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REGOLITH-LANDSCAPE EVOLUTION AND GEOCHEMICAL DISPERSION ABOUT THE BRONZEWING GOLD DEPOSIT, W.A.

Z.S. Varga, R.R. Anand and J.E. Wildman

CRC LEME OPEN FILE REPORT 108

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CSIRO Division of Exploration and Mining Report 308R, 1997.
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CRC LEME is an unincorporated joint venture between The Australian National University, University of Canberra, Australian Geological Survey Organisation and CSIRO Exploration and Mining
Headquarters: CRC LEME c/o CSIRO Exploration and Mining, Private Bag No 5, PO Wembley, Western Australia, 6913.

RESEARCH ARISING FROM CSIRO/AMIRA YILGARN REGOLITH GEOCHEMISTRY PROJECTS 1987-1996

In 1987, CSIRO commenced a series of multi-client research projects in regolith geology and geochemistry which were sponsored by companies in the Australian mining industry, through the Australian Mineral Industries Research Association Limited (AMIRA). The initial research program, "Exploration for concealed gold deposits, Yilgarn Block, Western Australia" had the aim of developing improved geological, geochemical and geophysical methods for mineral exploration that would facilitate the location of blind, buried or deeply weathered gold deposits. The program commenced with the following projects:

P240: Laterite geochemistry for detecting concealed mineral deposits (1987-1991). Leader: Dr R.E. Smith.
Its scope was development of methods for sampling and interpretation of multi-element laterite geochemistry data and application of multi-element techniques to gold and polymetallic mineral exploration in weathered terrain. The project emphasised viewing laterite geochemical dispersion patterns in their regolith-landform context at local and district scales. It was supported by 30 companies.

P241: Gold and associated elements in the regolith - dispersion processes and implications for exploration (1987-1991). Leader: Dr C.R.M. Butt.
The project investigated the distribution of ore and indicator elements in the regolith. It included studies of the mineralogical and geochemical characteristics of weathered ore deposits and wall rocks, and the chemical controls on element dispersion and concentration during regolith evolution. This was to increase the effectiveness of geochemical exploration in weathered terrain through improved understanding of weathering processes. It was supported by 26 companies.

These projects represented 'an opportunity for the mineral industry to participate in a multi-disciplinary program of geoscience research aimed at developing new geological, geochemical and geophysical methods for exploration in deeply weathered Archaean terrains'. This initiative recognised the unique opportunities, created by exploration and open-cut mining, to conduct detailed studies of the weathered zone, with particular emphasis on the near-surface expression of gold mineralisation. The skills of existing and specially recruited research staff from the Floreat Park and North Ryde laboratories (of the then Divisions of Minerals and Geochemistry, and Mineral Physics and Mineralogy, subsequently Exploration Geoscience and later Exploration and Mining) were integrated to form a task force with expertise in geology, mineralogy, geochemistry and geophysics. Several staff participated in more than one project. Following completion of the original projects, two continuation projects were developed.

P240A: Geochemical exploration in complex lateritic environments of the Yilgarn Craton, Western Australia (1991-1993). Leaders: Drs R.E. Smith and R.R. Anand.
The approach of viewing geochemical dispersion within a well-controlled and well-understood regolith-landform and bedrock framework at detailed and district scales continued. In this extension, focus was particularly on areas of transported cover and on more complex lateritic environments typified by the Kalgoorlie regional study. This was supported by 17 companies.

P241A: Gold and associated elements in the regolith - dispersion processes and implications for exploration (1991-1993). Leader: Dr. C.R.M. Butt.
The significance of gold mobilisation under present-day conditions, particularly the important relationship with pedogenic carbonate, was investigated further. In addition, attention was focussed on the recognition of primary lithologies from their weathered equivalents. This project was supported by 14 companies.

Most reports related to the above research projects were published as CRC LEME Open File Reports Series (Nos 1-74), with an index (Report 75), by June 1999. Publication now continues with release of reports from further projects.

P252: Geochemical exploration for platinum group elements in weathered terrain. Leader: Dr C.R.M. Butt.
This project was designed to gather information on the geochemical behaviour of the platinum group elements under weathering conditions using both laboratory and field studies, to determine their dispersion in the regolith and to apply this to concepts for use in exploration. The research was commenced in 1988 by CSIRO Exploration Geoscience and the University of Wales (Cardiff). The Final Report was completed in December 1992. It was supported by 9 companies.

P409: Geochemical exploration in areas of transported overburden, Yilgarn Craton and environs, WA.
Leaders: Drs C.R.M. Butt and R.E. Smith.
About 50% or more of prospective terrain in the Yilgarn is obscured by substantial thicknesses of transported overburden that varies in age from Permian to Recent. Some of this cover has undergone substantial weathering. Exploration problems in these covered areas were the focus of Project 409. The research was commenced in June 1993 by CSIRO Exploration and Mining but was subsequently incorporated into the activities of CRC LEME in July 1995 and was concluded in July 1996. It was supported by 22 companies.

Although the confidentiality periods of Projects P252 and P409 expired in 1994 and 1998, respectively, the reports have not been released previously. CRC LEME acknowledges the Australian Mineral Industries Research Association and CSIRO Division of Exploration and Mining for authority to publish these reports. It is intended that publication of the reports will be a substantial additional factor in transferring technology to aid the Australian mineral industry.

This report (CRC LEME Open File Report 108) is a second impression (second printing) of CSIRO, Division of Exploration and Mining Restricted Report 308R, first issued in 1997, which formed part of the CSIRO/AMIRA Project P409.

Copies of this publication can be obtained from:
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PREFACE

CSIRO-AMIRA Project 409 has as its principal objective the development of geochemical methods for mineral exploration in areas in the Yilgarn Craton and its environs that have substantial transported overburden, through investigations of the processes of geochemical dispersion from concealed mineralization. The project has investigated the geochemical expression, in the regolith, of Au deposits in a variety of geomorphological environments. Bronzewing represents a series of significant Au deposits which are concealed by a wide range of clastic and chemical sediments, 5 m to over 30 m thick, overlying a thick residual profile. There is a discontinuous horizon of lateritic residuum and, where it is absent, ferruginous saprolite immediately beneath the sediments, and these carry a pronounced multi-element geochemical anomaly. Geochemical dispersion into the sediments themselves is only minor, except immediately overlying the lateritic residuum. The dispersion observed is, however, almost entirely mechanical, generally confined to within a metre of the unconformity and there appears to have been little, if any, post-depositional chemical dispersion. The deposits are blind to 'conventional' soil sampling (10-30 cm depth) using total and partial extraction techniques.

The results demonstrate that a sampling strategy that specifically targets lateritic residuum and ferruginous saprolite, where outcropping or buried, readily locates the deposits. In the absence of such materials, sampling of the lowermost sedimentary units, possibly including the unconformity, is recommended to give the broadest anomaly. Because the dispersed ore-related elements are mostly confined to the ferruginous nodules, preferential sampling of these materials is recommended. The results also provide strong evidence for the advantages of multi-element analysis, with elements such as Cu and W being enriched close to primary mineralization and thus assisting in defining drill targets. These conclusions are in accordance with other investigations conducted during the course of the project and confirm the requirement for careful regolith mapping and accurate logging and identification of drill cuttings in order to optimise exploration and sampling procedures.

C.R.M. Butt and R.E. Smith
Project Leaders

March 1997

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Mineralisation

The Bronzewing deposit is in the Archaean Yandal Greenstone Belt. Gold mineralisation occurs within a sequence of mafic volcanics (basalts, dolerites) and minor sediments, which are intruded by felsic porphyries. The mineralisation is associated with a dense stockwork of quartz veining, and alteration of the host sequence, and is accompanied by pyrite, pyrrhotite and minor chalcopyrite and scheelite. Gold, W and Cu are the most significant indicators in mineralised bedrock.

Regolith

Regolith-landform relationships over the 1000 km^2, centred on the Bronzewing deposit, were mapped at 1:50 000. This was based on interpretation of aerial photography, image enhanced Landsat TM images and field traverses. The Bronzewing Au deposit was covered by a blanket of soil and colluvium. Mapping regolith relationships and distributions using drilling and pit faces, has revealed the details of the sub-surface regolith and palaeolandscape, from which the weathering history and likely origins of anomalies in the residuum and transported cover can be deducted. A wide range of sediments overlie older, residual regolith. Colluvial and alluvial sediments are 20-30 m thick in the Discovery pit and directly overlie saprolite. In the southwest of the Central pit, the sediments are 15-20 m thick and overlie lateritic residuum in places. The sediments thin towards the northeast to less than 5 m thick in the Laterite pit. Alluvium is most likely derived from the south, and the colluvium from the east where there is a subdued breakaway.

The palaeochannels have been infilled with kaolinite-smectite sediments derived from the erosion of pre-existing red soils and saprolites. On a regional scale, palaeochannel sediments reach 120 m in thickness. Dolocretes, calcretes, pisoliths and megamottles have developed in these sediments. Mobilisation and segregation of Fe by a combination of roots and reduced groundwaters in porous, vegetated red clays was probably responsible for the formation of the megamottles. Dolocretes are likely to be relict forms equivalent to those in deep sediments in the Roe palaeodrainage. They are confined to the base of the channel above the lateritic residuum and may have formed by evaporation of a Mg-rich lakewaters so their formation appears to be related to a period of high evaporation rates. The dolocretes differ from valley calcretes of the region, which are surficial deposits in major, active drainages.

Considerable palaeotopography (60 m) around Bronzewing suggests that lateritic residuum did not form a simple, extensive, peneplained surface but a discontinuous cover on an undulating plateau. The pre-Eocene landscape at Bronzewing was not only mantled with lateritic residuum but also with thick blankets of kaolinite-hematite red soils. Ferruginous duricrusts and red soils developed in different sites in response to contrasting geological and topographic conditions. Duricrusts were developed on mafic and ultramafic rocks and red soils were probably restricted to felsic lithologies on well-drained upper slopes. Where fully preserved, the residual profile beneath the colluvium and alluvium has a 2-5 m thick lateritic residuum consisting of lateritic nodules and some pisoliths, set in a silty clay matrix. The nodules were formed by the fragmentation and collapse of the underlying ferruginous saprolite. The ferruginous saprolite, a few metres thick, grades downwards into saprolite. Fresh rock is encountered at 80 to 120 m depth.

Geochemical dispersion in the regolith

Sampling of the residual materials (ferruginous saprolite and lateritic residuum) showed significant Au, W and Cu anomalies in the vicinity of the Bronzewing deposit. The lateritic duricrust and nodules and pisoliths of the Laterite and Central pits, where developed over primary mineralisation, contain significant amounts of Au. Elements associated with the Au mineralisation in the lateritic residuum of the Laterite pit are Ag, Ba, Ce, W, Mo, As, Sb and Cu. The Au anomalies are not as consistent in the Discovery pit, and the lateritic residuum of both the Central and Discovery pits are enriched in Cu and W close to the primary mineralisation. Wide spaced sampling would be adequate to sample areas of buried lateritic residuum and ferruginous saprolite.

The buried lateritic residuum contains Au to ore grade, which sometimes extends into the colluvium. This relationship is particularly apparent in the Central pit area where extensive Au anomalies occur across the unconformity. Size fractionation of the gravelly colluvium that occurs within a metre of the residuum/colluvium interface, indicates that Au is concentrated in the plus 2000 µm fraction and depleted in the minus 75 µm fraction, relative to the bulk sample. The enrichment in the coarse fractions represents clastic dispersion of lateritic detritus. There is no evidence to show that hydromorphic dispersion has accumulated Au in the fine fraction. Gravelly colluvium is useful sampling medium in situations where lateritic residuum or ferruginous saprolite are missing.

Mottles extracted from the palaeochannel sediments contain no significant enrichment of pathfinder elements, and Au contents are below detection. No significant concentrations of Au or pathfinder elements are present in bulk soils collected from 0.3-0.5 m depth; the Au content barely exceeded the detection limit of 5 ppb. No dispersion of Au into the soil was detected by partial extraction of the soil fine fraction (<250 µm).

1. INTRODUCTION

1.1 Location, history and geological setting

The Bronzewing Au deposit is located in the Yandal Greenstone Belt, about 400 km north of Kalgoorlie at 303000 mE, 6970000 mN (Figure 1). Access is by unsealed road from just north of Leinster and, within the mining and exploration tenements, along local gravel roads, grid lines and fences.

The Bronzewing deposit lies beneath deep, transported overburden, a residual, ferruginous zone and intensely weathered clays derived from mafic and ultramafic rocks. Fresh rock is encountered below 80-120 m. It was discovered in 1992 by geochemical sampling of buried lateritic residuum and ferruginous saprolite. Mining commenced in June 1994. Since then, intensive RAB, RC and diamond drilling has outlined zones of mineralisation that have been developed into the Discovery, Central and Laterite pits. Total indicated and inferred resources at Bronzewing (June 1995), were reported as 19.8 mT at 4.7 g/t Au yielding 3 million ounces (uncut grades), or 3.6 g/t yielding 2.3 million ounces (cut grades).

1.2 Work program

The broad objective has been to investigate the nature, stratigraphy and characteristics of the regolith and to evaluate the residual and cover materials as geochemical sample media. Extensive drilling around the open pit exposures provided an ideal opportunity to understand the regolith and study dispersion processes.

Work at Bronzewing commenced in mid 1993 with two CSIRO-supported honours research projects by Steven Varga and Roger Crawford from the Centre for Ore Deposits and Exploration Studies (CODES) at the University of Tasmania (Crawford, 1994; Varga,1994), supervised by R.R. Anand. Follow up studies have since confirmed the regolith-landform relationships and added to the understanding of the Bronzewing regolith-landform setting. The work program was as follows:-

(i) To establish a regolith-landform framework for a geochemical orientation study of the Bronzewing Au deposit by mapping regolith-landform relationships on a district scale.

(ii) To establish the regolith stratigraphy, using the drilling and open pit exposures and compile a 3D model.

(iii) To characterise regolith materials to assist their recognition in drill spoil.

(iv) To investigate the mineralogy and geochemistry of residual and transported regolith units from geotechnical drill holes and type sections.

(v) To investigate the geochemistry of the soil, the interface between the basement and colluvium, ferruginous mottles in the cover, lateritic residuum and ferruginous saprolite covering the deposit.

A series of stratigraphic sections were to be compiled, based on RAB and RC drill spoil logging. The accuracy of the stratigraphy was to be checked later by studying the stratigraphy exposed in pit walls at Discovery, Central and Laterite pits. A 3D regolith-landform model for the area could then be produced based on stratigraphic and surface mapping information.

2. REGIONAL SETTING AND LOCAL GEOLOGY

2.1 Climate and vegetation

The Bronzewing district has a semi-arid to arid climate, with hot summers and cool to mild winters. The mean annual rainfall of 205 mm falls predominantly in the summer from erratic, localised thunderstorms. The area is subject to both droughts and short-term floods. Prevailing winds for most

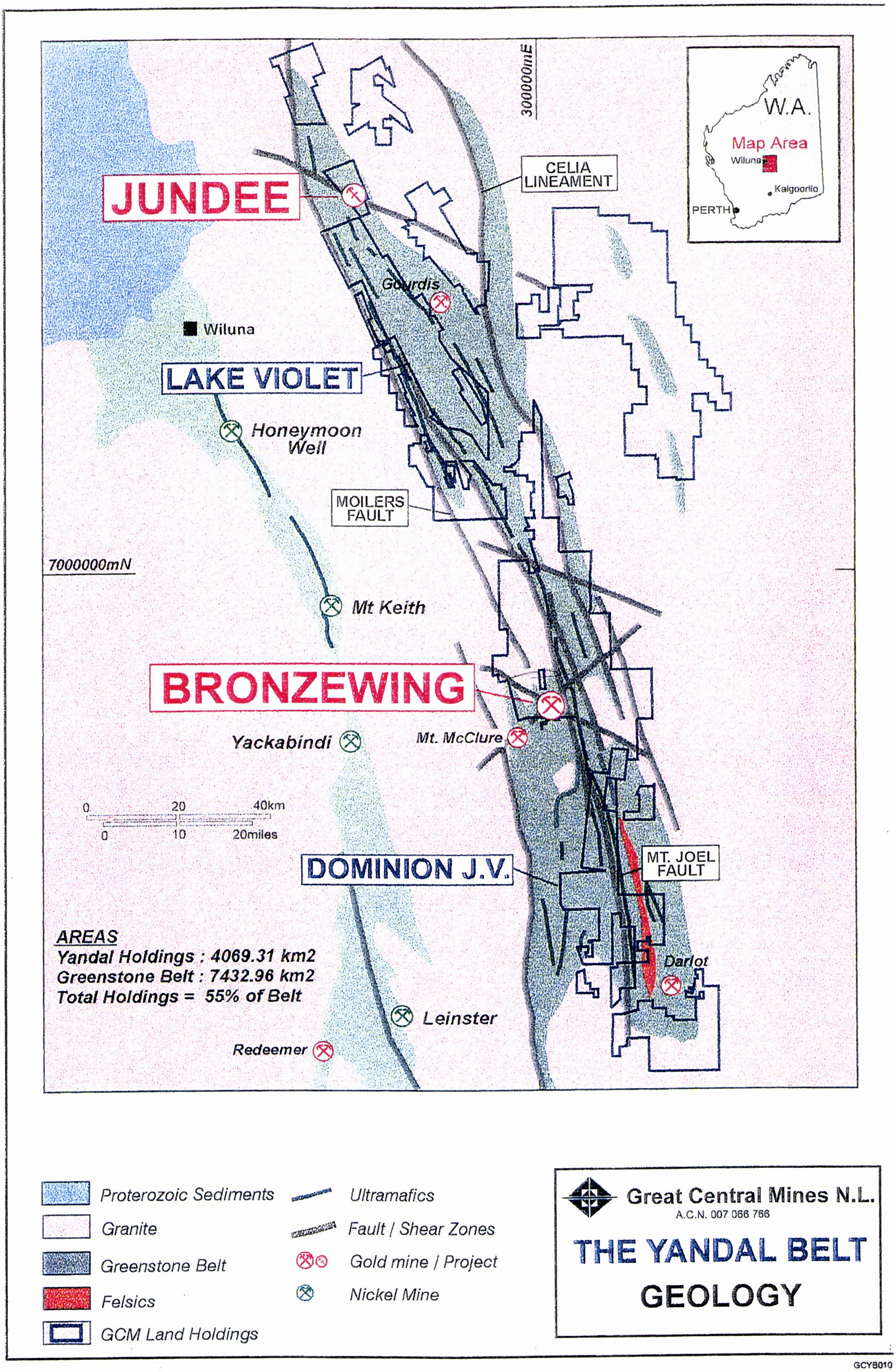


Figure 1: Yandal Belt geology and location of the Bronzewing Au deposit (courtesy of Great Central Mines NL).

of the year are strong easterlies during the summer and a combination of strong easterlies and westerlies in the winter. Annual evaporation exceeds rainfall by a factor of 10 and generally only a very limited proportion of the rainfall recharges the groundwater.

The vegetation throughout the Sir Samuel sheet area (Burbidge, 1943) consists of four physiographic units. Broad flood plains of colluvium, alluvium and sheetwash are characterised by small shrubs and mulga (*Acacia* spp., predominantly *A. aneura*) with *Cassia* sp., *Eucalyptus* sp. and sandalwood (*Santalum* sp) in defined creeks. Areas of rock outcrop and adjacent colluvium have mainly mulga, with some sheoak (*Casuarina* sp.), kurrajong (*Brachychiton* sp.) and shrubs. Areas marginal to salt lakes carry halophytes such as saltbush, samphire and bluebush, (*Atriplex* sp., *Arthrocnemum* sp. and *Kochia* sp., respectively). Sandplains are characterised by spinifex (*Triodia* sp.), commonly present as a sparse to moderate groundcover, under sparse to locally dense stands of mallee eucalypts.

2.2 Geology and mineralisation

The Bronzewing gold deposit is located on the central western margin of the NNW-trending Yandal Greenstone Belt (Figure 1). The belt is made up of tightly folded low- to medium-grade metamorphosed sediments and mafic, ultramafic and some felsic rocks, flanked by major shear zones which juxtapose those greenstones with granite gneisses and younger granites (Bunting and Williams, 1979).

The local geology is dominated by upper greenschist facies rocks, commonly massive tholeiitic pillow basalts and dolerite (Figure 2). Ultramafic and gabbroic bodies are also present at the west and northwest part of the main deposit. A north striking diorite body intrudes the sequence to the southeast of the Discovery pit (Herbison and Bravo, 1993).

Gold mineralisation is associated with veins and dense stockworks of quartz within variably sheared and altered pillow basalts and is accompanied by pyrite, pyrrhotite, minor chalcopyrite, scheelite and visible Au. The host basalts are marked by a near-vertical, north trending, east-dipping schistosity, within and peripheral to brittle-ductile structures. The mineralisation is contained within a zone about 2 km long, 500 m wide and open at depth. The vein systems are generally sulphide-poor, although pyrite may be locally abundant with some pyrrhotite and chalcopyrite.

The mineralisation in the Central Zone is characterised by abundant free Au, up to 5 mm within veins and peripheral to intensely altered vein selvedges, chalcopyrite, tellurides and scheelite are locally common accessory minerals in areas of higher grade (Blucher, unpublished presentation, 1996). Thus, from the fresh rock environment, Cu, Te, W and Au may be pathfinder elements. Mineralisation ranges from isolated quartz veins to a quartz stockwork 5-80 m wide, up to 130 m in strike northeast and plunging southeast more than 400 m. Alteration around mineralisation comprises a pervasive muscovite-carbonate-biotite-pyrite- chlorite assemblage, up to tens of metres wide. Mineralisation in the Discovery pit has similar characteristics, but the orebody plunges steeply north (Blucher, unpublished presentation, 1996).

Gold has accumulated in sufficient quantities within the lateritic residuum of the Laterite and Central pits to form additional shallow deposits. Supergene enrichment of Au within the saprolite is negligible.

2.3 Geomorphology

The Bronzewing district is broadly undulating, characterised by the low relief typical of the Yilgarn Craton. It ranges in elevation from 575 to 461 above mean sea level (amsl). The Bronzewing mine site is at about 500 m and is situated on an alluvial mulga flat, adjacent to the Bates Creek drainage, and slopes very gently west-southwest (see Figure 5A). The few hills generally occur on secondarily silicified and ferruginised or relatively unweathered Archaean greenstones, regularly forming strike ridges. Greater relief variation, such as at breakaway scarps, occurs where there has been differential stripping of the regolith. Below the breakaways, gentle slopes of main valleys are produced by active but intermittent drainage and by localised deposition of sediments.

Bates Creek and its tributaries in the south and west of the mapped area form drainage channels trending east and northeast toward Lake Maitland and associated playas. Creek bed definition is very variable. In places, they may be 15 m wide and 2 m deep but, both upstream and downstream, become a complex of merging anabranches. Recharge to the groundwater system is severely limited by high evaporation. Indirect recharge may occur in the vicinity of surface creeks during periods of rainfall. No surface water was present at the time of the fieldwork, but water may be retained temporarily after heavy rains, in the creek beds and in the playas to the northeast. Groundwater throughflow in the direct vicinity of the Bronzewing deposit is likely to occur from the southwest.

Local topographic complexities generally occur where the extensive, deep weathered mantle has been modified by erosion. These erosional zones physiographically separate the gently undulating uplands from alluvial plains. Jutson (1950) referred to these uplands as portions of the 'Old Plateau'. He perceived a 'New Plateau' developing as a consequence of the erosion of the 'Old Plateau'. However, in many parts of the Yilgarn, there are areas that could, within the content of the theory, be classified as 'Old Plateau', but are not clearly separated from the younger surface and merge with it, by way of long, gentle slopes and by burial under extensive sheets of transported detritus, mainly derived from discontinuous erosional tracts. An alternative is the etchplain concept (Wayland, 1933) which emphasises deep, chemical weathering and differential stripping of a deeply weathered mantle, rather than regional drainage rejuvenation and continent-wide landsurfaces. This concept has been used to classify weathered terrain in west Africa (Thomas, 1965) and in south-western Australia (Finkl and Churchward, 1973) and has widespread application to the Yilgarn Craton.

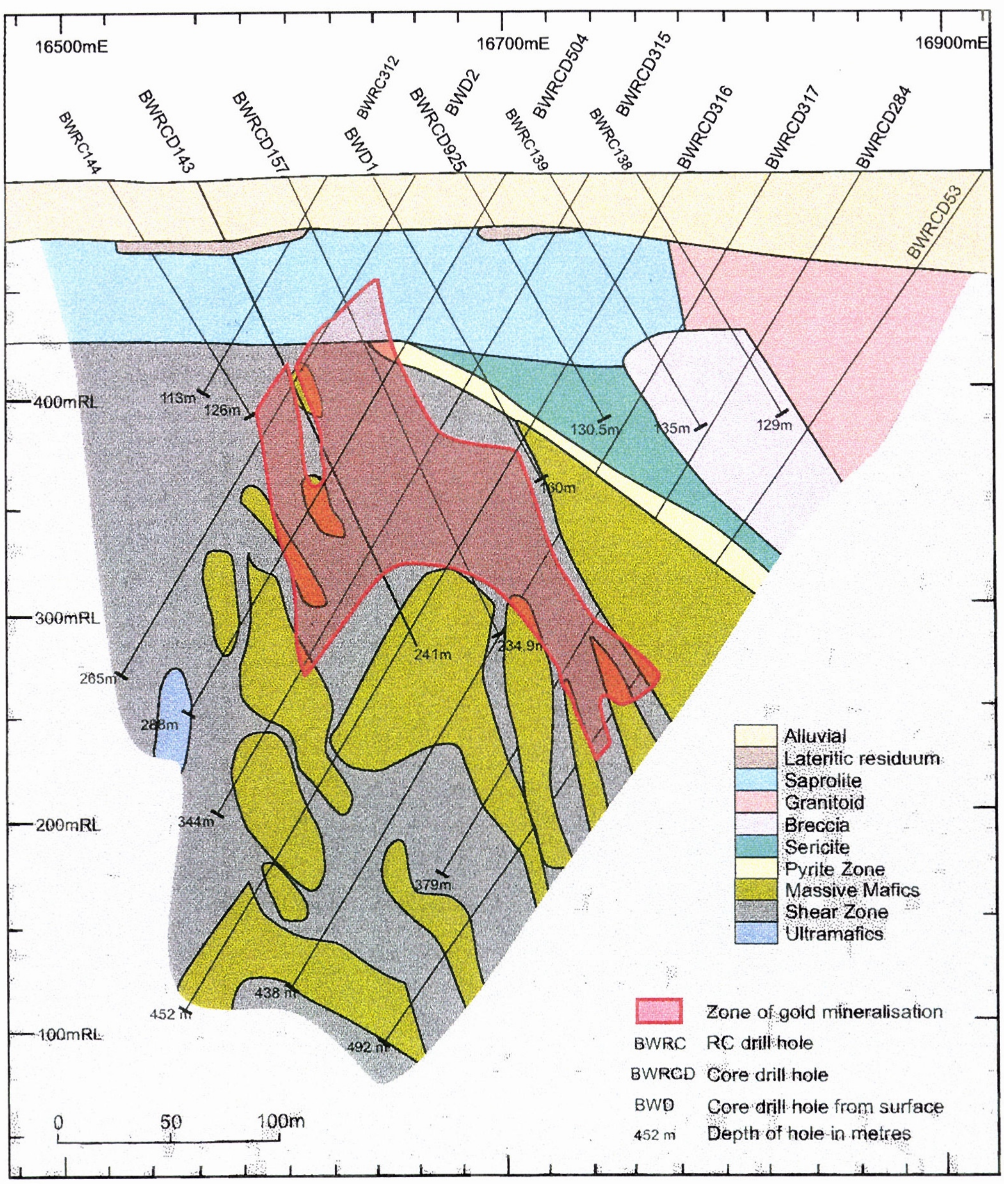
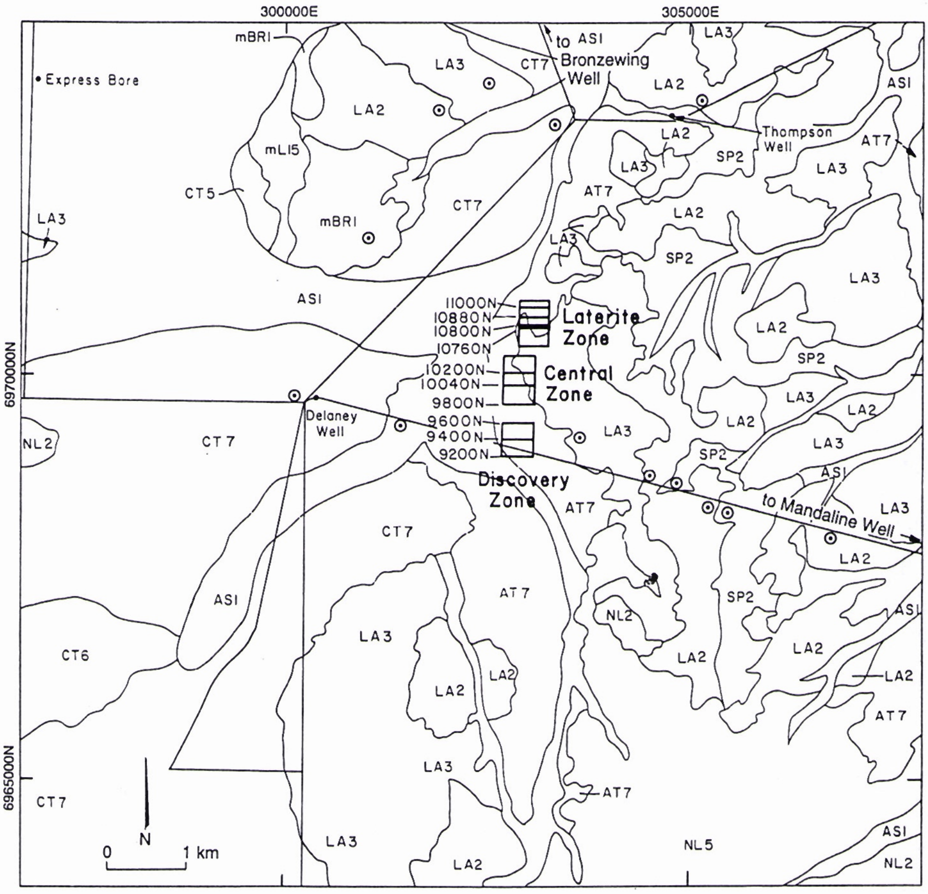


Figure 2: Mineralisation across line 9360N within the Discovery Zone (courtesy of Great Central Mines NL)

3. REGOLITH-LANDFORM RELATIONSHIPS

The distribution of regolith and landforms in the district, centred on the Bronzewing deposit, have been mapped at 1:50 000 (Appendix 1). The map covers some 1000 km^2 (285000 to 315000 E and 6965000 to 7000000 N) and was based on interpretation of black and white aerial photographs (1: 50 000) and Landsat TM imagery and checked by field traverses. A portion of the complete regolith-landform map, centred on the Bronzewing deposit area is presented in Figure 3. Regolith-landform relationships are summarised in Figure 4.



Regolith units immediately surrounding the Bronzewing Deposit

LA2	Lateritic nodules and pisoliths, fragments of lateritic duricrust, Fe-saprolite and mottles, crests
LA3	Fe-saprolite, mottles, lateritic nodules and pisoliths, backslopes
NL2	Iron segregations, low hills, pediment slopes
NL5	Ferruginous granules, stripped slopes, undulating plains
LI5	Bedrock, saprock and quartz fragments, crests, stripped slopes
SP2	Ferruginous saprolite, crests, breakaways, low hills
BR1	Ferruginous bedrock, crests. low hills
AS1	Red clays, alluvial plains, drainage floors
CT5	Saprolite present beneath colluvial sediments
CT6	Bedrock present beneath colluvial sediments
CT7	Colluvium on unknown substrate
AT7	Alluvium on unknown substrate (polymictic lag of ferruginous saprolite, ferruginous granules, lithic fragments)
⊙	Recorded observation points

m = mafic

This map uses an uncontrolled photomosaic as its base: some minor distortion occurs.

Figure 3: Portion of regolith-landform map of the Bronzewing district. For complete map see map packet.

3.1 Aerial photograph patterns

The photographs display tones, patterns and textures that reflect changes in vegetation, soil type and local relief related to outcropping bedrock and regolith and to ephemeral streams. Gently undulating, granitic sandplains may be identified from an even-textured, finely stippled, medium-grey tone related to the extensive Spinifex (*Triodia* spp.) on loamy sand soils of the sandplains in the northwest quadrant. Evenly textured, dark areas on gently sloping backslopes and breakaways and low undulating hills are characteristic of exposed lateritic gravels. This contrasts with the generally patchy mosaic of white, grey and dark grey tones typical of largely bare, hilly areas, where erosion is the predominant geomorphological process. White patches in these areas are bleached saprolite, quartz lag, and/or exposed pedogenic calcrete. Playas in the northeast form groups of flat, even, light-coloured lakes and associated sediments. Valley calcrete has formed in the northeast of the mapped area and is identified by coarse, light and dark, stippled mounds and basins along relict drainage lines.

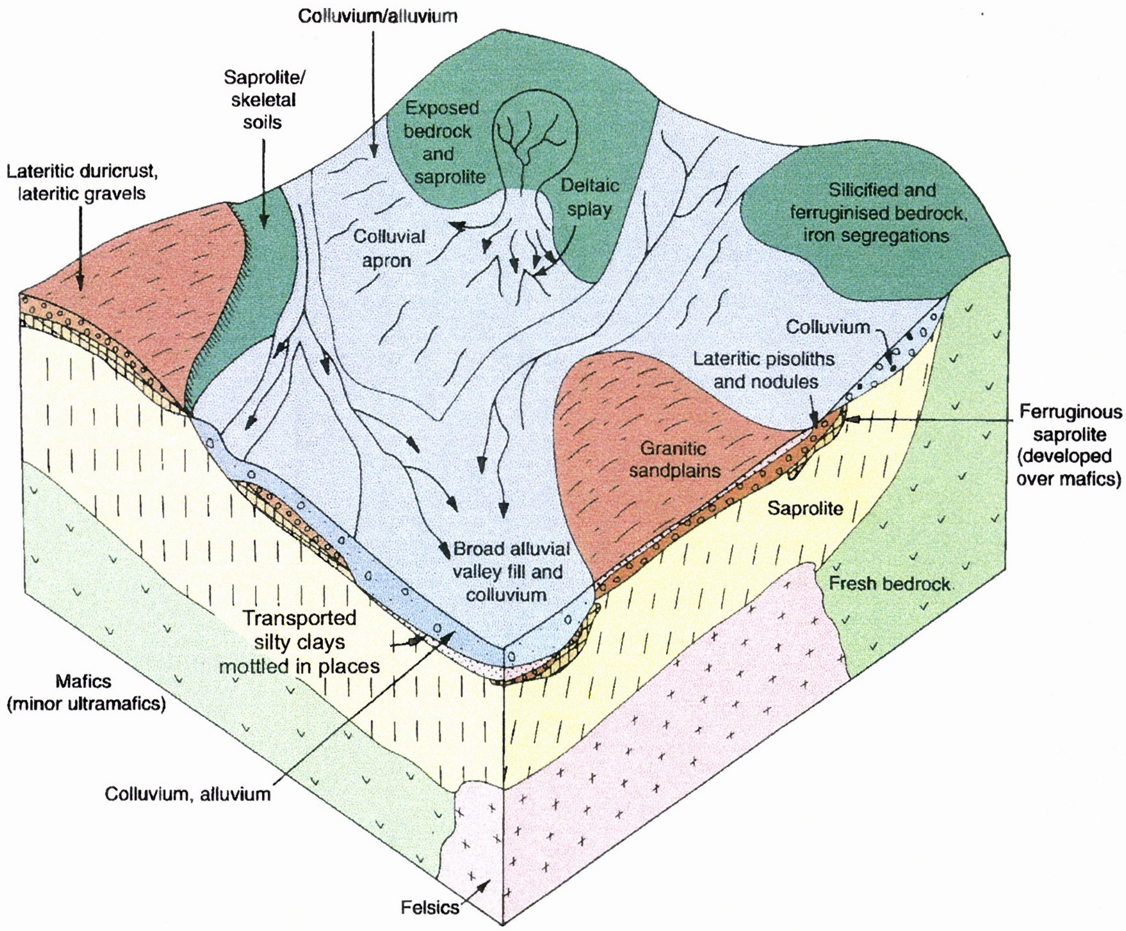


Figure 4: Block diagram showing regolith-landform relationships for the Bronzewing district.

3.2 Regolith distribution

3.2.1 *Ferruginous materials*

The map shows twenty one regolith-landform mapping units developed on mafic, ultramafic and granitic lithologies. Details of these are shown in Appendix 2. The pattern of regolith types at Bronzewing relates closely to bedrock geology, landforms and to varying degrees of erosional and depositional modification of the deeply weathered mantle. Generally, areas developed on greenstones are mantled by various ferruginous lags and, on some crests, lateritic duricrusts occur (Figure 5B, C). Pockets of calcrete occur in bedrock-and saprock-dominated areas. In contrast, areas that overlie granitoids have little lag, much less carbonate and have sandy soils. Well-developed nodular or pisolitic structures are not common on the faces of breakaway scarps on any lithology. The capping on granite is generally greyish-white, gritty, kaolinitic clay, case-hardened by silicification. In contrast, many breakaway scarps on weathered greenstones are developed on more uniformly ferruginised and indurated saprolite (Figure 5D, E). Most duricrusts comprise ferruginous saprolite and these are generally massive. Iron-rich duricrusts, as extensive caps and slabs, are not common.

Crests and associated backslopes are gently sloping, commonly reaching 3-10 m above their surroundings, and are separated by pediments and erosional plains. Most crests are slightly stripped, with consequent exposure of an array of ferruginous materials from the upper parts of the regolith. These are predominantly ferruginous saprolite, but there are also some pisoliths, nodules and fragments of duricrust, clay and sand released by weathering (Figure 5B). Nodules with yellow cutans are common. Such materials contribute to the colluvial mantle that extends down slope from the crest, covering the nodular horizon; the latter forming the more extensive substratum of the backslopes. The backslopes are mantled with fine, nodular to pisolitic lag; this is coarse upslope, on the fringes of duricrust-capped crests, and becomes fine (<10 mm) down slope. On the backslopes, colluvium is less than 3 m thick and nodular horizon can occur in places. As it is not present everywhere, colluvium can rest directly on ferruginous saprolite or saprolite. The soils are acidic and have developed in a fine, sandy loam colluvium which has granules of similar composition to the lag. Hardpan appears at a depth of 1 m and continues to 3-5 m.

Lateral variations in duricrust morphologies occur in the Bronzewing area. Nodular duricrust is the most common. The mid and lower-slope positions, are dominated by nodular and fragmental duricrusts, typically underlain by collapsed ferruginous saprolite. In contrast, nodular duricrust is generally absent on crests and upslopes where massive, mottled or vermiform duricrusts occur.

Mottled duricrust is a very hard, non-magnetic, ferruginous material, irregularly and diffusely mottled various shades of light brown and red-brown. Vermiform, nodular and incipient pisolitic structures are present. Where coarse, vermiform voids are common, the materials are termed vermiform duricrusts. Some duricrusts comprise ferruginous saprolite and these are generally brown and massive. In part, these can have irregular, diffuse, light brown mottles.

3.2.2 *Saprolite*

The landforms and regolith types in the erosional areas are more complex, reflecting active geomorphic processes. Deeper units of the weathered mantle and country rock are exposed. The regolith is dominated by a shallow, generally calcareous soil, and a lag of lithic fragments and ferruginous saprolite; there are outcrops of saprock, saprolite, vein quartz and goethitic Fe segregations. The fragments of Fe segregations occur on low hills and undulating tracts; these conceal the underlying ferruginous saprolite or saprolite which, in places, is exposed at the surface (Figure 5F). The Fe segregations are very similar to those described for the Lawlers and Mt McClure areas (Anand *et al.*, 1991). They are dense, dark brown to black, non-magnetic and are dominated by goethite with variable amounts of hematite and quartz. Maghemite and kaolinite are absent. The interiors of the Fe segregations are riddled with solution cavities, filled with brownish yellow, highly crystalline secondary goethite. Some cavities are lined with chalcedony.

Gently sloping pediments occur below low breakaways. These slopes are mantled by acidic red earths, developed in a pedisediment, and are covered by a lag of coarse, ferruginous saprolite, lithic fragments and quartz. Erosion is less active in these areas. ferruginisation of bedrock is more common in the mafic greenstone sequences than in the felsics sequences. Examples may be found 3 km north of Bronzewing, around Mt. Joel, and in the central and western parts of the study area.

Figure 5: Regolith and landforms

(A) Looking south to the Bronzewing deposits, situated on a flat, depositional plain. Fragments of ferruginous saprolite and lateritic nodules are in the foreground.

