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**ZEEHAN NO. 4 EL 38/89, TASMANIA**  
**REPORT ON EXPLORATION FOR THE THIRD**  
**YEAR OF TENURE, 1/3/92 TO 28/2/93**

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**DATE:** FEBRUARY, 1993

**LICENCE HOLDER:** MAJOR MINING LIMITED

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CRAE REPORT NO. 18647

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## 1. SUMMARY

CRA Exploration Pty. Limited (CRAE) is exploring EL 38/89 for surficial secondary Zn-Pb deposits derived from the decomposition of Ordovician Gordon Limestone. Subsidiary targets include primary stratiform/stratabound carbonate-hosted Zn-Pb mineralisation.

Zinc and Pb are being enriched at the surface by dissolution of the carbonate. This decarbonatisation has left a layer of black sulphidic pug sitting above fresh limestone, beneath a veneer of glacial gravels. Zinc and Pb have been retained and concentrated in this pug layer. The mechanism for this process is unclear, but it is suggested that low pH, strongly reducing conditions have acted to remove carbonate, but preserve sulphides near the surface. The black pug is extensively developed over virtually all areas of near-surface Gordon Limestone.

The degree of upgrading is such that surface Zn concentrations are commonly ore-grade. This fact, combined with likely favourable mining characteristics of low ore:waste ratio, ease of excavation, and close proximity to established infrastructure, significantly upgrades the prospectivity of this style of mineralisation.

One target was selected for work during 1992; Grieves prospect. Activities included literature studies and open-file data compilation, rock geochemical and mineralogical studies, and reverse-circulation air-core drilling.

Wacker sampling by Amoco-EZ delineated three areas at Grieves with substantial Zn anomalism; an 1100m linear zone at the top of the limestone peaking at 3.3% Zn, a 700m linear trend at the base of the limestone with up to 4.5% Zn, and a highly conspicuous single point 19.5% Zn anomaly in the middle of the limestone.

Costeaming and drilling by these companies confirmed that the surface anomalies are due to secondary dispersion and enrichment within the weathering environment. Maximum costean values were 20m @ 7.0% Zn, with a shallow drill-hole returning 6.8m @ 8.5% Zn from 12.2m to 19.0m.

Mineralogical studies by CRAE indicate smithsonite may be the dominant Zn mineral.

Air-core drilling has shown that the thickness of the decarbonated layer with anomalous Zn is variable but may locally reach 20m, averaging 3-10m. A typical downhole profile would consist of 0-2m of quartzite gravels, followed by up to 20m of dark grey strongly carbonaceous clay, grading into fresh limestone at the base. Clays are more thickly developed at the upper and lower contacts of the limestone with the adjacent quartzite units. Vertical zonation of Zn is unknown, analyses were unavailable at the time of writing this report. A total of 103 holes for a cumulative metreage of 1070m have been completed.

## 2. INTRODUCTION

EL 38/89 was granted to Major Mining Ltd on 30th March 1990. CRA Exploration Pty. Limited entered into a joint venture agreement with Major to explore EL 38/89, commencing on 23rd April 1991.

EL 38/89 covers 9 km<sup>2</sup> located S of Zeehan on the Tasmanian W coast (Plan Tv431). During the period under review, the third year of tenure, CRAE has a statutory obligation to spend \$5000.

CRAE's principal commodity of interest in the Zeehan area is Zn-Pb. An exhaustive review of Amoco-EZ open-file data for the Myrtle to Rose Valley areas highlighted the importance of secondary surficial mineralisation derived from the decomposition of Ordovician Gordon Limestone. CRAE's activities focussed on potential for Zn-Pb deposits developed within this surficial residual black pug. One target was selected for fieldwork during 1992; Grieves prospect. Activities included literature studies and open-file data compilation, rock geochemical and mineralogical studies, and reverse-circulation air-core drilling.

This report details all exploration activities conducted within EL 38/89 by CRAE during 1992/93.

### 3. CONCLUSIONS

An exhaustive review of Amoco-EZ open-file data for the Myrtle to Rose Valley areas highlighted the importance of secondary surficial mineralisation derived from the decomposition of Ordovician Gordon Limestone.

Wacker sampling by Amoco-EZ delineated three areas at Grieves prospect within EL 38/89 with substantial Zn anomalism. Costeaming and drilling by these companies indicated that the surface anomalies are due to secondary dispersion and enrichment within the weathering environment.

The degree of upgrading is such that surface Zn concentrations are commonly ore-grade. This fact, combined with likely favourable mining characteristics of low ore:waste ratio, ease of excavation, and close proximity to established infrastructure, significantly upgrades the prospectivity of this style of mineralisation.

Reverse-circulation air-core drilling traverses have shown that strongly carbonaceous clays, thought to host the secondary Zn mineralisation, average 3-10m thickness. Clays reach greater thicknesses at the upper and lower contacts of the limestone with the adjacent quartzite units, possibly in response to channelling of water flows. Vertical zonation of Zn is still unknown as analyses are unavailable for inclusion in this year's report.

### 4. RECOMMENDATIONS

The direction of further work will hinge on results from the air-core drilling program. If significant thicknesses of ore-grade material can be identified, mineralogical studies will be required to confirm whether the Zn is in carbonate or sulphide form.

Once this has been resolved, bench-scale metallurgical testwork would be required to prove if the Zn ore can be concentrated and the metal subsequently extracted.

If each of these hurdles can be overcome, additional drilling will be required to delineate resources as the initial traverses are only cursory investigations.

## 5. REGIONAL GEOLOGY

Zeehan and its surrounding districts have seen almost continuous sedimentation, igneous activity and deformation from the Late Proterozoic to the Quaternary. Consequently the picture of geological evolution is a complex one. Recent mapping by the Tas Dept of Mines is helping to solve old puzzles, but also continues to open new cans of worms. Corbett (1989) gives a good summary of possible tectonic models to account for the early palaeozoic geology of NW Tasmania. Some interesting new concepts are summarised informally in Turner (1992). For CRAE staff, Parkinson (1992) attempts to pull together a few loose threads.

The Rocky Cape Association forms basement in NW Tasmania. This association is not represented on the Zeehan 1:63360 sheet. In the late Precambrian, around 700Ma, a shallow basin was forming in the stretched intracratonic area between the Rocky Cape and Tyennan Regions. Coarse clastic sediments (conglomerates and sandstones) of the Forest Conglomerate, Donaldson Fm and base of the Timbs Gp were deposited.

Turbidite sequences of interbedded sands and silts of upper Donaldson Fm, Timbs Gp and Oonah Fm were laid down as the intracratonic basin deepened.

As the rift phase drew to a close, sag phase Black River Dolomite, Savage Dolomite, ?Timbs Gp magnesite horizons, and Success Creek Gp limestones were deposited. Rift tholeiites and associated sediments of the Smithton Volcanics, Bernafai Volcanics, Timbs Gp and Crimson Creek Fm erupted over the now filled basin.

During the mid to late Cambrian, an arc-continent collision caused overthrusting of ultramafic-mafic rocks and related sediments, possibly from a subduction complex some distance E of the Tyennan Block. The gabbros and basalts between Trial Harbour and Zeehan are of Boninitic composition - present understandings of basalt chemistry require that these Boninites derive from a fore-arc wedge (Brown and Jenner, 1989).

Post-collision extension tectonics then produced troughs into which the Dundas Gp sediments and Mount Read Volcanics were deposited. A local metamorphic event dated at 500Ma (Penguin Orogeny), possibly contemporaneous with eruption of the MRV, affected the rift sediments in the area of the present-day Arthur Lineament. This event probably affected the formations over a broader area than seen today.

Latest Cambrian to Ordovician times saw tectonic uplift of the Tyennan Block. Rapid stripping of this nucleus produced the coarse clastics of the Owen Conglomerate and correlates. As the rate of erosion slowed, sequences became finer (e.g. Moina Sandstone). Finally, in a short period of quiescence, limestones of the Gordon Group were deposited.

A second phase of uplift introduced sands and silts into a shallow marine environment to form the Eldon Group. This event took place from the early Silurian until the early Devonian, when the first rumblings of the Tabberabberan Orogeny were being felt.

Earliest of events forming part of the Tabberabberan Orogeny was a period of thrusting, possibly induced by compressive stresses caused by the rising plutons of the Heemskirk, Meredith and Husetop Granites.

To the NW of the granites, this compression thrust imbricate slices of the Timbs Gp over one another to produce the rapid, apparently quantum jumps in metamorphic grade seen in the Arthur Lineament. To the S, the Tenth Legion Thrust within the EL area is the clearest evidence of the early Devonian thrust event (Findlay and Brown, 1992). Other thrusts are likely to have developed, perhaps along the Little Henty and Firewood Siding Faults, to "poke the tongue" of Zeehan area geology southward into the Henty Basin.

Continued Tabberabberan deformation folded the Zeehan Basin formations about NNW-trending axes.

Geological events subsequent to the Tabberabberan Orogeny do not capture the imagination of mineral explorers. Terrestrial sedimentation continued in the Permian. Jurassic dolerite sills intruded the Zeehan area. Tertiary basalts flooded much of NW Tasmania, with remnants preserved near Granville Harbour.

Tertiary and Quaternary erosion and deposition continue to modify the ancient landsurface.

## 6. MINERALISATION

Several periods, styles and commodities of mineralisation are recognised in the Zeehan area. In summary these are:-

PERIOD	STYLE	EXAMPLE
Proterozoic	Stratiform syn-depositional pyrite in black shale.	Oonah Fm
Cambrian	Stratiform? magmatic Ni-sulphides in ultramafics	Cuni
Ordovician	Stratabound sphalerite-galena in limestone.	Oceana
Devonian	Stratabound replacement cassiterite-pyrrhotite in carbonates	Renison Bell
Devonian	Discordant lode-style pyrite-galena-sphalerite	Spray,
Comstock		
Devonian	Discordant vein-style pyrite-galena-sphalerite	Comet
Devonian	Skarn magnetite (+sphalerite-cassiterite)	Saint Dizier
Quaternary	Residual Pb-Zn in surficial decarbonated limestone	Myrtle, Grieves

Historically it has been the lode and vein-style Pb-Ag mineralisation of the Zeehan and Dundas fields that have dominated interest. Lode-style mineralisation at Zeehan is usually hosted within graphitic shears in Oonah or Crimson Creek Fms. These deposits are high grade, but narrow (typically 0.3m) and with short strike and depth extent (usually less than 100m). In the context of modern large-scale mining practises, it is unlikely that such a target could be of economic interest on its own.

In the last 20 years or so, replacement-style Sn deposits have been given considerable attention. West Tasmania is well endowed with these deposits, which include Renison Bell, Queen Hill, Mt Bischoff and Cleveland. At Renison Bell, most ore occurs as massive pyrrhotite replacement of carbonate horizons, although a substantial quantity of ore occurs within the Federal-Bassett feeder zone. Source of the mineralisation is believed to be from Sn-rich fluids emanating from the underlying Devonian granite. A pre-mining resource is estimated at 42Mt @ 1.1% Sn (Collins, 1989).

Queen Hill is similar in style to Renison Bell, with a resource of 4Mt @1% Sn. Given the world oversupply of Sn, and the inherent low grade and metallurgical difficulties of these deposits, a replacement style Sn deposit is probably not a valid exploration target for a company without an existing Sn portfolio.

Magnetite skarn deposits such as Saint Dizier and Tenth Legion have formed in carbonate lithologies adjacent to the Heemskirk Granite. St Dizier contains 5Mt @ 0.5% Sn, whilst the skarn at Tenth Legion contains low percent levels of Zn as sphalerite.

During 1992, RGC announced the discovery of stratabound replacement pyrrhotite-galena-sphalerite in Oonah Fm carbonates near Zeehan. Published resource estimates are 6Mt @ 5.5% Zn, 3.3% Pb and 40 ppm Ag. The deposit is a lower temperature "telescoped" part of the Tenth Legion magnetite skarn system.

Nickel mineralisation as magmatic segregations within the ultramafics appears to be insignificant in quantity, although the grade of individual occurrences sounds impressive. Deposits are generally less than 50m long and of the order of 1m wide, with several percent of Ni and Cu (Blissett, 1962). Although some drilling has been carried out, there is no clear understanding of the geometry of the deposits with depth. This style of mineralisation should be considered incompletely explored.

Stratabound Pb-Zn in limestone is exemplified by the Oceana deposit where Amoco outlined a resource of 4Mt @ 19.4% Pb, 4% Zn and 106 ppm Ag (Taylor and Mathison, 1990). Mineralisation is described as syndiagenetic replacement, broadly equivalent to Irish-type deposits. Indications of other stratabound carbonate-hosted Pb-Zn mineralisation is recorded in Amoco-EZ diamond drilling from Myrtle and Grieves prospects. Despite intensive but fruitless exploration by Amoco-EZ, the Gordon Limestone still holds excellent potential for significant base-metal discoveries.

Perhaps more significant than potential within the limestone is near-surface enrichment of Pb-Zn by the dissolution of the carbonate. This decarbonatisation has left a layer of black sulphidic pug sitting above fresh limestone, beneath a veneer of glacial gravels. Zinc and Pb have been retained and concentrated in this pug layer. The black pug is extensively developed over virtually all areas of near-surface Gordon Limestone. Potential of this target is untested to date, but will be evaluated by CRAE in the course of these investigations.

Stratiform syngenetic pyrite is present in Proterozoic black shale in the Zeehan area. To date however, no economic occurrences of Proterozoic black shale-hosted base-metal deposits are known in Tasmania. Clear similarities can be drawn between Zeehan and the Mt Isa and Lawn Hill areas, and on that basis the potential for discovery of another Century-type deposit is high.

The best reference for brief descriptions of all deposits on the Zeehan field, although somewhat dated now, is Blissett (1962). Early Geological Survey bulletins from between 1890 and 1910 are important historical references.

## 7. PREVIOUS EXPLORATION BY COMPETITORS

Relevant exploration activities by competitors prior to the granting of EL 38/89 is restricted to the program on EL4/78 by Amoco, followed by EZ in joint venture, best summarised by Mathison and Taylor (1987).

During the period 1978-1987, Amoco-EZ, collected a large body of data over the Gordon Limestone as part of their Zn-Pb exploration activities on EL4/78. Amoco-EZ focussed on an Irish-type exploration model, based on their success in delineating the sub-economic Oceana deposit. Data amassed by the joint venture includes:-

- geological mapping
- wacker geochemistry
- costean geochemistry
- ground magnetics
- gravity
- IP and EM surveys
- drilling logs and assays

Although the program was unsuccessful in delineating a bedrock carbonate-hosted resource (apart from the sub-economic Oceana deposit), numerous drill-holes intersected sub-economic and patchy Zn-Pb mineralisation.

It also became clear that significant enrichment of Pb and Zn was occurring in the decarbonated black pug developing in the weathering profile above the limestone. After so many frustrating years of searching for the hardrock source to these anomalies, Amoco-EZ failed to perceive the black pug as a target in itself.

At Grieves prospect, wacker sampling revealed several areas of highly anomalous Zn-Pb mineralisation in weathered limestone, up to 19.5% Zn and 2.4% Pb. Costeans dug over selected wacker anomalies returned best results of 20m @ 7.0% Zn, and 8m @ 10.2% Zn, further upgrading the prospect. Costeans reporting % levels of Zn often failed to reach bedrock, providing the first clues to the presence of secondary surficial metal accumulations.

Diamond drilling at Grieves proved the existence of low-grade stratiform Zn mineralisation at the base of the Gordon Limestone. Holes testing 700m of strike length intersected up to 5.3m @ 6.1% Zn, although the mineralisation was discontinuous. A second target in the middle of the limestone returned up to 6.8m @ 8.5% Zn in shallow diamond holes. In most cases the Zn mineralisation is dominated by smithsonite.

Plan Tv506 summarises the significant results recorded by Amoco-EZ within the area of EL 38/89.

## 8. EXPLORATION BY MAJOR MINING LTD / CRAE PRIOR TO 1/3/92

Activities by Major Mining prior to CRAE's involvement are detailed in the relevant statutory reports.

Exploration by CRAE on EL 38/89 prior to 1/3/92 focussed on a compilation and review of existing open-file data. These initial activities led to a concentration of effort on adjacent tenements EL28/88 and EL 34/88, at that time considered to be more prospective. All exploration by CRAE on EL 38/89 since commencement of the joint venture is detailed in this report.

## 9. EXPLORATION ACTIVITIES FOR THE PERIOD 1/3/92 TO 28/2/93.

### 9.1 Exploration Philosophy

CRAE's principal commodity of interest in the Zeehan area is Zn-Pb. CRAE's initial interest focussed on potential for carbonate-hosted Zn-Pb deposits within Ordovician Gordon Limestone. Following an exhaustive review of Amoco-EZ open-file data for the Myrtle to Rose Valley areas, secondary surficial deposits derived from the decomposition of the carbonate was perceived to be a more desirable target.

Zinc and Pb are being enriched at the surface by dissolution of the carbonate. This decarbonisation has left a layer of black sulphidic pug sitting above fresh limestone, beneath a veneer of glacial gravels. Zinc and Pb have been retained and concentrated in this pug layer. The mechanism for this process is unclear, but it is suggested based on studies by Amoco (Wall, 1984) that low pH, strongly reducing conditions have acted to remove carbonate, but preserve sulphides near the surface. Wall (1984) has suggested a four-fold increase in grade above that of underlying primary mineralisation. The black pug is extensively developed over virtually all areas of near-surface Gordon Limestone. Potential of this target is untested to date, but will be evaluated by CRAE in the course of these investigations.

The rationale behind the pursuit of the secondary surficial targets rests on a number of features of the mineralisation already defined in open-file literature. These features are:-

- Zn mineralisation at % levels is defined at several prospects
- Potential lateral extent is huge, with vast areas of gravel-covered decomposed limestone unexplored. Over 20 km<sup>2</sup> held in CRAE joint venture tenements.
- The deposit style has not been previously evaluated
- Mineralisation is shallow, thereby offering low stripping ratios for mining
- Sediments are soft, capable of being mined without drilling and blasting
- Sealed roads run adjacent to all targets

The latter three factors translate to substantially lower capital and operating costs for a mine, which in turn allows lower grades to be mined, thereby maximising the resource.

## 9.2 Grieves Prospect

### 9.2.1 Introduction

Grieves prospect is 12km S of Zeehan, adjacent to the Zeehan-Strahan road (Plan Tv443). The prospect sits in a synform of Gordon Limestone. Quaternary gravels obscure the limestone, which has eroded to form the Badger River valley between ridges of Moina Sandstone and Crotty Quartzite.

The target was selected based on highly anomalous open-file wacker and costean geochemistry indicating potential for substantial grade, thickness and areal extent of mineralised surficial decomposed limestone.

Rock sampling of infilled costeans, mineralogical studies, and reverse-circulation air-core drilling traverses were completed in an effort to identify areas of substantial secondary near-surface mineralisation.

### 9.2.2 Geology

Grieves prospect is hosted in Ordovician Gordon Limestone. Conformably underlying the limestone is Ordovician Moina Sandstone. Crotty Quartzite, of Silurian age, conformably overlies the limestone. At Grieves the Gordon Limestone is approximately 400m-500m thick. The sequence was folded during the Devonian Tabberaberan Orogeny to produce an open NNW-plunging synform. Measured dips at Grieves are generally between 35deg and 55deg.

Erosion has reduced the limestone to rare outcrops in Quaternary gravel-covered valleys between ridges of sandstone and quartzite. Gravels may be up to 5m thick. In-situ weathering has further degraded the limestone to a black decarbonated clay. This weathering surface is variable in depth but may locally reach 30m, averaging 3-10m.

Bedrock specimens collected during air-core drilling will be used to define local carbonate facies variations. This work has not been completed in time for inclusion in this year's report.

### 9.2.3 Costean Geochemistry

Rock samples for geochemistry were collected from the surface of a number of filled-in costeans at Grieves. In all, 15 samples were collected during 1992/93. Samples were submitted to Analabs, Burnie for aqua regia - perchloric acid digest followed by AAS analysis of Ag-As-Bi-Co-Cu-Fe-Mn-Mo-Pb-V-Zn. A batch of 10 samples were submitted for Au by fire assay. Results are listed in Appendix 1.

Maximum values were up to 18.75% Zn, 5.8% Pb from the costean on line 47100N. Mn ranged up to 1% and As was patchy up to 350ppm, but other elements, including Ag were not anomalous. Sphalerite could not be visually identified in any samples and galena was only rarely observed. Anomalous samples had a high density, suggesting smithsonite may have been present (see 9.2.4).

Peak Zn values were obtained in weathered black, sugary and vuggy limestone, usually with visible Fe carbonates. Follow-up sampling showed that all samples from costean 47100N contained over 1% Zn, including a sample comprised mainly of clay and organic matter which returned 5.1% Zn and 5.8% Pb.

Massive pyrite was common on costean 47100N, however base-metal contents were low, 1500 ppm Zn and 800 ppm Pb.

### 9.2.4 Mineralogical Studies

A sample of pulverised rock that assayed 16.5% Zn was submitted to Analabs Perth for qualitative XRD identification of the Zn species. Smithsonite was found to be the major Zn mineral. Oil grain mount supported this result. A polished section of the same powder showed the opaques to be a minor phase only, dominated by galena with lesser pyrite and Fe-poor sphalerite.

A duplicate sample of the rockchip that returned 18.75% Zn was submitted for thin-section examination at Central Mineralogical Services in Adelaide. The rock was described as a monomineralic Fe-Mg-Zn carbonate. No evidence for the former presence of sphalerite could be seen.

A second sample of fine-grained limestone also contained the Fe-Mg-Zn carbonate mineral, and similarly no sphalerite precursors could be deduced.

Laboratory reports are presented in Appendix 2.

### 9.2.5 Wacker Geochemistry

CRAE has digitised all Amoco-EZ wacker geochemistry, converting local grids to AMG coordinates (Appendix 3). Zn-Pb anomalism and thickness of the pug layer were used to select targets for air-core drilling traverses.

