

The McPhillamys Gold Deposit, A significant discovery in the Lachlan Fold Belt, central western NSW



Peter Duerden (Alkane Resources Ltd)

Mines and Wines 2010, Mudgee

Acknowledgements

- Damon Bird/Ian Baillie/Chris Johnson (Hargraves Resources Ltd)
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1. Background



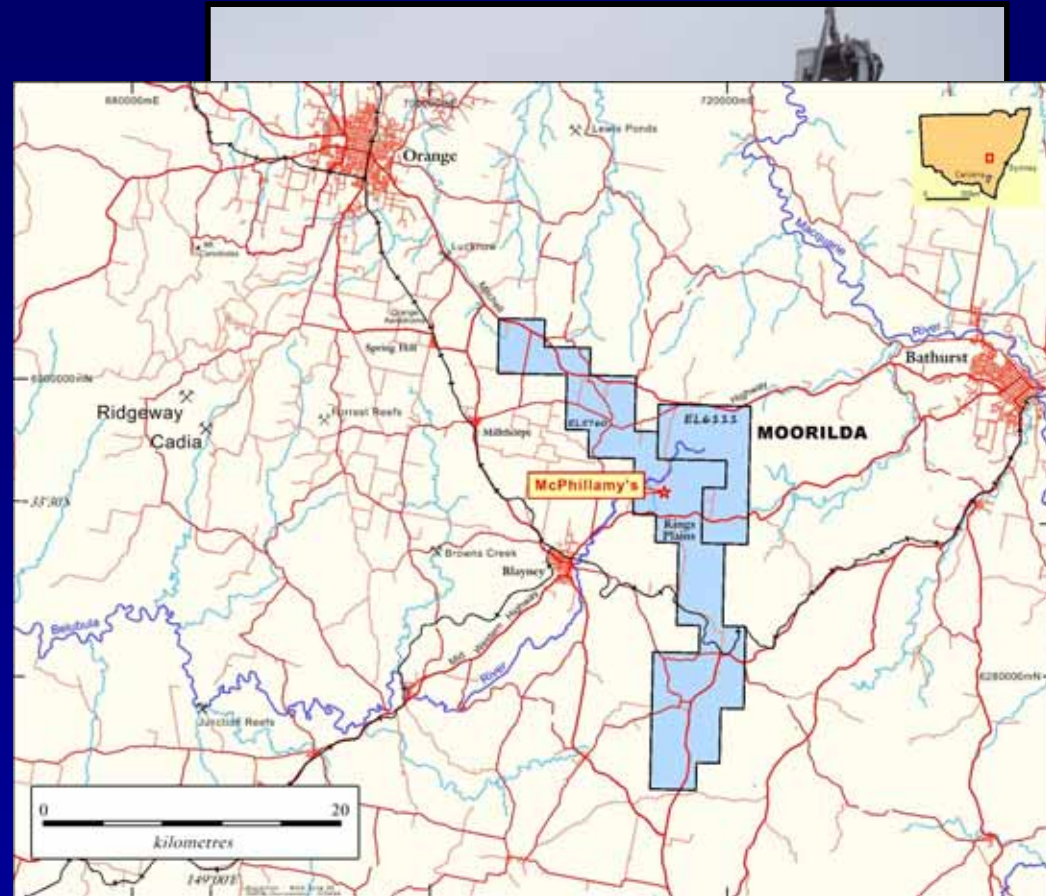
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Summary

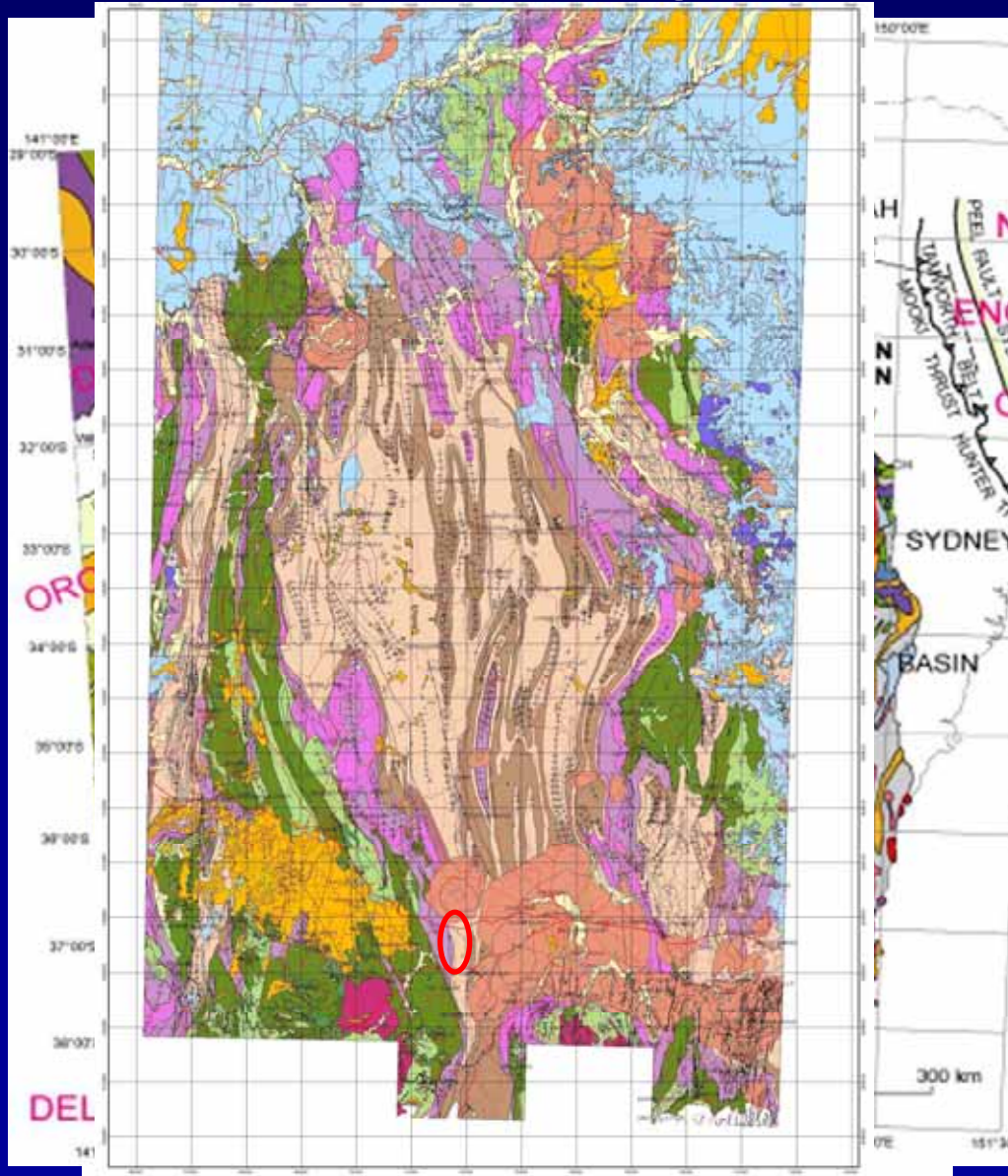
- 91.94Mt grading 1g/t Au and 0.07% Cu = 2.96Mo Au, 60000t Cu (Indicated + Inferred)
- Several significant intercepts inc:
 - 366m grading 1.86g/t gold and 0.076% copper from 134m (KPD003)
 - 123m grading 1.96g/t gold from surface (KP048)
- Orange District Exploration Joint Venture (ODEJV) formed in late 2005 between Alkane Resources Ltd and Newmont Australia Ltd
- ODEJV incorporates the Molong and Moorilda Projects
- Newmont have elected to earn 75% by completing bankable feasibility study (February 2010)

