

A proven gold producer

Exploration for breccia hosted gold deposits in north east Queensland

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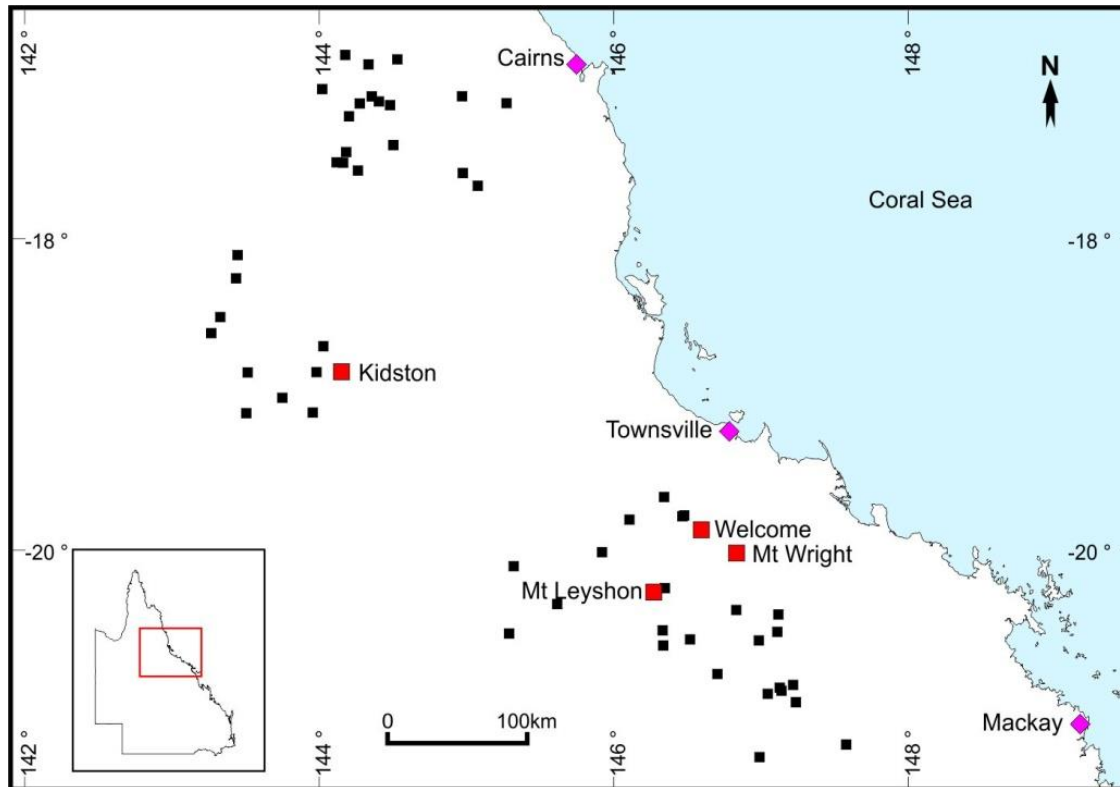
² Klondike Exploration Services, Townsville, QLD

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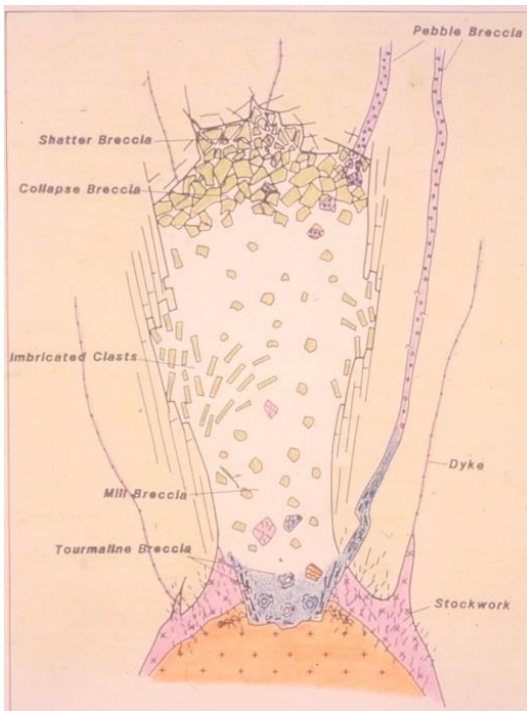
Resolute
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Introduction

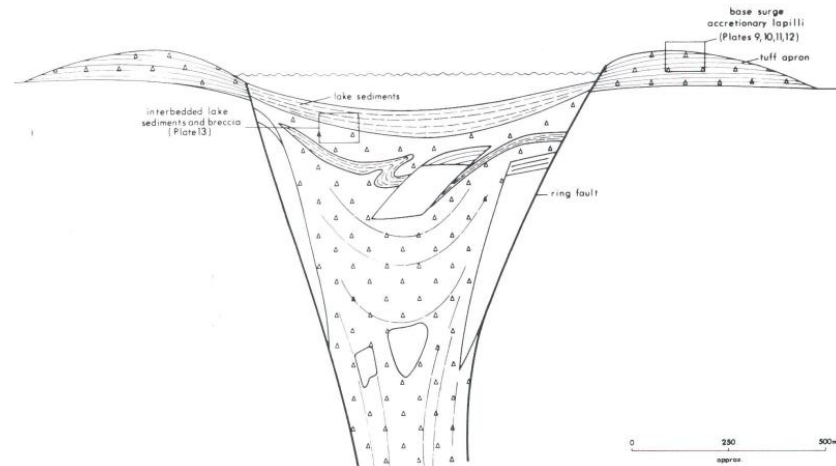


- Several significant Au deposits in NQ associated with hydrothermal/magmatic breccia pipes:
 - Kidston (5Moz)
 - Mt Leyshon (3Moz)
 - Mt Wright (1Moz)
 - Welcome (0.2Moz)
 - Mungana (Au + BM)
- Many other (>100) barren or weakly anomalous breccia systems identified.

Background – Magmatic/Hydrothermal Breccias



Sub-volcanic Breccia Pipes
(e.g. Kidston)

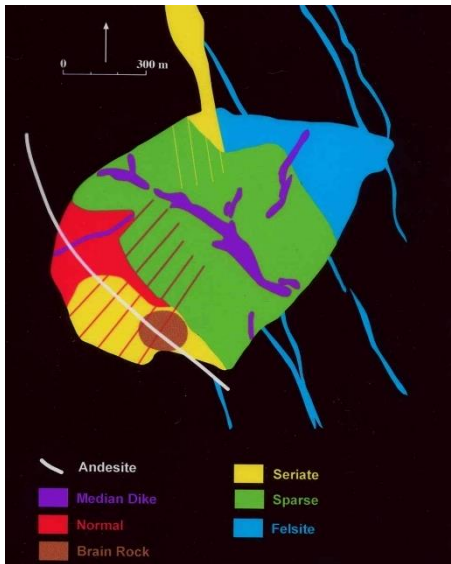


Maar / Diatreme / Volcanic
complexes (e.g. Pueblo Viejo, D.R.,
Mt Success, QLD)

Also fault related breccias with later
hydrothermal/ magmatic input (e.g.
Buck Reef, Ravenswood, QLD)

Mineralisation post-dates or less commonly synchronous with breccia formation.