Of the 468 wacker samples within EL 38/89, eight returned over 0.5% Zn, and four returned >1% Zn, up to 19.5% Zn. Anomalous samples define three separate targets; an 1100m linear zone at the top of the limestone, a 700m linear trend at the base of the limestone, and a highly conspicuous single point anomaly in the middle of the limestone. Plans of wacker sample depth (i.e. inferred depth of black pug), Zn and Pb geochemistry are presented on plans Tv507 to Tv509.

The anomaly at the top of the limestone peaks at 3.3% Zn and 1.4% Pb. Amoco-EZ costean 47600N recovered 12m @ 3.1% Zn testing a portion of the anomaly (Plan Tv506). Amoco-EZ drillholes probing for primary mineralisation beneath the surface zone failed to intersect anomalous Zn. Depths of the weathered layer with anomalous Zn vary between 5m and 20m. Since the vertical zonation of Zn is unknown, it is purely speculative how these values relate to true Zn content of the profile.

Wacker sampling of the base of limestone anomaly ranged up to 4.5% Zn, with a depth of decomposition up to 22m, but generally ranging between 5m to 10m. Two costeans testing the target returned 8m @ 10.2% Zn and 10m @ 3.7% Zn. Three out of six holes drilled by Amoco-EZ intersected significant stratiform mineralisation over the 700m strike length, open along strike. Results include:-

ZG2	106.4m - 110.2m = 3.8m @ 3.2% Zn
ZG7	415.5m - 419.5m = 4.0m @ 4.9% Zn
	425.5m - 431.2m = 5.7m @ 5.1% Zn
ZG13	105.5m - 110.8m = 5.3m @ 6.1% Zn

The single-point anomaly on line 47100N returned 19.5% Zn and 2.4% Pb, from a depth of 5m. Costeaning of the anomaly produced 20m @ 7.0% Zn. Sixteen shallow winkie diamond holes were drilled by Amoco-EZ, five intersecting over 1% Zn. Best intersection was ZWG1, drilling beneath the costean, with 6.8m @ 8.5% Zn from 12.2m to 19.0m. A drilling summary is presented on plan Tv506.

### 9.2.6 Air-core Drilling

Wallis Drilling Pty. Ltd. of Western Australia were contracted to drill a series of shallow reverse-circulation air-core holes at Grieves to test the thickness and lateral extent of Zn mineralisation within surficial decomposed limestone. Wallis have a lightweight rig mounted on a Muskeg Bombardier snowmobile, chosen to minimise environmental impact on the fragile buttongrass areas.

Air-core drilling was selected as it is one of the only methods capable of obtaining accurate uncontaminated samples in wet, clay-rich and unconsolidated ground. With hindsight, it has been shown the rig was ideally suited to the task, being able to hammer through quartzite boulders, easily drill the clays and broken ground, then finally obtaining a small core of fresh bedrock.

At the time of writing, the air-core program had been completed, but geochemical analyses had not been received from Analabs, Burnie. Results will be included in the next annual statutory report. Nine 300m traverses with a hole spacing of 25m were completed to test the three wacker anomalies. In total, 103 holes for a total metreage of 1070m have been completed. Drill-hole locations are shown on Plan Tv510. Collar information and down-hole logs are tabulated in Appendix 4.

A typical drillhole encountered a profile of transported quartzite pebble to boulder gravels, followed by the target clay layer, finally bottoming in fresh limestone. Geological sections are plotted on Plan Tv511.

The gravel layer consisted of transported pebble to boulder-sized gravels derived from the adjacent Moina Sandstone. Thickness of the gravel layer ranged from absent to 8m, averaging 2m. Gravels were generally developed to similar depths through the entire prospect, although the size of the gravel pieces decreased to the N.

The target clay layer to be developed over almost the entire area tested (Plan Tv511). Thickness of this clay layer varied from absent to 28m, averaging about 6m. The clay varied in character from light brown or light grey through to black, strongly carbonaceous and sulphidic. The majority were dark grey carbonaceous clays. Limestone textures were rarely, if ever, preserved in the clay layer. In some holes, fresh, or weakly weathered limestone would be intersected, but then broken through to continue in carbonaceous clays.

Generally the clays are more thickly developed at the contacts of the limestone with the over- and underlying quartzite units. This may represent a depressed weathering surface due to channelling of greater groundwater volumes at the contact with the less permeable quartzites.

All holes terminated in fresh limestone. Commonly there was an abrupt transition from clay to limestone, often marked only by strongly broken fresh limestone. Rarely some clay weathered limestone would be observed. The limestone itself displayed a range of facies types, from massive cherty limestone through fine grained bioturbated mudstones, to coarse oolitic limestones. Bivalve fossils were occasionally seen. Calcite veining was common, pyrite mineralisation rare, but no Pb or Zn sulphides were observed.

Reference samples of fresh bedrock were retained to aid geological mapping of the limestone facies, however this has not yet commenced.

Air-core holes testing peak costean and wacker geochemistry encountered thick developments of dark grey carbonaceous clays from the depth of the original Zn-anomalous sample. Assay results are required for confirmation, but it seems reasonable to expect that significant Zn accumulations could be expected throughout the clay profile. In addition, wacker sampling that attained a fresh bedrock sample will not have tested the overlying clays. Therefore, a low analysis from bedrock may not preclude the potential for significant Zn in the overlying clay.

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- WALL L.N. 1984 Origin and significance of Pb-Zn-Ag geochemical anomalies developed in regolith, in part EL15/76 Amoco/CSR joint venture area, Dundas, Tasmania. TCR 85-2457.

KEYWORDS

Tasmania, Ordovician, Gordon Limestone, Literature Review, Rockchip Sampling, Mineralogy, Air-Core Drilling, Zinc, Lead.

LOCATION

Queenstown	1:250,000	SK55-5
Pieman	1:100,000	7914
Zeehan	1:50000	7914-S

LIST OF DPO'S

71511, 71515, 71516, 71519.

LIST OF PLANS

<u>Plan No.</u>	<u>Title</u>	<u>Scale</u>
Tv431	Zeehan Area West Tasmania Zeehan Joint Venture Tenement Plan	1:10,000
Tv506	Zeehan 4 EL 38/89 Grieves Prospect - Summary Plan	1:10,000
Tv443	Zeehan Area Grid & Prospect Location Plan	1:50,000
Tv507	Zeehan 4 EL 38/89 Grieves Prospect Wacker Geochemistry - Depth m	1:10,000
Tv508	Zeehan 4 EL 38/89 Grieves Prospect Wacker Geochemistry - 21 NC ppm	1:10,000
Tv509	Zeehan 4 EL 38/89 Grieves Prospect Wacker Geochemistry - Lead ppm	1:10,000

Tv510	Zeehan 4 EL 38/89 Grieves Prospect Aircore Drillhole Locations	1:10,000
Tv511	Zeehan 4 EL 38/89 Grieves Prospect Aircore Drilling Geological Sections	1:1,000

### LIST OF APPENDICES

APPENDIX 1:	Rockchip lithological codes, sampling ledgers and geochemistry
APPENDIX 2:	Mineralogical reports
APPENDIX 3:	Amoco-EZ Wacker sampling ledgers and geochemistry
APPENDIX 4:	CRAE air-core drilling location data and downhole logs

93-3417

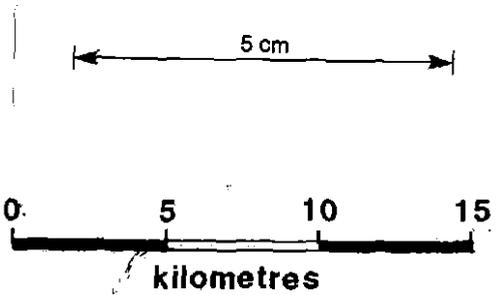
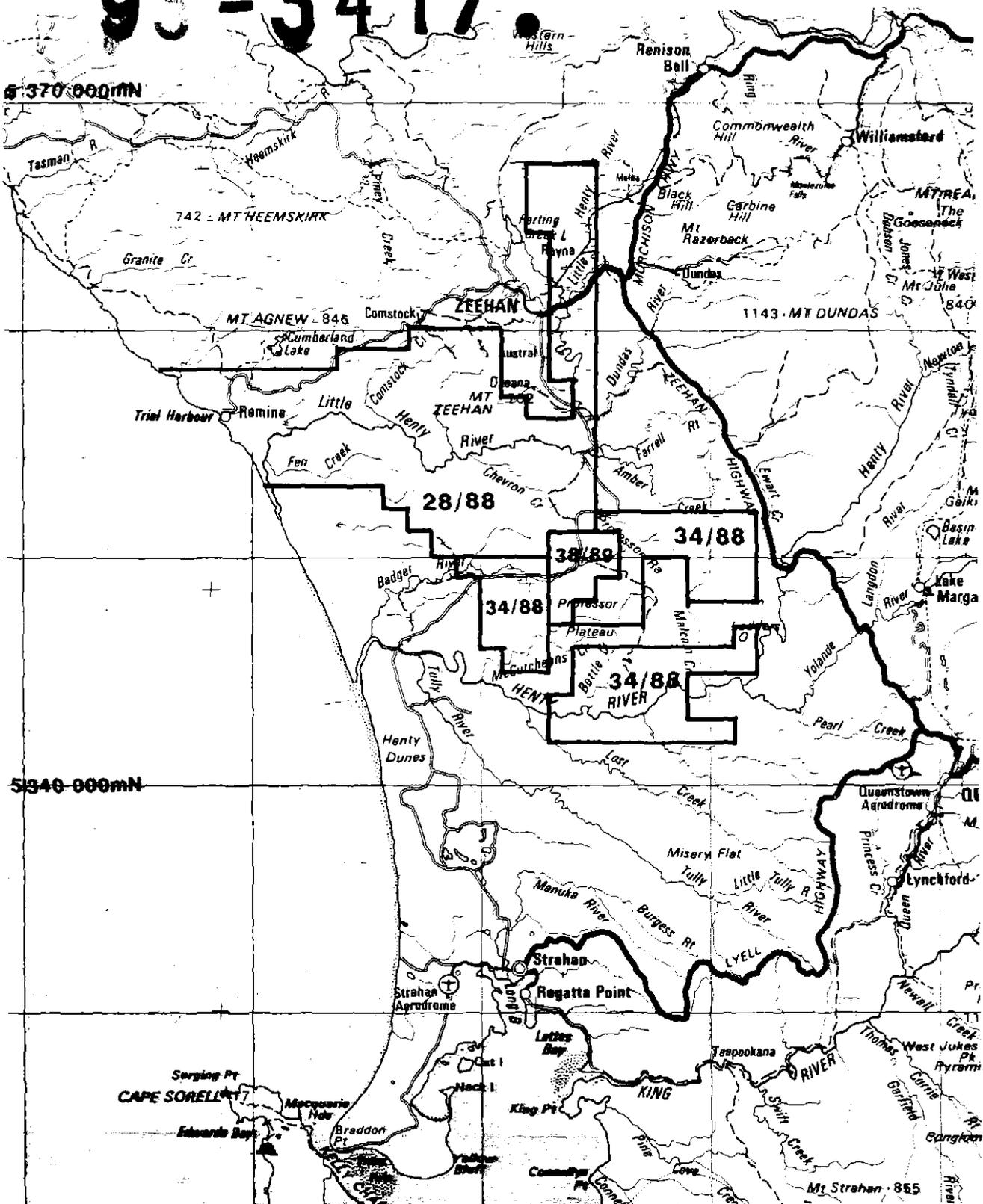
031018

5 370 000mN

5340 000mN

340 000mE

370 000mE



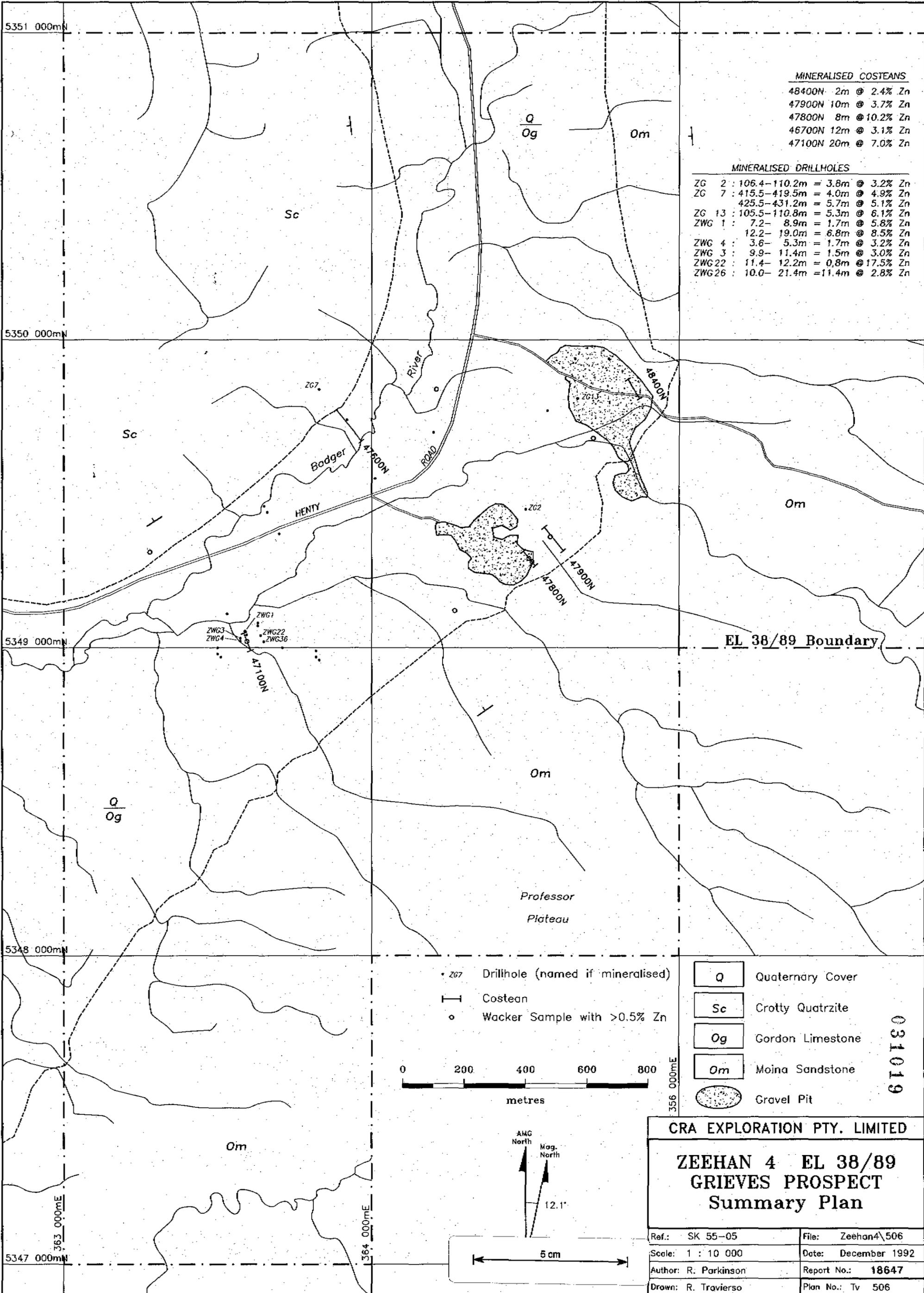
**CRA EXPLORATION PTY. LIMITED**

**ZEEHAN JOINT VENTURES**

**LOCALITY DIAGRAM**

Ref.: SK 55 - 5	Scale: 1:250 000.
Author: T. Summons	Report No.: 18647
Drawn: R. Traverso	Plan No.: TV 431

Nov. 1991



**MINERALISED COSTEANS**

48400N	2m @ 2.4% Zn
47900N	10m @ 3.7% Zn
47800N	8m @ 10.2% Zn
46700N	12m @ 3.1% Zn
47100N	20m @ 7.0% Zn

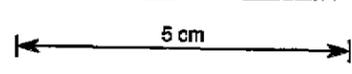
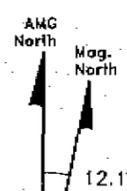
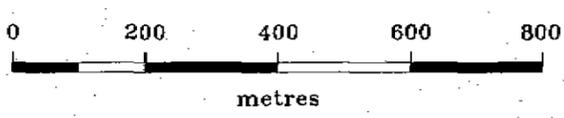
**MINERALISED DRILLHOLES**

ZG 2	: 106.4-110.2m = 3.8m @ 3.2% Zn
ZG 7	: 415.5-419.5m = 4.0m @ 4.9% Zn
	: 425.5-431.2m = 5.7m @ 5.1% Zn
ZG 13	: 105.5-110.8m = 5.3m @ 6.1% Zn
ZWG 1	: 7.2- 8.9m = 1.7m @ 5.8% Zn
	: 12.2- 19.0m = 6.8m @ 8.5% Zn
ZWG 4	: 3.6- 5.3m = 1.7m @ 3.2% Zn
ZWG 3	: 9.9- 11.4m = 1.5m @ 3.0% Zn
ZWG 22	: 11.4- 12.2m = 0.8m @ 17.5% Zn
ZWG 26	: 10.0- 21.4m = 11.4m @ 2.8% Zn

**EL 38/89 Boundary**

- ZG7 Drillhole (named if mineralised)
- Costean
- Wacker Sample with >0.5% Zn

- Q** Quaternary Cover
- Sc** Crotty Quartzite
- Og** Gordon Limestone
- Om** Moina Sandstone
- Gravel Pit

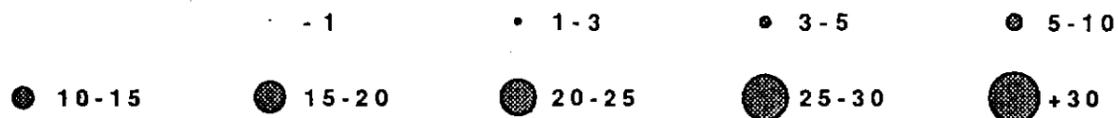
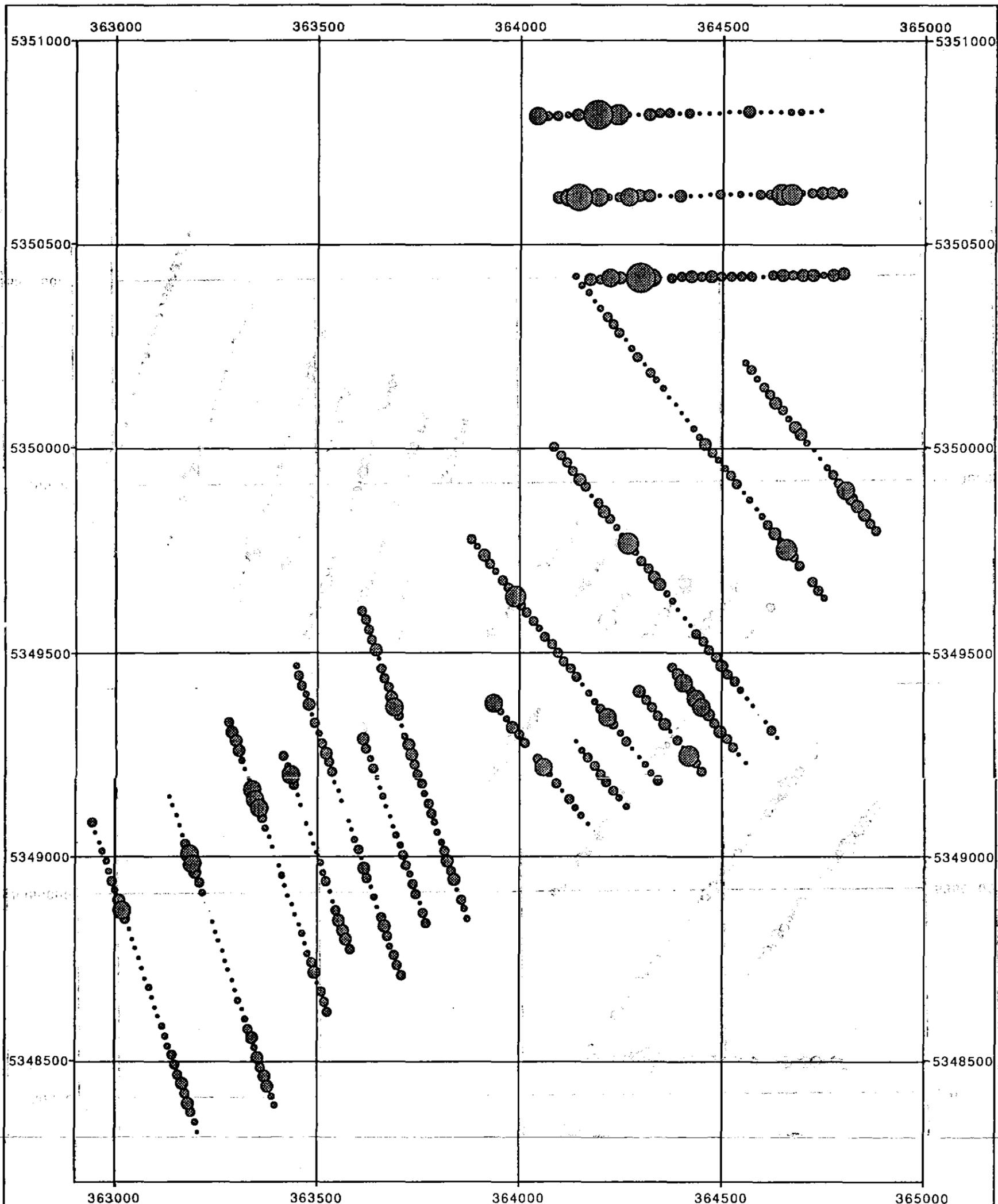


**CRA EXPLORATION PTY. LIMITED**

**ZEEHAN 4 EL 38/89  
GRIEVES PROSPECT  
Summary Plan**

Ref.: SK 55-05	File: Zeehan4\506
Scale: 1 : 10 000	Date: December 1992
Author: R. Parkinson	Report No.: 18647
Drawn: R. Travieso	Plan No.: Tv 506

