



# **CAMBRIDGE GULF EXPLORATION NL**

## **Surrender Mineral Exploration Report**

Part of EL 8118  
for the period 12 May 1993 to 11 May 1995

Report Lodged under Section 32(b)(i)

of the

Northern Territory Mining Act

**Tenements**

**1:250 000 Map Ref**

**Tenement Holder**

EL 8118

Auvergne (SD52-15) and  
Port Keats (SD52-11)

Cambridge Gulf Exploration NL  
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Report Date: August 1995

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## 1. INTRODUCTION

Cambridge Gulf Exploration NL applied for E8118 on 24 February 1993. The tenement was granted on 12 May 1993 (Figure 1-1) and covered an area of 498 graticules (1604 square kilometres) along the Victoria and Fitzmaurice Rivers and their offshore extensions in the Queens Channel and Keyling Inlet (Figure 1-2).

The original area covered by EL 8118 lies on the 1:250 000 sheets Auvergne (SD52-15) and Port Keats (SD52-11), and on the 1:100 000 sheets Auvergne (25/6), Millik Monmir (25/3), Victoria River (25/2), Keyling (19/5) and Turtle Point (19/4).

On 11 May 1995, EL8118 was reduced by 50% under Sections 26 and 27 of the Northern Territory Mining Act. This surrender (final) report covers all exploration work done in the area surrendered and covers the period 12 May 1993 to 11 May 1995.

In EL 8118, Cambridge Gulf Exploration NL is exploring for alluvial diamonds and related heavy minerals.

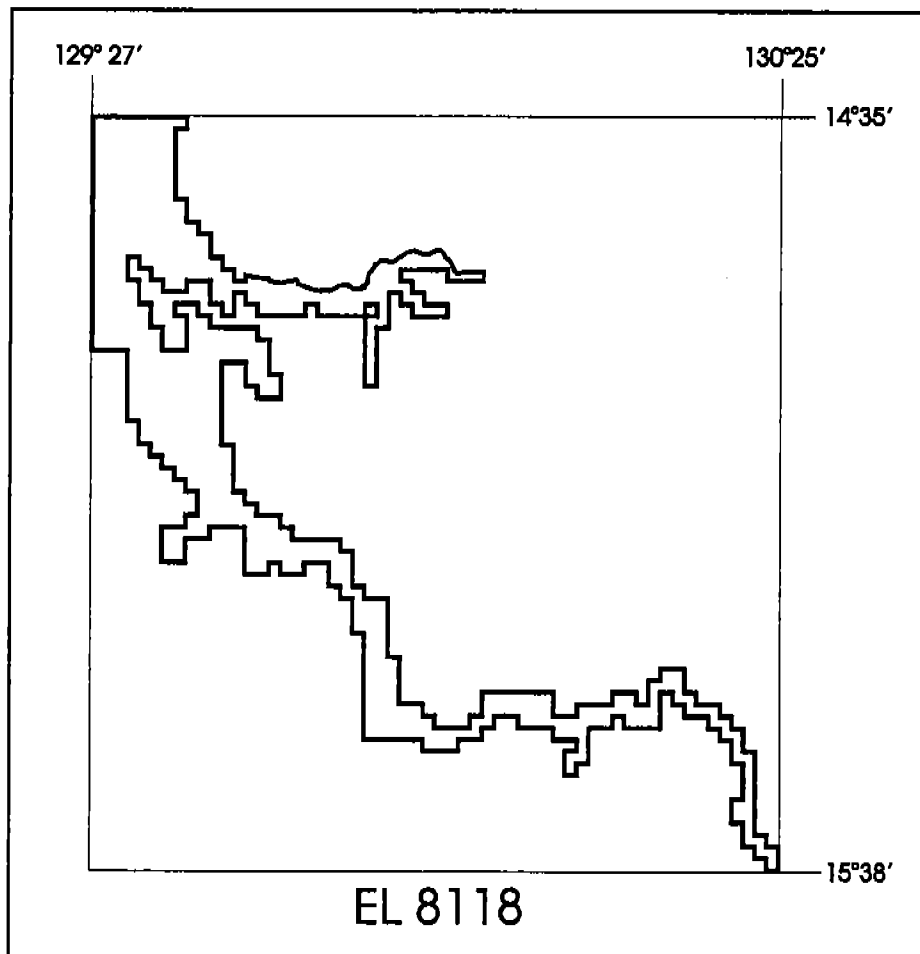
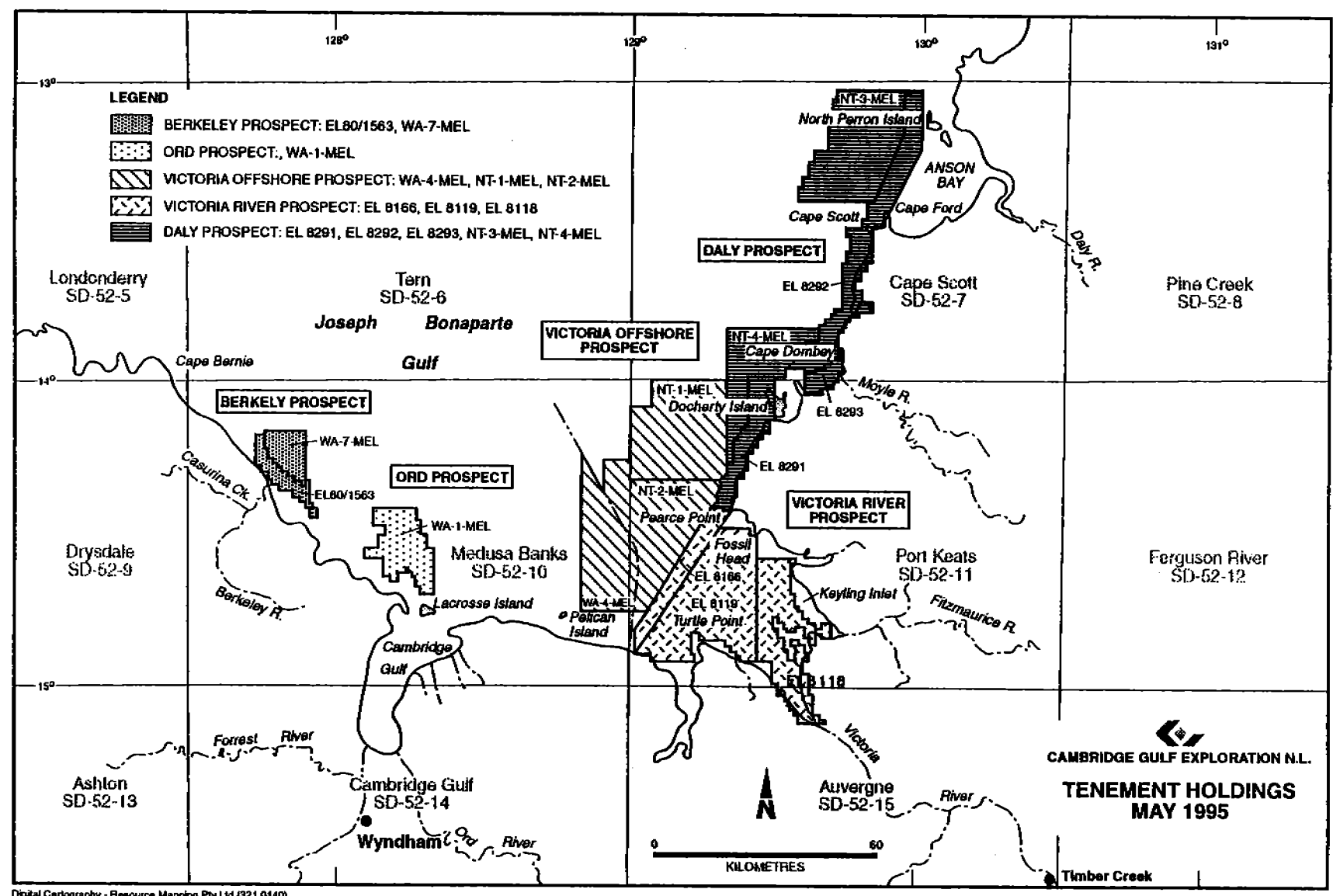


Figure 1-1 EL 8118 graticular layout as granted by the Northern Territory Department of Mines and Energy on 12 May 1993



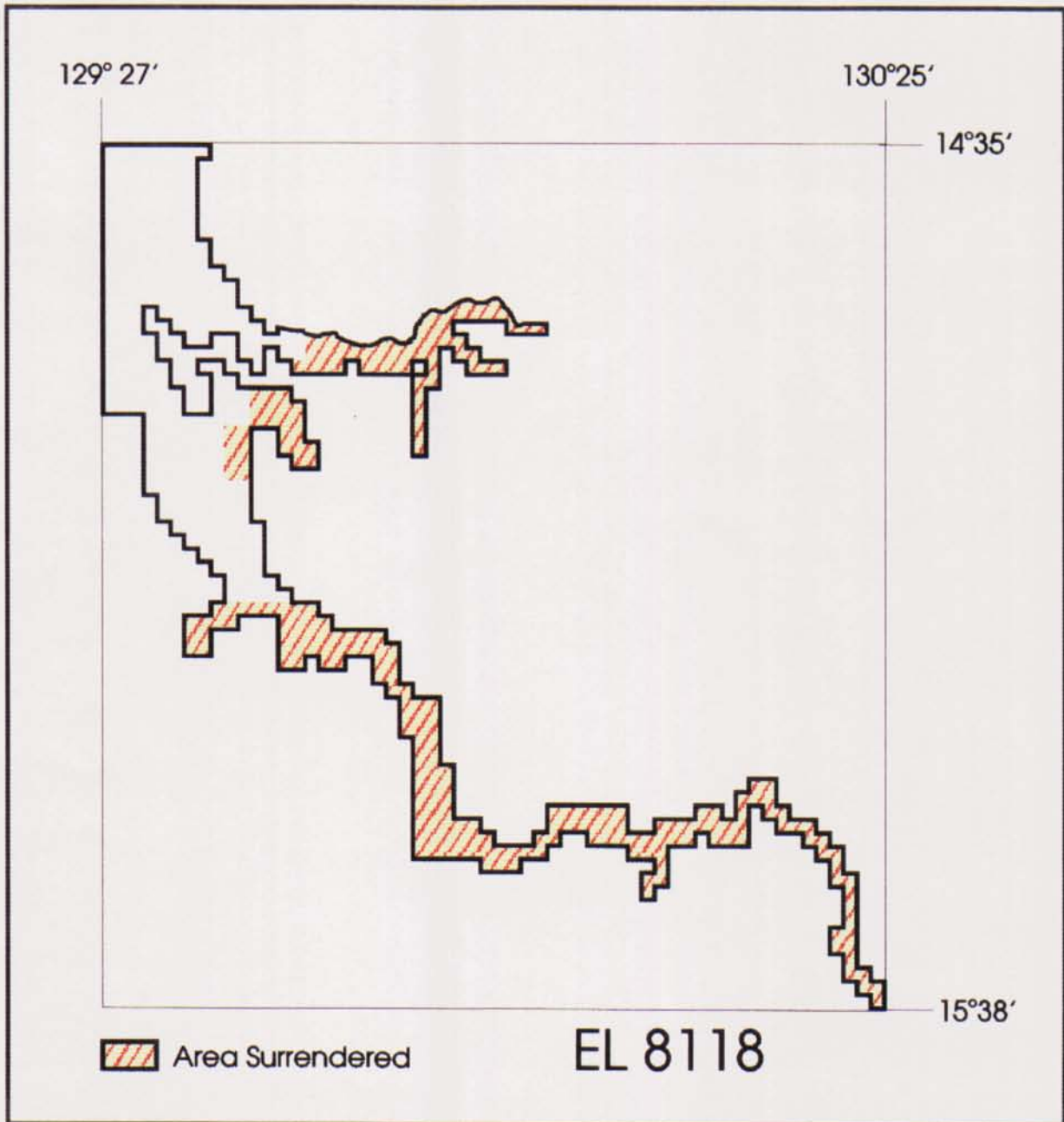
Digital Cartography - Resource Mapping Pty Ltd (321 0140)

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Figure 1-2 Location of EL 8118 with reference to the National 1:250 000 topographic map sheets

## 2. LOCATION OF THE AREA SURRENDERED

Fifty percent (or 249 graticules) of EL 8118 were surrendered on 11 May 1995. A detailed list of graticules surrendered is given in Table 2-1, and in Figure 2-1 the surrendered area is highlighted with respect to EL 8118.