Location

- Located in central western NSW, 250km from Sydney, 28km from Bathurst
- Cleared undulating grazing country above 800m
- Mild climate with 885mm precipitation pa, and a light dusting of snow 2-3 times a year



Regional Geology



Lachlan Fold Belt –
(Glen, 2005)

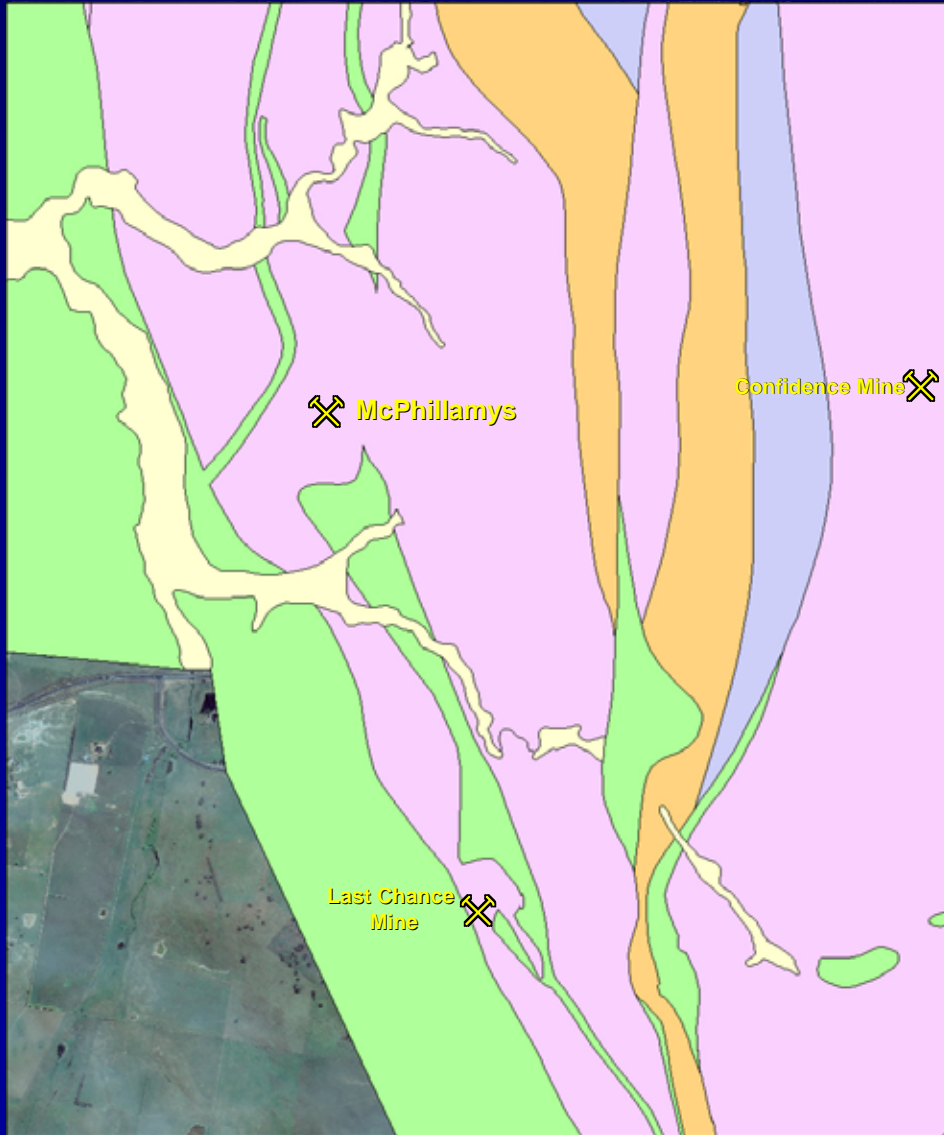
Eastern Lachlan Fold Belt –
(Glen, 2005)



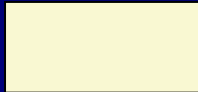


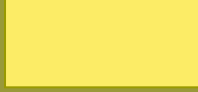

Hill End Trough – Mumbil Shelf -
(GSNSW)

- Late Silurian Mumbil Shelf = basal Hill End Trough
- Acid volcanics/volcaniclastics (Anson Formation + Mullions Range Volcanics)

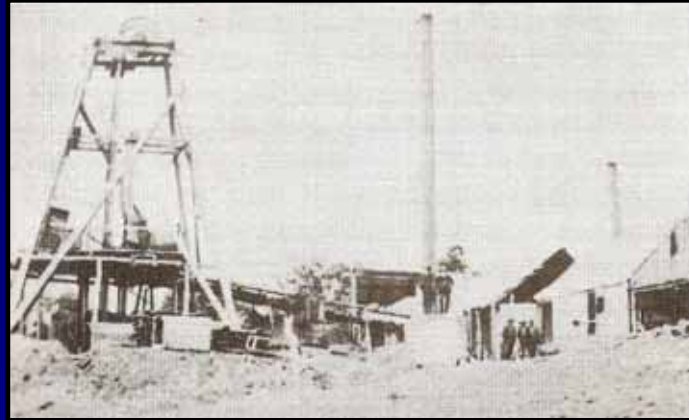
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Local Geology



