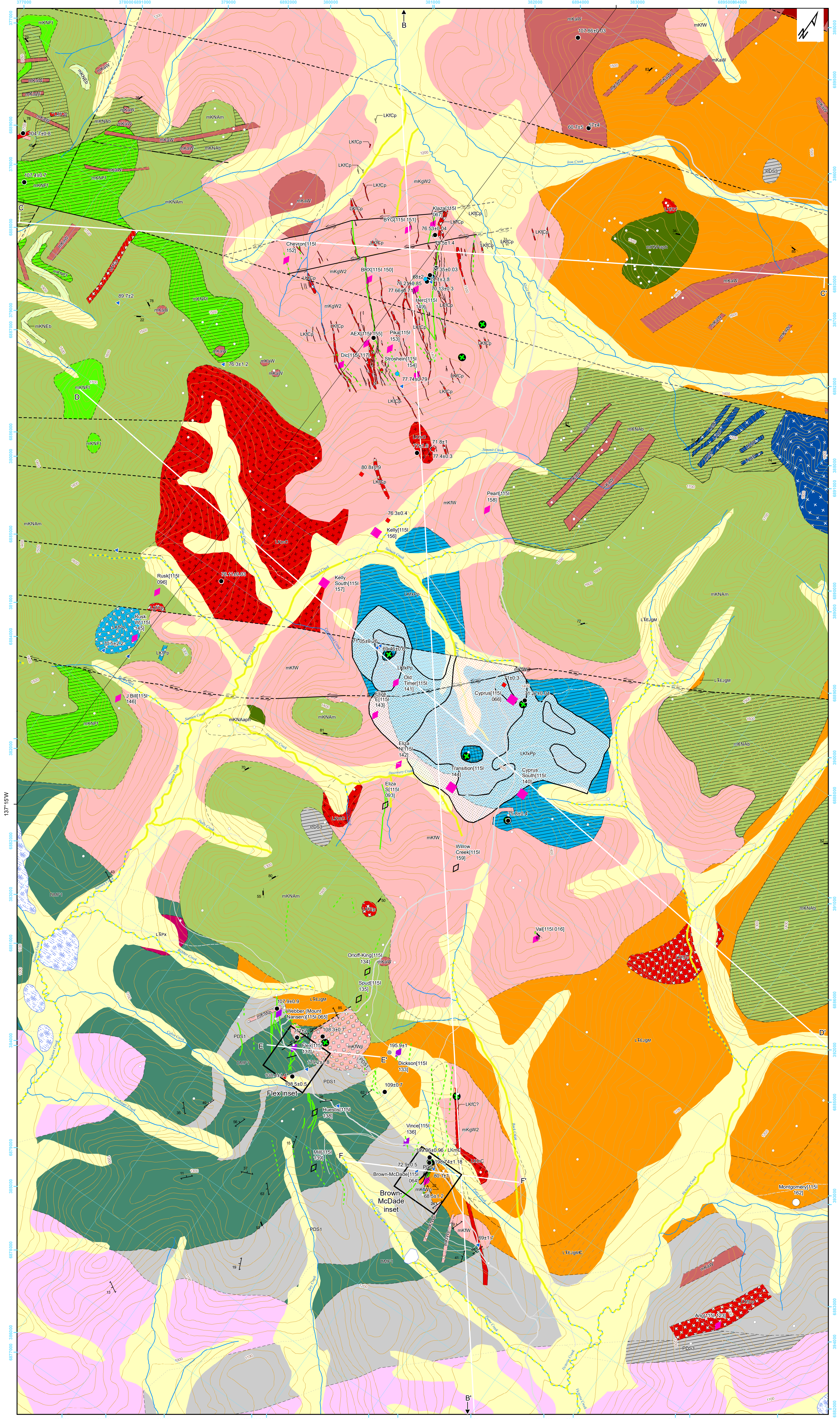
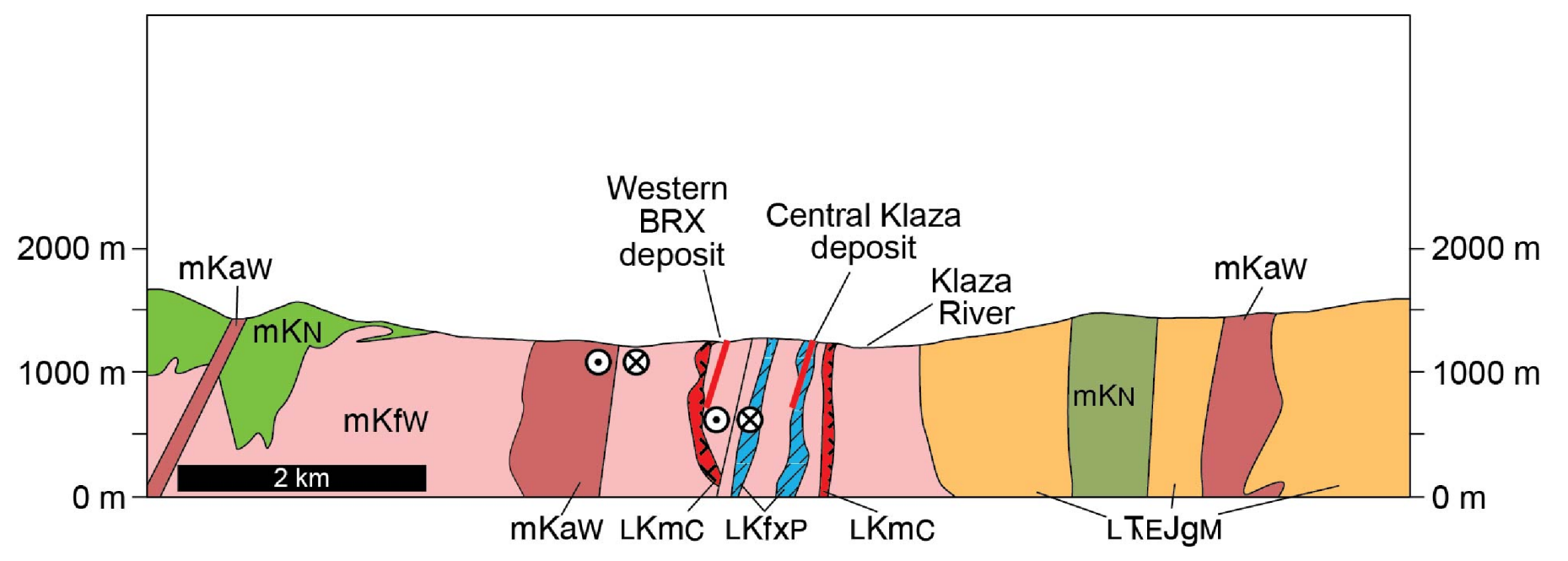
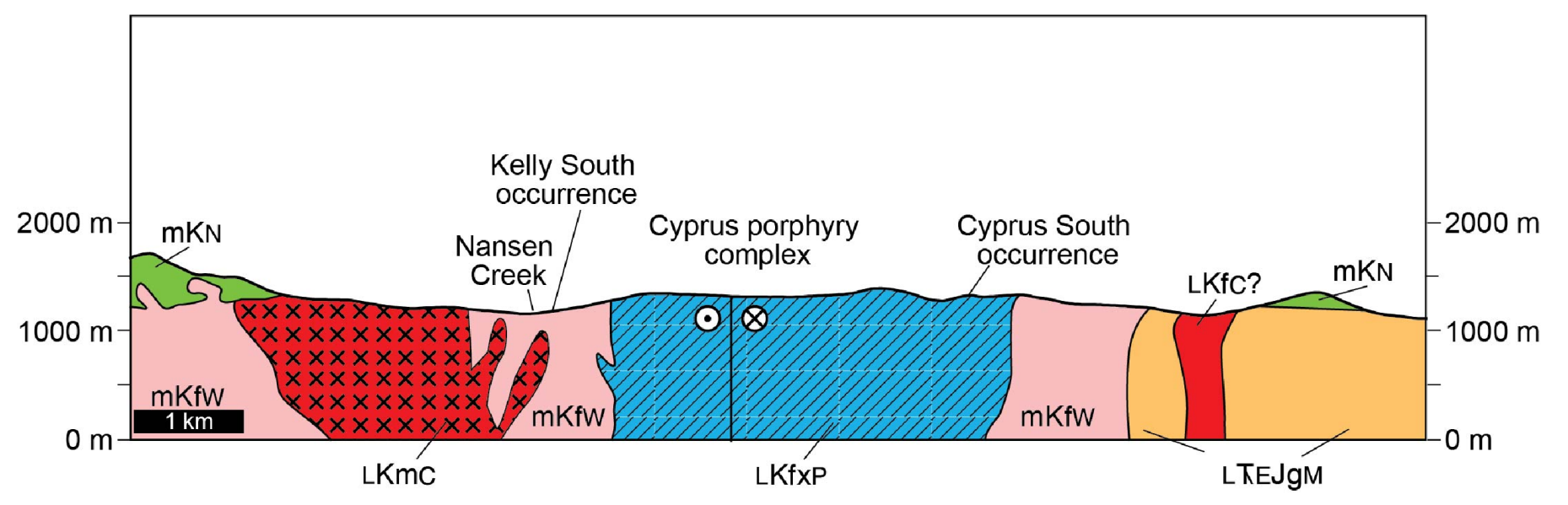