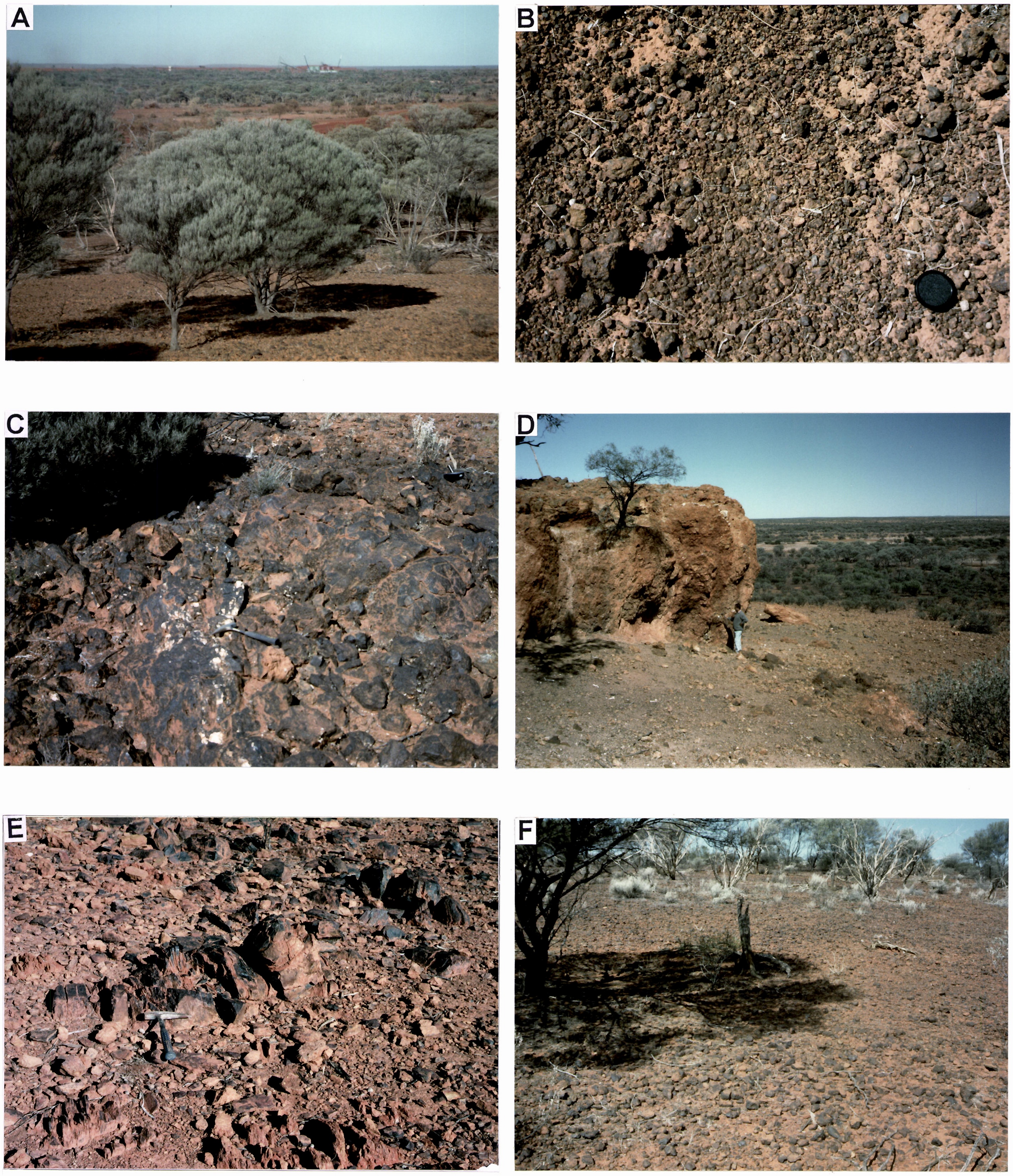
(B) Lag of lateritic nodules, pisoliths and fragments of lateritic duricrust on crest.

(C) Massive lateritic duricrust on crest.

(D) A major breakaway comprising an erosional escarpment that gives way to steep debris slope below.

(E) Ferruginous saprolite on a stripped crest.

(F) Abundant lag of cobbles of goethite-rich iron segregations.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3.2.3 *Colluvium and alluvium*

Colluvial and alluvial outwash plains form widespread regolith-landform units that account for about 50% of the mapped area. Their surfaces are strewn with polymictic lag. Detailed stratigraphy from drilling in these areas has indicated the variable nature of the substrate. Beneath this colluvial-alluvial cover are concealed (a) earlier depositional regimes, consisting of megamottled, clay-rich materials, confined to palaeochannels and (b) extensive areas where profiles with lateritic residuum are preserved. Their distributions are erratic and difficult to predict, because of partial stripping of the old surface, and can only be revealed by systematic drilling.

Transported overburden reaches 120 m in thickness and comprises soil, hardpanised silty colluvium, gravelly hardpanised colluvium, lenses of transported gravels, dolocretes, megamottled clays and variably coloured smectitic, puggy clays. Smectite-kaolinite-rich puggy clays are common in palaeochannel infill sediments and, in places, (for example, at Mt. Joel), these are characterised by well-rounded *in situ* pisoliths, with greenish brown to grey multiple cutans, in a matrix of pale-pink clays with minor detrital quartz. Pisoliths are typical of the palaeochannel profiles in the Yilgarn Craton (Anand *et al.*, 1993). The origins of the sediments range from proximal to distal. Sub-horizontal to horizontal laminations have developed within the upper several metres of the profile, commonly marked by thin coatings of precipitated MnO_2. These result from surficial process referred to as hardpanisation, which includes partial cementation of the regolith by hyalite and Fe oxides. In detail, hardpanisation is not stratigraphically controlled but transgresses lithologic contacts and locally extends through colluvium into the underlying, loose nodules. Hardpan reaches maximum development within 2 m of surface; the maximum depth of hardpan observed was about 15 m. The thickness of hardpan steadily decreases to the breakaway scarp where it is draped over the breakaway embayment and has permeated downwards into ferruginous saprolite.

Wanderrie banks occur on depositional plains. These have resulted from differential deposition from unchannelled sheet floods, which have segregated the coarse fraction into low, sandy rises, preferred by mulga plant communities.

Calcrete in valley drainages is restricted to the north and northeast portion of the mapped area. Rubbly calcrete is generally raised above the low-lying surrounds landscape, forming a complex of raised mounds and soil-filled depressions or 'mini-karst' landscape.

4. REGOLITH STRATIGRAPHY AND CHARACTERISTICS

4.1 Introduction

In the immediate vicinity of the Bronzewing deposit, the regolith consists of surface hardpanised, red-brown colluvium and alluvium of variable thickness, overlain by a polymictic lag. Beneath this, the degree of complexity varies considerably and drill spoil logging was necessary to reveal the details. In many places, particularly around the Laterite and Central pits, colluvium and alluvium overlie lateritic residuum, collapsed ferruginous saprolite, ferruginous saprolite and saprolite, developed largely on basalt and dolerite. Elsewhere, notably around the Discovery pit, colluvium and alluvium are largely underlain by saprolite. Parts of the colluvium are underlain by mottled clay sediments that infill palaeovalleys cut into saprolite or lateritic residuum.

The stratigraphy was compiled by logging cuttings from over 200 RAB and RC holes along 14 east-west, and 2 north-south orientated lines over and adjacent to mineralisation (Figure 6), prior to the commencement of mining. The co-ordinates used relate to the local exploration grid. The stratigraphic sections in Figures 7-12 have been confirmed by examination of the pit walls since mining.

As the present surface is essentially flat, the thickness of transported overburden, shown in Figure 13A, B, is directly related to the palaeotopography. This information is based on Great Central Mines (GCM) data from 1481 RAB holes. The palaeosurface of the residual profile on the basement shows that the deposit is on a north and east trending palaeohigh. Within the 2.0 x 2.5 km minesite area at Bronzewing, the present topography varies by only 7 m between Bates Creek in the west to the low hill on which the plant has been constructed in the east. The bed of Bates Creek was once approximately 50 m below the present surface and palaeochannels ran southeast to northwest through the deposit area. The direction of Bates Creek and the palaeochannels probably were controlled by north-trending bedrocks and cross cutting faults. A basin to the southwest of the deposit area was the site of clay and silt deposition over the Discovery orebody.

4.2 Regolith stratigraphic units

The regolith stratigraphy consists of two principal components, transported overburden and a residual lateritic weathering profile. A general stratigraphic column for the regolith in the vicinity of the Bronzewing deposit is shown in Figure 14; Figures 15 and 16 are guides to identification of units in the field.

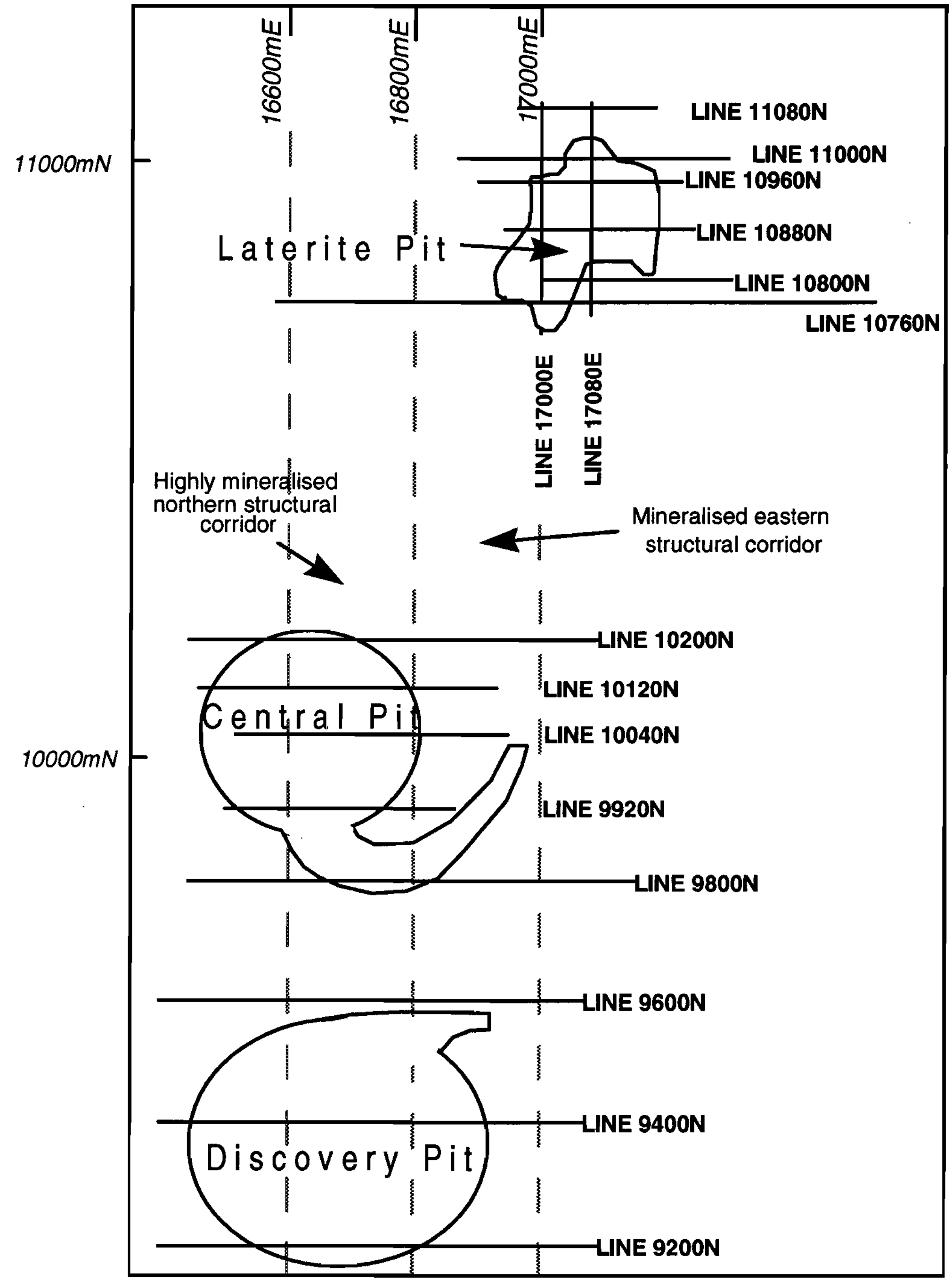


Figure 6: Plan of stratigraphic section locations relative to mineralisation and present pit locations at Bronzewing.

4.2.1 *Transported overburden*

Colluvium and alluvium on slopes, and in valleys and basins, has covered much of the weathered Archaean bedrock. In the Discovery Zone, a 20-30 m thick mantle of sediments directly overlies saprolite. The sedimentary cover is 15-20 m thick in the southwest of the Central pit (Figures 17A, B) and thins toward the northeast to less than 5 m in the Laterite pit. There are three principal sedimentary units: soil, colluvium/alluvium and palaeochannel clays.

Soil

Red-brown soils are developed in the top 0.5-1 m of colluvium and alluvium (see Figures 7-12) over the entire area. The soil consists of sand, silt and clay with a few polymict granules to small pebble-sized clasts of alluvial and colluvial origin. Vein and detrital quartz grains are common. Faceted and polished sand- to silt-sized surficial quartz grains indicate an aeolian component to the soil. Brown to black ferruginous silt to granule sized clasts (the products of mechanical erosion of lateritic residuum, iron segregations, ferruginous saprolite and ferruginous bedrock), are also abundant. The soil grades into the hardpanised unit below (Figures 15 and 16).

Colluvium and alluvium

These sediments consists of alluvial deposits, colluvial talus and detrital sheets derived from up slope during occasional flooding and sheetwash events. In general, the colluvial and alluvial deposits fine upward so they may be subdivided into upper, silty components and lower gravelly components, which generally comprise the lower few metres of the cover (Figure 18 A,B). Hardpanisation is largely restricted to the upper, silty unit, which reaches a thickness of 5 m. It consists of kaolinite, goethite, hematite, mica, rutile and anatase with minor black, hematite-rich ferruginous granules (without cutans) and sub-angular to angular quartz pebbles. Hardpanisation also affects the gravelly colluvium-alluvium where it occurs in the top few metres of the profile, such as in the Laterite pit (Figures 7-12).

The gravelly colluvium/alluvium may be divided into an upper unit with polymictic gravels and a lower unit with homogenous gravels. The upper unit contains distally transported polymictic gravels composed of sub-rounded to rounded ferruginous clasts (0.2-10 mm), vein and detrital quartz, and lithic fragments. Polymictic clasts indicate a distal provenance, as does a high proportion of black, well worn, sub-spherical ferruginous granules. The lower unit consists of coarse (5-20 mm) locally transported nodules and some pisoliths (Figure 18B). These gravels consist of hematite, goethite, kaolinite, maghemite, gibbsite, quartz and anatase. Here, nodules have partly worn cutans. Some voids in the matrix are lined with brown, goethitic clay.

Transported lateritic nodules and pisoliths may be identified by worn goethitic cutans, or the complete absence of cutans. Gravels of a local provenance contain less worn clasts of more homogeneous composition.

Contrary to the general trend of the sediments to fine toward the top, in the southwest of the deposit area, where the transported overburden is deepest, the base of the gravelly colluvium-alluvium grades laterally, into silty clay alluvium that has been mottled since deposition.

Palaeochannel clays

Fine, alluvial clays are exposed in the Central and Discovery pits, occupying the lower 5-30 m of cover. These clays occupy a palaeochannel and have been subjected to intensive post-depositional mottling (Figure 17E). This megamottled zone is typical of palaeochannel clays in the Yilgarn Craton (Anand *et al.*, 1993; Kern and Commander, 1993). Palaeochannel clays may overlie either saprolite or a nodular zone (Figure 17F). In the south wall of the Central pit, the contact between the mottled clays and the nodular horizon is sharp and is marked by a distinctive fabric change (Figure 17F). The mottled clays become progressively more Fe-rich. At the top of the megamottled clays, the matrix has been dissolved leaving collapsed mottles.

A channel, over 30 m deep, runs through the eastern wall of the Discovery pit along its northern wall and into Bates Creek through its western wall. The section exposed in the western wall of the Discovery pit has residual, lateritic nodules at its base which are underlain by ferruginous saprolite (Figure 19). These nodules are ferruginous at the base but have been silicified as they grade into the overlying smectitic clay. The nodules largely consist of goethite, hematite, kaolinite, gibbsite and

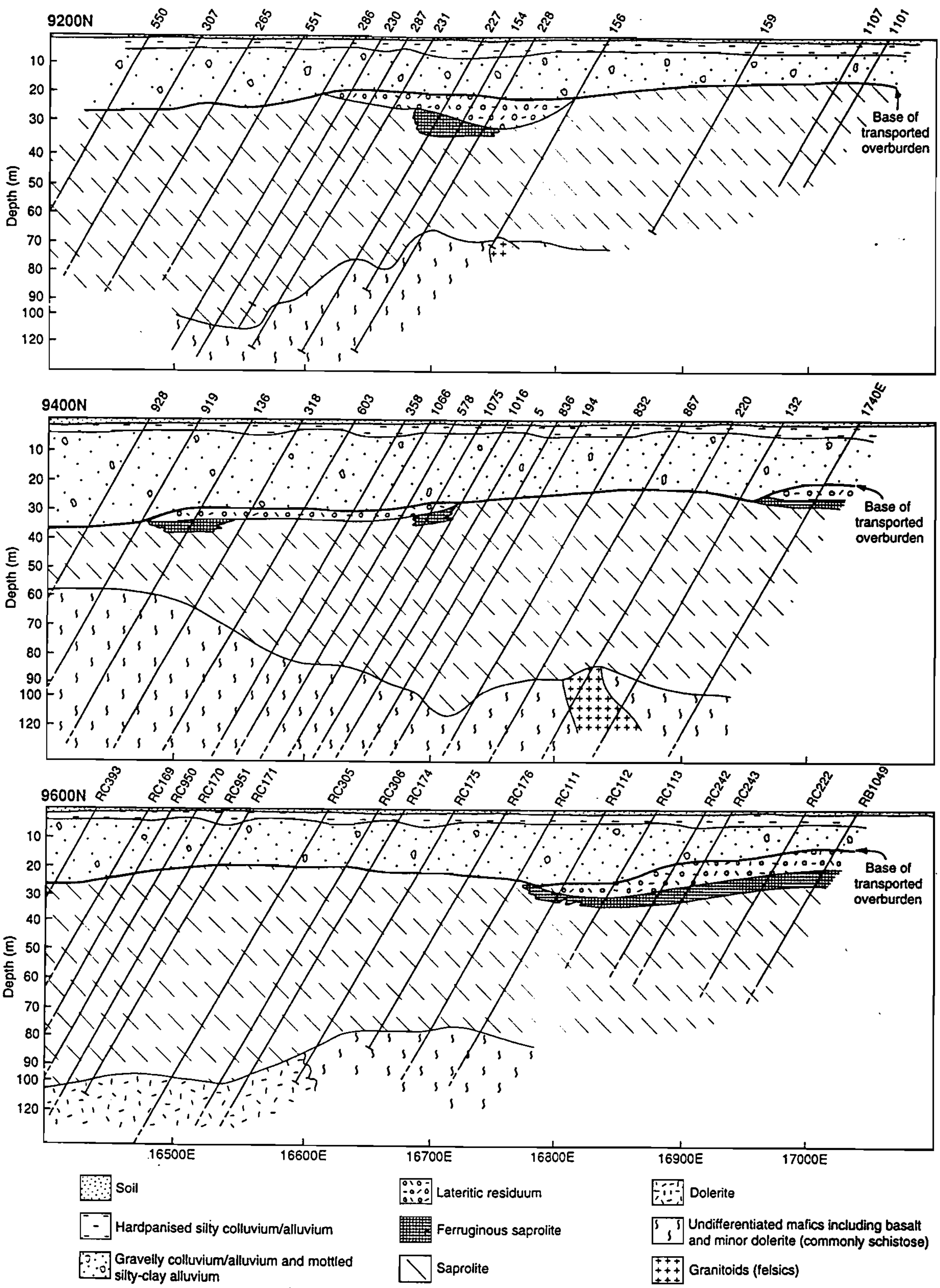


Figure 7: Regolith stratigraphic sections, Lines 9200N, 9400N and 9600N.

quartz. Above the nodular zone, there is a lens of dolocrete, up to 5 m thick, which appears to be continuous across the pit and has a very similar upper surface RL as a dolocrete lens in the Central pit. It consists entirely of dolomite which is consistent with its chemical composition (1.1% SiO_2, 0.3% Al_2O_3, 0.3% Fe_2O_3, 21.2% MgO and 30% CaO). There is an evidence of extensive vegetation growing over the dolocrete as abundant root holes, now filled with green clay, are found in its upper part. Similar dolocrete from palaeochannels in the Kalgoorlie region have been described by Kern and Commander (1993).

Above the dolocrete are deposits of fine alluvial red clay that have undergone several phases of weathering. The alluvial clays contain large vertical mottles of hematite-kaolinite-quartz 10 cm in diameter and over a metre deep.

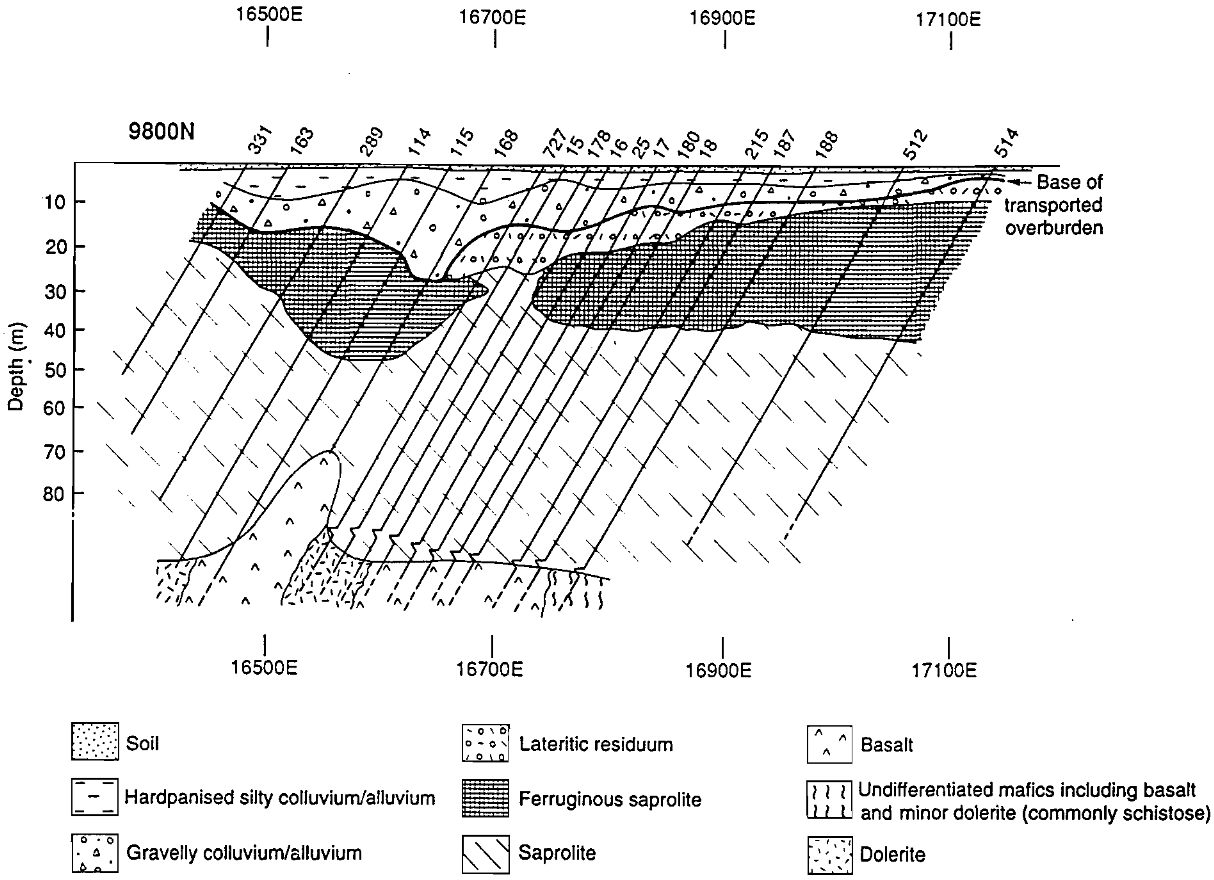


Figure 8: Regolith stratigraphic section, Line 9800N.

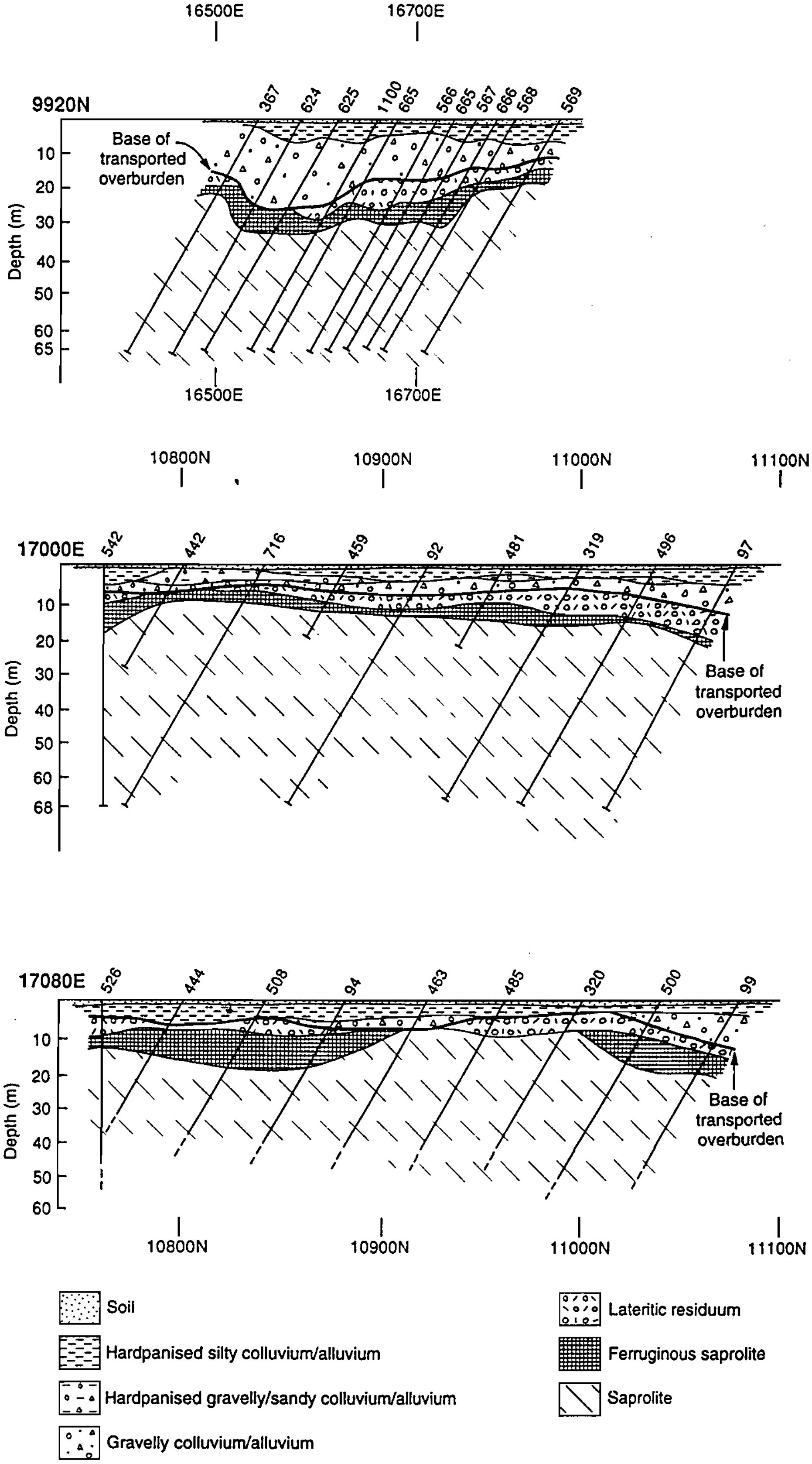


Figure 9: Regolith stratigraphic sections, Lines 9920N, 17000E and 17080E.

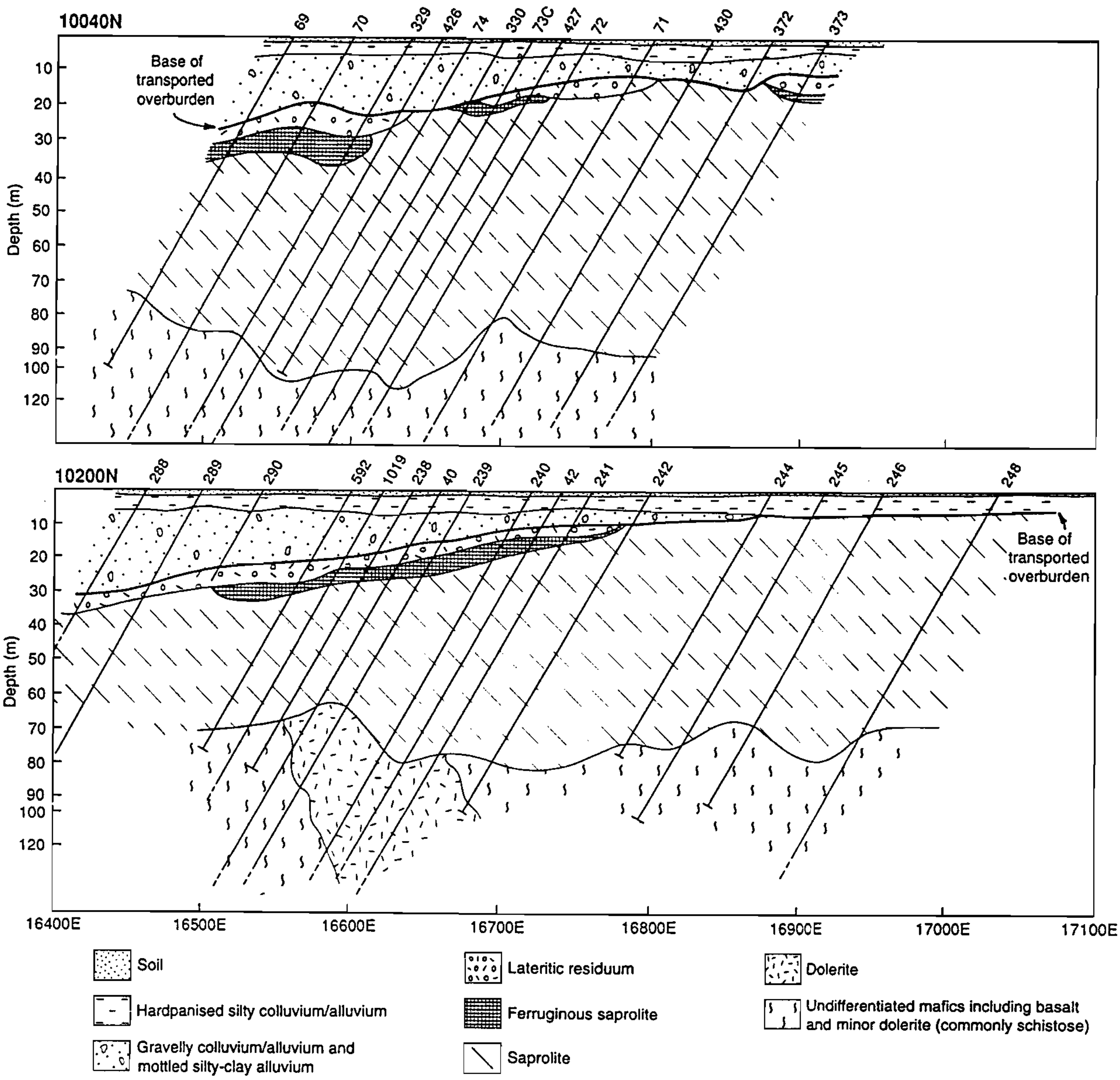


Figure 10: Regolith stratigraphic sections, Lines 10040N and 10200N.

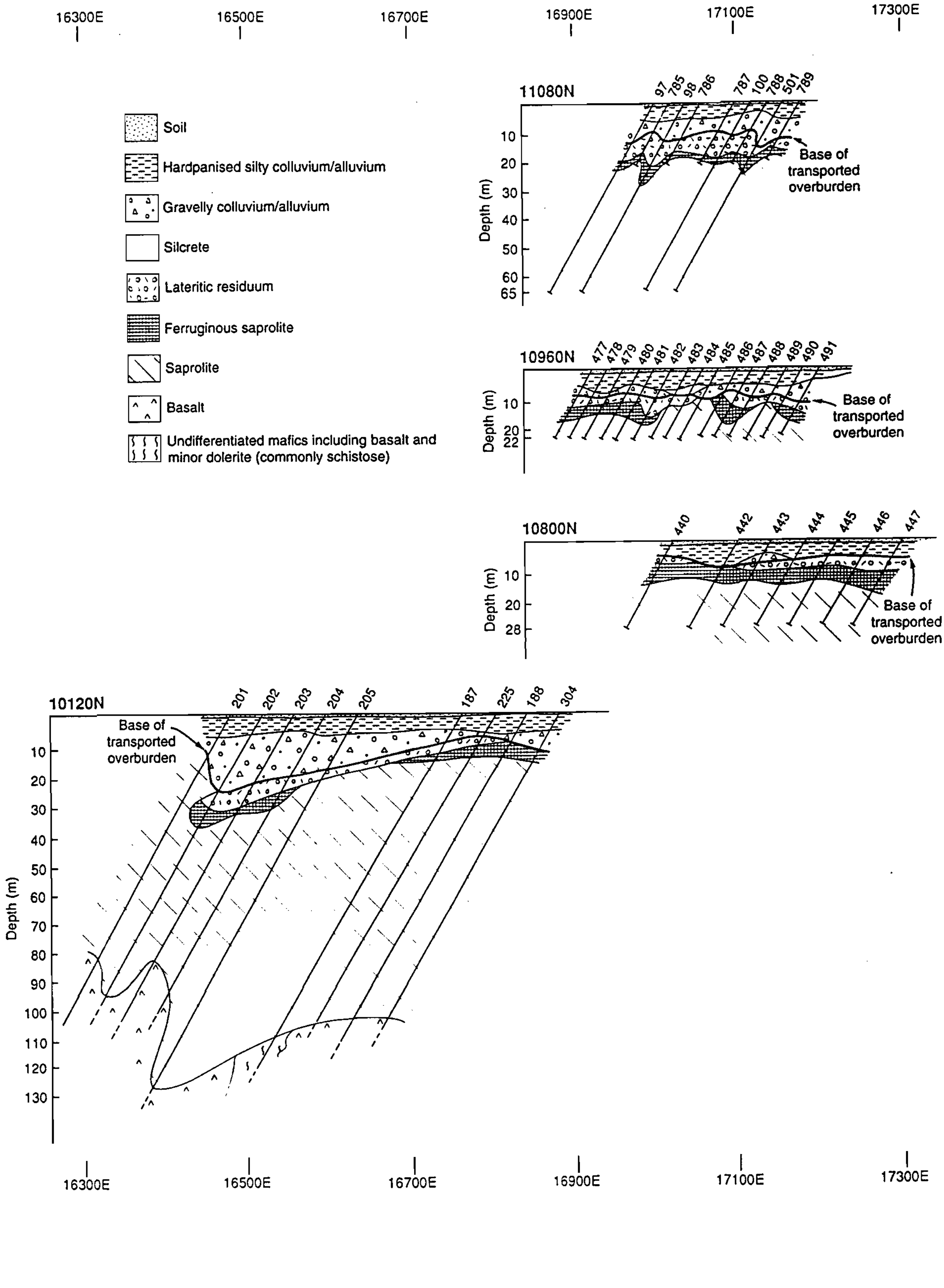


Figure 11: Regolith stratigraphic sections, Lines 11080N, 10960N, 10800N and 10120N.

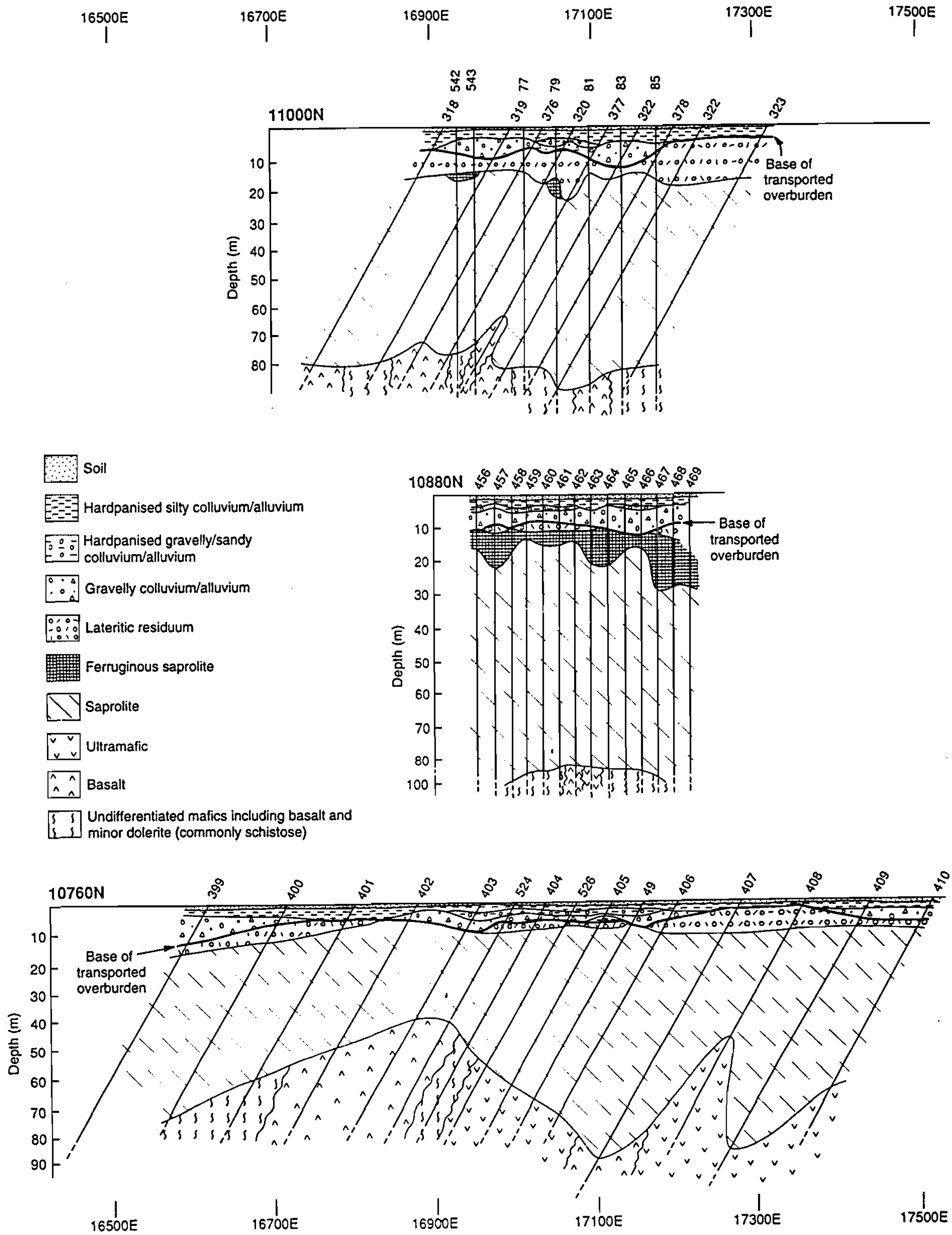


Figure 12: Regolith stratigraphic sections, Lines 11000N, 10880N and 10760N.