Early Devonian Crudine Group		Merrions Formation dacitic lavas, vlcs
		Waterbeach Formation siltstone, felsic vlcs sandstone
		Turondale Formation qtz+feldspar lithic sandstone
Late Silurian Mumbil Group		Barnby Hills Shale siliciclastic siltstone, sandstone
		Mullions Range Volcanics Rhyolite, dacite
		Anson Formation Int. vlcs, volcanic breccias, Pyritic, hosting McPhillamys mins
Late Ordovician Cabonne Group		Byng/Blayney Volcanics Py-phyric basalt, hbl-d-phyric basalt, andesitic vlcs
	Benambran unconformity/ Godolphin Fault Zone	

2. Discovery Timeline



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Discovery Timeline



- 1850's-1910's gold rushes in the Kings Plains district, numerous alluvial + several hard rock workings
- McPhillamys Mine – worked in 1884, 1889, 1903 with no production records, 1967 trial mining of 4 tons @ 7-10g/t Au
- Last Chance Mine - 4800oz - 1889-1911
- Confidence Mine – 6406oz – 1886-1890

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Discovery Timeline

1981 – Tinaron Pty Ltd

- completed literature review

1984 – Australian Occidental Pty Ltd/Windsor Resources Ltd

- targeted Godolphin FZ for 'orogenic' gold, drilled at Last Chance (best LCP23 6m @ 2.37g/t Au) and Confidence Mines. Collected 8 rockchips at McPhillamys returning discouraging results 0.08ppm Au, 274ppm Cu, 3280ppm As

1989 - BHP Gold/Newcrest

- completed regional stream, soil sampling and mapping with follow-up rockchips, limited RC drilling at Bright Star Mine

Discovery Timeline

1994 – Hargraves Resources Ltd

- review highlighted ‘very encouraging’ descriptions of McPhillamys and recommended further work to assess the areas economic potential
- regional soil sampling (Regoleach) defined a large Au + Te ± Sb ± As anomaly covering a 2.5 kilometre strike adjacent to the Godolphin Fault; 30ppb Au peak over the “Ingledoon Anomaly” (McPhillamys)
- follow up mapping and rock chip sampling returned up to:11.2g/t Au
- unable to secure timely land access to drill test and corporate activity resulted in the surrender of the lease in 2000

2000 – Alkane Resources Ltd

- pegged the ground targeting shear zone/structurally controlled gold mineralisation (Moorilda Project)
- protracted land access negotiations at McPhillamys
- high resolution aeromagnetics (50 x 50m)
- RC drilling (Bright Star, Last Chance Mines)

Discovery Timeline

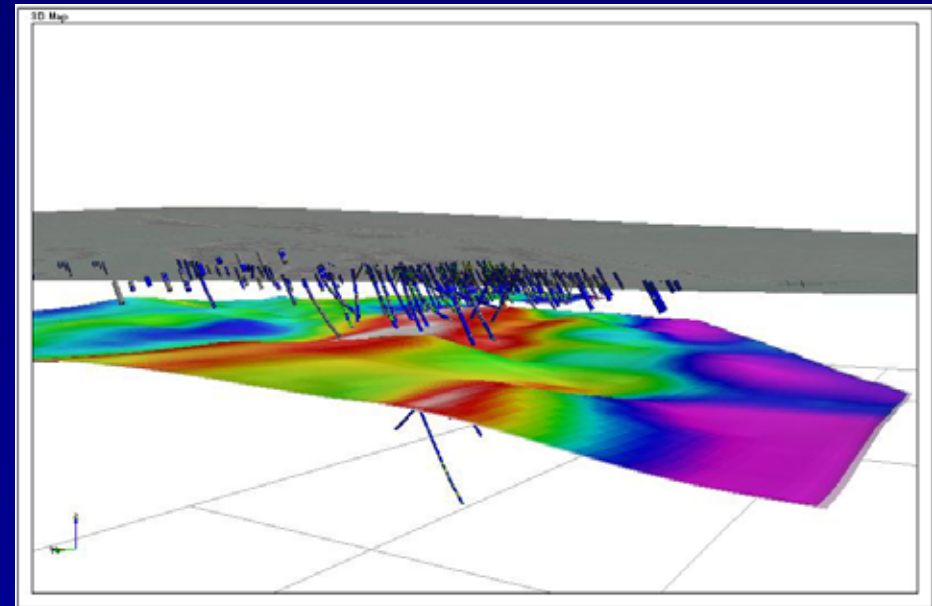
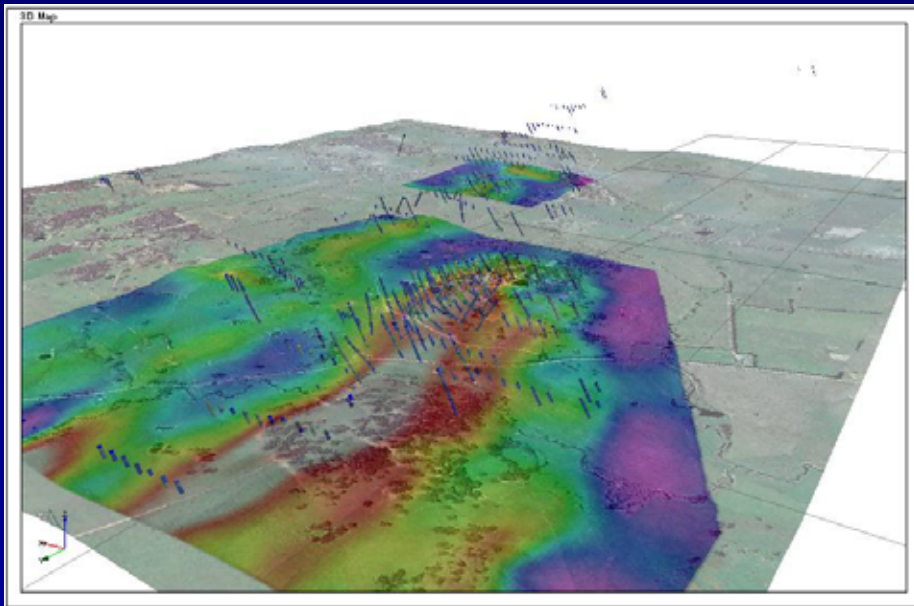
2005 – Alkane-Newmont Australia JV

