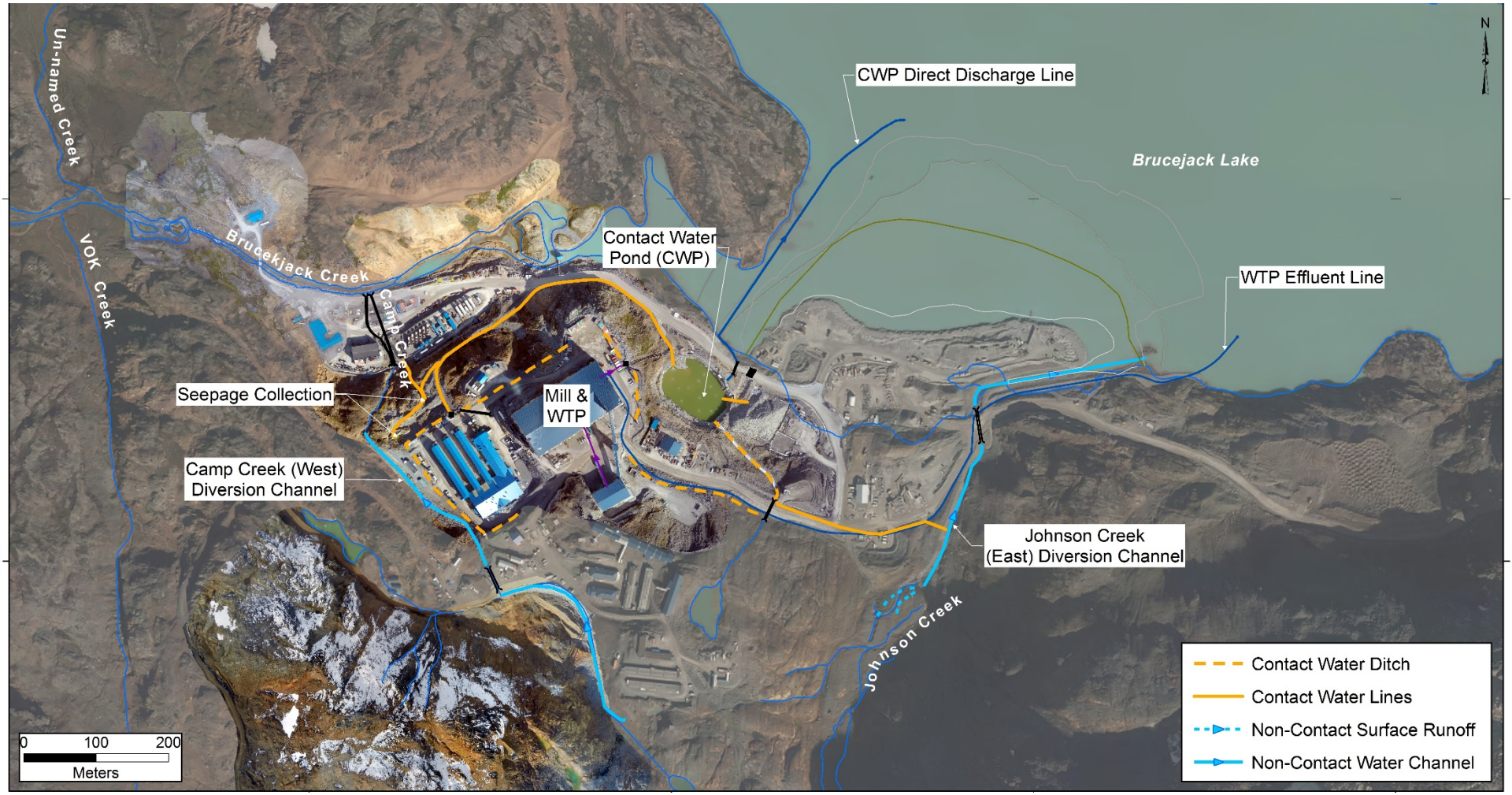


Waste Rock Deposition

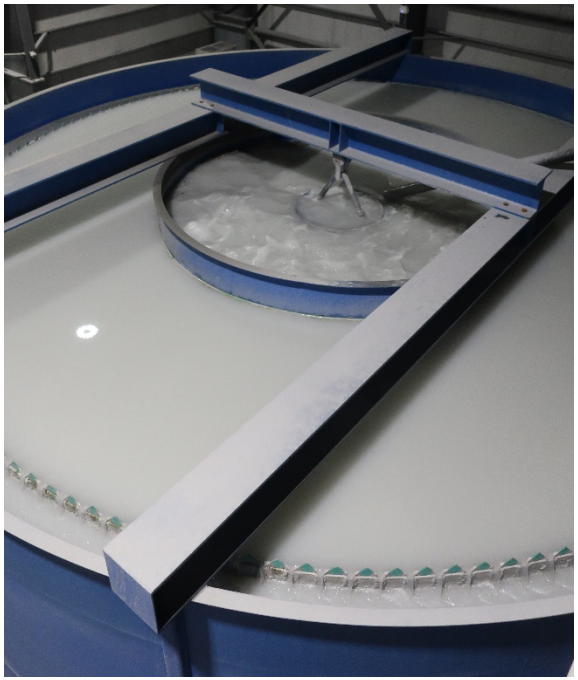
PRETIVM

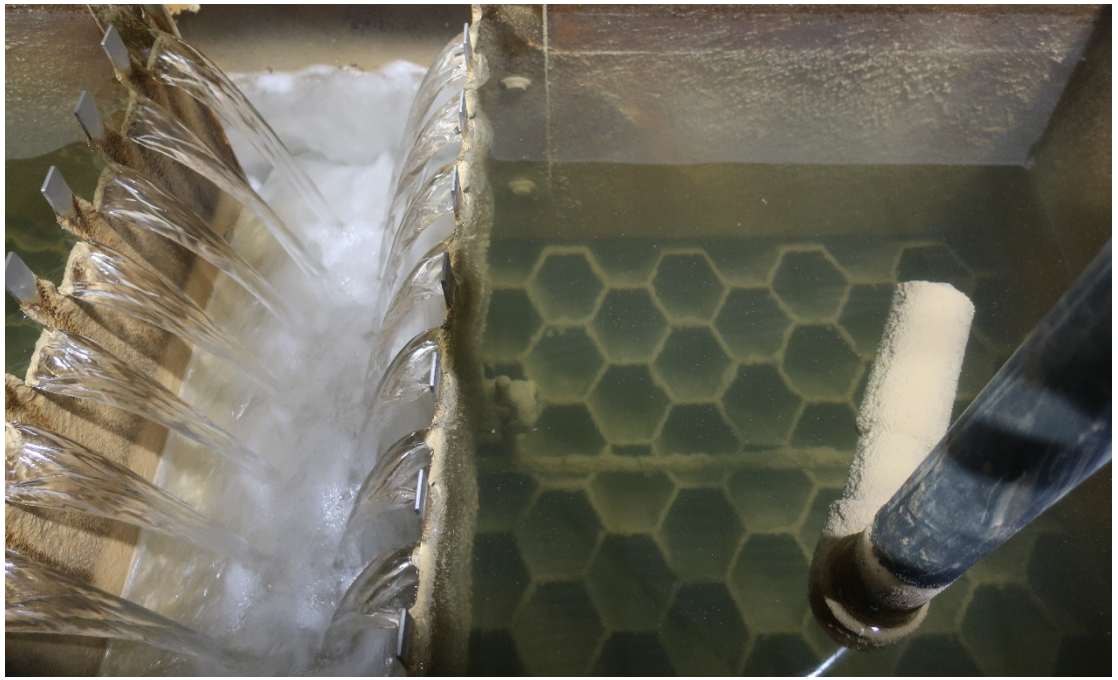


Contact Water Management



ARD Mitigation





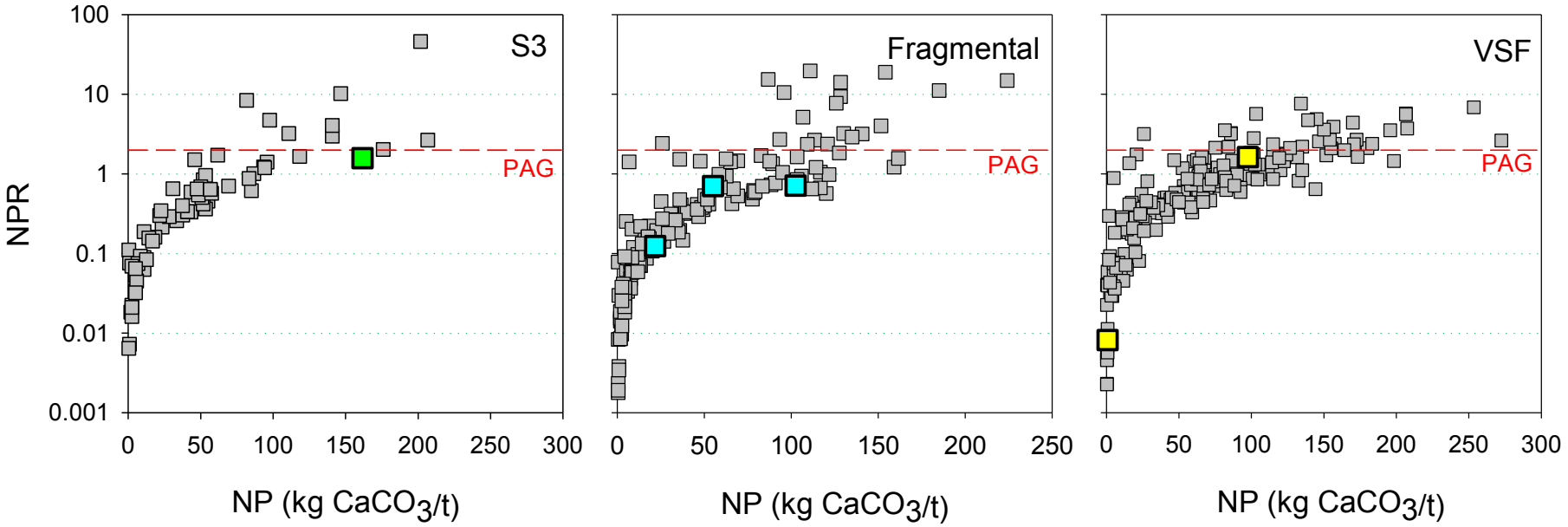
- Water Treatment Plant
  - Designed to treat maximum predicted concentrations