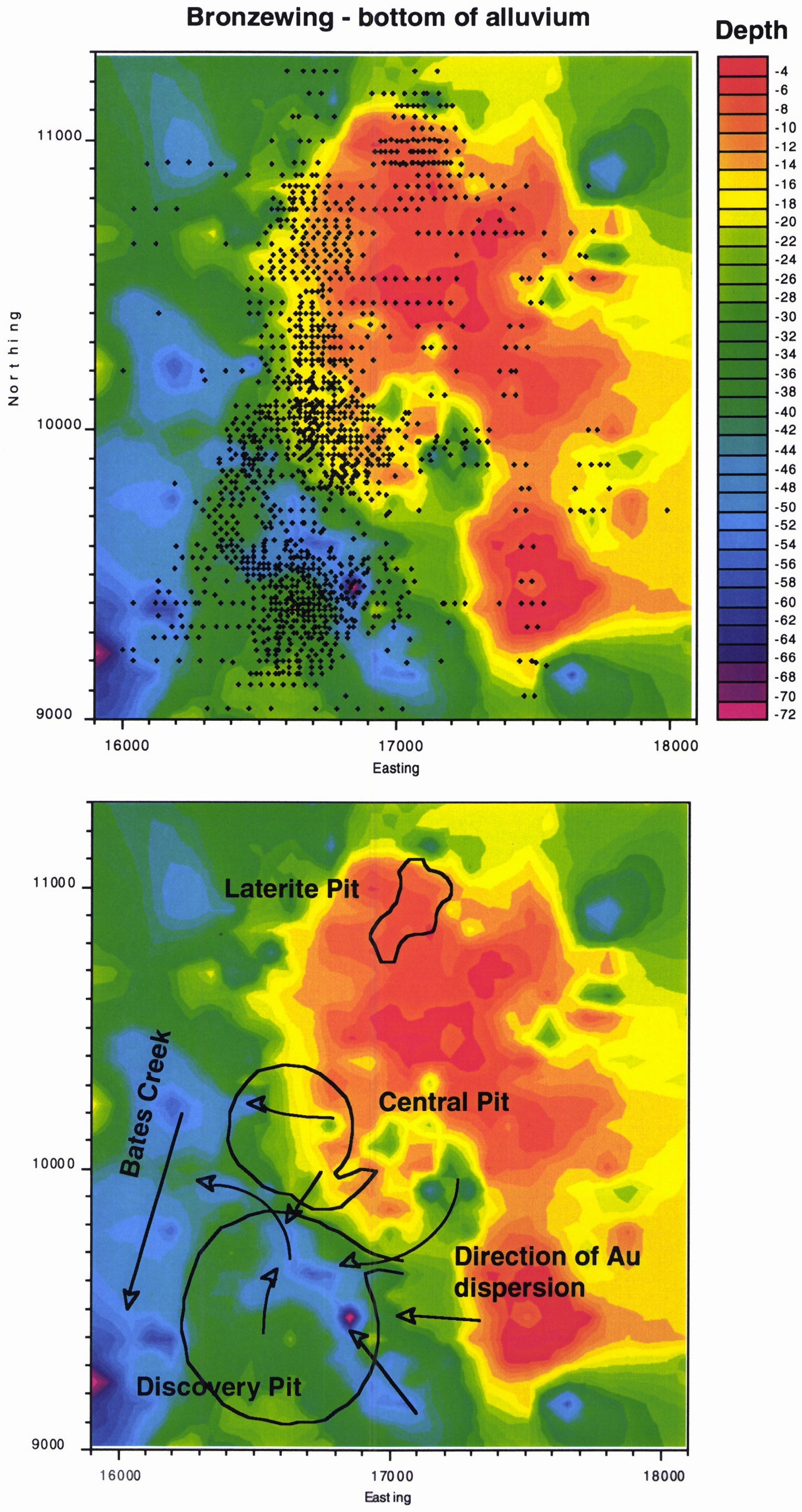
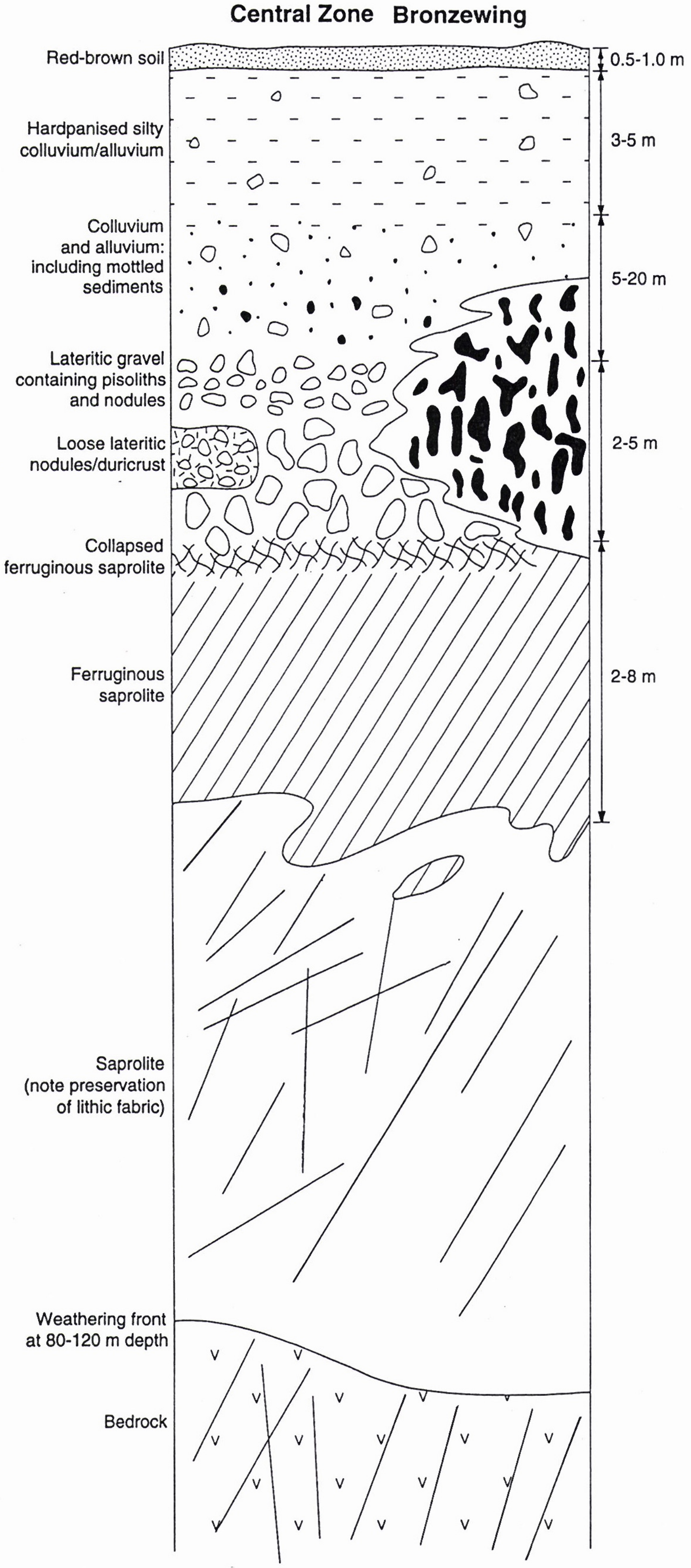


Figure 13: Thickness of transported overburden indicating palaeotopography.



Unconsolidated red-brown sandy clay.

Hardpanised silty colluvial and alluvial gravels - Characterised by coarse subhorizontal laminations of opaline silica or hyalite cement. Hardpanisation decreases with depth.

Gravelly colluvium and alluvium - The coarse fraction consists of polymict clasts, including vein quartz, fine ferruginous nodules, and lithic fragments of distal provenance, and locally transported ferruginous, lateritic nodules and pisoliths. The western wall of the Central Pit exposes a section through mottled sediments. The mottled cover here directly overlies saprolite. The interface between cover and saprolite represents the predepositional landsurface.

Lateritic horizon - When fully preserved, the top metre or so of this horizon is composed of 0.5 to 2 cm diameter lateritic nodules and pisoliths loosely set within a matrix of red-brown silty clay. Toward the base of the ferruginous horizon larger nodules up to 4 or 5 cm diameter are also set within an unconsolidated silty matrix. Pods of highly indurated lateritic duricrust are present in some exposures about the Central Pit. Duricrust is far more common, however, in the Laterite Pit to the north.

Ferruginous saprolite - The ferruginous saprolite is stained a yellowish brown to purple colour by the concentration of Fe oxides in the uppermost few metres of the saprolite directly underlying the lateritic horizon. This unit consists of a puggy clay matrix containing 1 to 5 cm purple-brown to black incipient ferruginous nodules. These nodules or ferruginous segregations are subspherical to tabular in shape and commonly preserve primary fabrics.
The ferruginous saprolite has been subjected to solution weathering processes whereby much of the clay matrix has been removed. This has led to collapse, resulting in a relatively nodule-rich (matrix-poor) unit. With further ferruginisation, this material is thought to give rise to the lateritic nodules which lie above. Fragmentation of the nodules as the uppermost portion of the profile continues to collapse gives rise to the smaller nodules and pisoliths in the lateritic gravel.

Saprolite - Note presence of structural features and the structurally controlled collapse features at the base of the ferruginous saprolite/lateritic horizons. Solution processes concentrated along structural partings have removed clays from the uppermost saprolite creating voids and subsequent slumping of overlying materials.

Fresh bedrock is encountered at 80 to 120 m below the surface.

Figure 14: Stratigraphic column.

Away from the centre of the palaeochannel, the red clays are homogeneous and are unmottled (Figure 19). They consist largely of kaolinite, quartz and hematite. This zone is calcified and dolomitised and has calcite nodules and lenses of dolocrete which overlie collapsed ferruginous saprolite. Here, the dolocrete also contains kaolinite, quartz and hematite. Calcitic nodules contain small amounts of kaolinite and quartz.

The top 5-10 m of the channel sediments are unmottled, but have been hardpanised by Si and Fe induration, producing sub horizontal partings with surface coatings of Mn oxide. All of the materials above the lateritic nodules in the palaeochannel show signs of a gradual collapse of the profile, with slickenslide surfaces that commonly have Mn oxide sheets on their faces.

The palaeochannel section exposed in the eastern wall differs from that on the west by having an extensive layer of transported lateritic gravels, over 6 m thick, between the dolocrete and the fine clayey alluvium. The western sides of the Discovery and the Central pits have more gradual channel slopes than those exposed in the eastern side of the pit. The colluvium size also increases from west to east. The eastern sides of both pits have thick beds of locally derived lateritic gravels, indicating greater energy of erosion to the east, consistent with steeper slopes away from Bates Creek.

4.2.2 Residual profile

The residual profiles on mafic and ultramafic rocks vary in thickness from 60-90 m and consist of lateritic nodules and/or nodular duricrust, collapsed ferruginous saprolite, ferruginous saprolite, saprolite and bedrock (Figure 14).

Ferruginous zone (loose nodules and pisoliths, nodular duricrust, collapsed ferruginous saprolite, ferruginous saprolite)

Where it occurs, the top metre or so of the lateritic horizon is composed of 5-20 mm diameter lateritic nodules and pisoliths loosely set in a matrix of red-brown silty clay (Figure 18 C, D). The nodules are generally angular and platy fragments of ferruginous saprolite, composed mainly of hematite, goethite, kaolinite, gibbsite, quartz and anatase. Nodules may contain recognisable pseudomorphs after primary minerals (*e.g.* mica) or relict schist (Figure 20A, B) and have 1 mm thick yellow cutans. Many nodules at all levels display syneresis (contraction cracks). In places, colloform hematite fill the voids (Figure 20D). Where these are ovate to spherical, they form massive pisoliths (Figure 20C), but comprise only a small proportion of nodules. Towards the base of this unit, larger nodules, up to 40 or 50 mm in diameter, are present, set in an unconsolidated, silty matrix (Figure 18E).

Ferruginous saprolite is yellowish brown to reddish brown, composed largely of kaolinitic clay, variably impregnated by Fe-oxides (Figure 18F). Ferruginous saprolite is either uniformly ferruginised or may also consist of red, hematitic, tabular, ferruginous fragments (10-70 mm) aligned with the structure of the bedrock. Common pseudomorphic replacement of structurally aligned primary minerals in the bedrock by hematite and goethite has resulted in preservation of primary fabrics within incipient *in situ* nodules and pisoliths of ferruginous saprolite.

Towards the top, yellowish brown, ferruginous saprolite has been subjected to solution weathering, resulting in a marked, mesoscopic porosity to form coarse, generally vermiform voids. Some voids are lined with goethite and secondary silica. Amalgamation of these coarse voids leads to the ultimate collapse of the ferruginous saprolite. The base of the collapsed ferruginous saprolite is very irregular and has pendants penetrating the ferruginous saprolite (Figure 17C, D). The collapsed ferruginous saprolite, is a condensed, largely residual zone, composed of fragments of ferruginous saprolite (as large nodules) and some incipient nodules and pisoliths (Figure 17F). Further weathering, micro-fragmentation and minor lateral transport gives rise to the small nodules and pisoliths that lie above it. The angularity of the nodules tends to increase down the profile. Near the surface, they tend to be dark brown to black but are yellowish brown to brown in collapsed saprolite. These nodules and pisoliths have evolved by partial collapse, involving both vertical and some lateral movement, following chemical wasting.

Figure 15: Western wall, Central Pit.

Dashed line = base of transported overburden.

A. Red-brown soil to approximately 1 m depth.

B. Hardpanised silty colluvium and alluvium cemented by yellow laminae of hyalite.

C. Gravelly colluvium/alluvium containing transported ferruginous clasts which are usually no coarser than 0.5 cm in diameter and largely devoid of cutans. The red-brown colouration is due to the hematite-rich nature of the silty clay matrix.

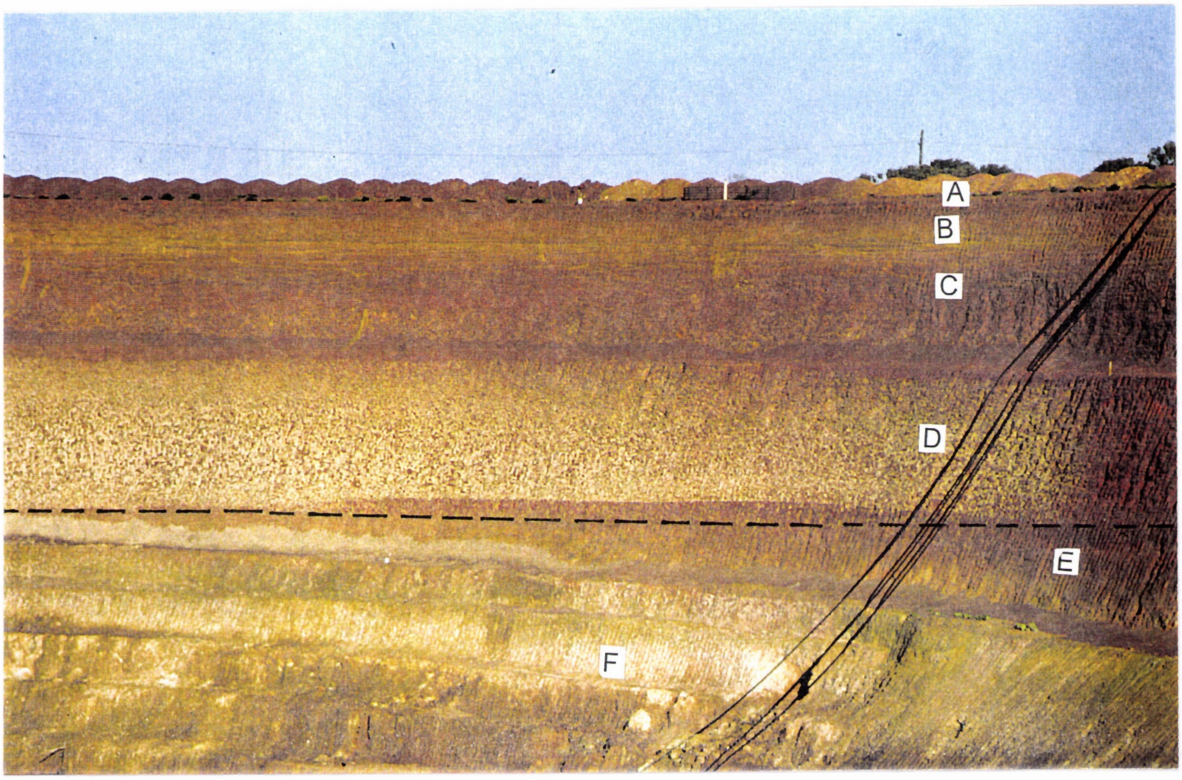
D. Western wall: Mottles developed in silty sediments overlying saprolite.

Eastern wall: Nodular and pisolitic lateritic residuum. Nodules and pisoliths have yellow-brown to red cutans and are set in a goethite-rich clay matrix.

E. Ferruginous saprolite.

F. Saprolite.

Figure 16: Eastern wall, Central Pit.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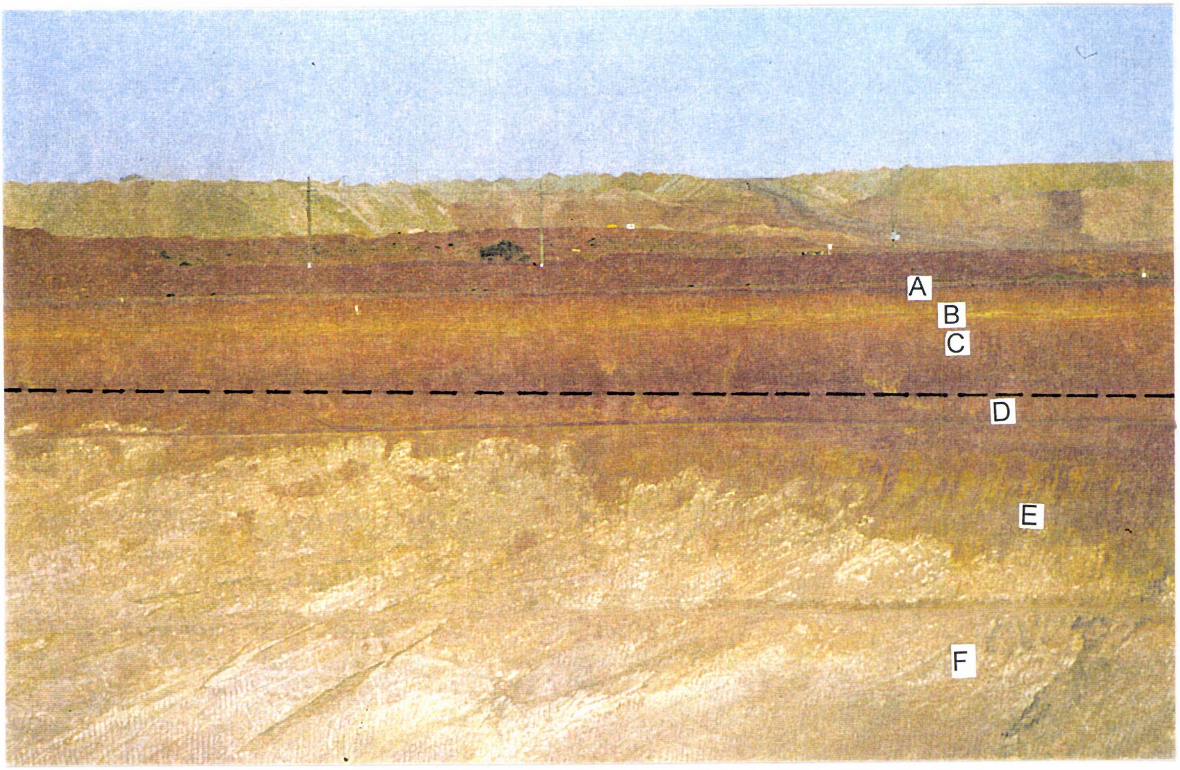
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Figure 17: Regolith stratigraphy

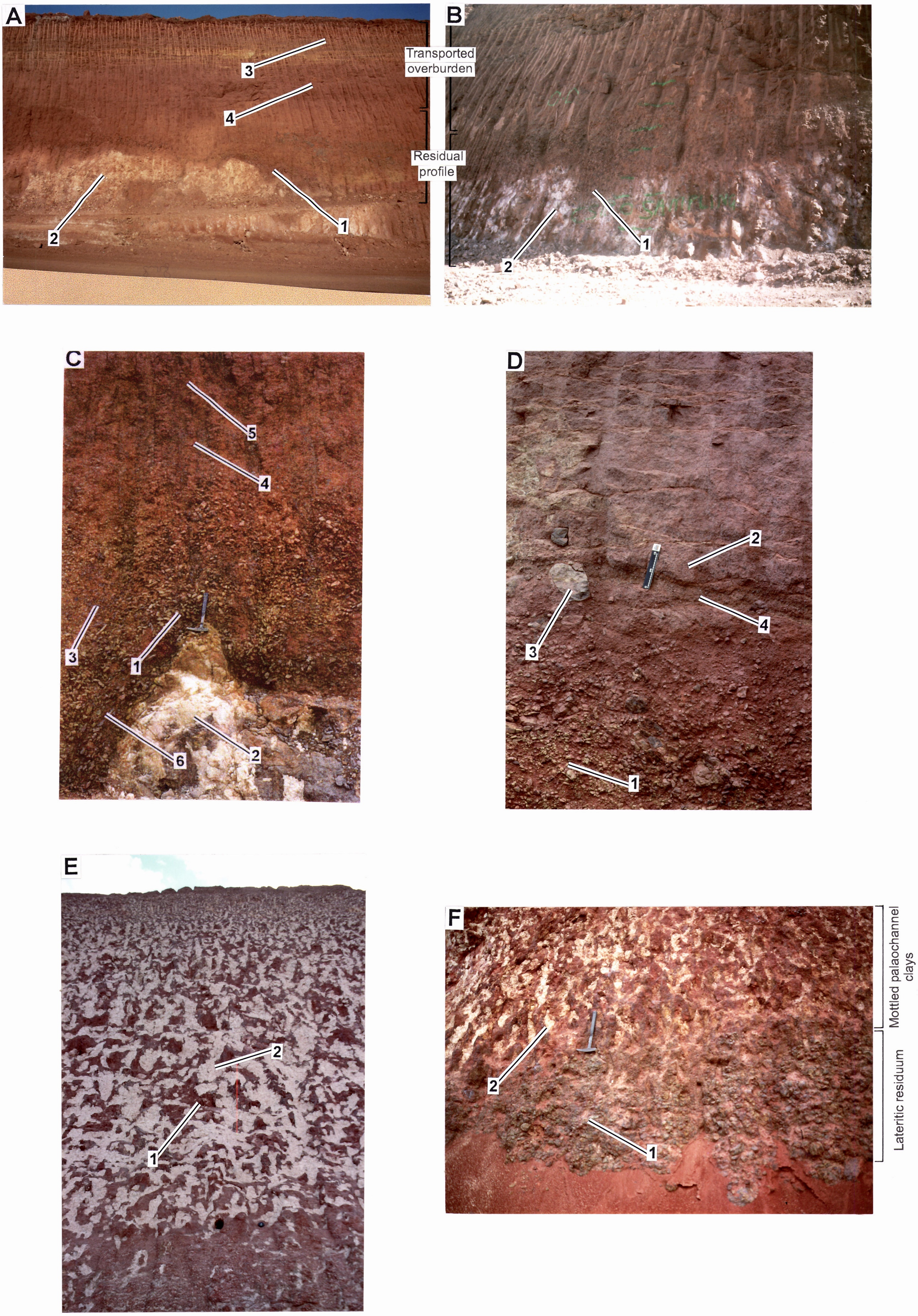
(A,B) Mine exposures showing transported overburden overlying lateritic residuum. The scalloped base of the lateritic residuum (1) forming pendents which penetrate the mottled saprolite (2). These were formed by localised dissolution of the mottled saprolite. Hardpanised silty (3) and gravelly colluvium (4) overly the residual profile. Central Pit.

(C) A thin layer of collapsed mottled saprolite (1) developed on mottled saprolite (2). This grades upwards into lateritic residuum (3) and is overlain by gravelly (4) and silty colluvium (5). Note the imbricate structure (6) of the tabular, ferruginous saprolite fragments which lie parallel to the lower contact. Central Pit.

(D) Yellow brown nodules at the top of lateritic residuum (1), covered with thin cutans and its contact with gravelly colluvium (2). Some large clasts (3) occur at the base of colluvium. Between the two is a layer of fine, well sorted gravel (4) with partly worn cutans which is related to lateritic residuum but has suffered transport down slope. Central Pit.

(E) Mottled palaeochannel clays showing hematitic megamottles (1) and kaolinitic matrix (2). Central Pit.

(F) Mottled palaeochannel clays overlying lateritic residuum. Yellow-brown nodules at the top of lateritic residuum (1) covered with thin goethite-gibbsite cutans and its contact with mottled palaeochannel clays (2). Central Pit..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B
Transported overburden
Residual profile
C
D
E
F
Mottled palaochannel clays
Lateritic residuum

Figure 18: Regolith materials

(A) A silty, hardpanised colluvium showing sporadic angular ferruginous fragments (1) in a silty matrix (2).

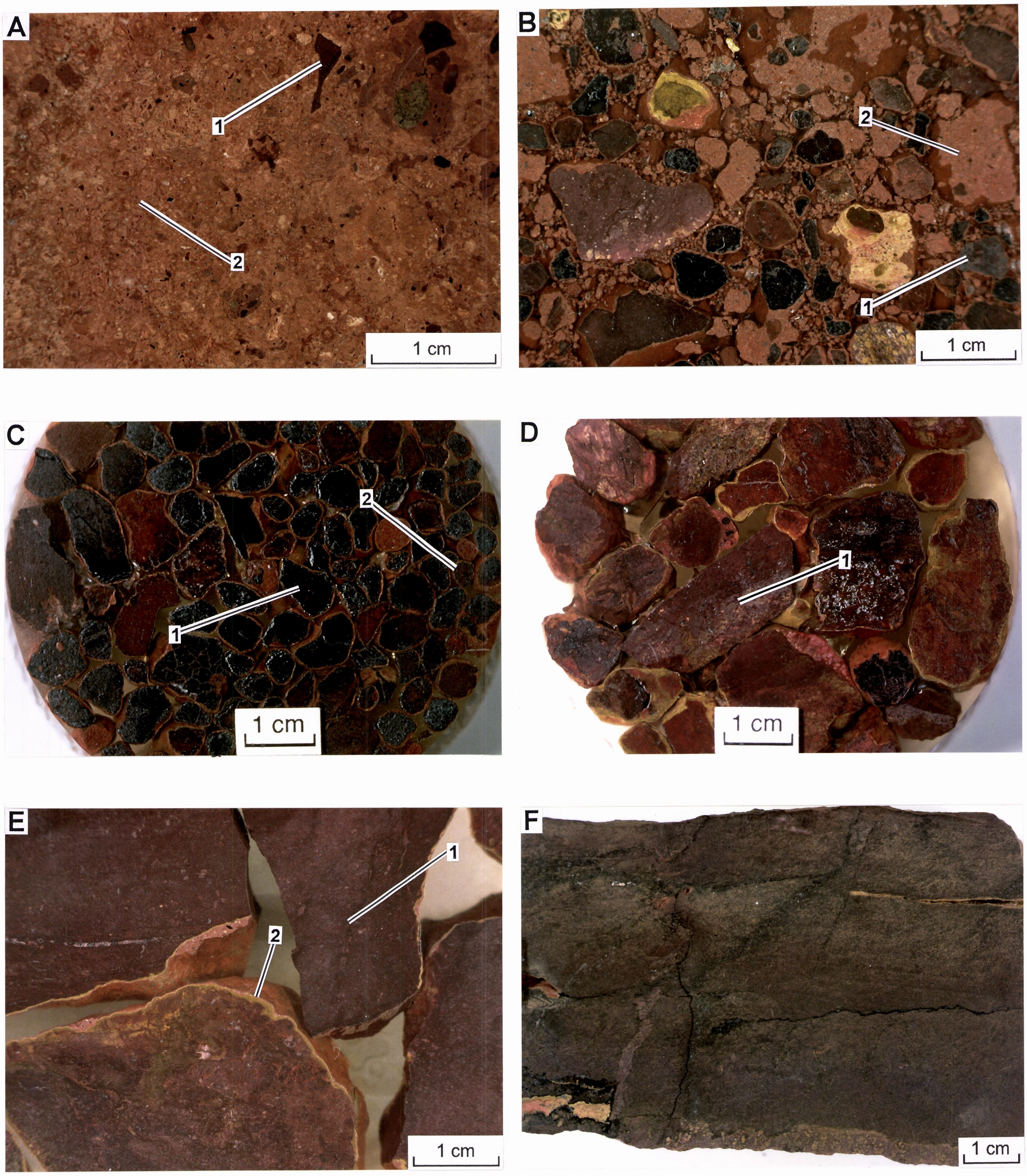
(B) Gravelly colluvium showing abundant locally derived lateritic nodules and pisoliths with slightly worn cutans (1) in a silty matrix (2).

(C,D,E) Residual lateritic nodules and pisoliths formed by the fragmentation and collapsing of the underlying ferruginous saprolite.

(C) Hematite-rich matured lateritic nodules (1) and pisoliths, (2) from nodular zone.

(D,E) Immature kaolinite-hematite-goethite lateritic nodules (1) with yellowish cutans (2) from base of nodular zone and collapsed ferruginous saprolite. The angularity of nodules increases down the profile.

(F) Ferruginous saprolite.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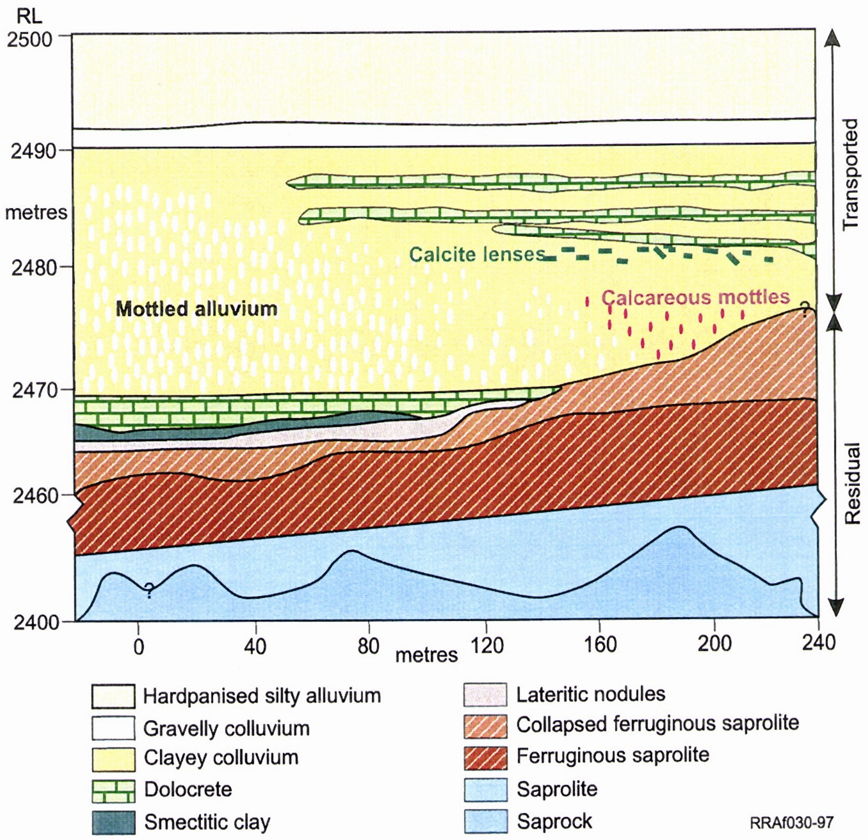


Figure 19: Regolith stratigraphy, western wall Discovery pit.

Yellowish brown cutans, 1 mm thick, coat the surface of nodules. Formation of cutans begins in ferruginous saprolite and becomes dominant in the collapsed ferruginous saprolite and nodular zone. They consist mainly of goethite-kaolinite in collapsed ferruginous saprolite, and goethite and gibbsite in the nodular zone.

Pods of highly indurated duricrust are present in some exposures around the Central pit, but the duricrust is far more common in the Laterite pit to the north. The duricrust pods are composed of re-cemented dark brown to black nodules, separated by a small amount of goethitic matrix. Many cavities in the matrix are lined with yellow goethite and kaolinite. The nodules have cores with fabrics that indicate primary rock.

Saprolite

The saprolite is generally 50-70 m thick. Primary bedrock fabric and structure are generally well preserved and can be traced through saprock to fresh bedrock. Cream, light yellow or grey-brown clays are typical of the upper saprolite. They are composed of kaolinite, smectite and quartz; smectite increases in abundance with depth. Near the base, creamy buff, light green or khaki-cream coloured, slickensided clays and saprock fragments of weathered chloritic basalt pass into the fresh bedrock. The lower part of the saprolite consists of quartz, chlorite, feldspars, calcite, mica and pyrite.

4.2.3 Regolith stratigraphy of geotechnical drill hole (GTD 9)

Drillhole GTD 9 (located at 16630E, 9910N on the exploration grid) was drilled through weathered materials near the centre of the proposed Central pit at Bronzewing, before mining commenced. Its stratigraphy is included here to provide the background to multi-element geochemistry of samples taken from GTD 9, presented below. The top 22 m are transported silty clays and gravels which are underlain by a complete lateritic profile.

A red-brown sandy soil, with poorly sorted, black, ferruginous granules and rare quartz fragments, occupies the top 0.6 m of the profile and overlies hardpanised colluvium. The hardpanised sandy silty colluvium-alluvium contains ferruginous nodules and granules which vary from well rounded to angular with rounded edges. This unit extends to 5 m and grades into a weakly silicified, silty clay colluvium which, in turn, is 10 m thick with no obvious layering. The silty clay colluvium contains

Figure 20: Reflected light micrographs

(A) Lateritic nodule showing pseudomorphic replacement of primary minerals by Fe oxides and kaolinite, preserving schistose fabric (1).

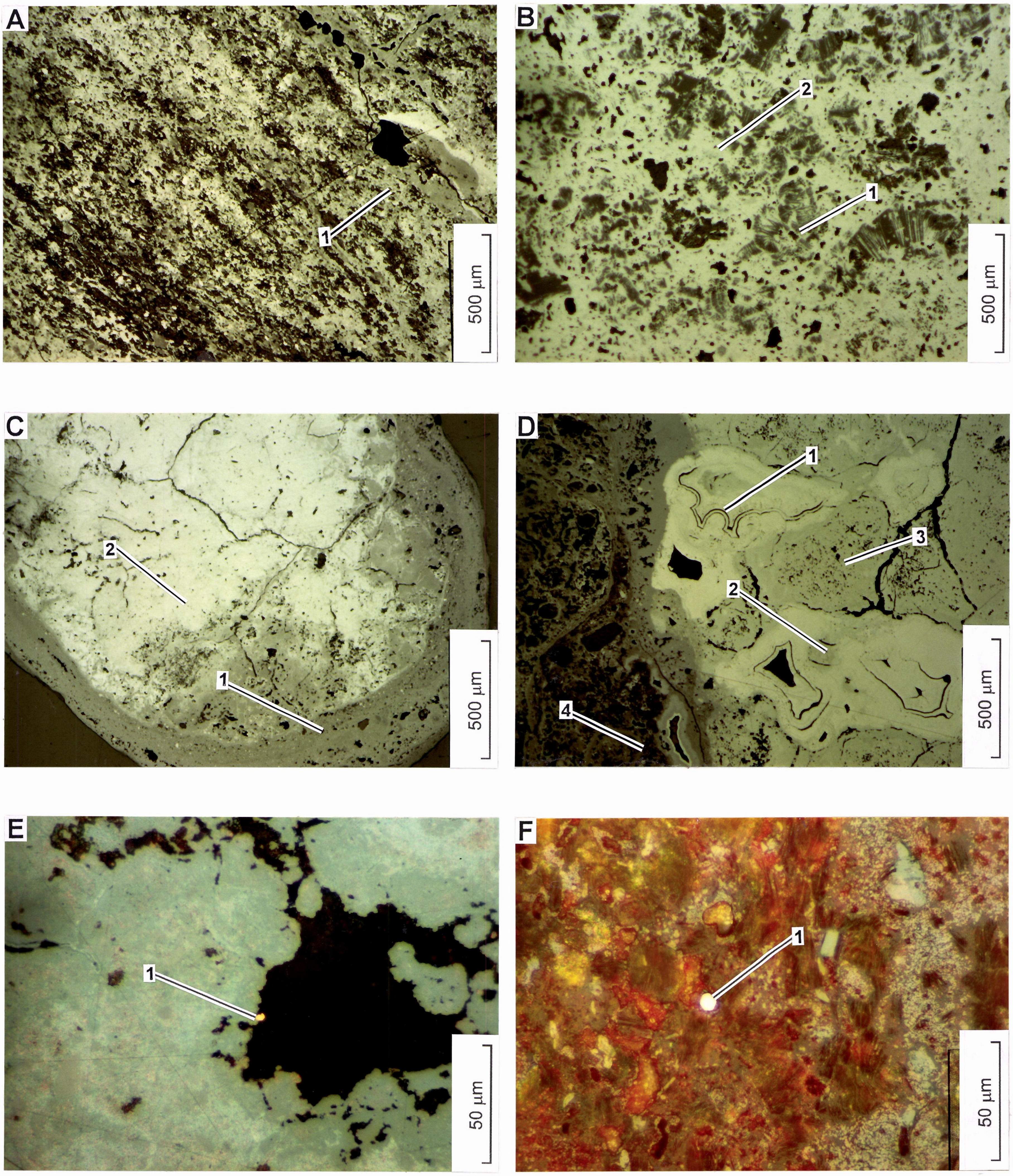
(B) Lateritic nodule displaying accordion fabrics of kaolinite (1) set in a hematite matrix (2).

(C) Goethite-rich cutan (1) surrounding partly dehydrated goethitic-hematitic lateritic pisolith (2).

(D) Lateritic nodule showing voids filled with colloform hematite (1), less reflective hematite (2) grades into goethite (3, medium grey). Dark area (4) is numerous voids among goethitic clay of the matrix.

(E) Gold grain (1) at the edge of void in lateritic nodule.

(F) Gold grain (1) in clay-rich lateritic nodule.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1
50 µm

fine (<2 mm) ferruginous granules, with some Mn oxide precipitated along cracks in the clay. The fine colluvium grades downward into a gravelly colluvium, or locally transported lateritic gravel, at 18 m depth, which in turn overlies a zone of nodular gravels. The gradual transition is marked by an increase in the size of the ferruginous nodules and the increasing occurrence of nodules with goethitic cutans.

At 22 m, the lateritic residuum contains abundant goethite-rich nodules and pisoliths. Below this depth, there is a complete lateritic profile with 3 m of lateritic gravels over an Fe-indurated duricrust. The duricrust is underlain by a mottled zone, 20 m of pale saprolite and Fe-stained saprock containing some primary minerals. The base of the weathering is at 87 m.

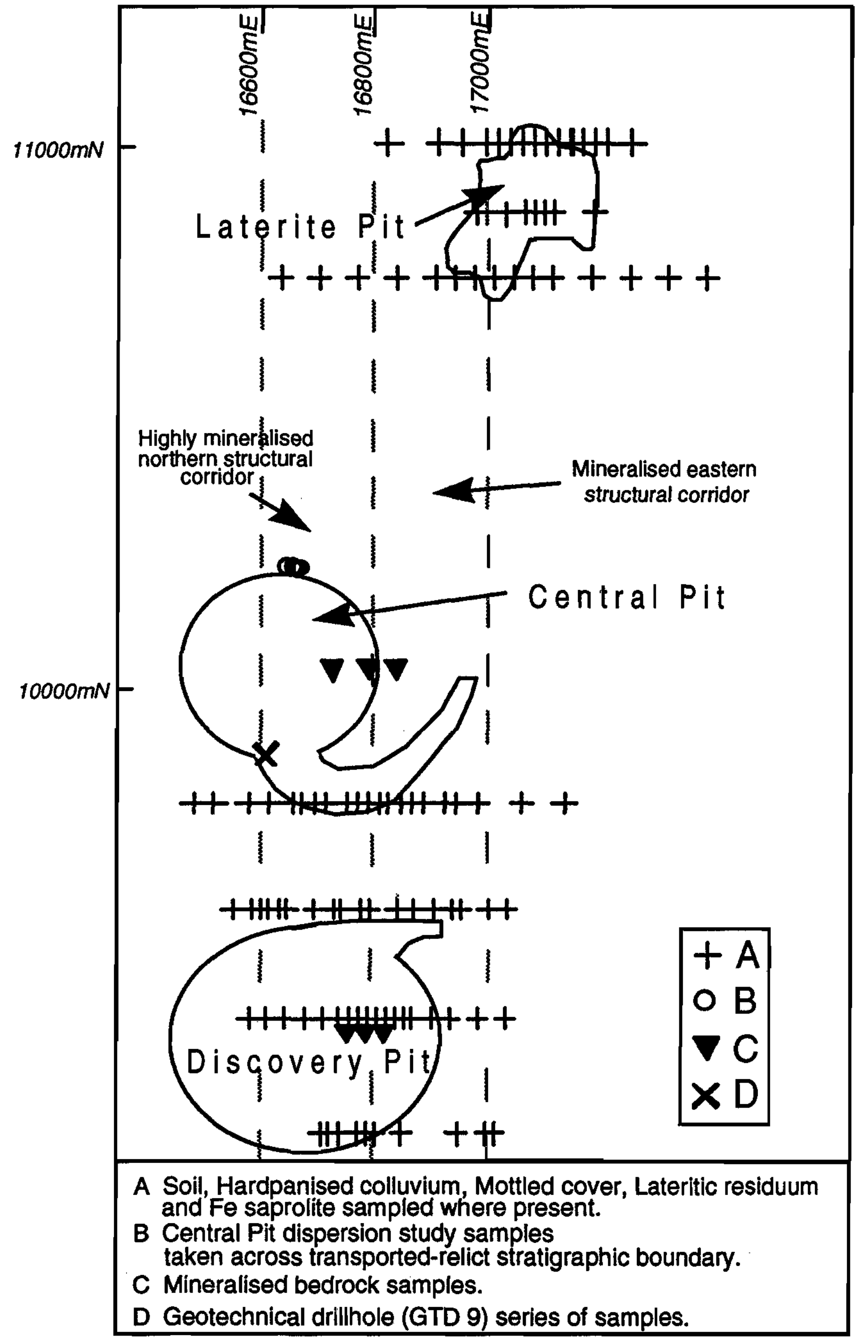


Figure 21: Sample locations across the Bronzewing Deposit.

5. GEOCHEMISTRY

5.1 Sampling

Prior to mining, a total of 600 regolith samples were collected from the soil, hardpanised colluvium, mottled palaeochannel sediments, lateritic residuum and ferruginous saprolite horizons over the north-south trending, elongate zone of mineralisation that forms the Bronzewing deposit. Of these, 160 samples, taken from the localities shown in Figure 21, were analysed for 48 elements by XRF and INAA.

The 160 regolith samples in group (A) of Figure 21 comprise:

- 64 samples of soil from lines 9400N, 9600N, 9800N and 10760N,
- 12 samples of mottled palaeochannel sediment from lines 9200N and 9400N,
- 76 samples of lateritic residuum from lines 9200N, 9400N, 9600N, 9800N, 10760N, 10880N, and 11000N and
- 8 samples of ferruginous saprolite from lines 9200N, 9400N and 9600N.

Where possible, samples were taken at 20 m intervals over gold mineralisation, and several at 40 m intervals on either side. Numerous 1 m samples of RAB spoil and RC cuttings had been laid out beside their drill holes prior to sampling. Sample sites that had been disturbed or where labels had faded were avoided where there was a potential for contamination or incorrect logging. Grab samples of 1.5 kg were taken from the selected regolith units.

In addition to the above:

- 18 samples of colluvial gravels and lateritic residuum from the N wall of the Central Pit, (Group B Figure 21),
- 6 mineralised bedrock diamond core samples from an average depth of just over 230 m, (Group C, Figure 21), and
- 22 samples from GTD 9 drill core, (Group D, Figure 21),

were collected and analysed by XRF and INAA.

As a follow up to the initial geochemical analysis of the soil fine fraction, Mn oxides and amorphous Fe oxides were analysed by partial extraction using 2 sequential methods,

- 1 M acetate buffer at pH 5, followed by
- 0.25 M hydroxylamine hydrochloride.

Soil samples were collected from within a 10 m radius of the drill holes sampled. At each sample site the upper 20 mm of soil was scraped away to remove surface contamination. The samples were taken at a constant depth of 0.3 to 0.5 m by hand auger and placed in plastic bags.

All other samples were handled with plastic scoops and strainers and bagged similarly. Small portions of some samples were washed in the field to aid identification of regolith units. Ferruginous sample media, including mottles from cover sequences, lateritic residuum and ferruginous saprolite were preferentially collected where present. Samples were also collected across the contact between residual and transported materials in the north wall of the Central pit during pit excavation in 1995.

5.2 Sample media

5.2.1 Soil

Bulk soil samples were sieved into their >2000 µm, 250 µm - 2000 µm and <250 µm size fractions, and each was examined petrographically. The coarser fraction (>2000 µm) consists of ferruginous nodules, quartz and lithic fragments. The intermediate fraction (250-2000 µm) consists of ferruginous saprolite fragments, ferruginous granules and quartz. The <250 µm fraction consists mainly of aeolian sand and silt-sized quartz grains, kaolinite and hematite with minor amounts of feldspar, muscovite, and calcite (Table 1). The hematite is in fine, ferruginous, sand-to clay-sized particles and as thin coatings on quartz grains and, presumably, within the clay matrix, giving an orange-red colour to the soil. Any hydromorphic dispersion of Au into the soil would be expected to be relatively concentrated in the fine, hematitic clays and silt, including coatings on fine, ferruginous granules, due to their high surface area. Thus, the clay-rich fraction (<250 µm) was selected for analysis.