- entered into the Orange District Exploration Joint Venture (ODEJV) with Alkane, funding exploration on the Moorilda Project
- protracted land access negotiations
- detailed soil sampling
- Pole-Dipole IP
- drill testing:
 - KP048: 123m grading 1.96g/t gold from surface
 - KPD002: 224.7m grading 1.16g/t gold from 207m
 - KPD003: 366m grading 1.86g/t gold from 134m

2009 – Newmont became full operator of the joint venture following expenditure of A\$5 million to earn an initial 51% interest in the ODEJV

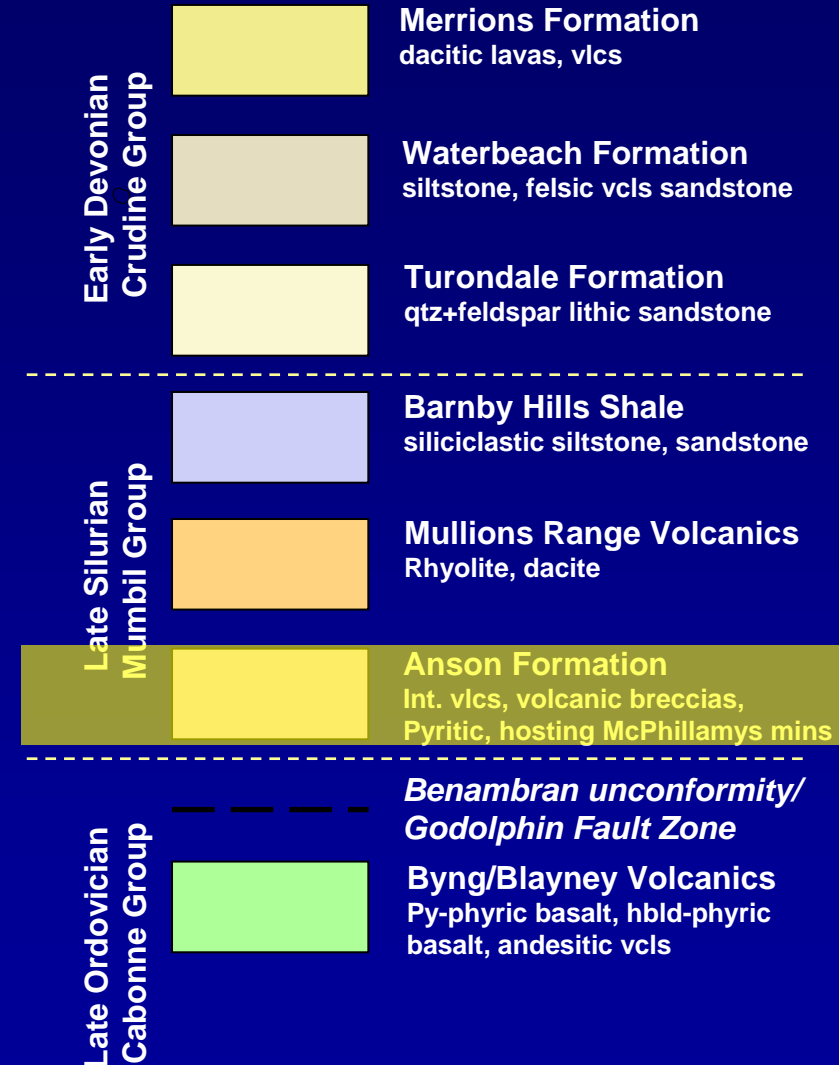
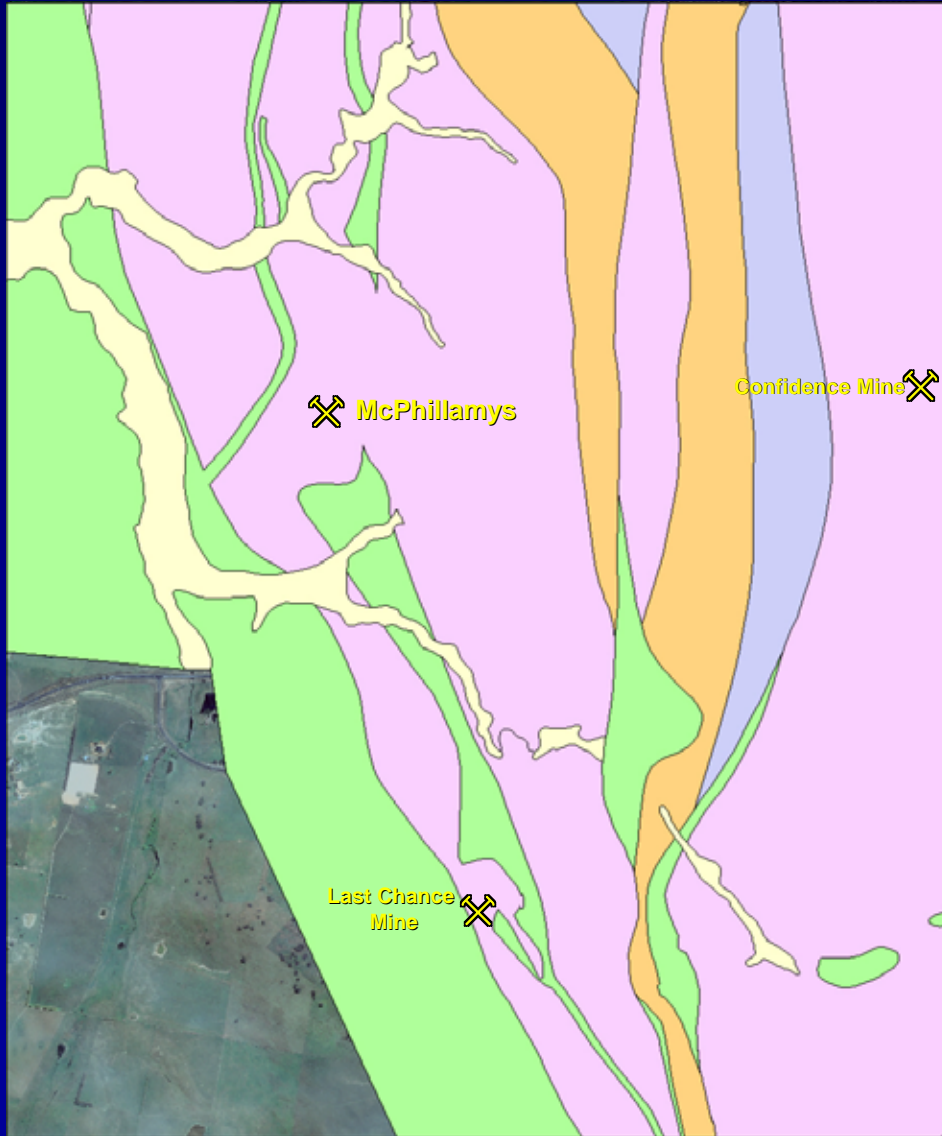
2010 (feb) – Newmont increase their interest in the ODEJV to 75% by deciding to complete a Bankable Feasibility Study on the McPhillamys Gold Deposit

