Gold exploration: permit 1215-1/2012, Gåmen, Ringvassøy, northern Norway, 2012

Report compiled by:

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EXECUTIVE SUMMARY

The Gåmen permit area is a 3 × 3 km square in the extreme northwest of the Archaean (2.83-2.60 Ga) Ringvassøy Greenstone Belt in the West Troms Basement Complex of northern Norway. The lowermost part of the greenstone belt overlying felsic basement gneisses occurs within the permit area. A total of 100 point and float samples were collected from stratabound mineralised zones up to a few metres thick, previously mapped by the present author in 2001. Gold grades range from below the detection level of 0.001 g/t to 0.17 g/t. The average grade is 0.02 g/t and the median is 0.01 g/t. Only 2 samples assayed above 0.1 g/t. The permit area is deemed uneconomic in terms of gold although there might be a gold-anomalous zone in the southeast. Iron concentrations of up to 34% in magnetite-rich rocks resembling banded ironstone occur in thin (<0.5m) layers and lenses. No further exploration is recommended and the exploration permit has been surrendered. Total project expenditure was approximately GBP 4,500 (NOK 40,500). Some observations of academic interest are presented in the report.

INTRODUCTION

In early 2012, the author was informed that ground had been staked in large areas of Ringvassøy by two exploration companies. In the knowledge that the Ringvassøy Greenstone Belt (RGB) hosts gold (Sandstad & Nilsson 1998; Ihlen & Furuhaug 2000; Finne 2000), and having previously carried out lithological and structural mapping for academic research on the island, the author applied for an exploration permit in the Gåmen area in the far northwest of the greenstone belt on behalf of his own limited company, Paul Armitage Consulting Limited. To the author's knowledge, the Gåmen area had seen no previous exploration and very little, if any, mapping or sampling. However, mapping in 2001 by the present author proved that the Gåmen area hosts mineralised zones with gold potential, in view of their Archaean greenstone setting. The reader should note that significant additions and some modifications could be made to details of the 2001 geological map after observations in 2012, but time has not permitted such changes to be made. The broad representation of the map holds true.

Location, access and physiography

Ringvassøy is a large island located north of Tromsø in North Norway (Fig. 1) and is accessible by paved road from Tromsø via the Kvalsund tunnel. A paved road continues around the south and east coast of the island towards the main population centre, Hansnes. All other access is by gravel roads branching into the interior of the island.

The permit area is a few km north of the termination of a gravel road in Skarsfjord (Fig. 2). The author has previously (1998) been accommodated in a house in Skarsfjord owned by Tromskraft, the regional power company (there is a hydroelectric power station in Skarsfjord). When camping in the Gåmen area, equipment and supplies were carried with relative ease on foot from Skarsfjord. However, it is possible to access the Gåmen area by boat either from Skarsfjord or from Skogsfjord to the east.

The permit area is a 3 × 3 km square with its northwestern corner at (UTM zone 34N) 418400E 7770700N and southeastern corner 421400E 7767700N. Eastwards of longitude 419000E, the southernmost 300m of the permit area overlaps with 2 previously awarded permits belonging to Store Norske Gull A/S.

The sun does not set from approximately mid June to mid August and daytime temperatures are moderate to warm in this period, falling considerably in damp or rainy conditions but never freezing. Fieldwork requiring sight of the ground can usually be carried out comfortably between mid June and mid September.

The Gåmen area has no strenuous terrain, being a gently rolling landscape up to 150m above sea level with a few hills a little higher, and a coast on the north and northeast sides. Ground cover is generally thin with low vegetation, no trees, and some boggy areas. Potable water can be taken from most streams or lakes. There are plenty of excellent locations for camping. Mosquitoes and gnats/midges are an occasional nuisance. Mobile phone coverage is good but not total.

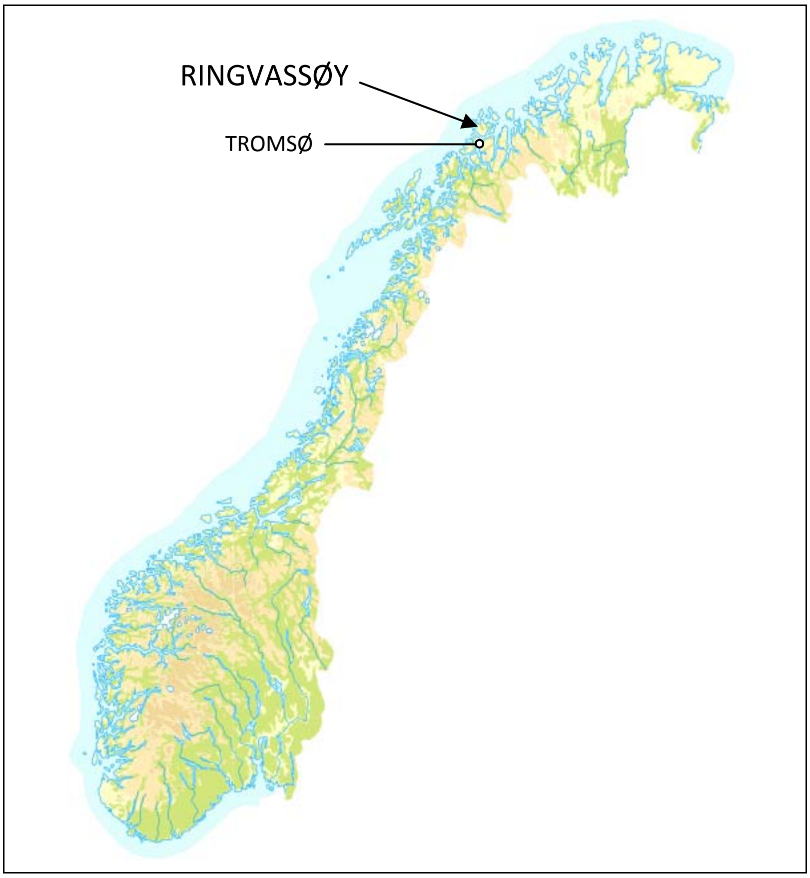

Fig. 1. Location of Ringvassøy in North Norway.

Fig. 2. Location of the Gåmen permit on Ringvassøy nothwest of permits held by Store Norske Gull and Scandinavian Resources as of June 2012. Source: *http://geo.ngu.no/kart/bergrettigheter*

Regional geological setting

The RGB is an Archaean (2.85-2.83 Ga; Motuza *et al.* 2001) supracrustal belt within the West Troms Basement Complex (WTBC, Zwaan 1995; Fig. 3) which has Archaean to Palaeoproterozoic crystallisation ages (Zwaan & Tucker 1996), and was deformed and metamorphosed in Svecofennian (Palaeoproterozoic) time, possibly also during the Caledonian Orogeny but to a far lesser extent and expressed by very limited fault zones.

The cratonic evolution of the WTBC can be divided into three stages (Myhre 2011): the oldest rocks are found in the northeast, on Ringvassøy and Vannøy, recording the formation of a paired tonalite complex and greenstone belt from 2.92-2.80 Ga. This oldest complex is in contact with younger Neoarchaean rocks along a high-grade shear zone. Although there is also some evidence of 2.83 Ga rocks in the geotransect to the southwest of the high-grade shear zone on Ringvassøy, the majority of those rocks record a two-stage (2.75-2.70 and 2.70-2.67 Ga) magmatic and migmatitic evolution. A swarm of mafic dykes documented in one location on Kvaløy to the south concluded this event, possibly closely related to granitoid magmatism and migmatisation of earlier rocks.

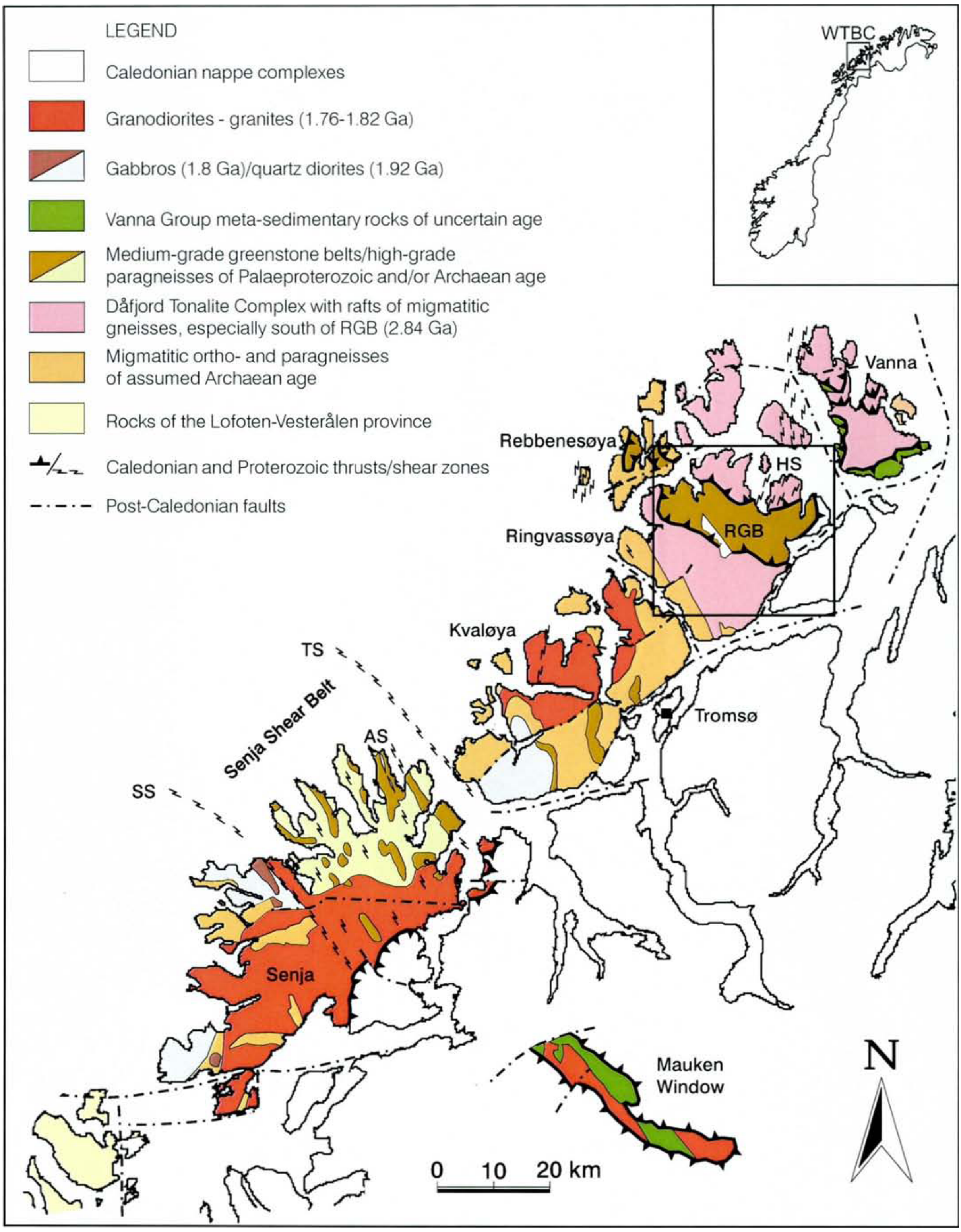

Fig. 3. Simplified geological map of the West Troms Basement Complex, redrawn from Zwaan (1995). AS = Astridal Shear Zone, HS = Helgøy Shear Belt, RGB = Ringvassøy Greenstone Belt, SS = Svanfjellet Shear Zone, TS = Torsnes Shear Zone.