031019



031020

"CRA EXPLORATION PTY. LIMITED"		
ZEEHAN 4 EL38/89 - GRIEVES PROSPECT		
WACKER GEOCHEMISTRY - DEPTH m		
Geol: RGP	Scale: 1:10000	Report: 18647
Drawn: RGP	Date: 13/1/93	Plan: Tv507

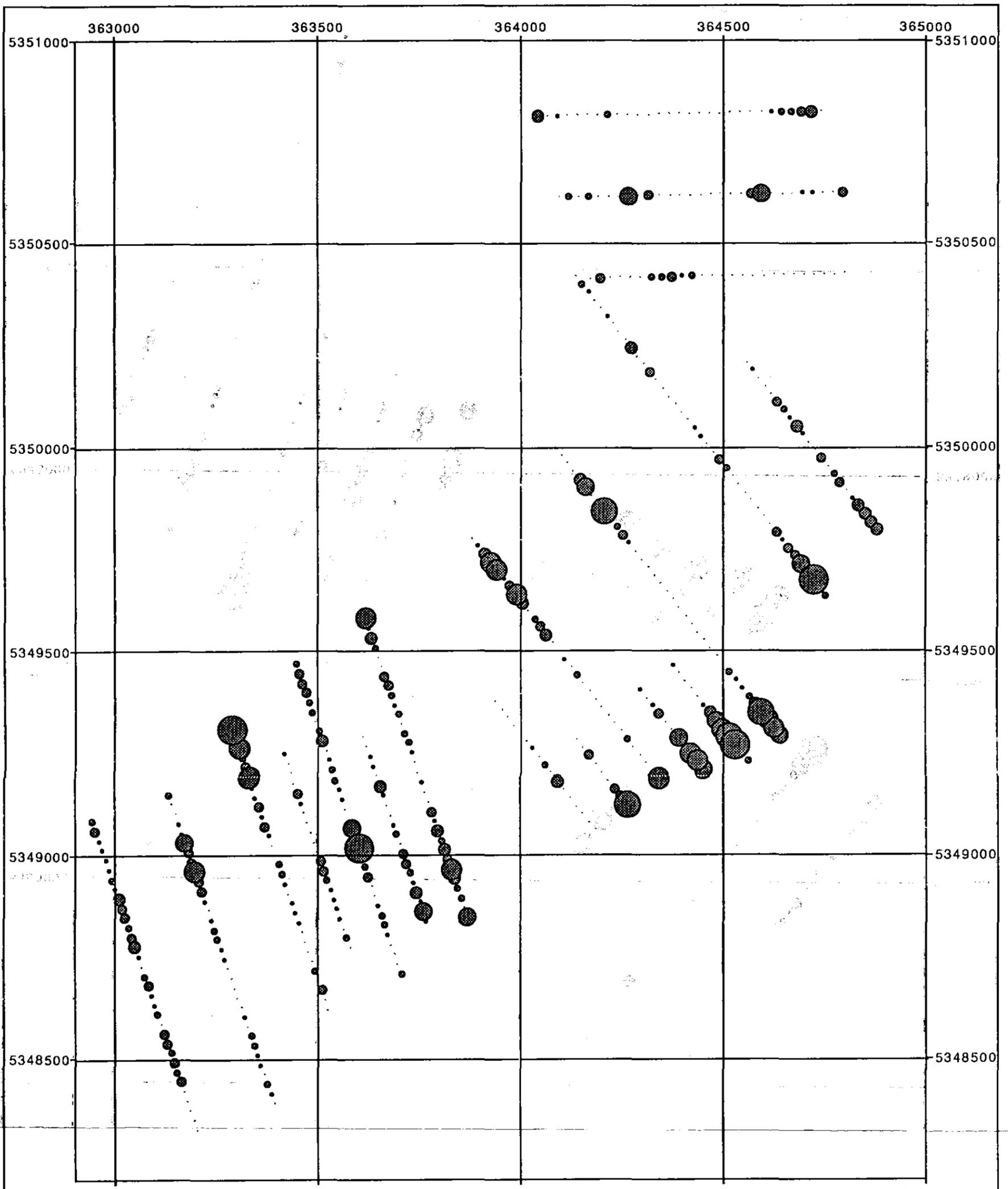
Sampling by Amoco-EZ on EL4/78



100m

5 cm

95-3417.



- -50
- 50-100
- 100-200
- 200-500
- 500-1000
- 1000-2000
- 2000-5000
- 5000-10000
- +10000

Sampling by Amoco-EZ on EL4/78



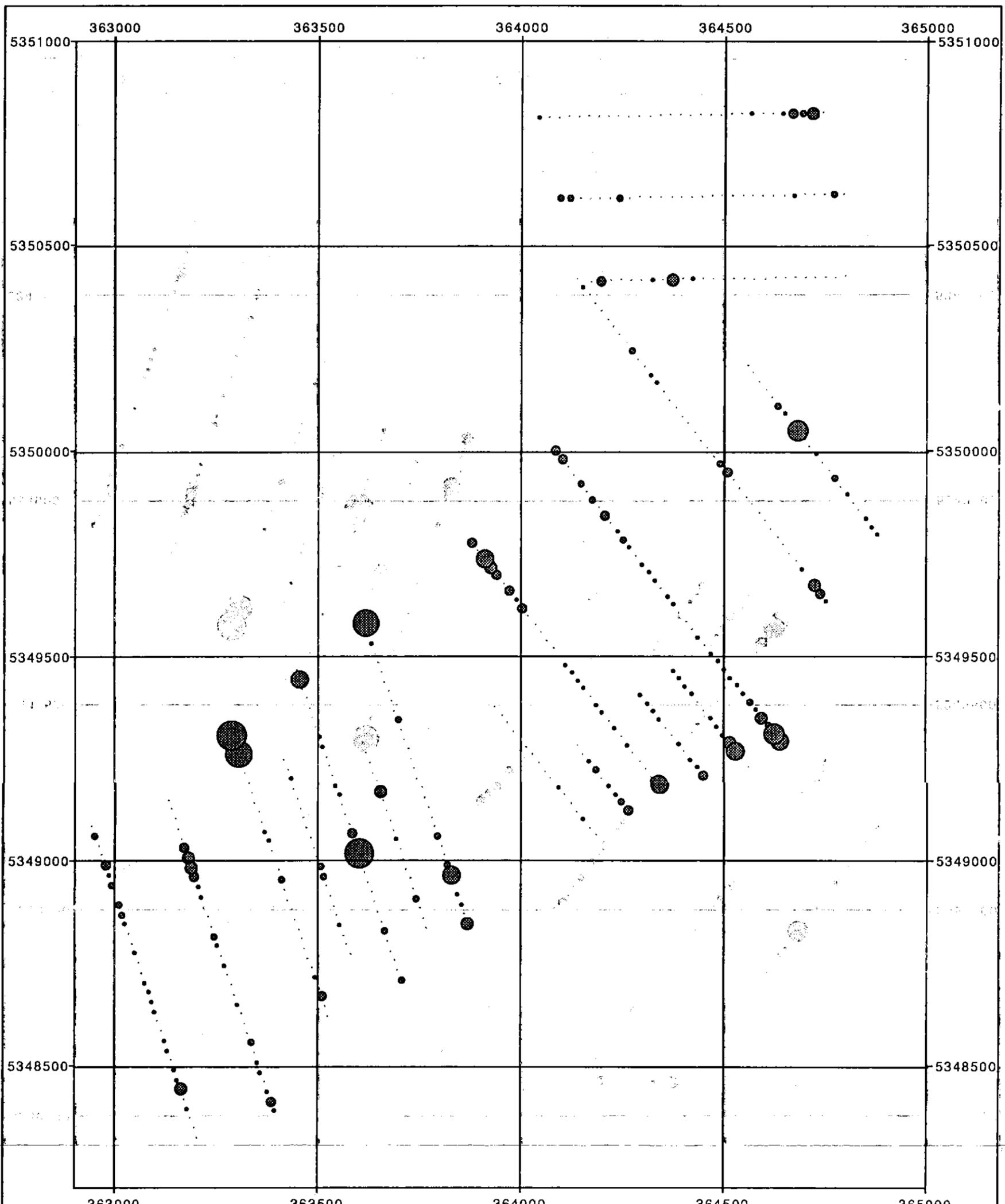
100m

5 cm

"CRA EXPLORATION PTY. LIMITED"		
ZEEHAN 4 EL38/89 - GRIEVES PROSPECT		
WACKER GEOCHEMISTRY - ZINC ppm		
Geol: RGP	Scale: 1:10000	Report: 18647
Drawn: RGP	Date: 13/1/93	Plan: Tv508

031021

93-3417



- -50
- 50-100
- 100-200
- 200-500
- 500-1000
- 1000-2000
- 2000-5000
- 5000-10000
- +10000

5 cm

Sampling by Amoco-EZ on EL4/78

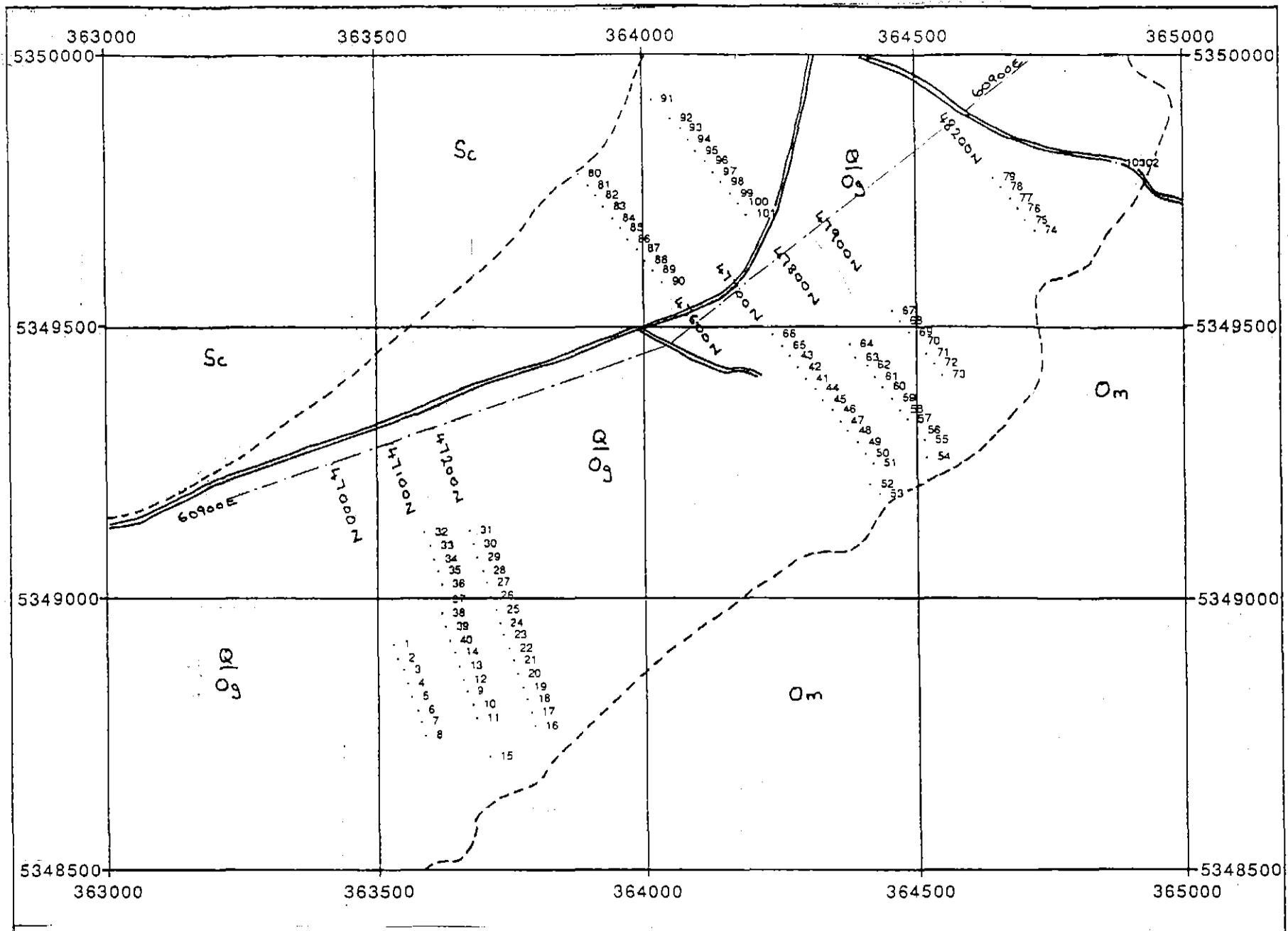


100m

"CRA EXPLORATION PTY. LIMITED"		
ZEEHAN 4 EL38/89 - GRIEVES PROSPECT		
<b>WACKER GEOCHEMISTRY - LEAD ppm</b>		
Geol: RGP	Scale: 1:10000	Report: 18647
Drawn: RGP	Date: 13/1/93	Plan: Tv509

031022

93-3417.



O	Quaternary Cover	==	Road or track
Sc	Crotty Quartzite	- - -	Lithological boundary
Og	Gordon Limestone	- · - · -	Amoco/EZ baseline
Om	Moina Sandstone		

HOLE PREFIX ZG--



100m

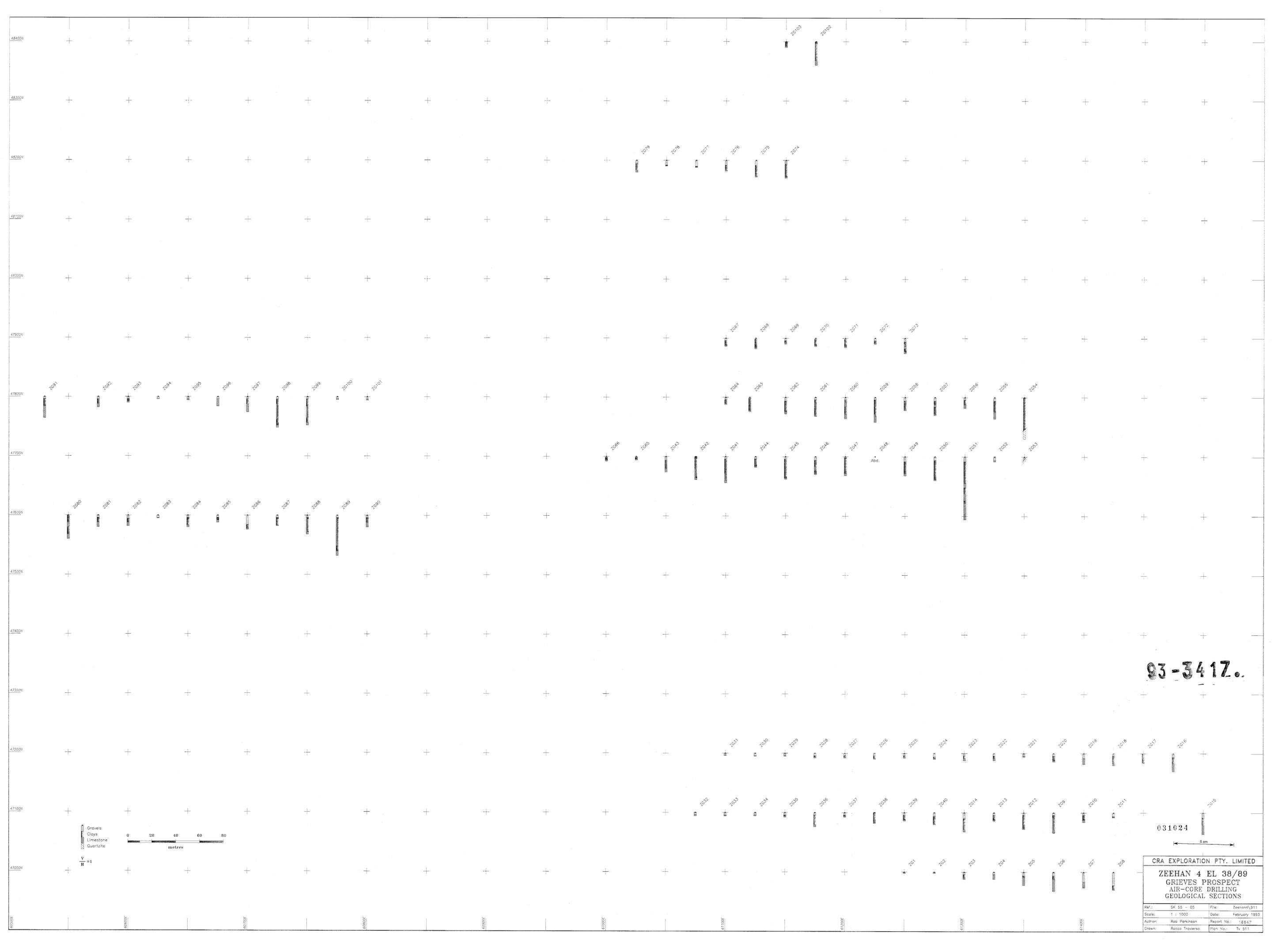
5 cm

"CRA EXPLORATION PTY. LIMITED"

ZEEHAN 4 EL38/89 - GRIEVES PROSPECT  
AIR-CORE DRILL-HOLE LOCATIONS

Geol: RGP	Scale: 1:10000	Report: 18647
Drawn: RGP	Date: 15/2/93	Plan: Tv510

92-3417.

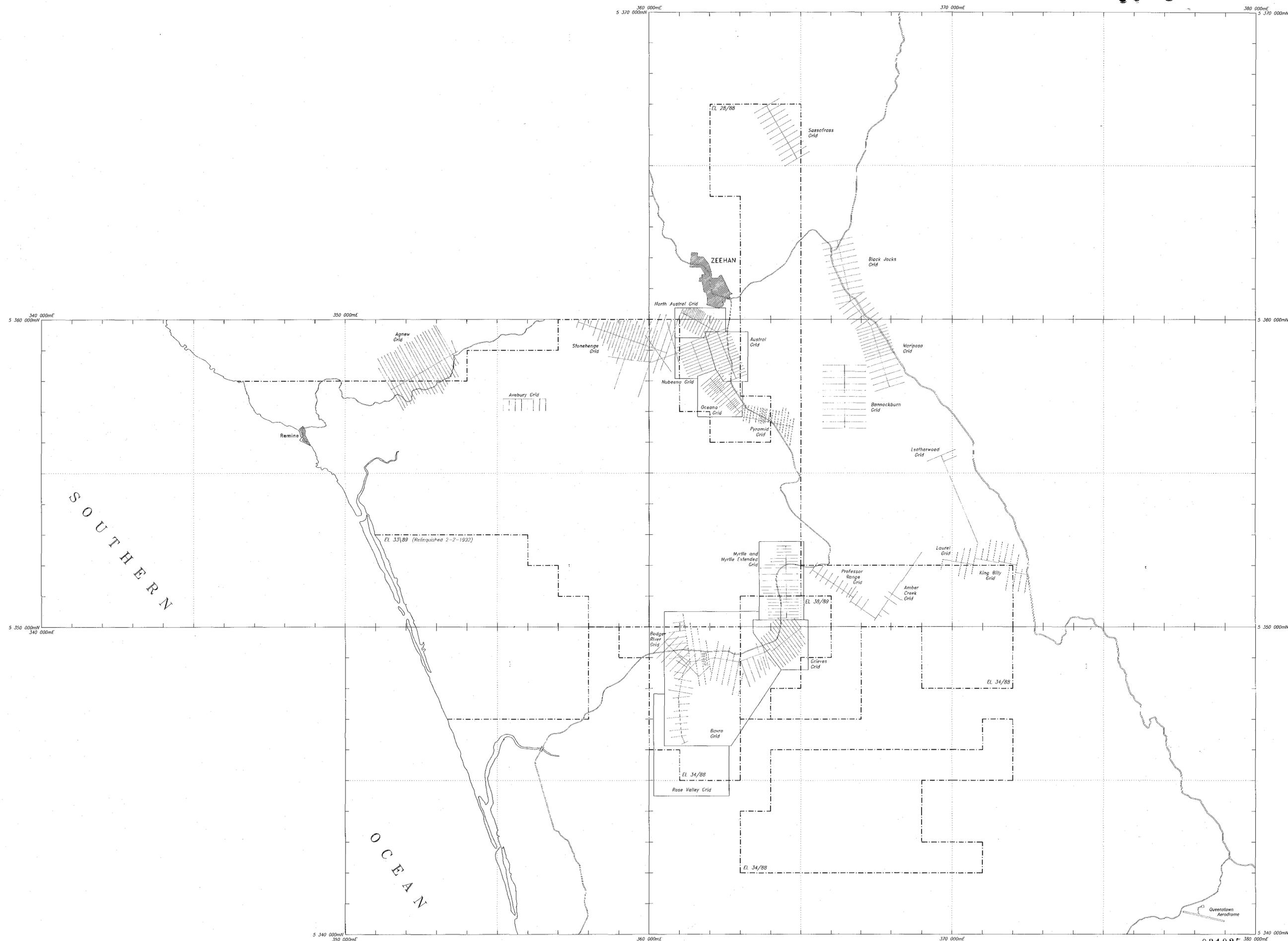


93-3417.

031024

5 cm

CRA EXPLORATION PTY. LIMITED			
ZEEHAN 4 EL 38/89			
GRIEVES PROSPECT			
AIR-CORE DRILLING			
GEOLOGICAL SECTIONS			
Ref.:	SK 55 - 05	File:	Zeehan4/S11
Scale:	1 : 1000	Date:	February 1993
Author:	Rob Parkinson	Report No.:	18647
Drawn:	Rocco Traverso	Plan No.:	Tv S11



S O U T H E R N

O C E A N

031025

\*\* NOTE \*\*  
 Contiguous grids are internally  
 consistent, however the relative  
 position of groups of grids may vary.