3. Exploration Datasets

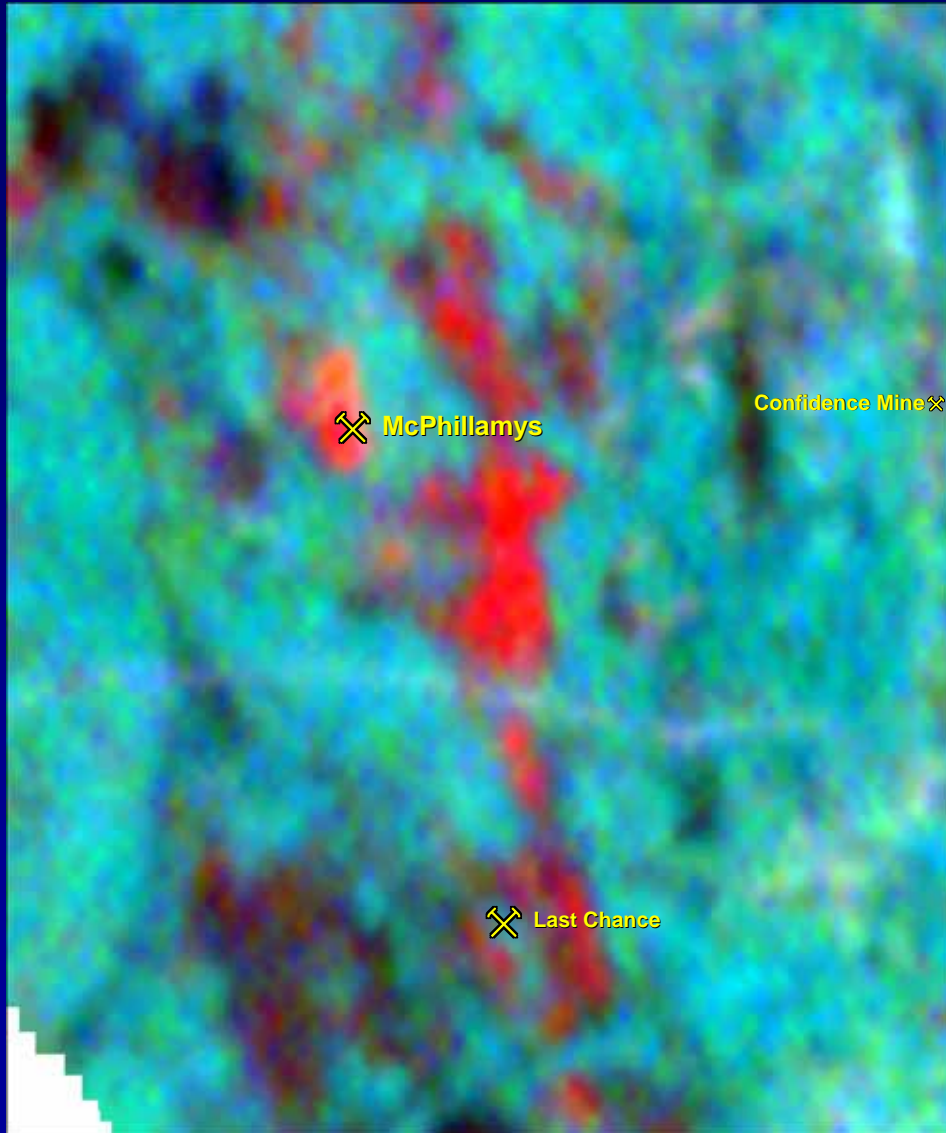


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Exploration Datasets - Geology



Exploration Datasets - Geophysics



Aeromagnetics/radiometrics

- 50m line spacing
- 50m flight height
- 5242 line kms

Pole-Dipole IP

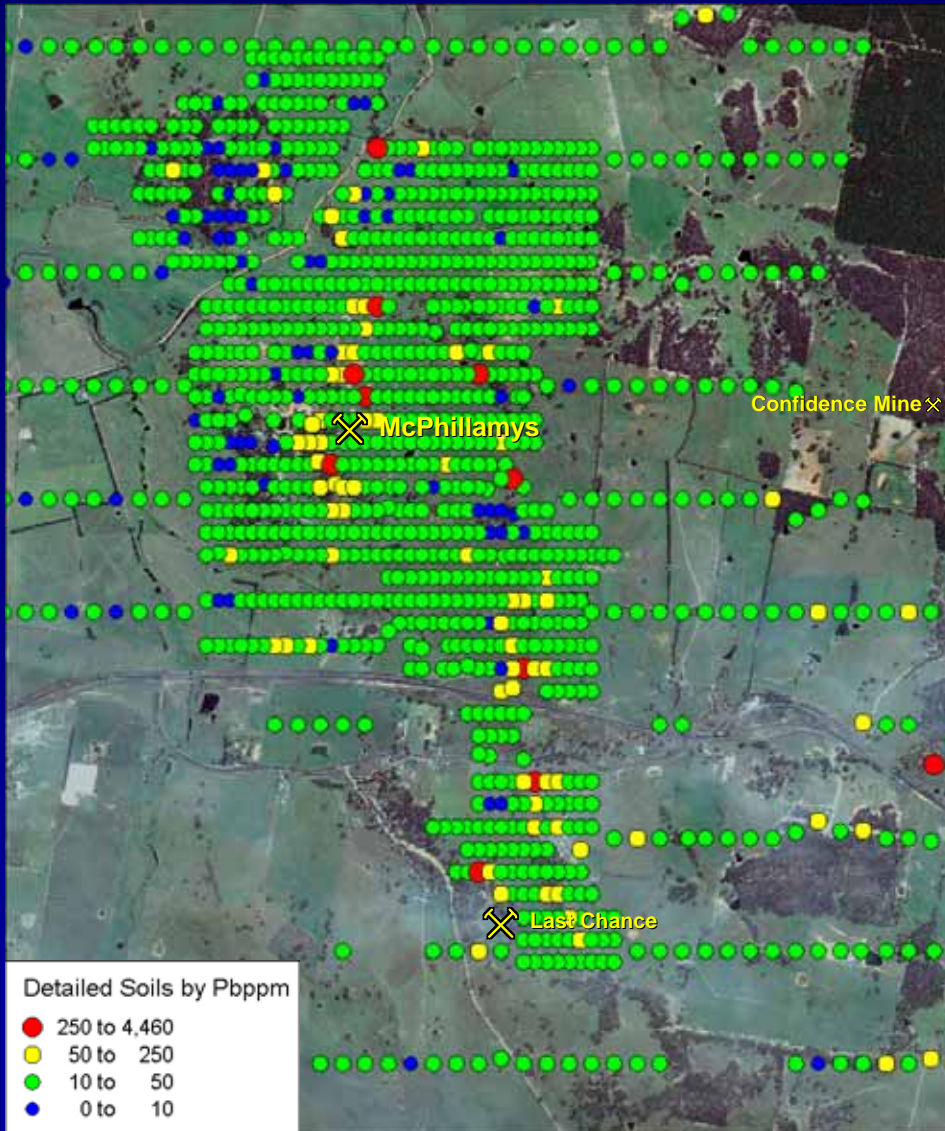
- 100m spaced lines
- total of ~40 line kms