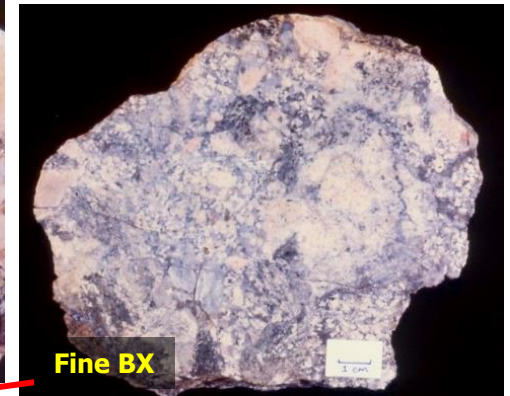
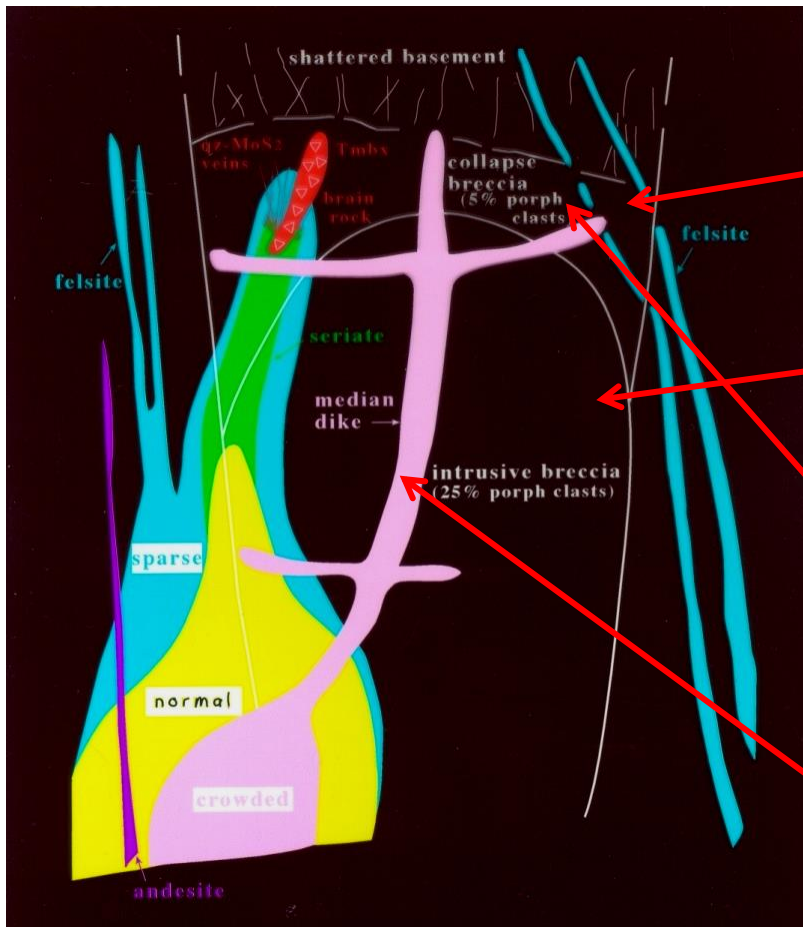
NQ Examples - Kidston



Surface map

- Discovered in early 1980's
- Mined from 1984-2000
- 5Moz total production
 - 80Mt @ 1.56g/t (Wises pit)
 - 29Mt @ 1.16g/t (Eldridge pit)
- Hosted within 1100 x 900m breccia pipe – extends to at least 1300m deep.
- Located adjacent to contact of middle Proterozoic Metamorphics and Sil-Dev. granodiorite.
- Breccia related to intrusion of Carboniferous aged rhyolite dykes and plugs.

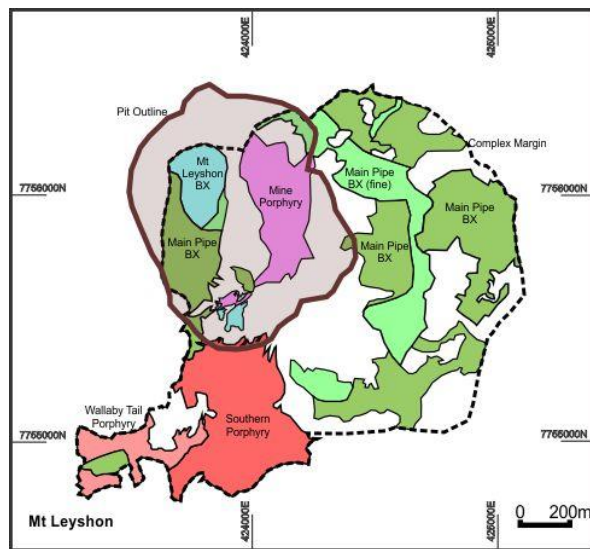
Kidston



Mt Leyshon

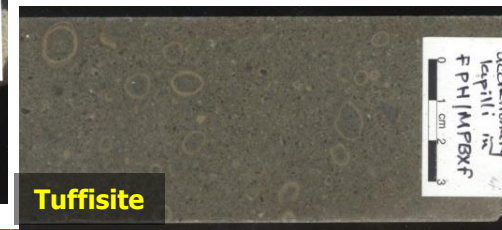
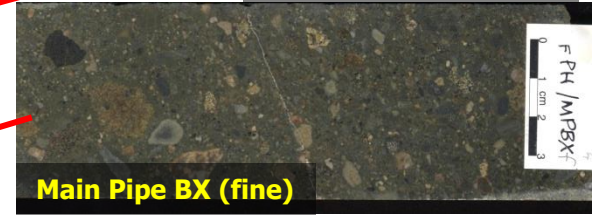
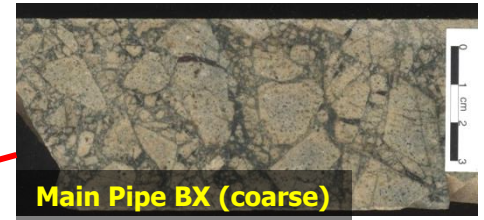
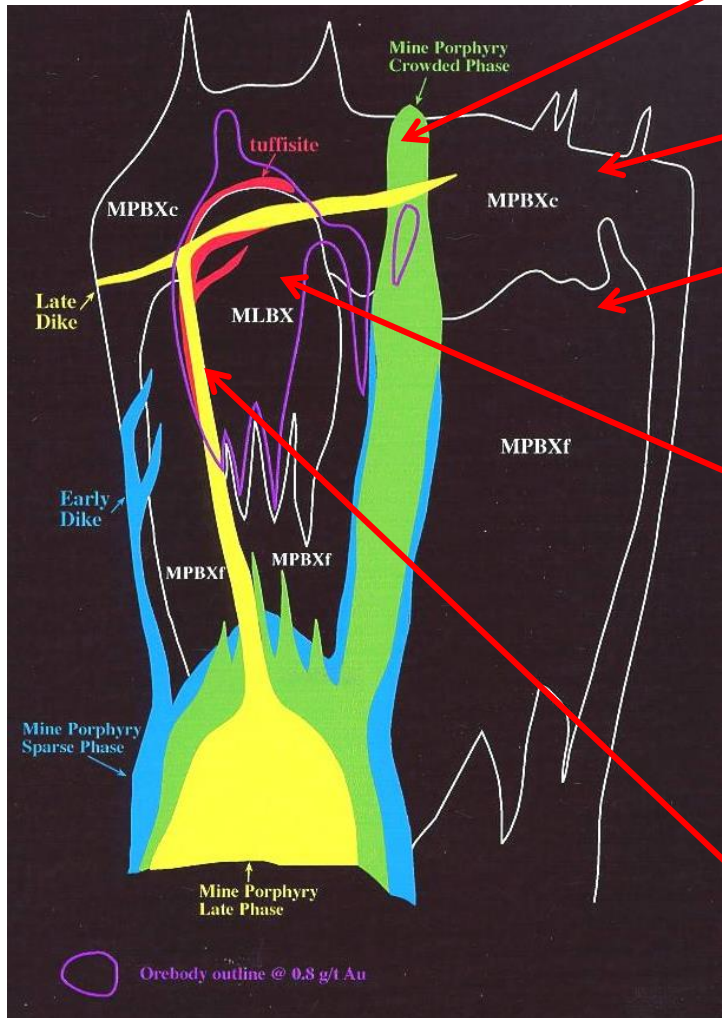