Geology of Ringvassøy

The bedrock of Ringvassøy has been divided into three main units: (1) a Precambrian gneiss complex, (2) an overthrust sequence of Precambrian metasupracrustals known as the Ringvassøy Nappe, and (3) overthrust Caledonian rocks belonging to the Lyngsfjell Nappe in the far east of the island (Zwaan 1989; Fig. 4). Mafic intrusive rocks are a common feature of the gneiss complex and the Ringvassøy Nappe, but do not intrude the Lyngsfjell Nappe as the mafic dykes are Precambrian.

Fareth & Lindahl (1982) recognised the Ringvassøy Nappe as a greenstone belt and divided it into two conformable units: the upper Skogsfjord Formation and underlying Hessfjord Formation. However, Zwaan (1989) considered these two formations to be unconformable and renamed them the Skogsfjord Group and Skogsfjordvatn Group, respectively. The Skogsfjordvatn Group was subdivided into the upper Hessfjord Formation and underlying Sætervik Formation. The contact between the formations is defined by a gradual lithological transition from dominant metavolcanites to clastic metasediments.

Zwaan (1989) considered the contact between the gneiss complex and overlying Skogsfjordvatn Group (gneiss-greenstone contact) to be a 'regional tectonic unconformity', and the contact between the Skogsfjordvatn Group and overlying Skogsfjord Group a 'thrust of uncertain size and age'. Thus the greenstone belt is portrayed as two allochthons. Sturt (1983) and Skauli (1990) found no evidence for a tectonic contact within the greenstone belt, nor an abrupt change in metamorphic grade across the contact, a view supported by the present author's work, at least in the western part of Ringvassøy (Bergh & Armitage 1998, 1999; Armitage 2001). Binns (1983) found that gneiss-greenstone contact is a basal thrust that is older than at least some of the mafic intrusives since they cut the mylonitic foliation in the thrust (Binns 1983). The present author found clear evidence of two episodes of movement along the gneiss-greenstone contact (Armitage *et al.* 1999): the first event cuts large, assumed 2.4 Ga (Kullerud *et al.* 2006) mafic dykes with large displacements of an unknown vector, the second event cuts later a later generation of mafic dykes intruded into discordant shear zones and displays small lateral displacements.

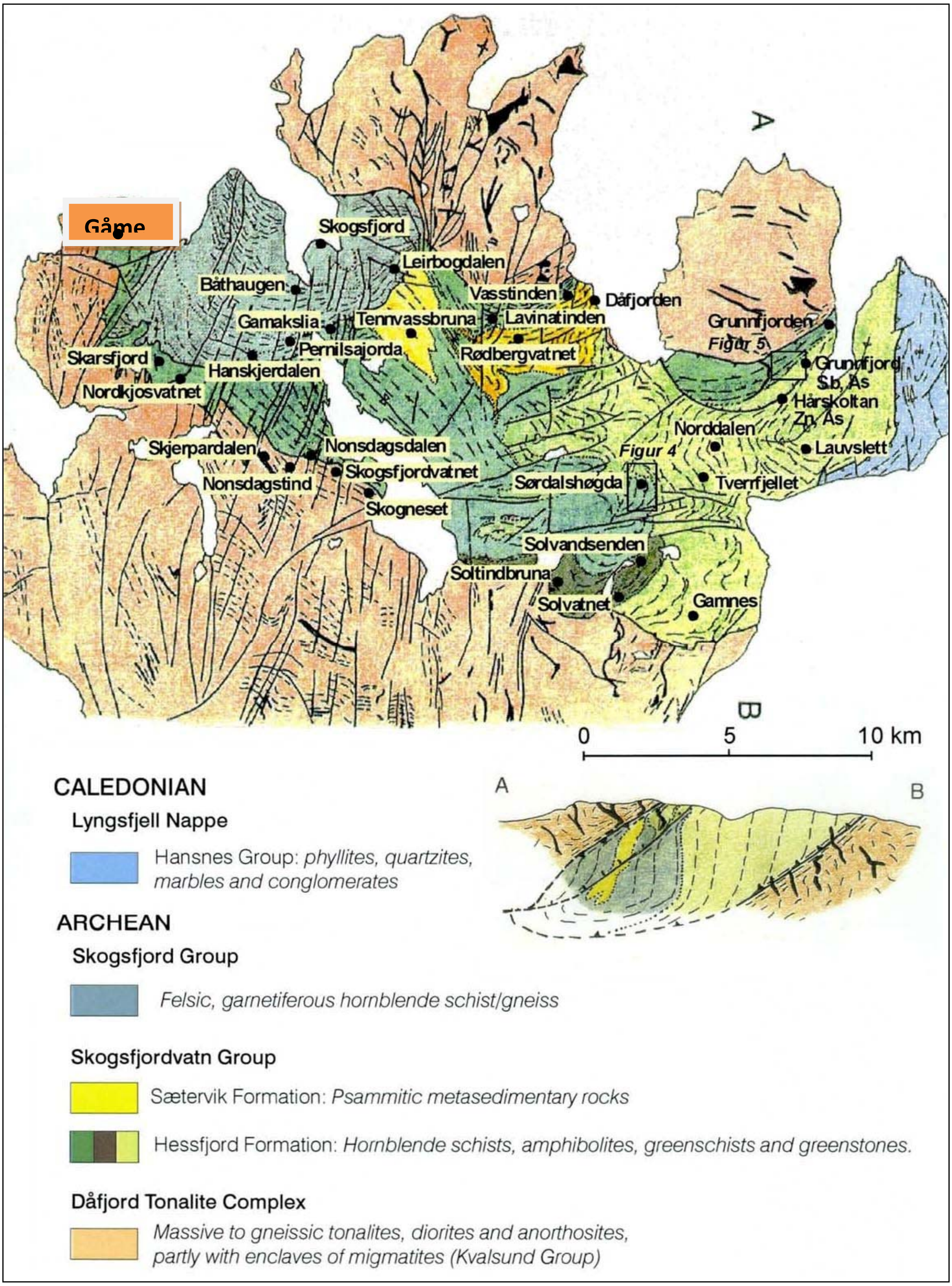

Fig. 4. Simplified geological map of the Ringvassøy Greenstone Belt showing locations referred to in the text. Modified after Zwaan (1989).

Geology of the Gåmen area

The permit area was selected to cover the under- or unexplored extreme northwestern part of the RGB, although the belt appears to continue on another island, Rebbenesøy, to the northwest. The greenstone belt is well documented in recent publications (see Bergh *et al.* 2010 and references therein) and is dominated by mafic metavolcanics of upper(?) greenschist to middle amphibolite facies grade, with an apparent increase in metamorphic grade from east to west. Very little was known about the Gåmen area before 2001, when the present author mapped it (Fig. 5, Fig. 6). The greenstone rocks of the area are entirely amphibolite facies and locally garnetiferous, except in retrograde calcareous chloritic shear zones. A large shear zone that strikes SW-NE and runs through Laksevatn to Sør-Grunnfjord divides an area of relatively high magnetism to the northwest (Gåmen area) from relatively low magnetism to the southeast (Fig. 7). However, the author was informed that geophysical data from Ringvassøy was undergoing reinterpretation (Iain Henderson, NGU, personal communication 2012).

The mafic metavolcanics (with flattened volcaniclastic textures evident in large boulders along the northern shore) are conformably intercalated with other, minor lithologies. One is a quartz-ribboned rusty rock (Fig. 8) that is difficult to describe in detail, as it typically occurs as narrow, highly weathered 'pavements' of ferricrete-like, possibly gossanous fragments (Fig. 9, Fig. 10). The rusty appearance is due to oxidation of sulphides. Fresh sulphides are rare, but are found as abundant pyrrhotite in fresh exposures along the northern shore, especially at Rødberget (Fig. 11, Fig. 12), where an exposure has been blasted to set up a pole for power cables. Pyrrhotite oxidises readily, and this could explain the rust seen in all of the mineralised zones.

Another less common lithology is a banded magnetite gneiss (Fig. 13) occurring in horizons and lenses <1m thick. Where these are observed along the northern shore, they resemble banded iron formations, but the banding might be a metamorphic phenomenon.

It is interesting from an academic viewpoint that the apparent banded ironstone is associated with sulphidic horizons and apparent quartzite in at least two exposures between Holmebukta and Rødberget in the northeast. The best examples of open to tight subhorizontal folding can also be seen along the same stretch of shoreline (Fig. 13).

In the Gåmen area, the main foliation has a predominantly north-south strike and subvertical to steep eastward dip. An east-west traverse therefore offers a section through the (tectono)stratigraphy. Subhorizontal assymetric open folding is locally evident on a scale of tens of metres (Fig. 14). The assymetry, where observable, indicates up-to-west sense of shear. Along the mineralised zones, steep to subvertical sinistral folding is occasionally evident (Fig. 8). In the case of steep folding, it is likely that shearing has been localised in rheologically weak zones that were previously mineralised. In the author's opinion, deformation post-dates mineralisation as the mineralised zones are occasionally seen to be repeated at the surface by open subhorizontal folding; this open folding is interpreted to pre-date sinistral shearing but post-dates mineralisation. The mineralisation is thus considered to be a primary feature of the supracrustal belt. The contact to the basement gneisses is unmineralised and otherwise unremarkable in the Gåmen area.