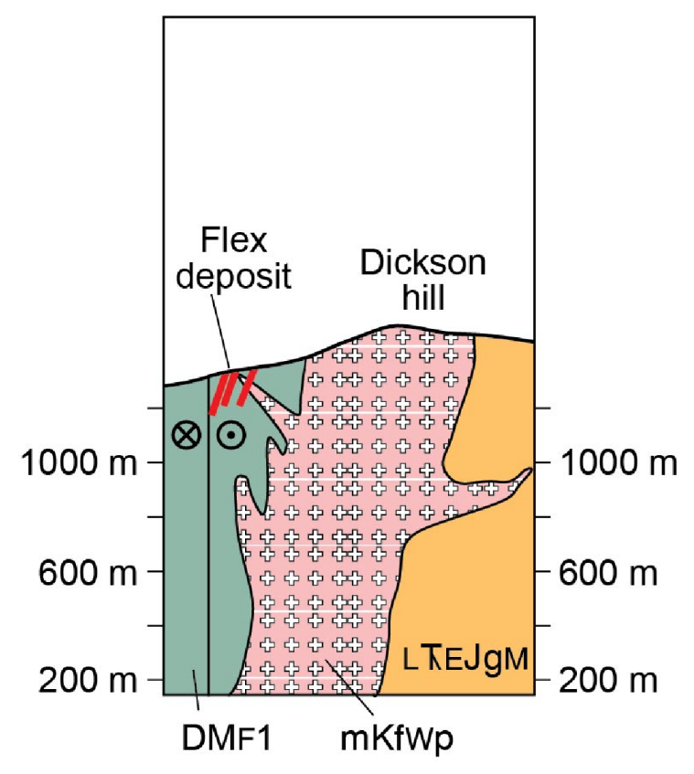
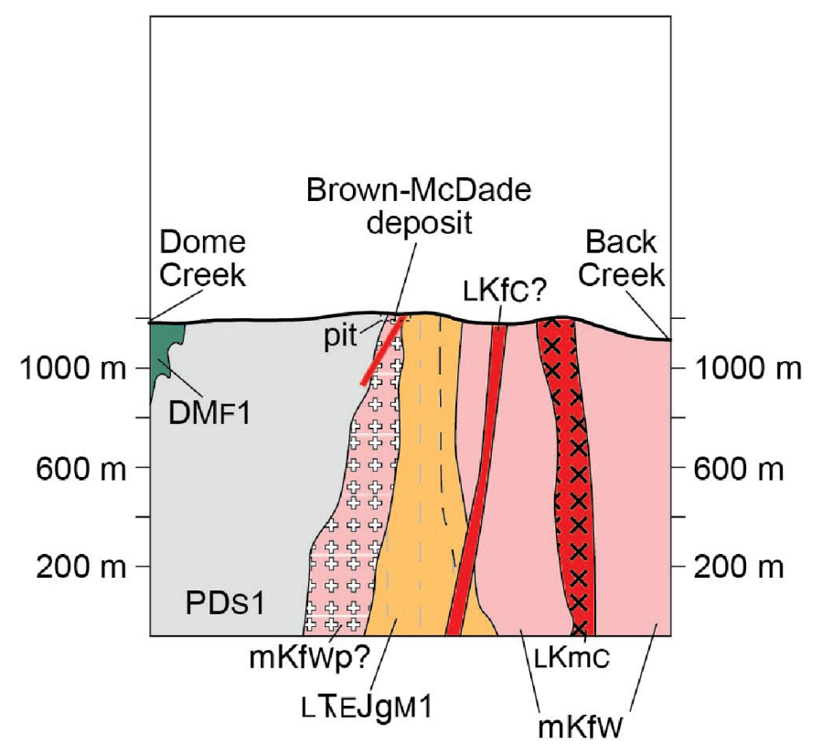
MOUNT NANSEN PORPHYRY DISTRICT INSET