- Discovered in early 1980's
- Mined from 1987-2001
- 3Moz total production
 - 70Mt @ 1.43g/t
- Occupies NW corner of 1.5km diameter breccia complex.
- Located on contact between Cambrian meta-seds and Ordovician granite.
- Breccia related to early dacite/rhyolite and late trachyte/trachy-andesite intrusions of Carboniferous-Permian age.

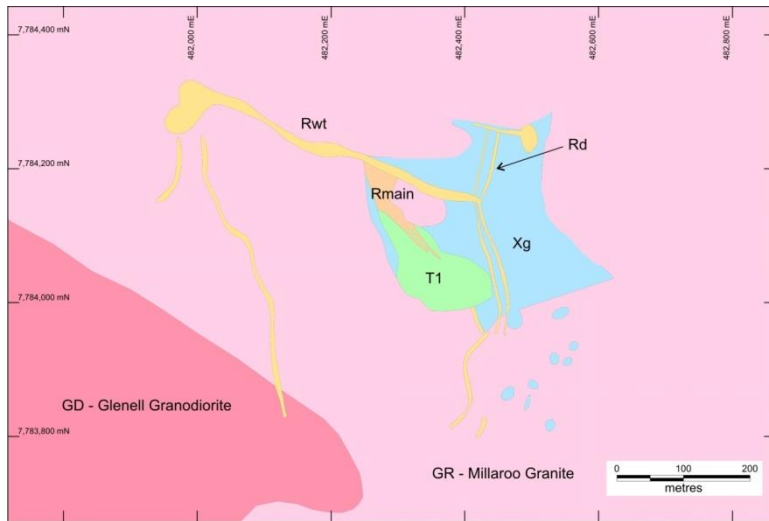


Surface map

Mt Leyshon



Mt Wright

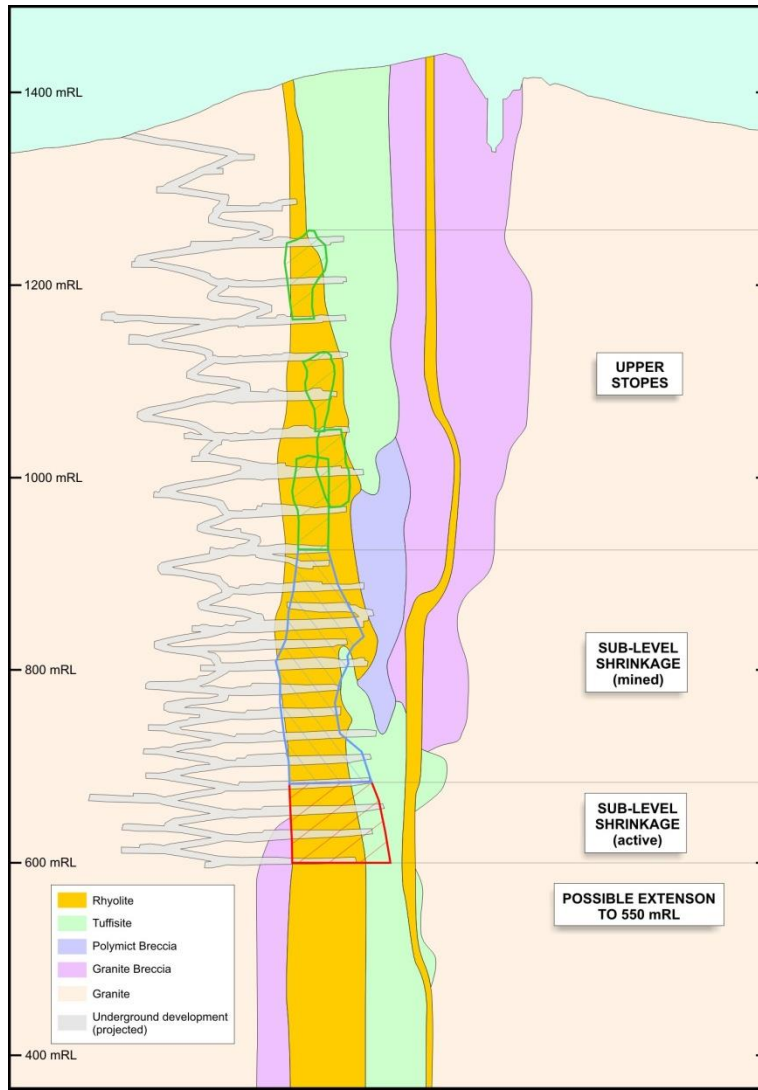


Surface map

- Discovered in 1992 (main lode).
- Mined from 2006-present (by RML).
- 1Moz total endowment
 - 5.6Mt @ 2.8g/t - 510koz (production to date)*
 - 3.3Mt @ 2.8g/t (Reserves)*
 - 1.7Mt @ 3.1g/t (Resources)*
- Occupies SW portion of 300 x 300m breccia complex, extends to at least 1200m deep.
- Located within Ravenswood Batholith near contact of Ordovician granite and granodiorite.