  - Designed to removed TSS and targeted metals and adjust pH
  - Will operate as long as necessary to mitigate impact of ARD from underground workings and surface disturbance

Ongoing Characterization

- Water quality model developed from preliminary data
- Updates required every five years
- Includes a variety of data sources from each lithology:
  - Static testing (> 500 samples)
  - Humidity cells (46)
  - Saturated columns (15)
  - Field Bins (14)
  - Wall washing stations (5)
- ML/ ARD Mgmt Plan identifies triggers for additional investigation or review of model

Ongoing Characterization

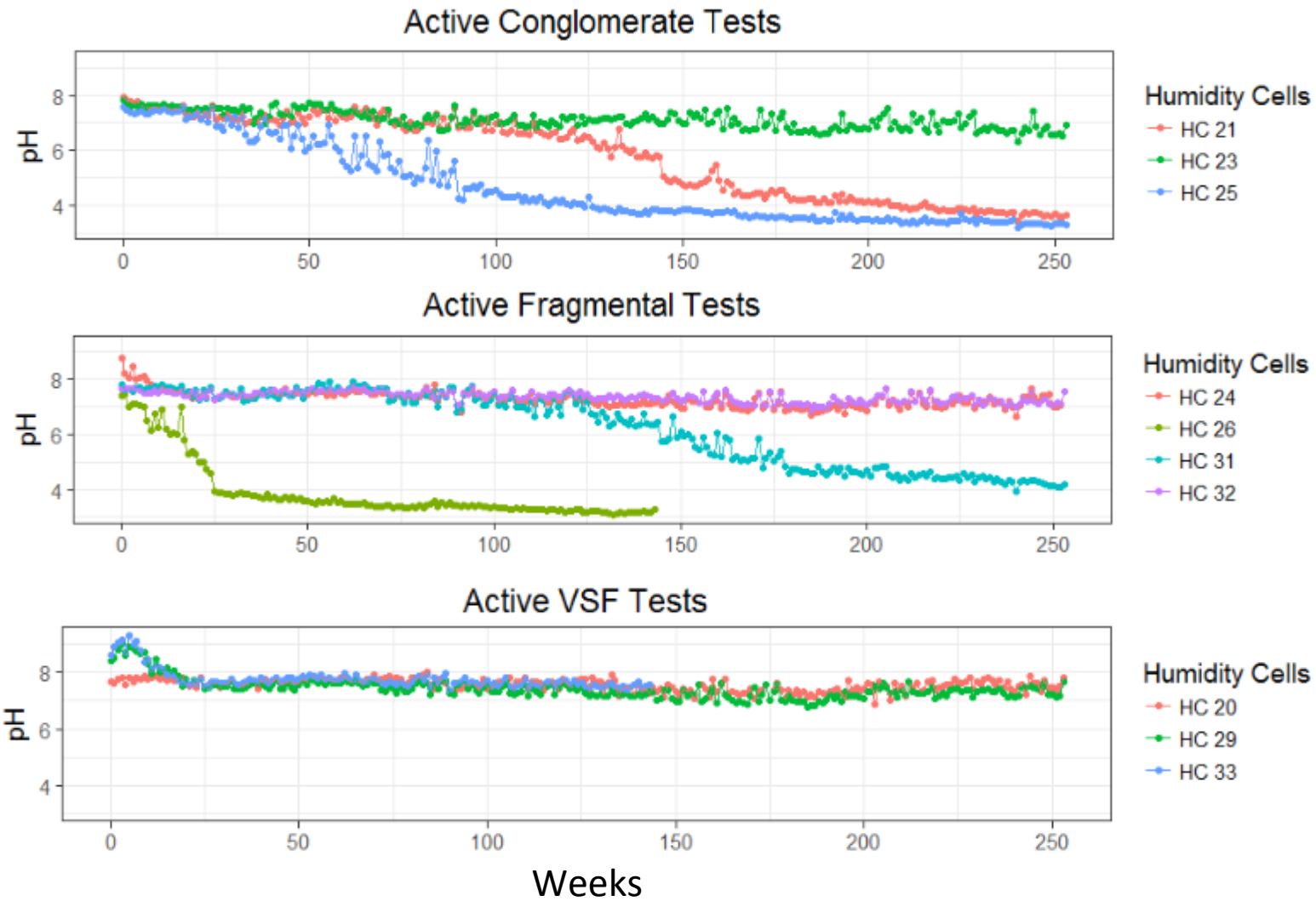
Underground Waste Rock Static Test Results