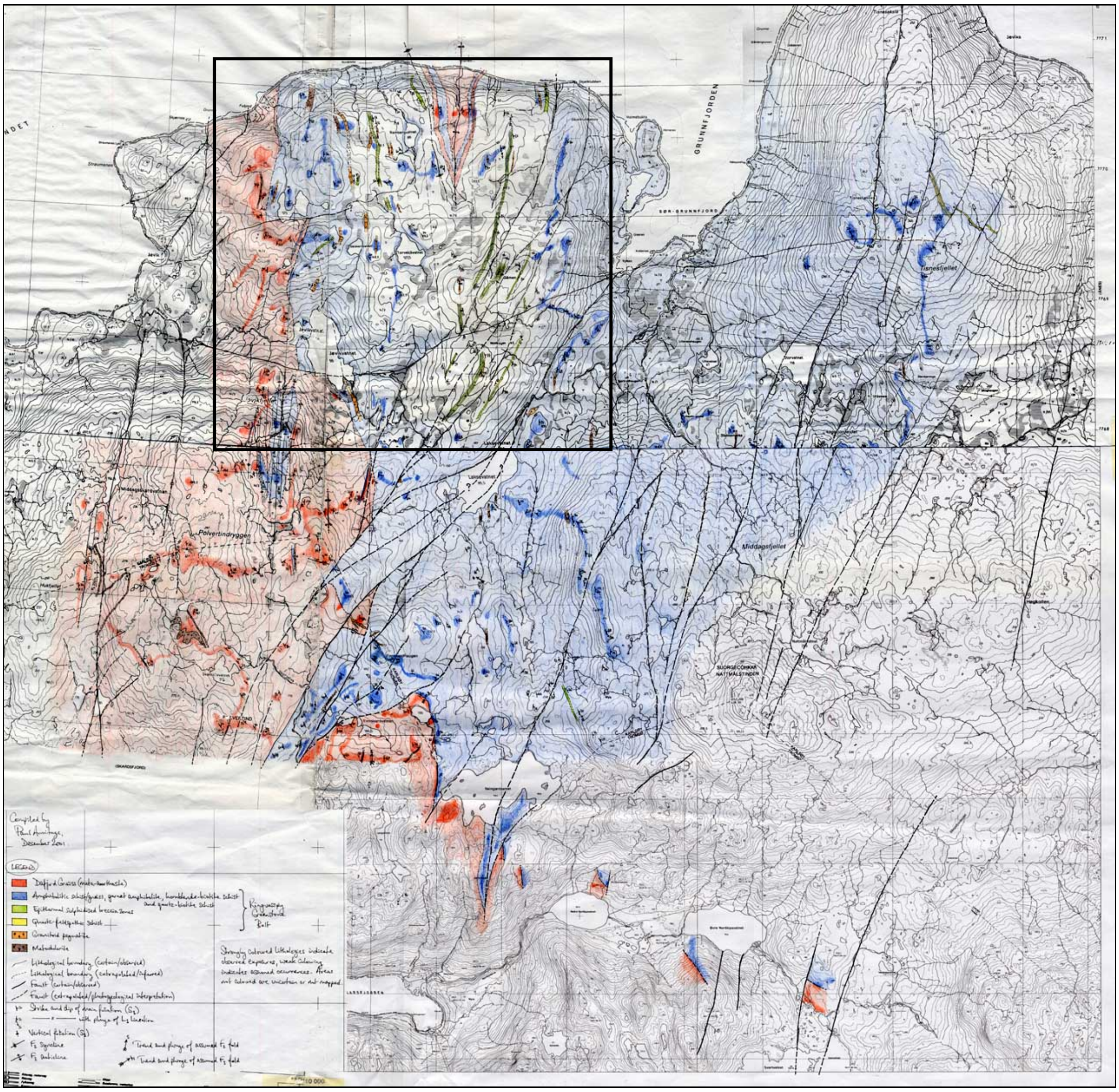

Fig. 5. The Gåmen area (black square, 3 x 3 km) in the context of the broader geological map of the northwestern part of the Ringvassøy Greenstone Belt (from Armitage 2001). Red = banded anorthositic gneisses, blue = amphibolites/greenschists (metavolcanics), green = rusty horizons (exploration targets), brown = mafic dykes, orange = granitoid pegmatite dykes.

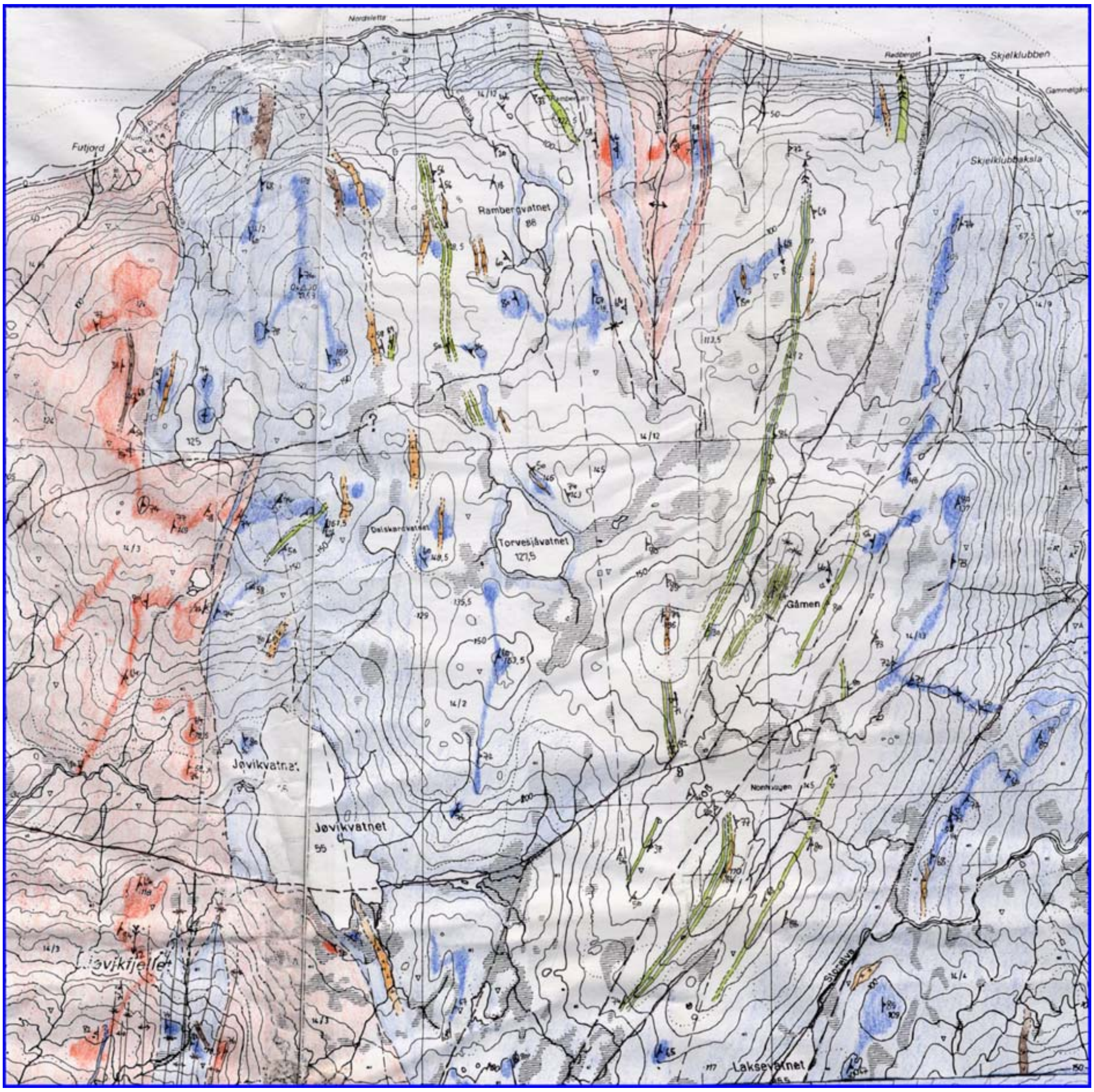

Fig. 6. Geological map of the permit area (cropped from Armitage 2001). The frame of the map is the permit boundary, exactly 3 × 3 km. Blue coloured areas are amphibolitic schists, red coloured areas are banded 'basement' gneisses. Brown = diabase dykes, orange = granitoid pegmatite dykes. Darker coloured zones indicate first-order observation. The main exploration targets are the green zones.

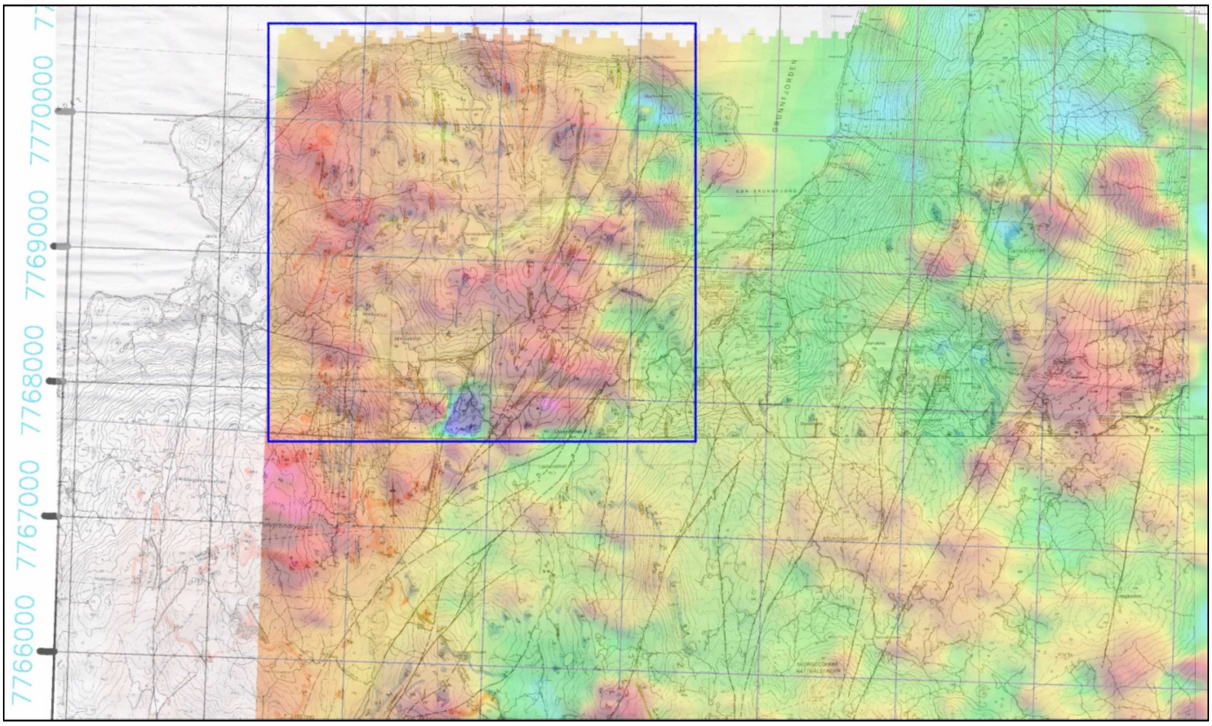

Fig. 7. Part of the NGU aeromagnetic map superimposed on a geocorrected geological map (Armitage 2001) showing relatively a high magnetic response around Gåmen delimited by a large NE-SW striking shear zone transecting the southeastern part of the Gåmen permit area (blue square).

Fig. 8. Quartz-ribboned mineralised lithology occurring in continuous units a few metres wide. Note sinistral folding, which is common along these horizons.

Fig. 9. Typical inland surface expression of a mineralised zone.

Fig. 10. Fragmented, oxidised ‘ferricrete-like’ rock (gossan?) observed in mineralised zones.
UTM 420905E 7770336N

Fig. 11. Southward view of Rødberget from the shore. Note the power cable and pole on the hillside where the bedrock has been blasted to reveal a fresh quatrz-rich rock with abundant pyrrhotite (Fig. 12 below). UTM 420933E 7770478N

Fig. 12. Pyrrhotite in a blasted quartz-rich rock fragment at Rødberget. UTM 420929E 7770435N

Fig. 13. Banded magnetite gneiss at Skjelklubben, a shoreline locality in the far northeast (see Fig. 6).

Fig. 14. Subhorizontal open synform at UTM 420386E 7768813N. Hammer shaft indicates trend of fold axis.

Previous exploration

Mining on Ringvassøy began in 1860 in sulphide occurrences in the east but the gold occurrences did not receive much attention until the 1980s.

Gold exploration at the Holmvasshøgda prospect was initiated by Norwegian company ASPRO in 1982 (Lieungh 1985). Stream sediment sampling outlined a 1200m long gold anomaly along the Dåfjord Fault, which was subsequently drill tested by 7 holes. Whilst the peak gold value was only 1m @ 1.08 g/t Au, the drill holes were widely spaced at 500m and unfavourably collared in diabase.

As of late 2012, Scandinavian Resources has permits covering three known gold occurrences in the eastern part of the RGB, namely the Sørdalshøgda, Holmvasshøgda and Hårskoltan prospects. Each of these is located at or near the transition between greenschist and amphibolite facies domains (Fig. 4).

The gold mineralisation at Sørdalshøgda is hosted in hydrothermal, sugar-grained and laminated quartz veins with disseminated pyrite, chalcopyrite and pyrrhotite. The quartz veins are spatially bound to a quartz-porphyritic, medium-grained felsic intrusive (tonalite) containing tourmaline and are the likely result of the competency contrast between the tonalite and the surrounding greenstones. The vein frequency increases with increasing deformation and the veins are generally parallel to foliation in the tonalite, occasionally weakly foliated but not folded. The tonalite is cut by irregular, northwest-trending diabase dykes. Although the quartz veins at Sørdalshøgda are high-grade, they appear limited in width and length: the main northern vein is 7m long and 30-40cm wide, and the main southern vein is several metres long and 45cm wide where exposed by excavation. Both veins contain pyrite-chalcopyrite-pyrrhotite mineralisation and have mylonitic, chlorite-ankerite altered contacts. Dump sampling of the main northern vein by Scandinavian Resources returned 9.05 g/t Au, 11 g/t Ag and 0.95% Cu in one sample.