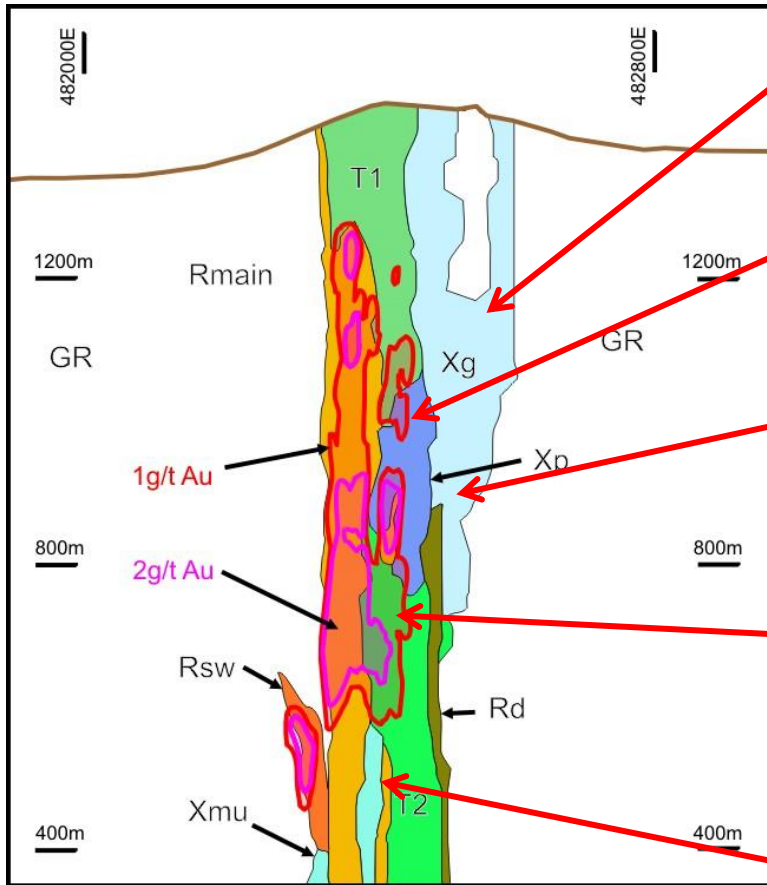
* As of 30 June 2013

Mt Wright

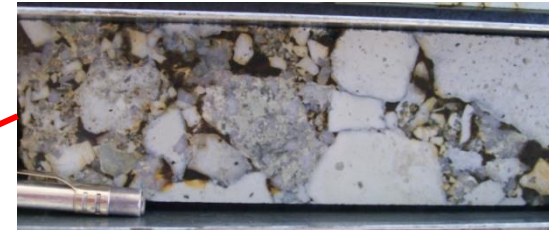


- Top of orebody approx 150m below the surface.
- Upper levels mined by sub-level stoping.
- Currently mined by sub-level shrinkage (caving) with continuous fill.
- Current depth of mining approximately 700m below surface on 3 production levels.
- 141,846oz produced in 12/13 @ cash cost of \$760/oz (AISC = \$1,079/oz).
- Exploration drilling ongoing.

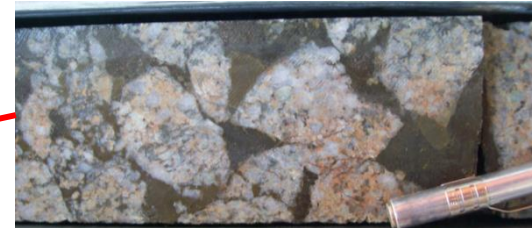
Mt Wright



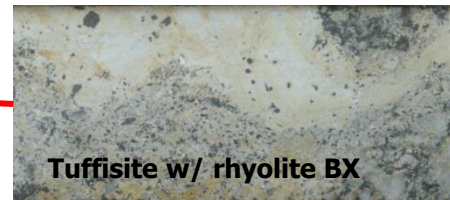
Granite "mush" BX



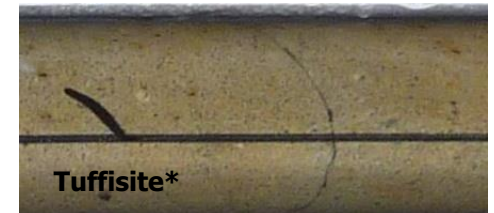
Polymict BX



Granite BX (cavity fill)



Tuffisite w/ rhyolite BX



Tuffisite*

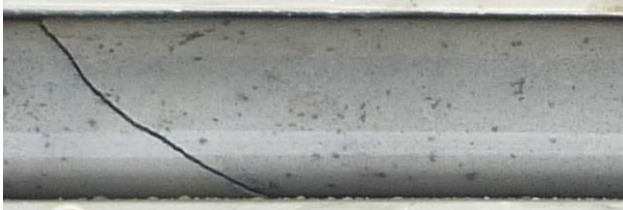


Granite "mush" (deep)

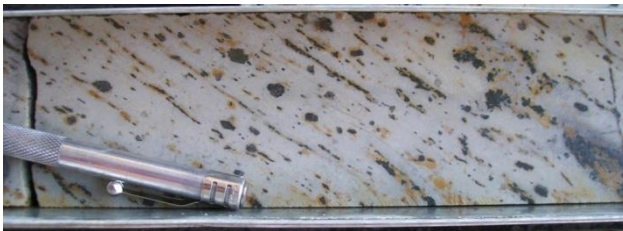
***Tuffisite: Intrusive/hydrothermal units with tuff appearance (ash-matrix, lapilli-sized clasts etc)**