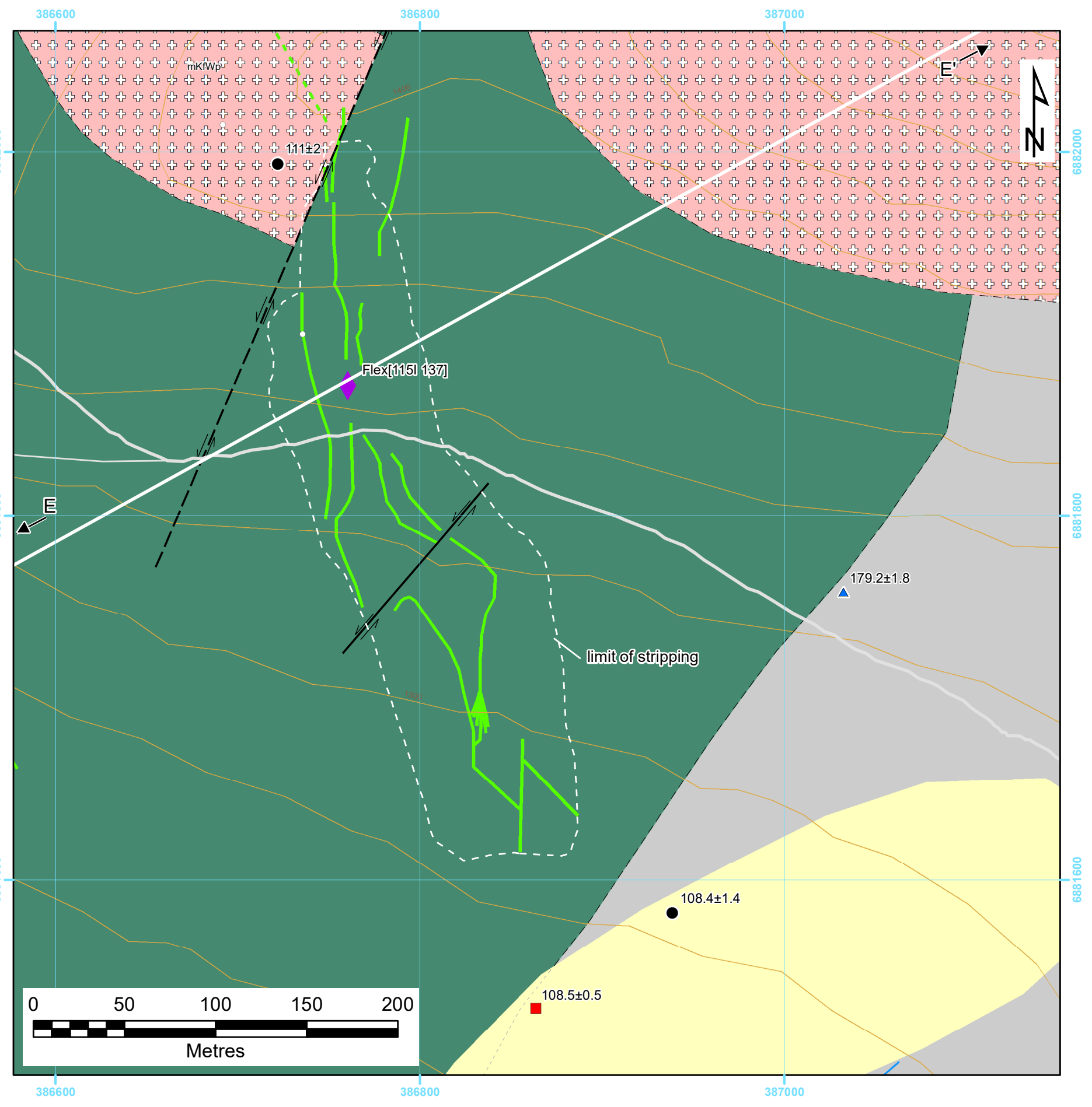




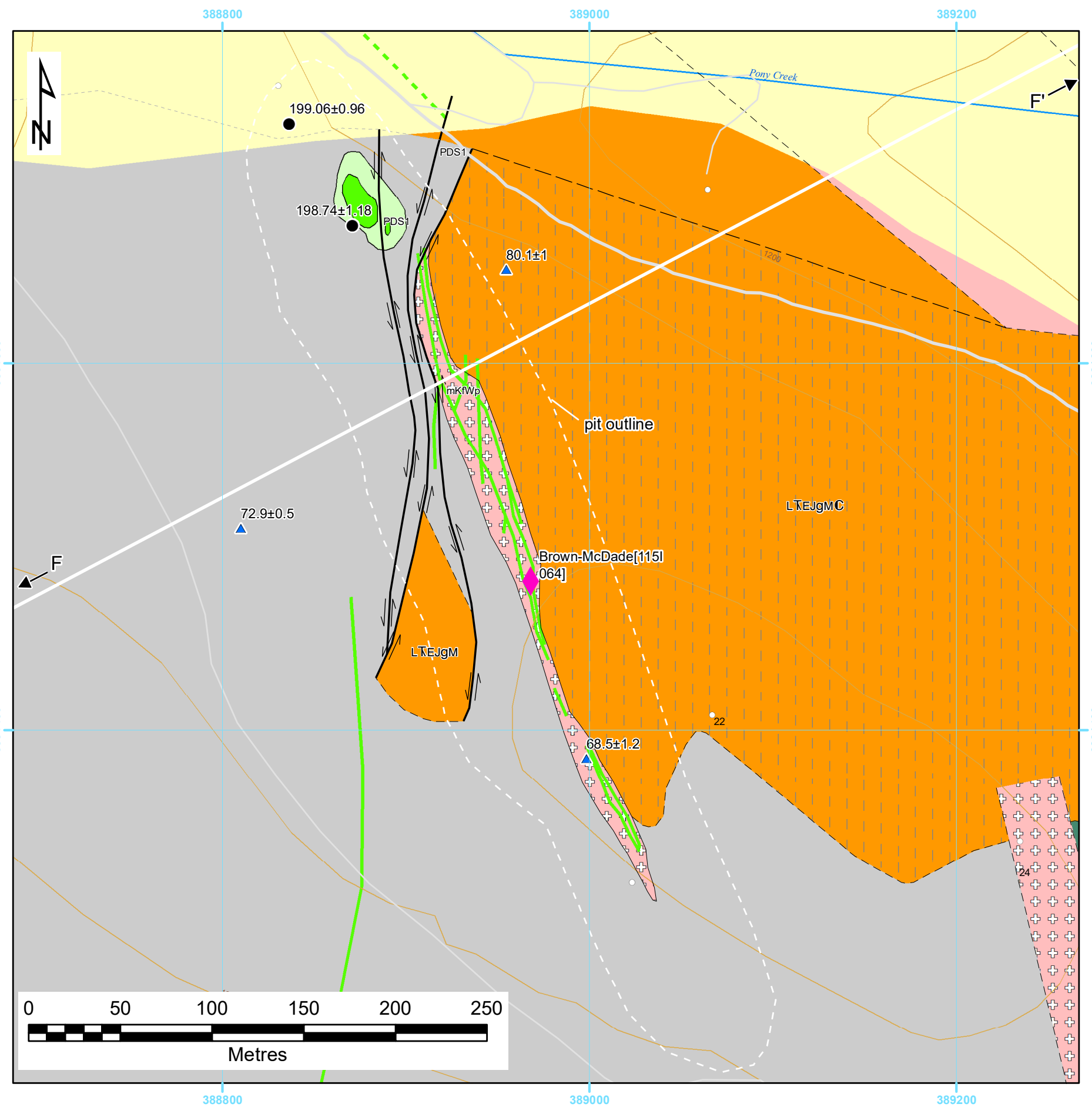




FLEX INSET



BROWN-MCDADE INSET



MINFILE NUMBER	NAME	DEPOSIT TYPE	STATUS	HOST LITHOLOGY	COMMODITY	MINERALIZATION AGE	LATITUDE	LONGITUDE
115I 016	Val	Vein/breccia	Showing	Granodiorite	Gold, Lead, Silver	Late Cretaceous?	62.07699	-137.13679
115I 064	Brown-McDade	Epithermal	Past Producer	Granodiorite in north and schist/gneiss in south	Gold, Silver, Lead, Copper, Zinc	Early Cretaceous; 109 ± 0.7 Ma OR Late Cretaceous; 74.3 ± 2 Ma, 72.9 ± 0.5 Ma	62.04922	-137.12355
115I 065	Webber	Epithermal	Deposit	Schist and gneiss	Silver, Gold	Early Cretaceous; 107 ± 0.9 Ma	62.05404	-137.17349
115I 066	Cyprus	Porphyry	Drilled Prospect	Quartz feldspar porphyry	Copper, Molybdenum, Gold	Late Cretaceous; 71.1 ± 0.3 Ma	62.09596	-137.17392
115I 067	Klaza	Epithermal	Deposit	Granodiorite	Copper, Gold, Zinc, Silver, Lead	Late Cretaceous; 74 to 71 Ma	62.13154	-137.25379
115I 068	Maverick	Vein/breccia	Drilled Prospect	Syenite	Gold, Silver	Unknown	62.14655	-137.16087
115I 080	Rico	Epigenetic	Anomaly	Granodiorite	Copper, Lead, Zinc, Gold	Uknown	62.14189	-137.33466
115I 084	Lonely	Vein/breccia	Showing	Quartz feldspar porphyry	Copper, Silver, Gold	Late Cretaceous?	62.07534	-137.32722
115I 085	Car	Vein/breccia	Showing	Rhyolite to dacite and granodiorite felsenmeer	Copper, Tungsten, Lead, Silver, Gold	Unknown	62.08888	-137.02666
115I 086	Rowlinson	Vein/breccia	Showing	Biotite schist	Silver, Gold	Unknown	62.13932	-136.96440
115I 093	Eliza S	Epithermal	Drilled Prospect	Quartz diorite, schist and gneiss, minor andesite (along the edge of a volcanic-granodiorite contact)	Copper, Gold, Zinc, Molybdenum, Silver, Lead	Unknown	62.07874	-137.18265
115I 096	Rusk	Vein/breccia	Showing	Rhyolite to dacite(near quartz feldspar porphyry plug contact)	Copper, Gold, Silver, Molybdenum, Lead	Late Cretaceous; 65.0 ± 0.8 Ma to 70.5 ± 2.2 Ma	62.08231	-137.25357
115I 110	Row	Epigenetic	Anomaly	Biotite schist	Copper, Zinc, Silver, Lead	Unknown	62.15361	-137.09500