**Figure 2-1 EL 8118 graticular layout showing area surrendered**

**Table 2-1 EL 8118 - Description of surrendered graticules**

Map Sheet	Easting	Northing	Number of Blocks
25/6	35	47, 48	2
	34	46, 47	2
	33	41, 42, 43, 44, 45, 46	6
	32	43, 44	2
25/3	33	69, 70	2
	32	67, 68, 69	3
	31	66, 67	2
	30	65, 66	2
	29	65	1
	28	64, 65	2
	27	62, 63, 64	3
	26	62, 63	2
	25	63, 64, 65, 66	4
	24	65, 66	2
	23	64, 65, 66	3
	22	64, 65	2
	21	65, 66	2
	20	65, 66	2
	19	65, 66, 67, 68, 69	5
	18	66, 67, 68, 70	4
	17	66, 67	2
	16	64, 65, 66	3
	15	64, 65, 66	3
	14	64, 65, 66	3
	13	64, 65	2
	12	64, 65	2
	11	64, 65, 66	3
25/2	40	66, 67	2
	39	67	1
	38	67, 68	2
	37	67, 68	2
	36	66, 67, 68	3
	35	65, 66, 67	3
	34	65, 66, 67	3
	33	61, 62, 63, 64, 65, 66, 67	7
	32	56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67	12
	31	56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67	12
	30	55, 56, 57	3
	29	52, 53, 54, 55	4
	28	51, 52, 53, 54	4
	27	51, 52	2
	26	51, 52	2
	25	51, 52, 53	3
	24	50, 51, 52, 53	4
	23	49, 50, 51, 52	4
	22	49, 50, 51, 52, 53	5
	21	49, 50, 51, 52, 53	5
	20	49	1
	19	49	1
	18	49	1
	17	49, 50	2
	16	49, 50	2
	15	50, 51, 52	3
	14	50, 51, 52	3

Map Sheet	Easting	Northing	Number of Blocks
19/5	40	59	1
	39	59	1
	38	58, 59	2
	37	57, 58, 62	3
	36	57, 58, 62	3
	35	57, 58, 61, 62	4
	34	57, 58, 60, 61	4
	33	57, 58, 59, 60	4
	32	58, 59, 60, 61, 62, 63	6
	31	59, 60, 61, 63, 64, 65, 66, 67, 68	9
	30	60, 61, 62	3
	29	60, 61, 62	3
	28	60, 61, 62	3
	27	60, 61, 62	3
	26	60, 61	2
	25	60, 61, 62	3
	24	60, 61, 62	3
	23	60, 61, 62, 68, 69	5
	22	62, 65, 66, 67, 68, 69	6
	21	64, 65, 66, 67, 68	5
	20	64, 65	2
	19	64, 65	2
	18	66, 67, 68, 69, 70	5

Total Number of Blocks to be Surrendered:

249

### 3. SUMMARY OF EXPLORATION ACTIVITIES

In the area surrendered, the Company undertook a bulk sampling programme to investigate the presence of alluvial diamonds in the Victoria River present day channel sediments. The bulk sampling activities are summarised in Table 3.1

**Table 3-1 Summary of exploration activities at The Hook, EL 8118**

Period of work	From 17th May 1993 to 22nd August 1993.			
	Min.	Max.	Average	Total
Costean Length	15m	163m	62.4m	1392m
Costean Depth	1m	4m	2.4m	
Feed Tonnage (locality)	52T	330T	149.2T	
Concentrate Produced	0	779kg	331.8kg	
	No. samples	Min wt.	Max Wt.	Av Wt.
Samples processed	316	0	155kg	65.93kg
Samples processed Au, Pt, Pd	139	1kg	27kg	13.12kg
Diamonds recovered	No. stones	Min wt.	Max wt.	
	72	0.0125 cts	0.600 cts	

NB: Sample weights for diamonds refer to the weight of concentrate extracted for each size range at each locality. Sample weights for Au, Pt and Pd refer to the weights submitted for assay, a fraction of the total concentrate weight.



**4. EXPENDITURE STATEMENT**

Expenditure related to the exploration work completed in the surrendered area is set out in Table 4-1.

**Table 4-1 Expenditure details for the surrender area of EL 8118 for the period  
12 May 1993 to 11 May 1995**

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**To 11 May 1994: Bulk Sampling**

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Personnel	\$80 223
Travel & Accommodation	\$43 138
Equipment Hire and Purchased	\$117 450
Fuel	\$8 735
Field Consumables	\$12 535
Precious Metal Assaying	\$3 815
Diamond Separation	\$17 036
Head Office Overhead (15%)	<u>\$42 440</u>
<b>Sub-Total</b>	<b>\$325 372</b>

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**To 11 May 1995: Implication of Sacred Site disturbance and compilation of bulk  
sampling data**

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Equipment Hire	\$2 520
Laboratory Expenses	\$149
Legal Fees	\$28 847
Salaries Technical Staff	\$7 977
Tenement Administration	\$634
Transport and Freight	\$2 912
Head Office Overhead (15%)	<u>\$6 456</u>
<b>Sub-Total</b>	<b>\$49 495</b>

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**TOTAL** **\$374 867**

## 5. BULK SAMPLING IN EL 8118

### 5.1 Introduction

The bulk sampling site which is referred to as 'The Hook' is situated on the Millik Monmir 1: 100 000 sheet (25/3). It lies on the Whirlwind Plain (Figure 5-1) and is approximately 28 kilometres north-west of the township of Timber Creek .

Exploration Licence 8118 follows the Victoria River, effectively encompassing the limits of recent deposition along its upper reaches. As a result the tenement geology is predominated by unconsolidated Quaternary to Recent alluvium and Tertiary colluvium which locally overlie the gently folded Proterozoic basement (Veevers, 1967). Similarly, the deposit at The Hook bulk sampling site comprises fluvial sediments interpreted to be of Quaternary to Recent age (Veevers, 1967). The geomorphological setting at this site suggests that the gravels from which the deposit has formed would have been reworked frequently and are consequently of a wide range of ages. The geological descriptions of sample sites are given in Appendix 3.

### 5.2 Bulk Sampling Program

Bulk sampling at The Hook site was carried out using costeaning and backfilling from May to August 1993. Figure 5-2 is a map of the costeans sampled; detailed diagrams of individual costeans are presented in Appendix 1 and tonnages are included in Appendix 2.

#### 5.2.1 Period of field work

Field work for the bulk sampling program commenced on site as of 17 May 1993 and ceased as of the 22 August 1993.

#### 5.2.2 Personnel

A break down of field crew personnel man days worked follows:

Personnel	Total Days worked	Personnel	Total Days worked
N. Crookston	16	C.Barraclough	89
K. Sibraa	74	G.Clark	81
V. Crewe	59	C.Edwards	5
C. Carmichael	82	A.Gans	7
M.Vogelpoel	83	P.Jones	6
D.Weston	39	G.Deacon	1
B.Conway	60	P.Dumesny	2
D.Barraclough	82	W.Fogarty	2
<b>TOTAL</b>			<b>686</b>

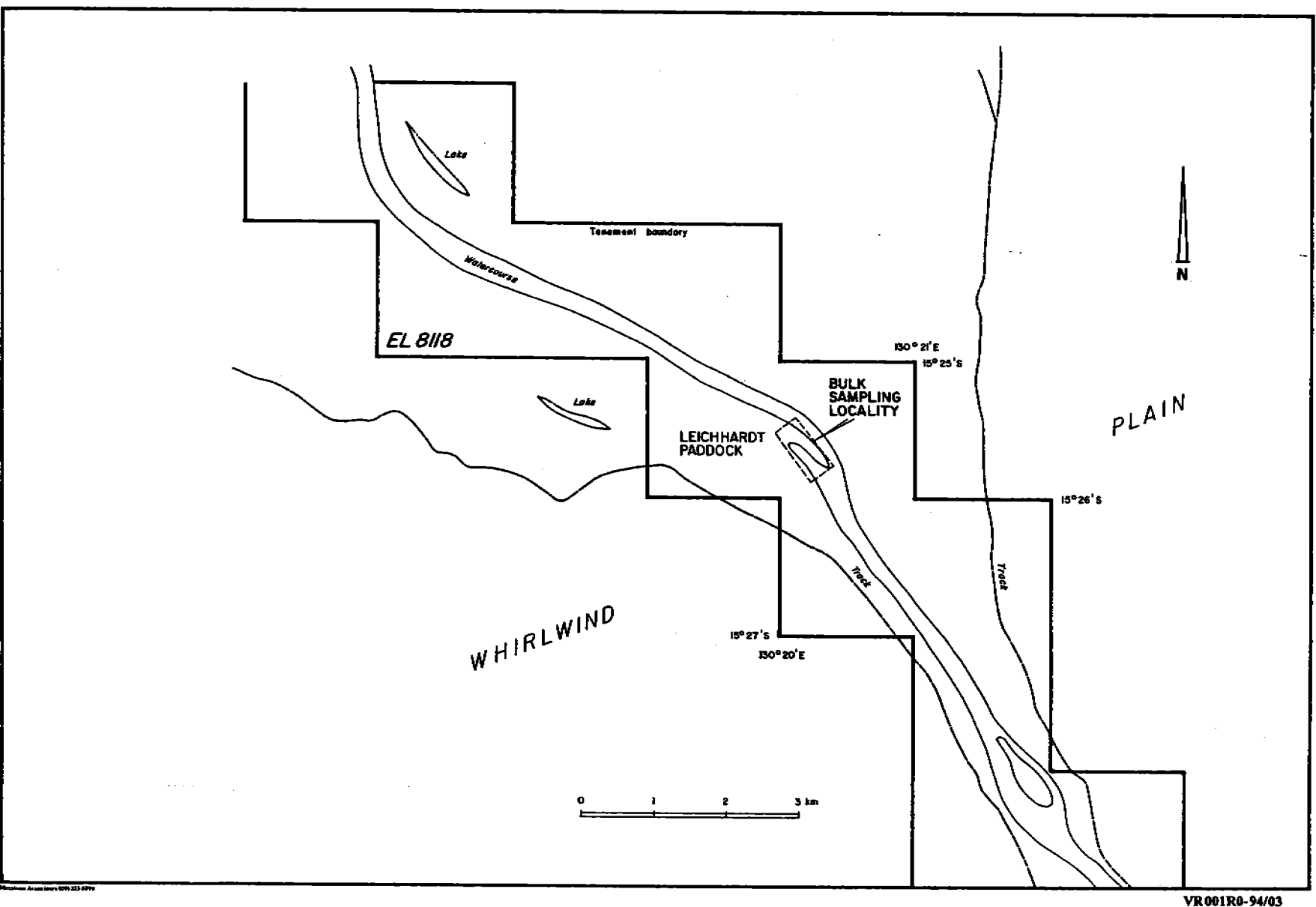
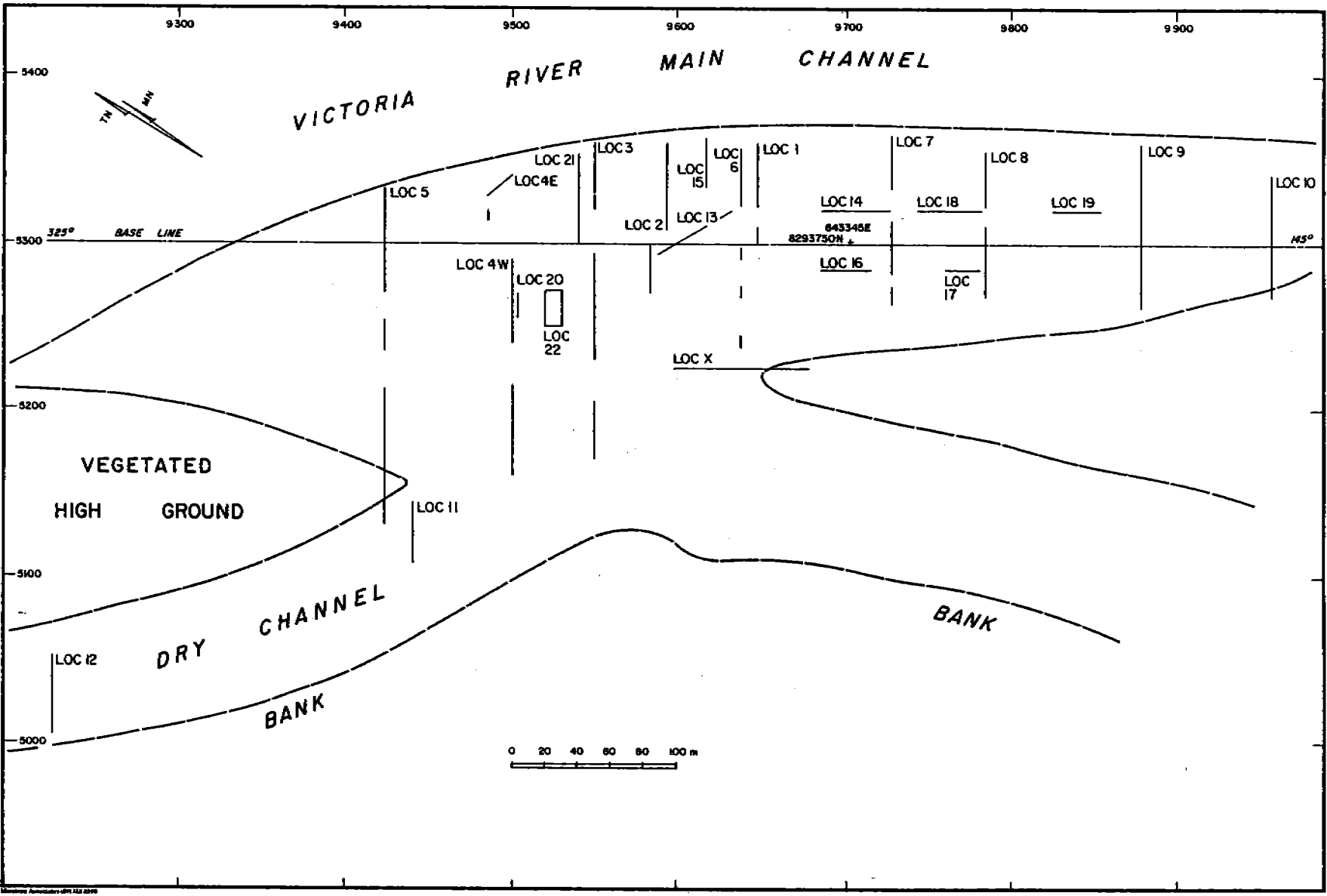


Figure 5-1 Locality map showing the bulk sampling site The Hook with the local limits of EL 8118



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Figure 5-2 Trench locality map for the bulk sampling site at The Hook in EL 8118

In total, sixteen personnel were employed for field work on site at The Hook. Of these, the full time operating crew varied between six and nine members, inclusive of one operator (Vernon Crewe) provided by the contracting company supplying the Diamond Pan (Moonstone Mines NL). The remaining personnel were present periodically as casuals or in supervisory or consultatory roles. A total of 686 man days were worked on site between the 17 May and 22 August 1993.