CRA EXPLORATION PTY. LIMITED	
<b>ZEEHAN AREA</b>	
<b>Western Tasmania</b>	
<b>Grid &amp; Prospect Location Plan</b>	
Ref.: Sh55 - 5	File: ZEEHAN_S0000
Scale: 1 : 50000	Date: August 1992
Author: T.W. Dickson	Report No.: 18647
Drawn: R. Travieso	Plan No.: Tv 443

APPENDIX 1

ROCKCHIP LITHOLOGICAL CODES.  
SAMPLING LEDGERS AND GEOCHEMISTRY

**ROCKING AND DRILLING CODES**

**GEOLOGY**

Rock code as per published geological map  
For time designation use:

O Quaternary	M Permian	P Proterozoic
T Tertiary	C Carboniferous	A Archaean
	S Silurian	
K Cretaceous	D Devonian	
R Triassic	O Ordovician	
J Jurassic	E Cambrian	

**FIELD NO.**

Field term for rock type

Broad groupings are:

S Sedimentary	I Intrusive	C Surficial
M Metamorphic	E Extrusive	O Others

**SEDIMENTARY**

Scg Conglomerate	Slx Limestone	Sw Waste
Sst Sandstone	Sch Chert	
Ssl Siltstone	Sll BIF	
Ssh Shale		
Sos Black shale	Sbx Breccia	

**METAMORPHIC**

Mst Slate	Mq Quartzite	Mmg Migmatite
Mph Phyllite	Mm Marble	
Msc Schist	Ma Amphibolite	
Mgs Graphitic schist	Mca Calcification	Usk Skarn
Mgs Quartzite		

**INTRUSIVE IGNEOUS**

Ii Felsic undiff.	Ij Intermed undiff.	Iu Ultramafic
Iip Felsic porphyry	Iip Intermed porph.	Ius Serpentinite
Iap Andite	Im Mafic undiff.	
Igr Granite	Ido Diorite	Ipp Pegmatite
Igd Grandiorite	Igp Gabbro	

**EXTRUSIVE IGNEOUS**

Ery Rhyolite	Ean Andesite	Ei Tuff undiff.
Eoc Dacite	Eb Basalt	Eii Felsic tuff
		Emi Mafic tuff

**SURFICIAL (COVER) MATERIAL**

Ca Alluvium	Cl Lignite	Csg Gossan
Coa Colluvium	Csp Pisolites	
Ca Aoplan sand	Csl Ironstone	Ccr Clay
Cbs Black soil	Csl Siltstone	
Cg Gravel	Ccl Calcrite	

**OTHERS**

Ovq Vein quartz	Omy Mylonite	Oms Massive sulphide
Ovc Vein carbonate	Oca Breccia	
Ovs Vein sulphide	Odf Fault gouge	Ox Unknown

**TEXTURAL CODES**

**WEATHERING/SURFICIAL FEATURES**

Wc Weathered	Fc Ferruginous
Bl Bleached	Fo Fe ox in tact
Le Leached	

**MINERALISATION/ALTERATION FEATURES**

Gs Gossanous	Vs Vein sulphide	AI Altered
Va Veined	Ds Dissemin sulph.	SI Silicified
DI Disseminated	Fs Fracture sulph.	
	Bs Banded sulph.	

**GEOLOGICAL FEATURES**

Bd Bedded	Ff Fractured	Pp Porphyritic
Bn Banded	Ib Interbedded	Sc Schistose
Bx Brecciated	Lm Laminated	Sh Sheared
Fi Fissile (staley)	Mb Massive	Vu Vuggy

**DIAGNOSTIC MINERALOGY**

**PRIMARY MINERALISATION**

Ca Galena	Pp Pyrite
Sp Sphalerite	Po Pyrrhotite
Cp Chalcopyrite	Su Unknown sulph.

**SECONDARY MINERALISATION**

Le Lead secondaries	Cc Copper sulph.
Zs Zinc	Us Uranium

**ALTERATION/DIAGNOSTIC MINERALS**

Cy Clay	Ha Haematite	Gi Garnet
Ep Epidote	Ml Magnetite	Ky Kyanite
Cc Carbonate	Js Jarosite	
	Mn Manganese mins	

**COLOUR CODES**

L Light	A Banded	M Mottled
D Dark		
N Black	P Purple	V Green
G Gray	R Red	K Pink
B Brown	O Orange	E Blue
W White	Y Yellow	S Silver

APPENDIX 1: EL38/89 ROCKCHIP LEDGER AND GEOCHEMISTRY

APPENDIX 1: EL38/89 ROCKCHIP DATABASE.										
All results in ppm (Fe in %).										
SAMPLE NO.	DPO	EAST	NORTH	PROSPECT	BMRLITH	FIELD ID	TEXTURE	ALT/MIN	COLOUR	COMMENTS
3190596	71511	364540	5349280	GRIEVES	OI	Sls	WeGs?		MBOG	Decarbonated Lst.
3190597	71511	364540	5349280	GRIEVES	OI	Sls			N	
3190598	71511	364540	5349280	GRIEVES	OI	Sls	Vu		MCN	Decarbonated Lst.
3190599	71511	364540	5349280	GRIEVES	OI	Sls	WeGs?		MYO	
3190600	71511	364540	5349280	GRIEVES	OI	Cbs	We		N	Greasy clay after Lst.
3307840	71511	363600	5349020	GRIEVES		Oms	Ms	Py	LY	
3307841	71511	363600	5349020	GRIEVES	OI	Sls	WeVu		DGN	
3307842	71511	363600	5349020	GRIEVES	OI	Sls	Vn	Cc	DGN	
3307843	71511	363600	5349020	GRIEVES	OI	Sls	FeWe	Ga?	DPG	DUP. FOR XRD (DPO71515)
3307844	71511	363600	5349020	GRIEVES	OI	Sls	FeWe	Ga	MGOP	Decarbonated Lst. 1% Ga.
3308029	71516	363600	5349020	GRIEVES	OI	Sls	VuWeDs	Sp	DGN	crystalline Lst. 10% Sp.
3308030	71516	363600	5349020	GRIEVES	OI	SlsSsh	Lm		DG	Shaley lime mudstone
3308031	71516	363600	5349020	GRIEVES	OI	SlsSsh	Lm		DG	Shaley lime mudstone
3308032	71516	363600	5349020	GRIEVES	Qrs	Ccy	We		DG	Clay + organics
3308033	71516	363600	5349020	GRIEVES	OI	Sls	Vn	Cc	G	carbonate veining
3308065	71519	363600	5349020	GRIEVES	OI	Sls	VuWeDs	Sp	DGN	Dup. of 3308029. Petrology
3308066	71519	363600	5349020	GRIEVES	OI	SlsSsh	Lm		DG	Dup. of 3308030. Petrology

APPENDIX 1: EL38/89 ROCKCHIP LEDGER AND GEOCHEMISTRY

SAMPLE NO.	Ag	As	Au	Bi	Co	Cu	Fe%	Mn	Mo	Pb	V	Zn
3190596	-1	350	-0.005	-10	-3	12	8	19	-5	87	100	345
3190597	-1	44	-0.005	-10	-3	11	1.94	21	-5	290	70	120
3190598	-1	25	-0.005	-10	-3	13	1.7	25	-5	195	68	120
3190599	-1	24	-0.005	-10	35	20	30.1	3750	-5	145	64	7800
3190600	-1	40	-0.005	-10	11	19	1.83	38	-5	625	79	445
3307840	-1	250	-0.005	-10	-3	4	45.5	68	-5	800	10	1500
3307841	4	48	-0.005	-10	6	19	5.77	1650	-5	22400	52	114000
3307842	4	2	-0.005	-10	4	7	18.7	6800	-5	19500	25	139000
3307843	3	-1	-0.005	-10	5	6	26.6	7700	-5	16600	14	165000
3307844	3	2	-0.005	-10	5	6	28.9	9600	-5	18900	11	146000
3308029	4	2				6	23.43	8400		19700		187500
3308030	1	32				7	1.6	790		12300		61200
3308031	-1	7				16	1.83	375		2800		10600
3308032	6	21				20	1.57	56		58000		51000
3308033	-1	3				6	0.61	300		1200		1050
3308065												
3308066												

APPENDIX 2

MINERALOGICAL REPORTS



**ANALABS** A.C.N. 004 591 664

A division of Inchcape Inspection & Testing Services Pty. Ltd.



18 September 1992

Mr R Parkinson  
CRA Exploration Pty Limited  
P.O. Box 8093  
NORTHLAND CENTRE VIC 3072

Dear Robert

Following are the results of [REDACTED] sample submitted for preparation of Polished Sections and Mineragraphic Examinations for the presence of [REDACTED] Zn bearing species, on your DPO No. 71515 dated 21.8.1992.

Yours faithfully  
ANALABS - A division of  
Inchcape Inspection &  
Testing Services Pty Ltd

Nigel Ball  
MANAGER - TASMANIA

**BURNIE:**

14 THIRKELL STREET, BURNIE, TASMANIA, 7320, P.O. BOX 929, TASMANIA, 7320.

TELEPHONE: (004) 31 6837 FACSIMILE: (004) 31 8890

**HEAD OFFICE:**

50 MURRAY RD, WELSHPOOL, WESTERN AUSTRALIA, 6106, P.O. BOX 210, BENTLEY, W.A., 6102, TELEX: AA 92560 TELEPHONE: (09) 458 7999 FACSIMILE: (09) 458 2922

AUSTRALIA • FIJI • INDONESIA • NEW ZEALAND • PAPUA NEW GUINEA • PHILIPPINES • SOLOMON ISLANDS • GHANA • UNITED KINGDOM

Sample No. 3307843

Rock Powder

Polished section

OPAQUES	ACCESSORY
GALENA	DOMINANT
PYRITE	MINOR
SPHALERITE	ACCESSORY

The galena was present as rather small grains, often included in the non opaques. There was a rare composite with low Fe sphalerite.

Oil grain mounts and XRD examination found that the non opaques contained a major content of SMITHSONITE.

031033



## Central Mineralogical Services

8 Bradshaw Avenue, Craters, S.A. 5152  
Telephone (08) 370 9779 Fax (08) 370 9788  
International: Telephone + 618 370 9779 Fax + 618 370 9788

15 October, 1992

Mr R Parkinson  
CRA Exploration Pty Ltd  
P O Box 8093  
NORTHLAND CENTRE VIC 3072

### REPORT CMS 92/10/7

YOUR REFERENCE: DPO No. 71519  
DATE RECEIVED: 7 October 1992  
SAMPLE NO'S: 3308065 - 3308066  
SUBMITTED BY: R. Parkinson  
WORK REQUESTED: Petrology

*H.W. Fander*

H.W. Fander, M.Sc.

COPIES TO  
CRA Exploration Pty Ltd  
P O Box 8093  
NORTHLAND CENTRE VIC 3072  
Attention: Craig Hayward

CRA Exploration Pty Ltd  
P O Box 3709  
MANUKA ACT 2603  
Attention: CRAE Information Systems



## SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 92/10/7 Date Received: 7 October 1992Reference: DPO 71519Sample No: 3308065Nature of Sample: Hand Specimen

## IDENTIFICATION

3308065

Carbonate  
Rock

## DESCRIPTION

## SECTION No.

## a. Hand Specimen:

Dark grey, porous microcrystalline rock. Carbonate stain test negative.

## b. Microscopic:

This carbonate rock is almost monomineralic, and consists of a "mixed-crystal" carbonate with a composition believed to be  $\text{FeCO}_3\text{-MgCO}_3\text{-ZnCO}_3$  (these three carbonates are completely miscible), comprising a molecule with about 40%  $\text{ZnCO}_3$  (allowing for other components in the rock); a complete analysis for Fe, Mg, Ca, Mn, Zn and  $\text{CO}_2$  would throw more light on the exact composition of this carbonate, as optical properties are not definitive.

Minor components include small patches of a clay mineral, and interstitial films of carbonaceous matter. There are many irregular voids, probably caused by the volume reduction consequent upon replacing calcite or dolomite by heavier carbonates; this supposition is based on observations on the next rock (066) as well as references.

Thin intergranular films of goethite occur throughout.

## SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 92/10/7 Date Received: 7.10.92

Reference: DPO 71519

Sample No: 3308066

Nature of Sample: Hand Specimen

IDENTIFICATION

3303066

DESCRIPTION SECTION No. 63018

## a. Hand Specimen:

Grey, fine-grained soft rock. Carbonate stain test positive for calcite.

## b. Microscopic:

This is a patchily mineralised, fine-grained limestone, composed of very small calcite grains (mostly <10um) with finer interstitial calcite and carbonaceous pigmentation, and scattered fine pyrite.

Irregular patches and wider bands of a more coarsely-crystalline (about 50um) carbonate have replaced the calcite in places; this carbonate is believed to be similar to the Zn-bearing carbonate ("zincian siderite"?) in 065. The replacive carbonate occurs as scattered single crystals.

The origin of this zincian carbonate is not known; there is no suggestion of the former presence of sphalerite in either rock, and the Zn source(s) appear to be external.

The rock is cut by veinlets of calcite, and of carbonaceous matter, and of white opaque ?leucoxene.

APPENDIX 3

AMOCO-EZ WACKER SAMPLING LEDGER AND GEOCHEMISTRY

APPENDIX 3: AMOCO-EZ OPEN-FILE WACKER GEOCHEMISTRY.

APPENDIX 3 - AMOCO-EZ WACKER GEOCHEMISTRY														
All results in ppm (Fe in %)														
SAMPNO	LOCALE	LOCALN	AMGE	AMGN	DEPTH	BEDROCK?	COLOR	Cu	Pb	Zn	Ag	Fe	Mn	Ba
62654	60900	46500	362943	5349084	5.6		G	10	35	130		0.35	60	
62655	60925	46500	362951	5349060	1.3		G	15	135	420		0.40	75	33
62656	60950	46500	362959	5349037	1.8		GN	15	30	75		1.35	270	140
62657	60975	46500	362968	5349013	3.0		G	20	35	95		0.70	155	41
62658	61000	46500	362976	5348990	3.6		LG	10	340	85		0.19	150	
62659	61025	46500	362984	5348966	3.0		BG	15	55	75		0.60	45	193
62660	61050	46500	362992	5348942	5.6		G	15	150	190		1.20	70	224
62661	61075	46500	363000	5348919	4.8		DG	25	40	70		2.10	180	372
62662	61100	46500	363008	5348895	12.0		DG	20	170	780		1.90	50	333
62663	61125	46500	363016	5348871	19.0		DG	35	105	280	3.0	1.25	25	497
62664	61150	46500	363025	5348848	7.6		G	10	55	230		0.42	115	20
62665	61175	46500	363033	5348824	2.2		G	15	35	190		0.27	75	
62666	61200	46500	363041	5348800	1.2		G	15	45	220		0.42	85	
62667	61225	46500	363049	5348777	1.8		DG	15	50	710		0.37	65	
62668	61250	46500	363057	5348753	2.0		DG	15	30	90		0.73	195	84
62669	61275	46500	363065	5348730	1.6		G	20	35	40		1.65	405	52
62670	61300	46500	363073	5348706	1.6		DG	20	50	140		0.51	150	65
62671	61325	46500	363082	5348682	3.2		DG	15	60	255		0.41	225	22
62672	61350	46500	363090	5348659	2.5		G	10	55	85		0.18	110	29
62673	61375	46500	363098	5348635	2.8		G	10	80	70		0.17	100	
62674	61400	46500	363106	5348611	2.8		DG	15	45	155		0.52	195	88
62675	61425	46500	363114	5348588	3.4		DG	25	45	45		1.25	155	132
62676	61450	46500	363122	5348564	3.8		DG	20	95	325		0.97	70	80
62677	61475	46500	363130	5348540	4.8		DG	15	60	225		0.33	65	
62678	61500	46500	363139	5348517	5.3		G	15	40	110		0.55	85	42
62679	61525	46500	363147	5348493	6.0		YGW	15	80	260		0.30	150	43
62680	61550	46500	363155	5348469	7.9		G	20	50	145		0.46	225	130
62681	61575	46500	363163	5348446	13.0		BG	25	560	485		4.70	150	110
62682	61600	46500	363171	5348422	7.0		B	15	10	15		0.15	10	85
62683	61625	46500	363179	5348399	10.5		B	15	60	20		0.22	10	155
62684	61650	46500	363187	5348375	8.5		B	15	5	10		0.15	5	155
62685	61675	46500	363196	5348351	4.8		B	15	10	15		0.18	10	28
62686	61700	46500	363204	5348328	1.8		GN	15	5	15		0.18	10	
62719	60900	46700	363132	5349149	1.5		G	10	35	115		0.39	60	27
62718	60925	46700	363140	5349126	1.6		G	10	30	25		0.69	100	62
62717	60950	46700	363149	5349102	1.8		DG	10	30	25		0.60	110	70

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62716	60975	46700	363157	5349078	1.4		DG	10	35	60		0.76	100	118
62715	61000	46700	363165	5349055	2.0		DG	10	30	55	0.5	1.75	75	334
62714	61025	46700	363173	5349031	5.6		GGN	10	285	1000	0.5	0.93	15	261
62713	61050	46700	363181	5349007	19.0	N	DG	15	630	335	1.0	1.30	20	487
62712	61075	46700	363189	5348984	19.0	N	GLB	25	975	270	1.0	1.45	40	437
62711	61100	46700	363197	5348960	11.7		DG	15	255	3800	0.5	7.35	755	43
62710	61125	46700	363206	5348936	9.6		G	10	90	410	0.5	4.10	1250	60
62709	61150	46700	363214	5348913	4.0		GB	5	50	330		0.67	110	
62708	61175	46700	363222	5348889	0.8		G	10	40	85		0.94	180	50
62707	61200	46700	363230	5348866	0.8		DG	10	25	30		1.35	225	115
62706	61225	46700	363238	5348842	2.6		LBW	10	35	70		0.20	130	28
62705	61250	46700	363246	5348818	1.8		LG	5	110	135		0.13	170	28
62704	61275	46700	363254	5348795	1.6		GW	5	75	105		0.22	190	14
62703	61300	46700	363263	5348771	1.2		G	5	25	55		0.15	90	14
62702	61325	46700	363271	5348747	2.0		G	20	75	65		0.69	110	72
62701	61350	46700	363279	5348724	1.8		DG	10	30	30		1.55	370	56
62700	61375	46700	363287	5348700	1.2		DG	15	40	30		0.79	135	49
62699	61400	46700	363295	5348676	1.6		DG	15	25	25		0.59	135	47
62698	61425	46700	363303	5348653	3.7		DG	15	60	35		0.35	105	25
62697	61450	46700	363311	5348629	2.6		DG	10	20	25		0.49	100	30
62696	61475	46700	363320	5348606	3.1		LGW	15	45	75		0.33	300	34
62695	61500	46700	363328	5348582	5.8		LG	10	35	40		0.21	60	
62694	61525	46700	363336	5348558	10.1		WLYB	10	175	140		0.23	160	
62693	61550	46700	363344	5348535	4.8		DGW	15	40	125		0.32	120	
62692	61575	46700	363352	5348511	10.6		GLB	15	50	65		0.21	120	43
62691	61600	46700	363360	5348487	5.2		BLG	20	50	95		1.00	180	45
62690	61625	46700	363368	5348464	12.6		DGW	10	35	30		0.81	250	20
62689	61650	46700	363376	5348440	10.6		LBL	15	65	105		0.55	95	77
62688	61675	46700	363385	5348416	4.8		DB	25	440	60		0.43	10	225
62687	61700	46700	363393	5348393	3.8		NB	25	85	20		0.40	10	217
62462	60775	46900	363281	5349333	6.6	?	B	10	30	60		0.16	15	151
62461	60800	46900	363289	5349309	11.9	N	GB	60	14400	33300	16.5	5.62	20	331
62460	60825	46900	363297	5349285	13.2	Y	DG	10	25	565		1.32	180	64
62459	60850	46900	363305	5349262	11.8	Y	DG	10	8335	3610	1.0	2.37	190	25
62458	60875	46900	363313	5349238	3.5	Y	DG	10	20	115		0.59	90	26
62720	60900	46900	363321	5349214	1.3		DGW	10	35	460		0.54	155	65
62721	60925	46900	363330	5349191	2.3		DG	5	30	2250		0.67	120	63
62722	60950	46900	363338	5349167	16.4		LG	15	15	55		1.60	120	301
62723	60975	46900	363346	5349143	19.0	N	G	45	35	65	0.5	0.96	75	219
62724	61000	46900	363354	5349120	15.5		GB	15	35	420	0.5	2.40	170	226