115I 117	Dic	Epithermal	Drilled Prospect	Granodiorite (near andesite contact)	Copper, Zinc, Lead, Silver, Gold	Late Cretaceous	62.11359	-137.25123
115I 119	Dows	Vein/breccia	Drilled Prospect	Feldspar porphyry dykes cutting schist	Gold	Late Cretaceous?	62.04179	-137.24330
115I 122	Grizzly	Vein/breccia	Showing	Granodiorite to diorite gneiss	Gold, Tungsten, Silver	Late Cretaceous?	62.11216	-137.08217
115I 123	Ang	Vein/breccia	Showing	Quartz feldspar porphyry cutting schist	Gold	Late Cretaceous?	62.05555	-137.05055
115I 133	Dickson	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver, Copper	Early Cretaceous?	62.05839	-137.14629
115I 134	Orloff-King	Epithermal	Deposit	Andesite	Gold, Silver, Copper	Unknown	62.06336	-137.16306
115I 135	Spud	Vein/breccia	Showing	Andesite	Gold, Silver, Copper	Unknown	62.06044	-137.16090
115I 136	Vince	Vein/beccia	Drilled Prospect	Schist and gneiss	Gold, Silver, Copper	Early Cretaceous; 108.3 ± 07 Ma	62.05127	-137.13262
115I 137	Flex	Epithermal	Deposit	Schist and gniess, mineralization within highly altered and bx veins	Gold, Silver, Copper, Lead , Zinc	Early Cretaceous; 108.5 ± 0.5 Ma	62.05207	-137.16598
115I 138	Huestis	Epithermal	Past Producer	Schist and gneiss	Gold, Silver, Copper	Unknown	62.04789	-137.15339
115I 139	Mill	Epithermal	Prospect	Schist and gneiss	Gold, Silver, Copper	Unknown	62.04308	-137.14599
115I 140	Cyprus South	Porphyry	Showing	Granodiorite and quartz feldspar porphyry	Copper, Molybdenum	Late Cretaceous?	62.08851	-137.15914
115I 141	Old Timer	Vein/breccia	Showing	Granodiorite and quartz feldspar porphyry	Gold, Silver, Copper, Lead, Zinc	Late Cretaceous; 71 to 70 Ma	62.08992	-137.19750
115I 142	Eliza N	Epithermal	Drilled Prospect	Quartz diorite and andesite	Gold, Silver, Copper, Lead, Zinc	Late Cretaceous?	62.08308	-137.18575
115I 143	Eliza E	Epithermal	Drilled Prospect	Quartz feldspar porphyry crosscutting granodiorite and andesite	Gold, Silver, Copper, Lead, Zinc	Late Cretaceous?	62.08582	-137.19687
115I 144	Transition	Porphyry	Showing	Granodiorite	Gold, Silver, Copper, Molybdenum	Late Cretaceous?	62.08453	-137.17302