### 5.2.3 Sampling Equipment

Equipment used on site included:

- 1 Rotary Diamond Pan (Moonstone Mining NL)
- 1 Pleitz Jig - to recover diamonds
- 1 Nelson Concentrator - to recover gold
- 1 Falcon Concentrator - to recover gold
- 1 Caterpillar 930 front-end loader with approx. 1.5 m<sup>3</sup> bucket (Resource Center)
- 1 Backhoe with approx. 0.5 m<sup>3</sup> bucket (Resource Center)
- 1 Kato Excavator (Kununurra Earthmovers)
- 1 Runabout boat, twin 70 hp outboards (K.Sibraa)
- 1 10 Tonne tip truck (Resource Center)
- 1 Tray back truck (Moonstone Mining NL)
- 1 Hi-Lux Utility (Hertz, East Kimberley Hirings)
- 1 Hi-Lux Utility (Resource Center)
- 1 Toyota Land Cruiser (Moonstone Mining NL)

Bulk sampling was accomplished with an eight foot diameter Rotary Diamond Pan (Figure 5-3) from plant feed costeamed by backhoe and excavator. Costeams were back-filled progressively to minimise disturbance of the site. Concentrate produced by this method was treated in a variety of ways. Five grain-size splits were investigated for the number of diamonds and analysed for precious metals:

- 0 to 0.5 mm (size 1);
- 0.5 to 2 mm (size 2);
- 2 to 4 mm (size 3);
- 4 to 7 mm (size 4); and
- 7 to 11 mm (size 5).

The 0 to 0.5 mm fraction was passed through a Nelson concentrator to produce a concentrate, the other fractions were concentrated by passing through a Pleitz Jig. The size 1 fraction was assayed for gold, platinum and palladium by bulk leach by Genalysis

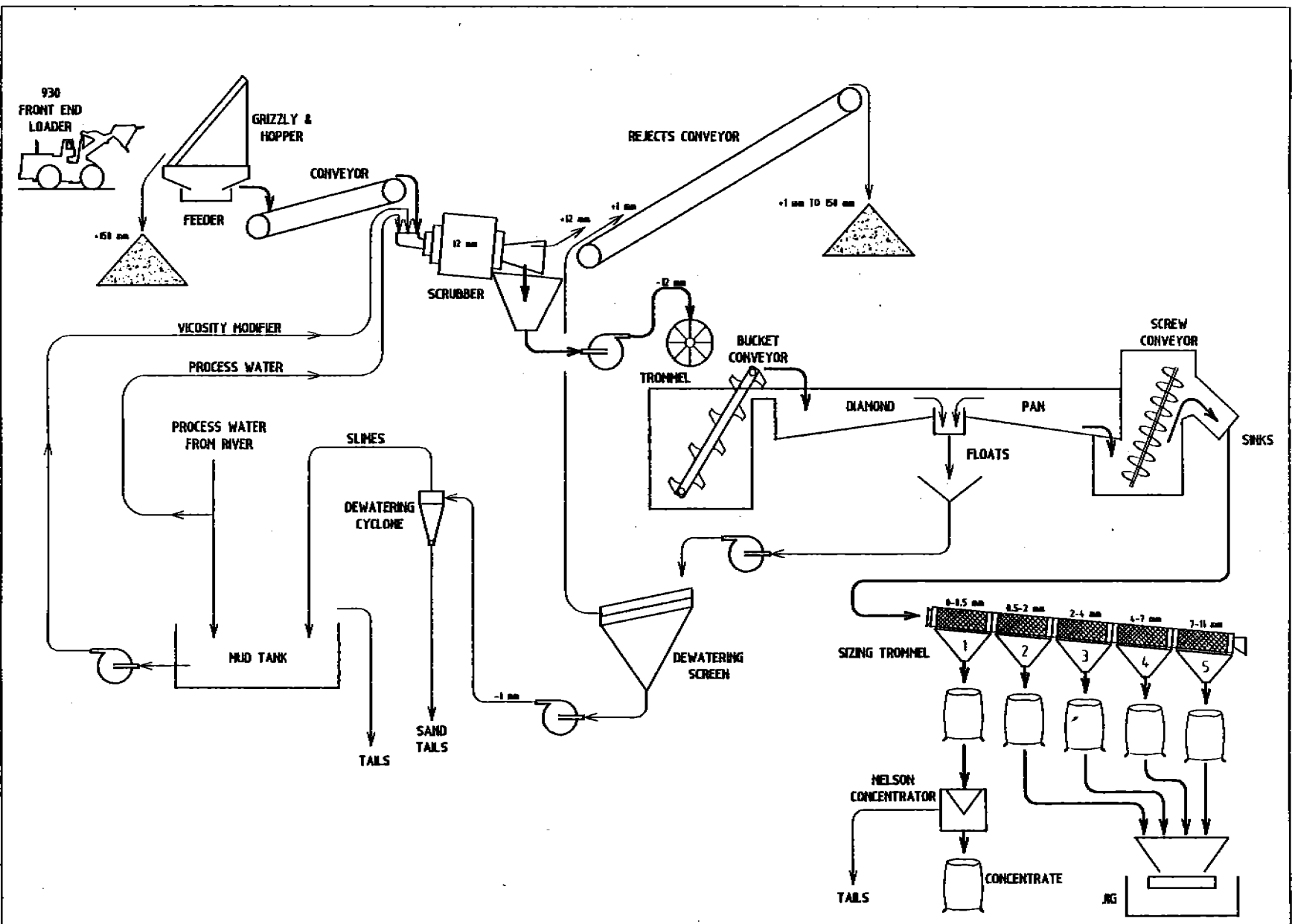


Figure 5-3 Processing plant flow diagram at The Hook, EL 8118

Laboratory Services Pty Ltd. The larger size fractions were processed for diamond recovery using firstly a Sortex machine (operated by Cambridge Gulf Exploration NL) followed by heavy liquid separation and hand sorting by Diatech Heavy Mineral Services.

#### **5.2.4 Processing rates**

The total tonnage of plant feed was 11 318 Tonnes (Appendix 2). This figure was estimated from regular trials which determined the rate of feed carried by the conveyor belt per unit time. The amount of material processed by the Rotary Diamond Pan varied from 41 to 310 tonnes per day, resulting in daily concentrate aggregates which ranged from 72 kg to 528 kg. The total amount of concentrate produced during the program was 24 963 kg, approximately 0.2% of the plant feed. The plant feed tonnages did not include gravel larger than 150 mm which were rejected by an oversize screen. The proportion of this oversize was not recorded during the project but it was later estimated that it would account for between 3 and 5 tonnes per day. Because no regular records were kept of the oversize fraction it is not possible to document the in situ tonnages processed.

### **5.3 Sample Processing**

#### **5.3.1 Field processing**

Field processing (Figure 5-3) began with the cutting of costeans by backhoe and excavator. Material excavated was fed into a variable speed feed hopper through a 150 mm grizzly screen, the +150 mm material being rejected. The remaining feed was passed along a feed conveyor to a scrubber with a 250 mm diameter feed chute discharging through a trommel screen with an aperture of 12 mm. The +12 mm was passed via a rejects conveyor out of the system, and the remaining feed was passed into the diamond pan.

The diamond pan is a "quicksand" (puddle) separator in which the puddle-supporting force and the upward impulse are obtained by rotary agitation. Concentrate is obtained by separation in Specific Gravity in which a thick puddle of between 1.25 and 1.40 SG is produced from which the lighter constituents are carried away in suspension and overflow from an adjustable weir in the inner wall. Those particles that settle sufficiently fast enough to escape being carried over the discharge weir accumulate on the bottom of the pan and are gradually worked towards the outer periphery by the spirally set teeth. Concentrate was discharged from a point about two thirds of the way around the pan from the feed inlet. The float was removed via a de-watering screen to the rejects pile whilst the concentrate was passed through a sizing trommel that separated the material into the five size fractions documented previously. The size 1 fraction was passed to a Nelson

concentrator, the concentrate retained and the other fractions were bagged for sortex processing.

### **5.3.2 Diamond Retrieval**

Size fractions 2 to 5 were transported to Perth and further concentrated using a Sortex machine operated by Cambridge Gulf Exploration NL. The size 3, 4 and 5 fractions were then dried and hand sorted to recover diamonds, and the size 2 fraction was dried and sieved through a 1.6 mm screen. The +1.6 mm fraction was then hand sorted, the -1.6 mm fraction treated with heavy mineral separation using TBE, and the sinks hand sorted. Sortex tails (i.e. the size fraction -1.0 mm which was collected in the sump of the sortex machine) were acid milled and then sieved through a 1.0 mm screen. The +1.0 mm fraction was treated using a grease table separation technique, and the -1.0 mm fraction split using the using TBE heavy liquid; the concentrates in each case being hand sorted to recover diamonds. Where necessary the sortex samples were treated using a Wilfley table. The procedures subsequent to treatment by the Sortex machine were carried out by Diatech Heavy Mineral Services.

### **5.3.3 Precious Metal Assaying**

Gold, platinum and palladium assays were carried out on the size 1 fraction by Genalysis Laboratory Services Pty Ltd. Assay involved bulk cyanide leach, and detection by solvent extraction graphite furnace. Detection limits were 0.1 ppb, 0.3 ppb and 0.1 ppb for gold, platinum and palladium respectively. The resultant residue was examined for diamonds and other economic indicator minerals. In some instances recovery of diamonds was attempted by acid digestion.

### **5.3.4 Multi Element Analysis**

Multi element analysis was carried out on a few samples and the results are tabulated in Appendix 2. Assays were carried out using a range of techniques.

Gold was assayed by three methods:

1. Lead collection fire assay with detection by mass spectrometer (MS), detection limits were 1 ppb;
2. Lead collection fire assay with detection by Flame Atomic Absorption Spectrometry, detection limits were 0.01 ppm;
3. Wet chemical digestion using Aqua-regia with detection by Graphite Furnace Atomic Absorption Spectrometry, detection limits were 1 ppb.



Magnesium, vanadium, chromium and nickel were assayed by oxidation alkaline fusion digestion with Inductively Coupled Plasma Optical (Atomic) Emission Spectrometry (OES). Detection limits were 100 ppm, 50 ppm, 50 ppm and 20 ppm for Mg, V, Cr and Ni respectively.

Strontium, Niobium, Barium and Neodymium were assayed by oxidative alkaline fusion using Sodium Peroxide in Nickel crucibles and detected by MS. Detection limits were 1 ppm, 5 ppm, 10 ppm and 1 ppm for Sr, Nb, Ba and Nd respectively.

Palladium and Platinum were assayed by Lead collection fire assay and detected by MS. Detection limits for both were 1 ppm.

### 5.3.5 Results

Seventy two diamonds weighing a total of 6.5735 carats were recovered during the sampling program. Diamonds were recovered from the 2, 3 and 4 size fractions. A complete list of recovered diamonds is presented in Appendix 2 and their weight distribution is given in Figure 5-4.

Assay results for gold, platinum and palladium are tabulated in Appendix 2. The results are anomalous for gold. The presence of gold at The Hook which is a prograding point bar and not a significant point of entrapment is encouraging as it suggests that it is possible that economic quantities may exist at entrapment sites.