At Sørdalshøgda South, stratabound Au-Zn-As-Ag mineralisation occurs in strongly oxidised quartz-carbonate-chlorite schist with abundant magnetite, garnet and biotite. This prospect was drill tested in the early 1980s, outlining a 350m long and 60m wide zone with a variable thickness of 1-2m. The best intersection from historical drilling was 1.45 g/t Au, 5 g/t Ag and 0.86% Zn over 2m. Sampling of this mineralisation by Scandinavian Resources returned 11.6 g/t Ag, 3960 g/t Zn in one sample and 1.36 g/t Au, 10.9 g/t Ag and 6460 g/t Zn in another.

A large carbonate-altered tonalite crops out at the Hårskoltan prospect which has been cut by two generations of diabase dykes. ASPRO explored the prospect in the early 1980s. They mapped and sampled a 1500m long quartz vein within greenstones south of the tonalite. Rock chip sampling returned a peak value of 15 g/t Au and also demonstrated that sugary quartz veins within the tonalite are not auriferous.

Rock chip sampling of the quartz vein at Hårskoltan by Scandinavian Resources in 2011 returned relatively low gold values of 0.1-0.4 g/t although a peak value of 11.4 g/t was returned.

ASPRO and a prospector named Wilhelm Tveter recovered >100 gold grains and >400 scheelite grains in individual panned samples. However, the exact locations are not given.

All of the previous exploration has taken place in the eastern and central parts of Ringvassøy. What would be relevant to the west and northwest, where Gåmen is located, is an understanding of the mineralisation styles present within and adjacent to the greenstone belt. However, it is a repeated remark in various reports that the mineralisation styles and their setting require much more investigation.

Closer to the Gåmen area, a sample from a quartz vein in the Nordkjosvatnan area that returned 8.5 g/t Au (Rune Wilberg, pers. comm. 2012). The vein was traced over c. 2 km and channel-sampled at a number of locations, but gold values were negligible. In the same area, several stream samples panned by NGU workers returned values in the range 1500-6000 ppb Au and >6000 ppb Au.

Norwegian company Store Norske Gull have exploration permits adjoining the Gåmen area but the present author is not aware of any recent results in those areas, as the permits were only granted in 2011.

Exploration targets in 2012

Several continuous, apparently stratabound units rich in weathered sulphides appear to be associated with foliated quartz-feldspathic lithologies, some possibly originating as 'keratophyre', a term used by Zwaan (1989). These mineralised zones are approximately 1-5 m thick, coloured green on the geological map (Fig. 5, Fig. 6), and are probably continuations of identical units at similar stratigraphic levels further southeast (Bergh & Armitage 1998, 1999; Skoglund 2006).

In the mineralised horizons, there appears to be a positive correlation between thickness and the degree of hydrothermal brecciation. The thickest zones are the most altered, consisting almost entirely of a friable (at surface) aggregate of millimetre- to several cm-sized, angular, rust-coloured fragments of schists and sulphides resembling gossan. The composition and fabric of the original lithology is virtually unrecognisable, though freshly broken surfaces in the fragments often display a fine-grained feldspathic schist with variable mica and chlorite content. The least altered/deformed mineralised units tend to be the thinnest, seen as a banded rock resembling quartzite or arkose, but possibly a felsic metavolcanite ('keratophyre'?), with rusty mineralisation in the foliation/bedding planes. These planes are spaced at approximately 1-2 cm.

Fieldwork in 2001 was focused on mapping and time was of the essence due to poor weather. For this reason, the mineralised zones were not sampled or thoroughly described.

An aeromagnetic survey was flown over the RGB on behalf of the Geological Survey of Norway (NGU) in 2002. Fig. 7 shows the magnetic map superimposed on the geological map, and reveals that a large NE-SW striking shear zone transecting the southeastern part of the permit area delimits a relatively high magnetic response to the northwest (Gåmen area). The author's structural geological data tentatively indicates an oblique sinistral sense of shear with an up-to-north component. This would mean that the Gåmen area represents a slightly higher crustal level than the area to southeast of the shear zone at the present erosion level.

EM and gravity data acquired at the same time as the aeromagnetic data are currently being reprocessed by NGU (Iain Henderson, NGU, pers. comm. 2012).
It should be emphasised that no exploration has been carried out in the Gåmen permit area. This is somewhat surprising, given the relative abundance of apparently stratabound mineralised zones there, and given that the Gåmen area is clearly part of the RGB in which gold has been found in the east.

EXPLORATION ACTIVITIES IN 2012

Personnel

The author had one assistant, Ole Patrick Larsen, a student at the Department of Geology, University of Tromsø. Prof. Steffen Bergh of the same department arranged and assisted with transport between Tromsø and Ringvassøy, and visited the permit area on the first and final days.

Health, safety and environmental issues

Operations were carried out in accordance with regulations and procedures set out by the University of Tromsø, especially those relating to seaborne transport. In the field, the author and his assistant worked separately but stayed within visual range of each other, and also carried walkie-talkies and mobile phones, for which there was adequate coverage in the area. Safety glasses and work gloves were used when hammering to collect samples.

Logistics

[redacted]

Transport in the form of a minibus and boat on a trailer was provided by the Department of Geology, University of Tromsø, as the fieldwork was incorporated into ongoing research at the university. The boat was put to sea by a farm [redacted] on the east side of Skogsfjord, with easy navigation past Tisneset to the destination at Sør-Grunnfjord.

Fieldwork

Transport and fieldwork occupied the period 1–5 September, resulting in the collection of 58 *in situ* point samples and 42 float samples from several sulphidic zones that had been mapped by the present author in 2001. Some of the samples were from other lithologies of interest, e.g. banded magnetite-rich units (Fig. 13). The sulphidic horizons are not necessarily separate but some at least may be repeated by open to isoclinal folding and/or thrusting. Subhorizontal folding is evident in and adjacent to some of the mineralised horizons, particularly where there appear to be 'twinned' horizons, i.e. two running parallel and close to each other but likely to be the same horizon on either limb of a subhorizontal fold. The fold hinges are occasionally exposed.

Geographic positions were taken on Garmin handheld GPS units using the UTM coordinate system in the WGS84 geodetic datum. Samples were sealed individually in Tyvek tie-string bags together with a waterproof tear-off label from booklets containing sequentially numbered labels. The bags were marked on the outside with the project code GMN, sample type, and unique sample number. The sample type, collector and geographic position were noted on the corresponding stub in the label booklet. The sample numbers and their geographic positions were also saved on the GPS units. Reference samples (matchbox-sized pieces of the main sample) were collected in the same manner but sealed in plastic rather than cotton bags and additionally marked REF on the outside of the bag. All reference samples are currently in storage at the University of Tromsø.

In addition to the exploration work, during a visit by Prof Steffen Bergh, two samples of syntectonic granitoid pegmatite dykes were collected from a shear zone at Nordsletta near the northwest boundary of the permit area for age determination by Fernando Corfu at the University of Oslo. The two samples were collected a few metres apart. The shear zone is ductile, east-west striking, gently to moderately south-dipping, and characterised by a greenschist facies mineral assemblage (Fig. 15). The sense of shear is ambivalent, and there was little time available to establish the sense of shear with certainty. The association of the pegmatite dykes with the shear zone and the relatively slight deformation of the pegmatite (Fig. 16, Fig. 17) strongly suggests they are syntectonic. However, the zircons separated in the laboratory are extremely metamict and milky, so age determination is very unlikely to give a meaningful result (F. Corfu, personal communication).

Fig. 15. Westward view along strike of a moderately south-dipping, greenschist facies shear zone at Nordsletta. UTM 647918E 7773924N.

Fig. 16. Locality of sample PA-12-01, a syntectonic granitoid pegmatite dyke. View to south. UTM 647904E 7773917N.

Fig. 17. Locality of sample PA-12-02, a syntectonic granitoid pegmatite dyke. View to south. UTM 647891E 7773919N.

LABORATORY ANALYSES

Sample preparation and analysis

At the end of fieldwork, all samples were transported to the University of Tromsø, where they were batched and sent to ALS Minerals in Piteå, Sweden, using the services of DB Schenker in Breivika, Tromsø.

Samples were dried at 60°C and crushed, split and pulped in a tungsten carbide pulveriser to 85% passing 75μm (200 mesh). The pulps were analysed by ALS Minerals' Au-ICP21 package for Au (30g fire assay with ICP-AES finish) and ME-ICP61 package for other elements (33-element four-acid digestion with ICP-AES finish). The sample database is presented in Appendix 1 and laboratory certificates in Appendix 2.

Assay results

Certified assay data are provided in Appendix 3. The gold grades range from below the detection level of 0.001 g/t to the highest concentration of 0.17 g/t. The average grade is 0.02 g/t and the median is 0.01 g/t. Only 2 samples assayed above 0.1 g/t. A map of samples and their assayed Au ranges is given in Appendix 3. Note there is a slight mismatch between the positions of the collected samples and the mineralised zones shown in green on the field map. This is due to inaccuracies in the topographic base map, compounded by wrinkling of the map sheets from 2001.

Of the 100 samples collected, 25 were selected for geochemical analysis of 33 elements to gain a representative set of geochemical data and to test for other metals such as iron and copper. The results are unremarkable for a greenstone belt dominated by mafics. Where magnetite-rich samples were observed directly in the field, the analyses show iron content of up to 34%. However, these rocks are restricted to: (1) thin units and lenses of a lithology resembling a banded ironstone, although the bands of magnetite might be a metamorphic phenomenon; and (2) pyrrhotite-rich units near the northern shoreline that appear to be the fresh (unweathered) continuations of the rusty mineralised horizons throughout the permit area.

No QA/QC was carried as further expenditure could not be justified on the basis of the assays.

CONCLUSIONS AND RECOMMENDATIONS

Despite a few of the 100 samples carrying anomalous gold concentrations, there is no reason to believe that significantly higher gold grades would be found in sufficient tonnage to make the area economic.

In view of the disappointing assays, the permit was surrendered before 15 January 2013, when continuation fees would have been imposed by the Mining Inspectorate of Norway. ALS Minerals were instructed to dispose of all remaining sample material later in the year, but reference samples are in storage at the University of Tromsø. It is unclear how many styles of gold exploration exist on Ringvassøy and exploration opportunities may be sought in adjacent ground depending on the results of activities on the island by other companies. Exploration in the continuation of the greenstone belt on Rebbensøy to the northwest should also be considered, although a national park occupies part of the belt.

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APPENDIX 1

Database of samples collected in the Gåmen permit in 2012.