Gravity

- 10km x 7km survey area
- 100 x 400m station spacing
- 500 stations

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Exploration Datasets – Surface Geochemistry



Regoleach geochemistry (Hargraves)

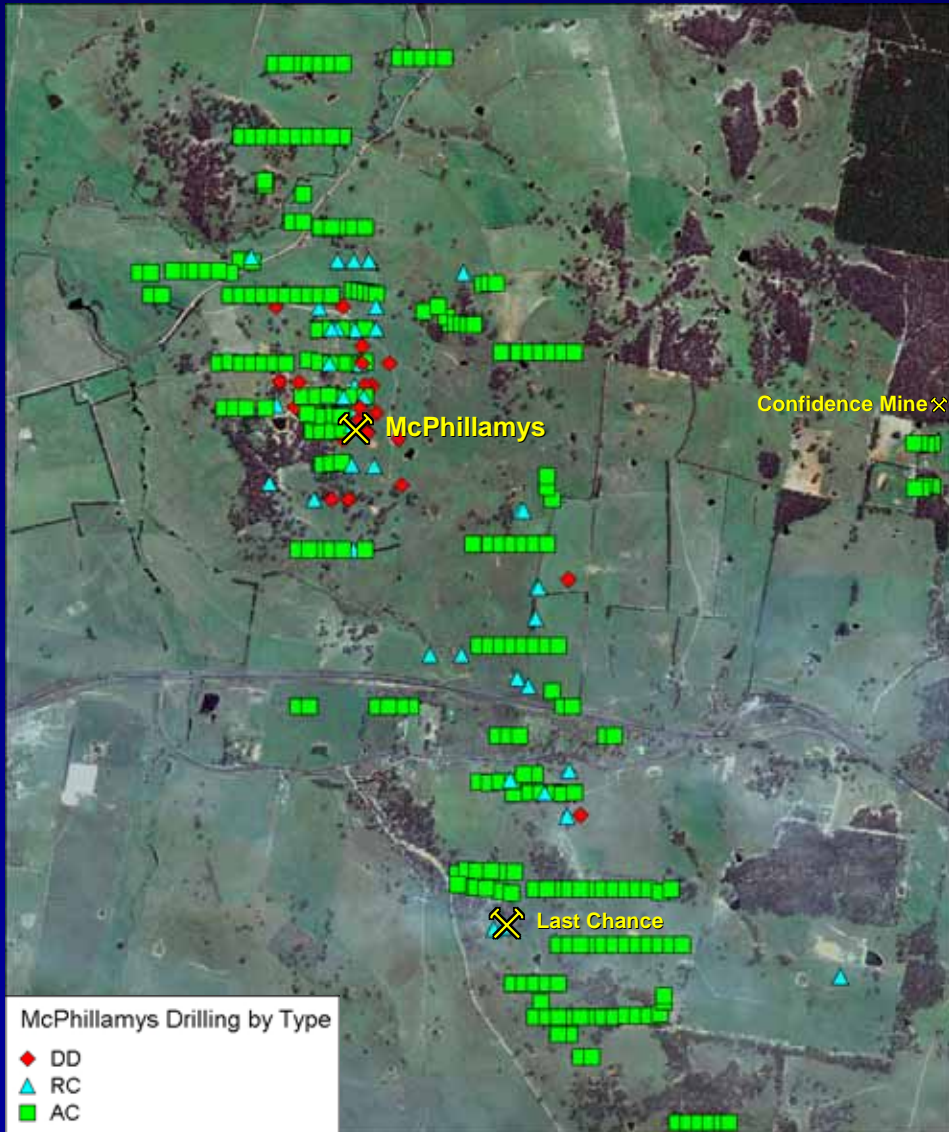
- B-horizon, partial leach geochemistry
- 10094 samples
- Au, Cu, Pb, Zn, Ag, As, Sb, Bi, Mo, W, Se, Te, Co, Ba, Na, K, Mg, Ca, Fe, S
- 16 anomalies identified
- highest priority anomaly was Ingledoon Anomaly = McPhillamys
- multielement anomaly covering about a 2.5 kilometre strike adjacent to the Godolphin Fault

Detailed soil geochemistry (Alkane/Newmont)

- 1692 samples
- infill, regional sampling continuing

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Exploration Datasets - Drilling