### 5.4 Environmental Considerations

The nature of the bulk sampling program involved costeaning of the gravels at The Hook sampling site (see Figure 5-2 and Appendix 1). Appropriate advice was provided to the Department of Mines and Energy in the form of a letter dated 13 May 1993 advising of the intention to costean wet and dry gravels from four sites within EL 8118. A reply dated 19 May 1993 was received by CGE stipulating the conditions of the Mining Act and the Mine Management Act under which the costeaning could progress. The stipulated conditions were:

- *Vegetation clearing and surface disturbance to be kept to the absolute minimum required to conduct the proposed program. Where possible mature trees shall be left undisturbed.*
- *Where possible existing access tracks shall be utilised. Any new access tracks shall be kept to a minimum and constructed and maintained so as to prevent the initiation of erosion and alteration of natural drainage.*

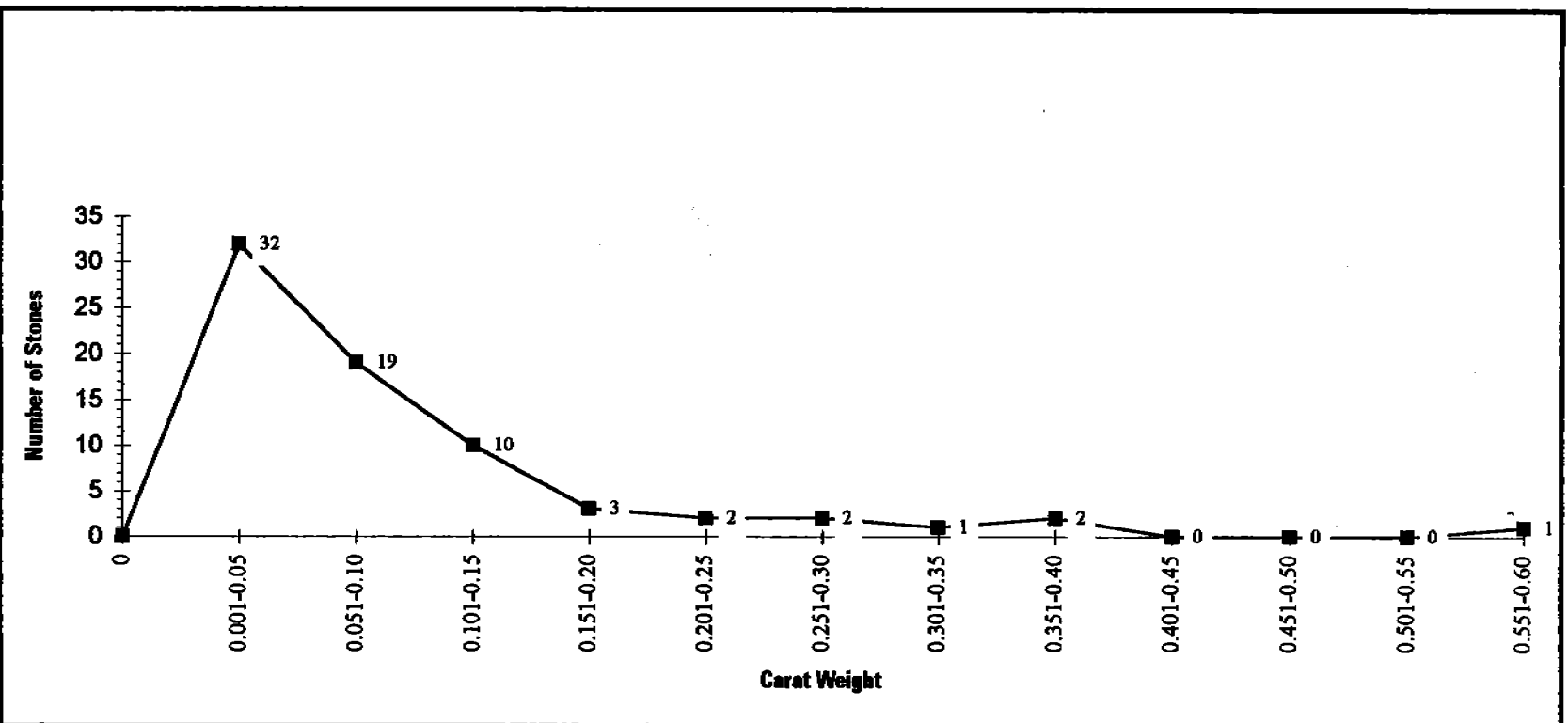


Figure 5-4 The Hook bulk sampling survey, weight distribution of recovered diamonds

- *The costeans shall have a negotiable slope at both ends to facilitate the escape of inadvertently trapped animals. Where possible the costeans shall be backfilled immediately upon completion of sampling.*
- *Prior to 1 November 1993, the following actions shall be undertaken, unless written application is made to, and written approval received from the Director of Mines:*
  - *all costeans shall be backfilled;*
  - *on sloping ground, suitable drainage shall be provided to ensure that soil erosion is not initiated from the costeans in the wet season.*
- *The tenement holders and/or operators shall submit written notification to the Director of Mines, as to the completion of the program.*
- *With regard to environmental protection, the tenement holders and/or operators shall comply with such directions as may be issued from time to time by the Director of Mines or his nominee.*
- *All stabilisation and rehabilitation shall be conducted on a progressive basis wherever possible and shall be to the satisfaction of the Director of Mines or his nominee.*
- *Please liaise with the pastoral lessee or any affected landowner/occupier regarding your activities, and keep this department advised of any further surface disturbance associated with exploration or mining.*

All such directions were strictly adhered to during CGE's bulk sampling program. On completion of the program much care was taken to leave the site in as close to original condition as possible, all rubbish was removed from the site and every effort was made to contour and remove large mounds and holes. Because the site comprises a seasonally active river point bar no significant removal of vegetation was necessary thus negating the need for re-vegetation. It is additionally noted that the site would inevitably become inundated during the subsequent wet season completely erasing any trace of disturbance.

## 6. SACRED SITE CLAIM

Cambridge Gulf Exploration NL were served a Summons on 9 March 1994 from the Aboriginal Areas Protection Authority for carrying out work on a sacred site contrary to Section 34 of the Northern Territory Aboriginal Sacred Site Act 1989. The sacred site is referred to as "Mitparal" recorded by the AAPA as site No. 4976-002. On 24 August 1994, Cambridge Gulf Exploration NL pleaded guilty, were convicted and fined by Katherine Court for carrying out excavation work on a sacred site. An agreement was also reached with the Custodians that the Company would return all the samples which had been removed from the site. The samples were returned in September 1994.

## 7. SAMPLE MATERIAL

During the bulk sampling at The Hook, a number of vertical channel samples were collected in the trenches as reference samples. On 7 June 1994, the Northern Territory Geological Survey, Department of Mines and Energy were notified about the availability of these samples (our ref: jmg/n-226).

As mentioned in Section 5, and as a result of the agreement with the custodians, all material from the bulk sampling programme retained by the company was returned in September 1994. The Mining Registrar, Northern Territory Department of Mines and Energy was fully informed in a letter dated 16 September 1994 (our ref. pj/n-427).

## 8. CONCLUSION

A bulk sampling programme was successfully completed at The Hook, in the bed of the Victoria River, some 90 kilometres upstream from the river estuary. The aim of the sampling was to investigate the present day river gravel for alluvial diamonds. The presence of alluvial diamonds was demonstrated and therefore it is conceivable that alluvial diamonds have accumulated in previous geological time in remnant buried palaeo channels offshore from the Victoria River.

A diamond occurrence was demonstrated and may have warranted further investigations. Unfortunately, the circumstances and the difficulties that have arisen from the sacred site disturbance claim, brought against the Company by the local aboriginal communities, have added considerable uncertainty about any guaranties of being able to mine in the Victoria River once a resource has been identified.

The question must be asked at what **additional cost** would mining be able to proceed and, therefore, what would the minimum break-even grade have to be to cover those uncertain additional costs. The answer may well be that the required **minimum grade** would have to be unrealistically high to compare with economic grades found in alluvial diamond deposits mined elsewhere in the world.

Because of these added uncertainties and possible unrealistic expectations, Cambridge Gulf Exploration NL has decided not to pursue further exploration in the Victoria River and to surrender 249 graticular blocks covering the Victoria and Fitzmaurice Rivers.

**9. REFERENCES**

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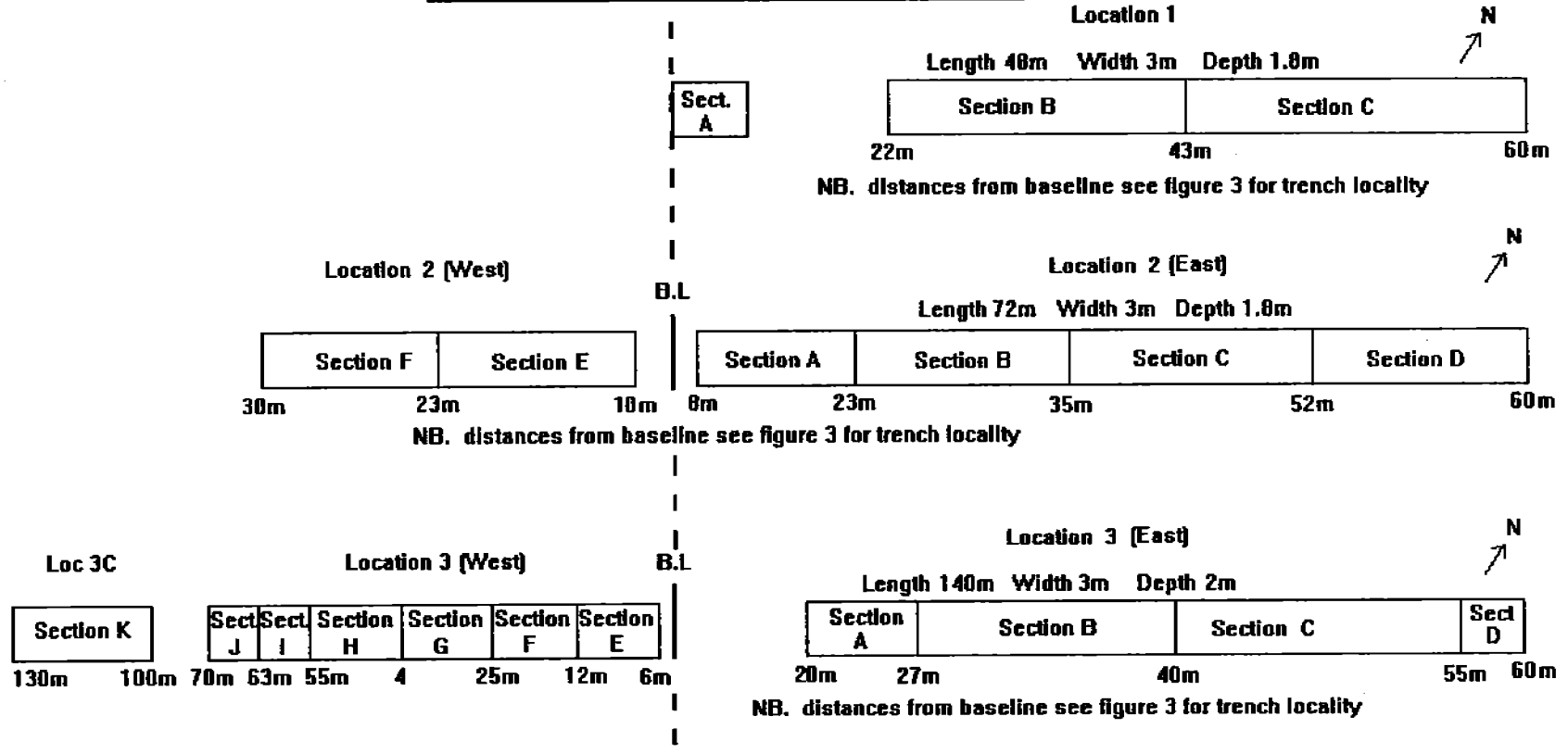
## **Appendix 1**