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62725	61025	46900	363362	5349096	9.6	G	5	45	65	0.5	2.80	920	38
62726	61050	46900	363370	5349072	3.4	GLB	5	50	250		0.42	280	22
62727	61075	46900	363378	5349049	1.8	DG	5	50	80	0.5	0.52	100	14
62728	61100	46900	363387	5349025	1.0	DG	10	35	35		0.55	410	118
62729	61125	46900	363395	5349002	0.8	DG	10	30	30		1.75	255	56
62730	61150	46900	363403	5348978	1.8	DG	10	35	195		2.15	170	80
62731	61175	46900	363411	5348954	3.6	G	5	105	160		0.39	100	27
62732	61200	46900	363419	5348931	2.2	G	5	30	55		0.78	60	22
62733	61225	46900	363427	5348907	1.8	G	10	35	45		0.26	60	30
62734	61250	46900	363435	5348883	2.4	G	10	30	90		0.74	95	47
62735	61275	46900	363443	5348860	2.5	G	10	25	50		0.30	105	35
62736	61300	46900	363452	5348836	1.6	G	15	30	55		1.40	175	120
62737	61325	46900	363460	5348812	3.0	G	15	30	35	0.5	1.30	270	55
62738	61350	46900	363468	5348789	1.8	G	20	30	30	1.0	0.70	110	68
62739	61375	46900	363476	5348765	4.5	G	10	35	30	0.5	1.25	210	81
62740	61400	46900	363484	5348742	5.6	B	5	15	15	1.0	0.20	10	231
62741	61425	46900	363492	5348718	14.5	NB	15	50	130		1.95	350	181
62742	61450	46900	363500	5348694	2.0	B	10	15	15		0.14	5	98
62743	61475	46900	363509	5348671	9.6	DGB	40	215	335	0.5	0.55	10	342
62744	61500	46900	363517	5348647	6.7	BLB	20	45	30	0.5	0.27	5	287
62745	61525	46900	363525	5348623	5.4	BG	5	5	10		0.11	5	11
62777	60900	47000	363416	5349247	6.8	DG	10	30	65		0.65	70	76
62779	60925	47000	363424	5349223	3.8	GB	15	30	40		0.26	5	207
62780	60950	47000	363432	5349200	17.8	LBG	15	95	35	0.5	0.67	15	484
62781	60975	47000	363440	5349176	8.7	LG	10	30	30		0.61	20	507
62782	61000	47000	363449	5349152	1.8	G	10	40	300	0.5	0.71	435	14
62783	61025	47000	363457	5349129	1.6	G	15	40	55		1.95	535	31
60461	61050	47000	363465	5349105		DG	-5	25	-5		0.90	150	
60460	61075	47000	363473	5349081	1.5	G	-5	25	-5		0.65	75	
60459	61100	47000	363481	5349058	1.5	DG	-5	25	-5		0.50	125	
60458	61125	47000	363489	5349034	2.5	DGB	-5	25	25		1.05	225	
60457	61150	47000	363497	5349010	2.8	DG	-5	25	-5		0.78	50	
60456	61175	47000	363505	5348987	4.5	LG	-5	125	200		0.50	50	
60455	61200	47000	363514	5348963	3.6	DG	-5	125	225		1.43	50	
60454	61225	47000	363522	5348940	8.8	DG	-5	25	150		0.90		
60453	61250	47000	363530	5348916	2.6	DGL	-5	25	50		0.54	50	
62746	61275	47000	363538	5348892	2.6	G	5	40	85		0.34	75	22
62747	61300	47000	363546	5348869	7.0	G	10	40	60		0.38	50	13
62748	61325	47000	363554	5348845	12.8	LG	10	50	60		0.29	65	46
62749	61350	47000	363562	5348821	10.6	B	10	25	25		0.25	10	195

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62750	61375	47000	363571	5348798	11.4		G	15	30	100		0.55	145	94
62751	61400	47000	363579	5348774	6.2		G	10	10	10		0.12	5	26
62457	60700	47100	363445	5349469	3.6?		LB	20	20	135		0.29	25	314
62456	60725	47100	363454	5349445	5.2 Y		DG	1745	1185	300		3.12	30	411
62455	60750	47100	363462	5349421	7.8 Y		DG	10	30	205		3.27	600	46
62454	60775	47100	363470	5349398	3.0?		DG	5	30	245		0.35	145	22
62453	60800	47100	363478	5349374	12.3?		DG	15	25	175	0.5	0.47	85	19
62452	60825	47100	363486	5349350	1.6 Y		DG	15	15	110	0.5	0.90	150	79
62451	60850	47100	363494	5349327	6.8 Y		DG	5	10	30		0.25	75	11
62450	60875	47100	363502	5349303	3.6 Y		DG	20	70	150		0.74	100	76
62776	60900	47100	363511	5349279	6.6		LB	20	80	580	0.5	5.30	10	405
62775	60925	47100	363519	5349256	14.5		LG	10	45	41		0.60	15	518
62774	60950	47100	363527	5349232	8.8		LB	25	30	75	0.5	2.40	120	513
62773	60975	47100	363535	5349209	7.6		G	10	45	165		1.50	450	54
62772	61000	47100	363543	5349185	2.4		GW	5	50	165		0.34	170	38
62771	61025	47100	363551	5349161	1.8		LGW	5	50	85		0.17	60	17
62770	61050	47100	363559	5349138	1.8		G	10	35	75	0.5	1.45	230	78
62769	61075	47100	363567	5349114			G	15	45	25		1.50	115	39
62768	61100	47100	363576	5349090	2.6		G	10	35	45		0.47	85	36
62767	61125	47100	363584	5349067	2.0		G	10	205	1250		1.30	270	42
62766	61150	47100	363592	5349043	4.2		G	10	50	205		0.73	150	32
62765	61175	47100	363600	5349019	5.4		G	10	24500	195000	6.0	17.50	5750	23
62764	61200	47100	363608	5348996	2.3		G	5	45	220	0.5	0.77	155	33
62763	61225	47100	363616	5348972	12.2		G	10	30	130	0.5	0.55	115	27
62762	61250	47100	363624	5348948	6.3		G	5	30	285		0.28	55	14
62761	61275	47100	363633	5348925	2.6		GB	5	10	10		0.11	5	
62752	61300	47100	363641	5348901	3.1		B	10	15	10		0.13	5	
62753	61325	47100	363649	5348878	2.6		G	10	30	65		0.74	110	52
62754	61350	47100	363657	5348854	7.8		DB	20	45	115		0.62	10	253
62755	61375	47100	363665	5348830	14.0		BLB	60	100	145	0.5	1.60	15	305
62756	61400	47100	363673	5348807	7.8		G	5	25	70		0.36	100	17
62757	61425	47100	363681	5348783	4.6		G	15	25	45	0.5	0.32	60	11
62758	61450	47100	363690	5348759	6.8		BLB	10	15	30		0.28	5	160
62759	61475	47100	363698	5348736	5.6		LB	10	10	10		0.15	5	
62760	61500	47100	363706	5348712	9.8		GB	25	120	180	0.5	5.45	560	137
62786	60925	47200	363613	5349288	14.8		GDG	5	30	35		0.40	95	23
62787	60950	47200	363621	5349265	8.2		G	10	30	40		0.51	100	37
62788	60975	47200	363629	5349241	3.4		G	10	25	60	0.5	0.38	230	11
62789	61000	47200	363638	5349217	7.8		G	5	30	55	0.5	0.45	195	38
62790	61025	47200	363646	5349194	2.6		G	10	30	25		1.30	255	111

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60452	61050	47200	363654	5349170	1.5		G	-5	650	575		0.20	125	
60451	61075	47200	363662	5349147	4.5		DGL	-5	25	75		0.62	225	
60450	61100	47200	363670	5349123	1.5		DG	-5	25	25		0.23	25	
60449	61125	47200	363678	5349099	1.8		DG	-5	25	25		0.57	25	
60448	61150	47200	363686	5349076	2.5		LGW	-5	25	50		0.20	225	
60447	61175	47200	363695	5349052	3.2		LGW	-5	50	125		0.29	100	
60446	61200	47200	363703	5349028	3.2		GW	-5	25	25		0.44	100	
60445	61225	47200	363711	5349005	5.2		G	-5	25	425		0.68	25	
62438	61250	47200	363719	5348981	5.2	Y	DG	10	30	360		0.50	100	14
62437	61275	47200	363727	5348957	4.6	Y	DG	15	35	130		0.55	110	19
62436	61300	47200	363735	5348934	6.0	Y	DG	10	45	80		0.42	140	55
62435	61325	47200	363743	5348910	6.0	Y	G	20	180	835		0.38	175	90
62434	61350	47200	363752	5348887	2.0	Y	LG	30	20	80		1.27	140	110
62433	61375	47200	363760	5348863	6.7	Y	DG	10	25	1410		0.67	95	20
62432	61400	47200	363768	5348839	6.2	N	BG	5	15	65		0.25	5	62450
62449	60625	47300	363610	5349605	6.8	N	GW	5	20	5		0.47	15	526
62448	60650	47300	363618	5349581	5.6	Y	DG	45	7335	2795	15.5	0.52	5	329
62447	60675	47300	363626	5349557	7.8	?	DG	20	40	65		3.07	10	282
62446	60700	47300	363635	5349534	5.5	Y	DG	5	70	595		1.22	275	37
62445	60725	47300	363643	5349510	10.8	?	DG	15	45	155		1.42	195	139
62444	60750	47300	363651	5349486	1.4	Y	DG	10	10	45		0.55	75	42
62443	60775	47300	363659	5349463	5.8	Y	DG	10	10	40		1.22	170	105
62442	60800	47300	363667	5349439	6.0	Y	DG	15	25	245		0.36	115	35
62441	60825	47300	363675	5349415	6.5	Y	DG	15	35	360		1.87	385	112
62440	60850	47300	363683	5349392	11.7	?	DG	20	30	190		1.57	30	380
62439	60875	47300	363691	5349368	17.7	Y	DG	25	25	70		1.12	25	511
62791	60900	47300	363700	5349345	7.4		DG	10	160	100		0.60	180	27
62792	60925	47300	363708	5349321	1.5		DG	5	30	35	0.5	0.48	190	25
62793	60950	47300	363716	5349297	3.0		LG	15	30	180		0.55	120	29
62794	60975	47300	363724	5349274	11.0		LG	15	35	185	0.5	0.39	170	23
62795	61000	47300	363732	5349250	12.0		G	10	25	50		1.40	200	32
62796	61025	47300	363740	5349226	8.4		G	10	20	35		0.74	175	42
62797	61050	47300	363748	5349203	8.8		G	10	15	25		0.42	85	37
60326	61075	47300	363757	5349179	6.7		G	10	15	55		1.20	115	19
60327	61100	47300	363765	5349155	4.8		DG	10	20	40		0.54	75	23
60328	61125	47300	363773	5349132	9.9		DG	10	20	30		0.74	195	58
60329	61150	47300	363781	5349108	8.0		DG	15	30	225		1.95	470	66
60330	61175	47300	363789	5349085	4.0		DG	10	20	75		0.54	155	
60331	61200	47300	363797	5349061	3.6		DG	10	165	600		0.63	155	
60316	61225	47300	363805	5349037	3.5		G	10	25	180		0.75	105	48

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60317	61250	47300	363814	5349014	6.0		G	10	30	565		0.50	90	35
60334	61275	47300	363822	5348990	11.0		GNG	10	135	290		0.70	150	
60319	61300	47300	363830	5348966	8.0		GR	30	1650	4900	2.0	2.20	495	220
60320	61325	47300	363838	5348943	11.8		G	10	45	725	0.5	0.33	60	
60321	61350	47300	363846	5348919	2.8		G	15	50	165		0.53	105	10
60322	61375	47300	363854	5348895	6.8		DGW	10	50	185	1.0	1.40	210	40
60323	61400	47300	363862	5348872	3.5		RGB	10	5	15		0.17	5	23
60324	61425	47300	363871	5348848	3.6		DB	30	665	1750	1.5	2.36	100	233
60352	60900	47400	363938	5349378	17.8		LGW	10	5	25		0.12	345	
60351	60925	47400	363953	5349358	3.8		DGW	5	10	20		0.34	110	10
60350	60950	47400	363969	5349339	4.6		DGW	10	15	40		62.00	70	46
60349	60975	47400	363984	5349319	12.6		DGW	5	20	35		0.32	225	17
60348	61000	47400	363999	5349299	8.8		DGW	10	15	30		0.60	140	30
60347	61025	47400	364015	5349280	9.6		DG	20	15	40		1.50	120	113
60346	61050	47400	364030	5349260			DG	15	30	85		0.93	125	63
60345	61075	47400	364045	5349240	6.3		DG	15	20	25		1.35	130	71
60344	61100	47400	364061	5349220	16.6	N	DG	20	30	175		2.25	15	222
60343	61125	47400	364076	5349201	4.6	N	LG	20	-5	15		0.16	5	25
60342	61150	47400	364092	5349181	5.8		GNGB	40	70	635		1.55	5	248
60341	61175	47400	364107	5349161	2.8		LG	10	15	30		1.20	140	45
60340	61200	47400	364122	5349142	8.7		DGW	10	15	35		0.39	90	20
60339	61225	47400	364138	5349122	4.5		OFWB	10	5	10		0.15	10	35
60338	61250	47400	364153	5349102	3.6		DB	25	60	30		1.25	5	111
60337	61275	47400	364169	5349083	1.4		L	20	-5	15		0.13	5	
60336	61300	47400	364184	5349063	0.8		L	10	-5	10		0.14	10	
65111	61100	47500	364140	5349282	2.8	N	GW	-5	25	5		0.20	10	17
65112	61125	47500	364155	5349262	3.7	?	LB	-5	30	5		0.22	10	63
65113	61150	47500	364170	5349243	5.2	Y	BLB	10	75	280		9.52	10	137
65114	61175	47500	364186	5349223	7.5	Y	BLG	110	110	45		0.26	5	417
65115	61200	47500	364201	5349203	6.7	Y	BLB	-5	30	5		0.23	10	35
65116	61225	47500	364217	5349183	8.7	N	B	20	65	15		0.30	5	258
65118	61250	47500	364232	5349164	9.8	Y	NB	15	75	270		2.97	15	338
65119	61275	47500	364247	5349144	3.4	Y	DG	20	105	395		3.22	30	252
65120	61300	47500	364263	5349124	3.8	?	B	10	400	6200		4.17	5	132
61797	60550	47600	363880	5349777	8.8	?	B	65	410	30		0.43	5	419
61796	60575	47600	363895	5349757	4.0	Y	DG	5	40	70		1.12	185	57
61795	60600	47600	363911	5349738	11.2	Y	DG	5	1400	890		0.89	365	
61794	60625	47600	363926	5349718	6.5	Y	DG	5	615	2250		0.60	195	31
61793	60650	47600	363941	5349698	3.2	Y	DG	5	400	2550		0.75	170	63
61792	60675	47600	363957	5349678	5.8	Y	DG	5	30	85		0.64	140	36

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61791	60700	47600	363972	5349659	8.0 Y	DG	10	210	280		0.80	45	77
61790	60725	47600	363988	5349639	20.2 Y	DG	20	55	2550		3.17	15	383
61789	60750	47600	364003	5349619	8.4 Y	DG	5	325	970		4.97	5	156
61788	60775	47600	364018	5349600	7.8 Y	W	10	25	35		0.74	15	505
61787	60800	47600	364034	5349580	7.4 Y	G	5	40	170		0.74	100	54
61786	60825	47600	364049	5349560	3.0 Y	GW	5	40	240		2.17	125	29
61798	60850	47600	364065	5349541	5.1 Y	DG	5	45	650		1.27	240	47
61799	60875	47600	364080	5349521	9.2 Y	DG	10	30	25		0.80	100	73
61800	60900	47600	364095	5349501	9.6 Y	DG	5	35	25		0.72	95	53
65101	60925	47600	364111	5349481	5.7 Y	NG	-5	65	50		0.63	125	73
65102	60950	47600	364126	5349462	5.7 Y	G	-5	50	15		0.38	80	42
65103	60975	47600	364142	5349442	5.8 N	DG	15	60	135		2.32	25	289
65104	61000	47600	364157	5349422	1.8 Y	G	5	50	35		0.70	85	40
65105	61025	47600	364172	5349403	3.2 Y	G	5	45	20		0.81	115	70
65106	61050	47600	364188	5349383	4.8 Y	G	10	50	25		1.67	90	115
65107	61075	47600	364203	5349363	6.1 Y	G	-5	50	15		0.51	95	28
65108	61100	47600	364218	5349344	17.0 Y	G	5	45	15		1.67	175	49
65109	61125	47600	364234	5349324	6.1 Y	DB	15	60	40		0.55	10	249
65110	61150	47600	364249	5349304	4.5 Y	BLB	-5	30	5		0.19	10	39
65170	61175	47600	364265	5349284	9.3 Y	DB	10	50	140		2.02	10	233
65171	61200	47600	364280	5349265	2.3 Y	B	-5	35	10		0.32	20	123
65172	61225	47600	364295	5349245	1.6 N		-5	35	5		0.20	10	57
65173	61250	47600	364311	5349225	3.4 N		-5	30	5		0.40	20	39
65174	61275	47600	364326	5349206	3.2 N		-5	25	5		0.20	10	23
65175	61300	47600	364342	5349186	5.3 ?	B	20	1650	2100		1.22	5	120
65121	61100	47700	364297	5349405	10.2 Y	DHG	10	55	70		2.02	165	163
65122	61125	47700	364313	5349385	7.9 Y	DG	5	50	30		2.17	165	126
65163	61150	47700	364328	5349366	9.4 Y	G	5	50	50		1.27	100	80
65123	61175	47700	364343	5349346	6.1 Y	B	10	75	290		2.02	10	126
65124	61200	47700	364359	5349326	13.4 Y	G	5	45	35		1.67	230	97
65164	61225	47700	364374	5349307	2.8 N	L	-5	30	5		0.20	10	
65165	61250	47700	364390	5349287	6.3 Y	DB	10	90	1600		3.07	15	161
65166	61275	47700	364405	5349267	2.9 ?		-5	45	10		0.18	5	22
65167	61300	47700	364420	5349248	22.6 ?	DG	5	75	3700		16.37	5250	62
65168	61325	47700	364436	5349228	6.3 Y	G	-5	85	2000		3.22	1400	
65169	61350	47700	364451	5349208	9.2 Y	G	20	270	1100		3.87	35	238
65162	61100	47800	364376	5349467	8.2 Y	GW	-5	50	55		0.82	85	31
65161	61125	47800	364391	5349447	10.3 Y	GW	5	50	20		1.17	180	72
65160	61150	47800	364407	5349427	19.2 Y	DG	10	50	15		1.12	120	89
65159	61175	47800	364422	5349408	8.5 Y	B	15	55	25		1.87	10	165

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65158	61200	47800	364438	5349388	19.6	Y	DGB	- 5	40	30		1.37	330	69
65157	61225	47800	364453	5349368	16.8	Y	DGW	- 5	45	50		0.63	100	31
65156	61250	47800	364468	5349348	13.1	N	DB	15	90	730		4.77	15	210
65155	61275	47800	364484	5349329	5.3	Y	DBGN	5	85	1850		7.77	10	180
65154	61300	47800	364499	5349309	10.3	Y	DGW	5	55	2350		1.22	330	29
65150	61325	47800	364515	5349289	6.6	Y	DG	10	545	5350		11.57	3950	86
65151	61350	47800	364530	5349270	5.5	Y	DLG	45	1350	45000		3.47	35	344
65152	61375	47800	364545	5349250	1.7	Y	LL	- 5	35	45		0.22	30	
65153	61400	47800	364561	5349230	1.6	Y	L	- 5	45	130		0.20	10	
61785	60500	47900	364085	5350001	8.6	?	NB	25	390	20		0.26	5	182
61784	60525	47900	364101	5349981	7.0	?	DB	55	230	40		0.32	5	268
61783	60550	47900	364116	5349962	5.4	N	BT	5	15	10		0.16	5	31
61782	60575	47900	364132	5349942	8.4	N	GB	5	20	10		0.18	5	21
61781	60600	47900	364147	5349922	10.9	?	DG	5	100	590		1.77	125	55
61780	60625	47900	364162	5349903	9.1	Y	DG	20	30	1100		1.82	20	452
61779	60650	47900	364178	5349883	2.0	?	B	5	175	45		0.68	20	353
61778	60675	47900	364193	5349863	6.8	Y	LG	10	25	70		1.17	25	408
61777	60700	47900	364209	5349843	10.9	?	DG	5	225	8300		0.85	115	18
61776	60725	47900	364224	5349824	5.1	Y	DG	5	35	50		0.35	75	12
61775	60750	47900	364239	5349804	4.9	Y	G	10	90	120		0.61	65	47
61774	60775	47900	364255	5349784	4.3	Y	G	40	130	345		3.62	85	293
65125	60800	47900	364270	5349765	20.5	Y	GW	5	70	50		1.92	300	97
65126	60825	47900	364286	5349745	4.3	Y	GW	5	45	40		0.65	150	59
65127	60850	47900	364301	5349725	5.2	Y	GW	5	50	10		0.83	105	41
65128	60875	47900	364316	5349706	5.6	Y	DG	5	55	15		0.94	165	84
65129	60900	47900	364332	5349686	10.0	Y	GW	- 5	60	45		0.38	65	19
65130	60925	47900	364347	5349666	11.6	Y	G	- 5	40	15		0.63	100	24
65131	60950	47900	364363	5349646	3.2	Y	G	- 5	55	35		0.35	75	18
65132	60975	47900	364378	5349627	3.2	Y	DGW	5	50	20		1.02	80	35
65133	61000	47900	364393	5349607	2.8	Y	GW	- 5	45	10		1.22	165	29
65134	61025	47900	364409	5349587	1.4	Y	LGW	10	45	15		0.50	100	41
65135	61050	47900	364424	5349568	1.4	Y	G	5	45	10		0.85	160	50
65136	61075	47900	364439	5349548	7.6	Y	DG	- 5	50	30		2.17	65	20
65137	61100	47900	364455	5349528	7.4	Y	LGW	5	45	20		0.42	220	13
65138	61125	47900	364470	5349509	9.6	Y	LGW	- 5	50	10		1.62	75	
65139	61150	47900	364486	5349489	8.2	Y	LG	5	50	15		1.37	75	23
65140	61175	47900	364501	5349469	10.0	Y	DGB	- 5	55	25		0.97	90	28
65141	61200	47900	364516	5349449	7.0	Y	DG	5	55	145		2.57	100	46
65142	61225	47900	364532	5349430	5.2	Y	LGW	- 5	50	80		0.67	100	15
65143	61250	47900	364547	5349410	3.6	Y	DBG	5	50	80		0.56	10	149