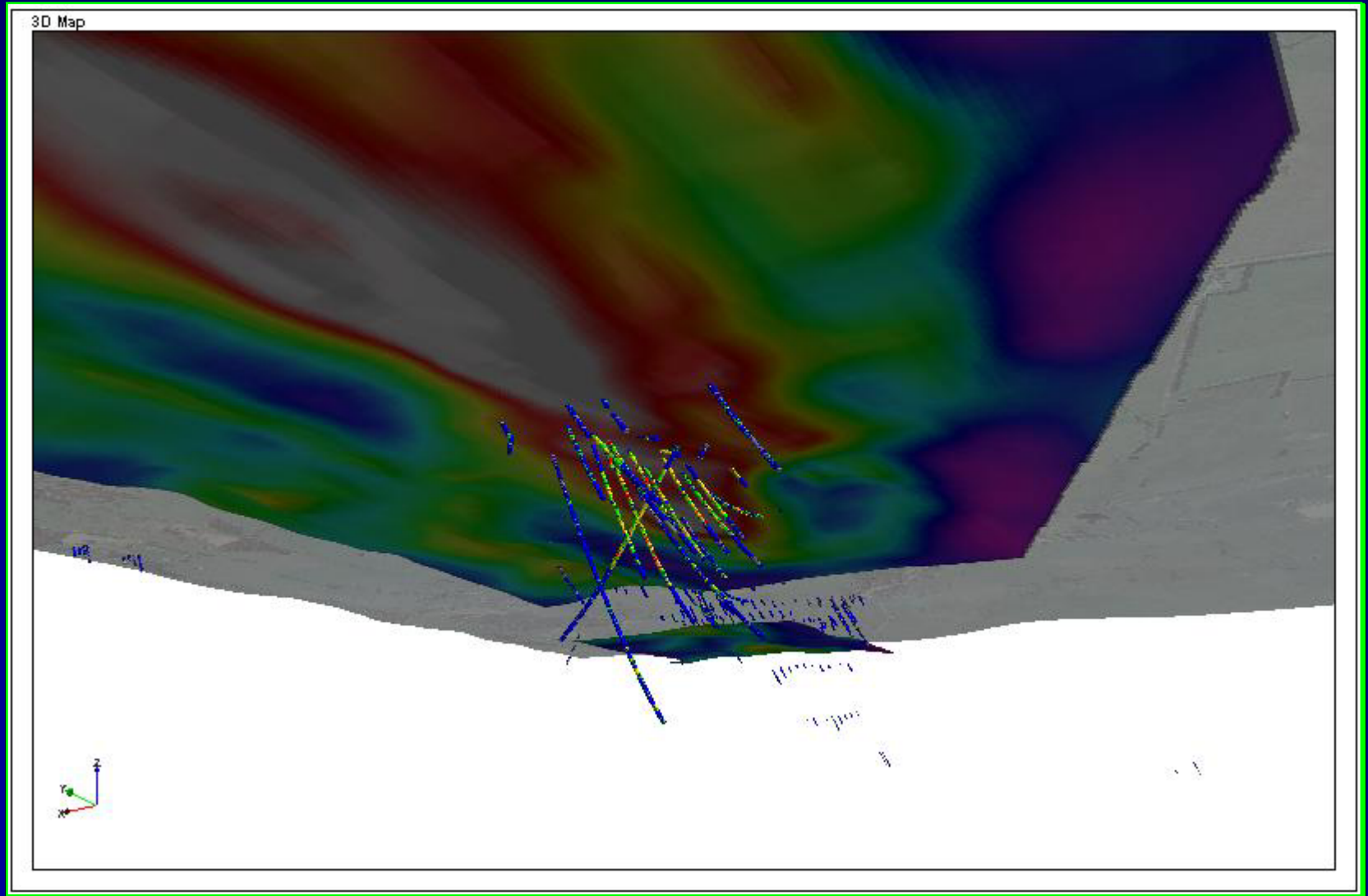
AC = 399 holes for 13,863m

RC = 48 holes for 7,740m

DD = 27 holes for 11,309m

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Exploration Datasets – 3D Interpretation



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4. McPhillamys Characteristics



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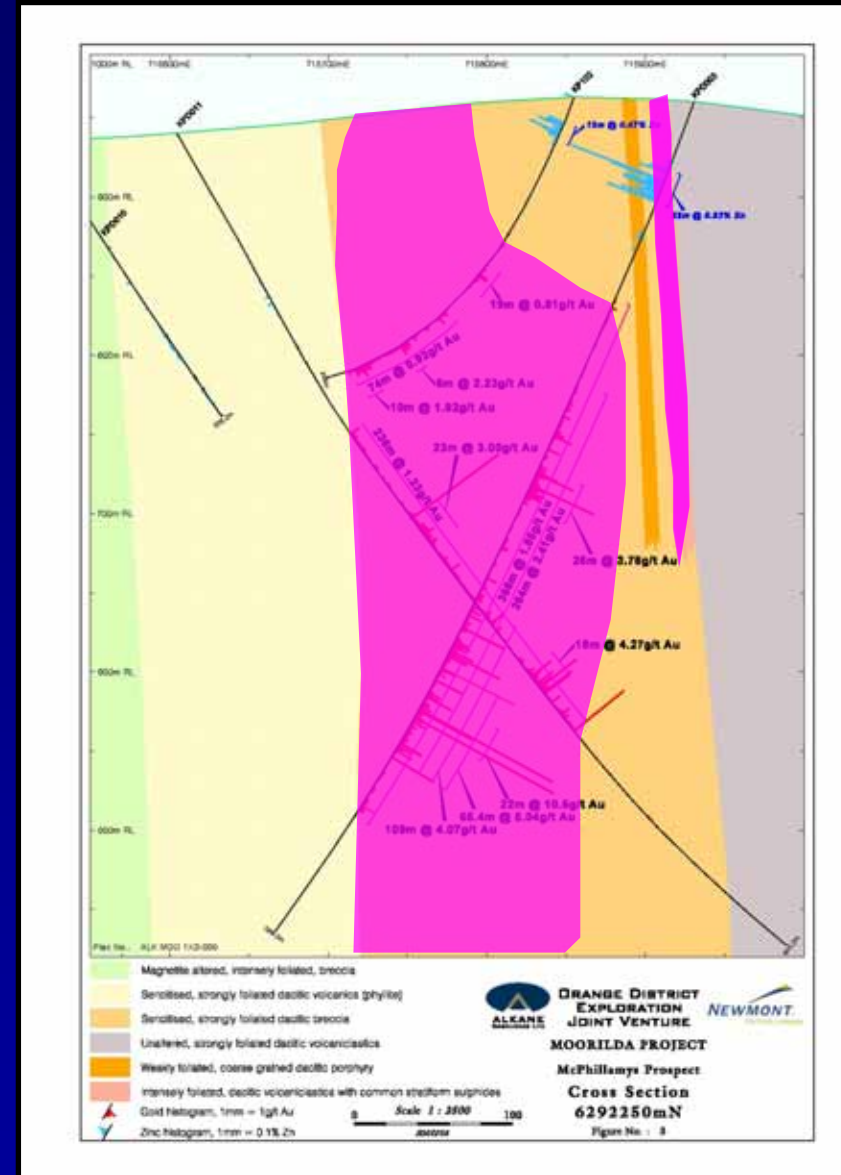
McPhillamys - Mineralisation styles



Shear controlled horizontal textures

(Gold mineralisation)