5.2.2 *Mottles developed in transported clays*

The most hematite-rich mottle fragments (2.5-10 mm) were extracted by washing for analysis. These mottles are dark brown to reddish maroon and consist of hematite, quartz and kaolinite with minor amounts of goethite. They are generally massive but occasionally show hematite pseudomorphs after wood fragments.

5.2.3 *Gravelly colluvium*

The colluvium consists of ferruginous nodules and pisoliths with worn cutans, lithic fragments and hematitic clays.

5.2.4 *Lateritic residuum*

Nodules and pisoliths (3-30 mm diameter) selected for analysis typically have a red-brown, earthy to black, metallic, hematite-rich core, encased by a 0.1-1 mm thick, yellow-brown, goethite-rich cutan. Nodules are far more common than pisoliths. Some of the cutans have been slightly worn, suggesting local transport. These were considered as relict where distance from source is negligible and/or stratigraphic continuity with clearly *in situ* lateritic residuum could be established. Hematite, goethite and kaolinite are the dominant minerals with minor maghemite, gibbsite, anatase and a trace of quartz. Primary fabrics are generally preserved in nodules.

5.2.5 *Ferruginous saprolite*

Smooth, 5-30 mm, equidimensional to tabular, hematite-rich fragments, with a black, metallic to purple-brown, earthy lustre, were selected for analysis. Hematite, goethite and kaolinite are the dominant minerals, with minor anatase, quartz and a trace of mica in some samples (Table 1). Primary fabrics (*e.g.* mica) are commonly well preserved by pseudomorphic replacement by Fe oxides (mainly hematite).

5.2.6 *Geotechnical drill hole (GTD 9)*

Table 2 lists the XRD-determined mineralogy of 10 representative samples selected from GTD 9. The dominant minerals through the profile are quartz, kaolinite, hematite and goethite. The whole profile is clay-rich (25-50%) and the abundances of Fe oxides reach a maximum in the coarse colluvium-alluvium at 0.6-0.8 m and in the duricrust at 25 m depth.

5.3 Mineralised bedrock geochemistry

The composition of mineralised bedrock from an average depth of just over 230 m is shown in Table 3; useful indicator elements for Au mineralisation are Cu (mean 135 ppm) and W (mean 95 ppm). Although As and Sb occur at low concentrations at Bronzewing, there may be variants in the mineralisation style where As (mean 15 ppm) and Sb (mean 1 ppm) may be important so they should not be removed from the analytical scheme.

5.4 Geochemical dispersion in the regolith

Summary statistics for the sample media are given in Tables 1-4 of Appendix 3. The chemical composition of individual samples is tabulated in Appendix 4 and a selection of data are given in Table 4.

5.4.1 *Major element geochemistry*

Silica, Fe_2O_3 and Al_2O_3 are the major constituents of all the media investigated (Table 4) and their relationships are shown in Figure 22. The Fe-rich lateritic residuum and ferruginous saprolite have

Sampled material	Goethite	Hematite	Maghemite	Gibbsite	Kaolinite	Anatase	Quartz	Calcite	Feldspar	Mica
Soil (<250µm fraction)		••			••		•••	•	•	•
Hardpanised co/alluvium	•	•	•		•••		••		•	•
Mottled cover	•	•••			•••		••			
Lateritic residuum	•••	•••	•	•	••	•	tr			
Ferruginous saprolite	••	•••			•	•	•			tr

••• = dominant, •• = subdominant, • = minor amount, tr = trace.

Table 1 Mineral assemblages for the four sample media - XRD analyses

Depth (m)	Sample description	Goethite	Hematite	Gibbsite	Kaolinite	Anatase	Quartz	Calcite	Albite?	Mica	Chlorite	Halloysite?	Smectite	Muscovite	Amphibole	Rutile	Boehmite
0.1-0.3	Soil	tr	•		••		•••										
3.4-3.55	Hardpanised colluvium	tr			••		•••					•				tr	
11.9-12.3	Gravelly colluvium		••		•••	•	••										
18.7-18.9	Carbonate in colluvium	tr	••		•••	tr	••	•								tr	tr
25.1-25.3	Nodular duricrust	•••	•••	•	••												
28.6-28.9	Fe Sap./Mottled zone	••	••	••	•••	•		•					••			tr	
32.1-32.25	Mottled Zone	••		•	•••								•			tr	
47.1-47.3	Saprolite	tr			•••		•••										
77.25-77.5	Saprock				••		•••		•	•	••			•			
87.2-87.4	Bedrock						•••		•		••				•		

••• = dominant, •• = subdominant, • = minor amount, tr = trace.

Table 2 Mineral assemblage of GTD9 samples - XRD analysis

Table 3. Mineralised bedrock geochemistry

Sample No	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MnO %	MgO %	CaO %	Na_2O %	K_2O %	TiO_2 %	P_2O_5 %	LOI %	Total oxides
07-3317	44.2	13.3	11.0	0.149	7.19	9.91	0.03	1.57	0.78	0.058	11.8	100.2
07-3318	41.2	13.0	15.3	0.211	5.77	8.01	2.40	0.54	1.63	0.164	7.5	95.9
07-3319	34.1	10.0	12.0	0.128	6.93	11.19	0.08	2.60	0.58	0.030	14.5	92.2
07-3320	43.0	11.9	9.9	0.155	5.17	10.50	0.08	2.53	0.70	0.039	12.0	96.2
07-3321	37.0	12.7	9.5	0.168	5.93	10.33	1.44	3.18	0.65	0.036	13.8	94.8
07-3322	43.7	14.2	11.1	0.140	7.54	7.49	1.05	1.76	0.80	0.070	10.0	98

Sample No	Ba ppm	Ce ppm	Cl ppm	Cr ppm	Co ppm	Cu ppm	Ga ppm	La ppm	Ni ppm	Nb ppm	Pb ppm	Rb ppm
07-3317	41	7	<20	299	44	126	14	0	135	<4	9	37
07-3318	128	8	<20	105	40	315	21	11	63	7	14	15
07-3319	160	8	<20	222	41	111	11	<2	87	<4	7	65
07-3320	135	6	<20	265	45	91	11	4	127	<4	12	67
07-3321	107	12	40	281	37	27	14	1	130	<4	5	81
07-3322	82	4	<20	344	43	123	15	1	161	<4	10	44

Sample No	S ppm	Sr ppm	V ppm	Y ppm	Zn ppm	Zr ppm	Sb ppm	As ppm	Ba ppm	Br ppm	Ce ppm	Cs ppm
07-3317	340	49	258	16	74	46	1.0	<1	114	<2	6	2
07-3318	8380	106	324	33	107	113	1.4	<1	248	<2	20	<1
07-3319	15090	90	198	12	49	40	0.5	31.2	230	2	3	2
07-3320	19900	70	238	16	42	39	0.9	26.0	172	<2	6	2
07-3321	17910	59	240	16	39	38	1.1	24.4	109	2	9	2
07-3322	3920	50	250	21	85	45	0.4	<1	<100	<2	8	1

Sample No	Cr ppm	Co ppm	Eu ppm	Au ppb	Hf ppm	Ir ppb	La ppm	Lu ppm	Mo ppm	Rb ppm	Sm ppm	Sc ppm
07-3317	288	48	0.7	33	1.0	<20	2.3	0.3	<5	53	1.8	32.9
07-3318	96.9	48	1.54	32	3.0	<20	8.1	0.5	<5	<20	4.3	36.7
07-3319	226	45	0.82	4440	1.0	<20	1.1	<0.2	<5	73	1.0	23.0
07-3320	266	48	-0.5	5500	1.2	<20	2.2	0.3	<5	77	1.6	30.1
07-3321	264	40	0.64	8670	1.3	<20	3.7	0.2	<5	88	2.1	30.7
07-3322	322	45	0.61	1980	1.5	<20	2.7	0.3	<5	48	1.9	33.2

Sample No	Se ppm	Ag ppm	Ta ppm	Th ppm	W ppm	U ppm	Yb ppm	Zn ppm
07-3317	<5	<5	<1	<0.5	16	<2	1.9	112
07-3318	<5	<5	<1	1.0	<2	<2	3.7	158
07-3319	<5	<5	<1	<0.5	9	<2	1.1	<100
07-3320	<5	<5	<1	<0.5	9	<2	1.7	<100
07-3321	<5	<5	<1	<0.5	19	<2	1.8	<100
07-3322	<5	<5	<1	<0.5	534	<2	2.0	120

Table 4: Summarised geochemical statistics for four sample media.
Samples of mineralised bedrock are included for comparison.

	Soil (<250µm) n=64		**Mottled cover** n=12		**Lateritic residuum** n=76		**Ferruginous saprolite** n=8		**Mineralised bedrock** n=6	
	Mean	S. dev.*	Mean	S. dev.*	Mean	S. dev.*	Mean	S. dev.*	Mean	S. dev.*
SiO_2 %	69.28	5.33	30.89	7.72	18.39	5.57	15.91	5.26	40.54	4.09
Al_2O_3 %	14.74	1.56	20.66	3.96	19.71	4.33	14.57	4.66	12.51	1.45
Fe_2O_3 %	7.15	3.12	34.38	12.43	48.45	9.93	56.40	11.12	11.47	2.08
MgO %	0.19	0.04	0.41	0.17	0.25	0.13	0.19	0.05	6.42	0.93
CaO %	0.07	0.04	0.35	0.20	0.27	0.29	0.32	0.48	NA	
Na_2O %	0.09	0.02	0.09	0.03	0.07	0.02	0.04	0.01	NA	
K_2O %	1.19	0.14	0.15	0.06	0.07	0.06	0.05	0.06	NA	
TiO_2 %	0.76	0.08	1.23	0.33	1.89	0.80	1.27	0.56	NA	
P_2O_5 %	0.05	0.01	0.02	0.00	0.02	0.01	0.04	0.02	NA	
MnO %	0.08	0.04	0.03	0.02	0.02	0.01	0.02	0.01	0.16	0.03
Ag	0.59	0.10	0.46	0.15	1.01	0.51	0.41	0.20	<	
As	5.81	1.31	20.20	15.50	25.94	11.78	17.09	6.24	13.10	15.61
Au ppb	<		<		558.3	1477.95	16.44	21.68	3442.37	3404.57
Ba	242.00	45.47	114.64	250.77	106.4	115.66	60.17	93.64	108.83	42.41
Bi	0.38	0.09	0.25	0.11	0.61	0.87	0.26	0.24	NA	
Br	2.75	2.65	<		<		<		<	
Ce	45.79	9.61	13.67	11.59	23.72	25.95	3.97	2.61	8.80	5.62
Cl	96.42	330.45	65.46	116.13	34.61	56.17	45.00	46.59	<	
Co	15.83	5.52	16.70	6.00	13.14	12.25	16.92	9.20	45.95	3.08
Cr	166.84	69.43	617.18	287.58	1476	1363.64	840.38	395.26	243.82	78.57
Cs	3.13	0.63	<		<		1.28	1.57	1.51	1.31
Cu	12.98	13.09	67.09	17.76	96.76	96.29	251.50	260.27	132.17	96.70
Eu	0.74	0.17	<		0.71	0.61	<		0.64	0.66
Ga	19.02	2.39	31.91	9.66	53.71	16.55	40.38	22.53	14.33	3.67
Hf	7.53	0.80	4.28	0.78	5.1	1.69	3.42	1.57	1.49	0.77
La	21.68	3.41	8.07	7.09	9.61	7.40	1.71	1.14	3.33	2.47
Lu	0.29	0.04	<		0.27	0.19	<		0.22	0.23
Mo	1.28	0.17	1.97	0.73	2.25	0.84	1.99	1.08	<	
Nb	4.82	2.56	<		<		<		<	
Ni	31.57	6.51	77.05	21.13	76.25	45.71	58.96	16.10	117.17	35.62
Pb	21.62	2.28	23.07	10.79	18.01	6.69	10.83	4.78	9.50	3.27
Rb	65.75	7.99	<		<		<		51.50	24.05
S	108.44	28.35	88.18	105.81	221.2	132.77	362.50	258.55	10923	7928.14
Sb	0.44	0.07	0.90	0.51	1.19	0.42	0.91	0.34	0.87	0.38
Sc	15.50	3.70	44.97	19.27	73.14	20.93	58.09	34.61	31.10	4.60
Sm	3.60	0.66	2.04	1.84	3.16	1.93	1.08	0.82	2.13	1.13
Sr	36.03	4.02	27.27	4.24	22.87	6.49	21.38	6.05	70.67	23.04
Ta	1.17	0.53	<		<		<		<	
Th	13.96	0.83	12.97	3.08	12.24	4.90	5.14	3.50	<	
U	2.59	0.91	<		<		<		<	
V	132.52	86.62	910.64	257.34	1402	544.34	1213	359.40	251.33	41.18
W	<		2.20	4.43	5.95	9.68	2.12	2.72	97.41	214.00
Y	14.91	3.72	8.55	7.30	14.49	8.34	5.75	3.49	19.00	7.43
Yb	2.14	0.22	1.47	0.83	2.38	1.18	1.36	1.11	2.03	0.90
Zn	39.41	7.68	16.91	5.82	20.16	13.43	44.63	39.57	66.00	27.20
Zr	273.27	24.99	175.27	30.26	184.3	58.77	132.75	70.77	53.50	29.33

S. dev.* =Standard deviation.
all values in ppm unless otherwise marked.
'<' symbol indicates mean values falling below the given detection limit.

similar compositions but the mottles are more Si- and Al-rich due to kaolinite and quartz. Some of the lateritic residuum also contains gibbsite. A mean SiO_2 content of 69.3% reflects the dominance of aeolian quartz in the fine fraction of the soil (Table 4). Aluminium and Fe_2O_3 are present as kaolinite and hematite respectively. Significant concentrations of K_2O occurs as muscovite which is probably granitic in origin. Zirconium occurs as zircon.

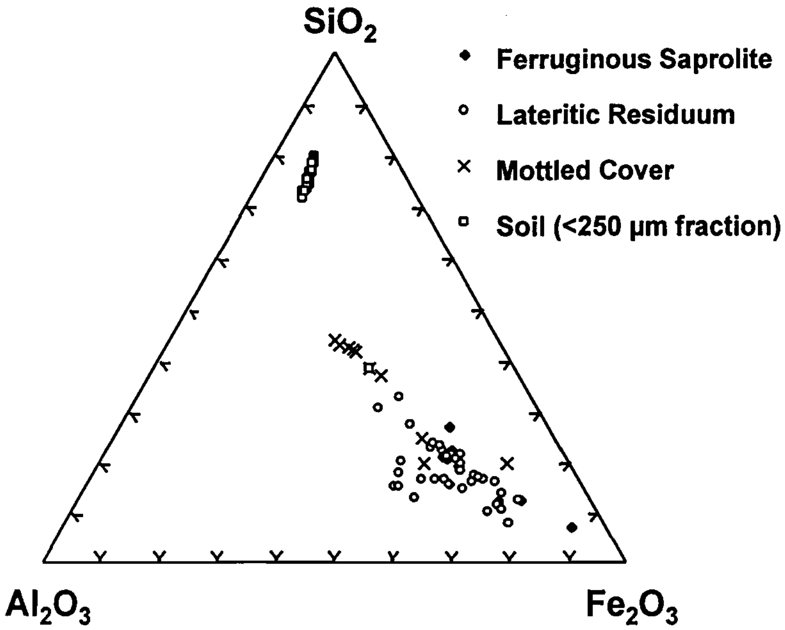


Figure 22: Ternary diagram of the major oxides.

The mottles from the transported clays are primarily composed of Fe_2O_3 (34.4%), SiO_2 (30.9%) and Al_2O_3 (20.7%) (Table 4), as hematite, minor goethite, quartz, and kaolinite (Table 2). Despite being based on only 12 samples, data from these mottles (Figure 22) display a bimodal distribution of relative proportions of SiO_2 and Fe_2O_3. This is consistent with the observation that some mottles are more ferruginised than others. The abundances of hematite and goethite are inversely proportional to that of kaolinite.

The lateritic residuum and ferruginous saprolite samples are genetically closely related and have similar major element compositions. They are composed predominantly of Fe oxide, with mean Fe_2O_3 abundances of 48.5% and 56.4%, respectively (Table 4). Mean SiO_2 abundances are also similarly low (18.4% and 15.9%) and mean Al_2O_3 abundances are 19.7% and 14.6%, respectively. Titanium occurs mainly as anatase.

Geochemical response in transported overburden

Soil <250 µm fraction and ferruginous mottles developed in palaeochannel

No Au or pathfinder elements reflect the underlying mineralisation in the <250 µm fraction of the soil (Figure 23) or the mottled clay fragments. The maximum Au contents rarely exceeded the detection limit of 5 ppb (Appendix 3). No additional information was gained from partial extraction analysis of the soil <250um fraction.

Base of transported overburden (gravelly colluvium)

Drill sections displaying Au data (Great Central Mines) indicate extensive Au anomalies in the gravelly colluvium and underlying lateritic residuum across the deposit area (Figure 24). Similar anomalies in colluvium have been reported from the S, C, N and Midway pits, Mt. Gibson (Anand *et al.*, 1991), at the North and Turret pits, Lawlers (Anand *et al.*, 1991) and the Calista Deposit, Mt. McClure, (Anand *et al.*, 1993). A brief study, focused on processes leading to the development of Au haloes in the colluvium, is discussed below.

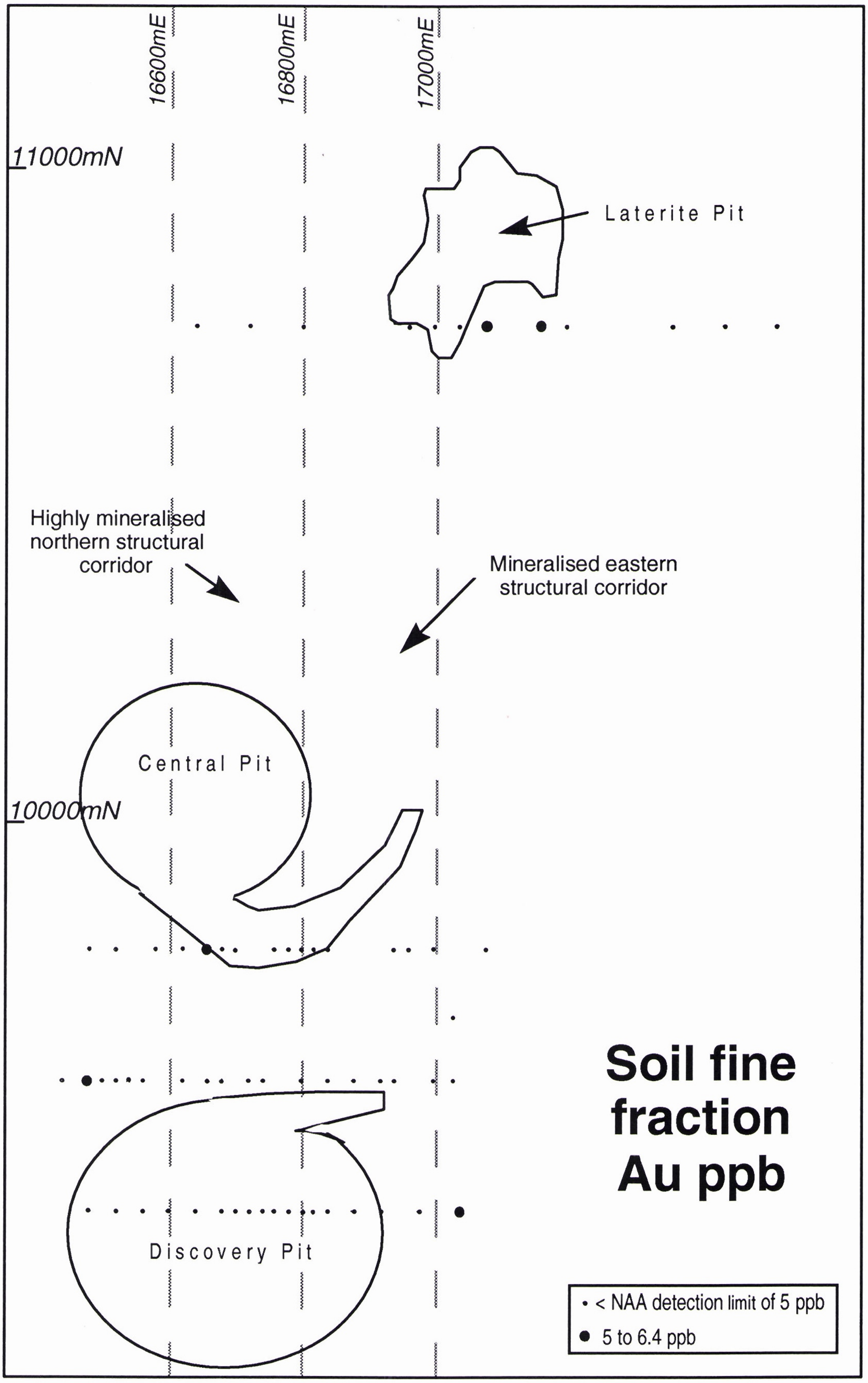


Figure 23: Soil <250 μm fraction, Au distribution.

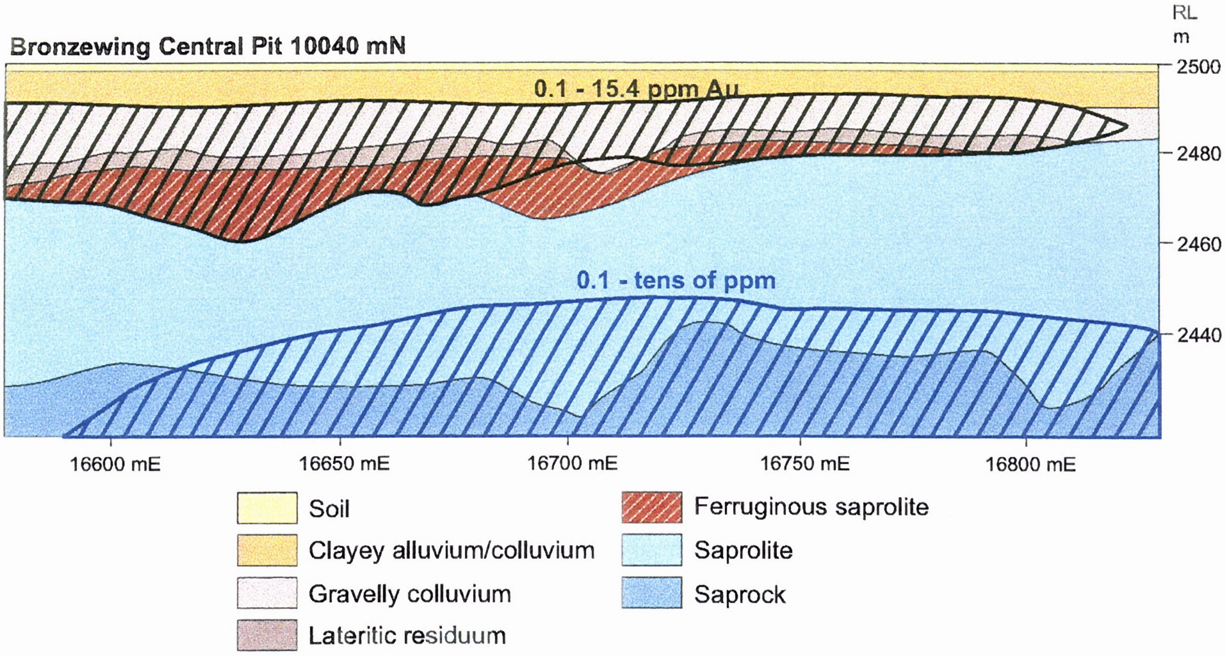


Figure 24: Dispersion of Au in gravelly colluvium, lateritic residuum and ferruginous saprolite (courtesy of Great Central Mines NL).

The buried lateritic residuum contains Au to ore grade that, in places, extends into the colluvium. This relationship was examined in the Central Pit, where essentially residual materials were overlain by 15 m of colluvium in a mineralised environment. In the N wall, the colluvium consists of hematitic clays and ferruginous nodules and pisoliths of probable local origin. The Fe gravels in the colluvium are generally fine-grained (<5 mm), with worn, or no cutans. The underlying lateritic gravels consist mainly of nodules and pisoliths larger than 5 mm, with goethitic cutans, in a goethite-clay matrix

Eighteen samples were collected from the pit wall above and below the interface (Figure 25). The samples were each separated into six size fractions and the largest (>2000 µm) and smallest (<75 µm) to distinguish between mechanical and hydromorphic dispersion. Hydromorphic dispersion will precipitate Au on the chemically active surfaces of finely divided Fe oxides and clays; mechanical dispersion of Au will occur dominantly as particles encapsulated in nodules and fragments of ferruginous saprolite. Thus, concentration of Au in the fine fraction would suggest hydromorphic dispersion and concentration in the coarse fraction would suggest mechanical dispersion.

The Au analyses of bulk, fine and coarse samples are shown in Figure 25. The complete data set is provided in Appendix 5. In most samples, the Au is concentrated in the >2000 µm fraction and depleted in the <75 µm fraction, relative to the bulk sample. The only reversal of this trend is at 2 m above the interface in profile 1, where the fines contain over 4 ppm Au. No reason could be found for this. Elsewhere, there is no evidence to show that Au has accumulated in the fine fraction. Mechanical dispersion above the unconformity is thus strongly suggested by concentration of Au in the coarse fraction. The palaeosurface represented by the unconformity has a 6% slope and there are sufficient mineralised lateritic nodules upslope to source the Au in the colluvium.

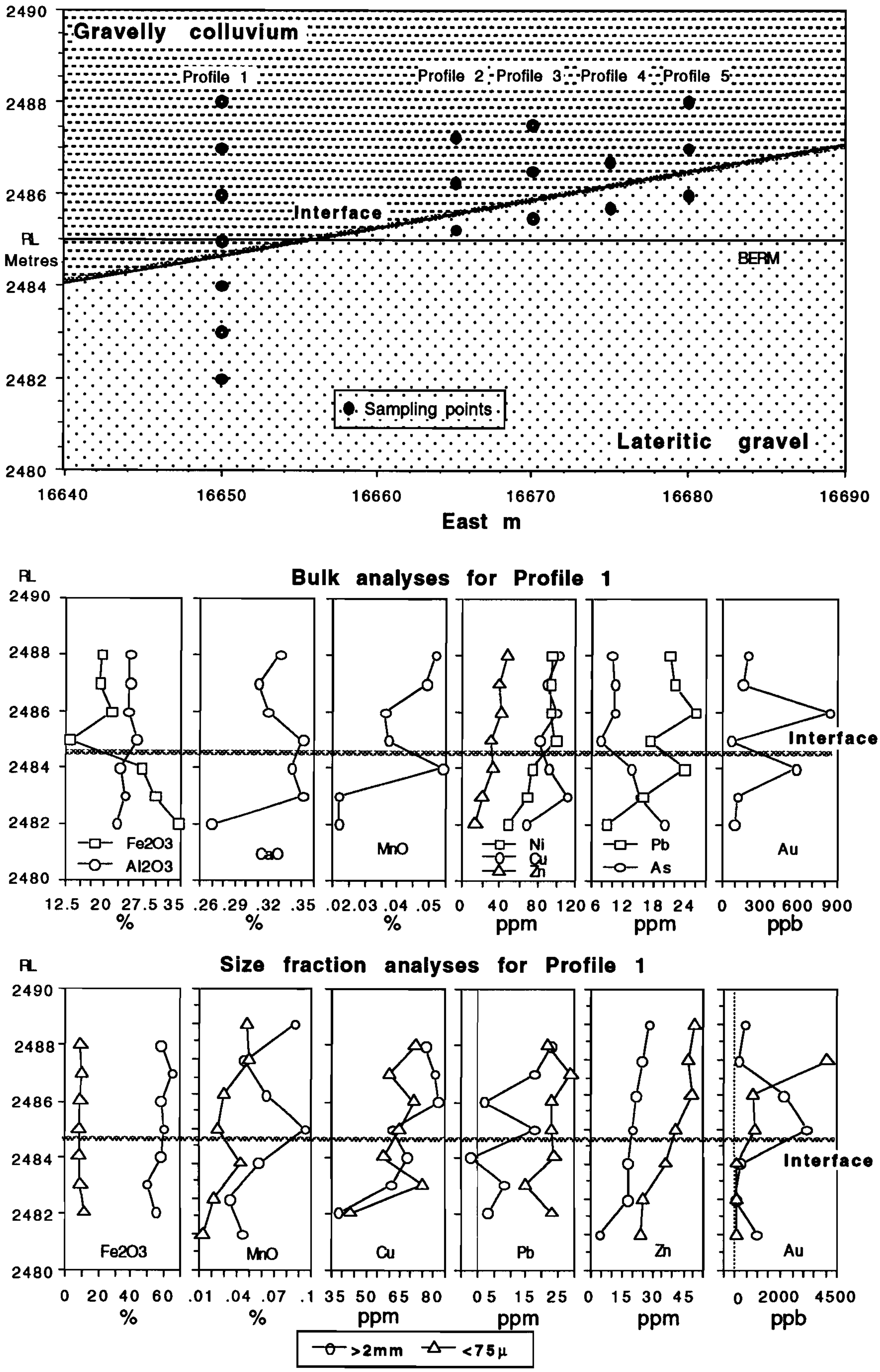


Figure 25: Colluvium dispersion study. Sampling points and selected bulk size and fraction analyses for Profile 1.

5.4.3 Geochemical response in lateritic residuum and ferruginous saprolite

Lateritic residuum (gravels and duricrust) in the Laterite and southern Central pits contains significant Au (mean 560 ppb)) over primary mineralisation (Figure 26). The most notable zone of Au enrichment in the regolith at Bronzewing was within the variably indurated lateritic duricrust of the Laterite pit with concentrations up to 9060 ppb. The underlying bedrock is mineralised, although sub-economic. In contrast, the Discovery pit has less consistent Au anomalies than those further north. Apart from Au, the most promising pathfinder elements are Cu, W and Ag. Other elements, such as As (mean 25 ppm) and Sb (mean 1 ppm), are not enriched in lateritic residuum nor is there any apparent correlation with Au in lateritic nodules.

Gold

The pattern of Au distribution (1.6-9060 ppb; mean 560 ppb) shows well developed, consistent haloes of high Au concentrations in the Laterite pit and Line 9800N in the Central pit, with less consistent, poorly defined haloes of generally lower Au concentrations in the Discovery pit (Figure 26). The less consistent results in the Discovery pit are not surprising considering that the horizon of lateritic residuum there has been variably stripped and is only partially preserved. Euhedral secondary Au crystals, to approximately 5 μm in diameter, were observed in lateritic nodules, precipitated within cracks and voids (Figures 20 E, F).

Examination of the scatterplot matrix reveals no pathfinder elements to be directly correlated with Au in the lateritic residuum. An apparently strong statistical correlation between Au and W is due to a single Au-W-rich outlier.

Elements enriched in lateritic residuum above Bronzewing mineralisation are Ag, Cr, Cu, Ga, Ni, and V. Of these, only Ag and Cu are associated with primary Au mineralisation (Table 5). The other elements (Cr, Ga, Ni, V) are probably relatively enriched by chemical wasting of primary bedrock, regardless of mineralisation. Tungsten is also likely to be elevated above mineralisation due to the common occurrence of scheelite in the ore zone.

Silver

The Ag distribution (0.23-2.66 ppm; mean 1 ppm) is similar to that of Au (Figure 27). A highly enriched and relatively consistent dispersion halo occurs in the Laterite pit and Lines 9800N and 9600N of Central pit. Silver very rarely attains concentrations of >1 ppm in the Yilgarn Craton, as it tends to be strongly leached during weathering (Smith *et al.*, 1992). Although still highly enriched in Ag, the halo is inconsistent and less significant in the southern two lines of the Discovery pit. Despite the similarity between the distributions of Au and Ag, there appears to be no direct correlation between the elements.

Copper

The lateritic gravels and duricrust are enriched in Cu (median 74 ppm, mean 97 ppm), relative to the Yilgarn regional data set (median 14 ppm, mean 44 ppm) (Smith *et al.*, 1992). The distribution of Cu over the deposit area is even, with the exception of a few scattered peaks in concentration (Figure 28). Copper tends to be mobile during lateritic weathering but is likely to have been sourced, in part, from chalcopyrite associated with mineralisation. It is considerably enriched in the ferruginous saprolite (Table 4), with a mean concentration of over 250 ppm.

Tungsten

Scheelite is a common accessory mineral to primary Au mineralisation. Tungsten is erratically distributed (up to 50ppm) (Figure 29). More than half of the samples contain W at less than the detection limit (<2 ppm), but moderate to high W concentrations (up to 50 ppm) are scattered over the deposit area. Tungsten is generally immobile during weathering, so that the erratic distribution of high W concentrations probably reflects that of scheelite in the bedrock.

5.4.4 Elements associated with parent rocks

The distributions of elements such as Cr, K, Zr, Hf, Th, Nb, Ti, V, Ta, W and REE (e.g. La, Ce, Sm, Eu, Yb, Lu, Y), within the regolith relate to the stability of their primary and/or secondary host minerals. Many have accumulated with Fe oxides in the lateritic horizons although, for most, no chemical interactions are involved. Although some lateral dispersion of the lateritic residuum by colluvial action has taken place during the course of profile evolution, the abundances of these elements in the residuum provide information about the mineralogy of the underlying bedrock. Immobile element compositions may also indicate the provenance of transported materials.

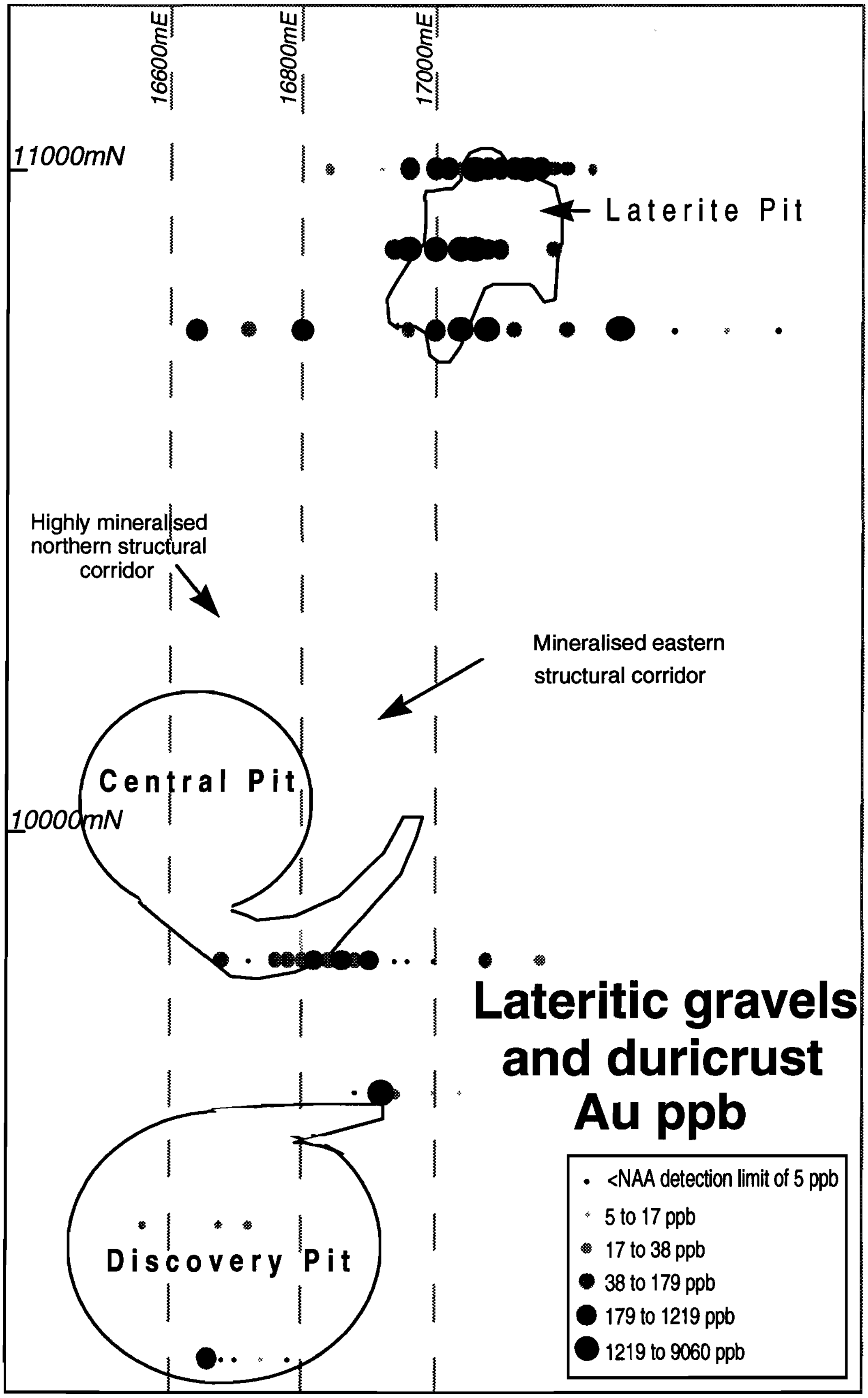


Figure 26: Distribution of Au in lateritic gravels and duricrust.

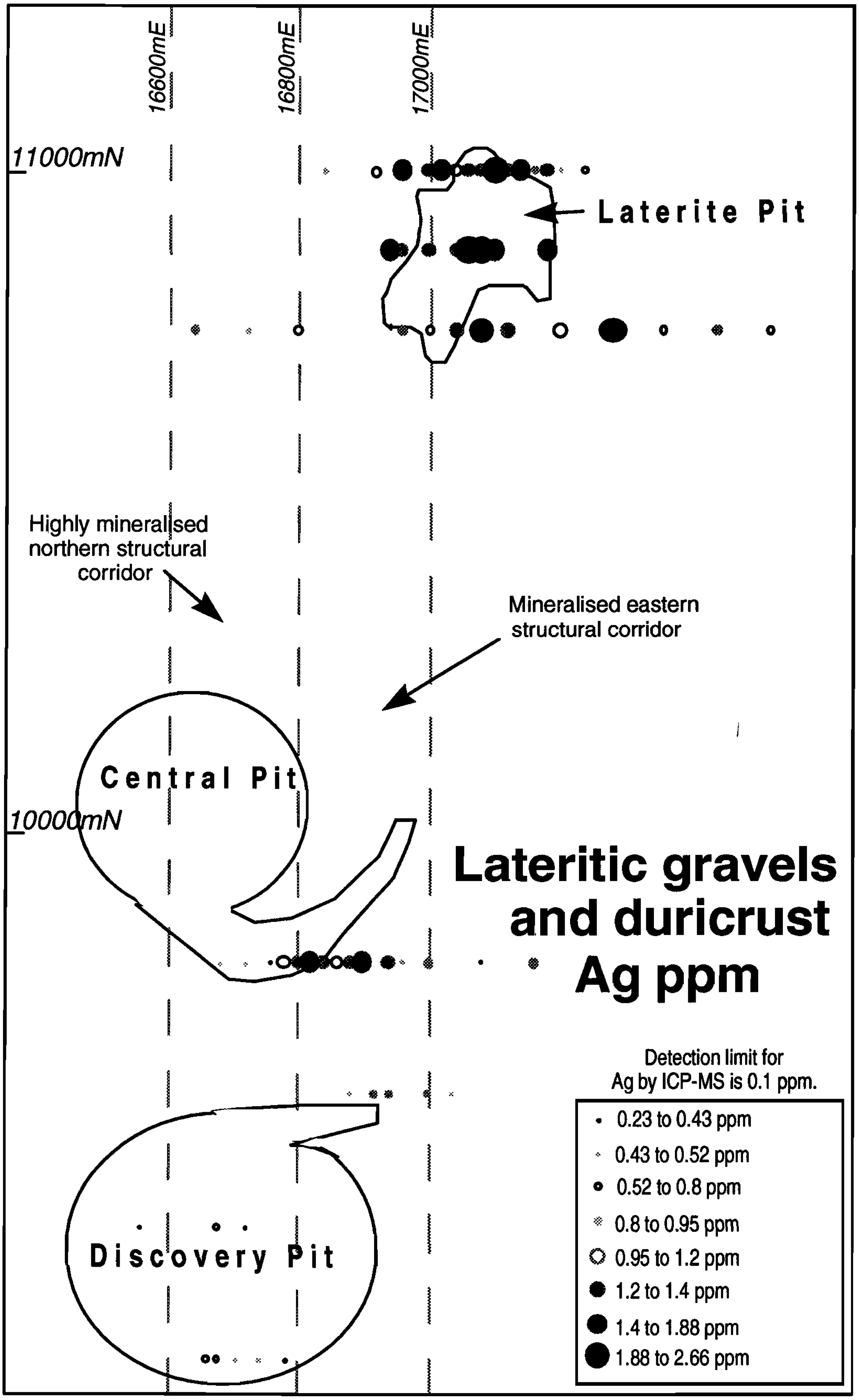


Figure 27: Distribution of Ag in lateritic gravels and duricrust.