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65144	61275	47900	364563	5349390	2.8	Y	DBG	15	170	110		0.80	20	237
65145	61300	47900	364578	5349371	2.3	Y	DBG	10	85	660		0.43	10	216
65146	61325	47900	364593	5349351	0.3	Y	BLB	-5	765	8850		3.17	1150	67
65147	61350	47900	364609	5349331	2.8	Y	GLB	-5	110	2300		0.55	380	
65148	61375	47900	364624	5349312	6.6	Y	DG	10	2150	3750		2.92	50	173
65149	61400	47900	364640	5349292	2.3	Y	DG	25	1550	1250		1.62	15	175
61748	60200	48200	364137	5350422	4.5	Y	DG	-5	25	20		0.21	55	10
61747	60225	48200	364153	5350402	3.4	Y	G	-5	85	130		0.07	40	
61746	60250	48200	364168	5350383	3.0	Y	DG	5	25	55		0.39	285	27
61745	60275	48200	364183	5350363	2.8	Y	WG	5	25	20		1.22	280	162
61744	60300	48200	364199	5350343	3.2	Y	G	-5	20	30		0.38	165	23
61743	60325	48200	364214	5350324	8.7	Y	G	-5	25	50		0.93	370	57
61742	60350	48200	364230	5350304	6.9	Y	G	-5	25	35		0.34	100	
61741	60375	48200	364245	5350284	5.1	N	B	-5	5	10		0.19	5	22
61740	60400	48200	364260	5350265	1.6	Y	CKG	20	45	25		0.78	15	330
61739	60425	48200	364276	5350245	4.4	?	BFN	10	100	550		10.87	10	237
61738	60450	48200	364291	5350225	5.0	Y	LG	45	40	45		0.70	10	447
61737	60475	48200	364306	5350205	1.7	Y	LTHG	10	45	30		1.87	15	502
61736	60500	48200	364322	5350186	8.6	?	W	-5	75	290		0.17	190	18
61735	60525	48200	364337	5350166	3.0	Y	DG	-5	50	30		0.34	85	16
61749	60550	48200	364353	5350146	4.3	Y	DG	-5	15	20		0.77	95	55
61750	60575	48200	364368	5350127	1.6	Y	GW	5	15	15		0.19	50	
61751	60600	48200	364383	5350107	1.4	Y	DG	5	20	40		1.62	90	114
61752	60625	48200	364399	5350087	2.6	Y	DG	10	30	20		0.55	90	44
61753	60650	48200	364414	5350068	2.9	Y	LG	5	30	25		0.64	65	32
61754	60675	48200	364430	5350048	3.4	Y	DG	5	35	60		1.27	170	85
61755	60700	48200	364445	5350028	4.9	Y	DG	5	35	65		1.97	205	14
61756	60725	48200	364460	5350008	10.6	Y	DG	-5	25	25		1.12	105	38
61757	60750	48200	364476	5349989	5.1	Y	GW	-5	25	30		0.45	85	24
61758	60775	48200	364491	5349969	3.7	Y	GW	15	100	200		1.42	130	80
61759	60800	48200	364507	5349949	4.1	Y	GW	5	220	115		0.71	155	22
61760	60825	48200	364522	5349930	5.2	Y	LG	5	35	35		0.84	110	51
61761	60850	48200	364537	5349910	5.8	Y	WG	5	25	15		0.45	95	31
61762	60875	48200	364553	5349890	2.9	Y	G	5	35	30		0.91	105	38
61763	60900	48200	364568	5349871	3.2	Y	GW	-5	25	20		0.39	65	13
61764	60925	48200	364584	5349851	1.7	Y	GW	-5	30	25		0.69	140	50
61765	60950	48200	364599	5349831	3.0	Y	G	-5	25	20		0.82	85	39
61766	60975	48200	364614	5349811	6.1	Y	LG	5	30	35		0.89	90	61
61767	61000	48200	364630	5349792	10.8	Y	G	-5	30	210		1.37	90	31
61768	61025	48200	364645	5349772	4.6	Y	GW	-5	35	95		0.53	130	52

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61769	61050	48200	364660	5349752	21.3	Y	LG	5	45	270		1.17	155	29
61770	61075	48200	364676	5349733	6.3	Y	GW	-5	45	270		0.43	125	21
61771	61100	48200	364691	5349713	6.1	Y	G	5	75	1350		0.50	75	23
61772	61150	48200	364722	5349674	9.0	?	DG	25	720	29500		8.57	1400	270
61773	61175	48200	364737	5349654	6.4	Y	LB	30	290	310		0.31	10	146
60462	60600	48400	364753	5349634	3.2		G	-5	50	150		0.94	325	
60463	60625	48400	364556	5350210	4.7		N	-5	25	-5		0.38		
60464	60650	48400	364572	5350191	5.2		DGW	-5	25	50		0.64	258	
60465	60675	48400	364587	5350171	3.3		G	-5	25	25		0.99	100	
60466	60700	48400	364603	5350151	6.0		LB	-5	25	25		0.50	125	
60467	60725	48400	364618	5350132	6.2		DG	-5	25	25		0.42	100	
60468	60750	48400	364633	5350112	12.5		DG	-5	175	325		0.58	50	
60469	60775	48400	364649	5350092	9.0		LG	-5	50	125		0.44	50	
60470	60800	48400	364664	5350072	4.8	N	DG	-5	25	75		1.28		
60471	60825	48400	364680	5350053	11.2		DG	-5	3700	700		6.84	25	
60472	60850	48400	364695	5350033	14.6		DGB	-5	75	50		1.05	150	
60473	60875	48400	364710	5350013	4.8		G	-5	25	25		0.92	100	
60474	60900	48400	364726	5349994	2.5		GNG	-5	50	25		0.92	125	
60475	60925	48400	364741	5349974	1.8		DG	-5	25	254		0.66	125	
60476	60950	48400	364757	5349954	4.8		DG	-5	25	25		1.07	150	
60477	60975	48400	364772	5349935	9.4		DG	-5	100	125		1.79	100	
60478	61000	48400	364787	5349915	6.4		G	25	25	225		1.73	100	
60479	61025	48400	364803	5349895	15.2		DG	-5	50	25		0.12	100	
60480	61050	48400	364818	5349875	10.6		LG	-5	25	50		0.19	100	
60481	61075	48400	364833	5349856	10.6		LGB	-5	25	675		2.73	1275	
60482	61100	48400	364849	5349836	11.8		LGB	-5	50	650		0.66	300	
60483	61125	48400	364864	5349816	9.0		LYB	-5	75	550		0.46	250	
60484	61150	48400	364880	5349797	7.5		G	-5	50	700		0.66	25	
64810	60225	48600	364173	5350416	10.4	Y	DGW	5	15	-5		0.63	110	20
64809	60250	48600	364198	5350416	8.5	Y	BG	25	280	275		4.03	25	330
64812	60275	48600	364223	5350417	15.4	Y	G	5	20	15		0.30	90	
64813	60300	48600	364248	5350417	11.1	Y	G	5	20	10		0.53	110	35
64814	60325	48600	364273	5350417	7.4	Y	GW	5	20	15		0.60	80	
64815	60350	48600	364298	5350418	35.7	Y	LG	10	20	35		0.68	105	60
64816	60375	48600	364323	5350418	19.4	Y	GLB	10	60	175		0.87	15	490
64817	60400	48600	364348	5350419	0.7	Y	GB	15	15	170		4.13	10	460
67377	60425	48600	364373	5350419	7.8	Y	DGWG	5	645	455		0.25	80	
67378	60450	48600	364398	5350420	9.2	Y	LGW	10	30	90		0.29	95	
67379	60475	48600	364423	5350420	11.2	Y	DGW	5	50	160		0.53	70	
67380	60500	48600	364448	5350420	8.9	Y	DG	10	10	-5		0.93	185	40

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67381	60525	48600	364473	5350421	12.7 Y	G	5	15	- 5	0.40	80	70
67382	60550	48600	364498	5350421	5.8 Y	GW	5	15	- 5	0.45	105	
67383	60575	48600	364523	5350422	5.0 Y	DGW	5	15	35	0.59	60	
67384	60600	48600	364548	5350422	5.3 Y	DGW	15	20	30	0.61	120	
67385	60625	48600	364573	5350423	7.5 Y	G	5	10	- 5	0.72	70	
67386	60650	48600	364598	5350423	2.9 Y	G	10	20	- 5	0.67	100	60
67387	60675	48600	364623	5350424	9.0 Y	DGW	10	20	20	1.23	315	
67388	60700	48600	364648	5350424	13.7 Y	GW	5	20	- 5	0.34	70	
67389	60725	48600	364673	5350424	8.7 Y	G	5	20	- 5	0.63	100	
67390	60750	48600	364698	5350425	11.7 Y	GW	10	20	25	0.64	100	
67391	60775	48600	364723	5350425	14.6 Y	G	5	10	- 5	0.72	105	
67392	60800	48600	364748	5350426	3.5 Y	GW	5	10	5	0.49	110	
67393	60825	48600	364773	5350426	14.2 ?	DB	15	10	- 5	2.28	10	170
67394	60850	48600	364798	5350427	13.8 Y	G	5	15	- 5	0.59	180	
64808	60150	48800	364094	5350614	13.1 ?	N	20	100	45	2.03	20	350
64807	60175	48800	364119	5350615	17.0 ?	GW	70	155	110	0.64	20	330
64806	60200	48800	364144	5350615	25.2 Y	GW	5	15	30	0.33	50	
64805	60225	48800	364169	5350616	4.7 Y	WG	5	30	130	0.24	75	
64804	60250	48800	364194	5350616	19.4 Y	GW	5	20	10	0.42	85	
64803	60275	48800	364219	5350616	4.3 Y	GW	5	15	35	0.54	110	
64802	60300	48800	364244	5350617	7.7 Y	G	10	154	25	1.08	90	140
64801	60325	48800	364269	5350617	15.4 Y	LGW	5	10	1350	0.66	85	25
64580	60350	48800	364294	5350618	11.4 Y	G	10	10	5	0.95	15	470
64579	60375	48800	364319	5350618	11.7 Y	LGW	5	40	200	0.29	85	
64513	60400	48800	364344	5350619	2.9 Y	GW	- 5	15	- 5	0.20	55	
64512	60425	48800	364369	5350619	1.0 Y	KTG	5	20	- 5	0.20	65	
64511	60450	48800	364394	5350620	12.8 Y	DG	5	15	- 5	1.13	110	350
64510	60475	48800	364419	5350620	1.0 Y	DG	5	20	35	0.35	105	
64509	60500	48800	364444	5350620	1.1 Y	LG	10	20	- 5	0.89	110	110
64508	60525	48800	364469	5350621	1.1 Y	GW	5	45	35	0.30	60	
64507	60550	48800	364494	5350621	7.4 Y	GW	- 5	20	- 5	0.49	120	
64506	60575	48800	364519	5350622	1.2 Y	G	5	30	- 5	2.78	580	
64505	60600	48800	364544	5350622	3.6 Y	G	5	20	10	0.93	170	35
64504	60625	48800	364569	5350623	2.0 Y	G	5	25	280	0.65	165	
64503	60650	48800	364594	5350623	6.0 Y	DG	5	20	1300	0.69	105	35
67395	60675	48800	364619	5350623	9.5 Y	GW	5	10	- 5	0.63	150	20
67396	60700	48800	364644	5350624	23.2 Y	G	5	10	- 5	0.43	140	35
67397	60725	48800	364669	5350624	23.8 ?		5	80	- 5	1.78	90	40
67398	60750	48800	364694	5350625	3.8 Y	LG	5	10	80	0.29	100	
67399	60775	48800	364719	5350625	6.2 Y	GW	5	10	80	0.47	330	

APPENDIX 3: AMOCO-EZ OPEN-FILE WACKER GEOCHEMISTRY.

67400	60800	48800	364744	5350626	13.7	Y	GW	35	30	20	0.90	335	1100
64501	60825	48800	364769	5350626	13.2	Y	GW	10	110	15	2.43	750	
64502	60850	48800	364794	5350627	9.2	Y	CRB	-5	25	485	1.58	650	
64566	60100	49000	364041	5350813	15.6	?	G	25	60	530	1.63	25	750
64568	60125	49000	364066	5350814	9.4	Y	G	5	20	-5	1.38	180	
64569	60150	49000	364091	5350814	6.0	Y	GW	5	20	75	0.31	70	
64570	60175	49000	364116	5350815	4.4	Y	G	5	10	-5	0.25	65	
64571	60200	49000	364141	5350815	12.7	Y	GW	5	15	20	1.48	220	
64572	60225	49000	364166	5350816	7.9	Y	GW	5	15	30	0.47	105	
64573	60250	49000	364191	5350816	31.4	Y	LG	20	20	25	0.98	15	430
64574	60275	49000	364216	5350816	7.0	Y	G	10	20	120	1.63	15	430
64575	60300	49000	364241	5350817	21.4	Y	GW	5	15	30	0.32	85	
64576	60325	49000	364266	5350817	4.5	Y	GW	5	45	40	0.66	120	
64577	60350	49000	364291	5350818	1.4	Y	LG	10	15	35	0.30	65	20
64578	60375	49000	364316	5350818	11.5	Y	DG	5	10	-5	1.23	145	160
64514	60400	49000	364341	5350819	5.8	Y	DG	5	20	-5	0.89	140	80
64515	60425	49000	364366	5350819	5.2	Y	DG	5	20	-5	0.69	95	55
64516	60450	49000	364391	5350820	1.5	Y	DG	5	20	-5	0.48	85	
64517	60475	49000	364416	5350820	5.3	Y	GW	5	20	-5	0.86	125	30
64518	60500	49000	364441	5350820	1.0	Y	GW	5	10	-5	0.90	170	
64519	60525	49000	364466	5350821	2.0	Y	G	5	20	-5	0.89	125	20
64520	60550	49000	364491	5350821	1.6	Y	G	5	15	-5	0.68	105	40
64521	60575	49000	364516	5350822	1.0	Y	G	5	20	-5	0.48	85	25
64522	60600	49000	364541	5350822	2.5	Y	LGW	5	10	-5	0.29	75	
64523	60625	49000	364566	5350823	13.7	Y	DG	5	75	-5	1.18	215	40
64524	60650	49000	364591	5350823	1.4	Y	W	10	30	15	0.30	170	60
64525	60675	49000	364616	5350823	1.0	Y	LGB	5	25	50	0.68	245	
64526	60700	49000	364641	5350824	1.1	Y	G	10	50	105	0.81	110	85
64527	60725	49000	364666	5350824	3.2	Y	N	10	325	135	2.53	660	80
64529	60750	49000	364691	5350825	3.8	Y	N	20	145	460	3.08	290	90
64530	60775	49000	364716	5350825	2.0	Y	LBG	15	515	710	0.98	425	
64531	60800	49000	364741	5350826	2.0	N		5	-5	-5	0.11	10	

APPENDIX 4

CRAE AIR-CORE DRILLING LOCATION DATA AND DOWNHOLE LOGS

APPENDIX 4: GRIEVES PROSPECT AIR-CORE DRILLHOLE COLLAR DATA						
HOLE ZG-	LOCALE	LOCALN	AMGE	AMGN	TOTAL DEPTH	CLAY THICKNESS
1	61250	47000	363530	5348916	0.9	0
2	61275	47000	363538	5348892	1.2	0
3	61300	47000	363546	5348869	6.1	4
4	61325	47000	363554	5348845	5.8	4
5	61350	47000	363562	5348821	11.0	8
6	61375	47000	363571	5348798	16.0	6
7	61400	47000	363579	5348774	13.0	4
8	61425	47000	363587	5348750	15.0	1
9	61375	47100	363665	5348830	17.0	12
10	61400	47100	363673	5348807	7.4	5.5
11	61425	47100	363681	5348783	4.0	1
12	61350	47100	363657	5348854	14.0	13
13	61325	47100	363649	5348878	7.0	5
14	61300	47100	363641	5348901	15.5	10
15	61500	47100	363706	5348712	18.0	8
16	61475	47200	363792	5348769	15.0	5
17	61450	47200	363784	5348792	8.0	7
18	61425	47200	363776	5348816	10.0	6
19	61400	47200	363768	5348839	10.0	2
20	61375	47200	363760	5348863	7.0	4
21	61350	47200	363752	5348887	2.5	0
22	61325	47200	363743	5348910	6.0	2
23	61300	47200	363735	5348934	6.0	4
24	61275	47200	363727	5348957	4.5	2
25	61250	47200	363719	5348981	3.5	0.5
26	61225	47200	363711	5349005	4.5	2.5
27	61200	47200	363703	5349028	3.0	1.5
28	61175	47200	363695	5349052	3.0	1
29	61150	47200	363686	5349076	2.5	0
30	61125	47200	363678	5349099	2.1	0
31	61100	47200	363670	5349123	1.8	0
32	61075	47120	363586	5349120	2.3	0.5
33	61100	47120	363595	5349097	1.8	0
34	61125	47120	363603	5349073	2.2	0
35	61150	47120	363611	5349050	3.0	1
36	61175	47120	363619	5349026	12.2	10
37	61200	47110	363618	5348999	3.0	1
38	61225	47100	363616	5348972	9.0	7
39	61250	47100	363624	5348948	7.5	5.5
40	61275	47100	363633	5348925	9.8	8
41	61100	47700	364297	5349405	21.3	14
42	61075	47700	364282	5349425	19.5	19.5
43	61050	47700	364267	5349445	13.5	9
44	61125	47700	364313	5349385	9.0	6
45	61150	47700	364328	5349366	18.5	16
46	61175	47700	364343	5349346	15.0	10
47	61200	47700	364359	5349326	16.5	13
48	61225	47700	364374	5349307	0.0	0
49	61250	47700	364390	5349287	15.8	12
50	61275	47700	364405	5349267	20.0	16
51	61300	47700	364420	5349248	54.0	26



## ROCKCHIP AND DRILLING CODES

17/2/93

## BMRLITH

Rock code as per published geological map  
For time designation use:-

Q	Quaternary	M	Permian	P	Proterozoic
T	Tertiary	C	Carboniferous	A	Archaean
		S	Silurian		
K	Cretaceous	D	Devonian		
R	Triassic	O	Ordovician		
J	Jurassic	E	Cambrian		

## FIELD ID

Field term for rock type  
Broad groupings are:-

S	Sedimentary	I	Intrusive	C	Surficial
M	Metamorphic	E	Extrusive	O	Others

## SEDIMENTARY

Scg	Conglomerate	Slc	Limestone
Sss	Sandstone	Sch	Chert
Ssi	Siltstone	Sif	BIF
Ssh	Shale		
Sbs	Black shale	Sbx	Breccia

## METAMORPHIC

Msl	Slate	Mq	Quartzite	Mmg	Migmatite
Mph	Phyllite	Mm	Marble		
Msc	Schist	Ma	Amphibolite	Msk	Skarn
Mbs	Graphitic schist	Mcs	Calcsilicate		
Mgn	Gneiss	Mh	Hornfels		

## INTRUSIVE IGNEOUS

Ii	Felsic undiff.	Ii	Intermed undiff.	Iu	Ultramafic
Iip	Felsic porphyry	Iip	Intermed porph.	Ius	Serpentinite
Iap	Aplite	Im	Mafic undiff.	Ipg	Pegmatite
Igr	Granite	Ido	Dolerite		
Igd	Granodiorite	Igb	Gabbro		

## EXTRUSIVE IGNEOUS

Ery	Rhyolite	Ean	Andesite	Et	Tuff undiff
Edc	Dacite	Eb	Basalt	Eft	Felsic tuff
				Emt	Mafic tuff

## SURFICIAL (COVER) MATERIAL

Ca	Alluvium	Clt	Laterite	Csg	Gossan
Coo	Colluvium	Csp	Pisolites	Ccy	Clay
Cs	Sand	Csf	Ironstone	Cv	Vegetation/peat
Cbs	Black soil	Csi	Silcrete		
Cg	Gravel	Ccl	Calcrete		

## OTHERS

Ovq	Vein quartz	Omy	Mylonite	Oms	Massive sulphide
Ovc	Vein carbonate	Obx	Breccia	Ox	Unknown
Ovs	Vein sulphide	Oif	Fault gouge		

## TEXTURAL CODES

## WEATHERING/SURFICIAL FEATURES

We	Weathered	Fe	Ferruginous
Bl	Bleached	Fo	Fe ox in fract
Le	Leached		

## MINERALISATION/ALTERATION FEATURES

Gs	Gossanous	Vs	Vein sulphide	Al	Altered
Vn	Veined	De	Dissem sulph	Sl	Silicified
Di	Disseminated	Fs	Fracture sulph		
		Bs	Banded sulph		

## GEOLOGICAL FEATURES

Bd	Bedded	Fr	Fractured	Po	Porphyritic
Bn	Banded	Ib	Interbedded	Sc	Schistose
Bx	Brecciated	Lm	Laminated	Sh	Sheared
Fi	Fissile (slatey)	Ma	Massive	Vu	Vuggy

## DIAGNOSTIC MINERALOGY

## PRIMARY MINERALISATION

Ga	Galena	Py	Pyrite	Ni	Ni sulphides
Sp	Sphalerite	Po	Pyrrhotite		
Cp	Chalcopyrite	Su	Unknown sulph		

## SECONDARY MINERALISATION

Ls	Lead secondaries	Cs	Copper sec.	Ni	Ni secondaries
Zs	Zinc "	Us	Uranium "		

## ALTERATION/DIAGNOSTIC MINERALS

Cy	Clay	Ha	Haematite	Gt	Garnet
Ep	Epidote	Mt	Magnetite	Ky	Kyanite
Cc	Carbonate	Js	Jarosite	To	Tourmaline
Sd	Siderite	Mn	Manganese mins		

## COLOUR CODES

L	Light	A	Banded	M	Mottled
D	Dark				
N	Black	P	Purple	V	Green
G	Grey	R	Red	K	Pink
B	Brown	O	Orange	E	Blue
W	White	Y	Yellow	S	Silver