### **Detailed Trench Diagrams for The Hook Locality EL 8118**

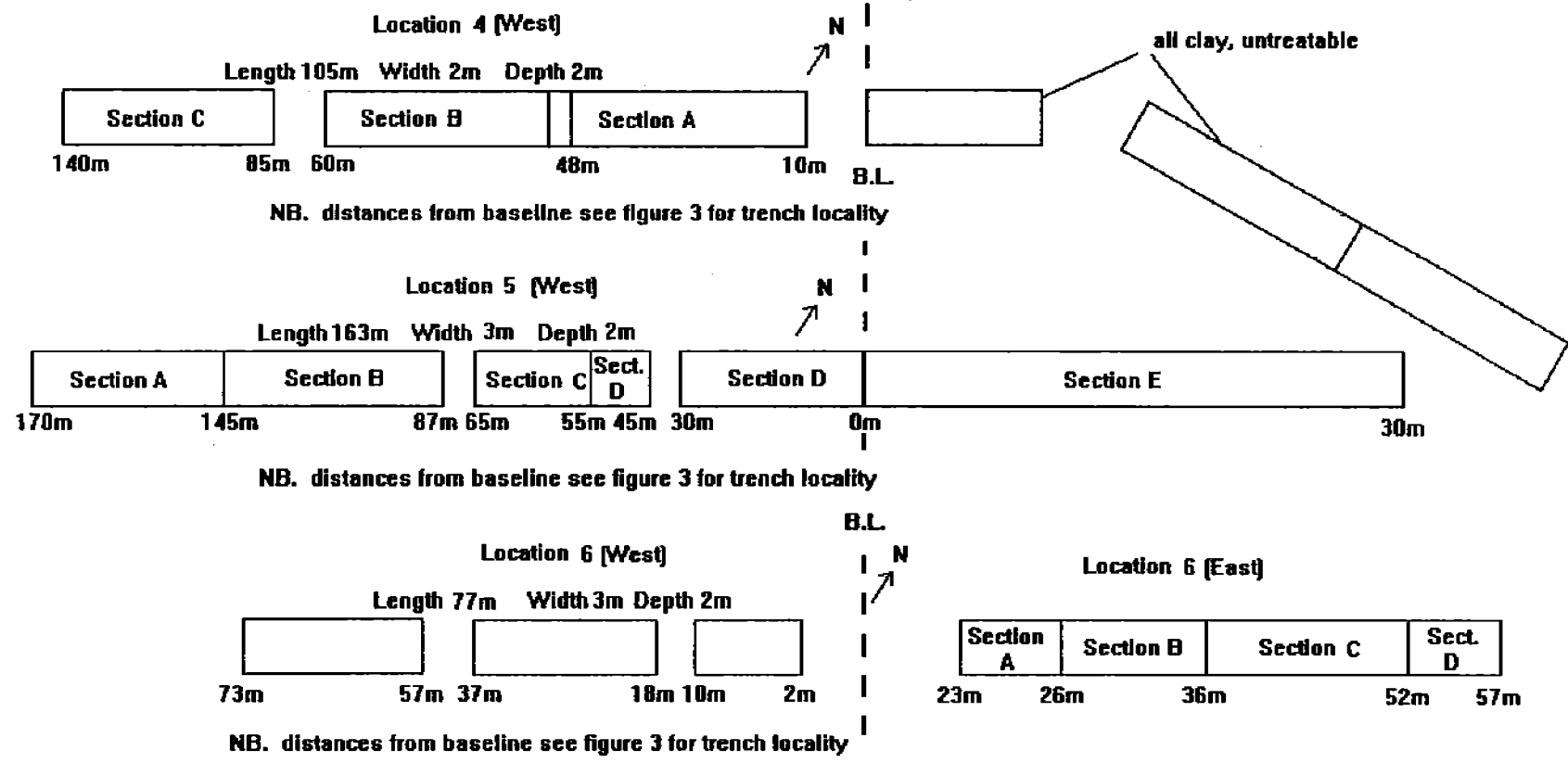


Detailed trench diagrams for The Hook locality, E.L. 8118

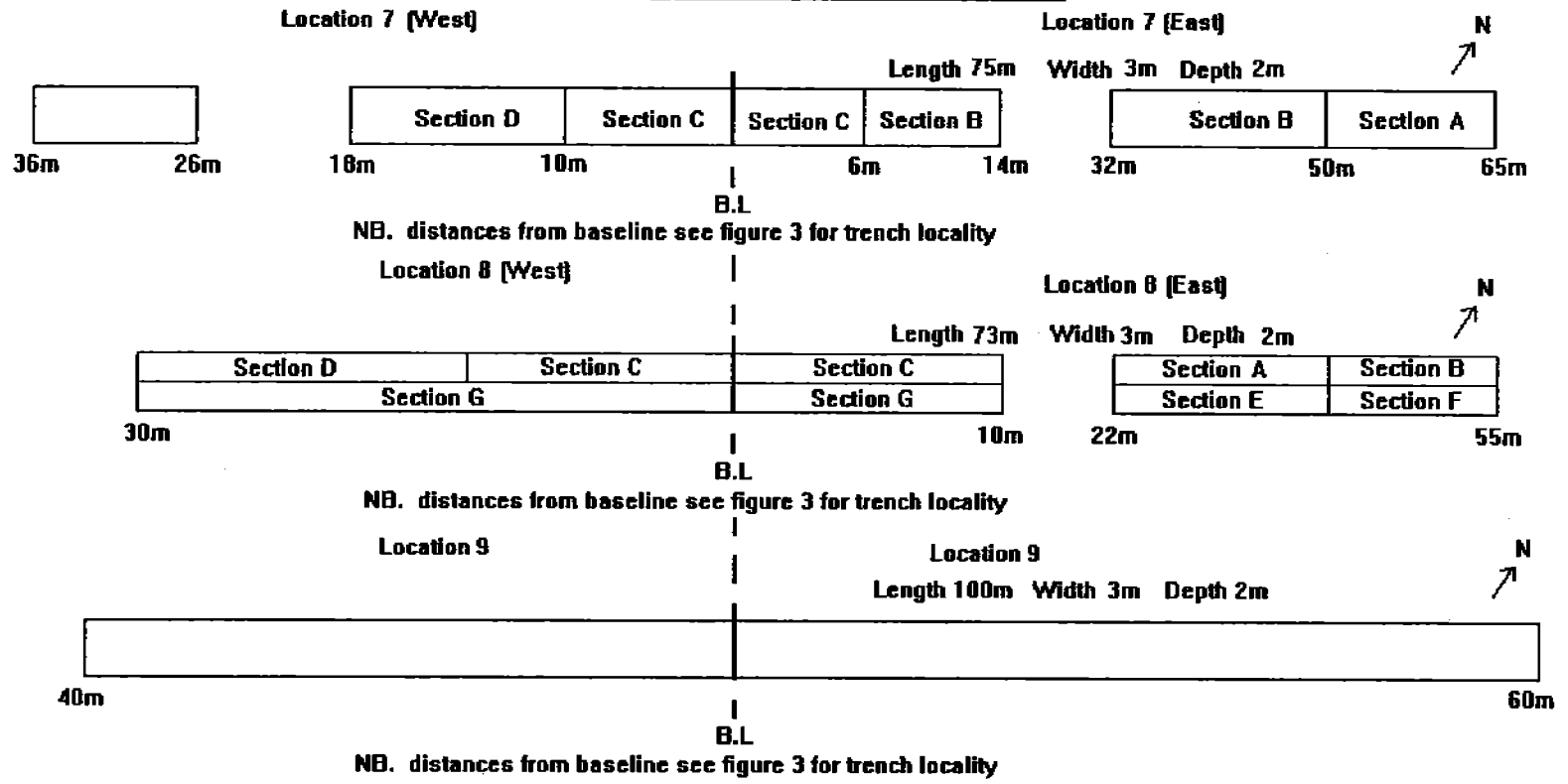
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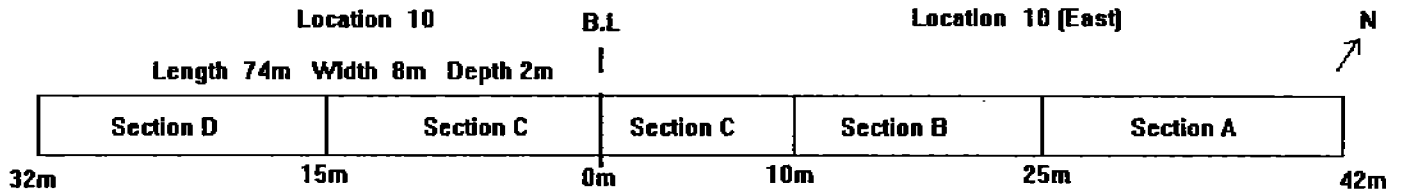
Detailed trench diagrams for The Hook locality, E.L. 8118



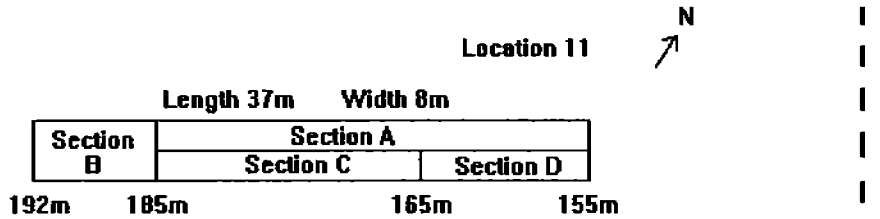
**Detailed trench diagrams for The Hook locality, E.L. 8118**



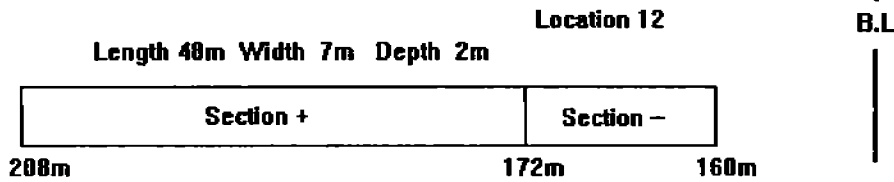
**Detailed trench diagrams for The Hook locality, E.L. 8118**



NB. distances from baseline see figure 3 for trench locality

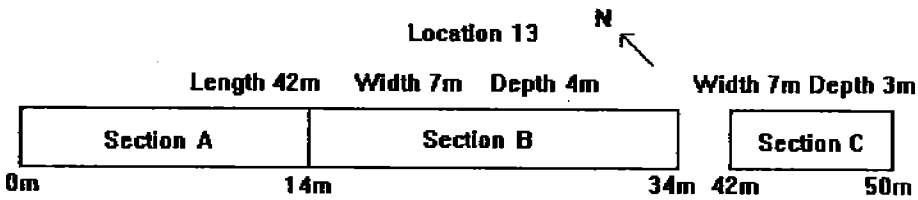


NB. distances from baseline see figure 3 for trench locality

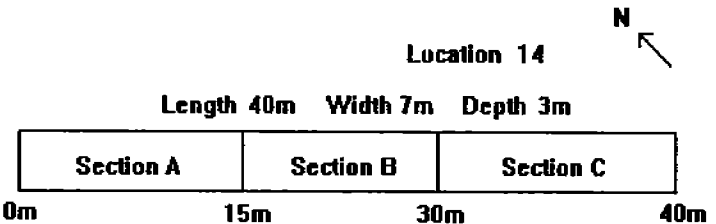


NB. distances from baseline see figure 3 for trench locality

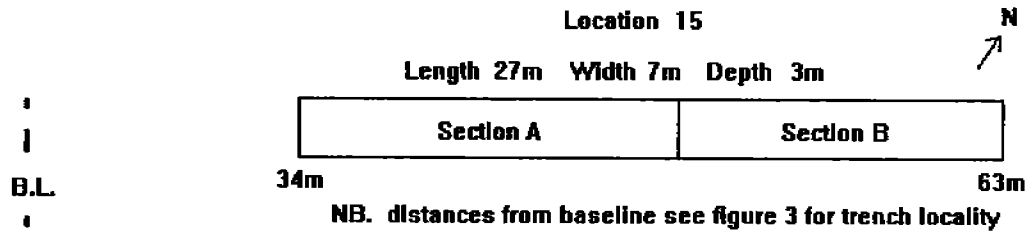
Detailed trench diagrams for The Hook locality, E.L. 8118



In this instance the trench cuts the base line obliquely and 0m represents the western end of the trench (see Fig. 3).

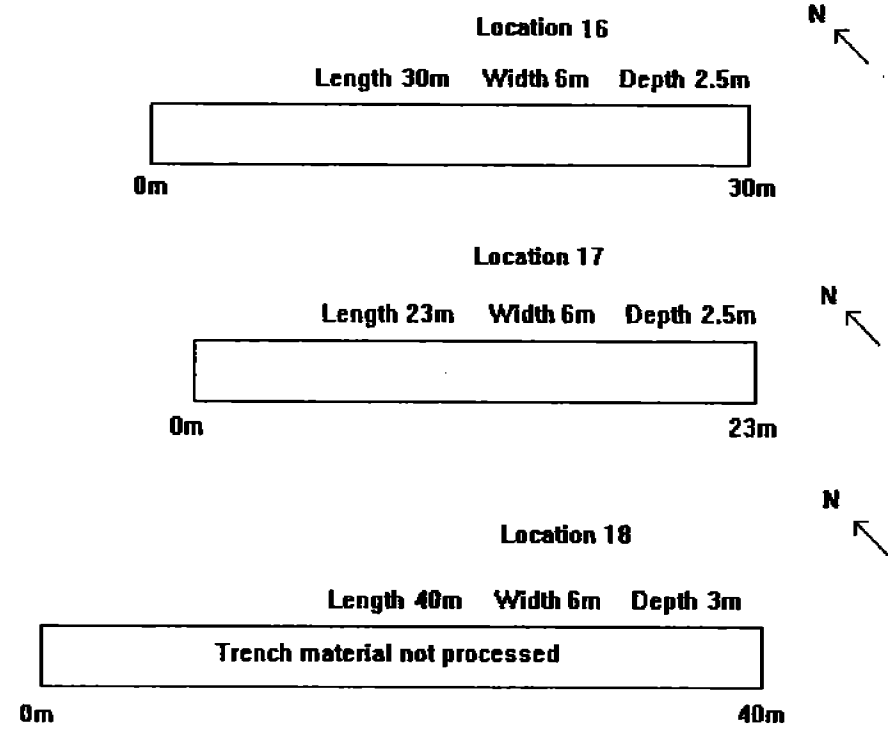


Trench 14 runs parallel to the baseline, distances are noted from north to south.