Abbreviations used:
RGB = Rock GraB (*in situ* point sample)
RTR = Rock Transported (float sample)
qz = quartz
bi = biotite
hbl = hornblende
vfg = very fine grained
fsp = feldspar
fg = fine grained
chl = chlorite
cc = calcite
mt = magnetite

Sample ID	Type	Date	Year	Taken by	Easting	Northing	Au (ppm)	Description
17001	RGB	02 Sep	2012	PEBA	420157	7767956	0.006	Margin of quartz vein of uncertain size crosscutting amphibolite. Some rust.
17002	RGB	02 Sep	2012	PEBA	420160	7767977	0.005	Rusty zone in qz rich foliated rock.
17003	RTR	02 Sep	2012	PEBA	420185	7768006	0.030	Qz rich rusty rock (float within continuous rusty zone).
17004	RGB	02 Sep	2012	PEBA	420232	7768043	0.027	Margin of crosscutting qz vein in amphibolite. Slightly rusty.
17005	RGB	02 Sep	2012	PEBA	420264	7768098	0.001	S1-conformable qz vein in rusty zone.
17006	RGB	02 Sep	2012	PEBA	420266	7768100	0.076	Rusty qz-amphibolite schist.
17007	RGB	02 Sep	2012	PEBA	420309	7768146	0.053	Qz rich rusty rock.
17008	RGB	02 Sep	2012	PEBA	420343	7768213	0.013	Rusty foliated qz rich rock. Massive translucent qz between rusty foliation planes.
17009	RGB	02 Sep	2012	PEBA	420367	7768251	0.090	Rusty qz rich foliated rock. Rust is in foliation planes and fractures.
17010	RGB	02 Sep	2012	PEBA	420384	7768298	0.011	Rusty foliated qz rich rock.
17011	RGB	02 Sep	2012	PEBA	420397	7768347	0.010	Rusty foliated qz rich rock (with bi and ?hbl).
17012	RGB	02 Sep	2012	PEBA	420397	7768347	0.001	Rusty vfg qz-bi schist. Sulphate/sulphite on surface.
17013	RTR	02 Sep	2012	PEBA	420413	7768433	0.064	Very rusty foliated qz rich rock.
17014	RGB	02 Sep	2012	PEBA	420402	7768431	0.008	Very rusty microfolded qz rich schist.
17015	RTR	02 Sep	2012	PEBA	420159	7768363	0.168	Very rusty vfg qz-bi schist.
17016	RTR	02 Sep	2012	PEBA	420208	7768425	0.013	Rusty vfg qz-bi schist.
17017	RTR	02 Sep	2012	PEBA	420214	7768476	0.010	Rusty vfg qz-bi schist.
17018	RTR	02 Sep	2012	PEBA	420895	7770177	0.015	Very rusty foliated qz rich rock (qz-bi schist evident). Sulphides present as encrustation. Uncertain dark mineral present.
17019	RTR	02 Sep	2012	PEBA	420879	7770186	0.017	Very rusty slightly ferricrete-like qz rich foliated rock.
17020	RGB	02 Sep	2012	PEBA	420896	7770227	0.082	Very rusty ferricrete-like vfg qz-fsp rock. Low density.
17021	RGB	02 Sep	2012	PEBA	420905	7770291	0.016	Extremely rusty ferricrete-like rock.
17022	RTR	02 Sep	2012	PEBA	420905	7770337	0.084	Extremely rusty ferricrete-like rock.
17023	RTR	02 Sep	2012	PEBA	420929	7770435	0.007	Foliated fresh mt and sulphide (arsenopyrite? - maybe pyrrhotite) rich qz-bi schist/gneiss at blasted outcrop by power cable pole.
17024	RGB	02 Sep	2012	OPL	420930	7770472	0.012	Fg quartzite(?) with mt and arsenopyrite(? - maybe pyrrhotite). Rusty crust.
17025	RGB	02 Sep	2012	PEBA	420928	7770473	0.017	Fg quartzite(?) with mt and arsenopyrite(? - maybe pyrrhotite). Rusty crust.
17026	RGB	02 Sep	2012	PEBA	421136	7770497	0.003	Sigmoid qz lens in sheared rusty qz-bi schist.
17027	RGB	02 Sep	2012	PEBA	421136	7770496	0.004	Fg qz-bi schist (bi-rich) with very rusty crust.
17028	RGB	03 Sep	2012	PEBA	421338	7770339	0.038	Very rusty qz rich folaited rock. Quartzite exposed on east side, amphibolite on west side. This may be a repeated pattern.
17029	RTR	03 Sep	2012	OPL	421334	7770342	0.009	Qz and amphibole (hbl?) rich rock with visible sulphides.
17030	RGB	03 Sep	2012	OPL	421311	7770381	0.014	Rusty qz rich folaited rock with fresh sulphides in foliation planes.
17031	RGB	03 Sep	2012	OPL	421306	7770390	0.026	Very sulphide rich, mica(?) rich rock in hinge of tight steeply plunging fold.
17032	RGB	03 Sep	2012	PEBA	421304	7770388	0.002	Margin of rusty qz vein in pale banded rock on west side of rusty zone (sample 17031).
17033	RGB	03 Sep	2012	PEBA	421292	7770397	0.008	Rusty qz-fsp-hbl banded gneiss.
17034	RGB	03 Sep	2012	PEBA	421276	7770403	0.003	Planar foliated qz-fsp-bi gneiss. Rusty crust, grey qz-fsp on fresh surface.
17035	RGB	03 Sep	2012	PEBA	421135	7770481	0.016	Qz-bi-hbl(?) gneiss with small sulphides in foliation planes between segregated qz bands and mafic bands. Occurs in hinge of well exposed upright gently north plunging fold.
17036	RGB	03 Sep	2012	PEBA	421161	7770477	0.008	Same as sample 17035 but with small garnets and less sulphides.
17037	RGB	03 Sep	2012	PEBA	421161	7770483	0.007	Rusty qz vein crosscutting usual gneisses/schists. Sulphides enriched along margins and at contacts to think mafic bands.
17038	RGB	03 Sep	2012	PEBA	421156	7770481	0.016	Fresh qz-fsp-bi-hbl gneiss, nicely banded. Hbl in small lenses containing sulphides. Sulphides also in foliation planes.
17039	RGB	03 Sep	2012	PEBA	421137	7770496	0.032	Qz fill in pinch point between boudins. Rusty with some sulphides.
17040	RGB	03 Sep	2012	PEBA	420929	7770475	0.007	Very sulphide rich massive qz-bi-chl rock with mt. Very fresh on broken surfaces with extremely rusty crust.
17041	RGB	04 Sep	2012	PEBA	419298	7770615	0.001	Qz-fsp-cc. Granitoid pegmatite with hydrothermal qz. Syntectonic in low angle S2 zone.
17042	RGB	04 Sep	2012	PEBA	418900	7770349	0.005	Rusty small silvery sulphide bearing dolerite? Shear foliation, roughly N-S strike, dip to W.
17043	RGB	04 Sep	2012	PEBA	418984	7769339	0.001	Thin mt lens/boudin in basement gneiss.
17044	RGB	04 Sep	2012	PEBA	419118	7769237	0.022	Qz-bi gneiss with rusty crust and fractures.
17045	RGB	04 Sep	2012	PEBA	419235	7769316	0.010	Very rusty ferricrete-like rock. Many thin qz ribbons in this area.
17046	RTR	04 Sep	2012	PEBA	419687	7769648	0.022	Very rusty weathered qz rich qz-bi gneiss.
17047	RTR	04 Sep	2012	PEBA	419450	7769808	0.017	Ferricrete-like rock, very rusty.
17048	RTR	04 Sep	2012	PEBA	419967	7770327	0.024	Ferricrete-like rock with qz clasts.
17049	RGB	04 Sep	2012	PEBA	419945	7770407	0.010	Ferricrete-like rock.
17050	RTR	04 Sep	2012	PEBA	419922	7770423	0.006	Rusty qz

Sample ID	Type	Date	Year	Taken by	Easting	Northing	Au (ppm)	Description
17101	RGB	01 Sep	2012	OPL	421322	7770372	0.060	Rusty crust with blue sheen. High density. Rich in amphibole and mt.
17102	RGB	02 Sep	2012	OPL	420345	7767909	0.001	Qz with shiny rusty weathered crust.
17103	RGB	02 Sep	2012	OPL	420365	7767945	0.003	Rusty qz.
17104	RGB	02 Sep	2012	OPL	420417	7768006	0.005	Qz with massive sulphides. Rust with yellow, purple, green colours. Medium density.
17105	RGB	02 Sep	2012	OPL	420447	7768048	0.002	Rusty.
17106	RGB	02 Sep	2012	OPL	420477	7768108	0.004	(None.)
17107	RGB	02 Sep	2012	OPL	420501	7768148	0.001	Banded gneiss with some rust.
17108	RGB	02 Sep	2012	OPL	420546	7768197	0.002	Rusty gneiss with some sulphides.
17109	RTR	02 Sep	2012	OPL	420568	7768248	0.002	Qz with sulphides.
17110	RGB	02 Sep	2012	OPL	420569	7768250	0.003	Gneiss with sulphides, rusty. High density.
17111	RTR	03 Sep	2012	OPL	420305	7768542	0.029	Ferricrete-like rock.
17112	RTR	03 Sep	2012	PEBA	420263	7768605	0.019	Slightly ferricrete-like rock with low density vfg qz-fsp-mica(?) clasts
17113	RTR	03 Sep	2012	PEBA	420253	7768659	0.113	Ferricrete-like rock.
17114	RTR	03 Sep	2012	OPL	420240	7768693	0.010	Fissile rusty vfg qz-fsp(?)-bi(?)-chl(?) schist. Very rusty in foliation planes.
17115	RTR	03 Sep	2012	PEBA	420240	7768758	0.007	Grey qz-fsp-bi gneiss with rusty crust.
17116	RGB	03 Sep	2012	PEBA	420261	7768792	0.005	Slightly ferricrete-like very rusty low density vfg qz-fsp-(bi?) schist.
17117	RTR	03 Sep	2012	PEBA	420253	7768841	0.010	Rusty weathered qz rich rock.
17118	RTR	03 Sep	2012	PEBA	420422	7768816	0.015	Rusty qz, possibly granitoid pegmatite (pink feldspar?).
17119	RTR	03 Sep	2012	PEBA	420429	7768855	0.020	Ferricrete-like rock.
17120	RTR	03 Sep	2012	PEBA	420435	7768895	0.003	Rusty qz.
17121	RTR	03 Sep	2012	PEBA	420436	7768894	0.015	Rusty low density weathered qz-fsp rock.
17122	RTR	03 Sep	2012	PEBA	420464	7768920	0.017	Very rusty slightly ferricrete-like qz-bi-chl rock. Some vugs with drusy qz.
17123	RTR	03 Sep	2012	PEBA	420507	7768962	0.023	Rusty qz-chl-bi gneiss.
17124	RGB	03 Sep	2012	PEBA	420525	7768990	0.022	Rusty weathered qz-bi-chl gneiss.
17125	RTR	03 Sep	2012	PEBA	420459	7769027	0.005	Ferricrete-like rock.
17126	RGB	03 Sep	2012	PEBA	420557	7769057	0.006	Ferricrete-like low density vfg qz-fsp clastic rock.
17127	RTR	04 Sep	2012	OPL	419293	7770613	0.001	Qz-chl-cc, part of granitoid pegmatite/hydrothermal quartz dyke.
17128	RGB	04 Sep	2012	OPL	418892	7770353	0.010	Very rusty crust, dark. Contains sulphides. High density.
17129	RTR	04 Sep	2012	OPL	419103	7769227	0.012	Rusty. High density. Hornblende. Maybe small sulphides.
17130	RTR	04 Sep	2012	OPL	419711	7769545	0.017	Qz with rusty banded layers and some black mineral.
17131	RTR	04 Sep	2012	OPL	419971	7770298	0.050	Ferricrete-like rock.
17132	RGB	04 Sep	2012	OPL	419957	7770380	0.006	Rusty. Sulphides (?). Mica.
17133	RTR	05 Sep	2012	PEBA	420612	7768839	0.002	Rusty qz-fsp-bi schist.
17134	RGB	05 Sep	2012	PEBA	420621	7768858	0.001	Rusty thick quartz ribbon.
17135	RGB	05 Sep	2012	PEBA	420644	7768912	0.002	Rusty quartz (in lens) and qz-bi schist.
17136	RGB	05 Sep	2012	PEBA	420682	7768956	0.004	Rusty (in foliation planes) planar foliated dark fg qz-fsp-bi schist.
17137	RTR	05 Sep	2012	PEBA	420715	7769019	0.002	Rusty quartz.
17138	RGB	05 Sep	2012	PEBA	420741	7769070	0.002	Rusty qz lens in usual mafic metavolcanics.
17139	RTR	05 Sep	2012	PEBA	420576	7769205	0.067	Ferricrete-like rock.
17140	RTR	05 Sep	2012	PEBA	420477	7769165	0.036	Ferricrete-like rock.
17141	RGB	05 Sep	2012	PEBA	420503	7769219	0.016	Slightly ferricrete-like weathered schist in hinge of subhorizontal open fold.
17142	RTR	05 Sep	2012	PEBA	420507	7769345	0.094	Ferricrete-like rock.
17143	RTR	05 Sep	2012	PEBA	420537	7769486	0.006	Qz rich schist, rusty. Quartz ribbons?
17144	RTR	05 Sep	2012	PEBA	420555	7769536	0.001	Rusty quartz with chlorite.
17145	RTR	05 Sep	2012	PEBA	420622	7769949	0.048	Ferricrete-like rock.
17146	RGB	05 Sep	2012	PEBA	418856	7770484	0.008	Rusty garnet amphibolite.
17147	RTR	05 Sep	2012	PEBA	418819	7770240	0.003	Rusty qz with mt(?) and very small sulphides. Fallen from outcrop approx 15m upstream.
17148	RTR	05 Sep	2012	OPL	418821	7770238	0.008	Mt-rich bi-amphibolite, very dark and compact, tightly foliated. Local source.
17149	RGB	05 Sep	2012	PEBA	421155	7770487	0.016	Sulphide bearing qz-grt-bi gneiss with very rusty crust.
17150	RGB	05 Sep	2012	PEBA	421163	7770478	0.010	Very rusty banded qz and hbl-mag rock (BIF?) with sulphides.