Mt Wright

Rhyolites – Core to Margin



RM: Massive Rhyolite



RF: Flow Banded Rhyolite

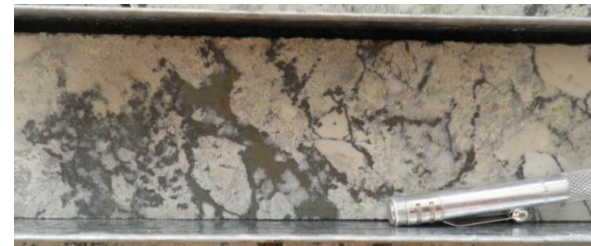


**RY: "Yoghurt Textured" Rhyolite
(Highly contorted flow banding)**

Rhyolite Breccias

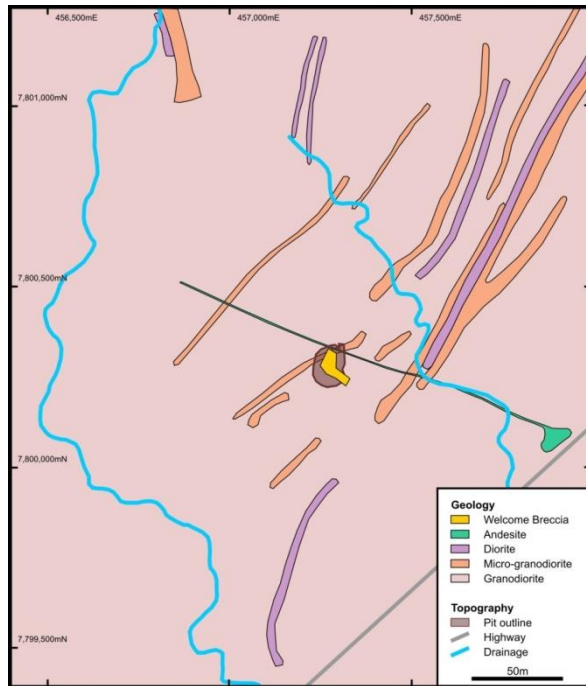


**RB: Rhyolite "Blobby BX"
auto-breccia in plastic rhyolite intrusions**



**RX: Rhyolite BX
Hydrothermal**

Welcome



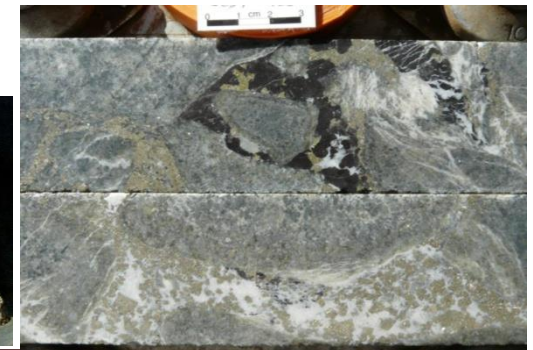
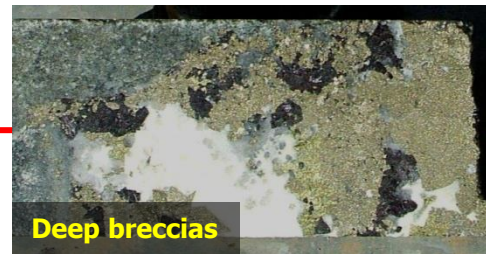
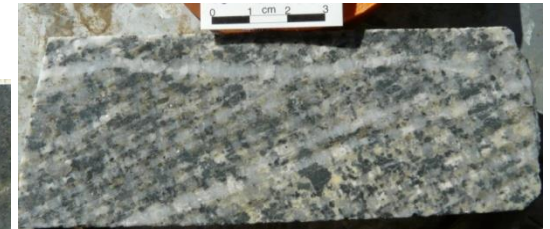
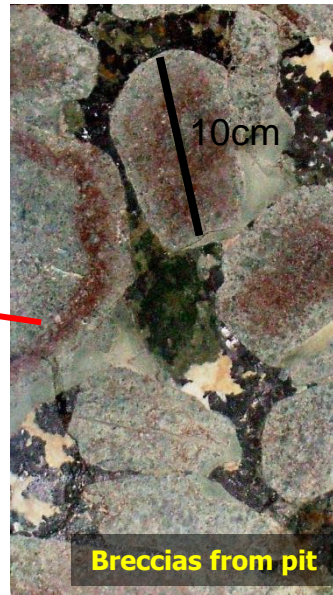
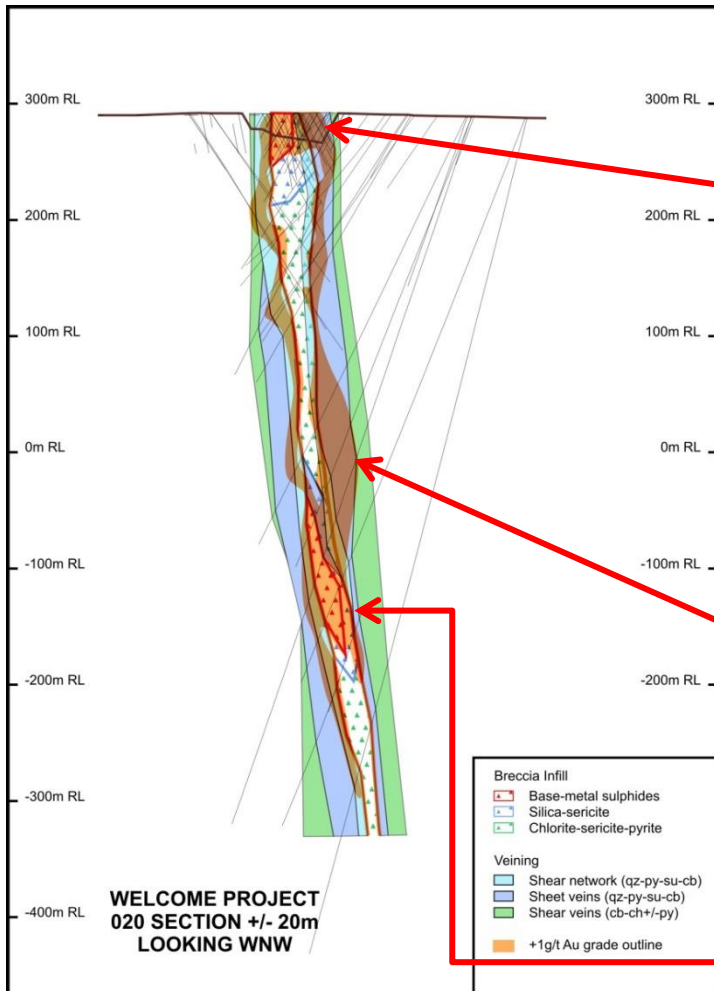
- First drilled in 1950's – initial resource outlined in 1980's.
 - Au grade decreased below 50m depth.
 - No drilling below 100m.
- Mined in 1994.
 - 65,208t @ 1.87g/t Au (3,915oz).
- RML signed JV with previous holder in 2009 and commenced three hole diamond drilling program.
- Third hole (WED003):
 - 113m @ 7.7g/t Au from 316m.
- Current Resource (inferred):
 - 2.04Mt @ 3.2g/t (210,000oz).
- Scoping study completed in 2011.

Welcome



- Breccia pipe is only 50 x 20m across, but at least 600m deep.
- Hosted in Ordovician granodiorite.
- Breccia probably related to early faulting then intrusion of diorite / andesite – possibly in Devonian.
- Mineralisation hosted in both breccia and vein array outside of pipe.
- Mineralisation age still inconclusive.

Welcome



Exploration Model for Breccia Hosted Au

- Mineralised portions of the all the breccia complexes described was discovered and mined historically.
- However, the main orebody is often offset or within a different part of the complex (e.g. Mt Wright) and/or deeper (e.g. Welcome).
- As breccia-hosted systems have been a popular exploration target since the 1980's numerous systems have been found – however few have turned into deposits.
- Despite numerous differences, certain characteristics of the known breccia-hosted Au deposits in NQ, can be used as an exploration model for potentially mineralised systems.
- This exploration model includes both early reconnaissance and advanced stage techniques.