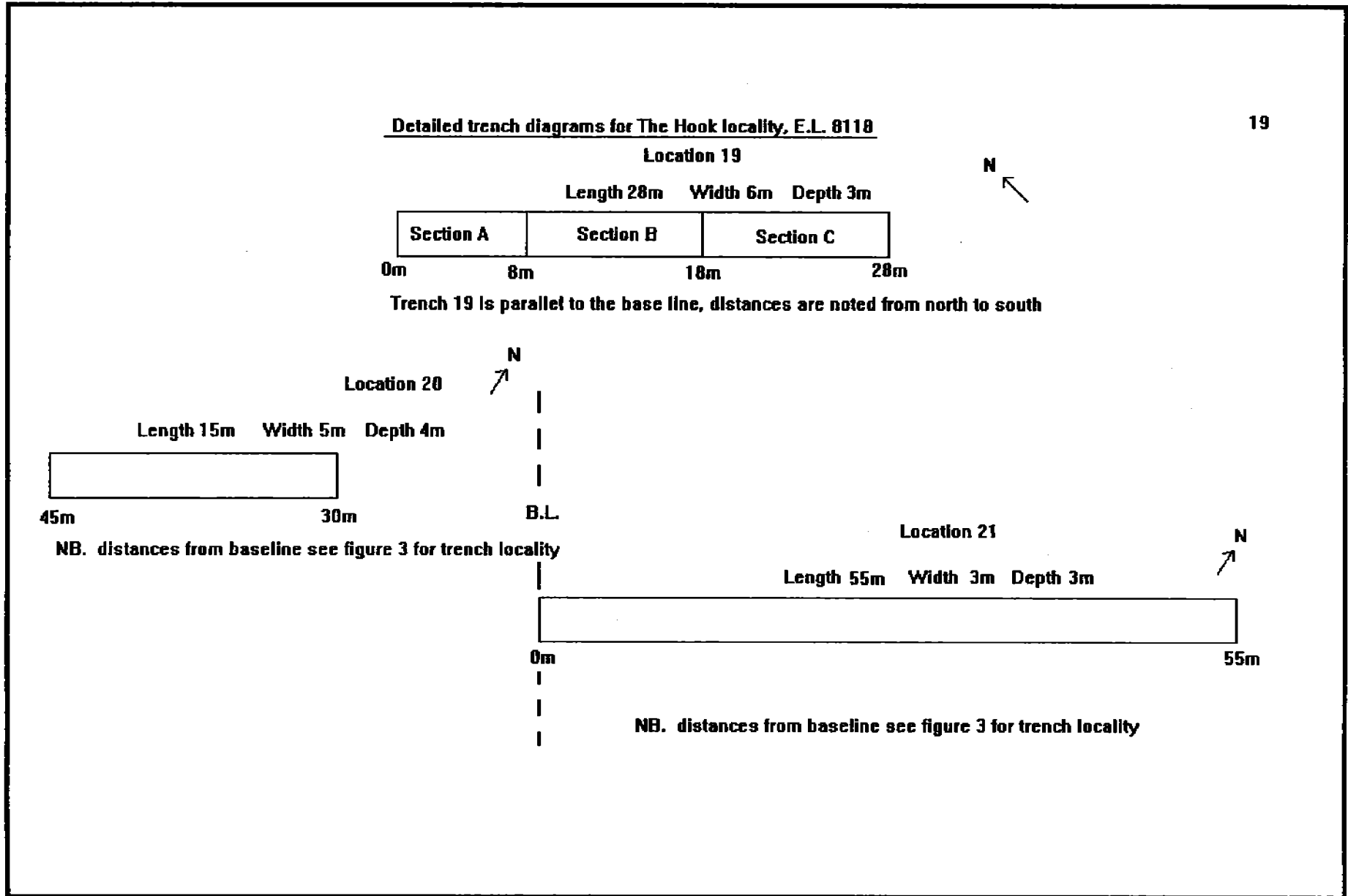


NB. distances from baseline see figure 3 for trench locality

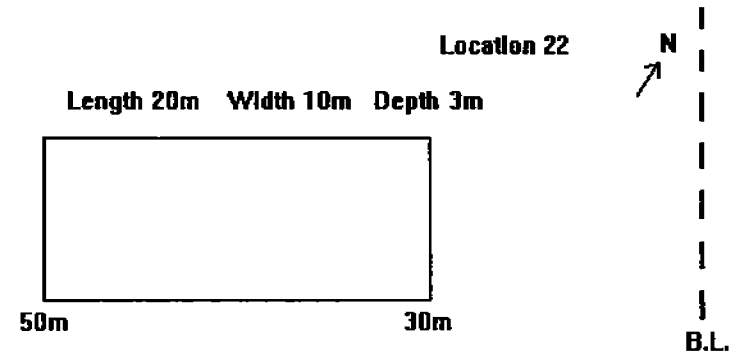
Detailed trench diagrams for The Hook locality, E.L. 8118



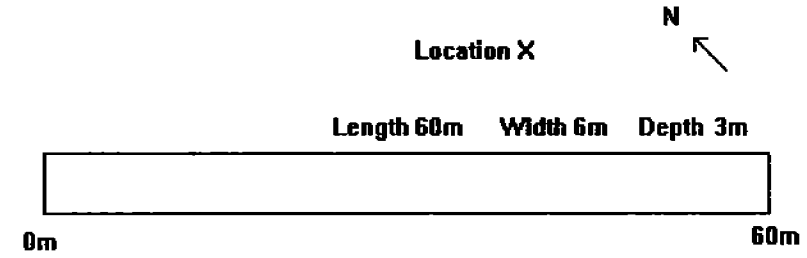
NB. Trenches 16, 17 and 18 run parallel to the baseline. Distances are noted from north to south



Detailed trench diagrams for The Hook locality, E.L. 8118



NB. distances from baseline see figure 3 for trench locality



NB. Trench X runs parallel to the baseline. Distances are noted from north to south



## **Appendix 2**

### **Diamond Sorting and Precious Metal Assaying for The Hook Bulk Sample Concentrates; Multi Element Analysis of Selected Samples**

Date	Location No.	Plant feed Tonnage (Tonne)	CONCENTRATES						DIAMOND RECOVERED						PRECIOUS METAL ASSAY			
			Size 1 0-5mm (Kg)	Size 2 .5-2mm (Kg)	Size 3 2-4mm (Kg)	Size 4 4-7mm (Kg)	Size 5 7-12mm (Kg)	Total 0-12mm (Kg)	Size 2 No.	Size 2 Weight (Ct)	Size 3 3No.	Size 3 Weight (Ct)	Size 4 4No.	Size 4 Weight (Ct)	Sample No.	Au (ppb)	Pt (ppb)	Pd (ppb)
12-14/6/93	6b	162	12	20	63	61	43	199	1	0.0585					S6-11	2.7	X	X
15/6/93	6c	188	10	27	50	44	43	174	1	0.0160					S6-12to13	15.3	X	X
16/6/93	6d	170	49	53	103	96	97	398	1	0.0920					S6-14,15,S1-27	4.9	0.3	0.1
22/6/93	6w	117	44	60	76	78	71	329	2	0.0930					S1023-26	0.3	X	0.0
3/7/93	7a	150	73	40	117	100	86	416							S1027-30	0.3	X	0.0
4/7/93	7b	130	41	33	79	65	56	274	1	0.0110					S1069-70	57.1	X	0.1
5/7/93	7c	77	37	35	65	55	50	242							S1071-73	X	X	0.1
5/7/93	7d	118	46	36	88	62	74	306			1	0.1970			S1074-76	4.8	0.2	X
30/6/93	8a	195	66	42	131	114	113	466							S1003-07	19.8	X	0.0
29/6/93	8b	180	71	37	140	126	102	476	1	0.0295					S1008-12	6.1	0.1	0.1
28/6/93	8c	180	66	72	119	113	91	461			1	0.1840			S1013-16	36.5	0.1	0.2
25/6/93	8d	180	81	46	148	124	99	498							S1048-51	4.9	0.1	0.0
24/6/93	8e	170	76	37	125	119	107	464							S1044-S1047,S1056	42.5	0.1	0.1
23/6/93	8f	175	74	54	146	103	91	468				1	0.1275		S1053-58	10.8	0.0	0.1
2/7/93	8g	135	47	41	129	103	79	399	1	0.0305	2	0.3275			S1001-2	0.2	X	X
26/5/93	9	310	22	65	135	105	77	404							S6-4	104.0	X	X
17/6/93	10a	170	89	49	115	96	97	446							S1-36	1.1	X	X
18/6/93	10b	180	97	55	107	112	117	488			1	0.3820			S1031-33	0.8	X	X
19/6/93	10c	175	106	43	97	98	99	443			2	0.3420			S1059-63	4.7	0.1	0.0
20/6/93	10d	180	80	42	105	113	87	427							S1039-43	15.3	0.1	0.0
21-22/6/93	10e	236	73	53	143	82	139	490	2	0.0480					S1034-38	4.6	0.1	X
6/7/93	11a	190	61	41	137	116	92	447							S1078-80	0.0	0.1	X
7/7/93	11b	110	36	35	100	81	64	316	1	0.0985					S1081,S1077	0.3	0.1	X
8/7/93	11c	216	73	41	148	114	90	466	1	0.0995					S1082-86	14.7	X	0.0
9/7/93	11d	100	29	25	84	70	50	258	1	0.0570	1	0.1225			S1087-88	0.5	X	X
1/7/93	12+	190	70	72	162	126	98	528							S1017	0.2	X	0.1
2/7/93	12-	55	21	19	52	34	22	148										
11/6/93	X	100	33	34	72	56	72	267	1	0.0665	1	0.3600			S6-9	X	X	X
20/7/93	13aBot	225	108	31	109	129	144	521	1	0.0450	2	0.4205			S1099	19.0	0.4	X
21/7/93	13aTop	200	111	41	127	123	97	499										

Date	Location No.	Plant feed Tonnage (Tonne)	CONCENTRATES						DIAMOND RECOVERED						PRECIOUS METAL ASSAY			
			Size 1 0-.5mm (Kg)	Size 2 .5-2mm (Kg)	Size 3 2-4mm (Kg)	Size 4 4-7mm (Kg)	Size 5 7-12mm (Kg)	Total 0-12mm (Kg)	Size 2 No.	Size 2 Weight (Ct)	Size 3 3No.	Size 3 Weight (Ct)	Size 4 4No.	Size 4 Weight (Ct)	Sample No.	Au (ppb)	Pt (ppb)	Pd (ppb)
22/7/93	13bBot	190	8	16	98	108	118	348			1	0.2855			S1100	180.0	X	X
23/7/93	13c	190	7	30	121	120	95	373			1	0.1210			S1103	390.0	0.2	0.2
	13d	200	111	41	127	123	97	499										
	ClnUp		5	27	47	47	37	163	5	0.2285					S1101	2050.0	X	X
28/7/93	14aTop	200	70	31	97	121	113	432	1	0.0250					S1105	0.1	X	X
27/7/93	14aBot	200	96	40	99	121	150	506							S1104	X	X	X
29/7/93	14bBot	190	105	43	140	102	151	541							S1109	2.7	X	X
30/7/93	14cBot	155	50	32	92	102	87	363	2	0.0735					S1106	1.1	X	X
25/7/93	15aTop	190	77	28	110	118	105	438							S1107	0.2	X	0.2
24/7/93	15aBot	195	5	28	117	131	127	408	1	0.0760					S1102	23.5	X	X
26/7/93	15bBot	115	50	19	79	81	74	303	1	0.0140					S1108	0.1	X	0.1
2-3/8/93	16aBot	180	92	54	152	155	149	602	1	0.0210					S1110	1.5	X	X
14/8/93	17	110	0	32	102	91	0	225	1	0.0220								
8/8/93	19aTop	178	67	42	123	127	133	492							S1117	0.2	X	X
4-5/8/93	19aBot	146	75	51	118	108	92	444	2	0.1155					S1111	X	X	0.1
9/8/93	19bTop	157	86	44	126	109	114	479							S1120	62.0	X	X
6/8/93	19bbBot	243	38	31	63	66	45	243										
7/8/93	19bBot	147	55	38	110	99	61	363							S1116	2.6	0.4	X
10/8/93	19cTop	156	85	32	123	112	103	455	1	0.0550					S1-8	0.4	X	0.1
	20	225	91	47	99	105	79	421	1	0.0180					S1097	41.0	0.2	X
11/8/93	21	140	60	28	128	55	88	359	1	0.0180					S1119	X	X	X
12/8/93	22	330	56	51	250	219	203	779	3	0.2080					S1121	X	X	0.2
	FinClnUp								1	0.0500								
<b>TOTAL</b>			<b>11836</b>	<b>3616</b>	<b>2832</b>	<b>7571</b>	<b>6663</b>	<b>5860</b>	<b>26542</b>	<b>47</b>	<b>2.115</b>	<b>19</b>	<b>3.654</b>	<b>1</b>	<b>0.1275</b>			

X denotes a "not detected" assay result

Precious metal assay were carried out on size fraction 1 only

## Multi element analyses carried out on samples from bulk sampling program at The Hook, EL 8118.

Element Units Detection limits Method	Au ppb 1 FA/MS	Au-rpt1 ppm 0.01 A/AA	Au-rpt2 ppb 1 B/ETA	Au-rpt3 ppb 1 B/ETA	Mg ppm 100 D/OES	V ppm 50 D/OES	Cr ppm 50 D/OES	Ni ppm 20 D/OES	Sr ppm 1 DX/M	Nb ppm 5 DX/M	Pd ppb 1 FA/MS	Ba ppm 10 DX/M	Nd ppm 1 DX/M	Pt ppb 1 FA/MS
<b>SITE</b>														
Loc 3a	34		5	102	2200	50	200	20	68	5	1	150	16	X
Loc 1a	1				1200	100	150	20	47	5	1	150	16	X
Loc 1b	11		11		1300	100	200	20	31	5	1	150	15	X
Loc 1c	660	0.02	1950	23	1800	200	250	20	35	5	1	150	15	X
Loc 1 ClnUp	X				1500	150	150	20	35	5	1	150	15	X

**KEY**

FA = Lead collection fire assay  
 B = Wet chemical digestion using Aqua-regia  
 D = Oxidative alkaline fusion  
 DX = Oxidative alkaline fusion in Nickel crucibles  
 MS = Mass spectrometry  
 AAS = Atomic absorption spectrometry  
 ETA = Graphite furnace atomic absorption spectrometry  
 OES = Inductively coupled plasma optical (atomic) emission spectrometry

## **Appendix 3**

### **Geological Descriptions of Trench Sections**

## **GEOLOGICAL DESCRIPTIONS OF TRENCH SECTIONS**

The following are basic qualitative descriptions of excavated material described in terms of cobble, pebble, gravel, sand, silt, mud and clay. They have been compiled by the author from written and diagrammatic descriptions produced by K.Sibraa.

Particle size terminology is defined by Pettijohn *et al.* (1972):

Cobble	=	grain size > 64mm
Pebble	=	4mm < grain size < 64mm
Granule	=	2 mm < grain size < 4 mm
Sand	=	0.0625 mm < grain size < 2 mm
Silt	=	0.0039 mm < grain size < 0.0625 mm
Clay	=	0.00006 mm < grain size < 0.0039 mm

The term "basal" is used in the following descriptions purely to describe material encountered at the deepest level of penetration accomplished at any location. It is not meant to indicate the presence of bedrock material or channel basement.