APPENDIX 2

Assay and internal QAQC certificates from ALS Minerals.

ALS Scandinavia AB

Hammarvagen 22
SE-943 36, Ojebyn
Phone: 46 911 65 800 Fax: 46 911 60 085 www.alsglobal.com

To: **PAUL ARMITAGE CONSULTING LTD**
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

CERTIFICATE PI12223657

Project: Not provided

P.O. No.: PACL-01

This report is for 100 Rock samples submitted to our lab in Pitea, Sweden on 3-OCT-2012.

The following have access to data associated with this certificate:

PAUL ARMITAGE		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
CRU-QC	Crushing QC Test
PUL-QC	Pulverizing QC Test
CRU-31	Fine crushing - 70% <2mm
SPL-21	Split sample - riffle splitter
PUL-31	Pulverize split to 85% <75 um

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
Au-ICP21	Au 30g FA ICP-AES Finish	ICP-AES
ME-ICP61	33 element four acid ICP-AES	ICP-AES

To: **PAUL ARMITAGE CONSULTING LTD**
ATTN: PAUL ARMITAGE
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

ALS Minerals

ALS Scandinavia AB
Hammarvagen 22
SE-943 36, Ojebyn
Phone: 46 911 65 800 Fax: 46 911 60 085 www.alsglobal.com

To: PAUL ARMITAGE CONSULTING LTD
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description / Method	WEI-21	Au-ICP21	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61
Analyte	Recvd Wt.	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga
Units	kg	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm
LOR	0.02	0.001	0.5	0.01	5	10	0.5	2	0.01	0.5	1	1	1	0.01	10
17001	0.65	0.006													
17002	0.93	0.005													
17003	1.00	0.030													
17004	1.13	0.027													
17005	0.77	0.001													
17006	0.91	0.076													
17007	0.78	0.053													
17008	0.89	0.013													
17009	0.93	0.090													
17010	0.87	0.011													
17011	0.81	0.010													
17012	0.63	0.001													
17013	0.68	0.064													
17014	0.99	0.008													
17015	1.06	0.168													
17016	0.72	0.013													
17017	0.97	0.010													
17018	1.24	0.015													
17019	1.17	0.017													
17020	0.77	0.082													
17021	0.96	0.016													
17022	0.80	0.084													
17023	1.13	0.007													
17024	1.07	0.012													
17025	1.01	0.017													
17026	1.15	0.003	<0.5	0.31	20	10	<0.5	<2	0.11	<0.5	5	21	14	0.93	<10
17027	0.87	0.004	<0.5	8.50	22	560	1.0	3	1.09	<0.5	18	113	22	2.90	30
17028	1.00	0.038	<0.5	0.30	<5	<10	<0.5	3	0.50	<0.5	4	21	75	13.55	<10
17029	0.85	0.009	<0.5	0.53	10	10	0.7	4	2.18	1.1	10	69	54	17.65	<10
17030	1.00	0.014	<0.5	6.68	<5	510	1.4	2	1.98	<0.5	19	33	121	7.93	20
17031	0.88	0.026	1.1	4.47	<5	230	0.7	4	0.92	<0.5	68	75	509	25.4	10
17032	0.82	0.002	<0.5	0.30	<5	20	<0.5	<2	0.05	<0.5	2	29	6	0.41	<10
17033	0.80	0.008	<0.5	0.94	6	<10	<0.5	<2	3.53	0.5	3	84	26	10.05	<10
17034	0.89	0.003	<0.5	8.39	<5	570	0.8	<2	0.62	<0.5	22	76	36	3.17	30
17035	0.85	0.016	<0.5	1.62	7	10	0.7	4	3.42	0.8	29	75	106	11.30	10
17036	0.92	0.008	<0.5	2.39	9	10	0.7	2	5.32	0.8	18	22	46	8.62	10
17037	0.92	0.007	<0.5	0.02	5	<10	<0.5	<2	0.03	<0.5	16	126	55	2.62	<10
17038	0.93	0.016	<0.5	0.64	19	10	0.8	<2	3.72	0.8	9	12	16	15.55	<10
17039	0.97	0.032	<0.5	0.22	<5	10	<0.5	<2	0.15	<0.5	6	135	24	1.59	<10
17040	0.95	0.007	0.9	4.36	<5	130	0.6	5	0.95	0.8	63	20	294	24.7	10

ALS Minerals
ALS Scandinavia AB
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SE-943 36, Ojebyn
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55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method / Analyte / Units / LOR	ME-ICP61 K % 0.01	ME-ICP61 La ppm 10	ME-ICP61 Mg % 0.01	ME-ICP61 Mn ppm 5	ME-ICP61 Mo ppm 1	ME-ICP61 Na % 0.01	ME-ICP61 Ni ppm 1	ME-ICP61 P ppm 10	ME-ICP61 Pb ppm 2	ME-ICP61 S % 0.01	ME-ICP61 Sb ppm 5	ME-ICP61 Sc ppm 1	ME-ICP61 Sr ppm 1	ME-ICP61 Th ppm 20	ME-ICP61 Ti % 0.01
17001																
17002																
17003																
17004																
17005																
17006																
17007																
17008																
17009																
17010																
17011																
17012																
17013																
17014																
17015																
17016																
17017																
17018																
17019																
17020																
17021																
17022																
17023																
17024																
17025																
17026		0.06	<10	0.03	35	<1	0.11	5	90	<2	0.48	<5	<1	10	<20	0.01
17027		2.74	20	0.92	722	<1	2.41	56	540	10	0.63	<5	14	164	<20	0.36
17028		0.06	<10	0.43	837	<1	0.03	2	720	<2	0.74	<5	1	14	<20	0.02
17029		0.08	<10	1.93	7310	1	0.11	11	530	4	1.32	<5	4	25	<20	0.02
17030		1.13	10	0.67	508	<1	2.74	33	380	16	3.66	<5	8	535	<20	0.21
17031		1.08	10	0.53	415	1	1.43	113	290	8	>10.0	<5	6	158	<20	0.16
17032		0.08	<10	0.01	17	<1	0.10	2	20	2	0.12	<5	<1	8	<20	0.01
17033		0.11	<10	1.19	3510	2	0.12	1	320	4	0.86	<5	4	40	<20	0.01
17034		2.88	10	0.94	214	1	1.76	67	560	9	1.14	<5	14	188	<20	0.21
17035		0.11	<10	2.31	3740	<1	0.17	23	1040	<2	2.97	<5	2	22	<20	0.05
17036		0.11	<10	2.16	3380	<1	0.14	21	790	5	1.57	<5	10	100	<20	0.22
17037		0.01	<10	0.01	40	1	0.01	16	10	<2	3.03	<5	<1	2	<20	<0.01
17038		0.07	<10	1.59	3700	<1	0.13	10	620	<2	1.04	<5	1	13	<20	0.02
17039		0.07	<10	0.11	145	1	0.02	8	100	2	0.57	<5	1	3	<20	0.02
17040		1.25	10	0.32	469	<1	1.28	113	320	4	>10.0	<5	4	111	<20	0.12

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To: PAUL ARMITAGE CONSULTING LTD
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method Analyte Units LOR	ME-ICP61 Tl ppm 10	ME-ICP61 U ppm 10	ME-ICP61 V ppm 1	ME-ICP61 W ppm 10	ME-ICP61 Zn ppm 2
17001						
17002						
17003						
17004						
17005						
17006						
17007						
17008						
17009						
17010						
17011						
17012						
17013						
17014						
17015						
17016						
17017						
17018						
17019						
17020						
17021						
17022						
17023						
17024						
17025						
17026		<10	<10	1	<10	2
17027		<10	<10	108	<10	91
17028		<10	<10	9	<10	65
17029		<10	<10	18	<10	222
17030		<10	<10	48	<10	115
17031		<10	<10	38	<10	148
17032		<10	<10	1	<10	3
17033		<10	<10	19	<10	84
17034		<10	<10	109	<10	72
17035		<10	<10	19	<10	167
17036		<10	<10	83	<10	221
17037		10	<10	2	<10	<2
17038		<10	<10	8	<10	167
17039		<10	<10	9	<10	16
17040		<10	<10	28	<10	371