115I 145	Rusk W	Vein/breccia	Drilled Prospect	Quartz feldspar porphyry	Gold, Silver, Copper, Lead, Molybdenum	Late Cretaceous?	62.07691	-137.25135
115I 146	J Bill	Vein/breccia	Showing	Quartz feldspar porphyry	Gold, Silver, Lead, Zinc	Late Cretaceous?	62.07070	-137.24609
115I 147	Sked	Vein/breccia	Drilled Prospect	Quartz feldspar porphyry	Gold, Silver, Copper	Late Cretaceous?	62.04331	-137.27963
115I 149	Herc	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver	Late Cretaceous	62.12485	-137.24794
115I 150	BRX	Epithermal	Deposit	Granodiorite	Gold, Silver, Lead, Zinc, Copper	Late Cretaceous	62.12272	-137.25782
115I 151	BYG	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver	Late Cretaceous	62.12950	-137.25766
115I 152	Chevron	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver	Late Cretaceous	62.11903	-137.27565
115I 153	Pika	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver	Late Cretaceous	62.11812	-137.24451
115I 154	Stroshein	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver	Late Cretaceous	62.11760	-137.23602
115I 155	AEX	Epithermal	Drilled Prospect	Granodiorite	Silver, Gold	Late Cretaceous	62.11705	-137.24954
115I 156	Kelly	Porphyry	Drilled Prospect	Granodiorite and quartz feldspar porphyry	Gold, Copper, Molybdenum	Late Cretaceous; 76.3 ± 0.4 Ma	62.10149	-137.22178
115I 157	Kelly South	Porphyry	Drilled Prospect	Granodiorite and quartz feldspar porphyry	Gold, Copper, Molybdenum	Late Cretaceous	62.09384	-137.22437
115I 158	Pearl	Epithermal	Drilled Prospect	Granodiorite	Gold, Silver	Late Cretaceous	62.11061	-137.20463
115I 159	Willow Creek	Epithermal	Showing	Andesite-granodiorite contact	Gold, Silver, Lead, Zinc	Unknown	62.07793	-137.16113
115I 160	Bear	Vein/breccia	Showing	Granodiorite to diorite gneiss	Gold, Silver	Unknown	62.10159	-137.03874
115I 161	Wind	Vein/breccia	Showing	Quartz feldspar porphyry crosscutting gneiss	Gold	Late Cretaceous?	62.07426	-137.03507
115I 162	Montgomery	Epigenetic	Anomaly (Float)	Andesite float	Gold, Silve	Unknown	62.07113	-137.05317