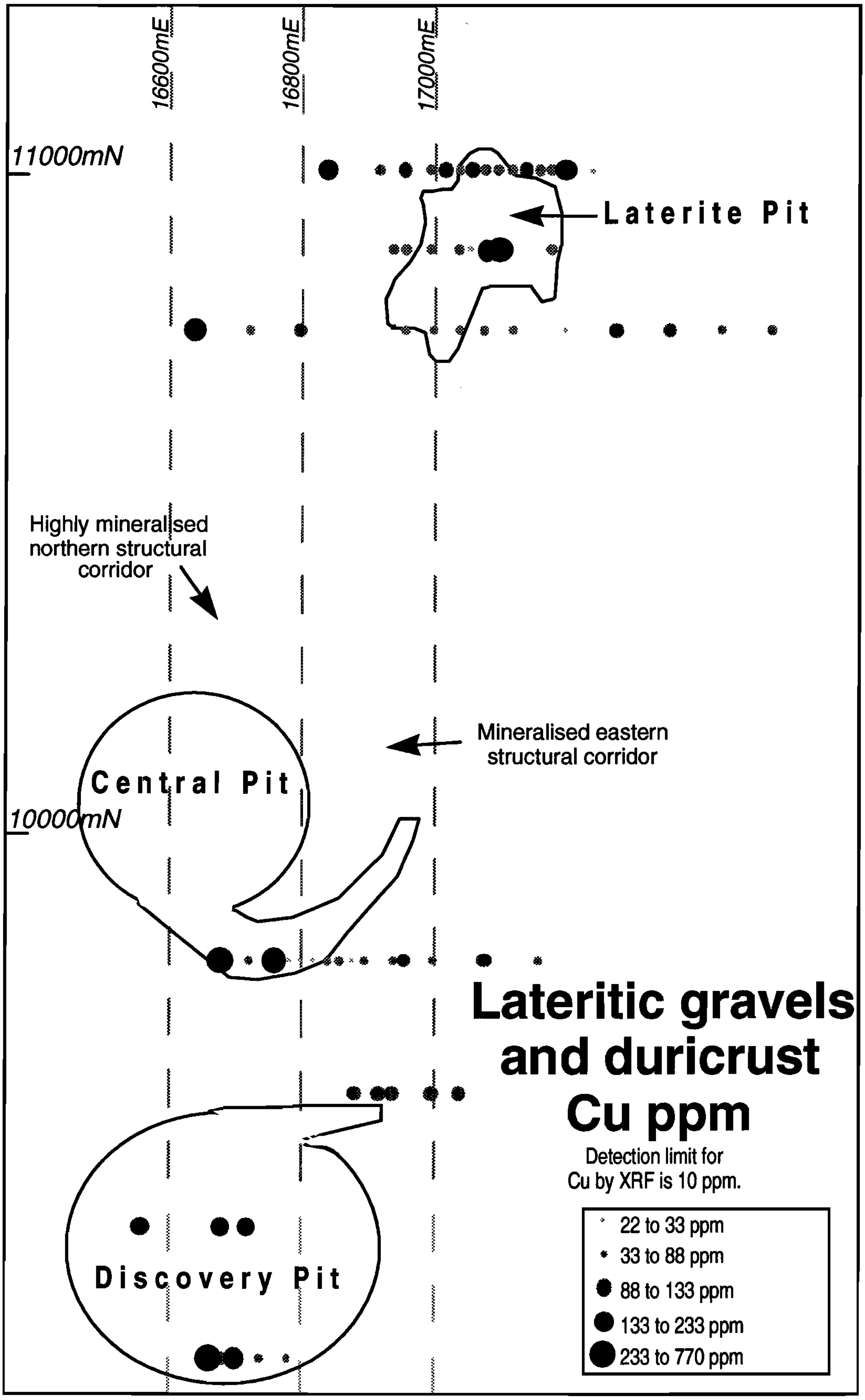


Figure 28: Distribution of Cu in lateritic gravels and duricrust.

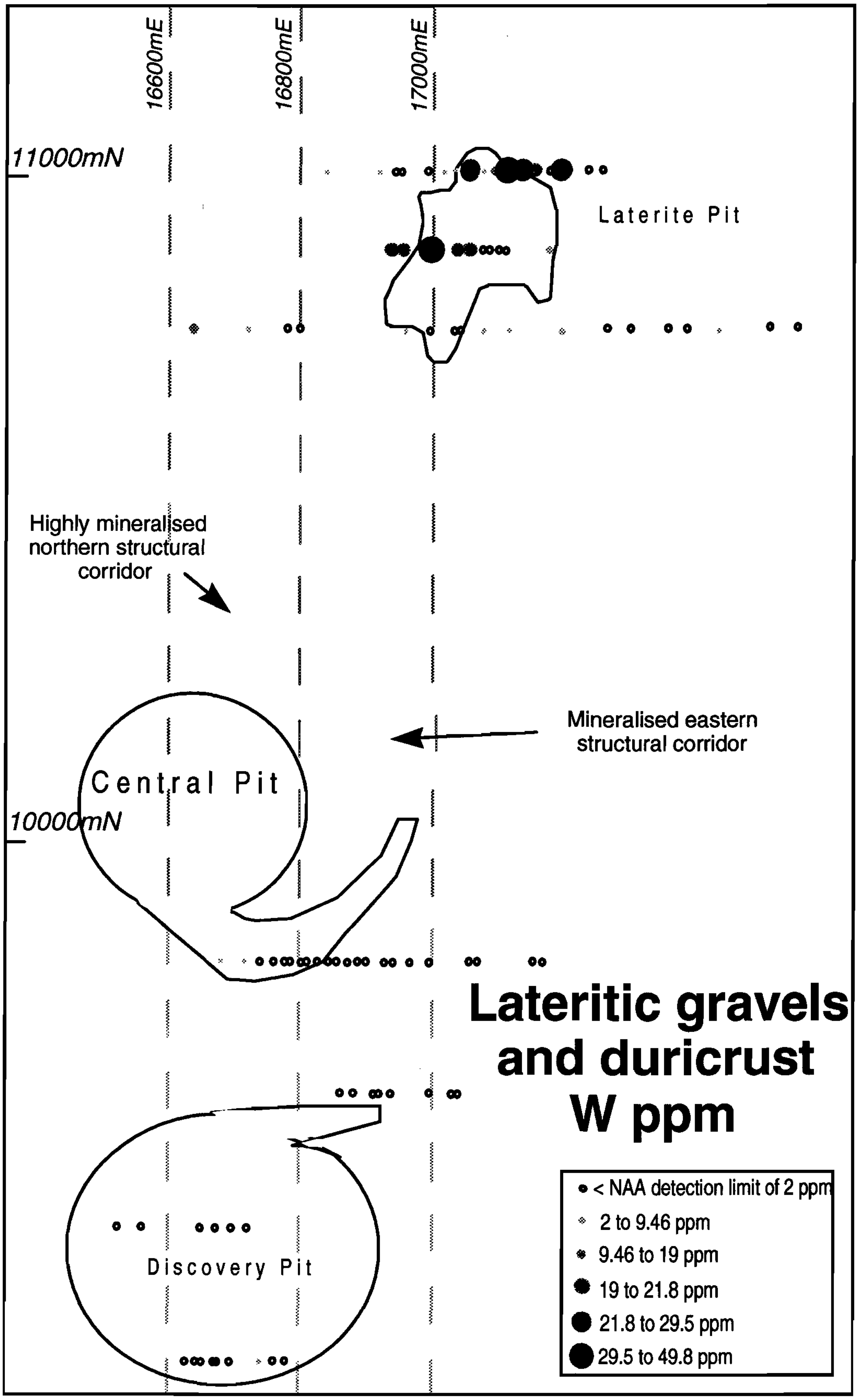


Figure 29: Distribution of W in lateritic gravels and duricrust.

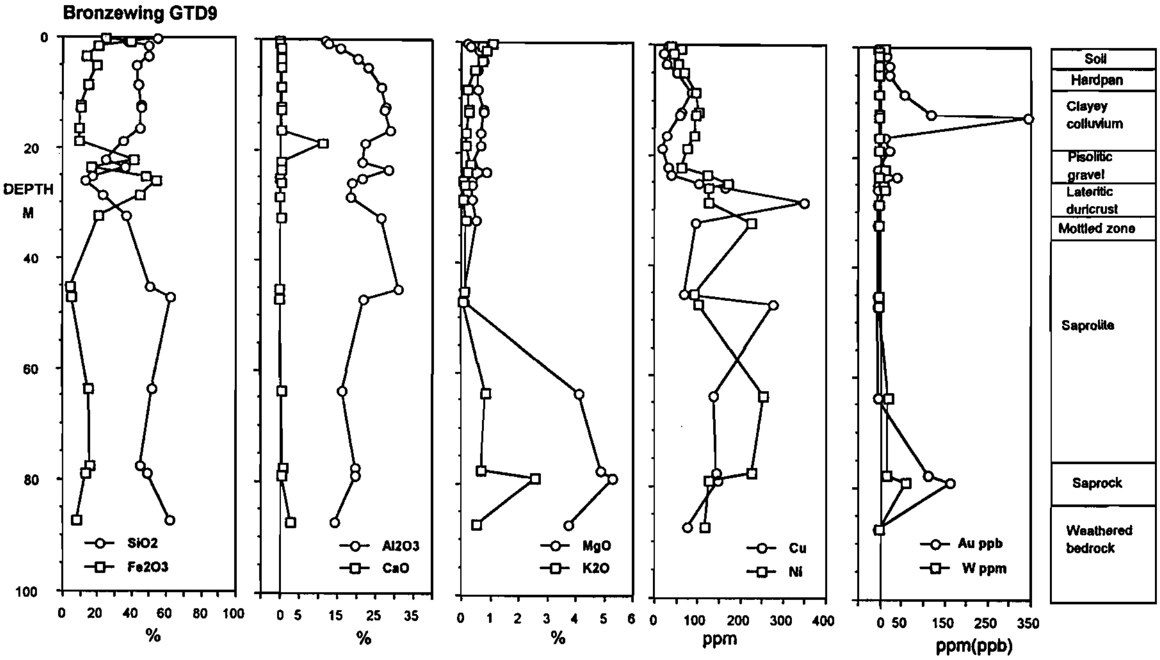


Figure 30: Selected GTD geochemistry.

Chromium and V are enriched in lateritic residuum (mean abundances 1480 ppm Cr and 1400 ppm V) and ferruginous saprolite compared to the fine (<250 μm) soil fraction where concentrations are consistently low. These elements are also relatively enriched in mottles (mean 617 ppm Cr and mean 911 ppm V), compared to the fine soil fraction (mean 165 ppm Cr and mean 133 ppm V; Table 4), suggesting a low proportion of ultramafics as source rocks for the fine alluvial and colluvial sediments. The silty clays (mean 615 ppm) making up the mottled palaeochannel, on the other hand, are likely to have been sourced from saprolitic clays eroded from a lateritic profile which had developed largely over ultramafic parent rocks. Chromium is either contained within resistant chromite or released by weathering of unstable ferromagnesian minerals under oxidising, acidic conditions. High V abundances are largely due to relative concentration within the lateritic residuum, being due to the loss of other components. The highest concentrations of Cr (7380 ppm) and V (354 ppm) were observed over mineralisation at Line 9200N and relate to minor bodies of ultramafics reported within a shear-zone.

Zirconium and Hf concentrations are closely correlated in each of the sample media, and are highest in the fine soil fraction and lowest in the lateritic residuum (Table 4). The fine soil fraction contains the lowest concentrations of Ti when compared to the other three sample media, but the lateritic residuum contains the most Ti (Table 4). These relatively immobile elements are related to zircon (Zr and Hf) to anatase (Ti).

5.4.5 Geochemistry of GTD 9

Twenty-two samples were taken from the core of GTD 9 (Figure 30 and 21) from the Central pit . The complete analytical dataset is provided in Appendix 6. Abundances of Fe, Al and Si reflect the varying abundances of hematite, goethite, gibbsite, kaolinite, other clay minerals and quartz (Table 2). Magnesium and K are leached from above 50 m and Ca is largely restricted to a calcite-rich horizon at 18 m.

Gold concentrations reach a maximum in the saprock at 79 m depth (161 ppb)and in the transported clayey colluvium at 12.7 m (343 ppb). Gold and W distributions are coincident in the saprock (Figure 30) reflecting the primary Au-W association, but W is not enriched with Au in the clayey colluvium (W<2 ppm at 12.7 m).

Bedrock Cu and Ni distributions are reflected in the relict lateritic material. These contain more Cu and Ni than the transported clays and gravels.

6. SYNTHESIS AND CONCLUSIONS

6.1 Regolith-landform evolution

6.1.1 Introduction

The present, relatively flat, surface around the Bronzewing deposit indicates little of the complex regolith beneath. However, mapping of regolith relationships and distributions using drilling and pit faces has revealed the details of the sub-surface regolith and palaeolandscape, from which the weathering history and likely origins of anomalies in the residuum and transported cover can be deduced. A wide range of sediments, including those in the palaeochannels overlie older, residual regolith. The characteristics of the palaeochannel sediments indicate a complex history of deposition and modification by weathering. The palaeochannel at Bronzewing is similar to those described for many major drainages in the Kalgoorlie region, in which the sediments are considered to be late-Eocene (Kern and Commander, 1993; Commander *et al.*, 1991) and were modified after sedimentation. The stratigraphy of the palaeochannel and overlying colluvium-alluvium bears ample evidence that weathering products have continuously contributed to the sediments since the Eocene. The composition of the sediments reflects the weathering profiles of the source area. Thus, the sediments contain valuable information on the evolution of the regolith and landscape.

6.1.2 Lateritic residuum and red soil (interpreted Pre-Eocene)

Preservation of buried lateritic residuum beneath the channel deposits suggest a duricrust-capped landscape before the alluvial fill commenced. However, the thick, kaolinite-hematite red clays which, overlain by hardpanised colluvium on the channel sediments were probably derived from erosion of a pre-existing red soil profile. Thus, the pre-Eocene landscape at Bronzewing was not only mantled with lateritic residuum but also with thick blankets of kaolinite-hematite red soils. Such relationships are also common in other parts of the Yilgarn Craton (Anand *et al.*, 1993). Ferruginous duricrusts and red soils developed in different sites in response to contrasting geological and topographic conditions. Duricrusts were developed on mafic and ultramafic rocks and red soils were probably restricted to felsic lithologies on well-drained upper slopes. These red soils, also known as latosols, ferrallitic soils or ferrisols have been reported from other parts of world and are developed on parent rocks under humid tropical or equatorial climates in regions covered by rain forest and particularly on the well drained upper slopes of landscapes (Chauvel, 1977). These soils do not harden upon exposure to air; Fe distribution is very homogenous and concretions are absent or near absent.

For an extended period prior to the pre-Eocene, the landscape of the region was very stable. The climate favoured weathering, resulting in the development and maintenance of ferruginous crusts and red clay soils, despite local erosion. The considerable palaeorelief (60 m) around Bronzewing suggests that duricrust did not form a simple, extensive, peneplained surface but a discontinuous cover on an undulating plateau. Lateritic nodules and minor pisoliths formed by complex, partly repetitive processes involving both vertical and minor lateral movement after chemical wasting (Figure 31). In general, the processes began with weathering of bedrock involved leaching of the more mobile elements and generation of ferruginous saprolite. Further weathering developed voids and cracks and caused collapse to form a collapsed ferruginous saprolite of large nodules which are further broken down into smaller nodules. Pisoliths, which form the minor component, were produced by dissolution of irregular shaped edges of nodules and local lateral transport. Thus, nodules are more residual than pisoliths, which are more highly evolved. The process of Fe precipitation, continued dissolution of clay, dehydration, nodule development, coupled with collapse of ferruginous saprolite and local lateral transport was probably repeated several times.

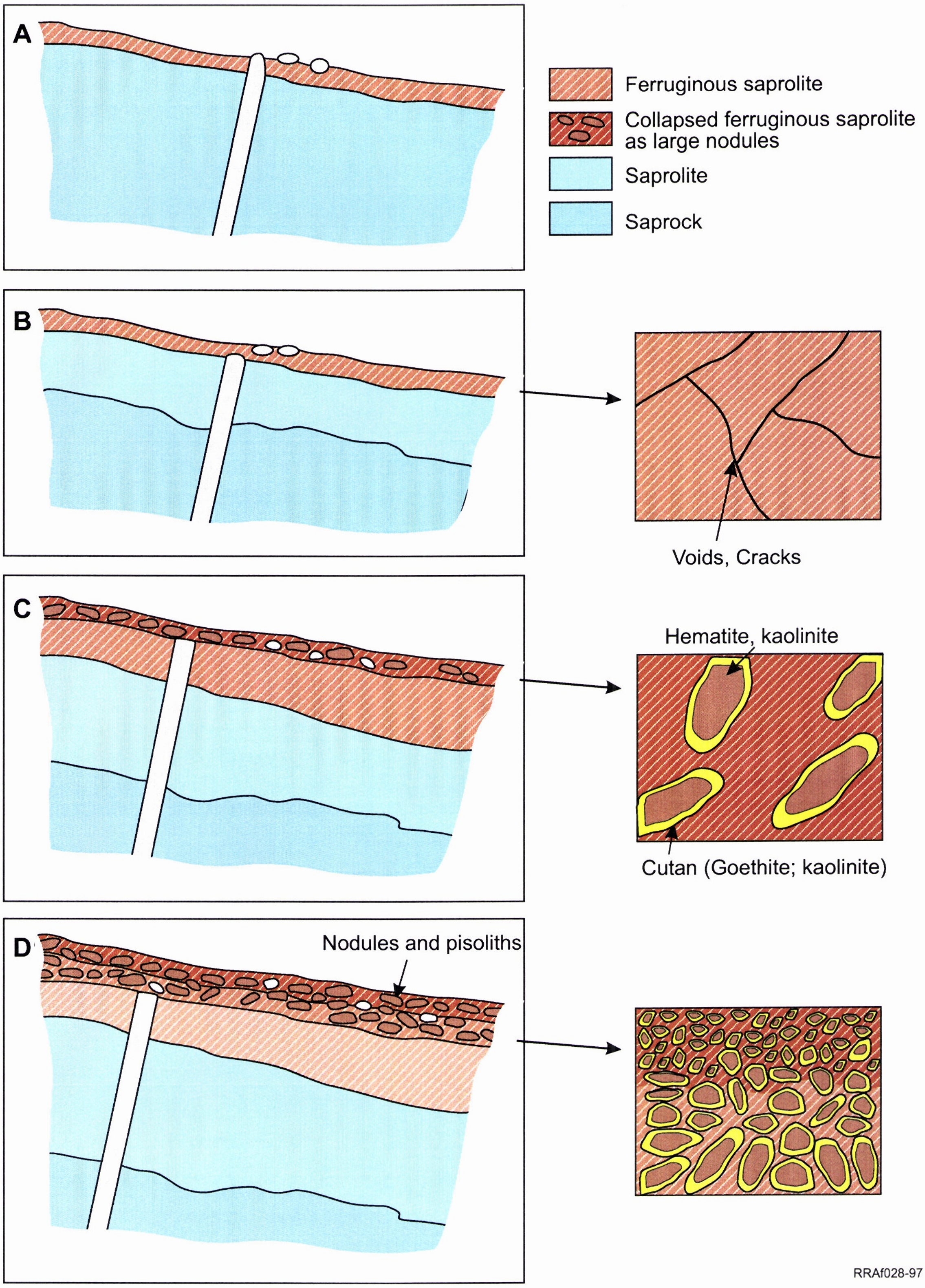
Figure 31: Development of lateritic nodules and pisoliths.

(A) Formation of ferruginous saprolite. Iron released from the weathering of bedrock forms ferruginous to mottled saprolite. Quartz vein starts breaking up.

(B) Weathering results in marked mesoscopic porosity, causing coarse voids in ferruginous saprolite. Bedrock weathering front migrates deeper increasing depth of saprolite. Redox boundary at the base of ferruginous saprolite.

(C) Amalgamation of coarse voids leads to collapse of ferruginous saprolite of large nodules. Cutans coat the large nodules. The base of the collapsed ferruginous saprolite is very irregular. Redox boundary at the base of ferruginous saprolite.

(D) Further weathering and microfragmentation result in small nodules and pisoliths. Pisoliths which form the minor component, are produced by dissolution of irregular shaped edges of nodules and local lateral transport. Ferruginous and clay induration may cement nodules into duricrust.


A
B
C
D
Ferruginous saprolite
Collapsed ferruginous saprolite as large nodules
Saprolite
Saprock
Voids, Cracks
Hematite, kaolinite
Cutan (Goethite; kaolinite)
Nodules and pisoliths
RRAf028-97

The formation of cutans on nodules commences in ferruginous saprolite and becomes dominant in collapsed ferruginous saprolite and the nodular zone. The cutans consist of kaolinite and goethite in ferruginous saprolite and collapsed ferruginous saprolite, and of gibbsite and goethite in the nodular zone. They form by deposition of goethite and kaolinite around a nucleus. Higher in the profile, kaolinite transformed to gibbsite by loss of Si. Alternatively, in moist situations, the hematite of nodules may be transformed to goethite and reprecipitate as cutans on hematite-cored nodules. Gibbsite formation in cutans indicates a well-drained, leached environment.

6.1.3 Deposition and weathering of palaeochannel sediments (interpreted Late Eocene-Miocene)

Dolocretes at Bronzewing are likely to be relict forms equivalent to those in deep sediments in the Roe palaeodrainage (Kern and Commander, 1993). They are confined to the base of the channel above the nodular zone and may have formed by evaporation of a Mg-rich lakewaters so their formation appears to be related to a period of high evaporation rates. Dolocretes survived post-depositional weathering possibly because they remain submerged under alkaline Mg-rich groundwaters. The dolocretes differ from the valley calcretes of the region, which are surficial deposits in major, active drainages.

Locally, thick beds of gravels on the eastern side of the channel cover the upper surface of dolocrete. This occurs in the Discovery and Central pits, indicating greater energy of erosion to the east, consistent with steeper slopes away from Bates Creek. Erosion and deposition of these gravels was followed by continued erosion that deposited red clays (kaolinite-hematite) in a very low-energy basin. These now mottled red clays were probably derived from erosion of pre-existing red soils kilometres to south. No sand layers were found at the base of the channel. Although these clays were probably deposited in a narrow, clearly defined channel, they do not show any current bedding; such structures would have been obliterated by subsequent weathering, mass movements and/or bioturbation. There were no signs of coarse bedding and discrete kaolinitic layers that would be expected in a debris flow.

Mobilisation and segregation of Fe by a combination of roots and reduced groundwaters in porous, vegetated red clays was probably responsible for the formation of the megamottles. The rooted, mottled sediments attest to organic matter having been once present. Similar observations have been made in palaeochannels from other parts of the Yilgarn Craton (Anand *et al.*, 1993; Butt *et al.*, 1997).

6.1.4 Colluvium-alluvium (interpreted Late Miocene-Quaternary)

Once the mantle of red soil profiles has been removed, erosion has access to the duricrust-capped profiles to the east of the pits. This erosion phase was probably triggered by the late Miocene climatic change from humid to more arid conditions. This reduced vegetation cover and destabilised the balance between erosion and weathering, resulting in sequential stripping of the weathered mantle. The nodules and pisoliths were the first to be eroded, followed by silty clays from the saprolite. The progressive stripping of weathered zones led to deposition of gravelly sediments overlain by silty sediments, creating a sedimentary deposit having a stratigraphy that is the inverse of that of the residual regolith. Similarities in the mineralogy of gravels of the gravelly colluvium and those of the buried lateritic nodules confirm that the former are probably sourced from lateritic gravels upslope (east) in the palaeolandscape. The upper 2-8 metres of colluvial-alluvial sediments have been hardpanised by Si and, to a lesser extent, Fe. Such sediments may then be almost indistinguishable from the weathered material from which they have been derived, and over which they have been deposited.

On a regional scale, the breakaways are the most striking consequences of erosion. Ferruginous saprolite is extensively exposed in the breakaway face and forms the principal regolith material maintaining the steep declivities of the areas of more active erosion. There are very few breakaways capped by major outcrops of Fe-rich duricrust in the Bronzewing study area. The steep debris slopes have extensive subcrop and some outcrop of saprock. However, even these slopes are considered relatively stable, and are generally associated with a thin, colluvial mantle. Pedogenic calcretes are commonly associated with the weathering of mafic rocks. Iron segregations appear to be closely associated with the weathering of Fe-rich lithologies, such as pyritic shales and associated gossanous bodies.

Dry conditions and reduced vegetation cover also assist formation of aeolian sediments. These occur over much of the study area and were produced by erosion of sands and reworking of pre-existing sediments. Aeolian deflation, on the other hand, has left vast areas covered by polished, ferruginous, siliceous, lithic, or polymictic lag, which, in some places, forms gibber plains.

6.2 Origin of anomalies in residual and transported cover

Gold mineralisation in quartz veins and sheared pillow basalts is reflected as a well developed dispersion halo in proximal, overlying, lateritic residuum and ferruginous saprolite. The haloes are particularly well-developed in the Laterite pit but, although not as strong in the Central pit, they are, nevertheless, consistent. Further south, in the Discovery pit, considerably weaker, and less consistent anomalies in lateritic residuum are present over mineralisation. Sheets of gravels downslope from the quartz vein are also anomalous in Au, Cu and W, but the distribution is erratic. Wide-spaced sampling would be adequate to sample areas of buried lateritic residuum and ferruginous saprolite.

Mottles developed in sediments have very low Au contents (<5 ppb) and thus are not suitable for geochemical sampling. Iron in mottles has been redistributed from the surrounding clays and was not derived from underlying lateritic residuum. The mottles are not enriched in any of the mobile indicator elements that are enriched in the lateritic residuum.

Colluvial, ferruginous gravels are anomalous in Au, Cu and W over the deposit. Their source is east of the pits, where a palaeosurface, intersected by many small mineralised quartz veins, gradually accumulated a Au-bearing gravel that shed westwards. Anomalous gravels occur in RAB intersections on line 9600 mN between 17000-17400 mE. Mechanical dispersion of Au is further suggested by high concentrations of Au in the coarse fraction of the colluvium directly overlying lateritic residuum in the north wall of the Central Pit. Hydromorphic dispersion might be expected to lead to a Au enrichment of the fine fraction, but there is no evidence for this. The present fresh groundwaters are unlikely to be able to dissolve or disperse Au as a halide complex and other ligands, such as organic and thiosulphate ions, are similarly absent or at very low concentrations. Gravelly colluvium is useful sampling medium in situations where lateritic residuum or ferruginous saprolite are missing. No dispersion of Au into the soil was detected by partial extraction of the soil fine fraction.

In conclusion, Au occurs in the regolith in several situations:

1. Quartz veins and stringers in saprolite (sub-vertical).

2. Complete, residual, lateritic profiles preserved by burial (horizontal).

3. Locally transported lateritic gravel beds on channel margins (sub-horizontal)

4. A palaeosurface that extends downslope from erosional surfaces on lateritic residuum to depositional areas over alluvium.

5. Possibly as secondary gold at the redox front at the upper boundary of the dolomite.

6.3 Identification of residual and transported materials

6.3.1 Characteristics of residual nodules, pisoliths and duricrust

- Preservation of bedrock structures or quartz veins through the profile
- Nodules of irregular, angular shape
- Nodules and pisoliths with yellowish-brown to olive green cutans
- Similar mineralogy of matrix and nodules/pisoliths

6.3.2 *Characteristics of transported nodules and pisoliths and duricrust*

- Unconformable contacts between the overlying and underlying units
- Chipped cutans
- Different mineralogy and grain size between matrix and nodules/pisoliths
- Well sorted gravels
- Pisoliths without cutans

6.3.3 *Characteristics of sediments*

- Polymictic gravels
- Pisoliths without cutans-unless pisoliths developed *in situ* in palaeochannel sediments
- Concentrations of heavy minerals unrelated to the underlying bedrock
- Concentration of relatively immobile elements (Ti, Zr, Cr) unrelated to the underlying bedrock
- Presence of weatherable minerals (*e.g.* feldspars, amphiboles)
- Presence of fractured ferruginous gravels
- Abrupt change in mineralogy - for example kaolinite to smectite
- Rounded quartz
- Lignite and organic matter

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APPENDICES

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APPENDIX 1

REGOLITH-LANDFORM MAP

APPENDIX 2

REGOLITH MAPPING UNITS

The 21 mapping units of the 1: 50000 scale regolith map of the Bronzewing study area (see map pocket at back), many of which are included in Figure 3, are described below. They are also compared in table form in TABLE 1 OF THE APPENDIX. Mapping criteria were focused on surface materials (including lag type), landform, geological, stratigraphic and vegetation associations particular to each unit.

- **LA2** - Predominantly occupying low hills and crests, this unit is characterised by a surface cover of lateritic nodules, ferruginous saprolite, lateritic duricrust and mottles, often covered by, and/or mixed with, a red-brown clay soil. The term crests, refers to the commonly subdued or low breakaways of the area. Locally, this unit may include areas of outcropping and near surface slightly weathered bedrock that have been lateritised.
- **LA3** - This unit consists of lateritic gravels comprising nodules, pisoliths, mottles, and ferruginous saprolite fragments, and is found on gently undulating low hills, including backslopes to breakaways. Whilst unit LA2 is found on crests and low hills, commonly contiguous with erosional units, unit LA3 typically extends gradually downslope from behind the erosional tract.
- **gLS5** - Typically comprising a surface cover of coarse-grained yellow to red relict granitic sand, gLS5 is widely distributed on very gently undulating plains in the northwest sector of the mapped area. The plains may display broad convexities and local dune formation.
- **NL2** - This unit represents areas characterised by lag of iron segregations on low hills and pediment slopes. The iron segregations have been exposed at the surface through extensive stripping of the saprolite and fragmented into hematite(± goethite)-rich granule to pebble sized clasts.
- **NL5** - Bearing lag composed of ferruginous sand to fine granule sized clasts on stripped slopes and undulating plains, this unit is widespread, and represents areas of sheet erosion where the ferruginous clasts have been transported short distances down slope, resulting in their mechanical erosion and greater fragmentation.
- **SP2** - This unit represents areas of minor erosion to just below the level of the lateritic residuum, where sand to small pebble sized ferruginous saprolite fragments are exposed on crests, breakaways and low hills.
- **SP5** - Restricted to the southwest corner of the study area, this unit represents areas of silicified saprolite on low hills. The bedrock geology is predominantly granitic which gives rise to the highly silicified nature of this unit.
- **LI4** - Blocky pebble to coarse cobble sized quartz fragments on ridges and low hills are characteristic of this unit. The quartz blocks are the product of erosion of underlying, protruding, or nearby quartz veins that penetrate the saprolite. The area immediately SW of Spinifex Well, with its prominent quartz veins, is typical of this unit.
- **LI5** - This unit is dominated by exposed bedrock, saprock, and quartz fragments on crests and stripped slopes. Areas that are eroded beyond this level are assigned to a BR unit (below), where relatively unweathered bedrock is dominantly exposed. As may be expected, these units are commonly contiguous and gradational.
- **BR1** - This unit is defined by outcropping ferruginised bedrock on crests and low hills. Ferruginisation is more common and more extensive in the mafic greenstone sequences than in the felsics. Examples may be found 3 km north of Bronzewing, around Mt. Joel, and in the central and western parts of the study area.
- **BR2** - This unit consists of silicified bedrock on high, rugged hills. Resilient escarpments up to 10 m high, (*e.g.* N of Mt. Joel), are surrounded locally by iron-stained siliceous boulder screes. Several N-S-trending outcrops of this unit, including those which occur E of the Yandal-Wiluna Road, N of Mt. Joel, follow the regional trend of the Yandal Greenstone Belt.

- **BR3** - This unit includes fresh bedrock which is exposed on ridges, low hills and stripped slopes. Areas mapped as BR3 occur 5 km south-west of Mt. Joel and 5 km north-west of Fred Bore. The rock is typically of doleritic and/or basaltic nature, forming small pediment slopes of angular boulders. The total area of outcropping rock hills is in the order of less than 5% of the total area mapped.
- **AS1** - This unit is readily distinguished as red clay on alluvial plains and drainage floors, present in low lying areas. Polymict lag, of ferruginous granules and pebbles, (disaggregated iron segregations and lateritic debris), and vein and detrital quartz, derived from marginal upland areas, is typically associated with the red clays. Finer quartz fragments and ferruginous granules may be reworked into a thin and patchy veneer of aeolian sand, on some alluvial plains, such as that marking the Bates Creek drainage present over the Discovery Zone and much of the Bronzewing tenement area.
- **AS4** - The saline calcareous earths of the playas associated with the Lake Maitland drainage system in the NE sector of the map are included in this unit. The highly calcareous nature of the sediments suggests input from the upstream mechanical erosion and dissolution of valley calcrete bodies.
- **CS2** - This unit comprises calcareous red clays on colluvial plains marginal to areas of valley calcrete, and is commonly an intermediate colluvial unit between the presently inactive drainage system, outlined by the higher areas of calcrete, and the calcareous playa systems.
- **CT5** and **CT6** - These units are defined by colluvial talus, on gentle pediment slopes and plains, deposited over bedrock and saprolite, respectively. These units occur predominantly on the western side of the study area where rocky hills and mature breakaway structures are eroding, thus, exposing the bedrock and saprolite, respectively, which underlies the colluvial talus derived from such erosion.
- **CT7** - This unit represents colluvium on unknown substrate, which is commonly covered by a polymict lag of ferruginous saprolite, iron segregations and quartz fragments. This unit is widespread throughout the mapping area, on colluvial slopes and plains marginal to low hills, where regolith exposure is insufficient to determine the substrate.
- **AT6** - Consisting of alluvium on bedrock substrate this unit is restricted in distribution to upper tributary alluvial plains, where alluvium is seen to directly overlie bedrock, and possibly patches of saprock / saprolite.
- **AT7** - This unit consists of alluvium on an unknown substrate. As such, it is commonly marginal to the upslope colluvial equivalent, CT 7, as seen E of the Old Bronzewing workings.
- **CC** - Calcrete present in relict valley drainages is characteristic of this unit, which is restricted to the N and NE portion of the mapped area. The rubbly calcrete is generally raised above the low-lying surrounding landscape, and is typified by a complex of raised mounds and soil-filled depressions which form a 'mini-karst' landscape.

APPENDIX 3

SUMMARY STATISTICS

Appendix 3: Summary statistics.

Table 1: Descriptive statistics, soil samples (n = 64)									
	Mean	Confid. -95%	Confid. 95%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Std. Dev.
SiO_2 %	69.28	67.95	70.61	69.54	32.88	76.19	67.69	71.85	5.33
Al_2O_3 %	14.74	14.35	15.13	14.77	11.45	21.09	13.64	15.77	1.56
Fe_2O_3 %	7.15	6.37	7.93	6.92	5.42	31.33	6.34	7.23	3.12
MgO %	0.19	0.18	0.2	0.18	0.12	0.45	0.17	0.2	0.04
CaO %	0.07	0.06	0.08	0.06	0.02	0.37	0.05	0.07	0.04
Na_2O %	0.09	0.08	0.09	0.09	0.05	0.18	0.08	0.09	0.02
K_2O %	1.19	1.15	1.22	1.2	0.11	1.25	1.19	1.22	0.14
TiO_2 %	0.76	0.74	0.78	0.76	0.62	1.24	0.72	0.8	0.08
P_2O_5 %	0.05	0.05	0.05	0.05	0.02	0.07	0.04	0.05	0.01
MnO %	0.08	0.07	0.09	0.08	0.02	0.18	0.06	0.1	0.04
Ag	0.59	0.56	0.61	0.57	0.39	0.88	0.52	0.64	0.1
As	5.81	5.48	6.14	5.72	4.66	15.4	5.27	6	1.31
Au ppb	1.93	1.64	2.21	1.6	1.6	6.4	1.6	1.6	1.13
Ba	242	230.64	253.36	248.5	9	303	230	265.5	45.47
Bi	0.38	0.36	0.41	0.36	0.29	0.93	0.33	0.41	0.09
Br	2.75	2.09	3.41	2.49	0.66	16.2	0.66	2.99	2.65
Ce	45.79	43.39	48.19	45.9	8.28	66.5	40.7	51.05	9.61
Cl	96.42	13.87	178.96	0.02	0.02	2310	0.02	35	330.45
Co	15.83	14.45	17.21	15.5	4.82	28.7	12.9	19.05	5.52
Cr	166.84	149.5	184.19	159	143	711	154	163	69.43
Cs	3.13	2.97	3.29	3.08	0.33	4.29	2.79	3.49	0.63
Cu	12.98	9.71	16.24	17	3.3	56	0.02	22	13.09
Eu	0.74	0.7	0.79	0.75	0.02	1.19	0.64	0.86	0.17
Ga	19.02	18.42	19.61	19	15	29	17.5	20.5	2.39
Hf	7.53	7.33	7.73	7.55	4.54	9.54	7.05	7.94	0.8
La	21.68	20.82	22.53	22	3.7	28.9	19.9	23.2	3.41
Lu	0.29	0.28	0.3	0.29	0.07	0.38	0.27	0.31	0.04
Mo	1.28	1.24	1.32	1.27	0.9	2.09	1.16	1.36	0.17
Nb	4.82	4.18	5.46	5	0.33	10	3	7	2.56
Ni	31.57	29.95	33.2	32	21.3	68.9	27.7	34.3	6.51
Pb	21.62	21.05	22.19	21.55	17.3	27.3	19.8	23.4	2.28
Rb	65.75	63.75	67.74	66.2	20.6	80	63.05	69.6	7.99
S	108.44	101.36	115.52	110	40	180	85	130	28.35
Sb	0.44	0.42	0.46	0.44	0.29	0.62	0.4	0.49	0.07
Sc	15.5	14.58	16.43	15.3	11.2	41.2	13.85	16.55	3.7
Sm	3.6	3.43	3.76	3.61	0.72	5.39	3.24	3.97	0.66
Sr	36.03	35.03	37.03	36.5	27	43	33	39	4.02
Ta	1.17	1.04	1.3	1.26	0.33	2.25	1.02	1.54	0.53
Th	13.96	13.76	14.17	14.05	12.3	15.8	13.3	14.5	0.83
U	2.59	2.37	2.82	2.79	0.66	4.45	2.48	3.05	0.91
V	132.52	110.88	154.15	124.5	92	809	114	129.5	86.62
W	0.69	0.63	0.75	0.66	0.66	2.51	0.66	0.66	0.23
Y	14.91	13.98	15.84	15	5	22	12	18	3.72
Yb	2.14	2.08	2.19	2.15	1.15	2.6	2.02	2.26	0.22
Zn	39.41	37.49	41.32	40.5	14	57	34	44.5	7.68
Zr	273.27	267.02	279.51	276	171	330	260.5	288.5	24.99

All values in ppm unless otherwise stated

Appendix 3: *Summary statistics.*

Table 2: Descriptive statistics for mottle samples (n=12)

	Mean	Confid. -95%	Confid. 95%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Std. Dev.
SiO_2 %	30.89	25.71	36.08	35.50	17.75	36.74	22.02	36.19	7.72
Al_2O_3 %	20.66	18.00	23.32	21.85	9.17	23.27	20.42	22.35	3.96
Fe_2O_3 %	34.38	26.03	42.72	27.93	23.54	61.84	26.13	46.04	12.43
MgO %	0.41	0.30	0.53	0.43	0.14	0.66	0.24	0.54	0.17
CaO %	0.35	0.22	0.48	0.29	0.13	0.77	0.18	0.39	0.20
Na_2O %	0.09	0.08	0.11	0.11	0.04	0.12	0.07	0.11	0.03
K_2O %	0.15	0.11	0.19	0.16	0.04	0.26	0.09	0.19	0.06
TiO_2 %	1.23	1.01	1.45	1.27	0.34	1.63	1.21	1.39	0.33
P_2O_5 %	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.004
MnO %	0.03	0.02	0.05	0.04	0.002	0.06	0.02	0.05	0.02
Ag	0.46	0.36	0.56	0.47	0.12	0.69	0.42	0.54	0.15
As	20.20	9.79	30.61	15.70	9.71	64.00	13.00	18.10	15.50
Au ppb	2.71	1.01	4.41	1.60	1.60	9.00	1.60	1.60	2.54
Ba	114.64	-53.84	283.11	42.00	19.00	870.00	30.00	51.00	250.77
Bi	0.25	0.17	0.32	0.20	0.12	0.46	0.16	0.36	0.11
Br	1.17	0.57	1.77	0.66	0.66	2.94	0.66	2.18	0.89
Ce	13.67	5.89	21.46	12.00	2.32	41.30	5.51	16.40	11.59
Cl	65.46	-12.56	143.48	40.00	0.02	410.00	10.00	60.00	116.13
Co	16.70	12.67	20.73	17.00	6.26	25.30	13.20	22.00	6.00
Cr	617.18	423.98	810.38	496.00	278.00	1160.00	429.00	707.00	287.58
Cs	0.79	0.22	1.36	0.33	0.33	2.86	0.33	1.52	0.85
Cu	67.09	55.16	79.02	74.00	37.00	87.00	49.00	79.00	17.76
Eu	0.41	0.06	0.77	0.02	0.02	1.40	0.02	0.61	0.53
Ga	31.91	25.42	38.40	30.00	13.00	53.00	28.00	36.00	9.66
Hf	4.28	3.76	4.80	4.38	2.76	5.05	4.25	4.87	0.78
La	8.07	3.30	12.83	6.50	1.20	22.30	3.24	9.58	7.09
Lu	0.12	0.04	0.19	0.07	0.07	0.35	0.07	0.07	0.11
Mo	1.97	1.48	2.46	1.69	0.93	3.22	1.49	2.52	0.73
Nb	2.88	1.18	4.58	3.00	0.33	8.00	1.00	5.00	2.53
Ni	77.05	62.86	91.25	82.00	18.20	98.80	78.70	86.80	21.13
Pb	23.07	15.82	30.32	25.40	6.65	43.00	11.00	27.90	10.79
Rb	15.56	5.70	25.41	6.66	6.66	52.20	6.66	21.60	14.67
S	88.18	17.10	159.27	40.00	20.00	380.00	30.00	130.00	105.81
Sb	0.90	0.56	1.24	0.82	0.49	2.33	0.54	0.91	0.51
Sc	44.97	32.03	57.92	45.50	16.60	92.80	30.20	50.10	19.27
Sm	2.04	0.80	3.27	1.49	0.32	5.53	0.72	2.34	1.84
Sr	27.27	24.42	30.12	29.00	18.00	32.00	24.00	31.00	4.24
Ta	0.62	0.28	0.97	0.33	0.33	1.60	0.33	1.25	0.51
Th	12.97	10.90	15.04	13.10	6.14	17.00	11.20	15.50	3.08
U	0.82	0.46	1.18	0.66	0.66	2.43	0.66	0.66	0.53
V	910.64	737.75	1083.52	872.00	552.00	1467.00	809.00	956.00	257.34
W	2.20	-0.77	5.18	0.66	0.66	15.40	0.66	0.66	4.43
Y	8.55	3.64	13.45	6.00	0.02	25.00	4.00	14.00	7.30
Yb	1.47	0.91	2.03	1.36	0.16	2.85	0.97	1.90	0.83
Zn	16.91	13.00	20.82	17.00	9.00	25.00	12.00	23.00	5.82
Zr	175.27	154.95	195.60	185.00	110.00	205.00	178.00	191.00	30.26

All values in ppm unless otherwise stated

Appendix 3: Summary statistics.