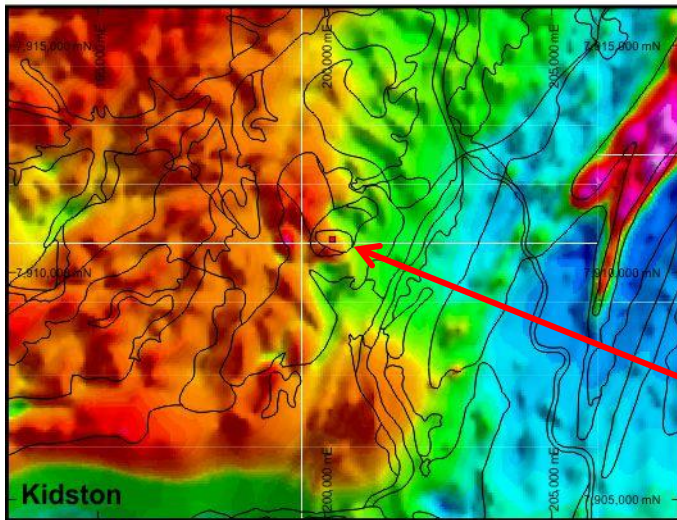
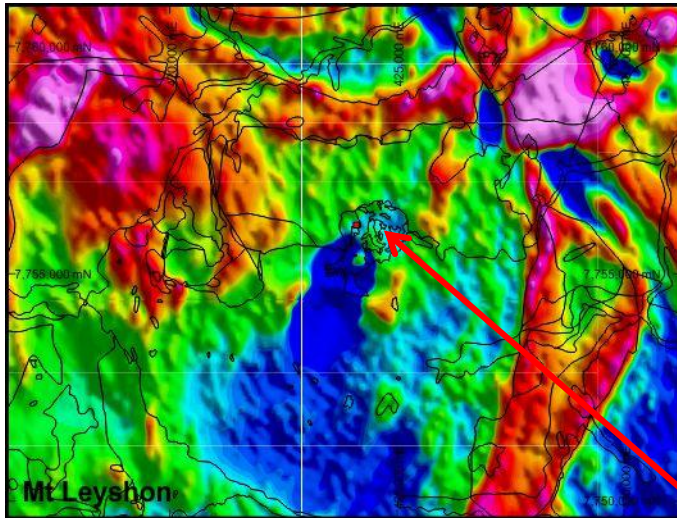
1. Topography



- Kidston, Mt Leyshon and Mt Wright are/were distinct topographic highs.
- Hydrothermal quartz alteration.
- Airborne recon surveys in 80s-90s, identified numerous systems.
- No good in areas of late cover – ambiguous if roof of system still buried (possible depression)?



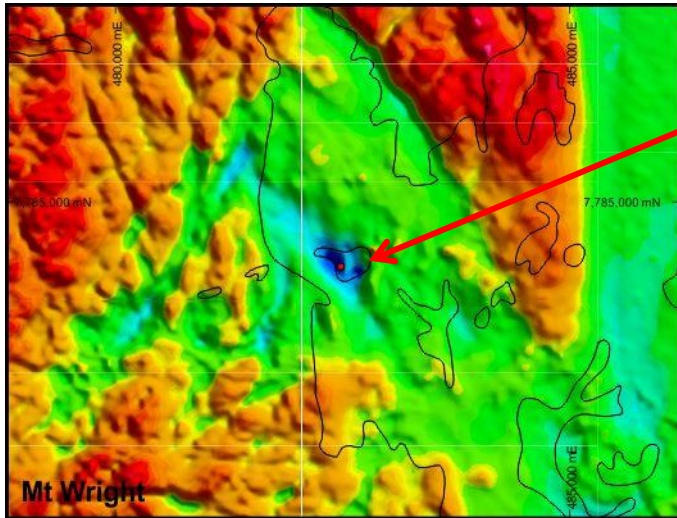
2. Magnetics



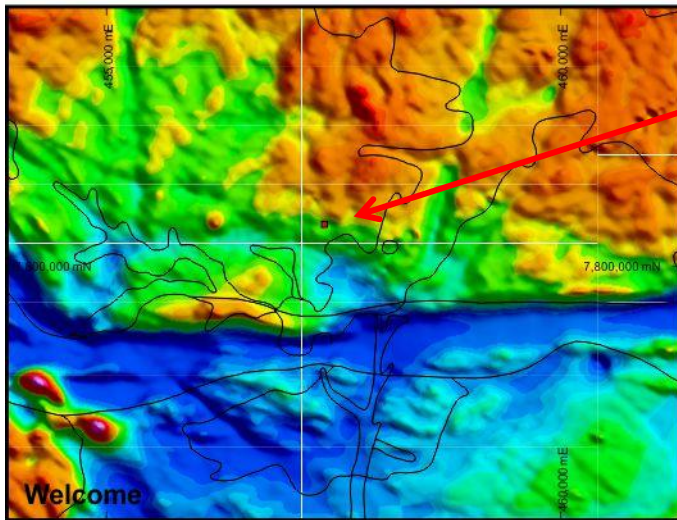
5km

- Magnetic anomalies can be variable.
- Ore stage alteration usually mag. destructive.
- Complicated by other features such as:
 - Intrusive plugs / dykes
 - Pyrrhotite (or magnetite) mineralisation
 - Low primary susceptibility of host
- Mount Leyshon:
 - Strong reverse polarised feature immediately south of deposit
 - Related to bt-mt alteration/hornfels associated with southern porphyry
 - Feature not directly related to mineralisation stage
- Kidston:
 - No obvious magnetic feature (at regional scale)
 - Felsic intrusions in felsic host.

2. Magnetics



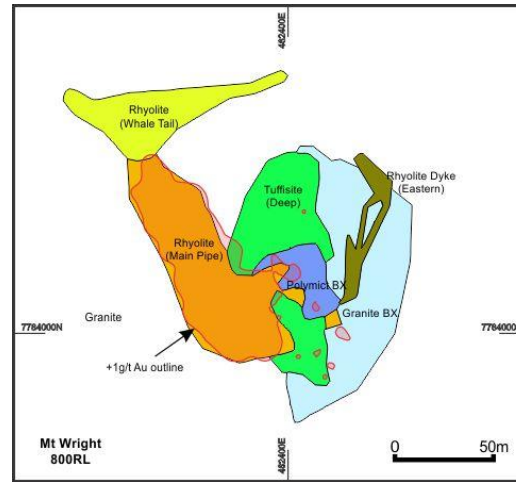
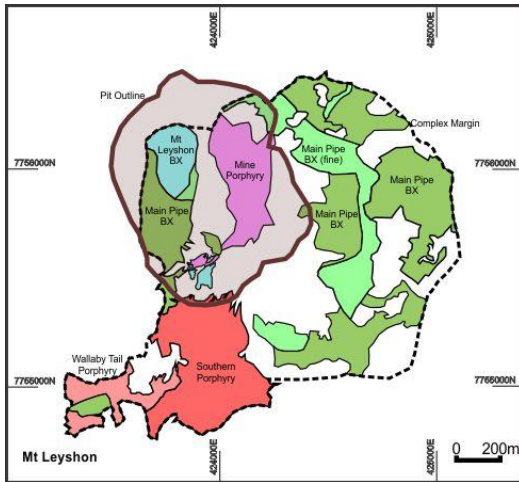
- Mount Wright:
 - Strong reverse polarised feature
 - Poorly understood.
 - Could be related to dolerite dykes or early, high T potassic alteration (typically deeper in complex).