- Laminated, fine grained, massive, primary horizontal textures of primary gold, arsenic, antimony and silver mineralisation concentrated along shear zones
- Sphalerite ± tennantite/tetrahedrite intergrown with sericite/illite, quartz, chlorite carbonate alteration



McPhillamys - Summary

Host Rock

- Late Silurian felsic volcanoclastics, volcanics, minor shales (Mumbil Shelf - Anson Formation)

Hydrothermal Alteration

- sericite/illite + k-feldspar + quartz ± chlorite ± calcite ± siderite ± dolomite ± albite ± barite

Ore Style/Mineralogy

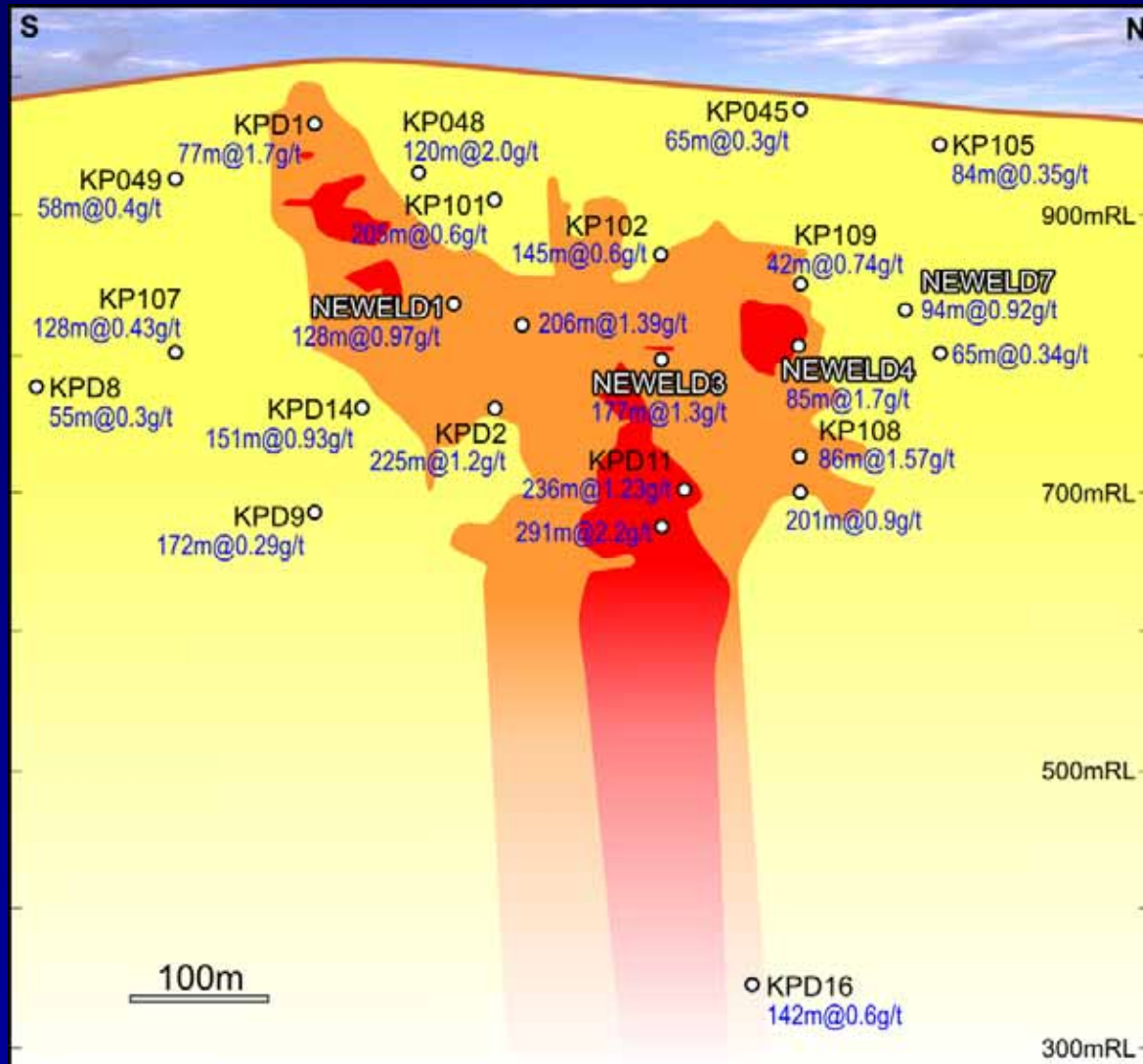
Base metal zones

- Stratiform and recrystallised pyrite ± sphalerite ± galena ± tetrahedrite/tennantite hosted in the overlying siltstones ± shales

Gold-rich stratigraphic footwall

- Stringer pyrite ± chalcopyrite ± pyrrhotite ± gold, gold telluride, bismuth telluride, ± arsenopyrite best developed in the coarser volcanoclastic units as shear fabric controlled stringers

McPhillamys – Long Section



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McPhillamys - Genesis

Remobilised syngenetic gold-rich VMS?

- other known VMSs on Mumbil Shelf
- gold rich stratigraphic footwall underlying VMS zone
- early sericite/illite \pm quartz \pm chlorite \pm siderite \pm dolomite \pm albite alteration event associated with both VMS base metal and gold zones
- early stage magmatic veining and k-spar alteration (magmatic 'flavour', high sulphidation component?)
- intermediate-felsic volcanism in incipient back arc setting

Epigenetic gold?

- location at gross intersection of Godolphin NW fault system and N-S shear zone
- deposit adjacent to/within the N-S Bushranger Shear Zone
- sulfide stringers + gold controlled by shear fabric, within strain shadows etc
- some sulphides associated with crosscutting fractured quartz veining

5. Conclusions



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Conclusions

- Significant gold mineralisation (~3Mo) identified within Late Silurian Mumbil Shelf sequence (basal Hill End Trough)
- Historical exploration has focussed in Ordovician arc rocks, the Godolphin fault systems + Mumbil Shelf underexplored for other target styles
- Main exploration tools:
 - Surface geochemistry
 - High resolution aeromagnetics, radiometrics, gravity
 - PDIP
 - Drilling (AC, RC, DD)
- Mineralisation styles present suggest syngenetic base metal ± gold system + possible epigenetic gold event
- Ongoing research inc. hydrothermal fluid evolution, inc. S and O isotopes, dating in progress (Jeffrey Bigelow, Masters, CODES) & volcanic facies architecture study (Ellen Marnock, Honours, Monash University)

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