Table 3: Descriptive statistics, lateritic residuum samples (n=76)

	Mean	Confid. -95%	Confid. 95%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Std. Dev.
SiO_2 %	18.39	17.12	19.66	17.62	7.16	37.89	14.68	21.31	5.57
Al_2O_3 %	19.71	18.72	20.7	19.53	10.58	31.2	16.6	22.76	4.33
Fe_2O_3 %	48.45	46.18	50.72	48.78	24.89	68.38	42.1	54.64	9.93
MgO %	0.25	0.22	0.28	0.22	0.1	0.99	0.17	0.3	0.13
CaO %	0.27	0.2	0.34	0.18	0.1	1.88	0.15	0.25	0.29
Na_2O %	0.07	0.07	0.08	0.07	0.04	0.15	0.05	0.09	0.02
K_2O %	0.07	0.05	0.08	0.06	0.02	0.47	0.04	0.08	0.06
TiO_2 %	1.89	1.71	2.07	1.85	0.62	4.76	1.27	2.38	0.8
P_2O_5 %	0.02	0.02	0.02	0.02	0.01	0.04	0.02	0.03	0.01
MnO %	0.02	0.01	0.02	0.01	0.002	0.05	0.01	0.02	0.01
Ag	1.01	0.89	1.12	0.9	0.23	2.66	0.52	1.35	0.51
As	25.94	23.25	28.64	23.4	7.48	69.1	18.1	31.3	11.78
Au ppb	558.33	220.61	896.06	74.1	1.6	9060	12.5	293.5	1477.95
Ba	106.44	80.01	132.87	73	0.33	595	30	146	115.66
Bi	0.61	0.41	0.81	0.4	0.03	5.5	0.28	0.59	0.87
Br	1.49	1.25	1.74	0.66	0.66	4.39	0.66	2.4	1.07
Ce	23.72	17.8	29.65	18.15	3.73	185	10.45	26.45	25.95
Cl	34.61	21.77	47.45	20	0.02	370	0.02	50	56.17
Co	13.14	10.34	15.94	8.21	2.41	64.5	6.03	14.9	12.25
Cr	1475.86	1164.25	1787.46	966.5	339	7380	748.5	1385	1363.64
Cs	0.69	0.53	0.86	0.33	0.33	3.11	0.33	0.33	0.72
Cu	96.76	74.76	118.77	73.5	15	770	46.5	110	96.29
Eu	0.71	0.57	0.85	0.74	0.02	2.67	0.02	1.07	0.61
Ga	53.71	49.93	57.49	53.5	23	101	41	65.5	16.55
Hf	5.1	4.71	5.49	5.04	1.5	9.74	4.01	6.25	1.69
La	9.61	7.92	11.3	7.85	1.89	41.7	4.13	13.1	7.4
Lu	0.27	0.22	0.31	0.28	0.07	0.88	0.07	0.39	0.19
Mo	2.25	2.06	2.44	2.14	0.54	4.69	1.6	2.89	0.84
Nb	3.13	2.33	3.94	1.5	0.33	14	0.33	5	3.5
Ni	76.25	65.8	86.69	64.4	26.3	258	43	94.55	45.71
Pb	18.01	16.48	19.54	17.3	4.66	39	12.55	23.1	6.69
Rb	15.39	12.62	18.16	6.66	6.66	56.6	6.66	26.85	12.13
S	221.18	190.85	251.52	200	40	950	120	285	132.77
Sb	1.19	1.1	1.29	1.19	0.46	2.47	0.92	1.43	0.42
Sc	73.14	68.36	77.92	69	36.5	122	56.25	89.7	20.93
Sm	3.16	2.72	3.6	2.91	0.82	10.8	1.72	4.14	1.93
Sr	22.87	21.38	24.35	23.5	10	39	18	28	6.49
Ta	0.89	0.73	1.05	0.33	0.33	2.49	0.33	1.46	0.7
Th	12.24	11.12	13.36	12	1.77	23.1	9.52	15.1	4.9
U	1.17	0.9	1.44	0.66	0.66	5.91	0.66	0.66	1.18
V	1402.11	1277.72	1526.49	1295	577	3626	1032.5	1679	544.34
W	5.95	3.74	8.17	0.66	0.66	49.8	0.66	6.98	9.68
Y	14.49	12.58	16.39	13	0	43	9	20.5	8.34
Yb	2.38	2.11	2.64	2.24	0.65	6.36	1.57	2.97	1.18
Zn	20.16	17.09	23.23	16	3	88	12	24	13.43
Zr	184.34	170.91	197.77	178.5	55	357	147	221.5	58.77

All values in ppm unless otherwise stated

Appendix 3: Summary statistics.

Table 4: Descriptive statistics, ferruginous saprolite samples (n=8)									
	Mean	Confid. -95%	Confid. 95%	Median	Minimum	Maximum	Lower Quartile	Upper Quartile	Std. Dev.
SiO_2 %	15.91	11.52	20.31	17.20	6.74	23.64	12.53	18.74	5.26
Al_2O_3 %	14.57	10.67	18.47	16.23	5.48	19.77	12.17	17.27	4.66
Fe_2O_3 %	56.40	47.10	65.70	51.98	48.70	81.28	49.46	59.17	11.12
MgO %	0.19	0.15	0.23	0.19	0.13	0.26	0.16	0.24	0.05
CaO %	0.32	-0.08	0.72	0.15	0.11	1.50	0.13	0.19	0.48
Na_2O %	0.04	0.03	0.05	0.05	0.01	0.05	0.04	0.05	0.01
K_2O %	0.05	0.01	0.10	0.04	0.01	0.19	0.02	0.06	0.06
TiO_2 %	1.27	0.80	1.74	1.35	0.64	2.24	0.72	1.57	0.56
P_2O_5 %	0.04	0.02	0.05	0.03	0.02	0.08	0.02	0.04	0.02
MnO %	0.02	0.01	0.03	0.02	0.01	0.04	0.01	0.02	0.01
Ag	0.41	0.25	0.57	0.41	0.14	0.62	0.25	0.61	0.20
As	17.09	11.87	22.30	16.95	9.00	30.00	13.05	18.85	6.24
Au ppb	16.44	-1.69	34.56	5.45	1.60	61.60	1.60	27.10	21.68
Ba	60.17	-18.12	138.45	25.00	0.33	277.00	5.50	71.50	93.64
Bi	0.26	0.06	0.46	0.21	0.03	0.72	0.07	0.38	0.24
Br	1.27	0.56	1.98	0.66	0.66	2.48	0.66	2.19	0.85
Ce	3.97	1.79	6.16	2.88	2.00	9.79	2.31	4.81	2.61
Cl	45.00	6.05	83.96	35.00	0.02	140.00	10.01	65.00	46.59
Co	16.92	9.23	24.61	19.55	3.85	29.80	8.56	22.75	9.20
Cr	840.38	509.93	1170.82	885.50	181.00	1250.00	535.50	1225.00	395.26
Cs	1.28	-0.03	2.59	0.33	0.33	4.53	0.33	2.04	1.57
Cu	251.50	33.91	469.09	213.00	0.02	858.00	114.00	250.00	260.27
Eu	0.13	-0.14	0.40	0.02	0.02	0.94	0.02	0.02	0.33
Ga	40.38	21.54	59.21	45.50	16.00	81.00	17.50	50.00	22.53
Hf	3.42	2.11	4.74	4.08	1.29	5.57	1.80	4.39	1.57
La	1.71	0.76	2.66	1.19	0.95	4.32	1.02	2.01	1.14
Lu	0.15	0.00	0.29	0.07	0.07	0.56	0.07	0.14	0.18
Mo	1.99	1.09	2.89	1.94	0.76	4.15	1.18	2.41	1.08
Nb	1.21	-0.43	2.85	0.33	0.33	6.00	0.33	1.00	1.96
Ni	58.96	45.51	72.42	60.60	27.00	74.40	51.90	72.65	16.10
Pb	10.83	6.83	14.83	10.13	5.15	21.00	8.02	12.10	4.78
Rb	11.48	3.94	19.03	6.66	6.66	28.40	6.66	15.08	9.03
S	362.50	146.34	578.66	280.00	60.00	800.00	180.00	560.00	258.55
Sb	0.91	0.63	1.19	0.74	0.62	1.53	0.68	1.15	0.34
Sc	58.09	29.16	87.02	43.60	18.60	119.00	36.00	83.95	34.61
Sm	1.08	0.40	1.77	0.77	0.38	2.77	0.58	1.42	0.82
Sr	21.38	16.32	26.43	22.00	11.00	29.00	17.50	26.00	6.05
Ta	0.68	0.26	1.09	0.33	0.33	1.49	0.33	1.14	0.49
Th	5.14	2.22	8.06	5.17	0.96	11.40	2.00	7.22	3.50
U	0.88	0.36	1.40	0.66	0.66	2.41	0.66	0.66	0.62
V	1213.00	912.54	1513.46	1160.50	707	1884	1021	1375	359.4
W	2.12	-0.15	4.39	0.66	0.66	7.06	0.66	3.29	2.72
Y	5.75	2.83	8.67	7.00	0.02	11.00	3.00	7.50	3.49
Yb	1.36	0.43	2.28	1.26	0.16	3.69	0.62	1.63	1.11
Zn	44.63	11.54	77.71	27.00	19.00	134.00	22.00	53.00	39.57
Zr	132.75	73.59	191.91	154.0	42.0	238.0	59.5	177.5	70.77

All values in ppm unless otherwise stated

APPENDIX 4

CHEMICAL COMPOSITION OF BRONZEWING SAMPLES

Appendix 4: Chemical composition of Bronzewing samples.

Ident	North	East	Dept	TYPE	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	LOI	Total
unit			(m)		%	%	%	%	%	%	%	%	%	%	%	%
method					XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
DL					0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.002	0.002		
07-2500	9600	16440	0.5	SU	67.1	16.1	7.42	0.20	0.07	0.09	1.20	0.84	0.051	0.173	6.5	99.8
07-2501	9600	16560	0.5	SU	70	14.6	6.93	0.19	0.06	0.09	1.22	0.77	0.045	0.141	5.9	100
07-2502	9600	16620	0.5	SU	70	14.4	6.87	0.18	0.06	0.09	1.20	0.75	0.041	0.095	5.9	99.5
07-2503	9600	16660	0.5	SU	69	15	7.15	0.17	0.05	0.08	1.19	0.75	0.046	0.064	6.1	99.6
07-2504	9600	16680	0.5	SU	67.6	15.6	7.44	0.22	0.09	0.12	1.19	0.77	0.046	0.114	6.6	99.8
07-2505	9600	17040	0.5	SU	73.8	12.6	6.02	0.13	0.04	0.07	1.20	0.68	0.037	0.078	5.1	99.8
07-2506	9600	17040	12	LT100	19.3	18.2	52	0.26	0.18	0.07	0.07	1.28	0.025	0.021	7.1	98.4
07-2507	9600	16920	21	LT100	11.3	14.2	66.2	0.17	0.17	0.05	0.04	1.46	0.015	0.009	5.3	98.8
07-2509	9600	17000	19	LT100	19.9	17.8	50.4	0.10	0.10	0.05	0.02	1.04	0.027	0.008	10.1	99.6
07-2513	9600	16940	19	LT100	14.7	22.9	48.8	0.19	0.20	0.05	0.05	1.38	0.016	0.010	10.3	98.6
07-2517	9600	16840	31	Fe-SAP	6.74	5.48	81.3	0.13	0.11	0.01	0.02	2.24	0.034	0.039	3.1	99.2
07-2518	9600	17000	15	LT100	16.5	17.1	55.7	0.16	0.13	0.07	0.04	1.33	0.019	0.010	7.1	98.1
07-2525	9600	16920	9	LT100	17	23.6	42.9	0.23	0.16	0.07	0.04	2.11	0.021	0.013	12.1	98.2
07-2526	9600	16920	30	Fe-SAP	16.9	16.2	53.3	0.18	0.12	0.04	0.02	1.68	0.035	0.014	9.8	98.3
07-2528	9600	17040	19	LT100	20.1	19.1	47.8	0.12	0.11	0.07	0.02	1.08	0.025	0.007	10.5	98.9
07-2531	9600	16840	32	Fe-SAP	17.8	17.4	48.7	0.26	0.15	0.05	0.06	1.46	0.038	0.018	11.5	97.4
07-2534	9600	16940	27	Fe-SAP	10.8	9.82	63.3	0.22	1.50	0.03	0.01	0.64	0.080	0.018	13.2	99.6
07-2535	9600	16880	30	LT100	11.5	25.6	49	0.23	0.23	0.05	0.05	1.59	0.021	0.022	10.4	98.6
07-2537	9600	16880	33	Fe-SAP	17.5	17.2	49.7	0.25	0.15	0.05	0.05	1.44	0.038	0.017	11.5	97.9
07-2539	9600	16920	20	LT100	14.2	19.8	55.1	0.14	0.14	0.05	0.05	1.26	0.017	0.009	7.4	98.1
07-2559	9200	17020	15	MTC	33.5	21.4	31.6	0.54	0.28	0.11	0.17	1.50	0.016	0.063	9.1	98.3
07-2561	9200	16740	24	LT100	15.2	25	43.6	0.30	0.25	0.08	0.07	1.27	0.028	0.015	12.5	98.3
07-2563	9200	16760	15	MTC	17.8	9.17	61.8	0.24	0.17	0.04	0.26	0.34	0.015	0.002	9.9	99.7
07-2564	9200	16700	24	LT100	15	14.1	59.3	0.14	0.12	0.05	0.03	0.95	0.027	0.012	8.9	98.7
07-2566	9200	16680	23	LT100	19.2	15.5	53.8	0.34	0.21	0.08	0.11	0.75	0.023	0.013	7.4	97.3
07-2571	9200	16660	23	LT100	16.9	15.6	52.1	0.15	0.14	0.05	0.03	0.62	0.027	0.014	10.9	96.6
07-2572	9200	16740	23	LT100	14.6	19.9	52.8	0.26	0.22	0.08	0.08	1.07	0.026	0.014	8.4	97.5
07-2574	9200	16840	15	MTC	35.9	21.9	27.4	0.43	0.39	0.11	0.16	1.21	0.016	0.047	10.1	97.6
07-2576	9200	17040	15	MTC	36.2	22.4	26.6	0.57	0.32	0.11	0.21	1.31	0.016	0.041	10.2	97.9
07-2577	9200	16740	22	LT100	15.8	15.9	59.5	0.19	0.17	0.07	0.04	0.93	0.028	0.016	6.0	98.6
07-2578	9200	16960	16	MTC	36.2	22.2	26.1	0.54	0.77	0.11	0.19	1.25	0.015	0.046	10.2	97.6
07-2579	9200	16760	31	Fe-SAP	14.2	19.8	55.1	0.14	0.14	0.05	0.05	1.26	0.017	0.009	7.4	98.1
07-2581	9200	16740	33	Fe-SAP	23.6	14.5	49.2	0.18	0.22	0.04	0.19	0.76	0.020	0.011	9.3	98.1
07-2582	9200	16780	30	LT100	11.3	10.6	66.6	0.17	0.13	0.04	0.12	0.65	0.020	0.010	9.0	98.6
07-2584	9600	16740	0.5	SU	67.8	15.9	7.16	0.18	0.06	0.08	1.19	0.82	0.051	0.083	6.3	99.5
07-2585	9600	17000	0.5	SU	72.5	13.5	6.31	0.16	0.06	0.09	1.21	0.73	0.040	0.100	5.4	100.1
07-2586	9600	16720	0.5	SU	66.8	16.1	7.29	0.20	0.07	0.09	1.18	0.80	0.048	0.066	6.8	99.4
07-2587	9600	16540	0.5	SU	69.5	14.8	6.98	0.17	0.06	0.09	1.22	0.79	0.044	0.166	6.1	99.9
07-2588	9600	16520	0.5	SU	68	15.7	7.19	0.17	0.05	0.08	1.19	0.82	0.050	0.081	6.4	99.7
07-2589	9600	16800	0.5	SU	66.8	16.1	7.41	0.18	0.05	0.09	1.20	0.86	0.060	0.111	6.7	99.5
07-2590	9600	16500	0.5	SU	67.3	16.2	7.31	0.18	0.06	0.08	1.19	0.80	0.053	0.069	6.9	100.1
07-2591	9600	16880	0.5	SU	70.2	14.6	6.72	0.18	0.06	0.09	1.21	0.76	0.044	0.076	6.0	99.9
07-2592	9600	16480	0.5	SU	70	14.6	6.9	0.16	0.06	0.09	1.21	0.75	0.046	0.064	6.1	99.9
07-2593	9600	16940	0.5	SU	71.2	13.9	6.55	0.19	0.11	0.12	1.23	0.74	0.037	0.128	6.0	100.1
07-2594	9600	16840	0.5	SU	71.1	13.7	6.54	0.17	0.08	0.09	1.22	0.73	0.042	0.129	5.7	99.6
07-2595	9600	16920	0.5	SU	71.1	13.9	6.44	0.19	0.08	0.09	1.22	0.74	0.038	0.155	4.8	98.7
07-2596	9400	16480	0.5	SU	66.4	16.1	7.47	0.19	0.07	0.08	1.17	0.80	0.053	0.110	6.7	99.2
07-2597	9400	16520	0.5	SU	66.1	16.2	7.49	0.22	0.10	0.12	1.15	0.83	0.051	0.070	6.9	99.3
07-2598	9400	16560	0.5	SU	68.9	15.4	7.12	0.17	0.05	0.08	1.19	0.77	0.050	0.089	6.2	99.9
07-2599	9400	16600	0.5	SU	66.9	16.1	7.38	0.19	0.07	0.09	1.19	0.83	0.048	0.112	6.6	99.4
07-2600	9400	16640	0.5	SU	67.8	15.8	7.29	0.18	0.06	0.08	1.20	0.81	0.052	0.085	6.4	99.7
07-2601	9400	16680	0.5	SU	66.6	16.1	7.39	0.19	0.06	0.09	1.18	0.81	0.052	0.123	6.7	99.2
07-2602	9400	16700	0.5	SU	69.4	14.6	6.95	0.23	0.12	0.18	1.22	0.77	0.043	0.127	6.3	99.9
07-2603	9400	16720	0.5	SU	70	14.2	6.93	0.16	0.06	0.09	1.18	0.74	0.045	0.067	5.9	99.4

SU = Soil
LT100 = Lateritic gravel
MTC = Mottled colluvium
Fe-SAP = Ferruginous saprolite

Ident	North	East	Dept	TYPE	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	LOI	Total
unit			(m)		%	%	%	%	%	%	%	%	%	%	%	%
method					XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
DL					0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.002	0.002		
07-2604	9400	16740	0.5	SU	68.8	15.1	7	0.18	0.10	0.09	1.17	0.77	0.049	0.060	6.4	99.6
07-2605	9400	16760	0.5	SU	68.7	15.2	7.08	0.19	0.07	0.09	1.21	0.78	0.050	0.091	6.4	99.9
07-2606	9400	16780	0.5	SU	67.2	16.1	7.22	0.19	0.07	0.11	1.18	0.77	0.050	0.088	6.6	99.5
07-2607	9400	16800	0.5	SU	65.7	17	7.35	0.21	0.10	0.11	1.18	0.83	0.062	0.088	7.3	99.8
07-2608	9400	16820	0.5	SU	68.9	15.4	7.25	0.19	0.06	0.11	1.22	0.82	0.052	0.109	6.3	100.5
07-2609	9400	16840	0.5	SU	69	15	7.11	0.19	0.06	0.11	1.22	0.79	0.052	0.092	6.2	99.8
07-2610	9400	16880	0.5	SU	67.7	15.7	7.23	0.18	0.07	0.09	1.20	0.79	0.047	0.184	6.5	99.7
07-2611	9400	16920	0.5	SU	68.7	15.1	7.16	0.21	0.10	0.12	1.23	0.81	0.044	0.084	6.1	99.6
07-2612	9400	16980	0.5	SU	68.2	15.5	6.85	0.18	0.07	0.08	1.19	0.79	0.055	0.047	6.7	99.7
07-2613	9400	16700	30	MTC	22	19.6	46	0.14	0.13	0.07	0.07	1.13	0.017	0.019	9.5	98.7
07-2614	9400	16720	30	LT100	18.7	16.2	50.1	0.30	0.18	0.07	0.06	0.87	0.018	0.010	12.3	98.8
07-2619	9400	16720	24	MTC	32.1	20.4	33.7	0.39	0.28	0.11	0.09	1.27	0.022	0.019	9.6	98.0
07-2620	9400	16480	20	MTC	36.2	23.3	24.5	0.42	0.64	0.12	0.12	1.31	0.028	0.015	11.1	97.6
07-2625	9400	16560	35	LT100	20.1	16.9	47.6	0.26	0.15	0.04	0.06	1.04	0.022	0.019	12.3	98.5
07-2643	9400	16820	21	MTC	36.7	23.2	23.5	0.66	0.39	0.12	0.17	1.39	0.017	0.036	11.2	97.5
07-2644	9400	16740	34	Fe-SAP	19.7	16.2	50.7	0.19	0.15	0.05	0.03	0.68	0.019	0.011	11.4	99.1
07-2646	9400	16560	18	MTC	35.5	21.9	27.9	0.46	0.29	0.09	0.16	1.22	0.022	0.052	10.1	97.6
07-2653	11000	17240	15	LT100	13	14.4	62.3	0.17	0.22	0.05	0.06	1.68	0.017	0.044	5.7	97.6
07-2655	11000	16920	14	LT100	25.8	21.6	38.8	0.33	0.18	0.12	0.08	1.55	0.019	0.015	10.8	99.3
07-2659	11000	17120	10	LT100	12.5	23.5	50.7	0.17	0.16	0.05	0.07	3.36	0.026	0.034	7.7	98.2
07-2661	11000	17160	14	LT100	20.6	23.3	42.4	0.32	0.25	0.11	0.12	2.64	0.013	0.023	8.1	97.9
07-2667	11000	17080	8	LT100	16.8	17.1	54.5	0.22	0.17	0.05	0.07	2.76	0.029	0.024	6.2	97.9
07-2673	10760	17000	0.5	SU	72	13.6	6.04	0.17	0.05	0.08	1.22	0.64	0.052	0.054	6.1	100.0
07-2674	10760	16800	0.5	SU	71.7	13.9	6.25	0.18	0.04	0.07	1.21	0.69	0.045	0.050	6.0	100.2
07-2675	10760	17040	0.5	SU	69.7	15.3	6.46	0.17	0.04	0.07	1.21	0.75	0.053	0.055	6.7	100.5
07-2676	10760	17080	0.5	SU	72.4	13.6	6.01	0.15	0.03	0.07	1.20	0.69	0.049	0.026	5.8	100.1
07-2680	11000	17060	9	LT100	22.7	20.8	40.5	0.13	0.28	0.07	0.04	2.18	0.019	0.011	11.6	98.4
07-2681	11000	17000	10	LT100	14.1	23.4	48.7	0.22	0.17	0.07	0.07	2.10	0.029	0.015	10.2	99.1
07-2683	11000	16840	13	LT100	18.1	15.5	54.8	0.17	0.11	0.07	0.03	1.52	0.026	0.013	9.1	99.5
07-2684	11000	17200	14	LT100	19.8	18.7	47.3	0.15	0.10	0.07	0.02	1.37	0.026	0.005	11.2	98.8
07-2685	11000	16960	9	LT100	23.3	31.2	26.5	0.27	0.15	0.11	0.07	1.20	0.017	0.002	16.3	99.2
07-2686	11000	17020	9	LT100	22	21.3	43.1	0.13	0.10	0.08	0.04	1.63	0.019	0.006	11.3	99.8
07-2689	11000	17180	9	LT100	21.4	17.3	50.1	0.22	0.60	0.08	0.09	1.92	0.016	0.015	6.8	98.5
07-2690	11000	17040	7	LT100	18.8	16.4	54.2	0.21	0.14	0.05	0.07	2.21	0.022	0.015	6.9	98.9
07-2691	11000	17240	10	LT100	27.8	24.4	32.3	0.14	1.00	0.09	0.05	1.21	0.018	0.048	12.8	99.9
07-2692	11000	17100	8	LT100	15.4	22.6	49.3	0.23	0.20	0.07	0.10	2.74	0.030	0.025	6.9	97.7
07-2693	11000	17120	8	LT100	12.1	28.4	48.3	0.17	0.17	0.05	0.07	2.76	0.030	0.026	5.8	97.6
07-2694	11000	17140	14	LT100	13.8	25.4	42.1	0.29	0.27	0.07	0.47	2.41	0.017	0.008	14.6	99.3
07-2696	10760	17080	5	LT100	23.8	19.1	43	0.43	0.27	0.11	0.06	2.46	0.016	0.021	9.4	98.7
07-2697	10760	16800	9	LT100	24.7	20.9	40.7	0.27	0.16	0.12	0.08	1.40	0.021	0.007	10.9	99.3
07-2699	10760	17200	7	LT100	17.9	18.2	50.2	0.22	0.19	0.08	0.06	3.73	0.018	0.014	8.3	98.8
07-2700	10760	17120	8	LT100	24.5	20.2	37.9	0.38	0.49	0.09	0.04	4.76	0.012	0.050	9.2	97.7
07-2701	10760	16720	11	LT100	25.1	21.6	38.7	0.43	0.22	0.13	0.11	1.97	0.017	0.007	10.8	99.0
07-2702	10760	17520	9	LT100	19	16.6	53.6	0.24	0.20	0.07	0.05	2.24	0.017	0.036	6.7	98.7
07-2703	10760	17360	7	LT100	32.4	27.6	24.9	0.20	0.69	0.15	0.07	1.00	0.011	0.003	12.6	99.5
07-2704	10760	17000	6	LT100	29.8	20	35	0.43	0.27	0.11	0.09	2.01	0.014	0.006	10.5	98.3
07-2705	10760	16640	15	LT100	22.9	25	36.6	0.29	0.16	0.09	0.08	1.41	0.020	0.023	11.6	98.2
07-2706	10760	16880	4	LT100	37.9	18.4	30.8	0.37	0.23	0.09	0.37	1.23	0.041	0.019	9.5	98.9
07-2707	10760	17440	8	LT100	27.1	19.5	41	0.27	0.35	0.11	0.09	2.20	0.013	0.014	8.0	98.7
07-2708	10760	16960	4	LT100	20.1	12.7	56.2	0.32	0.23	0.07	0.14	2.35	0.021	0.029	6.6	98.8
07-2709	10760	17040	5	LT100	17.4	22.1	44.2	0.33	0.22	0.07	0.06	2.39	0.029	0.015	12.9	99.7
07-2710	10880	17100	8	LT100	15.6	27.5	33.4	0.36	0.21	0.08	0.07	2.60	0.030	0.039	17.4	97.3
07-2711	10880	17180	6	LT100	17.4	20	47.5	0.27	1.88	0.07	0.08	3.28	0.029	0.021	7.8	98.3
07-2712	10880	17040	7	LT100	20.3	20.1	45.5	0.25	0.16	0.11	0.06	2.33	0.015	0.008	10.5	99.3

SU = Soil
LT100 = Lateritic gravel
MTC = Mottled colluvium
Fe-SAP = Ferruginous saprolite

Appendix 4: Chemical composition of Bronzewing samples.

Ident	North	East	Dept	TYPE	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	LOI	Total
unit			(m)		%	%	%	%	%	%	%	%	%	%	%	%
method					XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF		
DL					0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.002	0.002		
07-2713	10880	16960	6	LT100	16.1	18.7	51	0.19	0.15	0.07	0.05	1.78	0.016	0.006	11.4	99.4
07-2714	10880	17060	13	LT100	18.8	21.8	42.6	0.34	0.20	0.11	0.03	3.36	0.026	0.005	11.8	99.0
07-2715	10880	17080	8	LT100	20	23.7	32.8	0.99	0.45	0.07	0.05	2.99	0.008	0.046	15.3	96.3
07-2716	10880	16940	6	LT100	17.2	29.1	34	0.27	0.18	0.09	0.08	2.12	0.023	0.006	15.9	99.0
07-2717	10880	17000	7	LT100	22.1	19.7	41.8	0.66	0.29	0.09	0.09	2.37	0.023	0.007	11.0	98.1
07-2718	9800	16660	0.5	SU	69.4	14.7	6.82	0.20	0.06	0.09	1.22	0.75	0.049	0.062	6.3	99.7
07-2719	9800	16800	0.5	SU	71.6	13.8	6.5	0.19	0.05	0.08	1.24	0.73	0.044	0.057	6.0	100.2
07-2720	9800	16960	0.5	SU	74.3	12.4	6.08	0.15	0.03	0.07	1.23	0.65	0.039	0.114	5.3	100.3
07-2721	9800	16820	0.5	SU	71.1	13.6	6.38	0.19	0.08	0.09	1.22	0.71	0.040	0.029	6.1	99.5
07-2722	9800	16780	0.5	SU	71.4	13.7	6.48	0.17	0.05	0.08	1.24	0.73	0.039	0.055	5.8	99.8
07-2723	9800	17160	5	LT100	12.8	26.6	43.2	0.22	0.20	0.07	0.06	2.99	0.017	0.004	12.7	98.8
07-2724	9800	17000	10	LT100	15.9	15.5	58.7	0.20	0.16	0.05	0.04	1.47	0.018	0.009	7.6	99.6
07-2725	9800	16860	14	LT100	14.8	16.7	59.6	0.21	0.18	0.05	0.05	2.05	0.023	0.020	5.8	99.5
07-2726	9800	16780	19	LT100	10.8	14.7	65.7	0.17	0.28	0.05	0.04	2.19	0.023	0.018	4.9	98.9
07-2727	9800	17080	7	LT100	28.6	19.6	38.6	0.39	0.25	0.08	0.08	1.39	0.010	0.005	10.1	99.1
07-2728	9800	16960	12	LT100	21.3	18.4	48.4	0.15	0.12	0.05	0.02	1.19	0.025	0.007	10.0	99.7
07-2729	9800	16800	19	LT100	9.51	16.8	65.6	0.14	0.14	0.05	0.04	2.25	0.023	0.014	5.1	99.7
07-2730	9800	16880	15	LT100	7.16	14.5	68.4	0.14	0.12	0.04	0.03	2.04	0.032	0.015	7.0	99.4
07-2731	9800	16880	11	LT100	18.7	16.6	53.6	0.23	0.18	0.07	0.06	2.42	0.028	0.020	7.2	99.1
07-2732	9800	16680	26	LT100	12.7	12.7	64.2	0.22	0.16	0.04	0.08	0.87	0.040	0.043	8.3	99.3
07-2733	9800	16760	20	LT100	10.1	14.5	67.1	0.17	0.16	0.05	0.04	2.22	0.019	0.013	4.5	98.9
07-2734	9800	16840	15	LT100	13.8	18.5	58.5	0.17	0.17	0.05	0.06	2.03	0.022	0.021	6.1	99.5
07-2735	9800	16720	26	LT100	24	19.9	42.1	0.30	1.10	0.11	0.05	1.61	0.015	0.013	9.4	98.6
07-2736	9800	16900	14	LT100	18.9	17.8	51.6	0.14	0.13	0.08	0.03	1.68	0.026	0.005	9.4	99.7
07-2737	9800	16880	14	LT100	14.9	21.4	52.2	0.22	0.42	0.07	0.07	1.73	0.024	0.018	8.2	99.2
07-2738	9800	16940	11	LT100	15.6	14.7	59	0.17	0.15	0.07	0.03	2.42	0.024	0.033	6.5	98.6
07-2739	9800	16760	30	LT100	14.1	12.3	59.3	0.23	0.17	0.04	0.03	0.82	0.022	0.014	12.5	99.7
07-2766	10760	17280	7	LT100	14.8	21.5	45.6	0.30	1.51	0.07	0.05	2.79	0.020	0.016	12.9	99.5
07-2799	10760	17200	0.5	SU	73.5	12.9	6.01	0.16	0.03	0.07	1.20	0.66	0.051	0.033	5.6	100.1
07-2801	9800	16680	0.5	SU	73.3	12.8	6.24	0.15	0.04	0.07	1.22	0.69	0.038	0.076	5.3	99.9
07-2802	9800	16580	0.5	SU	64.1	17.3	7.78	0.24	0.08	0.09	1.15	0.84	0.063	0.055	7.9	99.6
07-2803	9800	16840	0.5	SU	73.4	12.5	6.33	0.16	0.05	0.08	1.24	0.65	0.045	0.064	5.4	100.0
07-2804	9800	17000	0.5	SU	72.3	13.1	6.34	0.18	0.07	0.08	1.21	0.68	0.044	0.099	5.7	99.8
07-2805	9800	17080	0.5	SU	72	13.6	6.37	0.18	0.05	0.08	1.21	0.72	0.040	0.101	5.7	100.0
07-2806	9800	16520	0.5	SU	67.6	15.8	7.12	0.22	0.06	0.09	1.19	0.79	0.053	0.034	6.6	99.5
07-2807	9800	16480	0.5	SU	65.9	16.9	7.45	0.21	0.08	0.09	1.20	0.83	0.059	0.049	7.4	100.1
07-2808	9800	16620	0.5	SU	68.2	15.3	7.1	0.20	0.07	0.09	1.20	0.80	0.046	0.074	6.6	99.7
07-2809	9800	16940	0.5	SU	72.8	13.1	6.27	0.16	0.04	0.08	1.22	0.73	0.035	0.087	5.6	100.2
07-2810	9800	16760	0.5	SU	70.8	14.2	6.61	0.17	0.05	0.08	1.24	0.76	0.046	0.054	6.0	100.0
07-2811	9800	16700	0.5	SU	72.4	13.5	6.2	0.16	0.05	0.08	1.25	0.72	0.040	0.089	5.5	100.0
07-2813	10760	16720	0.5	SU	69.6	15.1	6.55	0.20	0.06	0.08	1.23	0.70	0.062	0.098	6.5	100.2
07-2814	10760	17360	0.5	SU	74.9	12.4	5.73	0.14	0.02	0.07	1.17	0.67	0.038	0.023	5.3	100.5
07-2815	10760	16960	0.5	SU	70.6	14.3	6.21	0.23	0.09	0.12	1.19	0.74	0.047	0.032	6.3	99.9
07-2816	10760	17440	0.5	SU	76.2	11.5	5.42	0.13	0.02	0.07	1.21	0.62	0.036	0.022	4.8	100.0
07-2817	10760	17520	0.5	SU	75.7	11.9	5.58	0.12	0.02	0.05	1.19	0.63	0.048	0.022	5.0	100.2
07-2818	10760	17160	0.5	SU	72.8	13.2	5.94	0.16	0.03	0.07	1.19	0.67	0.050	0.026	5.7	99.8
07-2819	10760	16640	0.5	SU	66.7	16.5	7.12	0.25	0.08	0.08	1.23	0.78	0.074	0.079	7.3	100.2
07-2820	9800	16820	20	LT100	13.4	26.6	45.6	0.23	0.25	0.05	0.06	2.62	0.020	0.009	10.7	99.5
07-2900	9400	17040	0.5	SU	32.9	21.1	31.3	0.45	0.37	0.11	0.11	1.24	0.020	0.025	9.9	97.5
07-2902	9400	17040	21	MTC	17.8	21.8	48.9	0.16	0.18	0.05	0.04	1.63	0.016	0.011	8.2	98.8
07-2903	9400	16680	33	LT100	26.3	22.9	35.5	0.14	0.11	0.09	0.02	0.97	0.014	0.005	13.0	99.1

SU = Soil
LT100 = Lateritic gravel
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Fe-SAP = Ferruginous saprolite

Appendix 4: Chemical composition of Bronzewing samples.

Ident	Ag	As	Au	Ba	Bi	Br	Ce	Cl	Co	Cr	Cs	Cu	Eu	Ga	Hf	Ir	La	Lu	Mo
unit	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm
method	CP/MS	NAA	NAA	XRF	CP/MS	NAA	NAA	XRF	NAA	NAA	NAA	XRF	NAA	XRF	NAA	NAA	NAA	NAA	CP/MS
DL	0.1	1.0	ppb	30	0.1	2	2	20	1.0	5	1	10	0.5	3	0.5	20	0.5	0.2	0.1
07-2500	0.7	6.5	<5	295	0.4	3	67	<20	28.7	160	4	25	0.9	20	7.0	<20	22.8	0.3	1.3
07-2501	0.5	5.3	<5	297	0.5	3	53	<20	27.7	155	3	24	0.6	19	6.8	<20	19.6	0.3	1.4
07-2502	0.5	5.1	<5	285	0.4	<2	44	30	17.3	157	3	17	0.6	18	7.2	<20	18.5	0.3	1.4
07-2503	0.7	6.2	<5	245	0.4	2	38	30	14.1	159	3	21	0.6	19	6.6	<20	18.9	0.2	1.4
07-2504	0.5	5.9	<5	268	0.4	3	51	170	14.1	163	3	22	0.9	21	6.1	<20	22.6	0.3	1.4
07-2505	0.6	4.8	<5	268	0.4	<2	42	<20	17.7	150	3	14	0.6	16	7.7	<20	19.9	0.3	1.2
07-2506	0.5	41.8	13	87	0.3	2	28	40	6.1	877	2	112	1.1	44	4.9	<20	13.1	0.3	1.5
07-2507	0.5	28.2	<5	36	0.3	2	8	50	3.2	1040	<1	31	<0.5	61	4.5	<20	3.8	<0.2	2.0
07-2509	0.8	7.5	9	4	0.2	3	5	100	9.2	350	<1	200	<0.5	33	2.0	<20	2.1	<0.2	0.5
07-2513	0.8	15.2	19	31	0.2	3	8	<20	8.1	561	<1	99	0.6	44	3.9	<20	3.9	<0.2	1.5
07-2517	0.6	12.3	9	101	0.7	<2	4	20	29.8	1250	5	<10	<0.5	81	5.6	<20	2.1	<0.2	4.2
07-2518	0.9	40.8	13	235	0.3	<2	16	20	6.3	907	<1	108	0.6	48	5.3	<20	7.2	<0.2	1.7
07-2525	0.8	18.5	2110	312	0.6	<2	30	90	6.3	734	2	104	1.3	64	5.6	<20	9.2	0.4	2.4
07-2526	0.4	13.8	<5	6	0.5	2	2	140	12.2	579	3	220	<0.5	44	4.3	<20	1.0	0.2	2.7
07-2528	1.3	12.0	48	<1	<0.1	3	6	80	2.7	440	<1	173	<0.5	35	3.0	<20	2.2	<0.2	0.7
07-2531	0.3	17.1	<5	5	0.2	<2	3	60	21.4	1200	1	214	<0.5	47	4.4	<20	1.2	<0.2	2.1
07-2534	0.2	9.0	<5	<1	<0.1	<2	5	<20	17.7	181	<1	858	0.9	16	1.6	<20	1.9	0.6	1.7
07-2535	0.4	8.7	<5	41	0.2	<2	23	20	38.9	607	2	116	1.7	46	4.0	<20	7.0	0.7	2.1
07-2537	0.4	16.8	<5	12	0.2	2	2	70	22.5	1250	<1	212	<0.5	47	3.9	<20	1.0	<0.2	2.1
07-2539	0.6	30.0	20	38	0.2	2	10	20	3.9	895	<1	98	<0.5	53	4.3	<20	4.3	<0.2	1.4
07-2559	0.4	18.1	<5	52	0.2	2	41	30	20.5	707	<1	87	1.3	36	5.0	<20	22.3	0.4	1.5
07-2561	0.5	20.8	12	15	0.4	2	7	50	12.8	1410	<1	43	<0.5	52	4.1	<20	2.4	<0.2	3.8
07-2563	0.1	9.9	6	870	0.1	3	2	40	6.3	496	<1	37	<0.5	13	2.8	<20	1.2	<0.2	0.9
07-2564	0.5	36.0	<5	7	0.4	3	4	30	4.4	1300	<1	151	<0.5	36	2.7	<20	2.1	<0.2	3.0
07-2566	0.8	33.6	<5	11	0.4	4	4	20	4.9	1380	<1	106	<0.5	33	3.8	<20	2.1	<0.2	3.0
07-2571	0.6	69.1	179	44	0.3	3	6	30	6.1	1270	<1	233	<0.5	36	1.9	<20	2.9	<0.2	2.8
07-2572	0.5	22.9	<5	45	0.5	<2	7	<20	14.3	1580	<1	55	<0.5	52	4.3	<20	2.6	<0.2	3.8
07-2574	0.5	13.0	<5	50	0.2	<2	16	30	25.3	429	2	76	<0.5	29	4.4	<20	6.8	<0.2	2.2
07-2576	0.5	17.6	<5	51	0.2	<2	27	<20	19.0	490	<1	79	1.4	33	4.4	<20	20.6	0.3	1.2
07-2577	0.6	22.3	<5	33	0.5	3	5	50	14.8	1560	<1	31	<0.5	45	4.2	<20	2.4	<0.2	3.8
07-2578	0.5	14.0	<5	42	0.2	<2	13	<20	23.0	407	<1	79	0.6	28	4.6	<20	9.6	<0.2	1.5
07-2579	0.6	30.0	20	38	0.2	2	10	20	3.9	895	<1	98	<0.5	53	4.3	<20	4.3	<0.2	1.4
07-2581	0.1	18.6	62	42	0.1	<2	2	<20	4.9	876	<1	130	<0.5	17	2.0	<20	1.2	<0.2	0.8
07-2582	0.3	21.3	<5	595	0.3	<2	9	20	16.8	964	1	73	<0.5	32	3.5	<20	4.8	<0.2	2.3
07-2584	0.6	5.8	<5	230	0.3	<2	55	<20	21.3	164	4	22	0.7	21	7.6	<20	23.8	0.3	1.3
07-2585	0.5	5.9	<5	303	0.3	3	52	<20	21.6	160	3	17	0.7	18	7.9	<20	19.3	0.3	1.2
07-2586	0.5	6.3	<5	241	0.3	3	46	<20	15.2	160	4	23	0.7	21	6.9	<20	21.6	0.3	1.4
07-2587	0.6	6.0	<5	288	0.3	3	59	60	27.6	155	3	20	0.8	18	7.6	<20	20.4	0.3	1.3
07-2588	0.6	5.7	<5	251	0.3	2	47	<20	16.0	152	4	24	0.8	21	7.6	<20	22.0	0.3	1.1
07-2589	0.7	6.4	<5	263	0.4	<2	65	<20	19.8	153	3	23	0.8	22	7.4	<20	27.5	0.4	1.5
07-2590	0.6	5.0	<5	242	0.4	3	47	40	14.9	150	3	25	0.9	20	6.9	<20	23.7	0.3	1.4
07-2591	0.6	5.1	<5	266	0.3	2	44	<20	11.8	154	3	19	0.7	18	7.7	<20	21.1	0.3	1.1
07-2592	0.6	5.9	6	247	0.9	2	38	<20	11.6	159	4	19	0.6	19	7.3	<20	19.5	0.3	1.2
07-2593	0.5	6.0	<5	271	0.6	10	48	790	21.5	150	3	17	0.6	17	7.7	<20	18.7	0.3	1.2
07-2594	0.5	4.8	<5	290	0.5	<2	51	<20	17.9	157	3	18	0.7	17	7.9	<20	21.9	0.3	1.1
07-2595	0.5	4.9	<5	303	0.5	<2	62	<20	15.8	154	3	16	1.1	17	8.1	<20	24.9	0.4	1.1
07-2596	0.7	5.7	<5	269	0.5	4	53	<20	16.4	167	3	25	0.7	21	6.3	<20	22.8	0.3	1.3
07-2597	0.6	5.7	<5	242	0.5	9	43	850	13.5	159	3	23	0.9	22	6.7	<20	22.5	0.3	1.3
07-2598	0.6	5.1	<5	222	0.4	<2	42	<20	18.6	160	2	24	0.7	20	6.7	<20	20.9	0.3	1.3
07-2599	0.6	6.7	<5	265	0.4	3	54	<20	18.9	163	3	25	0.8	23	7.0	<20	23.1	0.3	1.3
07-2600	0.5	6.1	<5	260	0.4	<2	48	<20	17.8	169	3	22	0.9	21	7.5	<20	22.5	0.3	1.3
07-2601	0.5	6.1	<5	264	0.4	3	57	<20	25.9	165	3	22	0.8	19	7.3	<20	22.9	0.3	1.4
07-2602	0.5	5.6	<5	263	0.4	16	49	2310	23.1	164	2	21	0.7	18	7.6	<20	19.5	0.3	1.3
07-2603	0.5	5.1	<5	243	0.4	2	38	<20	14.9	175	3	20	0.6	17	7.9	<20	19.0	0.3	1.2

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Appendix 4: Chemical composition of Bronzewing samples.