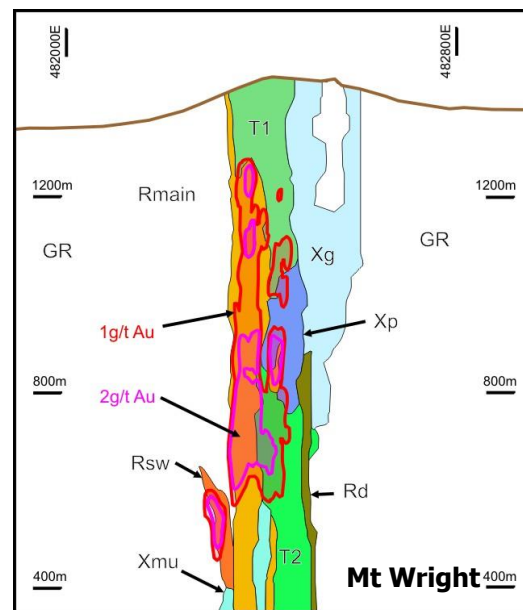
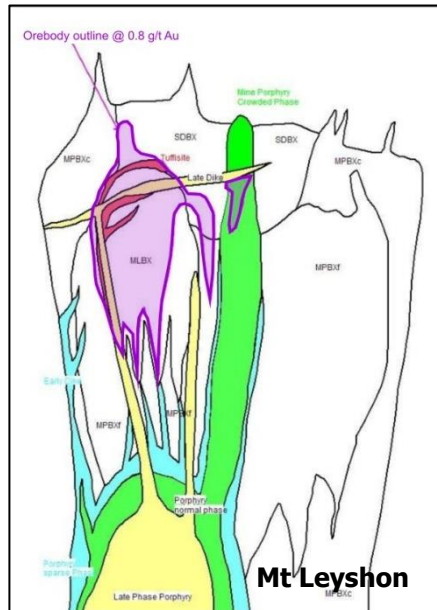
- Welcome
 - Demagnetised zone associated with sericite alteration with pipe.
 - Too small to identify at regional scale.

2.5km

3. Orebody Relative to Breccia System



- Orebody is often only a small percentage of the overall breccia system.
- Important not to dismiss a system, just because the “exposed” part is not mineralised.
- Use other criteria to assess...



4. Preferred Host - Breccia Facies



Matrix supported BX (Mt Leyshon)

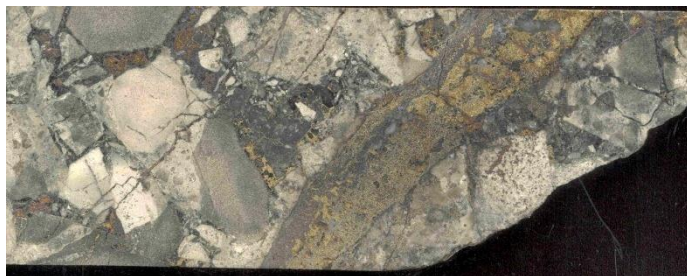


vs



Clast supported BX (Mt Leyshon)

- Mineralisation fluid typically postdates formation of breccia.
- Clast supported breccia better host – more open space.
- Matrix supported often relatively impermeable.
- Mineralisation can also be controlled by cross-cutting structures – can be combination of breccia cavity and vein fill.



Veins overprinting BX (Mt Leyshon)

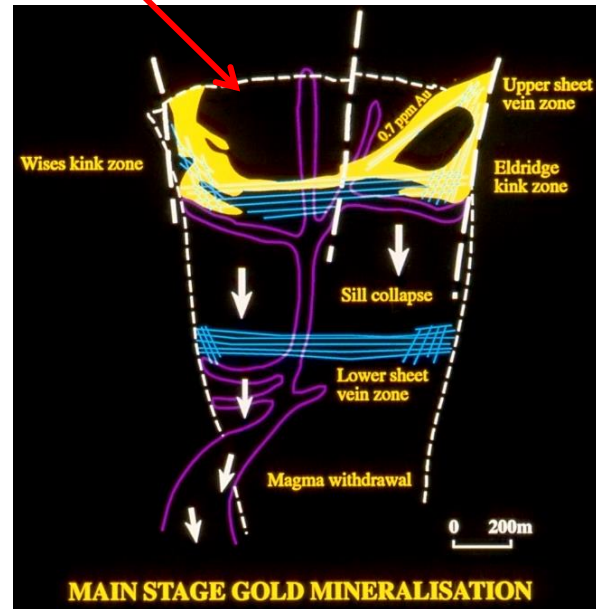
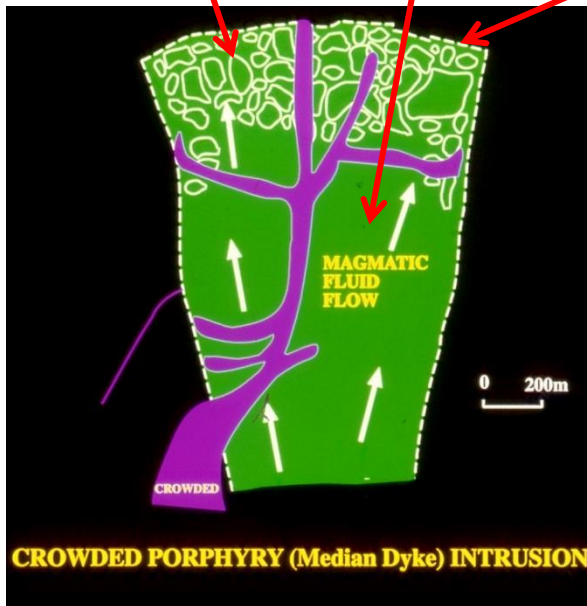
5. Pressure Release and Trap

Kidston

Clast supported BX

Matrix supported BX

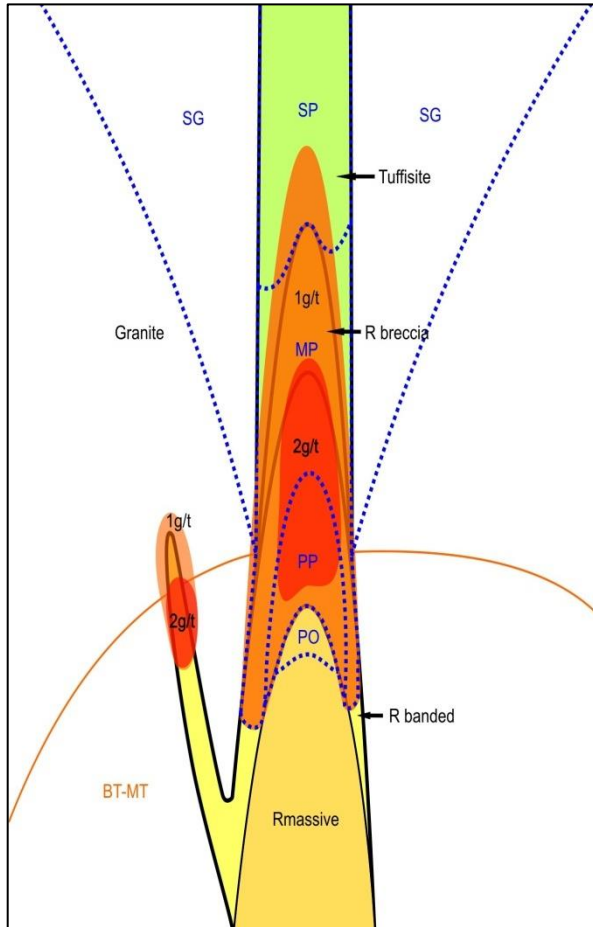
Roof (trap)