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55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method / Analyte / Units / LOR	WEI-21 Recvd Wt. kg 0.02	Au-ICP21 Au ppm 0.001	ME-ICP61 Ag ppm 0.5	ME-ICP61 Al % 0.01	ME-ICP61 As ppm 5	ME-ICP61 Ba ppm 10	ME-ICP61 Be ppm 0.5	ME-ICP61 Bi ppm 2	ME-ICP61 Ca % 0.01	ME-ICP61 Cd ppm 0.5	ME-ICP61 Co ppm 1	ME-ICP61 Cr ppm 1	ME-ICP61 Cu ppm 1	ME-ICP61 Fe % 0.01	ME-ICP61 Ga ppm 10
17041		1.38	0.001	<0.5	2.97	<5	40	1.3	<2	4.23	<0.5	<1	11	1	0.37	10
17042		0.69	0.005	<0.5	8.06	<5	280	0.6	3	7.12	0.5	47	81	148	9.59	30
17043		1.41	<0.001	<0.5	4.53	<5	80	<0.5	13	2.69	2.8	43	81	51	32.3	30
17044		1.17	0.022	<0.5	0.68	137	<10	<0.5	<2	1.20	<0.5	21	20	123	6.16	<10
17045		1.70	0.010	0.6	5.18	152	10	0.5	2	4.93	1.3	1	76	43	20.1	20
17046		1.09	0.022	0.5	1.37	<5	10	<0.5	2	2.18	<0.5	1	15	57	5.58	10
17047		1.12	0.017	1.1	2.64	<5	180	1.9	6	0.94	<0.5	<1	61	629	24.9	20
17048		1.34	0.024	0.7	0.80	<5	60	<0.5	<2	0.08	<0.5	1	25	302	6.49	<10
17049		1.75	0.010	<0.5	2.60	<5	270	<0.5	3	0.12	<0.5	<1	38	416	33.8	10
17050		1.22	0.006	<0.5	2.29	<5	10	<0.5	2	0.35	<0.5	2	97	286	4.02	10
17101		0.79	0.060													
17102		0.83	0.001													
17103		0.89	0.003													
17104		0.86	0.005													
17105		0.85	0.002													
17106		0.82	0.004													
17107		0.88	0.001													
17108		0.94	0.002													
17109		0.96	0.002													
17110		0.83	0.003													
17111		0.92	0.029													
17112		0.99	0.019													
17113		0.94	0.113													
17114		1.14	0.010													
17115		0.87	0.007													
17116		1.22	0.005													
17117		1.00	0.010													
17118		1.06	0.015													
17119		1.17	0.020													
17120		1.37	0.003													
17121		1.08	0.015													
17122		1.11	0.017													
17123		1.50	0.023													
17124		0.94	0.022													
17125		1.20	0.005													
17126		0.90	0.006													
17127		0.70	0.001													
17128		1.18	0.010													
17129		1.23	0.012													
17130		1.04	0.017													

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55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method / Analyte / Units / LOR	ME-ICP61 K % 0.01	ME-ICP61 La ppm 10	ME-ICP61 Mg % 0.01	ME-ICP61 Mn ppm 5	ME-ICP61 Mo ppm 1	ME-ICP61 Na % 0.01	ME-ICP61 Ni ppm 1	ME-ICP61 P ppm 10	ME-ICP61 Pb ppm 2	ME-ICP61 S % 0.01	ME-ICP61 Sb ppm 5	ME-ICP61 Sc ppm 1	ME-ICP61 Sr ppm 1	ME-ICP61 Th ppm 20	ME-ICP61 Ti % 0.01
17041		0.17	<10	0.14	458	<1	1.65	1	40	5	0.04	<5	1	236	<20	<0.01
17042		0.47	<10	2.81	1490	<1	1.77	53	600	4	1.39	<5	46	194	<20	0.84
17043		0.16	<10	1.14	3290	<1	0.37	14	30	3	0.05	<5	25	145	<20	8.86
17044		0.02	<10	0.97	1260	<1	0.08	22	320	<2	1.94	<5	2	5	<20	0.04
17045		0.10	<10	3.06	12550	2	0.23	<1	690	<2	0.07	<5	28	10	<20	0.66
17046		0.02	<10	0.76	555	<1	0.11	1	340	3	0.08	<5	3	32	<20	0.05
17047		0.23	<10	0.42	220	10	1.10	<1	440	<2	0.39	<5	8	56	<20	0.28
17048		0.24	<10	0.08	58	1	0.17	<1	150	2	0.18	<5	1	12	<20	0.04
17049		0.97	<10	0.18	39	<1	0.27	<1	710	<2	0.55	8	4	21	<20	0.11
17050		0.04	<10	0.63	283	<1	0.94	1	140	4	0.04	<5	2	51	<20	0.03
17101																
17102																
17103																
17104																
17105																
17106																
17107																
17108																
17109																
17110																
17111																
17112																
17113																
17114																
17115																
17116																
17117																
17118																
17119																
17120																
17121																
17122																
17123																
17124																
17125																
17126																
17127																
17128																
17129																
17130																

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To: **PAUL ARMITAGE CONSULTING LTD**
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method Analyte Units LOR	ME-ICP61 Tl ppm 10	ME-ICP61 U ppm 10	ME-ICP61 V ppm 1	ME-ICP61 W ppm 10	ME-ICP61 Zn ppm 2
17041		<10	<10	2	<10	2
17042		<10	<10	408	<10	186
17043		<10	<10	2590	10	134
17044		<10	<10	24	<10	181
17045		<10	<10	200	<10	324
17046		<10	<10	24	<10	86
17047		<10	<10	97	<10	27
17048		<10	<10	14	<10	13
17049		<10	<10	36	<10	19
17050		<10	<10	41	<10	40
17101						
17102						
17103						
17104						
17105						
17106						
17107						
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17109						
17110						
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UNITED KINGDOM

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CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method / Analyte / Units / LOR	WEI-21 Recvd Wt. kg 0.02	Au-ICP21 Au ppm 0.001	ME-ICP61 Ag ppm 0.5	ME-ICP61 Al % 0.01	ME-ICP61 As ppm 5	ME-ICP61 Ba ppm 10	ME-ICP61 Be ppm 0.5	ME-ICP61 Bi ppm 2	ME-ICP61 Ca % 0.01	ME-ICP61 Cd ppm 0.5	ME-ICP61 Co ppm 1	ME-ICP61 Cr ppm 1	ME-ICP61 Cu ppm 1	ME-ICP61 Fe % 0.01	ME-ICP61 Ga ppm 10
17131		1.47	0.050													
17132		0.64	0.006													
17133		0.83	0.002													
17134		1.15	0.001													
17135		1.18	0.002													
17136		1.04	0.004													
17137		1.07	0.002													
17138		1.18	0.002													
17139		1.10	0.067													
17140		0.86	0.036													
17141		1.14	0.016													
17142		0.87	0.094													
17143		0.92	0.006													
17144		1.08	0.001													
17145		1.06	0.048													
17146		0.83	0.008													
17147		1.24	0.003													
17148		1.20	0.008													
17149		0.90	0.016													
17150		1.39	0.010													

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Finalized Date: 20-OCT-2012
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Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method Analyte Units LOR	ME-ICP61 K % 0.01	ME-ICP61 La ppm 10	ME-ICP61 Mg % 0.01	ME-ICP61 Mn ppm 5	ME-ICP61 Mo ppm 1	ME-ICP61 Na % 0.01	ME-ICP61 Ni ppm 1	ME-ICP61 P ppm 10	ME-ICP61 Pb ppm 2	ME-ICP61 S % 0.01	ME-ICP61 Sb ppm 5	ME-ICP61 Sc ppm 1	ME-ICP61 Sr ppm 1	ME-ICP61 Th ppm 20	ME-ICP61 Ti % 0.01
17131																
17132																
17133																
17134																
17135																
17136																
17137																
17138																
17139																
17140																
17141																
17142																
17143																
17144																
17145																
17146																
17147																
17148																
17149																
17150																

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55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method / Analyte / Units / LOR	ME-ICP61 Tl ppm 10	ME-ICP61 U ppm 10	ME-ICP61 V ppm 1	ME-ICP61 W ppm 10	ME-ICP61 Zn ppm 2
17131						
17132						
17133						
17134						
17135						
17136						
17137						
17138						
17139						
17140						
17141						
17142						
17143						
17144						
17145						
17146						
17147						
17148						
17149						
17150						

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UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

QC CERTIFICATE PI12223657

Project: Not provided
P.O. No.: PACL-01
This report is for 100 Rock samples submitted to our lab in Pitea, Sweden on 3-OCT-2012.

The following have access to data associated with this certificate:

PAUL ARMITAGE		

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-22	Sample login - Rcd w/o BarCode
CRU-QC	Crushing QC Test
PUL-QC	Pulverizing QC Test
CRU-31	Fine crushing - 70% <2mm
SPL-21	Split sample - riffle splitter
PUL-31	Pulverize split to 85% <75 um

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
Au-ICP21	Au 30g FA ICP-AES Finish	ICP-AES
ME-ICP61	33 element four acid ICP-AES	ICP-AES

To: **PAUL ARMITAGE CONSULTING LTD**
ATTN: PAUL ARMITAGE
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

ALS Minerals

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QC CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Au-ICP21	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61
Analyte	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	K
Units	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	%
LOR	0.001	0.5	0.01	5	10	0.5	2	0.01	0.5	1	1	1	0.01	10	0.01
STANDARDS															
GBM908-5		56.0	7.02	5	2370	2.3	2	1.88	<0.5	10	26	478	3.17	20	3.50
Target Range - Lower Bound		51.5	6.79	<5	2070	1.4	<2	1.70	<0.5	8	23	447	3.14	<10	3.15
Upper Bound		64.1	8.32	17	2550	3.7	6	2.10	1.5	14	30	549	3.86	50	3.87
GLG307-4	0.051														
GLG307-4	0.050														
Target Range - Lower Bound	0.048														
Upper Bound	0.056														
GPP-01	1.005														
GPP-01	0.843														
Target Range - Lower Bound	0.850														
Upper Bound	0.960														
OGGeo08		20.5	6.67	107	900	2.8	13	2.26	19.2	98	86	8240	5.24	20	2.92
Target Range - Lower Bound		17.9	6.24	104	630	1.8	6	1.98	17.6	83	78	7550	4.89	<10	2.59
Upper Bound		22.9	7.65	138	790	4.1	16	2.44	22.6	103	98	9230	6.00	40	3.19
OREAS-151a	0.043														
Target Range - Lower Bound	0.039														
Upper Bound	0.047														
OxK95	3.68														
OxK95	3.44														
Target Range - Lower Bound	3.32														
Upper Bound	3.75														
OxN92	7.92														
Target Range - Lower Bound	7.18														
Upper Bound	8.10														
PD1	0.562														
Target Range - Lower Bound	0.508														
Upper Bound	0.576														
BLANKS															
BLANK	0.001														
BLANK	0.002														
BLANK	<0.001														
Target Range - Lower Bound	<0.001														
Upper Bound	0.002														
BLANK		<0.5	<0.01	<5	<10	<0.5	<2	<0.01	<0.5	<1	<1	<1	<0.01	<10	<0.01
Target Range - Lower Bound		<0.5	<0.01	<5	<10	<0.5	<2	<0.01	<0.5	<1	<1	<1	<0.01	<10	<0.01
Upper Bound		1.0	0.02	10	20	1.0	4	0.02	1.0	2	2	2	0.02	20	0.02

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QC CERTIFICATE OF ANALYSIS PI12223657

Sample Description / Method	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61	ME-ICP61
Analyte	La	Mg	Mn	Mo	Na	Ni	P	Pb	S	Sb	Sc	Sr	Th	Ti	Tl
Units	ppm	%	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm
LOR	10	0.01	5	1	0.01	1	10	2	0.01	5	1	1	20	0.01	10
STANDARDS															
GBM908-5	90	0.84	463	49	2.58	427	1250	385	0.16	<5	7	399	40	0.35	<10
Target Range - Lower Bound	90	0.76	430	49	2.27	375	1160	338	0.14	<5	6	380	<20	0.31	<10
Upper Bound	140	0.95	537	62	2.80	461	1450	418	0.19	15	10	467	80	0.40	30
GLG307-4															
GLG307-4															
Target Range - Lower Bound															
Upper Bound															
GPP-01															
GPP-01															
Target Range - Lower Bound															
Upper Bound															
OGGeo08	30	1.25	503	897	1.85	8700	870	7430	2.75	26	9	252	20	0.40	<10
Target Range - Lower Bound	<10	1.08	447	841	1.62	8020	760	6510	2.58	16	8	218	<20	0.36	<10
Upper Bound	60	1.34	557	1030	2.00	9810	950	7970	3.18	39	13	268	60	0.47	20
OREAS-151a															
Target Range - Lower Bound															
Upper Bound															
OxK95															
OxK95															
Target Range - Lower Bound															
Upper Bound															
OxN92															
Target Range - Lower Bound															
Upper Bound															
PD1															
Target Range - Lower Bound															
Upper Bound															
BLANKS															
BLANK															
BLANK															
BLANK															
Target Range - Lower Bound															
Upper Bound															
BLANK	<10	<0.01	<5	<1	<0.01	<1	<10	<2	<0.01	<5	<1	<1	<20	<0.01	<10
Target Range - Lower Bound	<10	<0.01	<5	<1	<0.01	<1	<10	<2	<0.01	<5	<1	<1	<20	<0.01	<10
Upper Bound	20	0.02	10	2	0.02	2	20	4	0.02	10	2	2	40	0.02	20