Ident	Ag	As	Au	Ba	Bi	Br	Ce	Cl	Co	Cr	Cs	Cu	Eu	Ga	Hf	Ir	La	Lu	Mo
unit	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm
method	CP/MS	NAA	NAA	XRF	CP/MS	NAA	NAA	XRF	NAA	NAA	NAA	XRF	NAA	XRF	NAA	NAA	NAA	NAA	CP/MS
DL	0.1	1.0	ppb	30	0.1	2	2	20	1.0	5	1	10	0.5	3	0.5	20	0.5	0.2	0.1
07-2604	0.6	6.1	<5	245	0.3	3	38	100	14.7	164	3	22	0.8	19	7.4	<20	20.6	0.3	1.3
07-2605	0.5	5.5	<5	241	0.4	<2	51	<20	16.4	160	3	19	0.8	20	7.5	<20	23.2	0.3	1.2
07-2606	0.5	5.7	<5	249	0.3	2	46	<20	16.4	160	4	23	0.8	21	6.3	<20	23.8	0.3	1.2
07-2607	0.6	5.5	<5	241	0.4	4	51	40	15.0	156	4	54	1.0	21	6.7	<20	26.0	0.3	1.1
07-2608	0.5	5.7	<5	263	0.3	<2	59	70	19.5	159	3	23	0.9	19	7.9	<20	23.2	0.3	1.4
07-2609	0.6	5.1	<5	274	0.4	3	60	120	18.4	160	3	19	1.0	21	7.4	<20	25.5	0.3	1.2
07-2610	0.7	5.7	<5	297	0.4	<2	65	20	25.1	154	3	22	0.8	21	7.3	<20	27.1	0.3	1.4
07-2611	0.5	6.1	<5	264	0.4	6	49	150	19.3	160	4	21	0.6	20	8.0	<20	19.9	0.3	1.3
07-2612	0.6	5.8	<5	230	0.3	3	43	<20	11.5	155	4	23	1.0	18	7.3	<20	23.0	0.3	1.6
07-2613	0.3	29.9	9	30	0.3	<2	3	40	13.2	1160	<1	71	<0.5	39	2.9	<20	1.8	<0.2	2.5
07-2614	0.2	32.4	22	7	0.2	<2	6	50	64.5	667	<1	186	<0.5	34	2.7	<20	3.0	<0.2	3.1
07-2619	0.4	15.7	<5	19	0.4	<2	6	60	14.8	699	2	43	<0.5	34	4.3	<20	3.2	<0.2	2.5
07-2620	0.5	15.8	<5	27	0.5	<2	6	60	14.1	493	<1	56	<0.5	28	4.6	<20	3.4	<0.2	3.2
07-2625	0.3	19.7	18	1	0.3	3	4	30	39.9	1520	<1	154	<0.5	30	2.7	<20	1.9	<0.2	4.7
07-2643	0.7	9.7	<5	32	0.2	<2	12	40	17.0	278	<1	49	<0.5	30	4.9	<20	6.5	<0.2	1.5
07-2644	0.6	19.1	34	277	<0.1	<2	2	50	23.0	492	<1	280	<0.5	18	1.3	<20	1.1	<0.2	1.0
07-2646	0.5	14.5	<5	50	0.4	<2	12	<20	22.0	500	<1	74	0.6	28	4.3	<20	7.0	<0.2	2.8
07-2653	0.8	16.5	21	131	0.5	<2	78	120	46.9	1940	<1	22	1.6	45	4.4	<20	18.4	0.4	2.6
07-2655	0.6	25.6	10	44	0.3	<2	15	60	7.9	649	1	77	<0.5	52	4.3	<20	5.4	<0.2	1.7
07-2659	1.2	25.8	324	167	1.4	4	27	40	26.1	4660	<1	51	1.5	81	7.2	<20	13.4	0.5	3.7
07-2661	0.8	24.2	273	126	5.4	<2	185	<20	25.2	4140	2	54	2.6	69	6.5	<20	41.7	0.9	3.3
07-2667	1.2	26.6	206	51	0.6	<2	26	<20	12.4	2200	3	43	0.9	62	6.6	<20	11.3	0.4	2.7
07-2673	0.5	5.6	<5	243	0.3	3	38	<20	13.8	150	4	<10	0.8	19	7.0	<20	21.5	0.2	1.2
07-2674	0.5	4.9	<5	224	0.4	<2	37	<20	12.1	146	3	<10	0.7	20	8.0	<20	21.8	0.3	1.3
07-2675	0.8	5.1	<5	239	0.4	<2	40	<20	11.0	143	4	<10	0.8	20	7.2	<20	22.3	0.3	1.6
07-2676	0.7	5.1	6	239	0.4	3	35	<20	5.6	144	3	<10	0.6	18	7.5	<20	19.7	0.3	1.3
07-2680	1.2	53.6	7460	138	2.3	<2	19	<20	12.1	3110	<1	108	0.8	41	4.6	<20	6.2	0.3	1.5
07-2681	1.2	20.8	223	237	0.3	<2	26	70	6.0	959	<1	41	1.1	60	6.1	<20	15.7	0.3	2.8
07-2683	0.5	23.8	29	43	0.2	<2	16	20	7.8	897	<1	179	0.8	52	3.4	<20	14.2	<0.2	1.5
07-2684	0.5	29.1	130	10	0.2	3	108	50	26.3	6120	<1	171	2.7	57	8.6	<20	37.5	0.8	1.3
07-2685	1.5	20.4	256	50	0.2	4	23	140	3.8	589	<1	88	0.7	39	4.6	<20	6.1	0.2	1.6
07-2686	1.6	15.2	946	409	0.5	<2	10	60	7.0	628	<1	89	0.5	38	3.8	<20	4.4	<0.2	1.5
07-2689	1.3	23.8	59	91	0.6	<2	38	30	13.2	1110	<1	53	1.5	60	5.1	<20	19.6	0.4	2.8
07-2690	1.0	26.5	41	29	0.6	<2	39	<20	11.6	1390	3	52	1.0	66	6.2	<20	18.8	0.3	3.2
07-2691	1.3	23.3	<5	193	0.5	<2	18	20	46.4	871	<1	175	<0.5	28	4.1	<20	5.7	<0.2	1.6
07-2692	1.9	24.7	193	108	1.3	<2	33	<20	15.9	3710	2	73	1.1	62	6.9	<20	11.6	0.4	2.9
07-2693	1.2	26.3	186	157	1.0	<2	20	30	14.6	4930	<1	46	1.0	64	7.0	<20	10.0	0.3	3.0
07-2694	1.6	36.4	1680	256	5.5	2	27	30	17.5	3530	<1	105	1.4	42	6.1	<20	14.5	0.4	2.8
07-2696	1.9	16.6	1700	361	0.7	2	22	50	8.1	962	<1	46	0.8	57	6.2	<20	13.8	0.3	1.8
07-2697	0.7	16.0	185	130	0.4	<2	22	20	6.7	811	<1	101	0.9	54	3.8	<20	13.6	0.3	1.9
07-2699	1.0	12.5	43	208	0.7	<2	78	<20	9.3	858	<1	27	0.9	97	7.4	<20	15.8	0.4	3.3
07-2700	1.2	18.3	39	134	0.6	<2	12	<20	5.6	2940	1	62	0.7	101	9.7	<20	6.0	0.4	3.2
07-2701	0.4	12.2	119	76	0.4	<2	27	<20	11.1	1030	<1	68	0.5	68	4.6	<20	11.3	0.3	2.7
07-2702	0.4	28.6	<5	80	0.4	<2	58	<20	31.6	1140	<1	48	1.9	69	5.5	<20	26.7	0.5	2.5
07-2703	0.5	17.5	<5	85	0.3	<2	26	20	11.9	420	<1	116	0.7	30	3.9	<20	4.6	0.2	1.6
07-2704	0.7	12.3	259	154	0.3	<2	14	<20	5.3	744	<1	79	<0.5	49	4.5	<20	8.5	<0.2	1.4
07-2705	0.9	21.1	488	231	0.5	2	26	<20	15.9	2910	3	151	0.9	54	4.6	<20	13.1	0.3	1.6
07-2706	0.5	16.0	100	275	0.4	<2	50	<20	10.0	554	<1	72	0.6	34	4.3	<20	13.2	0.2	1.7
07-2707	0.8	18.7	12	86	0.4	2	27	<20	15.0	969	<1	33	0.7	59	6.1	<20	10.2	0.3	2.2
07-2708	0.9	16.7	153	190	0.4	<2	38	<20	6.8	963	<1	36	0.9	63	6.0	<20	23.6	0.4	2.6
07-2709	1.2	11.8	1220	123	0.2	2	20	<20	8.3	576	2	55	0.8	41	5.0	<20	8.4	0.4	1.6
07-2710	1.5	16.9	314	97	0.2	2	19	<20	9.9	7380	<1	235	1.0	42	5.1	<20	10.0	0.4	0.9
07-2711	1.8	23.5	93	57	1.1	<2	24	<20	15.1	3760	<1	52	1.1	67	8.0	<20	11.3	0.4	3.3
07-2712	1.2	20.4	3810	120	0.6	3	16	50	8.1	894	<1	75	<0.5	68	5.8	<20	8.6	0.3	2.3

SU = Soil
LT100 = Lateritic gravel
MTC = Mottled colluvium
Fe-SAP = Ferruginous saprolite

Appendix 4: Chemical composition of Bronzewing samples.

Ident	Ag	As	Au	Ba	Bi	Br	Ce	Cl	Co	Cr	Cs	Cu	Eu	Ga	Hf	Ir	La	Lu	Mo
unit	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm
method	CP/MS	NAA	NAA	XRF	CP/MS	NAA	NAA	XRF	NAA	NAA	NAA	XRF	NAA	XRF	NAA	NAA	NAA	NAA	CP/MS
DL	0.1	1.0	ppb	30	0.1	2	2	20	1.0	5	1	10	0.5	3	0.5	20	0.5	0.2	0.1
07-2713	1.2	18.5	1340	228	0.3	3	23	<20	5.2	659	2	74	1.0	45	4.7	<20	14.0	0.4	1.7
07-2714	1.9	21.3	4050	46	0.3	<2	19	<20	9.4	887	2	28	<0.5	73	5.8	<20	8.5	0.3	2.9
07-2715	2.3	16.3	619	83	0.3	<2	16	<20	10.9	4110	<1	195	1.0	54	8.2	<20	7.2	0.5	1.4
07-2716	1.7	21.8	636	492	0.4	3	35	<20	6.6	784	<1	64	1.3	63	6.3	<20	13.1	0.4	2.1
07-2717	1.4	18.3	9060	129	0.5	<2	26	<20	7.3	716	<1	83	1.4	70	5.5	<20	12.2	0.7	2.5
07-2718	0.9	5.9	5	270	0.4	3	45	<20	13.7	162	3	<10	1.0	19	7.8	<20	23.0	0.3	1.3
07-2719	0.5	5.8	<5	265	0.3	3	45	<20	14.7	153	3	<10	0.7	15	8.0	<20	22.4	0.3	1.4
07-2720	0.6	5.3	<5	254	0.3	<2	41	<20	19.0	163	3	<10	0.7	16	8.0	<20	20.0	0.3	1.3
07-2721	0.6	5.5	<5	248	0.3	6	32	520	6.9	152	3	<10	0.6	17	7.8	<20	17.9	0.3	1.5
07-2722	0.6	5.8	<5	249	0.3	3	41	<20	16.1	156	3	<10	0.5	19	8.3	<20	20.4	0.3	1.4
07-2723	0.9	62.6	26	82	0.3	3	13	<20	3.4	1060	<1	33	0.8	96	7.2	<20	7.0	0.4	1.9
07-2724	0.8	43.8	<5	164	0.3	2	14	20	5.7	883	<1	79	0.7	49	4.9	<20	7.3	<0.2	1.6
07-2725	1.1	45.9	231	59	0.4	3	21	<20	7.3	1100	<1	39	1.0	71	6.6	<20	12.8	0.3	2.3
07-2726	1.1	35.4	42	14	0.7	<2	11	20	6.7	1250	2	28	<0.5	69	7.1	<20	3.7	<0.2	2.9
07-2727	0.4	32.2	59	184	0.2	<2	11	<20	4.7	490	<1	95	0.6	32	3.0	<20	6.4	<0.2	0.7
07-2728	0.5	28.0	<5	71	0.2	2	6	20	3.8	567	<1	133	<0.5	34	2.2	<20	6.3	<0.2	0.9
07-2729	1.4	34.6	67	<1	0.7	<2	9	<20	3.7	1280	<1	26	<0.5	71	7.9	<20	3.2	<0.2	3.0
07-2730	1.4	26.6	119	41	0.6	<2	12	<20	2.4	899	<1	22	0.7	67	5.0	<20	6.9	0.2	2.2
07-2731	1.5	45.2	472	52	0.3	3	29	80	4.9	971	<1	82	1.2	72	6.3	<20	17.0	0.4	2.0
07-2732	0.5	29.2	98	7	0.7	<2	13	<20	33.2	753	3	249	1.0	25	2.4	<20	4.8	0.3	1.7
07-2733	1.3	36.0	<5	3	1.1	<2	12	<20	3.7	1250	<1	15	<0.5	66	6.9	<20	2.9	0.2	3.1
07-2734	1.3	37.9	112	21	0.6	<2	16	30	6.1	1030	<1	47	1.1	65	5.8	<20	12.2	0.3	1.9
07-2735	0.5	18.2	<5	60	0.5	<2	13	<20	25.9	754	<1	56	<0.5	50	4.4	<20	3.4	<0.2	2.5
07-2736	1.7	30.4	361	8	0.5	<2	4	50	2.8	895	<1	71	<0.5	53	5.4	<20	2.7	<0.2	1.9
07-2737	1.5	36.1	69	27	0.6	<2	16	20	6.4	1050	<1	55	0.7	59	6.3	<20	10.2	0.2	2.0
07-2738	1.4	50.9	<5	37	0.5	<2	54	40	9.3	982	<1	64	0.7	66	6.1	<20	15.6	0.3	2.0
07-2739	0.4	20.1	80	<1	0.4	<2	11	370	25.1	339	<1	770	1.2	23	1.5	<20	3.1	0.6	1.3
07-2766	2.7	17.5	1440	75	0.6	2	25	150	9.2	1200	<1	88	1.1	58	5.5	<20	12.0	0.3	3.4
07-2799	0.9	5.6	<5	240	0.4	<2	46	<20	7.9	162	3	<10	0.9	17	7.7	<20	22.9	0.3	1.2
07-2801	0.5	5.9	<5	248	0.4	<2	45	<20	20.7	170	3	<10	0.7	20	8.5	<20	22.0	0.3	1.2
07-2802	0.8	6.3	<5	251	0.5	7	55	<20	12.9	170	4	<10	1.2	23	7.1	<20	28.9	0.4	1.2
07-2803	0.6	5.4	<5	272	0.3	2	37	<20	12.9	171	3	<10	0.8	18	8.0	<20	18.8	0.2	1.3
07-2804	0.5	5.8	<5	264	0.3	2	48	20	17.4	165	3	<10	0.6	15	8.0	<20	22.0	0.3	1.1
07-2805	0.7	6.1	<5	223	0.3	3	45	50	19.1	154	3	<10	0.6	19	8.6	<20	20.4	0.3	1.1
07-2806	0.6	5.9	<5	169	0.4	3	46	<20	8.5	162	4	<10	0.7	18	7.2	<20	24.2	0.3	1.2
07-2807	0.6	6.9	<5	187	0.4	4	48	60	11.8	163	4	<10	0.9	22	7.4	<20	25.4	0.3	1.4
07-2808	0.8	6.4	<5	258	0.4	3	52	<20	14.9	171	3	<10	0.9	19	8.8	<20	24.2	0:3	1.3
07-2809	0.6	5.8	<5	224	0.3	<2	43	<20	22.7	154	2	<10	0.6	15	9.5	<20	21.7	0.3	1.1
07-2810	0.5	6.3	<5	183	0.3	2	48	<20	14.2	160	3	<10	0.6	18	8.9	<20	22.5	0.3	1.2
07-2811	0.6	5.5	<5	259	0.3	<2	43	30	17.9	150	3	<10	0.6	18	8.8	<20	19.5	0.3	1.1
07-2813	0.4	5.5	<5	219	0.3	2	41	<20	14.4	149	3	<10	0.9	20	7.2	<20	24.5	0.3	1.3
07-2814	0.7	4.7	<5	161	0.3	<2	35	<20	5.6	160	3	<10	0.8	17	9.5	<20	21.5	0.3	1.0
07-2815	0.7	5.8	<5	200	0.4	9	43	650	8.8	148	4	<10	0.8	20	7.9	<20	23.8	0.3	1.3
07-2816	0.5	5.5	<5	188	0.3	3	32	<20	5.2	157	2	<10	0.7	15	8.7	<20	18.7	0.3	1.1
07-2817	0.8	4.8	<5	163	0.4	2	26	<20	4.8	156	2	<10	0.5	15	7.8	<20	14.8	0.2	0.9
07-2818	0.4	5.1	6	208	0.4	<2	35	<20	6.2	161	3	<10	0.8	16	6.8	<20	20.5	0.3	1.2
07-2819	0.6	5.8	<5	146	0.5	<2	47	<20	13.8	153	4	<10	0.9	17	6.7	<20	26.0	0.3	1.7
07-2820	1.5	18.0	477	16	0.7	<2	18	40	7.7	740	<1	27	0.9	65	6.8	<20	5.8	0.5	2.6
07-2900	0.8	15.4	6	9	0.4	3	8	40	20.7	711	<1	56	<0.5	29	4.5	<20	3.7	<0.2	2.1
07-2902	0.6	64.0	<5	38	0.1	2	13	410	8.6	1130	3	87	0.6	53	5.1	<20	6.4	<0.2	1.7
07-2903	0.5	24.4	18	<1	0.1	2	4	230	44.9	1110	2	175	<0.5	37	2.7	<20	1.9	<0.2	1.6

SU = Soil
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Fe-SAP = Ferruginous saprolite

Appendix 4: Chemical composition of Bronzewing samples.

Ident	Nb	Ni	Pb	Rb	S	Sb	Sc	Se	Sm	Sr	Ta	Th	U	V	W	Y	Yb	Zn	Zr
unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
method	XRF	CP/MS	CP/MS	NAA	XRF	NAA	NAA	NAA	NAA	XRF	NAA	NAA	NAA	XRF	NAA	XRF	NAA	XRF	XRF
DL	4	2	1	20	10	0.2	0.1	5	0.2	5	1	0.5	2	5	2	5	0.5	5	5
07-2500	6	36	24	68	170	0.4	16.7	<5	3.7	39	2	14.5	3	143	<2	17	2.2	45	276
07-2501	2	31	22	60	130	0.5	14.5	<5	3.3	36	2	13.2	3	126	<2	18	2.0	40	274
07-2502	6	31	19	64	80	0.3	14.2	<5	3.0	40	1	12.8	3	124	<2	15	1.9	40	292
07-2503	5	35	20	59	110	0.4	15.0	<5	2.9	36	1	13.0	2	128	<2	15	1.8	41	263
07-2504	5	38	20	59	80	0.4	15.7	<5	3.7	38	1	13.1	3	131	<2	16	2.0	46	253
07-2505	6	27	21	59	110	0.4	11.9	<5	3.0	37	<1	12.3	3	112	<2	16	2.0	32	305
07-2506	4	73	20	<20	220	1.1	85.2	<5	4.7	24	2	16.6	<2	1462	<2	20	2.9	24	165
07-2507	<1	37	17	57	110	1.6	104.0	<5	1.7	22	<1	10.2	<2	1731	<2	2	1.4	16	169
07-2509	1	31	10	<20	460	<0.2	78.3	<5	1.1	17	<1	2.1	<2	889	<2	7	1.0	24	86
07-2513	4	71	17	<20	110	0.6	106.0	<5	2.1	31	1	8.6	<2	1153	<2	10	1.9	14	142
07-2517	<1	51	12	<20	60	1.0	18.6	<5	1.0	20	1	5.6	<2	1884	7	7	1.5	37	238
07-2518	1	59	21	32	260	1.5	102.0	<5	2.9	24	<1	14.9	<2	1567	<2	17	2.1	18	173
07-2525	3	50	16	<20	300	0.8	97.5	<5	4.1	21	1	12.0	<2	1435	<2	17	3.4	13	213
07-2526	<1	52	9	28	460	0.7	50.1	<5	0.7	15	<1	4.8	<2	1150	<2	7	1.8	28	152
07-2528	<1	71	9	<20	430	0.5	95.0	<5	1.1	14	<1	4.7	<2	977	<2	7	1.0	24	112
07-2531	<1	71	12	<20	800	0.8	37.1	<5	0.8	27	<1	7.2	<2	1139	<2	3	1.2	25	180
07-2534	<1	74	5	<20	230	<0.2	96.1	<5	2.8	11	<1	1.0	<2	903	<2	11	3.7	134	42
07-2535	1	139	13	28	160	0.5	52.4	<5	5.4	24	<1	5.2	<2	915	<2	23	5.2	17	151
07-2537	6	74	13	<20	660	0.6	36.7	<5	0.7	23	<1	7.2	2	1171	<2	8	1.1	26	175
07-2539	1	55	21	<20	210	0.7	119.0	<5	1.9	25	1	11.4	<2	1513	<2	7	1.3	19	156
07-2559	1	82	25	29	30	0.8	50.1	<5	5.5	31	<1	13.1	<2	956	<2	17	2.9	25	205
07-2561	1	71	10	23	120	1.4	43.8	<5	0.9	28	<1	12.1	2	923	7	5	1.0	14	157
07-2563	<1	18	7	52	380	0.5	16.6	<5	0.3	24	<1	15.5	<2	552	3	<5	<0.5	9	110
07-2564	1	43	19	38	200	2.0	91.8	<5	0.9	24	2	10.4	<2	1883	<2	2	0.7	12	123
07-2566	3	47	39	<20	950	1.5	96.4	<5	0.8	34	<1	14.1	<2	1450	<2	6	0.7	12	132
07-2571	1	36	30	<20	360	2.5	111.0	<5	1.2	19	<1	16.5	<2	3626	<2	3	0.8	9	113
07-2572	5	77	18	30	160	1.5	58.7	<5	1.0	31	<1	13.6	<2	1009	<2	5	0.9	11	149
07-2574	1	84	43	<20	40	0.8	53.6	<5	1.5	29	1	16.3	<2	866	<2	7	1.3	20	179
07-2576	5	87	25	<20	30	0.8	47.0	<5	5.5	29	<1	11.5	<2	809	<2	25	2.9	23	188
07-2577	<1	80	20	<20	60	1.3	81.3	<5	0.9	18	1	18.3	<2	1212	4	0	0.9	15	144
07-2578	1	80	27	22	40	0.5	48.2	<5	2.3	30	2	11.2	2	825	<2	14	1.9	23	181
07-2579	1	55	21	<20	210	0.7	119.0	<5	1.9	25	1	11.4	<2	1513	<2	7	1.3	19	156
07-2581	<1	27	8	24	150	1.5	35.3	<5	0.4	29	1	2.3	<2	1237	<2	3	<0.5	19	66
07-2582	<1	41	14	<20	300	1.0	40.3	<5	0.9	16	1	19.6	<2	1043	<2	1	0.9	10	169
07-2584	9	35	21	65	90	0.4	16.9	<5	3.9	38	<1	14.8	<2	127	<2	16	2.2	43	286
07-2585	4	30	20	64	80	0.4	13.8	<5	3.0	36	1	13.7	3	108	<2	15	2.1	36	291
07-2586	5	40	25	75	80	0.5	17.5	<5	3.5	36	1	14.5	4	130	<2	13	2.1	44	271
07-2587	7	31	24	65	140	0.4	15.2	<5	3.3	38	1	13.6	3	121	<2	15	2.1	39	289
07-2588	9	34	24	58	100	0.5	16.1	<5	3.6	38	1	14.1	3	133	3	18	2.2	43	285
07-2589	9	36	22	69	80	0.5	16.7	<5	5.1	41	<1	15.2	3	134	<2	20	2.6	49	290
07-2590	10	33	23	58	130	0.5	16.0	<5	3.9	39	<1	13.8	3	123	<2	22	2.2	43	261
07-2591	8	32	24	68	70	0.3	14.6	<5	3.6	40	<1	14.3	3	118	<2	16	2.1	40	294
07-2592	5	34	26	64	80	0.5	14.9	<5	3.4	38	<1	13.3	2	127	<2	16	2.1	42	270
07-2593	5	32	23	57	120	0.4	13.4	<5	3.1	42	2	13.5	<2	116	<2	15	2.1	35	305
07-2594	6	32	22	64	70	0.3	14.1	<5	3.7	39	1	14.0	<2	114	<2	16	2.3	39	301
07-2595	7	34	21	55	50	0.4	14.5	<5	4.4	39	2	14.5	3	107	<2	18	2.6	44	305
07-2596	6	35	22	70	120	0.3	17.0	<5	3.8	42	2	14.0	2	128	<2	18	2.0	48	260
07-2597	8	35	21	73	120	0.5	16.8	<5	3.7	40	1	14.1	<2	129	<2	17	2.0	48	277
07-2598	7	34	22	66	110	0.4	15.9	<5	3.2	36	<1	13.6	2	128	<2	16	2.0	40	250
07-2599	6	36	24	68	70	0.5	16.9	<5	3.9	37	1	14.4	3	135	<2	17	2.3	48	273
07-2600	3	32	24	69	100	0.5	16.9	<5	3.7	36	1	14.8	3	133	<2	18	2.3	42	277
07-2601	8	34	24	67	110	0.5	17.2	<5	3.8	38	2	14.6	2	137	<2	15	2.2	46	275
07-2602	5	32	22	62	150	0.4	15.4	<5	3.1	41	2	13.8	3	126	<2	15	1.9	40	284
07-2603	5	31	20	67	80	0.4	14.7	<5	3.0	38	1	12.9	4	130	<2	20	2.0	39	287

SU = Soil
LT100 = Lateritic gravel
MTC = Mottled colluvium
Fe-SAP = Ferruginous saprolite

Appendix 4: Chemical composition of Bronzewing samples.

Ident	Nb	Ni	Pb	Rb	S	Sb	Sc	Se	Sm	Sr	Ta	Th	U	V	W	Y	Yb	Zn	Zr
unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
method	XRF	CP/MS	CP/MS	NAA	XRF	NAA	NAA	NAA	NAA	XRF	NAA	NAA	NAA	XRF	NAA	XRF	NAA	XRF	XRF
DL	4	2	1	20	10	0.2	0.1	5	0.2	5	1	0.5	2	5	2	5	0.5	5	5
07-2604	6	35	18	65	70	0.5	15.5	<5	3.3	39	2	12.9	<2	128	<2	19	2.0	44	276
07-2605	6	34	21	66	70	0.5	15.7	<5	4.1	40	<1	14.2	3	134	<2	21	2.4	46	284
07-2606	7	36	19	62	100	0.5	16.4	<5	3.9	38	<1	13.5	3	127	<2	19	2.0	44	252
07-2607	7	39	21	63	130	0.4	17.5	<5	4.6	42	2	14.4	3	134	<2	21	2.3	57	257
07-2608	7	33	24	71	80	0.4	15.7	<5	4.1	40	2	14.4	3	132	<2	22	2.4	43	303
07-2609	7	34	23	69	80	0.3	15.5	<5	4.4	41	<1	14.8	3	124	<2	20	2.3	44	278
07-2610	6	37	25	65	100	0.4	15.6	<5	4.4	38	2	14.2	2	127	<2	19	2.4	45	285
07-2611	8	33	26	74	140	0.4	15.4	<5	3.4	43	2	14.7	3	123	<2	18	2.2	43	307
07-2612	6	35	25	72	90	0.4	15.7	<5	4.0	40	2	14.4	3	126	<2	17	2.2	47	290
07-2613	<1	99	11	<20	130	2.3	30.2	<5	0.4	18	<1	6.1	<2	1222	15	2	0.6	9	123
07-2614	2	119	12	<20	150	1.2	50.3	<5	1.0	19	<1	6.6	<2	1104	<2	6	0.9	12	103
07-2619	8	66	22	<20	50	0.9	29.6	<5	0.7	26	<1	12.5	<2	872	<2	6	1.0	12	185
07-2620	3	80	31	<20	70	0.8	38.3	<5	0.8	27	<1	13.7	<2	952	<2	6	1.1	17	191
07-2625	<1	139	10	<20	310	1.2	52.4	<5	0.8	14	1	4.0	6	878	<2	4	1.3	27	112
07-2643	3	79	27	<20	30	0.5	45.5	<5	1.8	32	<1	10.8	<2	591	<2	7	1.4	14	197
07-2644	1	67	8	<20	330	1.3	71.8	<5	0.5	21	<1	1.7	<2	707	6	<5	<0.5	69	53
07-2646	6	82	28	22	20	1.0	42.8	<5	1.4	31	<1	17.0	<2	905	<2	6	1.5	21	191
07-2653	<1	143	22	<20	70	0.5	43.6	<5	5.6	30	<1	7.6	3	850	<2	22	3.3	24	153
07-2655	<1	58	14	<20	240	1.1	54.9	<5	1.6	18	<1	13.2	<2	1374	6	13	1.5	16	149
07-2659	10	122	19	<20	250	1.5	60.8	<5	4.4	31	<1	10.9	4	1239	38	25	3.6	25	269
07-2661	8	138	27	<20	140	1.5	62.3	<5	10.8	28	2	11.9	3	1109	22	43	6.3	19	242
07-2667	8	105	32	<20	70	1.4	71.2	<5	4.0	16	<1	20.6	<2	1377	8	21	2.8	31	270
07-2673	2	28	19	66	110	0.4	13.5	<5	3.5	29	1	13.1	4	112	<2	12	1.9	33	231
07-2674	<1	28	22	68	130	0.5	12.8	<5	3.3	32	1	13.1	3	104	<2	9	2.0	34	266
07-2675	1	32	25	66	110	0.5	14.7	<5	3.7	35	1	14.5	3	124	<2	13	2.2	38	276
07-2676	4	27	20	68	100	0.6	12.8	<5	3.2	33	<1	13.3	3	108	<2	8	2.0	36	274
07-2680	2	148	15	<20	370	1.3	97.3	<5	2.8	10	<1	8.8	<2	966	24	21	2.4	38	185
07-2681	8	46	19	<20	240	1.1	72.8	<5	3.8	29	<1	14.3	<2	1371	<2	18	2.5	15	203
07-2683	1	44	13	<20	220	1.4	62.5	<5	2.6	20	2	11.9	4	2165	7	19	1.4	38	149
07-2684	<1	44	14	27	450	1.8	60.2	<5	10.2	16	1	10.1	<2	3541	28	7	6.4	25	164
07-2685	1	71	12	27	250	<0.2	101.0	<5	2.9	12	<1	13.7	<2	832	<2	9	2.0	14	140
07-2686	2	88	17	<20	410	<0.2	122.0	<5	2.2	22	<1	9.8	<2	991	6	12	1.6	21	150
07-2689	2	86	27	<20	100	1.0	67.8	<5	5.9	29	1	15.3	<2	1201	<2	21	3.0	16	199
07-2690	<1	83	28	22	100	1.4	60.5	<5	4.7	24	2	16.8	<2	1493	4	21	2.6	16	222
07-2691	<1	201	12	24	230	<0.2	93.0	<5	2.1	11	1	10.4	<2	577	<2	11	1.6	18	118
07-2692	11	118	22	28	240	1.4	81.2	<5	4.7	28	2	17.7	<2	1109	19	27	3.2	29	248
07-2693	8	127	24	<20	190	1.0	84.0	<5	4.1	25	2	17.0	<2	1022	14	23	2.8	41	266
07-2694	8	137	12	27	160	1.4	41.8	<5	4.4	25	2	7.6	3	796	30	30	3.2	26	216
07-2696	5	75	15	30	230	1.2	42.6	<5	3.3	31	2	15.3	<2	1316	5	12	2.7	8	226
07-2697	1	52	17	<20	290	1.1	68.8	<5	3.9	11	<1	12.3	<2	1274	<2	14	2.8	9	139
07-2699	7	64	23	28	140	1.2	54.2	<5	4.0	20	<1	10.4	3	1683	9	16	3.2	12	283
07-2700	14	91	20	<20	120	1.7	44.2	<5	2.6	30	2	14.9	<2	2190	9	18	2.4	10	357
07-2701	<1	71	16	22	240	1.4	55.4	<5	2.7	23	1	9.4	3	1410	4	13	2.3	11	171
07-2702	6	105	25	30	40	1.0	56.9	<5	7.4	28	1	13.2	<2	1507	<2	31	3.9	14	207
07-2703	<1	105	12	24	200	1.6	77.3	<5	2.0	18	1	9.6	<2	622	<2	10	1.6	3	106
07-2704	<1	41	15	20	230	1.5	65.0	<5	2.2	24	<1	9.9	<2	2268	<2	15	1.7	9	176
07-2705	<1	123	19	<20	240	1.4	66.0	<5	4.0	19	<1	13.1	3	1134	13	13	2.8	53	146
07-2706	1	65	23	32	190	0.7	49.6	<5	3.1	33	<1	12.0	<2	1044	<2	18	2.0	38	155
07-2707	3	79	26	<20	80	0.8	63.2	<5	3.1	26	1	14.8	3	1069	5	18	2.2	12	212
07-2708	6	33	22	<20	140	1.6	36.5	<5	5.2	39	2	12.9	<2	2443	6	23	2.9	18	242
07-2709	2	34	8	30	400	<0.2	46.8	<5	3.3	20	<1	6.8	<2	796	<2	14	2.7	14	188
07-2710	<1	258	5	<20	350	<0.2	92.2	<5	3.6	20	2	7.1	5	798	<2	36	3.2	32	232
07-2711	14	98	26	<20	110	1.1	71.7	<5	4.0	28	2	16.7	<2	1161	7	22	2.9	23	299
07-2712	2	63	17	<20	290	1.1	67.9	<5	2.0	25	<1	10.8	<2	1582	21	12	2.2	10	220

SU = Soil
LT100 = Lateritic gravel
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Fe-SAP = Ferruginous saprolite

Appendix 4: Chemical composition of Bronzewing samples.

Ident	Nb	Ni	Pb	Rb	S	Sb	Sc	Se	Sm	Sr	Ta	Th	U	V	W	Y	Yb	Zn	Zr
unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
method	XRF	CP/MS	CP/MS	NAA	XRF	NAA	NAA	NAA	NAA	XRF	NAA	NAA	NAA	XRF	NAA	XRF	NAA	XRF	XRF
DL	4	2	1	20	10	0.2	0.1	5	0.2	5	1	0.5	2	5	2	5	0.5	5	5
07-2713	<1	35	12	<20	340	0.9	95.9	<5	4.4	22	2	12.0	<2	1081	19	19	3.0	18	164
07-2714	6	71	10	<20	180	0.9	67.9	<5	2.0	17	2	11.2	<2	1412	21	15	2.0	11	243
07-2715	3	229	7	22	200	<0.2	92.1	<5	3.7	25	<1	10.0	3	929	<2	27	4.2	66	263
07-2716	<1	42	17	<20	390	1.0	106.0	<5	5.0	20	2	14.4	<2	1264	20	24	3.6	8	200
07-2717	<1	64	12	32	290	1.2	55.6	<5	4.8	26	<1	7.9	<2	1431	50	23	4.3	18	203
07-2718	1	30	22	68	90	0.4	16.1	<5	4.0	33	1	14.5	4	128	<2	12	2.2	43	263
07-2719	<1	28	22	75	110	0.4	14.6	<5	4.0	33	1	14.0	2	123	<2	14	2.3	36	278
07-2720	4	24	21	67	110	0.3	12.3	<5	3.2	28	<1	12.8	3	108	<2	10	2.2	29	276
07-2721	5	28	20	69	180	0.5	14.1	<5	2.7	36	2	13.4	3	108	<2	8	1.9	31	274
07-2722	4	28	21	71	110	0.5	14.5	<5	3.3	34	1	14.1	4	125	<2	11	2.2	38	267
07-2723	9	27	17	32	280	2.4	77.8	<5	2.7	24	<1	15.8	<2	2040	<2	9	2.6	13	267
07-2724	<1	40	24	24	280	1.2	89.0	<5	2.6	23	<1	11.9	<2	1685	<2	13	1.9	19	148
07-2725	<1	51	29	43	100	1.2	83.5	<5	3.7	25	2	21.9	<2	1851	<2	9	2.1	14	221
07-2726	10	35	24	37	100	1.8	76.6	<5	1.7	28	<1	22.6	<2	1889	<2	13	1.8	14	255
07-2727	<1	40	12	<20	340	1.0	53.1	<5	1.7	32	<1	5.0	<2	986	<2	9	1.7	33	97
07-2728	<1	30	23	<20	320	1.0	79.3	<5	1.4	14	<1	7.7	<2	1929	<2	9	1.0	14	95
07-2729	8	32	24	27	110	1.5	81.0	<5	1.7	23	<1	22.2	<2	1744	<2	4	1.7	12	253
07-2730	1	26	14	<20	280	1.3	67.0	<5	2.3	17	<1	14.1	<2	1747	<2	9	2.2	15	190
07-2731	4	53	25	<20	160	1.0	69.2	<5	5.5	27	<1	14.5	<2	1805	<2	22	3.5	26	220
07-2732	5	114	9	<20	90	0.8	53.1	<5	3.2	12	<1	1.8	<2	804	9	15	2.5	47	73
07-2733	<1	35	25	<20	90	2.2	74.9	<5	1.6	24	<1	23.1	<2	1860	<2	10	1.7	15	252
07-2734	1	42	22	39	160	1.1	87.7	<5	4.2	23	2	18.4	<2	1670	<2	13	2.7	15	217
07-2735	<1	85	20	<20	70	1.3	37.3	<5	1.3	23	<1	10.6	<2	1112	6	9	1.5	8	173
07-2736	2	44	15	<20	240	0.7	89.4	<5	1.2	17	<1	13.3	<2	1675	<2	4	1.2	14	181
07-2737	4	47	20	<20	170	1.2	90.0	<5	3.4	23	<1	20.5	<2	1510	<2	12	2.0	16	207
07-2738	3	44	27	<20	150	1.9	68.8	<5	4.6	27	1	18.4	<2	1913	<2	13	2.7	21	220
07-2739	<1	68	5	<20	190	1.3	112.0	<5	3.4	10	<1	2.2	<2	1523	<2	16	4.0	88	55
07-2766	6	53	18	<20	170	0.9	63.2	<5	4.1	33	2	8.0	5	1245	<2	16	2.7	23	209
07-2799	<1	23	18	78	110	0.4	14.0	<5	3.8	32	1	13.9	3	99	<2	10	2.3	26	260
07-2801	6	24	20	58	100	0.6	13.9	<5	3.4	34	1	13.8	3	125	<2	15	2.2	30	265
07-2802	2	32	22	72	140	0.5	18.9	<5	5.4	38	2	15.4	<2	137	<2	18	2.6	47	232
07-2803	<1	24	19	56	120	0.4	12.5	<5	2.9	30	1	12.9	3	110	<2	12	1.9	36	245
07-2804	1	26	20	75	150	0.5	13.5	<5	3.5	31	1	13.4	2	117	<2	13	2.2	34	252
07-2805	2	28	20	65	100	0.5	13.8	<5	3.1	33	1	14.2	3	114	<2	11	2.1	32	299
07-2806	4	33	22	64	130	0.5	17.3	<5	4.2	36	2	15.0	<2	141	<2	15	2.3	45	244
07-2807	3	34	22	70	160	0.4	19.7	<5	4.3	36	<1	15.8	3	136	<2	14	2.3	52	260
07-2808	5	32	23	80	140	0.5	17.4	<5	4.0	37	<1	15.4	3	123	<2	15	2.4	41	274
07-2809	4	24	21	64	150	0.5	13.5	<5	3.3	33	1	14.7	<2	116	<2	12	2.2	31	310
07-2810	<1	26	19	72	120	0.5	15.7	<5	3.8	31	2	15.1	3	121	<2	12	2.3	33	285
07-2811	7	26	19	69	110	0.5	13.8	<5	3.1	33	1	14.5	3	106	<2	11	2.0	33	295
07-2813	2	29	22	77	120	0.4	15.2	<5	4.2	34	1	13.5	3	115	<2	12	2.0	48	221
07-2814	5	23	19	60	110	0.4	12.3	<5	3.4	30	1	14.2	3	108	<2	13	2.1	25	330
07-2815	6	28	20	70	150	0.3	15.9	<5	4.3	36	2	14.9	3	101	<2	15	2.5	41	286
07-2816	1	21	17	66	120	0.3	11.2	<5	3.2	27	1	13.1	<2	92	<2	10	2.0	25	288
07-2817	1	22	20	60	100	0.4	11.3	<5	2.5	28	1	12.3	3	101	<2	8	1.7	24	264
07-2818	3	25	18	64	130	0.5	13.4	<5	3.4	27	1	12.9	3	118	<2	11	1.9	33	253
07-2819	4	33	24	71	100	0.5	16.9	<5	4.4	38	1	15.5	2	129	<2	16	2.3	49	224
07-2820	8	50	16	22	120	1.4	59.4	<5	2.9	36	<1	10.0	<2	1271	<2	14	3.6	10	239
07-2900	8	69	27	21	40	0.6	41.2	<5	0.7	30	<1	12.4	3	809	<2	5	1.2	14	171
07-2902	3	91	8	<20	150	0.9	92.8	<5	2.1	23	1	14.9	<2	1467	<2	4	1.6	13	178
07-2903	2	90	8	<20	100	1.3	68.4	<5	0.9	13	<1	5.3	<2	1104	<2	4	0.9	15	94

SU = Soil
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APPENDIX 5

CHEMICAL COMPOSITION OF RESIDUAL/COLLUVIUM CONTACT

Appendix 5: Chemical composition of residual/colluvial contact.