LATE CRETACEOUS

Prospector Mountain suite (ca. 72-68 Ma)

LKdP	*pyroxene±biotite porphyritic monzodiorite to monzogabbro; brown to black weathered and fresh, massive, medium-grained, melanocratic; equivalent to uKCg of Colpron et al. (2007)*
LKfxPp	*intrusive breccia; light grey to orange-weathered, heterolithic, clast-supported breccia containing subangular to rounded sand to pebble-sized clasts of light grey porphyritic rocks in a fine-grained cream to pink matrix; locally quartz-sericite-pyrite altered; hypogene mineralization associated with the Cyprus porphyry complex contains chalcopyrite-pyrite ± molybdenite and is ca. 71 Ma (Selby et al., 2001; Lee, 2021)*

Casino suite (ca. 78-74 Ma)

LKmC	*hornblende±pyroxene diorite; fine-grained, equigranular; best exposed in the vicinity of Slate Creek*
LKfC?	*rhyolite to dacite dikes and plugs; light grey to orange-weathered, typically light grey fresh*

LOWER CRETACEOUS

Mt. Nansen Group (115-107 Ma)

mKNAaph	*aphanitic to fine-grained, massive andesite; interpreted as feeder plugs to Nansen volcanic rocks, but could also be related to Carmacks volcanism*
mKNFt	*rhyolite tuff; aphanitic, light grey to buff weathered and fresh, densely welded*
mKNFf	*rhyolite breccia and flow-banded rhyolite; 107.4 ± 0.7 Ma (Klöcking et al., 2016)*
mKNEb	*epiclastic breccia*
mKNAm	*plagioclase-hornblende phyric andesite; dark green to black, massive, fine-grained; 115 to 112 Ma (Klöcking et al., 2016)*
mKNAb	*andesite breccia; dark green to brown weathered and dark green to black fresh, monomict with andesite groundmass; 115 to 112 Ma (Klöcking et al., 2016)*