APPENDIX 4: AIR-CORE DRILLHOLE GEOLOGICAL LOGS									
HOLE	DFROM	DTO	SAMPNO	BMRLITH	FIELDID	TEXTURE	ALT/MIN	COLOUR	COMMENTS
ZG1	0.0	0.9	3523301	Og	Sls			DG	
ZG2	0.0	1.2	3523302	OhaOg	CvCgSls			DG	
ZG3	0.0	2.0	3523303	Oha	CvCcy			B	
ZG3	2.0	4.0	3523304	Og	Ccy			DGB	
ZG3	4.0	6.1	3523305	Og	Ccy			DGB	EOH in cc veined lst.
ZG4	0.0	2.0	3523306	Oha	CvCg			LB	
ZG4	2.0	4.0	3523307	Og	Sls	We	Cy	LBG	
ZG4	4.0	5.8	3523308	Og	Sls	We	Cy	DG	EOH in cc veined lst.
ZG5	0.0	2.0	3523309	Oha	CvCg			LB	
ZG5	2.0	4.0	3523310	OhaOg	CgCcy			LBDG	
ZG5	4.0	6.0	3523311	Og	Sls	We	Cy	DB	
ZG5	6.0	8.0	3523312	Og	Sls	WeDs	CyPy	DG	
ZG5	8.0	10.0	3523313	Og	Sls	WeDs	CyPy	DG	
ZG5	10.0	11.0	3523314	Og	Sls	WeDs	CyPy	DG	EOH in LGB lst.
ZG6	0.0	2.0	3523315	Oha	CvCcy			N	
ZG6	2.0	4.0	3523316	OhaOg	CgCcy			LBN	
ZG6	4.0	6.0	3523317	OhaOg	CgCcy			LBN	
ZG6	6.0	8.0	3523318	Og	Sls	WeDs	Py	DG	
ZG6	8.0	10.0	3523319	Og	Sls	We	Cy	DG	
ZG6	10.0	12.0	3523320	Og	Sls	WeDs	Py	DG	
ZG6	12.0	14.0	3523321	Og	Sls	Vu		LG	
ZG6	14.0	16.0	3523322	Og	Sls			G	
ZG7	0.0	2.0	3523323	Oha	Cg			LBK	
ZG7	2.0	4.0	3523324	Oha	Cg			LBK	
ZG7	4.0	6.0	3523325	Oha	Cg			LBK	
ZG7	6.0	8.0	3523326	Oha	Cg			LBK	
ZG7	8.0	10.0	3523327	OhaOg	CgSls	We		LBKB	
ZG7	10.0	12.0	3523328	Og	Sls	We	Cy	B	
ZG7	12.0	13.0	3523329	Og	Sls			G	
ZG8	0.0	10.0	3523330	Oha	Cg			LK	
ZG8	10.0	12.0	3523331	Oha	CgCcy			LKB	
ZG8	12.0	14.0	3523332	OgOha	CcySlsCg	We		DGN	
ZG8	14.0	15.0	3523333	Og	Sls			G	
ZG9	0.0	2.0	3523334	Oha	Cg			LK	
ZG9	2.0	4.0	3523335	Og	Ccy			B	
ZG9	4.0	6.0	3523336	Og	CcySls			BDG	
ZG9	6.0	8.0	3523337	Og	Sls	We	Cy	DG	
ZG9	8.0	12.0	3523338	Og	SlsOx	We	Cy	DG	Cavity ~2m.
ZG9	12.0	14.0	3523339	Og	Sls	We	Cy	DG	
ZG9	14.0	16.0	3523340	Og	Sls	Ds	Py	DG	
ZG9	16.0	17.0	3523341	Og	Sls	Ds	Py	DG	
ZG10	0.0	2.0	3523342	Oha	Cg			LK	
ZG10	2.0	4.0	3523343	Og	Ccy			DBN	
ZG10	4.0	6.0	3523344	Og	Ccy			N	
ZG10	6.0	7.4	3523345	Og	Sls	We	Cy	N	
ZG11	0.0	2.0	3523346	Oha	Cg			LK	
ZG11	2.0	4.0	3523347	OhaOg	CgCcy			LKDG	
ZG12	0.0	2.0	3523348	OhaOg	CgCcy			LKN	
ZG12	2.0	4.0	3523349	Og	Ccy			DB	
ZG12	4.0	6.0	3523350	Og	Ccy			DB	
ZG12	6.0	8.0	3523351	Og	Ccy			DBG	
ZG12	8.0	10.0	3523352	Og	Ccy			DEG	
ZG12	10.0	12.0	3523353	Og	Ccy			DBG	
ZG12	12.0	14.0	3523354	Og	CcySls			DEG	EOH in fresh lst
ZG13	0.0	2.0	3523355	Oha	Cg			LK	
ZG13	2.0	4.0	3523356	Og	Ccy			DB	
ZG13	4.0	6.0	3523357	Og	Ccy			DBG	
ZG13	6.0	7.0	3523358	Og	Ccy			DG	EOH in DG fine g/s lst
ZG15	0.0	2.0	3523359	Oha	Cg			LK	
ZG15	2.0	4.0	3523360	Oha	Cg			LK	

ZG15	4.0	6.0	3523361	Og	Ccy					DG	
ZG15	6.0	8.0	3523362	Og	Ccy					DGB	
ZG15	8.0	10.0	3523363	OgOm	CcyMa					GB	
ZG15	10.0	12.0	3523364	Og	CcySls					DBG	
ZG15	12.0	14.0	3523365	Og	Sls					DGB	
ZG15	14.0	16.0	3523366	Og	Sls					DG	
ZG15	16.0	18.0	3523367	Og	Sls					DG	
ZG16	0.0	2.0	3523368	Oha	CvCg					BLK	
ZG16	2.0	3.0	3523369	Oha	Cg					LK	
ZG16	3.0	4.0	3523369	Og	Ccy					GB	
ZG16	4.0	6.0	3523370	Og	Ccy					GB	
ZG16	6.0	8.0	3523371	Og	Ccy					GB	
ZG16	8.0	10.0	3523372	Og	Sls					DB	Fossiliferous muddy lst
ZG16	10.0	12.0	3523373	Og	Sls					DB	Fossiliferous muddy lst
ZG16	12.0	14.0	3523374	Og	Sls						Oolitic lst
ZG16	14.0	15.0	3523375	Og	Sls						Oolitic lst
ZG17	0.0	2.0	3523376	Og	Ccy					B	
ZG17	2.0	4.0	3523377	Og	Ccy					GB	
ZG17	4.0	6.0	3523378	Og	Ccy					GB	
ZG17	6.0	8.0	3523379	Og	CcySls					GN	
ZG18	0.0	2.0	3523380	Oha	CvCg					BLK	
ZG18	2.0	4.0	3523381	Og	Ccy					DGB	
ZG18	4.0	6.0	3523382	Og	Ccy					DGB	
ZG18	6.0	8.0	3523383	Og	Ccy					DGB	
ZG18	8.0	10.0	3523384	Og	Sls					N	
ZG19	0.0	2.0	3523385	Oha	Cg					LK	
ZG19	2.0	4.0	3523386	Oha	Cg					LK	
ZG19	4.0	6.0	3523387	Og	Sls	We	Cy			B	Fossiliferous
ZG19	6.0	8.0	3523388	Og	Sls	Vn	Cc			DG	Fossiliferous
ZG19	8.0	10.0	3523389	Og	Sls						
ZG20	0.0	2.0	3523390	Oha	Cg					LK	
ZG20	2.0	4.0	3523391	Og	Ccy					GB	
ZG20	4.0	6.0	3523392	Og	Ccy					GB	
ZG20	6.0	7.0	3523393	Og	Sls	Ds	Py			KN	
ZG21	0.0	2.0	3523394	Oha	Cg					LK	
ZG21	2.0	2.5	3523395	Og	Sls					EK	
ZG22	0.0	2.0	3523396	Oha	CvCg					BLK	
ZG22	2.0	4.0	3523397	Og	CcySls	We				GB	
ZG22	4.0	6.0	3523398	Og	Sls					KN	
ZG23	0.0	2.0	3523399	Oha	CvCg					DBLK	
ZG23	2.0	4.0	3523400	Og	Ccy					DB	
ZG23	4.0	6.0	3523401	Og	Sls	We	Cy			DG	EOH in G lst
ZG24	0.0	2.0	3523402	Oha	Cg					LK	
ZG24	2.0	4.0	3523403	OhaOg	CgCcy					LKB	
ZG24	4.0	4.5	3523404	Og	Sls					G	Oolitic lst
ZG25	0.0	2.0	3523405	Oha	Cg					LK	
ZG25	2.0	3.5	3523406	OhaOg	CgCcySls						EOH in G fine g/s lst
ZG26	0.0	2.0	3523407	Oha	Cg					LK	
ZG26	2.0	4.0	3523408	Og	Ccy					N	
ZG26	4.0	4.5	3523409	Og	Ccy					N	EOH in LG fine g/s lst
ZG27	0.0	2.0	3523410	OhaOg	CgCcy					LKN	
ZG27	2.0	3.0	3523411	Og	Ccy					N	EOH in cc veined fine g/s lst. Caving gravels
ZG28	0.0	2.0	3523412	Oha	Cg					LK	
ZG28	2.0	3.0	3523413	Og	Ccy					DGN	EOH in G fine g/s lst
ZG29	0.0	2.0	3523414	Oha	CvCgCs						
ZG29	2.0	2.5	3523415	Og	Sls					LB	
ZG30	0.0	2.0	3523416	Oha	CvCgCs						
ZG30	2.0	2.1	3523417	Og	Sls					DG	
ZG31	0.0	1.7	3523418	OhaOg	CvCgCcySls						
ZG31	1.7	1.8	3523419	Og	Sls					G	

ZG32	0.0	2.0	3523420	QhaOg	CsCgCcy				LKB	
ZG32	2.0	2.3	3523421	Og	CcySls				DG	
ZG33	0.0	1.8	3523422	QhaOg	CvCgCcySls					
ZG34	0.0	2.0	3523423	Qha	CgCv				LKB	
ZG34	2.0	2.2	3523424	Og	CcySls				DGN	
ZG35	0.0	2.0	3523425	QhaOg	CvCgCcy				LKB	
ZG35	2.0	3.0	3523426	Og	Ccy				N	EOH in DG fine g/s lst
ZG36	0.0	2.0	3523427	QhaOg	CgCcy				LKB	
ZG36	2.0	4.0	3523428	Og	Ccy				DB	
ZG36	4.0	6.0	3523429	Og	Ox					Cavity + minor clay and gravel
ZG36	6.0	8.0	3523430	Og	Ccy				LBG	
ZG36	8.0	10.0	3523431	Og	Sls	We	Cy		DG	
ZG36	10.0	12.0	3523432	Og	Sls	WeDs	Py		DG	
ZG36	12.0	12.2	3523433	Og	Sls	Ds	Py		DG	Bioturbated lime mudstone
ZG37	0.0	2.0	3523434	Qha	CgCv				LKB	
ZG37	2.0	3.0	3523435	Og	Ccy				DGB	EOH in DG fine g/s lst
ZG38	0.0	2.0	3523436	Og	Ccy				LDBG	
ZG38	2.0	4.0	3523437	Og	Ccy				DG	
ZG38	4.0	6.0	3523438	Og	Ccy				DG	
ZG38	6.0	8.0	3523439	Og	CcySls				DG	
ZG38	8.0	9.0	3523440	Og	Sls				DG	EOH in G med g/s lst
ZG39	0.0	2.0	3523441	Qha	CvCg				DBLK	
ZG39	2.0	4.0	3523442	Og	Ccy				DB	
ZG39	4.0	6.0	3523443	Og	Ccy				DG	
ZG39	6.0	7.5	3523444	Og	Ccy				DG	EOH in G med g/s lst
ZG40	0.0	2.0	3523445	Qha	CgCs				LB	
ZG40	2.0	4.0	3523446	Og	Ccy				DB	
ZG40	4.0	6.0	3523447	Og	Ccy				DB	
ZG40	6.0	8.0	3523448	Og	Ccy				DB	
ZG40	8.0	9.8	3523449	Og	Ccy				DB	
ZG14	0.0	2.0	3523450	Qha	CsCv					
ZG14	2.0	4.0	3523451	Qha	CgCs				B	
ZG14	4.0	6.0	3523452	QhaOg	CsCcy				DB	
ZG14	6.0	8.0	3523453	Og	Ccy				LB	
ZG14	8.0	10.0	3523454	Og	Ccy				DBG	
ZG14	10.0	12.0	3523455	Og	Ccy				DBG	
ZG14	12.0	14.0	3523456	Og	Ccy				DBG	
ZG14	14.0	15.5	3523457	Og	Sls	We	Cy		DG	EOH in laminated shaley lst
ZG41	0.0	2.0	3523458	Qha	Og				LK	
ZG41	2.0	4.0	3523459	Og	Ccy				D&N	
ZG41	4.0	6.0	3523460	Og	Ccy				DGN	
ZG41	6.0	8.0	3523461	Og	Ccy				DGN	
ZG41	8.0	10.0	3523462	Og	Ccy				DGN	
ZG41	10.0	12.0	3523463	Og	Ccy				DGN	
ZG41	12.0	14.0	3523464	Og	Ccy				DGN	
ZG41	14.0	16.0	3523465	Og	CcySls				DGN	
ZG41	16.0	18.0	3523466	Og	CcySls				G	
ZG41	18.0	20.0	3523467	Og	CcySls				G	
ZG41	20.0	21.3	3523468	Og	CcySls				G	EOH in G lime mudstone
ZG42	0.0	2.0	3523469	Og	Ccy				B	
ZG42	2.0	4.0	3523470	Og	Ccy				DBG	
ZG42	4.0	6.0	3523471	Og	Ccy				DGN	
ZG42	6.0	8.0	3523472	Og	Ccy				N	
ZG42	8.0	10.0	3523473	Og	Ccy				DGN	
ZG42	10.0	12.0	3523474	Og	Sls	We	Cy		DG	
ZG42	12.0	14.0	3523475	Og	Sls	We	Cy		DG	
ZG42	14.0	16.0	3523476	Og	Sls	We	Cy		DG	
ZG42	16.0	18.0	3523477	Og	Sls	We	Cy		DG	
ZG42	18.0	19.5	3523478	Og	Sls	We	Cy		DG	EOH in G cc veined lst
ZG43	0.0	2.0	3523479	Qha	CvCg				BLK	
ZG43	2.0	4.0	3523480	QhaOg	CsCcy				B	
ZG43	4.0	6.0	3523481	Og	Ccy				DG	
ZG43	6.0	8.0	3523482	Og	Ccy				DG	
ZG43	8.0	10.0	3523483	Og	Ccy				DG	
ZG43	10.0	12.0	3523484	Og	Sls	We	Cy		LG	

ZG43	12.0	13.5	3523485	Og	Sls	Vn	Cc	LG	
ZG44	0.0	2.0	3523486	Oha	Cg			LK	
ZG44	2.0	4.0	3523487	Og	Ccy			DB	
ZG44	4.0	6.0	3523488	Og	Ccy			DBG	
ZG44	6.0	8.0	3523489	Og	Ccy			DG	
ZG44	8.0	9.0	3523490	Og	CcySls			DG	
ZG45	0.0	2.0	3523491	Oha	CgCs			LK	
ZG45	2.0	4.0	3523492	Og	Ccy			DB	
ZG45	4.0	6.0	3523493	Og	Ccy			DBG	
ZG45	6.0	8.0	3523494	Og	Ccy			DG	
ZG45	8.0	10.0	3523495	Og	Ccy			DG	
ZG45	10.0	12.0	3523496	Og	Ccy			DG	
ZG45	12.0	14.0	3523497	Og	Ccy			DBG	
ZG45	14.0	16.0	3523498	Og	Ccy			DB	
ZG45	16.0	18.0	3523499	Og	CcyCs			BG	Caving sands
ZG45	18.0	18.5	3523500	Og	SlsCs			G	Lst + caving sands
ZG46	0.0	2.0	3523501	Oha	Cg			LK	
ZG46	2.0	4.0	3523502	Oha	Cs			LK	
ZG46	4.0	6.0	3523503	Og	Ccy			DBG	
ZG46	6.0	8.0	3523504	Og	Ccy			DBG	
ZG46	8.0	10.0	3523505	Og	Sls	We	Cy	DG	
ZG46	10.0	12.0	3523506	Og	Sls	We	Cy	G	
ZG46	12.0	14.0	3523507	Og	Ccy			DG	
ZG46	14.0	15.0	3523508	Og	Sls			MLDG	
ZG47	0.0	1.0	3523509	Oha	Cg			LK	
ZG47	1.0	2.0	3523509	Og	Ccy			DBN	
ZG47	2.0	4.0	3523510	Og	Ccy			DBG	
ZG47	4.0	6.0	3523511	Og	Ccy			DG	
ZG47	6.0	8.0	3523512	Og	Ccy			DG	
ZG47	8.0	10.0	3523513	Og	Ccy			DBG	
ZG47	10.0	12.0	3523514	Og	CcySch			DG	
ZG47	12.0	14.0	3523515	Og	CcySch			DBG	
ZG47	14.0	16.0	3523516	Og	Sls			MDG	
ZG47	16.0	16.5	3523517	Og	Sls			G	
ZG48	0.0			Oha	Cg				Abandoned due to gravels
ZG49	0.0	4.0		Oha	Cg			LK	
ZG49	4.0	6.0	3523518	Og	Ccy			B	
ZG49	6.0	8.0	3523519	Og	Ccy			DB	
ZG49	8.0	10.0	3523520	Og	Ccy			DB	
ZG49	10.0	12.0	3523521	Og	Ccy			DG	
ZG49	12.0	14.0	3523522	Og	Ccy			DG	
ZG49	14.0	15.8	3523523	Og	CcySls	We	Cy	DBG	EOH in sandy lst + bivalve fossil
ZG50	0.0	3.0		Oha	Cg			LK	
ZG50	3.0	5.0	3523524	Og	Ccy			DB	
ZG50	5.0	7.0	3523525	Og	Ccy			DB	
ZG50	7.0	9.0	3523526	Og	Ccy			DBG	
ZG50	9.0	11.0	3523527	Og	Ccy			DBG	
ZG50	11.0	13.0	3523528	Og	Ccy			DBG	
ZG50	13.0	15.0	3523529	Og	Ccy			DB	
ZG50	15.0	17.0	3523530	Og	Ccy			DPG	
ZG50	17.0	19.0	3523531	Og	Ccy			DPG	
ZG50	19.0	20.0	3523532	Og	CcySls			MLDG	
ZG51	0.0	4.0		Oha	Cg			LK	
ZG51	4.0	6.0	3523533	Og	Ccy			DG	
ZG51	6.0	8.0	3523534	Og	Ccy			DG	
ZG51	8.0	10.0	3523535	Og	Ccy			N	
ZG51	10.0	12.0	3523536	Og	Ccy			DG	
ZG51	12.0	14.0	3523537	Og	Ccy			DGN	
ZG51	14.0	16.0	3523538	Og	Ccy			DBG	
ZG51	16.0	18.0	3523539	Og	Ccy			DBG	
ZG51	18.0	20.0	3523540	Og	CcySls			DG	
ZG51	20.0	22.0	3523541	Og	CcySls			DG	
ZG51	22.0	24.0	3523542	Og	Sls			G	Med g/s oolitic lst?
ZG51	24.0	26.0	3523543	Og	CcySls			GFB	
ZG51	26.0	28.0	3523544	Og	Ccy			DGLBR	
ZG51	28.0	30.0	3523545	Og	Ccy			DG	
ZG51	30.0	32.0	3523546	Og	CcySls			DG	
ZG51	32.0	34.0	3523547	Og	Sls			DG	Carbonate sand
ZG51	34.0	36.0	3523548	Og	Sls	We	Cy	G	

ZG51	36.0	38.0	3523549	Og	Sls			G	Sandy lst with bivalve fossil
ZG51	38.0	40.0	3523550	Og	Ccy			DGLBFB	
ZG51	40.0	42.0	3523551	Og	Sls			G	Carbonate sand
ZG51	42.0	44.0	3523552	Og	Sls	VuAl	Sd	G	Siderite altn
ZG51	44.0	46.0	3523553	Og	Sls	VuAl	Sd	G	Siderite altn
ZG51	46.0	48.0	3523554	Og	Sls	VuAl	Sd	LOG	Siderite altn
ZG51	48.0	50.0	3523555	Og	Sls	VuAl	Sd	G	Siderite altn
ZG51	50.0	52.0	3523556	Og	Sls	VuAl	Sd	BG	Siderite altn
ZG51	52.0	54.0	3523557	Og	Sls	Al	Sd	YG	Siderite altn
ZG52	0.0	3.0		Oha	Cg			LK	
ZG52	3.0	4.0	3523558	Og	Sls			G	
ZG53	0.0	3.0		Oha	Cg			LK	EOH in quartzite?
ZG54	0.0	2.0	3523559	Og	Ccy			DG	
ZG54	2.0	4.0	3523560	Og	Ccy	Ds	Py	DG	
ZG54	4.0	6.0	3523561	Og	Ccy			DG	
ZG54	6.0	8.0	3523562	Og	Ccy			LOB	
ZG54	8.0	10.0	3523563	Og	Ccy			LOGDG	
ZG54	10.0	12.0	3523564	Og	Sls	We	Cy	LOG	
ZG54	12.0	14.0	3523565	Og	Ccy			G	
ZG54	14.0	16.0	3523566	Og	Sls	We	Cy	LGDG	
ZG54	16.0	18.0	3523567	Og	Sls	We	Cy	DG	
ZG54	18.0	20.0	3523568	Og	Ccy			N	
ZG54	20.0	22.0	3523569	Og	Ccy			G	
ZG54	22.0	24.0	3523570	Og	Sls	We	Cy	DG	
ZG54	24.0	26.0	3523571	Og	Sls	We	Cy	DG	
ZG54	26.0	28.0	3523572	Og	Ccy			N	
ZG54	28.0	30.0	3523573	Om	MqCcy			WG	
ZG54	30.0	32.0	3523574	Om	MqSlsCcy			WG	
ZG54	32.0	34.0	3523575	Om	MqCcy			LG	
ZG54	34.0	35.5	3523576	Om	Mq	Ds	Py	LG	
ZG55	0.0	2.0	3523577	OhaOg	CgCcy			LKB	
ZG55	2.0	4.0	3523578	OgOha	CcyCg			DBLK	
ZG55	4.0	6.0	3523579	Og	Ccy			DG	
ZG55	6.0	8.0	3523580	Og	Ccy			DG	
ZG55	8.0	10.0	3523581	Og	Ccy			DG	
ZG55	10.0	12.0	3523582	Og	CcySls	We	Cy	DGLG	
ZG55	12.0	14.0	3523583	Og	Sls	VuAlDs	SdPy	YG	
ZG55	14.0	16.0	3523584	Og	Sls	VuAl	Sd	YG	
ZG55	16.0	18.0	3523585	Og	Sls	VuAl	Sd	DYG	
ZG56	0.0	1.5	3523586	Oha	Cg			LK	
ZG56	1.5	2.0	3523586	Og	Ccy			B	
ZG56	2.0	4.0	3523587	Og	Ccy			DB	
ZG56	4.0	6.0	3523588	Og	Ccy			DG	
ZG56	6.0	8.0	3523589	Og	Sls			DG	
ZG56	8.0	9.5	3523590	Og	Sls			DG	
ZG57	0.0	2.5		Oha	Cg			LK	
ZG57	2.5	4.0	3523591	Og	Ccy			DBN	
ZG57	4.0	6.0	3523592	Og	CcySls			DG	
ZG57	6.0	8.0	3523593	Og	Sls			DG	Sandy lst
ZG57	8.0	10.0	3523594	Og	Ccy			DG	
ZG57	10.0	12.0	3523595	Og	Ccy			DG	
ZG57	12.0	14.0	3523596	Og	Ccy			DG	
ZG57	14.0	14.5	3523597	Og	Sls			LGDG	Fine g/s lst with shaley wisps
ZG58	0.0	2.0	3523598	Oha	Cg			LK	
ZG58	2.0	4.0	3523599	OhaOg	CgCcy			LKDB	
ZG58	4.0	6.0	3523600	Og	Ccy			DG	
ZG58	6.0	8.0	3523601	Og	Ccy			DG	
ZG58	8.0	10.0	3523602	Og	Ccy			DGLOB	
ZG58	10.0	10.3	3523603	Og	Sls	Ma		LG	Fine g/s lst
ZG59	0.0	2.0	3523604	OhaOg	CgCcy			LKDB	
ZG59	2.0	4.0	3523605	Og	Sls	We	Cy	DB	
ZG59	4.0	6.0	3523606	Og	Sls	We	Cy	DEG	
ZG59	6.0	8.0	3523607	Og	Sls	We	Cy	DB	
ZG59	8.0	10.0	3523608	Og	Sls	We	Cy	DEG	
ZG59	10.0	12.0	3523609	Og	Sls	We	Cy	DEG	
ZG59	12.0	14.0	3523610	Og	Ccy			DEG	
ZG59	14.0	16.0	3523611	Og	CcySls	Al	Sd	GYB	
ZG59	16.0	18.0	3523612	Og	Sls			DG	
ZG59	18.0	20.0	3523613	Og	Sls			DG	