- Conglomerate (S3) – Heterolithic boulder to coarse cobble conglomerate with sandstone
- Fragmental (V12) – Hornblende and/ or feldspar phyric latite to andesite fragmental volcanic rocks and subordinate flows with minor ash and lapilli tuff
- Volcanic Sedimentary Facies (VSF) – Volcanically derived siltstone and sandstone with minor arenite and pebble conglomerate

Ongoing Characterization
Humidity Cell Tests

PRETIVM



Geochemical Assessment of Impact

PRETIVM

Geological Model Unit	Relative % of Underground Waste Rock	HCT Time Until CaNP Depletion (years)		Field Bin ID	Field Bin Time Until CaNP Depletion (years)
		Base Case	Upper Case		
Volcanic Sedimentary Facies (VSF)	52.1	258	61	FB-2	1431
				FB-4	2337
Fragmental	22.0	127	3	FB-5	776
				FB-6	207
				FB-7	1112
Conglomerate (S3)	16.4	144	12	FB-8	376
Bridge P1	5.2	792	343	FB-3	4539

- Calculated NP depletion times are >> 2 years
- Loads accumulated during the first 2 years of exposure, based on lithology-specific field bin data and estimated exposed volumes were incorporated into the water quality model
- Loads associated with exposed waste rock are insignificant and result in insignificant change to lake water quality (e.g., a change of < 0.4 mg/L SO4, < 1ng/L As, < 1ng/L Zn)

Ongoing Studies

- Kinetic tests ongoing
  - Behaviour of waste in lake and UG mine
  - Behaviour following flooding
- Wall Washing
  - Evolution of mine wall geochemistry
  - Planning for closure
- Results used to refine site WQ model

PRETIVM

Questions

References

- Highland Valley Copper. 2017. Annual Reclamation Report for 2017 – Volume I. Logan Lake, BC: Highland Valley Copper
- Pretivm Resources Inc. 2015. Application for *Mines Act* and *Environmental Management Act* Permits. submitted May 2015.
- Pretivm Resources Inc. 2017. 2016 Annual Report for *Mines Act* Permit M-243, Effluent Permit 107835, Air Permit 107025. submitted March 2017.
- Pretivm Resources Inc. 2018. 2017 Annual Report for *Mines Act* Permit M-243, Effluent Permit 107835, Air Permit 107025. submitted March 2018.
- MEND. 2005. Case Studies of ML/ARD Assessment and Mitigation: Placement of the Sulphurets Waste Rock in Brucejack Lake. MEND report 9.1c, July 2005.
- Red Chris Development Company Ltd. 2017. Annual Reclamation and *Environmental Management Act* Report for 2017. submitted March 2017.

PRETIVM

BRUCEJACK MINE

Phone: 604-558-1784
Fax: 604-558-4784
Toll-free: 1-877-558-1784

invest@pretivm.com

Pretium Resources Inc.
Suite 2300 – 1055 Dunsmuir St.
Four Bentall Centre
PO Box 49334
Vancouver, BC, Canada V7X 1L4