EARLY CRETACEOUS

Whitehorse suite (111-104 Ma)

mKaW	*quartz-plagioclase-biotite porphyritic quartz latite; pink weathered and fresh*
mKfW	*biotite-hornblende granodiorite; fine to medium-grained, equigranular; main phase of the Dawson Range batholith ca. 108 to 105 Ma (Klöcking et al., 2016; Mortensen et al., 2016)*
mKfWp	*rhyolite to dacite dikes and plugs; light grey to orange-weathered, typically light grey fresh; plagioclase-quartz porphyritic with plagioclase>quartz; plagioclase is white, 2-3 mm, commonly clay altered and subround, quartz is clear, 3-5 mm and angular to subround, commonly embayed*

LATE TRIASSIC TO EARLY JURASSIC

Minto suite (204-194 Ma)

LTEJgM	*K-feldspar porphyritic hornblende granodiorite; medium to coarse-grained, moderately foliated to unfoliated; ca. 199 Ma (Sack et al., 2020; 2022)*
LTEJgMC	*hornblende granodiorite; medium to coarse-grained, moderately foliated to unfoliated, equigranular; best exposed on eastern margin of plutons; presumably ca. 199 Ma based on association with LTrEJgM*

LATE TRIASSIC

Pyroxene Mountain suite (220-214 Ma)

LTPx	*hornblende±biotite tonalite; medium-grained, weakly foliated, equigranular; ca. 216 Ma (Sack et al., 2022b)*

YUKON-TANANA TERRANE

LATE DEVONIAN TO EARLY MISSISSIPPIAN

Simpson Range suite (ca. 365-350 Ma)

MgSR	*biotite±hornblende metagranodiorite; light grey to orange weathered and light grey fresh, foliated; local feldspar augen; locally well foliated and difficult to distinguish from quartzofeldspathic Snowcap rocks; 365 to 350 Ma (Joyce et al., 2020)*

DEVONIAN TO MISSISSIPPIAN

Finlayson assemblage

DMF1	*amphibolite; dark green; strongly foliated and locally compositionally layered; generally schistose, locally gneissic; more micaceous than Snowcap amphibolite (PDS3)*

PROTEROZOIC TO DEVONIAN?

Snowcap assemblage

PDS3	*amphibolite; dark green weathered and fresh; fine to medium-grained, equigranular and foliated*
PDS1	*quartzite and schist; grey to white quartzite, micaceous quartzite and quartz-muscovite-biotite (± garnet) schist; strongly foliated and layered; locally forms a quartzofeldspathic gneiss difficult to distinguish from Simpson Range metagranitoid (MSR)*

geologic contacts (defined, approximate, inferred, covered)...

fault; movement not known (defined, approximate, inferred, covered)...

dextral strike-slip fault (defined, approximate, inferred, covered)...

normal fault (defined, approximate, inferred)..................

fault movement towards (L) and away (R) from section ⊙ ⊗

limit of outcrop, subcrop and felsenmeer... ....

jointing...

bedding or flow layering.............................

foliation (dominant).....................................

radiometric date ($^{238}U/^{206}Pb$, $^{187}Re/^{187}Os$, $^{40}Ar/^{39}Ar$) (age in Ma, ± 2s, Zrn = zircon; Ttn = titanite; Cal = calcite; Mo = molybdenite; Hbl = hornblende; Bt = biotite; Kfs = K-feldspar; Ms = muscovite; WR = whole-rock)................ ● *351 ± 1* ■ *71.0 ± 0.3* ▲ *195.2 ± 0.8*

field station (this study)................................. ○

road (maintained, unmaintained, quad trail).

ALTERATION (only on sheet 2)

🟩	high grade Au-Ag	▦	Quartz-tourmaline	▒	argillic
🟩	low grade Au-Ag	▒	phyllic	▒	propylitic

MINFILE DEPOSIT TYPE

◊ vein/breccia

☐ porphyry

○ unknown

vein trace (defined, approximate)

breccia body cemented by hydrothermal minerals such as tourmaline, magnetite and quartz ⊕

placer gold creek (major gold bearing stream, proven or high potential to be gold bearing)

MINERALIZATION AGE

● Late Cretaceous

● Early Cretaceous

○ unknown

NOTES

The maps on this sheet are larger-scale versions of the same geology presented in sheet 1 and are meant to display the increased level of detail over some of the key occurrences in the Mount Nansen porphyry district. The 1:20 000 district map is centred on the Late Cretaceous Klaza-Kelly-Cyprus occurrences and the 1:2500 maps cover the Early Cretaceous Flex and Brown-McDade deposits. Four cross sections (C-C’, D-D’, E-E’ and F-F’), all look northwest, are at a scale of 1:20 000 and their locations are shown on the district map; cross section C-C’ is located along A-A’.