### **LOCATION 1**

Location 1 comprises a single trench divided into 3 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

#### **Section 1A**

Two units are present in section 1A. A basal unit of sand/silt extends upwards from a depth of 2 metres. Horizontally overlying this at a depth of 0.5 m is a cover unit of cobbles/sand/gravel. The contact between these two units is horizontal and their thicknesses remain constant throughout the section.

#### **Section 1B**

Three units are present at section 1B. A 0.5 m thick basal unit of gravel/sand broadens towards the east to a thickness of 1 m before lensing out completely 21 m from the western end of the section. Overlying this at a depth of 1.2 m is a unit of sand/silt which correlates to the basal unit encountered in section 1A. This unit is 0.7 m thick at the western end of 1B but lenses out completely 12 m to the east. The uppermost unit comprises a pebble/gravel/sand which overlies the sand/silt unit at the western end but directly overlies the basal unit between 13 m and 18 m from the western end of 1B.

### **Section 1C**

Two units are present at the western end of section 1C. The basal unit is the sand/silt unit described in 1B which lenses out 7 m to the east. The overlying unit, which comprises the bulk of this section is the pebble/gravel/sand. This unit transcends the entire section for the eastern 10 m of the trench.

### **LOCATION 2**

Location 2 comprises 2 trenches divided into 6 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Section 2A**

The western end of section 2A comprises two units, a basal unit of gravel/sand extending from 0.2 m to 2.2 m depth, overlain by a cover unit of cobbles/pebbles/sand. Towards the east the basal unit is replaced by sand which is still overlain by the cover unit. The contact between the upper and lower units dips eastwards resulting in a progressive thickening of the upper unit to a thickness of 1 m.

### **Section 2B**

The western end of section 2B is continuous with the eastern end of 2A. It comprises a 1.2 m thick basal unit of gravel/sand extending from a depth of 2.2 m up to 1 m. This is horizontally overlain by the cover unit described for section 2A.

### **Section 2C**

The western end of section 2C is similar to 2B except that the contact between the upper and lower units dips to the east resulting in the thickening of the cover unit to 1.2 m. At the eastern limit of 2C a unit of sand begins to lens in basally, progressively reducing the thickness of the gravel and sand unit. However, the sand unit lenses back out again by the eastern limit of the section. At the eastern end of the trench the contact between the lower and upper units dips westwards resulting in the progressive diminishing of the cover unit to 0.8 m.

### **Section 2D**

At the western end of section 2D two units are present, a basal unit of gravel/sand and a cover unit of cobbles/pebbles/sand. As with section 2C the contact between these units dips westwards resulting in the progressive diminishing of the upper unit and corresponding thickening of the basal unit. At the eastern end of the section the cover unit is only 0.2 m thick and is separated from the basal unit by a thin 0.2 m lens of silt. The depth of the trench at this point is 1.8 m and the thickness of the basal unit is 1.4 m.

### **Section 2E**

The eastern end of section 2E comprises a 2.2 m thick basal unit of sand and silt overlain by a 0.2 m cover unit of cobbles/pebbles/gravel/sand. Immediately to the west a unit of gravel/sand lenses in replacing the upper portions of the basal unit. The contact between the sand/silt and the gravel/sand dips west. Ten metres to the west the basal unit is replaced by a sand unit which extends from 2.4 m to 1.7m. This unit has a horizontal contact between it and the overlying gravel/sand which is 1.5 m thick. The gravel/sand unit in turn has a horizontal contact between itself and the 0.2 m thick cover unit which overlies it.

### **Section 2F**

The same three units are present throughout 2F as described for 2E. However, the basal sand progressively lenses out towards the west resulting in a thickening of the gravel/sand unit. The contact between these two units dips west. At the western limit of the section the basal sand is 0.2 m thick, the overlying gravel sand is 2.1 m thick and the overlying cover unit is 0.2 m thick.

### **LOCATION 3**

Location 3 comprises 3 trenches divided into 11 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Section 3A**

Section 3A entirely comprises a single unit of sand/silt. This unit extends from the surface down to a depth of 2.0 m

### **Section 3B**

Section 3B is continuous with 3A at its western end, however, 10 m from the western limit a unit of pebbles/gravel/sand lenses in from the surface. At the eastern end of the section the upper unit is 0.5 m thick and the lower 1.5 m.

### **Section 3C**

The western end of section 3C is continuous with the eastern end of 3B. The contact between the upper and lower units dips east resulting in a progressive thickening of the upper unit towards the east. Five metres from the western end of the section the upper unit is at a maximum of 1.8 m thick and overlies the basal unit of 0.2 m thickness. From this point eastwards the upper unit diminishes in thickness, the contact between it and the basal unit dipping westwards and at the eastern limit of the section the upper unit is 0.7 m thick and overlies 1.3 m of basal material.



### **Section 3D**

The trend described in section 3C continues into 3D and at the eastern end of the section the upper unit is 0.3 m thick and overlies 1.7 m thickness of basal unit.

### **Section 3E**

At its eastern extremity section 3E comprises two units, a 0.6 m thick basal unit of sand overlain by a cover unit of pebbles/gravel/sand. The contact between the two units dips eastwards resulting in the progressive thickening of the basal unit. Four metres from eastern end of the section a unit of gravel, sand and some pebbles lenses in basally. The contact between this unit and the sand unit dips eastwards. At the western extremity of the section the basal unit is 0.3 m thick, the overlying sand 0.7 m thick and the cover unit 1 m thick.

### **Section 3F**

The basal unit described at the western end of 3E continues to thicken to the west. The overlying sand progressively diminishes in the same direction and completely lenses out 9 m from the eastern end. The contact between the basal unit and the cover unit of pebbles/gravel/sand dips more gently though still to the east. At the western limit of the section the section comprises two units, the 1.2 m thick basal unit and the 0.8 m cover unit.

### **Section 3G**

Immediately west of the eastern end of section 3G a sand/gravel unit lenses in basally. This unit forms an easterly dipping contact with the gravel/sand/pebble unit which occurred basally in 3F. The latter unit lenses out completely 4 m from the eastern end of the section. At this point the sand/gravel unit also begins to lens out forming a westerly dipping contact with the cover unit. This results in a progressive thickening of the cover unit which reaches a thickness of 1.9 m by the western end of the section and overlies just 0.1 m of basal sand/gravel.

### **Section 3H**

A sand/silt unit lenses in basally at the eastern limit of section 3H replacing the sand/gravel unit which occurred basally in 3F. This forms an easterly dipping contact with the cover unit and as a result thickens towards the west to the detriment of the cover unit. At the western end of 3H the basal unit is 0.7 m thick and the cover unit is 1.3 m.

### **Section 3I**

At the eastern end of section 3I the basal sand/silt unit begins to lens out and has completely diminished at the western limit of the section. At this point the entire section comprises the cover unit of pebbles/gravel/sand.

### **Section 3J**

At the eastern end of section 3J a basal unit of sand/silt lenses back in accompaniment with a gravel unit which immediately overlies it. The contacts between the basal unit and the gravel, and the gravel and the overlying cover unit both dip eastwards. At the western end of the section 1.2 m of basal sand/silt is overlain by 0.4 m of gravel which is in turn overlain by 0.4 m of cover unit.

### **Section 3K**

The eastern end of 3K comprises 3 units: a 1.05 m basal unit of gravel and sand overlain by 0.1 m unit of sand which is in turn covered by 0.35 m of cover unit comprising cobbles, gravel, sand and pebbles. The sand unit lenses out 12 m to the west. The trench deepens to 1.5 m deep 20m from the eastern end but still comprises the gravel sand basally overlain horizontally by the cover unit. The basal unit is 1.05 m thick and the cover unit is 0.35 m thick at the western limit of the section.

### **LOCATION 4**

Location 4 comprises four trenches divided into 6 sections aligned perpendicularly as well as obliquely to the base line in an approximately east - west orientation (see Figure 5-2). However, only the two trenches and their composite three sections located to the west of the base line were processed as part of this sampling program.

### **Section 4A**

The eastern end of this section comprises a single 2 m thick unit of pebbles/gravel/sand. This situation continues westwards until a sand/silt unit lenses in basally 40 m from the eastern limit. The contact between this basal unit and the overlying unit dips eastwards. At the western end of the section 1.3 m of cover unit overlies 0.7 m of basal material.

### **Section 4B**

Section 4B continues westward with the progressive thickening of the basal sand and silt in a westerly direction. Seven metres from the eastern end a unit of gravel/sand lenses in basally. At the western end of the section 0.4 m of cover unit overlies 1.2 m of sand/silt which in turn overlies 0.4 m of gravel/sand.

### **Section 4C**

The eastern end of section 4C comprises 3 units: A 0.2 m thick basal unit of gravel/sand overlain by 1.5 m of sand which is in turn overlain by 0.3 m of cover comprising cobbles/pebbles/gravel. The sand unit progressively lenses out towards the west and has completely diminished 25 m from the eastern end resulting in the corresponding thickening of both overlying and underlying units. The cover unit gradually diminishes in

thickness to the west. At the western end of the section the cover unit is 0.2 m thick and directly overlies the basal unit which is 1.8 m thick.

### **LOCATION 5**

Location 5 comprises three trenches divided into 5 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2).

#### **Section 5A**

The western end of section 5A comprises two units, a 1.8 m thick basal unit of gravel/sand overlain by a 0.2m thick cover unit of cobbles/gravel. One metre east from the western end a unit of silt lenses in at a depth of 1 m dividing the gravel/sand unit into two. This lens thickens to the east and at a point some 23 m from the western end of the section is 1 m thick, overlies 0.25 m of basal material, is overlain by 0.35 m of the same gravel/sand which in turn is covered by 0.4 m of cover unit, cobbles/gravel. The silt lens starts to diminish from this point east and is 0.8 m thick 2 m to the east at the eastern limit of the section.

#### **Section 5B**

The silt unit described in 5A continues to diminish and has lensed out completely 5 m from the western end of the section. At this point the now basal gravel/sand is 1.7 m thick and the cobble/gravel cover unit is 3 m thick. From this point to the east the cover unit begins to thicken, it reaches a maximum 19 m from the western end at which point it is 1 m thick and directly overlies the basal unit which is also 1 m thick. A unit of sand/silt lenses in at 1m depth to the east of this point and thickens dramatically to a maximum of 1.65 m 35 m from the western end. At this point it is overlain by 0.2 m of cover unit and underlain by 0.15 m of basal material. To the east of this point the basal unit lenses out completely being replaced by the sand/silt. The cover unit of cobbles/gravel broadens eastward reaching a maximum 45 m from the eastern end of the section at which point the basal unit (sand/silt) is 1.4 m thick and is overlain by 0.6 m of cover. To the east a unit of gravel/sand lenses in progressively thickening to the detriment of both overlying and underlying units. At the eastern end of the section the sand/silt layer has diminished completely, 1.8 m of gravel/sand occupying the basal position overlain by 0.2 m of cobble/gravel cover

#### **Section 5C**

The entire 10 m section of 5C comprises 2.0 m of basal gravel/sand overlain by a cover unit of cobbles/gravel.

#### **Section 5D**

The portion of 5D from 55 m to 45 m from the eastern end of trench 5 is identical to that of section 5C.

At the western end of the section extending from 30 m to 0 m, 1 m of basal gravel/sand is overlain by 1 m of sand. The contact between these two units dips east and 5 m to the east the gravel/sand unit has lensed out completely. Immediately east of the 30m mark a cover unit of cobbles/gravel lenses in. This thickens gradually to the east to a maximum of 0.2 m 25 m from the eastern end of the trench. at this point a gravel/sand unit lenses in and thickens substantially to the east. At a point 15 m from the eastern end of the trench the gravel/sand unit reaches a maximum and comprises 1.6 m thickness overlying 0.2 m of sand basal unit and overlain by 0.2 m of cobble/gravel cover. From this point eastwards the gravel/sand unit diminishes and the basal sand thickens accordingly. At a point 12 m from the eastern end of the trench the sand is at a maximum 1.15 m thick overlain by 0.65 m of gravel/sand which is in turn overlain by 0.2 m of cover unit. From this point eastwards a unit of silt/sand lenses in at a depth of 0.9 m it thickens dramatically to the east to the detriment of all other units, the gravel/sand unit has totally lensed out 10 m from the eastern end of the trench, the cover unit of cobbles/gravel has lensed out 5 m from the eastern end and the basal sand unit diminishes completely at the eastern end of the trench.

#### **Section 5E**

The western end of section 5E comprises a single unit of sand/silt extending from the surface down to a depth of 1.7 m. Immediately to the east a cover unit of cobbles/gravel lenses in at surface level. This unit thickens to 0.2 m within a metre and remains at that thickness for the 9 m east of that point. At 10 m from the western end of the trench a gravel/sand unit lenses in at a depth of 0.2 m causing the overlying cover and the underlying basal material to diminish in thickness. 15 m from the western end of the trench the cover has lensed out completely, the sand/silt layer extends from surface down to 0.7 m and the basal unit is 1 m thick and extends down to 1.7 m. Immediately east of this point a sand unit lenses in at surface level. This unit forms an easterly dipping contact with the underlying gravel and sand which also forms an easterly dipping contact with the basement. The sand unit reaches a maximum thickness 20 m from the western end of the section at which point it has a thickness of 0.6 m, overlies 0.6 m of gravel/sand which in turn overlies 0.5 m of sand/silt. From this point eastward the sand lenses out and has entirely diminished at 25 m from the western end. The gravel/sand unit thickens to the east and at the eastern end of the trench is 1.4 m thick and overlies 0.3 m of basal sand/silt.