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ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

QC CERTIFICATE OF ANALYSIS PI12223657

Sample Description / Method / Analyte / Units / LOR	ME-ICP61 U ppm 10	ME-ICP61 V ppm 1	ME-ICP61 W ppm 10	ME-ICP61 Zn ppm 2
STANDARDS				
GBM908-5	<10	59	<10	241
Target Range - Lower Bound	<10	52	<10	207
Upper Bound	30	66	30	257
GLG307-4				
GLG307-4				
Target Range - Lower Bound				
Upper Bound				
GPP-01				
GPP-01				
Target Range - Lower Bound				
Upper Bound				
OGGeo08	<10	86	<10	7170
Target Range - Lower Bound	<10	77	<10	6400
Upper Bound	30	97	30	7830
OREAS-151a				
Target Range - Lower Bound				
Upper Bound				
OxK95				
OxK95				
Target Range - Lower Bound				
Upper Bound				
OxN92				
Target Range - Lower Bound				
Upper Bound				
PD1				
Target Range - Lower Bound				
Upper Bound				
BLANKS				
BLANK				
BLANK				
BLANK				
Target Range - Lower Bound				
Upper Bound				
BLANK	<10	<1	<10	4
Target Range - Lower Bound	<10	<1	<10	<2
Upper Bound	20	2	20	4

ALS Minerals
ALS Scandinavia AB
Hammarvagen 22
SE-943 36, Ojebyn
Phone: 46 911 65 800 Fax: 46 911 60 085 www.alsglobal.com

To: **PAUL ARMITAGE CONSULTING LTD**
55 REEDHAM CRESCENT, CLIFFE WOODS
ME3 8HT ROCHESTER
UNITED KINGDOM

Finalized Date: 20-OCT-2012
Account: MRAUAP

Project: Not provided

QC CERTIFICATE OF ANALYSIS PI12223657

Sample Description / Method / Analyte / Units / LOR	Au-ICP21 Au ppm 0.001	ME-ICP61 Ag ppm 0.5	ME-ICP61 Al % 0.01	ME-ICP61 As ppm 5	ME-ICP61 Ba ppm 10	ME-ICP61 Be ppm 0.5	ME-ICP61 Bi ppm 2	ME-ICP61 Ca % 0.01	ME-ICP61 Cd ppm 0.5	ME-ICP61 Co ppm 1	ME-ICP61 Cr ppm 1	ME-ICP61 Cu ppm 1	ME-ICP61 Fe % 0.01	ME-ICP61 Ga ppm 10	ME-ICP61 K % 0.01
DUPLICATES															
ORIGINAL	0.001														
DUP	0.005														
Target Range - Lower Bound	0.002														
Upper Bound	0.004														
17014	0.008														
DUP	0.009														
Target Range - Lower Bound	0.007														
Upper Bound	0.010														
17026		<0.5	0.31	20	10	<0.5	<2	0.11	<0.5	5	21	14	0.93	<10	0.06
DUP		<0.5	0.31	20	10	<0.5	<2	0.11	<0.5	5	25	14	0.92	<10	0.06
Target Range - Lower Bound		<0.5	0.28	14	<10	<0.5	<2	0.09	<0.5	4	21	12	0.87	<10	0.05
Upper Bound		1.0	0.34	26	20	1.0	4	0.13	1.0	6	25	16	0.98	20	0.07
17101	0.060														
DUP	0.038														
Target Range - Lower Bound	0.046														
Upper Bound	0.052														
17121	0.015														
DUP	0.016														
Target Range - Lower Bound	0.014														
Upper Bound	0.017														
17141	0.016														
DUP	0.015														
Target Range - Lower Bound	0.014														
Upper Bound	0.017														
PREP DUPLICATES															
17101	0.060														
17101 PREP DUP	0.033														

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QC CERTIFICATE OF ANALYSIS PI12223657

Sample Description	ME-ICP61 La ppm 10	ME-ICP61 Mg % 0.01	ME-ICP61 Mn ppm 5	ME-ICP61 Mo ppm 1	ME-ICP61 Na % 0.01	ME-ICP61 Ni ppm 1	ME-ICP61 P ppm 10	ME-ICP61 Pb ppm 2	ME-ICP61 S % 0.01	ME-ICP61 Sb ppm 5	ME-ICP61 Sc ppm 1	ME-ICP61 Sr ppm 1	ME-ICP61 Th ppm 20	ME-ICP61 Ti % 0.01	ME-ICP61 Tl ppm 10
DUPLICATES															
ORIGINAL															
DUP															
Target Range - Lower Bound															
Upper Bound															
17014															
DUP															
Target Range - Lower Bound															
Upper Bound															
17026	<10	0.03	35	<1	0.11	5	90	<2	0.48	<5	<1	10	<20	0.01	<10
DUP	<10	0.03	35	<1	0.11	6	90	3	0.47	<5	<1	10	<20	0.01	<10
Target Range - Lower Bound	<10	0.02	28	<1	0.09	4	80	<2	0.44	<5	<1	9	<20	<0.01	<10
Upper Bound	20	0.04	42	2	0.13	7	100	4	0.51	10	2	12	40	0.02	20
17101															
DUP															
Target Range - Lower Bound															
Upper Bound															
17121															
DUP															
Target Range - Lower Bound															
Upper Bound															
17141															
DUP															
Target Range - Lower Bound															
Upper Bound															
PREP DUPLICATES															
17101															
17101 PREP DUP															

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Project: Not provided

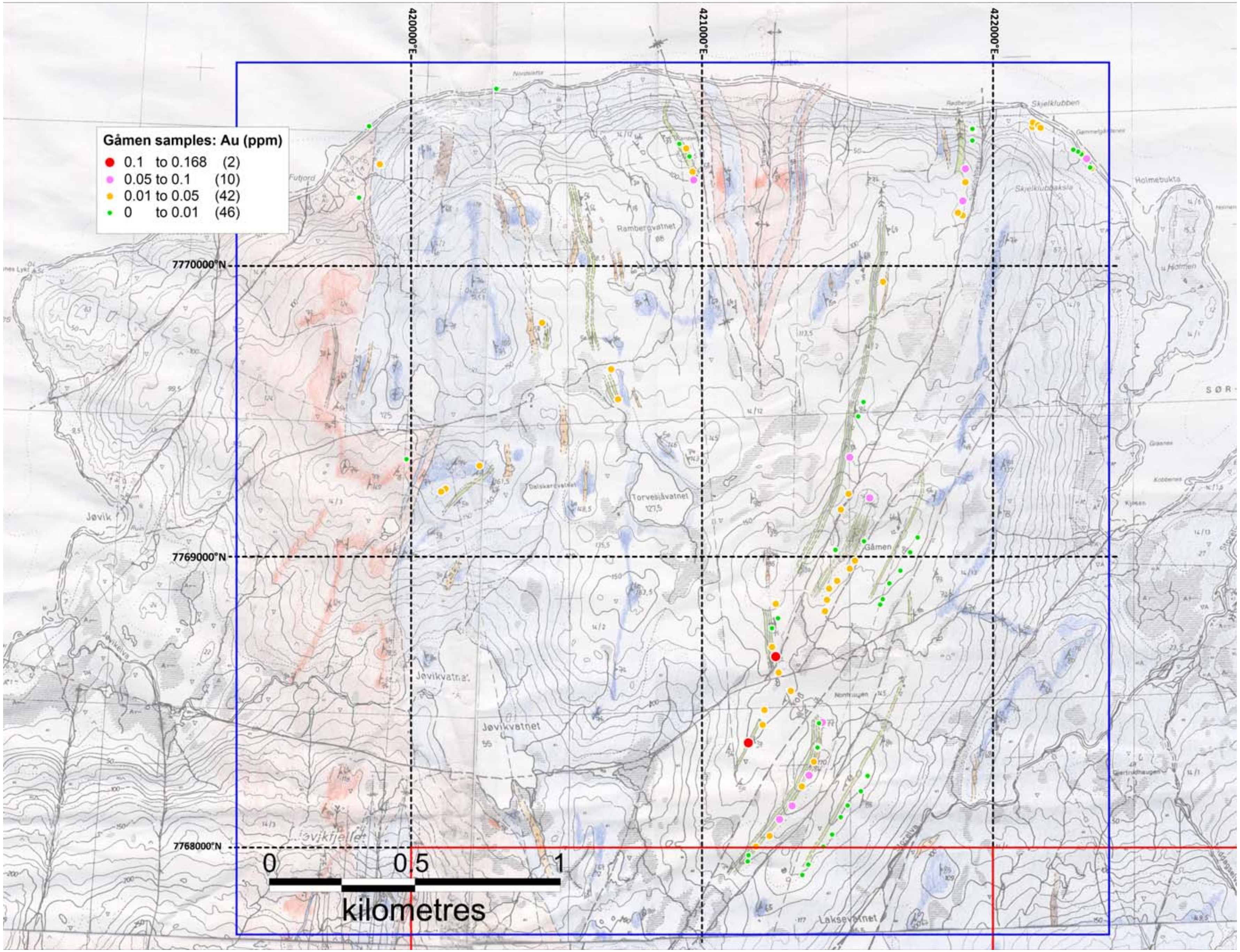
QC CERTIFICATE OF ANALYSIS PI12223657

Sample Description	Method / Analyte / Units / LOR	ME-ICP61 U ppm 10	ME-ICP61 V ppm 1	ME-ICP61 W ppm 10	ME-ICP61 Zn ppm 2
DUPLICATES					
ORIGINAL					
DUP					
Target Range - Lower Bound					
Upper Bound					
17014					
DUP					
Target Range - Lower Bound					
Upper Bound					
17026		<10	1	<10	2
DUP		<10	2	<10	5
Target Range - Lower Bound		<10	<1	<10	<2
Upper Bound		20	2	20	4
17101					
DUP					
Target Range - Lower Bound					
Upper Bound					
17121					
DUP					
Target Range - Lower Bound					
Upper Bound					
17141					
DUP					
Target Range - Lower Bound					
Upper Bound					
PREP DUPLICATES					
17101					
17101 PREP DUP					

APPENDIX 3

Map of samples with ranges of gold assays shown in coloured legend.

Lithological legend:
Red = felsic basement
Blue = amphibolites of the Ringvassøy Greenstone Belt
Green = mineralised zones
Orange = granitoid pegmatite and hydrothermal quartz bodies
Brown = mafic dyke


Gåmen samples: Au (ppm)
0.1 to 0.168 (2)
0.05 to 0.1 (10)
0.01 to 0.05 (42)
0 to 0.01 (46)
420000°E
421000°E
422000°E
7770000°N
7769000°N
7768000°N
0
0.5
1
kilometres
Rambergvatnet
Torvesjåvatnet
Jøvikvatnet
Jøvikvatna
Jøvik
Gåmen
Skjelklubben
Holmebukta
Futjord
Laksevatnet
Jøvikfjellet

APPENDIX 4

Project expenditure presented as expenses claims submitted the author.