The geology and alteration of the Late Cretaceous Kelly and Cyprus porphyry complexes are shown in the Mount Nansen porphyry district inset map and cross section D-D’. These two porphyry complexes occur in an approximately 8 km by 3 km area elongate northwest and bisected by Nansen Creek. To the west of Nansen Creek is the poorly exposed Kelly porphyry complex of which mineralized rocks have only been found in drill core. Mineralized Kelly porphyry rocks are early porphyry-type veins including quartz-molybdenite veins with potassic alteration and Re/Os molybdenite ages between ca. 81 and 76 Ma (Lee et al., 2021). Kelly porphyry-type veins are associated with the microdiorite best exposed on the flanks of Slate Creek which has a CA-TIMS U/Pb zircon crystallization age of 78.11 ± 0.03 Ma suggesting these rocks are part of the Casino suite. To the east of Nansen Creek, the Cyprus porphyry complex is characterized by porphyritic rocks that occur as dikes, plugs and breccia bodies (Sawyer and Dickinson, 1976). Concentric phyllic-argillic-propylitic alteration zones are centred on quartz-tourmaline cemented breccia bodies, the inferred centres of magmatic-hydrothermal mineralization (Sawyer and Dickinson, 1976). The presence of Prospector suite mineralization is indicated by two ca. 71 Ma Re-Os molybdenite ages from the southwestern and northeastern portions of the Cyprus porphyry complex (Selby and Creaser, 2001; Lee, 2021). A CA-TIMS U/Pb zircon crystallization age of 71.27 ± 0.03 Ma documents Prospector Mountain age magmatism in the Cyprus porphyry complex. The porphyry complex is cut by northeast striking faults that appear to truncate both Casino and Prospector Mountain suite rocks.

The geology of the Klaza and BRX deposits is shown in the Mount Nansen porphyry district inset map and cross section C-C’. The deposits are hosted by mid-Cretaceous biotite-hornblende granodiorite of the Whitehorse plutonic suite. Abundant dikes of the Late Cretaceous Casino and Prospector Mountain suites intrude the Whitehorse suite and are spatially associated with the gold-silver-zinc-lead epithermal veins (Turner and Dumala, 2017). The veins crosscut Late Cretaceous Casino suite dikes, the majority of which are ca. 78 to 76 Ma and mineralization is ca. 74 to 71 Ma, broadly coeval with the Prospector Mountain suite (Lee, 2021). Veins are sinistrally offset approximately 100 m along north-northeast faults; a regional steep fault with unknown kinematics separates two structural styles of veining to the southeast of the deposits.

The geology of the Flex deposit is shown in the Flex inset map and cross section E-E’. The Flex deposit is an epithermal vein system hosted within amphibolite and felsic schist of the Finlayson assemblage (Andersen and Stroshein, 1998). High-grade gold and silver values are associated with north-northwesterly trending, sulphide-rich quartz veins. The age of mineralization has previously been interpreted as mid-Cretaceous based on U-Pb ages of zircon from mineralized quartz-feldspar porphyry dikes (ca. 110 to 106 Ma; Mortensen et al., 2016). These results are consistent with a recently published LA-ICPMS U/Pb zircon crystallization age of 111 ± 2 Ma for the Dickson Hill plug immediately north of the deposit (Sack et al., 2022b) and a 108.5 Ma ± 0.5 Ma Re/Os age from molybdenite in a white quartz-pyrite vein from the Flex deposit.

The geology of the past producing Brown-McDade deposit is shown in the Brown-McDade inset map and cross section F-F’. The Brown-McDade deposit contains two types of mineralized rock, gold-silver veins hosted in feldspar porphyry dikes running the length of the pit and a quartz-sulphide cemented breccia body hosted in metasedimentary rocks in the northern end of the pit. The feldspar porphyry dike intruded the contact between Early Jurassic foliated granodiorite of the Minto plutonic suite (Sack et al., 2022b) and metasedimentary rocks of the Snowcap assemblage (Stroshein, 1999). The main feldspar porphyritic dike in the pit is mineralized and was likely emplaced in the Cretaceous, coeval with mineralization. Based on textural similarities between this dike and the Dickson Hill plug near the Flex deposit, the age of mineralization is interpreted as mid-Cretaceous (Mortensen et al., 2016; Sack et al., 2022b). Veins are truncated by steep, northeast striking sinistral faults (Stroshein, 1999).

1:50 000-scale topographic base data
produced by
CENTRE FOR TOPOGRAPHIC
INFORMATION,
NATURAL RESOURCES CANADA

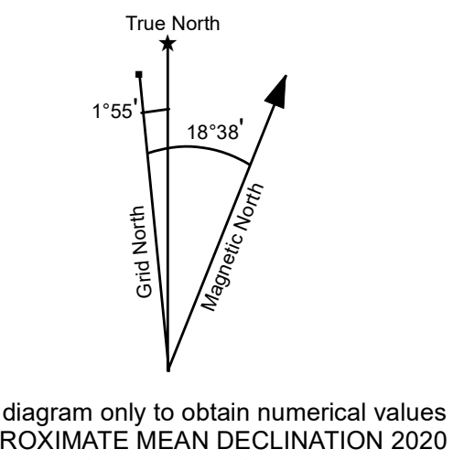
ONE THOUSAND METRE GRID
Universal Transverse Mercator Projection
North American Datum 1983
Zone 8

BEDROCK GEOLOGY
MOUNT NANSEN
YUKON

SCALE 1:20 000

CONTOUR INTERVAL 20 metres
Elevation in metres above mean sea level

0 1 2 3 4 5
Kilometres



Use diagram only to obtain numerical values
APPROXIMATE MEAN DECLINATION 2020
FOR CENTRE OF MAP

Yukon Geological Survey
Energy, Mines and Resources
Government of Yukon

Open File 2022-4

Revised geological map of
Mount Nansen area
(NTS 1115I/3 and part of 115I/2)
Sheet 2 of 2
(scale 1:20 000)

by

Patrick Sack, Nicole Eriks and Sydney van Loon