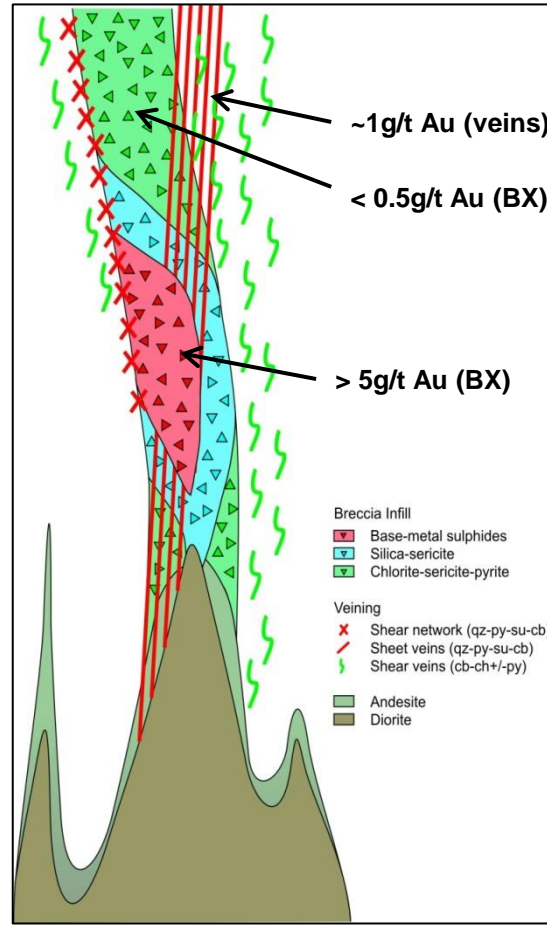
Pressure release ->
Decompression boiling

- Breccias can be efficient fluid pathways.
- Still need trap and mechanism for fluids to precipitate.
- Controls (concentrates) grade.
- Roof of breccia acted as trap at Kidston and Mt Leyshon.
- Fluids precipitated via decompression boiling – result of gravitational collapse and/or magma retreat.

5. Pressure Release and Trap



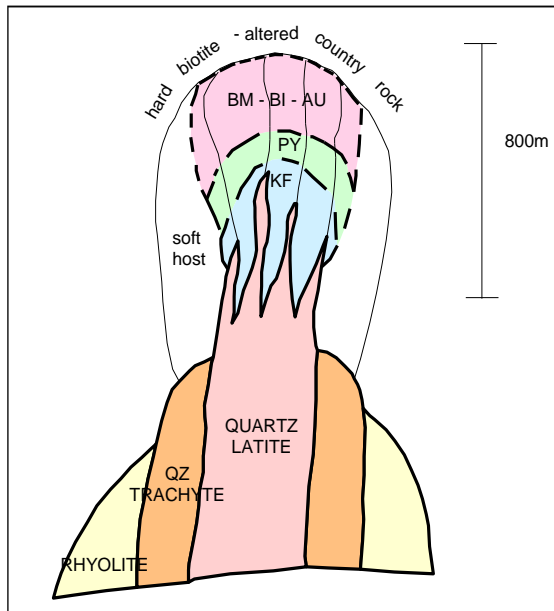
Mt Wright



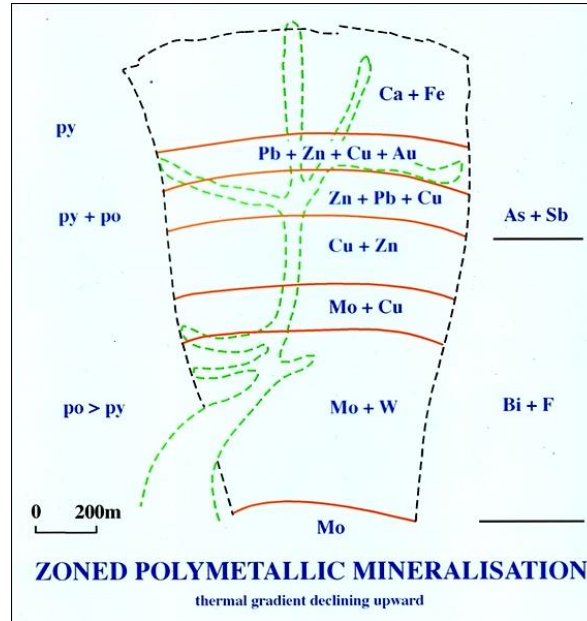
Welcome (Deep)

- The Mt Wright rhyolite breccia is gradational towards the surface – no evidence of roof.
- Fluids mostly confined to channel-way.
- Ore probably precipitated via dispersion and cooling.
- Could have been higher grades if trapped?
- Welcome has deep high grade breccia trapped by silicified breccia “roof”. Also dispersion of fluids into veins.

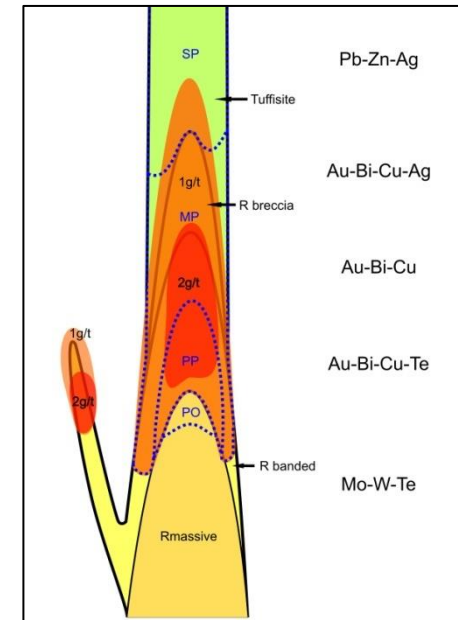
6. Geochemistry – Metal Zoning



Mt Leyshon



Kidston



Mt Wright

- All intrusion-related systems are zoned.
- Multi-element geochemistry important tool to vector towards potential ore.
- Effect of dispersion (e.g. Mt Wright vs Mt Leyshon)

Conclusion

- Breccia hosted deposits are an important sub-class of intrusion related Au systems in NQ.
- Potential for world class deposits.
- Important to not get too focused on the breccias themselves and look at the whole magmatic-hydrothermal system.
- Possible that the breccia system hosting the next major discovery has already been located – just not yet adequately tested.

Thank you

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- The information in this report that relates to the Exploration Results, Mineral Resources and Ore Reserves is based on information compiled by Mr Richard Bray who is a Registered Professional Geologist with the Australian Institute of Geoscientists and Mr Iain Wearing, a member of The Australian Institute of Mining and Metallurgy. Mr Richard Bray and Mr Iain Wearing both have more than 5 years' experience relevant to the styles of mineralisation and type of deposit under consideration and to the activity which they are undertaking to qualify as a Competent Person, as defined in the 2004 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Richard Bray and Mr Iain Wearing are full time employees of Resolute Mining Limited Group and have consented to the inclusion of the matters in this report based on their information in the form and context in which it appears. All Reserves Resources as at 30 June 2013
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