Sample	Anal.	type	RL	East	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	LOI	Total
No	type		m	m	%	%	%	%	%	%	%	%	%	%	%	%
07-3500	Bulk	CV	2488	16650	39.8	25.0	19.4	0.73	0.33	0.14	0.19	1.55	0.022	0.052	10.0	97.3
07-3501	Bulk	CV	2487	16650	41.1	25.0	19.0	0.61	0.31	0.14	0.20	1.48	0.022	0.049	9.9	97.8
07-3502	Bulk	CV	2486	16650	38.7	24.6	21.4	0.71	0.32	0.11	0.18	1.54	0.022	0.036	9.9	97.5
07-3503	Bulk	CV	2485	16650	43.3	26.3	13.3	0.75	0.35	0.13	0.15	1.45	0.017	0.037	10.8	96.6
07-3504	Bulk	LT100	2484	16650	34.9	22.9	27.0	0.72	0.34	0.12	0.17	1.55	0.021	0.054	9.6	97.3
07-3505	Bulk	LT100	2483	16650	30.9	23.9	29.9	0.75	0.35	0.16	0.14	1.44	0.012	0.022	10.0	97.6
07-3506	Bulk	LT100	2482	16650	29.2	22.4	34.4	0.50	0.27	0.11	0.09	1.39	0.013	0.022	9.7	98.1
07-3507	Bulk	CV	2487.25	16665	35.9	23.6	26.3	0.60	0.29	0.13	0.15	1.58	0.020	0.024	9.5	98.0
07-3508	Bulk	CV	2486.25	16665	34.9	23.2	28.3	0.55	0.28	0.11	0.15	1.76	0.024	0.034	9.2	98.5
07-3509	Bulk	LT100	2485.25	16665	26.2	21.4	40.1	0.51	0.26	0.10	0.14	1.51	0.018	0.016	8.3	98.6
07-3510	Bulk	CV	2487.5	16670	32.2	22.9	31.7	0.54	0.27	0.09	0.12	1.70	0.024	0.058	8.9	98.5
07-3511	Bulk	CV	2486.5	16670	29.9	21.9	35.2	0.49	0.25	0.09	0.12	1.77	0.027	0.048	9.1	98.9
07-3512	Bulk	LT100	2485.5	16670	25.9	22.8	38.2	0.47	0.24	0.10	0.11	1.59	0.016	0.023	9.3	98.8
07-3513	Bulk	CV	2486.7	16675	34.8	23.1	28.0	0.62	0.28	0.12	0.18	1.62	0.026	0.051	9.6	98.3
07-3514	Bulk	LT100	2485.7	16675	20.6	21.3	44.9	0.38	0.20	0.07	0.11	1.81	0.021	0.037	9.7	99.0
07-3515	Bulk	CV	2488	16680	33.6	22.8	30.1	0.59	0.29	0.12	0.17	1.67	0.022	0.051	9.4	98.7
07-3516	Bulk	CV	2487	16680	34.3	22.5	29.9	0.55	0.27	0.10	0.17	1.66	0.025	0.064	9.3	98.8
07-3517	Bulk	LT100	2486	16680	23.2	20.1	42.8	0.29	0.18	0.09	0.08	0.96	0.014	0.046	10.8	98.6
07-3509C	>2mm	LT100	2485.25	16665	16.9	20.2	54.0	0.29	0.19	0.09	0.09	1.65	0.020	0.018	6.7	100.1
07-3509F	<75µm	LT100	2485.25	16665	44.4	28.2	8.5	1.09	0.43	0.21	0.23	1.16	0.015	0.016	12.7	97.0
07-3507C	>2mm	CV	2487.25	16665	19.1	17.5	53.8	0.26	0.16	0.07	0.05	1.78	0.020	0.025	7.0	99.7
07-3507F	<75µm	CV	2487.25	16665	44.9	28.1	9.2	0.97	0.41	0.23	0.24	1.28	0.015	0.021	12.5	97.9
07-3508C	>2mm	CV	2486.25	16665	20.3	17.4	53.1	0.30	0.17	0.08	0.07	2.15	0.032	0.045	6.3	99.9
07-3508F	<75µm	CV	2486.25	16665	45.0	28.0	9.6	0.93	0.40	0.22	0.23	1.35	0.020	0.029	12.2	97.9
07-3512C	>2mm	LT100	2485.5	16670	17.2	18.9	54.9	0.32	0.20	0.10	0.07	1.65	0.019	0.037	6.7	100.0
07-3512F	<75µm	LT100	2485.5	16670	45.1	28.0	8.8	1.12	0.46	0.21	0.23	1.22	0.015	0.022	12.4	97.6
07-3510C	>2mm	CV	2487.5	16670	17.5	17.3	57.0	0.26	0.16	0.07	0.05	2.18	0.024	0.07	5.9	100.5
07-3510F	<75µm	CV	2487.5	16670	45.0	28.6	9.0	0.96	0.39	0.20	0.21	1.35	0.017	0.034	12.1	97.8
07-3511C	>2mm	CV	2486.5	16670	18.0	17.4	55.0	0.27	0.16	0.04	0.05	2.20	0.029	0.047	7.0	100.2
07-3511F	<75µm	CV	2486.5	16670	44.9	28.4	9.2	0.95	0.40	0.25	0.22	1.33	0.019	0.03	12.1	97.8
07-3514C	>2mm	LT100	2485.7	16675	15.0	18.7	56.1	0.24	0.16	0.06	0.07	1.57	0.023	0.034	7.9	99.9
07-3514F	<75µm	LT100	2485.7	16675	44.1	28.6	9.4	1.04	0.39	0.20	0.28	1.18	0.016	0.048	12.4	97.6
07-3513C	>2mm	CV	2486.7	16675	16.8	16.3	57.8	0.26	0.15	0.04	0.05	2.19	0.030	0.06	5.9	99.5
07-3513F	<75µm	CV	2486.7	16675	44.6	27.8	10.1	0.98	0.38	0.23	0.28	1.27	0.020	0.041	12.1	97.8
07-3517C	>2mm	LT100	2486	16680	21.5	19.2	47.4	0.25	0.16	0.11	0.07	1.04	0.014	0.025	10.1	99.9
07-3517F	<75µm	LT100	2486	16680	42.6	31.5	8.7	0.84	0.38	0.22	0.20	0.79	0.011	0.162	13.2	98.6
07-3515C	>2mm	CV	2488	16680	16.4	16.3	58.0	0.24	0.17	0.05	0.06	2.28	0.027	0.067	5.6	99.2
07-3515F	<75µm	CV	2488	16680	44.8	28.3	9.8	0.98	0.40	0.23	0.27	1.27	0.021	0.03	11.7	97.8
07-3516C	>2mm	CV	2487	16680	19.8	17.0	54.3	0.27	0.17	0.04	0.07	2.20	0.028	0.08	6.1	99.9
07-3516F	<75µm	CV	2487	16680	45.0	28.4	10.2	0.90	0.38	0.19	0.25	1.34	0.020	0.054	11.5	98.2
07-3500C	>2mm	CV	2488	16650	17.0	16.1	57.9	0.24	0.17	0.02	0.04	2.07	0.026	0.087	6.4	100.0
07-3500F	<75µm	CV	2488	16650	43.3	27.0	9.0	1.08	0.42	0.24	0.27	1.17	0.019	0.049	11.2	93.7
07-3501C	>2mm	CV	2487	16650	13.0	13.1	64.7	0.18	0.14	0.06	0.04	2.33	0.033	0.046	6.1	99.7
07-3501F	<75µm	CV	2487	16650	44.4	27.3	9.6	0.92	0.41	0.36	0.33	1.15	0.023	0.05	13.2	97.7
07-3502C	>2mm	CV	2486	16650	16.3	15.9	57.8	0.23	0.16	0.05	0.05	2.12	0.028	0.063	6.9	99.7
07-3502F	<75µm	CV	2486	16650	44.8	28.2	9.5	0.99	0.41	0.19	0.26	1.29	0.017	0.03	12.5	98.2
07-3503C	>2mm	CV	2485	16650	15.2	15.5	60.2	0.23	0.16	0.05	0.04	2.31	0.027	0.095	5.6	99.4
07-3503F	<75µm	CV	2485	16650	45.5	29.1	8.6	0.97	0.42	0.19	0.21	1.39	0.015	0.024	10.2	96.6
07-3504C	>2mm	LT100	2484	16650	14.7	17.8	58.2	0.27	0.20	0.06	0.07	1.75	0.024	0.057	5.9	99.0
07-3504F	<75µm	LT100	2484	16650	44.7	27.3	8.5	1.21	0.48	0.18	0.26	1.17	0.014	0.043	11.8	95.6
07-3505C	>2mm	LT100	2483	16650	19.9	19.4	50.0	0.34	0.20	0.10	0.07	1.54	0.015	0.034	6.2	97.7
07-3505F	<75µm	LT100	2483	16650	42.4	27.5	9.0	1.30	0.50	0.27	0.20	0.80	0.007	0.022	13.5	95.5
07-3506C	>2mm	LT100	2482	16650	18.5	16.6	54.4	0.25	0.18	0.07	0.05	1.53	0.013	0.044	7.4	99.0
07-3506F	<75µm	LT100	2482	16650	41.4	28.6	11.1	0.93	0.37	0.20	0.17	0.95	0.010	0.013	14.8	98.6

CV = Colluvium
LT100 = Lateritic gravel

Appendix 5: Chemical composition of residual/colluvial contact.

Sample No	Ag	As	Au	Ba	Br	Ce	Cl	Co	Cr	Cs	Cu	Eu	Ga	Hf	Ir	La	Lu	Mo	Nb
	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm
07-3500	<10	10	194	58	3	41	10	6	426	2	102	1.7	35	6.5	<20	20	0.4	<5	<5
07-3501	<10	11	163	44	3	50	<10	3	427	<1	91	1.4	37	6.2	<20	22	0.4	<5	<5
07-3502	<10	10	830	57	3	31	<10	<1	479	<1	101	1.4	38	6.0	<20	19	0.5	<5	<5
07-3503	<10	8	71	21	2	92	<10	12	371	2	82	1.1	32	6.1	<20	22	0.4	<5	<5
07-3504	<10	14	576	73	3	37	40	13	547	<1	92	2.0	42	5.5	<20	20	0.5	<5	<5
07-3505	<10	15	115	34	2	34	50	9	636	<1	112	1.1	42	5.2	<20	9	0.4	<5	<5
07-3506	<10	20	90	<20	2	9	30	<1	921	<1	67	<0.5	40	4.8	<20	<1	<0.2	<5	<5
07-3507	<10	13	312	<20	<2	17	10	<1	489	<1	74	1.3	42	6.2	<20	13	0.3	<5	<5
07-3508	<10	13	442	77	<2	51	60	1	531	<1	97	1.5	42	6.1	<20	14	0.5	<5	<5
07-3509	<10	20	350	78	3	21	10	7	763	<1	78	1.3	47	5.4	<20	5	0.4	<5	<5
07-3510	<10	15	52	53	3	66	<10	<1	587	<1	81	2.1	47	6.8	<20	24	0.5	<5	<5
07-3511	<10	14	123	35	<2	37	<10	<1	620	<1	94	2.0	47	6.4	<20	32	0.6	<5	<5
07-3512	<10	19	260	<20	4	26	<10	8	781	2	77	1.7	44	5.2	<20	10	0.4	<5	<5
07-3513	<10	14	442	49	<2	43	<10	<1	578	<1	91	2.5	42	6.4	<20	32	0.5	<5	<5
07-3514	<10	20	586	433	2	24	<10	1	867	<1	76	2.0	48	5.8	<20	8	0.5	<5	<5
07-3515	<10	16	86	<20	<2	45	40	1	582	1	88	1.9	41	5.9	<20	18	0.6	<5	<5
07-3516	<10	13	106	50	3	49	<10	4	568	2	81	2.1	42	6.4	<20	32	0.5	<5	<5
07-3517	<10	46	443	260	4	27	<10	36	1020	<1	178	1.7	41	3.7	<20	3	0.4	<5	<5
07-3509C	<10	23	703	33	2	13	10	2	976	3	73	1.6	58	5.8	<20	5	0.5	5	7
07-3509F	<10	6	55	<20	3	19	510	11	295	1	71	0.6	34	4.6	<20	6	0.3	5	<5
07-3507C	<10	20	940	32	<2	17	10	3	736	1	80	1.8	45	5.4	<20	18	0.4	5	<5
07-3507F	<10	7	94	<20	5	16	710	8	264	1	74	0.7	33	5.5	<20	8	0.3	5	<5
07-3508C	<10	20	457	35	2	52	<10	2	818	1	77	2.0	53	6.6	<20	23	0.6	5	<5
07-3508F	<10	7	56	<20	4	59	620	10	263	2	85	1.0	35	6.6	<20	22	0.4	5	<5
07-3512C	<10	26	410	20	2	23	10	2	828	1	87	2.0	47	5.2	<20	29	0.6	5	<5
07-3512F	<10	6	56	<20	3	38	360	16	288	1	69	0.7	34	5.0	<20	10	0.4	5	<5
07-3510C	<10	23	55	32	2	60	10	7	811	1	86	2.9	54	6.3	<20	31	0.6	5	10
07-3510F	<10	5	59	<20	3	56	500	17	242	1	81	0.9	33	5.9	<20	11	0.4	5	<5
07-3511C	<10	23	420	39	2	39	10	3	822	1	98	2.5	59	6.8	<20	16	0.6	5	<5
07-3511F	<10	7	59	<20	4	43	500	11	242	1	84	1.1	36	5.9	<20	15	0.5	5	<5
07-3514C	<10	22	458	135	2	14	10	3	886	1	112	2.0	44	4.9	<20	15	0.5	5	<5
07-3514F	<10	7	51	57	3	37	430	23	259	2	82	0.9	33	4.2	<20	17	0.5	5	<5
07-3513C	<10	22	1180	79	3	34	10	6	889	1	88	4.0	57	6.2	<20	43	0.8	5	6
07-3513F	<10	6	141	55	3	46	550	23	330	3	89	1.1	35	5.6	<20	21	0.5	5	<5
07-3517C	<10	48	426	257	2	14	10	10	1100	1	184	1.4	44	3.8	<20	3	0.4	5	<5
07-3517F	<10	8	50	161	2	79	230	140	236	1	90	1.0	33	3.4	<20	12	0.4	5	<5
07-3515C	<10	22	175	46	2	75	10	3	871	1	83	3.3	62	6.5	<20	37	0.7	5	<5
07-3515F	<10	7	52	<20	3	37	540	12	287	1	89	0.9	34	5.1	<20	12	0.4	5	<5
07-3516C	<10	20	90	187	2	45	10	21	789	1	83	3.0	57	6.8	<20	40	0.7	5	<5
07-3516F	<10	7	43	53	2	43	290	41	268	1	94	1.0	34	5.9	<20	18	0.5	5	<5
07-3500C	<10	22	468	39	<2	77	<10	3	880	<1	76	2.6	52	6.2	<20	49	0.6	<5	<5
07-3500F	na	na	na	29	na	na	780	26	na	na	72	na	34	na	na	11	na	na	<5
07-3501C	<10	5	140	<20	8	70	<10	3	272	<1	81	1.1	64	4.8	<20	25	0.3	<5	<5
07-3501F	<10	17	4050	<20	<2	42	1900	26	949	<1	60	2.0	33	6.7	<20	16	0.4	<5	<5
07-3502C	<10	25	2170	28	3	59	<10	<1	914	<1	82	3.0	59	6.0	<20	33	0.6	<5	<5
07-3502F	<10	7	789	<20	2	31	320	13	302	3	71	1.1	30	5.1	<20	15	0.5	<5	<5
07-3503C	<10	24	3170	33	<2	37	<10	44	858	<1	62	3.8	56	5.9	<20	48	0.7	<5	<5
07-3503F	<10	7	900	<20	<2	31	150	12	326	<1	65	0.8	34	4.2	<20	15	0.4	<5	<5
07-3504C	<10	24	222	48	<2	46	<10	20	982	<1	68	1.7	47	5.7	<20	43	0.4	<5	<5
07-3504F	<10	6	100	28	6	14	320	32	347	<1	58	<0.5	33	3.8	<20	21	<0.2	<5	<5
07-3505C	<10	28	28	<20	3	9	<10	10	1270	<1	61	0.5	46	4.3	<20	14	<0.2	<5	<5
07-3505F	<10	7	100	<20	2	3	1090	20	464	<1	75	<0.5	27	4.1	<20	4	<0.2	<5	<5
07-3506C	<10	25	992	32	<2	122	<10	10	956	<1	38	3.4	50	7.4	<20	<1	0.6	<5	<5
07-3506F	<10	7	68	<20	4	83	320	7	272	<1	43	1.0	32	5.9	<20	11	0.4	<5	<5

CV = Colluvium
LT100 = Lateritic gravel

Appendix 5: Chemical composition of residual/colluvial contact.

Sample No	Ni	Pb	Rb	S	Sb	Sc	Se	Sm	Sr	Ta	Th	U	V	W	Y	Yb	Zn	Zr
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
07-3500	96	21	16	100	0.6	78.2	<5	6.0	27	<1	16	<2	525	<2	22	3.7	48	227
07-3501	94	22	15	90	<0.2	70.5	<5	5.0	25	<1	16	<2	512	<2	21	3.0	40	218
07-3502	94	26	10	100	0.5	74.8	<5	5.6	23	<1	16	<2	554	<2	25	3.8	41	218
07-3503	99	17	8	70	1.8	74.0	<5	4.8	25	<1	14	<2	369	<2	19	3.2	31	222
07-3504	75	24	8	130	0.7	76.4	<5	6.4	30	<1	15	<2	690	<2	27	3.7	33	201
07-3505	69	16	9	780	0.8	78.3	<5	3.7	44	<1	15	<2	775	<2	25	2.9	20	176
07-3506	49	9	8	100	0.9	53.3	<5	1.2	29	<1	14	<2	930	<2	11	1.1	14	171
07-3507	108	30	6	130	0.8	69.8	<5	4.0	21	2	17	<2	654	<2	21	2.7	40	219
07-3508	85	10	11	110	0.6	76.1	<5	5.8	28	2	18	<2	734	<2	21	3.7	45	249
07-3509	56	9	8	150	0.7	77.8	<5	4.4	22	1	16	<2	959	<2	19	3.2	22	190
07-3510	87	38	2	140	1.1	79.4	<5	7.6	22	1	19	<2	797	<2	24	4.0	33	235
07-3511	83	26	7	180	1.0	79.4	<5	7.8	24	<1	20	<2	901	<2	22	4.3	34	224
07-3512	59	10	5	180	0.9	78.0	<5	5.7	23	<1	17	<2	879	<2	22	3.4	20	187
07-3513	91	27	11	150	0.7	75.2	<5	8.7	28	2	17	<2	713	<2	26	5.0	38	213
07-3514	47	<5	9	330	1.3	70.1	<5	6.5	24	<1	15	<2	1057	<2	24	4.0	23	200
07-3515	84	21	7	150	1.1	78.5	<5	7.2	26	2	18	<2	783	<2	23	4.2	40	209
07-3516	90	28	12	140	0.7	70.2	<5	7.7	23	2	18	<2	777	<2	19	4.3	41	226
07-3517	39	13	6	320	1.3	106.0	<5	5.4	33	1	16	<2	1604	<2	26	3.8	15	142
07-3509C	45	10	8	230	0.7	79.8	<5	5.6	25	2	21	<2	1294	5	21	3.3	11	199
07-3509F	99	14	13	200	0.9	72.2	<5	2.1	25	1	9	<2	228	<2	14	2.2	34	160
07-3507C	60	24	2	220	0.9	70.8	<5	6.2	22	2	20	<2	1207	<2	22	3.2	24	205
07-3507F	102	16	12	220	<0.2	71.6	<5	2.3	25	1	11	<2	234	<2	15	2.2	45	195
07-3508C	61	14	4	150	1.1	72.2	<5	8.8	26	2	24	<2	1386	<2	27	4.1	27	240
07-3508F	112	18	12	210	0.4	77.4	<5	3.5	27	2	12	<2	272	<2	16	2.9	48	205
07-3512C	55	9	3	210	0.9	86.9	<5	8.1	24	3	19	<2	1213	<2	26	3.7	13	189
07-3512F	99	13	9	160	<0.2	75.4	<5	2.8	26	1	9.5	<2	228	<2	15	2.6	38	173
07-3510C	50	18	7	160	1.0	74.3	<5	11.2	25	2	22	<2	1509	6	31	4.4	18	240
07-3510F	103	15	9	200	<0.2	79.3	<5	3.5	24	2	11	<2	242	<2	17	3.2	46	215
07-3511C	63	14	3	230	0.7	77.1	<5	10.0	25	1	22	<2	1555	4	28	4.5	23	249
07-3511F	112	14	8	210	<0.2	80.9	<5	3.7	23	2	12	<2	265	<2	15	3.4	48	208
07-3514C	33	9	5	290	0.8	80.7	<5	7.5	22	1	16	<2	1198	5	24	3.7	18	167
07-3514F	117	12	15	160	<0.2	73.8	<5	4.2	26	1	9.4	<2	246	<2	17	3.4	45	166
07-3513C	80	15	1	141	1.0	71.6	<5	13.6	25	3	24	<2	1516	<2	40	5.8	29	237
07-3513F	113	21	14	220	<0.2	72.7	<5	4.8	27	1	11	<2	273	<2	20	4.0	49	182
07-3517C	33	17	2	358	1.2	107.0	<5	5.3	25	1	16	<2	1835	<2	32	3.4	7	150
07-3517F	117	22	9	140	<0.2	93.6	<5	3.6	23	1	13	<2	248	<2	18	3.1	28	112
07-3515C	48	29	7	140	1.1	75.6	<5	12.5	28	3	25	<2	1515	5	33	5.3	24	242
07-3515F	115	9	12	220	0.3	75.6	<5	3.6	26	1	10	<2	278	<2	15	3.2	40	180
07-3516C	52	13	4	190	1.1	71.3	<5	12.3	29	2	23	<2	1418	5	29	5.2	26	245
07-3516F	114	20	10	180	0.5	71.0	<5	4.5	25	1	12	<2	287	3	16	3.5	43	200
07-3500C	46	23	9	150	1.3	72.4	<5	12.1	29	2	25	<2	1583	<2	31	4.2	28	218
07-3500F	102	22	14	220	na	na	na	na	25	na	na	na	256	na	19	na	51	171
07-3501C	18	18	5	200	<0.2	68.1	<5	4.3	26	<1	12	<2	1661	<2	25	2.4	25	220
07-3501F	108	29	17	390	1.3	64.2	<5	9.2	23	<1	22	<2	268	<2	15	4.0	48	167
07-3502C	45	<5	9	180	0.9	71.3	<5	12.0	24	2	24	<2	1538	<2	30	5.0	22	223
07-3502F	105	23	15	150	1.7	81.7	<5	3.7	24	2	12	<2	249	<2	14	3.4	49	173
07-3503C	38	18	6	130	1.1	81.1	<5	13.7	32	3	20	<2	1564	<2	29	6.3	20	237
07-3503F	91	23	11	140	<0.2	75.3	<5	3.6	22	<1	10	<2	246	<2	17	2.9	41	202
07-3504C	34	<5	4	180	1.0	74.4	<5	5.5	33	<1	20	<2	1305	<2	43	3.3	18	183
07-3504F	124	24	10	180	<0.2	75.5	<5	1.6	23	<1	9	<2	206	<2	18	1.6	36	155
07-3505C	96	8	2	180	4.5	50.9	<5	1.6	30	1	17	<2	1248	<2	29	1.2	18	180
07-3505F	84	15	9	320	0.5	57.9	<5	0.7	27	<1	8.5	<2	222	<2	14	0.8	25	117
07-3506C	20	<5	10	180	1.7	77.4	<5	13.4	32	<1	26	<2	1539	<2	13	5.2	4	179
07-3506F	68	23	7	170	0.7	83.6	<5	3.9	18	2	13	<2	267	<2	4	3.4	24	116

CV = Colluvium
LT100 = Lateritic gravel

APPENDIX 6

CHEMICAL COMPOSITION OF GTD9 SAMPLES

Appendix 6: Chemical composition of GTD9 samples.

Sample No	Depth	Type	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	TiO_2 %	P_2O_5 %	MnO %	LOI %	Total %
07-3550	-0.2	SU	54.5	12.1	25.1	0.20	0.13	0.10	1.10	0.97	0.056	0.148	5.3	100.9
07-3551	-0.7	CV	37.9	12.8	39.2	0.33	0.17	0.11	0.71	1.56	0.048	0.173	6.1	100.7
07-3552	-1.6	CV	50.0	15.7	20.4	0.62	0.40	0.15	0.88	0.82	0.044	0.070	8.2	100.5
07-3553	-3.5	CV	49.7	20.6	14.0	0.76	0.42	0.17	0.71	0.82	0.040	0.056	9.8	100.6
07-3554	-5	CV	43.1	23.0	19.4	0.54	0.26	0.12	0.47	1.18	0.041	0.057	10.0	100.4
07-3555	-8.4	CV	43.3	26.4	14.4	0.58	0.26	0.12	0.23	1.40	0.024	0.025	10.8	100.2
07-3556	-12.1	CV	45.1	27.7	10.1	0.78	0.32	0.16	0.24	1.45	0.018	0.036	11.1	100.3
07-3557	-12.8	CV	45.1	27.4	10.0	0.78	0.32	0.15	0.26	1.44	0.019	0.029	11.1	100.1
07-3558	-16.5	CV	44.6	29.0	9.0	0.67	0.31	0.17	0.17	1.58	0.014	0.020	11.5	100.5
07-3559	-18.8	CV	35.1	22.5	9.0	0.66	11.02	0.11	0.13	1.32	0.008	0.015	17.7	100.8
07-3560	-22.3	LT100	25.1	21.6	41.0	0.38	0.23	0.10	0.31	1.71	0.011	0.010	8.4	101.0
07-3561	-23.6	LT100	36.1	28.5	16.3	0.89	0.42	0.19	0.20	1.60	0.006	0.008	12.0	101.0
07-3562	-25.2	LT200	16.7	21.6	47.8	0.34	0.19	0.07	0.06	1.89	0.020	0.019	11.0	101.3
07-3563	-25.9	LT200	12.8	18.9	54.1	0.35	0.21	0.04	0.09	1.99	0.018	0.010	11.0	101.2
07-3564	-28.7	MZ	22.8	18.6	44.6	0.34	0.18	0.08	0.06	1.24	0.019	0.011	11.3	101.2
07-3565	-32.2	MZ	36.4	26.5	20.9	0.50	0.27	0.08	0.14	1.40	0.019	0.008	12.1	100.8
07-3566	-45.3	SAP	50.1	31.0	4.2	0.10	0.08	0.08	0.10	1.76	0.041	0.012	11.7	99.9
07-3567	-47.2	SAP	62.5	21.8	4.7	0.08	0.08	0.05	0.06	1.44	0.081	0.032	8.5	100.1
07-3568	-63.8	SAP	51.0	16.2	14.3	4.08	0.54	0.07	0.80	0.96	0.045	0.088	8.5	100.3
07-3569	-77.4	SAP	44.5	19.7	15.3	4.85	0.61	0.33	0.67	1.13	0.058	0.112	9.3	100.9
07-3570	-78.9	SAP	48.7	19.6	12.7	5.29	0.44	0.12	2.56	1.12	0.046	0.107	7.3	100.7
07-3571	-87.3	SAPROCK	61.5	14.2	7.5	3.72	2.81	3.96	0.53	0.58	0.217	0.085	3.6	99.4

SU = Soil
CV = Colluvium
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LT200 = Lateritic duricrust
MZ = Mottled zone
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Appendix 6: Chemical composition of GTD9 samples.

Sample No	Ag ppm	As ppm	Au ppb	Ba ppm	Br ppm	Ce ppm	Cl ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Eu ppm	Ga ppm	Hf ppm	Ir ppm	La ppm	Lu ppm	Mo ppm	Nb ppm	Ni ppm
07-3550	<5	13	<5	206	12	58	4040	20	641	2	31	0.8	24	6.0	<20	21.1	0.3	<5	<4	38
07-3551	<5	16	<5	381	7	77	1350	20	856	2	39	1.2	44	6.2	<20	38.8	0.4	<5	<4	61
07-3552	<5	10	13	406	6	42	1980	18	514	4	21	0.8	31	3.7	<20	22.8	0.2	<5	<4	43
07-3553	<5	11	21	223	2	53	300	12	425	3	28	1.0	29	4.5	<20	31.7	0.3	<5	<4	56
07-3554	<5	13	21	72	<2	31	430	12	569	3	50	0.6	35	5.2	<20	16.2	0.2	<5	<4	67
07-3555	<5	10	57	<20	<2	34	220	10	503	<1	86	0.9	31	4.3	<20	11.2	0.3	<5	<4	97
07-3556	<5	7	116	27	3	102	270	15	344	<1	61	2.3	34	6.3	<20	24.9	0.7	<5	<4	101
07-3557	<5	9	343	<20	4	42	400	12	361	1	57	1.3	30	5.3	<20	24.6	0.6	<5	<4	97
07-3558	<5	6	12	<20	2	7	430	12	377	1	27	<0.5	33	6.4	<20	6.2	0.2	<5	<4	91
07-3559	<5	6	22	23	<2	5	520	7	308	<1	16	<0.5	24	5.2	<20	2.5	<0.2	<5	<4	76
07-3560	<5	21	<5	85	6	12	700	16	987	<1	31	<0.5	73	6.3	<20	3.2	<0.2	<5	<4	60
07-3561	<5	9	39	<20	<2	46	500	19	489	<1	36	<0.5	37	5.3	<20	1.8	<0.2	<5	<4	122
07-3562	<5	15	<5	<20	<2	13	60	62	820	<1	104	0.7	48	4.7	<20	3.8	0.4	<5	<4	170
07-3563	<5	17	<5	<20	<2	11	110	38	899	<1	165	0.5	58	4.1	<20	2.8	0.4	<5	<4	127
07-3564	<5	30	<5	<20	4	7	130	48	733	<1	350	0.9	35	3.4	<20	2.9	0.3	<5	<4	128
07-3565	<5	8	<5	<20	3	3	480	23	508	2	95	<0.5	25	2.3	<20	1.2	0.2	<5	<4	226
07-3566	<5	4	<5	<20	4	3	700	15	533	<1	68	<0.5	35	2.5	<20	0.7	<0.2	<5	<4	94
07-3567	<5	5	<5	<20	<2	22	410	16	472	<1	276	2.2	26	2.7	<20	11.6	0.4	<5	<4	103
07-3568	<5	4	<5	<20	<2	12	160	72	361	<1	137	1.3	18	1.4	<20	5.3	0.4	<5	<4	253
07-3569	<5	6	112	<20	2	5	90	57	436	2	143	0.6	17	1.8	<20	2.3	0.3	<5	<4	225
07-3570	<5	30	161	113	3	10	150	35	412	<1	148	0.9	24	1.7	<20	3.8	0.3	<5	<4	126
07-3571	<5	3	<5	426	<2	74	<20	29	196	<1	75	1.6	17	4.2	<20	38.5	<0.2	<5	<4	117

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Appendix 6: Chemical composition of GTD9 samples.

Sample No	Pb ppm	Rb ppm	S ppm	Sb ppm	Sc ppm	Se ppm	Sm ppm	Sr ppm	Ta ppm	Th ppm	U ppm	V ppm	W ppm	Y ppm	Yb ppm	Zn ppm	Zr ppm
07-3550	32	42	200	0.5	22.3	<5	4.1	26	1	14.9	<2	523	12	15	2.0	395	228
07-3551	<5	42	190	0.9	28.8	<5	5.9	44	<1	15.5	<2	929	<2	20	2.5	42	214
07-3552	26	48	230	0.5	23.4	<5	3.4	59	<1	12.1	4	402	<2	16	1.8	59	128
07-3553	27	42	150	0.7	28.2	<5	4.7	56	1	13.8	<2	291	<2	19	2.0	47	144
07-3554	21	25	170	0.6	39.9	<5	2.7	34	<1	14.4	<2	429	<2	14	1.8	52	189
07-3555	19	13	130	0.6	57.8	<5	2.8	21	1	9.6	<2	419	<2	13	2.4	32	151
07-3556	21	11	100	1.2	68.5	<5	8.4	19	1	14.0	<2	343	<2	31	5.4	30	194
07-3557	21	8	110	<0.2	69.6	<5	5.0	25	1	13.6	<2	323	<2	22	4.3	31	193
07-3558	22	<5	100	1.4	59.2	<5	1.4	19	1	11.9	<2	295	<2	7	1.7	15	206
07-3559	19	<5	100	0.4	45.4	<5	0.6	32	<1	10.4	<2	275	<2	5	1.0	14	175
07-3560	14	6	90	1.3	54.0	<5	1.2	32	1	12.0	<2	982	12	5	1.5	18	218
07-3561	20	<5	90	0.8	37.1	<5	0.7	28	<1	7.0	<2	523	<2	9	1.3	5	168
07-3562	<5	<5	210	0.9	33.5	<5	2.2	21	1	3.5	<2	823	9	18	3.3	60	155
07-3563	<5	5	250	1.1	27.4	<5	1.6	27	1	4.2	<2	1055	11	13	3.0	59	170
07-3564	<5	10	140	1.3	43.4	<5	2.2	23	<1	3.2	<2	1272	<2	13	2.7	54	104
07-3565	10	<5	130	0.9	46.8	<5	0.7	21	<1	0.8	<2	460	<2	18	1.9	107	87
07-3566	7	<5	70	0.5	69.6	<5	0.5	<5	<1	0.5	<2	404	<2	7	1.2	51	95
07-3567	5	<5	70	<0.2	63.9	<5	7.1	<5	1	<0.5	<2	299	<2	22	3.3	36	84
07-3568	<5	17	70	0.6	45.0	<5	3.7	30	<1	<0.5	<2	268	20	35	3.2	158	58
07-3569	5	14	70	<0.2	46.1	<5	1.7	39	<1	<0.5	<2	310	15	19	2.0	173	63
07-3570	8	45	90	3.6	50.4	<5	2.4	32	<1	<0.5	<2	426	60	22	2.0	115	66
07-3571	15	8	660	0.3	12.0	<5	6.1	547	2	7.1	<2	90	<2	21	1.2	76	140

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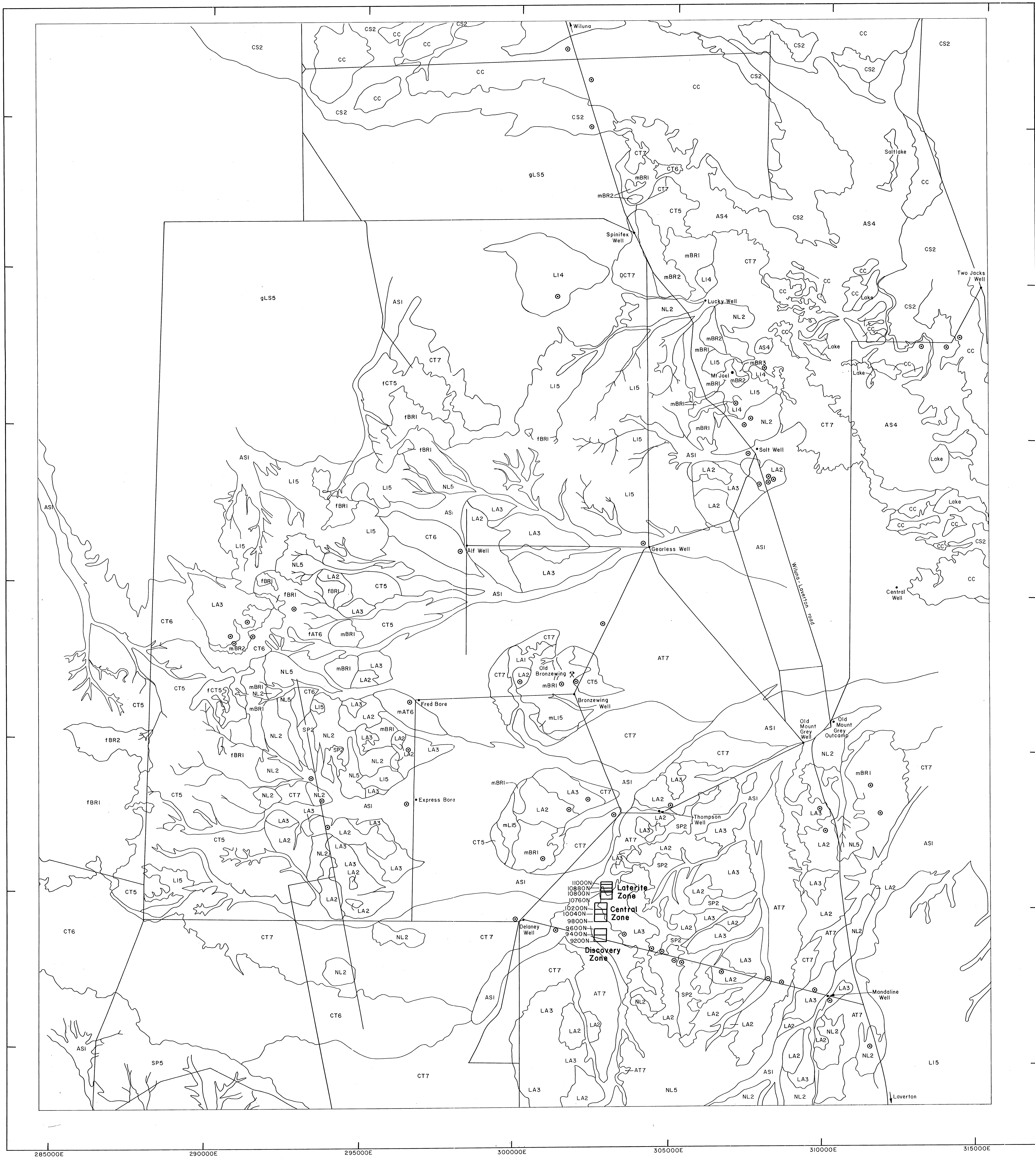

Regolith-landform map of the Bronzewing Area

LA2 Lateritic nodules and pisoliths, fragments of lateritic duricrust, Fe-saprolite and mottles, crests
LA3 Fe-saprolite mottles, lateritic nodules and pisoliths, backslopes
LS5 Red sand derived from the weathering of granite, plains

NL2 Iron segregations, low hills, pediment slopes
NL5 Ferruginous granules, stripped slopes, undulating plains

LI4 Quartz fragments, ridges, low hills
LI5 Bedrock, saprock and quartz fragments, crests, stripped slopes

SP2 Ferruginous saprolite, crests, breakaways, low hills
SP5 Silicified saprolite, low hills

BR1 Ferruginous bedrock, crests, low hills
BR2 Silicified bedrock, high hills
BR3 Fresh bedrock, ridges, low hills, stripped slopes

AS1 Red clays, alluvial plains, drainage floors
AS4 Saline calcareous earths, playas
CS2 Calcareous red clays, colluvial plains
CT5 Saprolite present beneath colluvial sediments
CT6 Bedrock present beneath colluvial sediments
CT7 Colluvium on unknown substrate
AT6 Bedrock present beneath alluvial sediments
AT7 Alluvium on unknown substrate (polymictic lag of ferruginous saprolite, ferruginous granules, lithic fragments)
CC Valley calcrete

⊙ Recorded observation points

m = mafic
f = felsic
g = granite

This map uses an uncontrolled photomosaic as its base; some minor distortion occurs.