ZG59	20.0	21.5	3523614	Og	Sls			DG	
ZG60	0.0	2.0	3523615	Oha	Cg			LK	
ZG60	2.0	4.0	3523616	Og	Sls	We	Cy	DB	
ZG60	4.0	6.0	3523617	Og	Sls	We		DB	
ZG60	6.0	8.0	3523618	Og	SlsCcy	We		DBG	
ZG60	8.0	10.0	3523619	Og	Ccy			DGP	
ZG60	10.0	12.0	3523620	Og	Ccy			DGB	
ZG60	12.0	14.0	3523621	Og	Ccy			DGB	
ZG60	14.0	16.0	3523622	Og	Sls			G	
ZG60	16.0	18.0	3523623	Og	CcySls			G	Bioturbated 1st
ZG60	18.0	19.0	3523624	Og	Sls			LG	Bioturbated 1st
ZG61	0.0	2.0	3523625	Oha	Cg			LK	
ZG61	2.0	4.0	3523626	OhaOg	CsCcy			DB	
ZG61	4.0	6.0	3523627	Og	Ccy			G	Plus caving sands
ZG61	6.0	8.0	3523628	Og	Ccy			DGDB	Plus caving sands
ZG61	8.0	10.0	3523629	Og	Ccy			DGDB	Plus caving sands
ZG61	10.0	12.0	3523630	Og	Ccy			DPG	Plus caving sands
ZG61	12.0	14.0	3523631	Og	Ccy			DPG	Plus caving sands
ZG61	14.0	16.0	3523632	Og	CcySls			DG	EOH in Bioturbated 1st
ZG62	0.0	2.0	3523633	Oha	Cg			LK	
ZG62	2.0	4.0	3523634	OhaOg	CsCcy			DB	
ZG62	4.0	6.0	3523635	Og	Ccy			DG	
ZG62	6.0	8.0	3523636	Og	Ccy			DG	
ZG62	8.0	10.0	3523637	Og	Ccy			DG	
ZG62	10.0	12.0	3523638	Og	Ccy			DG	
ZG62	12.0	13.5	3523639	Og	Sls			DG	Bioturbated 1st
ZG63	0.0	2.0	3523640	Og	Ccy			DEN	base of gravel pit
ZG63	2.0	4.0	3523641	Og	Ccy			DB	
ZG63	4.0	6.0	3523642	Og	Ccy			DG	
ZG63	6.0	8.0	3523643	Og	Ccy			DGB	
ZG63	8.0	10.0	3523644	Og	Ccy			DGN	
ZG63	10.0	11.5	3523645	Og	CcySls	Ma		DG	Fine g/s 1st
ZG64	0.0	2.0	3523646	Oha	CaCg			LK	
ZG64	2.0	4.0	3523647	Og	Ccy			DG	Soupy
ZG64	4.0	5.5	3523648	Og	CcySls			DG	
ZG65	0.0	2.0	3523649	OhaOg	CgCvCcy			B	
ZG65	2.0	3.0	3523650	Og	CcySls			DG	
ZG66	0.0	2.0	3523651	OgOha	CcyCg			DGB	
ZG66	2.0	3.7	3523652	Og	CcySls			DGN	
ZG67	0.0	2.0	3523653	OgOha	CcyCg			LB	
ZG67	2.0	4.0	3523654	Og	Ccy			DG	
ZG67	4.0	6.0	3523655	Og	Ccy			DGB	
ZG67	6.0	6.8	3523656	Og	Sls	Vn	Cc	G	
ZG68	0.0	1.0	3523657	Oha	Cg			LK	
ZG68	1.0	2.0	3523657	Og	Ccy			B	
ZG68	2.0	4.0	3523658	Og	Ccy			DB	
ZG68	4.0	6.0	3523659	Og	Ccy			DB	
ZG68	6.0	8.0	3523660	Og	Ccy			DG	
ZG68	8.0	8.5	3523661	Og	Ccy			LG	Coarse sandy 1st
ZG69	0.0	2.0	3523662	Oha	Cg			LK	
ZG69	2.0	4.0	3523663	Og	Ccy			DB	
ZG69	4.0	4.1	3523664	Og	Ccy			DBG	EOH in cherty 1st
ZG70	0.0	1.0	3523665	Oha	Cg			LK	
ZG70	1.0	2.0	3523665	Og	Ccy			DB	
ZG70	2.0	4.0	3523666	Og	Ccy			DBOG	
ZG70	4.0	6.0	3523667	Og	Ccy			DG	
ZG70	6.0	7.0	3523668	Og	Sls			LG	Lime mudstone with shaley wisps
ZG71	0.0	1.0	3523669	Oha	Cg			LK	
ZG71	1.0	2.0	3523669	Og	Ccy			DB	
ZG71	2.0	4.0	3523670	Og	Ccy			DG	
ZG71	4.0	6.0	3523671	Og	Ccy			DG	
ZG71	6.0	7.0	3523672	Og	Ccy			DG	EOH in DG fine g/s 1st
ZG72	0.0	2.0	3523673	Oha	Cs			LB	
ZG72	2.0	4.0	3523674	Og	Ccy			DB	Minor sand

ZG72	4.0	4.8	3523675	Og	CcySlS				BLG	Coarse g/s lst
ZG73	0.0	3.0		Qha	Cg				LK	
ZG73	3.0	5.0	3523676	OgQha	CcyCs				DEG	Minor sand
ZG73	5.0	7.0	3523677	Og	Ccy				DG	Minor caving sand
ZG73	7.0	9.0	3523678	Og	SlS	We	Cy		DB	
ZG73	9.0	11.0	3523679	Og	Ccy				G	
ZG73	11.0	12.8	3523680	Og	CcySlS	Ma			G	Fine g/s massive lst
ZG74	0.0	2.0	3523681	Qha	Cg				LK	
ZG74	2.0	3.0	3523682	Qha	Cg				LK	
ZG74	3.0	4.0	3523682	Og	Ccy				G	
ZG74	4.0	6.0	3523683	Og	Ccy				G	
ZG74	6.0	8.0	3523684	Og	Ccy				G	
ZG74	8.0	10.0	3523685	Og	Ccy				G	
ZG74	10.0	12.0	3523686	Og	Ccy				G	
ZG74	12.0	14.0	3523687	Og	CcySlS				G	Minor sandy lst
ZG74	14.0	14.5	3523688	Og	SlS	Ma			G	Massive sandy lst + minor clay
ZG75	0.0	1.5	3523689	Qha	Cg				LK	
ZG75	1.5	2.5		Qha	Cg				LK	
ZG75	2.5	4.0	3523690	Qha	Cg				LK	
ZG75	4.0	6.0	3523691	OgQha	CcyCs				BG	Lot of caving sand
ZG75	6.0	8.0	3523692	OgQha	CcyCs				BG	Lot of caving sand
ZG75	8.0	10.0	3523693	OgQha	CcyCs				BG	Lot of caving sand
ZG75	10.0	12.0	3523694	Og	Ccy				BG	Minor caving sand
ZG75	12.0	14.0	3523695	Og	CcySlS				BGLG	Fine g/s massive lst
ZG76	0.0	3.0		Qha	Cg				LK	
ZG76	3.0	4.0	3523696	Qha	Cg				LK	
ZG76	4.0	5.0	3523696	Og	Ccy				BG	
ZG76	5.0	7.0	3523697	OgQha	CcyCs				LBDBG	Caving sand and grit
ZG76	7.0	8.4	3523698	Og	CcySlS				BLG	Fine g/s massive lst
ZG77	0.0	4.7		Qha	Cg				LK	
ZG77	4.7	5.0	3523699	Og	Ccy				DEG	
ZG77	5.0	5.3	3523700	Og	CcySlS				G	Minor massive med g/s lst
ZG78	0.0	4.0		Qha	Cg				LK	
ZG78	4.0	4.9	3523701	Og	CcySlS				G	G fine g/s lst
ZG79	0.0	2.0		Qha	Cg				LK	
ZG79	2.0	3.0	3523702	Qha	Cg				LK	
ZG79	3.0	4.0	3523702	Og	Ccy				DG	
ZG79	4.0	6.0	3523703	Og	Ccy				DG	
ZG79	6.0	8.0	3523704	Og	CcySlS				GLO	DG fine g/s lst
ZG79	8.0	9.6	3523705	Og	SlS	Ma			DG	DG fine g/s lst
ZG80	0.0	2.0	3523706	Og	CcyCv				LGB	Minor veg/peat
ZG80	2.0	4.0	3523707	Og	Ccy				DGOBLB	
ZG80	4.0	6.0	3523708	Og	CcySlS				LG	WG sandy lst
ZG80	6.0	8.0	3523709	Og	SlS				LGDG	Sandy lst
ZG80	8.0	10.0	3523710	Og	SlScy				LGDG	Sandy lst
ZG80	10.0	12.0	3523711	Og	Ccy				N	
ZG80	12.0	14.0	3523712	Og	Ccy	Ds	Py		N	Abundant Py
ZG80	14.0	16.0	3523713	Og	Ccy	Ds	Py		G	Abundant Py
ZG80	16.0	18.0	3523714	Og	SlS	Ds	Py		G	Sandy lst + Py washing in?
ZG80	18.0	19.7	3523715	Og	SlS	Ds	Py		G	Sandy lst + Py washing in?
ZG81	0.0	2.0	3523716	QhaOg	CcyCvCg				BG	
ZG81	2.0	4.0	3523717	OgQha	CcyCg				LB	Minor gravel
ZG81	4.0	6.0	3523718	Og	Ccy				BG	
ZG81	6.0	8.0	3523719	Og	SlS				G	Sandy lst
ZG81	8.0	9.5	3523720	Og	SlS				G	Med-fine g/s lst
ZG82	0.0	2.0	3523721	Qha	Cg				LK	
ZG82	2.0	4.0	3523722	QhaOg	CgCcy				LKGB	
ZG82	4.0	6.0	3523723	Og	Ccy				DGB	
ZG82	6.0	8.0	3523724	Og	SlS				G	
ZG82	8.0	9.5	3523725	Og	SlS	Vn	Sd		G	
ZG83	0.0	2.0	3523726	Qha	CvCg				B	
ZG83	2.0	2.5	3523727	Og	SlS	We	Cy		DGDB	
ZG84	0.0	2.0	3523728	QhaOg	CvCcyCg				B	
ZG84	2.0	4.0	3523729	Og	Ccy				DB	
ZG84	4.0	6.0	3523730	Og	Ccy				DEG	

ZG84	6.0	8.0	3523731	Og	Ccy			DB	
ZG84	8.0	10.0	3523732	Og	Sls	We	Cy	DB	
ZG84	10.0	10.5	3523733	Og	Sls	Ma		G	Med g/s lst
ZG85	0.0	2.0	3523734	ChaOg	CgCcy			LKB	
ZG85	2.0	4.0	3523735	Og	Ccy			DB	
ZG85	4.0	6.0	3523736	Og	Sls	Ma		G	
ZG85	6.0	6.4	3523737	Og	Sls	Ma		G	Med g/s lst
ZG86	0.0	8.0	3523738	Cha	CgCs			LK	
ZG86	8.0	8.5	3523739	Cha	Cg			LK	
ZG86	8.5	10.0	3523739	Og	Ccy			DG	Minor caving sand
ZG86	10.0	12.0	3523740	Og	Ccy			DG	EOH in med-fine g/s massive lst
ZG87	0.0	2.0	3523741	ChaOg	CvCcyCg			B	
ZG87	2.0	4.0	3523742	OgCha	CcyCg			DB	Minor gravels
ZG87	4.0	6.0	3523743	Og	SlsCcy	Al	Sd	BYG	
ZG87	6.0	8.0	3523744	Og	Ccy			CB	
ZG87	8.0	9.3	3523745	Og	Sls	Ma		G	Minor G clay
ZG88	0.0	2.0	3523746	ChaOg	CgCcy			LKGB	
ZG88	2.0	4.0	3523747	Og	CcySls			GBN	
ZG88	4.0	6.0	3523748	Og	CcySls			GBN	
ZG88	6.0	8.0	3523749	Og	CcySls			GBN	
ZG88	8.0	10.0	3523750	Og	CcySls			GB	
ZG88	10.0	12.0	3523751	Og	SlsCcy			GBLB	
ZG88	12.0	14.0	3523752	Og	SlsCcy			GB	
ZG88	14.0	16.0	3523753	Og	Sls			N	
ZG89	0.0	2.0	3523754	Cha	Cg			LK	
ZG89	2.0	4.0	3523755	Og	CcySls			LBG	
ZG89	4.0	6.0	3523756	Og	CcySls			LBG	
ZG89	6.0	8.0	3523757	Og	CcySls			LBG	
ZG89	8.0	10.0	3523758	Og	SlsCcy			GB	
ZG89	10.0	12.0	3523759	Og	SlsCcy			GBLG	
ZG89	12.0	14.0	3523760	Og	SlsCcy			GB	
ZG89	14.0	16.0	3523761	Og	SlsCcy			GB	
ZG89	16.0	18.0	3523762	Og	SlsCcy			GB	
ZG89	18.0	20.0	3523763	Og	SlsCcy			GB	
ZG89	20.0	22.0	3523764	Og	SlsCcy			GB	
ZG89	22.0	24.0	3523765	Og	SlsCcy			GB	
ZG89	24.0	26.0	3523766	Og	SlsCcy			GB	
ZG89	26.0	28.0	3523767	Og	Ccy	Ds	Py	G	
ZG89	28.0	30.0	3523768	Og	Ccy	Ds	Py	G	
ZG89	30.0	32.0	3523769	Og	SlsCcy	Ds	Py	GB	
ZG89	32.0	34.0	3523770	Og?	Mq				
ZG90	0.0	2.0	3523771	Cha	Cg			LK	
ZG90	2.0	4.0	3523772	Og	Ccy			GB	
ZG90	4.0	6.0	3523773	Og	Ccy			GB	
ZG90	6.0	8.0	3523774	Og	SlsCcy			BG	Fossiliferous
ZG90	8.0	10.0	3523775	Og	Sls			LGB	
ZG90	10.0	10.3	3523776	Og	Sls			LGB	
ZG91	0.0	2.0	3523777	Cha	CgCv			B	
ZG91	2.0	4.0	3523778	Og	Ccy			GB	
ZG91	4.0	6.0	3523779	Og	Ccy			GB	
ZG91	6.0	8.0	3523780	Og	Ccy			GB	
ZG91	8.0	10.0	3523781	Og	SlsCcy			GB	
ZG91	10.0	12.0	3523782	Og	SlsCcy	Ds	Py	GB	
ZG91	12.0	14.0	3523783	Og	Sls			GB	
ZG91	14.0	16.0	3523784	Og	Sls			GN	
ZG91	16.0	18.0	3523785	Og	Sls			GN	
ZG92	0.0	2.0	3523786	ChaOg	CgCvCcy			B	
ZG92	2.0	4.0	3523787	Og	Ccy			GB	
ZG92	4.0	6.0	3523788	Og	Ccy			GB	
ZG92	6.0	8.0	3523789	Og	SlsCcy			GB	
ZG92	8.0	9.0	3523790	Og	Sls			G	
ZG93	0.0	2.0	3523791	ChaOg	CgCvCcy			B	
ZG93	2.0	4.0	3523792	Og	Ccy			VB	
ZG93	4.0	4.5	3523793	Og	Sls			G	
ZG94	0.0	1.8	3523794	ChaOg	CgCcySls			EG	
ZG95	0.0	2.0	3523795	ChaOg	CgCvCcy			B	

ZG95	2.0	3.0	3523796	Og	Sls				G	
ZG96	0.0	2.0	3523797	ChaOg	CgCcy				LKB	
ZG96	2.0	4.0	3523798	Og	SlsCcy				DGB	
ZG96	4.0	6.0	3523799	Og	SlsCcy				DGB	
ZG96	6.0	8.0	3523800	Og	Sls				GN	
ZG97	0.0	2.0	3523801	ChaOg	CgCcy				B	
ZG97	2.0	4.0	3523802	Og	Ccy				LB	
ZG97	4.0	6.0	3523803	Og	Ccy				LB	
ZG97	6.0	8.0	3523804	Og	SlsCcy				GNGB	
ZG97	8.0	10.0	3523805	Og	SlsCcy				GNGB	
ZG97	10.0	12.0	3523806	Og	SlsCcy				GNLG	
ZG97	12.0	13.0	3523807	Og	Sls				GN	
ZG98	0.0	2.0	3523808	ChaOg	CgCcy				LKB	
ZG98	2.0	4.0	3523809	Og	Ccy				G	
ZG98	4.0	6.0	3523810	Og	Ccy				G	
ZG98	6.0	8.0	3523811	Og	SlsCcy				G	
ZG98	8.0	10.0	3523812	Og	SlsCcy				G	
ZG98	10.0	12.0	3523813	Og	SlsCcy				G	
ZG98	12.0	14.0	3523814	Og	SlsCcy				G	
ZG98	14.0	16.0	3523815	Og	SlsCcy				G	
ZG98	16.0	18.0	3523816	Og	SlsCcy				G	
ZG98	18.0	20.0	3523817	Og	SlsCcy				G	
ZG98	20.0	22.0	3523818	Og	Ccy				LBG	
ZG98	22.0	24.0	3523819	Og	Ccy				LB	
ZG98	24.0	25.8	3523820	Og	CcySls				LBN	
ZG99	0.0	2.0	3523821	Cha	Cg				LK	
ZG99	2.0	4.0	3523822	Og	Ccy				GB	
ZG99	4.0	6.0	3523823	Og	Ccy				VB	
ZG99	6.0	8.0	3523824	Og	Ccy				VB	
ZG99	8.0	10.0	3523825	Og	SlsCcy				GB	
ZG99	10.0	12.0	3523826	Og	SlsCcy				GVB	
ZG99	12.0	14.0	3523827	Og	SlsCcy				GVB	
ZG99	14.0	16.0	3523828	Og	SlsCcy	Ds	Py		GB	
ZG99	16.0	18.0	3523829	Og	SlsCcy	Ds	Py		GB	
ZG99	18.0	20.0	3523830	Og	Ccy				LGB	
ZG99	20.0	22.0	3523831	Og	Ccy				LB	
ZG99	22.0	23.8	3523832	Og	Sls				G	
ZG100	0.0	2.0	3523833	Cha	CgCv				B	
ZG100	2.0	2.4	3523834	Og	CcySls				B	
ZG101	0.0	2.0	3523835	Cha	Cg				LK	
ZG101	2.0	3.5	3523836	Og	CcySls				B	
ZG102	0.0	2.0	3523837	Og	SshCcy	We			B	
ZG102	2.0	4.0	3523838	Og	SshCcy	We			B	
ZG102	4.0	6.0	3523839	Og	SshCcy	We			B	
ZG102	6.0	8.0	3523840	Og	SshCcy	We			B	
ZG102	8.0	10.0	3523841	Og	Ccy				VB	
ZG102	10.0	12.0	3523842	Og	Ccy				VB	
ZG102	12.0	14.0	3523843	Og	Ccy				VB	
ZG102	14.0	16.0	3523844	Og	Ccy				VB	
ZG102	16.0	18.0	3523845	Og	Sls	Vn	Cc		B	
ZG102	18.0	20.0	3523846	Og	Sls	Vn	Cc		B	
ZG103	0.0	2.0	3523847	ChaOg	CgCcy				LKB	
ZG103	2.0	4.0	3523848	Og	Ccy				GB	
ZG103	4.0	4.7	3523849	Og	CcySls				GB	