## **LOCATION 6**

Location 6 comprises four trenches divided into 5 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2). However, only the trench located on the eastern side of the base line and the 4 sections contained within were processed during this operation.

### **Sections 6A, 6B, 6C, 6D, 6E**

The entire trench encompassed by sections 6A through E comprises a 0.4 m unit of cobble/gravel cover overlying a 1.6 m gravel/sand basal unit.

## **LOCATION 7**

Location 7 comprises a two trenches divided into 4 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2).

### **Section 7A**

The eastern end of section 7A comprises 0.7 m of sand/silt overlying 0.9 m of gravel/sand. The sand/silt unit progressively diminishes to the west from this point. 7 metres from the east a cover unit of cobbles/gravel lenses in from the surface. At this point the sand/silt unit is 0.7 m thick and the basal unit is 1.3 m thick. The cobbles/gravel cover unit reaches a maximum thickness of 0.5 m, at the western end of the section at which point it overlies 0.1 m of sand silt which in turn overlies 1.4 m of basal gravel/sand.

### **Section 7B**

Section 7B is divided into two parts each of which is present in two separate trenches on the eastern side of location 7(see Appendix 3). The most westerly extreme of section 7B is continuous with section 7A. 7 m west of the eastern end of section 7B the sand /silt unit described in 7A lenses out completely. From this point westward the trench comprises 0.5 m of cobble/gravel overlying 1.5 m of gravel/sand. The remainder of section B is present in the next trench extending from 14 m east of the base line to 6 m east of the base line. At the most easterly extreme of this trench the sequence comprises 0.4 m of cobbles covering 0.6 m of silt and 1.0 m of gravel/sand basement. To the west both cobble and silt units diminish and at the western end of section 7B 0.2 m of cobbles cover 0.5 m of silt and 1.3 m of basal gravel/sand.

### **Section 7C**

This section spans the base line (see Appendix 3). At the eastern end it is continuous with the western end of 7B. To the west the silt unit continues to diminish. Adjacent to the base line 0.2 m of cobbles cover 0.2 m of silt and 1.6 m of gravel/sand. The silt unit continues to

### **Section 7D**

The eastern end of 7D is continuous with the western end of 7C. The entire length of 7D comprises 0.2 m of cobble cover overlying 0.1 m of silt and 1.7 m of basal gravel/sand.

### **LOCATION 8**

Location 8 comprises two trenches divided into 7 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 3 and Appendix 3).

#### **Sections 8A, 8B, 8E, 8F**

Sections 8A, 8B, 8E and 8F all comprise a 0.5 m cover unit of cobbles/gravel overlying a 1.5 m basal unit of gravel/sand.

#### **Sections 8C east, 8G east**

At the western end of sections 8C/8G east 0.9 m of cobbles/gravel cover 1.1 m of gravel/sand. The contact between these two units dips gently to the east and at the eastern end of the section 1.0 m of cobbles/gravel overlies 1.0 m of gravel/sand.

#### **Sections 8C west, 8D, 8G west**

Section 8G west is equivalent to the combination of sections 8C west and 8D (see Appendix 3). The eastern end of section C west and section G west comprises the same two units described for 8C/8G east. At the eastern end of the section 0.8 m of cobbles/gravel cover 1.2 m of basal gravel/sand. The cover unit diminishes slightly to the west and is 0.5 m thick at the western limit of the section and overlies 1.5 m of basal gravel/sand.

#### **Section 8D, 8G**

1 metre west of the eastern end of section 8D at a depth of 0.5 m a silt unit lenses in. This unit thickens to the west and reaches a maximum thickness of 0.6 m 8 m from the eastern end of 8D. At this point it is overlain by 0.4 m of cover unit and overlies 1.0 m of basal unit. To the west this unit diminishes until it lenses out completely by the western end of the section. At this point 0.8 m of cover directly overlies 1.2 m of basal material.

### **LOCATION 9**

Location 9 comprises a single trench aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Section 9**

The entire length of section 9 comprises 2 units, a cover unit of cobbles/pebbles/sand which varies from 0.4 m to 0.6 m thick overlying a basal unit of pebbles/gravel/sand which varies from 1.20 m to 1.0 m in thickness. The contacts between the two units are sub horizontal and the units remain relatively constant throughout the section.

### **LOCATION 10**

Location 10 comprises a single trench divided into 4 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Section 10A, 10B, 10C, 10D**

The entire location comprises two units, a 0.5 m thick cover unit of cobbles/gravel overlying a 1.5 m thick basal unit of gravel/sand. The contact between the two units is horizontal and the thicknesses remain constant throughout.

### **LOCATION 11**

Location 11 comprises a single trench divided into 4 sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Section 11A, 11C, 11D**

Section 11A is equivalent in section to sections C and D combined (see Appendix 3). At eastern end of the section the sequence comprises a 0.2 m unit of covering cobbles/gravel overlying 1.8 m of gravel sand. 8 metres to the west a unit of clay silt lenses in at a depth of 0.4 m dividing the gravel sand into two. The clay silt progressively thickens to the west. 24 metres from the eastern end the cover unit of cobbles/gravel lenses out. At this point the clay/silt becomes the cover unit at a thickness of 0.4 m and overlies 1.6 m of basal gravel/sand. The clay silt continues to thicken to the west and is 0.6 m thick and overlies 1.2 m of basal gravel/sand at the western extreme of the section.

### **Section 11B**

Section 11B comprises only the two units present at the western end of 11A. The covering clay/silt unit continues to thicken to the west and at the western end of the section 0.7 m of clay/silt overlies 1.0 m of gravel/sand.

### **LOCATION 12**

Location 12 comprises a single trench divided into two sections aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Sections 12+, 12-**

The entire section of location 12 inclusive of both sections 12+ and 12- comprises 0.2 m of cobbles/gravel overlying 1.8 m of gravel/sand.

### **LOCATION 13**

Location 13 comprises 2 trenches containing 3 sections aligned obliquely to the base line in an approximately ENE - WSW orientation (see Figure 5-2 and Appendix 1).

#### **Section 13A**

At the western end of the section the sequence comprises 5 units: a 0.7 m thick cover unit of cobbles overlying a 0.3 m unit of silt which in turn overlies 1.0 m of gravel/sand which in turn overlies 0.2 m of clay which in turn overlies 1.8 m of basal gravel/sand. 8 metres to the east the silt unit begins to diminish in favour of the gravel/sand which lenses in immediately above, consequently both overlying and underlying the silt unit until it lenses out completely 11 m from the western end. At this point 0.7 m of cobbles overlies 2.3 m of gravel/sand, 0.2 m of clay and 1.8 m of basal gravel/sand. This continues more or less continuously until the eastern end of the section.

#### **Section 13B**

At the western end of 13B a sand unit lenses in immediately below the clay. 4 metres to the east the same sand lenses in above the clay thus the sand both overlies and underlies the clay at that point. The clay lenses out completely 4.0 m to the east at which point 0.4 m of cobbles cover 1.6 m of gravel/sand, 0.7 m of sand and 1.3 m of basal gravel sand. From this point to the east the sand unit thickens dramatically to the detriment of both overlying and underlying gravel/sand units. 1 metre from the eastern end of the section the basal gravel sand lenses out to be replaced by the sand. At the eastern end, 0.4 m of cobbles overlie 0.5 m of gravel/sand and 3.1 m of basal sand.

#### **Section 13C**

The eastern end of 13 C comprises 4 units: a 1.5 m cover unit of cobbles/clay overlying 0.4 m of clay; 1.9 m of sand and 0.2 m of sand/gravel. The basal sand/gravel and the cover unit of cobbles/clay both thicken towards the east. The clay unit lenses out 8 m from the western end of the section. At the eastern end, the sequence comprises 2.0 m of cobbles/clay overlying 1.6 m of sand and 0.4 m of basal sand/gravel.

### **LOCATION 14**

Location 14 comprises 1 trench containing 3 sections and is aligned parallel to the base line in an approximately north - south orientation (see Figure 5-2 and Appendix 1).



### **Section 14A**

The northern end of 14A comprises 0.3 m of cobbles overlying 0.4 m of clay and 2.3 m of basal sand/gravel. To the south the clay unit thickens eventually forming a synformal structure with axis adjacent to a point 7 m from the northern end of the section. The cover unit of cobbles appears to unconformably truncate the upper portions of the clay unit and other units to the east. This cover unit thickens to 0.7 m thick at a point 10 m from the northern end of the section but then diminishes to the east. At the eastern end of the section the clay forms a conjugate antiformal structure. At this point 0.3 m of cobbles cover 0.4 m of clay which in turn overlies 2.3 m of sand/gravel.

### **Section 14B**

The northern end of 14B is continuous with 14A. The clay unit is antiformal at the northern end of the section progressively swings into a conjugate synform with axial plane adjacent to a point 7 m from the northern end of the section. The clay at this point is overlain by an apparently conformable gravel/sand unit which lenses in immediately to the south of the northern end of the section. This unit is overlain by an apparently unconformable unit of silt which lenses in 2 m south of the northern end. At this point 0.2 m of cobbles cover 0.3 m of silt, 0.6 m of gravel/sand, 0.2 m of clay, and 1.7 m of basal sand/gravel. To the south the clay and the overlying gravel sand swing back towards a conjugate antiform, however, the gravel sand is truncated by the overlying silt and lenses out completely at the eastern end of the section. At this point 0.2 m of cobbles cover 0.1 m of silt, 0.6 m of clay and 2.1 m of basal sand/gravel.

### **Section 14C**

The northern end of 14C is continuous with 14B. The silt unit described for 13B diminishes to the south and lenses out completely 8 m from the northern end of the section. The clay unit is antiformal with axial plane adjacent to a point 3 m south of the northern end of the section. To the south the clay unit thickens slightly and at the eastern end of the section the sequence comprises a 0.2 m thick cover of cobbles overlying 1.1 m of clay and 1.7 m of basal sand/gravel.

### **LOCATION 15**

Location 15 comprises 2 sections and is aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

### **Section 15A**

The western end of section 15A comprises 3 units: a 0.8 m cover unit of cobbles, a 0.4 m thick unit of clay and a 1.8 m thick basal unit of gravel/sand. To the east the cover unit diminishes slightly to a minimum of 0.4 m at a distance of 9 m from the western end. At this point the clay unit has thickened to 1 m and overlies 1.4 m of basal gravel/sand. 10

metres from the western end of the section a unit of gravel sand lenses in above the clay, this unit thickens to the east to the detriment of the clay. At the eastern end of the section 0.4 m of cobbles cover 0.9 m of gravel sand which in turn overlies 0.2 m of clay and 1.6 m of basal gravel/sand.

#### **Section 15B**

The western end of section 15B is continuous with the eastern end of 15A. To the east the cover unit of cobbles progressively diminishes. The upper unit of gravel/sand thickens to a maximum 6 m from the western end of the section, at this point 0.3 m of cobbles cover 1.0 m of gravel/sand which in turn overlies 0.2 m of clay and 1.6 m of basal gravel/sand. To the east a unit of clay lenses in at a depth of 0.3 m this unit thickens to the east to the detriment of the overlying cobbles and the underlying gravel sand. At the eastern end of the section 0.1 m of cobbles cover 0.9 m of clay, 0.4 m of gravel/sand, 0.1 m of clay and 1.6 m of basal gravel/sand.

#### **LOCATION 16**

Location 16 comprises a single section which is aligned parallel to the base line in an approximately north - south orientation (see Figure 5-2 and Appendix 1).

#### **Section 16A**

At the northern end of 16 three units are present, a 1.7 m thick cover unit of cobbles/gravel overlying a 0.9 m thick unit of sand which in turn overlies 0.4 m of basal gravel/sand. The cobble/gravel cover diminishes rapidly to the south. 3 metres south of northern end of the section a unit of clay lenses in at a depth of 1 m. This unit thickens to the south to a maximum of 0.9 m at a distance of 8 m from the northern end of the section. At this point the clay is overlain by 0.4 m of cobble/gravel cover and overlies 1.8 m of sand and 0.4 m of basal gravel/sand. To the south the clay unit diminishes persistently but irregularly and at the southern end of the section 0.5 m of cobbles/gravel cover 0.2 m of clay, 1.9 m of sand and 0.4 m of basal gravel/sand.

#### **LOCATION 17**

Location 17 comprises a single 23 m long section aligned parallel to the base line in an approximately north - south orientation (see Figure 5-2 and Appendix 1).

#### **Section 17**

The northern end of the section comprises five units. A 0.2 m cover unit of cobbles overlies 0.2 m of gravel, 1.3 m of sand, 0.1 m of gravel and 1.2 m of basal sand. The upper sand unit is a lens which splits the upper gravel unit into two. 7 metres to the south the upper sand unit lenses out completely at which point the sequence comprises 0.2 m of cobble

the benefit of the underlying sand and reaches a minimum 15 m from the northern end. Here 0.2 m of cobbles cover 0.2 m of gravel and 2.6 m of basal sand. To the south the gravel thickens to the detriment of the underlying sand. At the southern end of the section 0.2 m of cobbles cover 0.9 m of gravel and 1.9 m of basal sand.

### **LOCATION 18**

Location 18 comprises a single section aligned parallel to the base line in an approximately north - south orientation (see Figure 5-2 and Appendix 1). Material from this section was not processed but excavation allowed the documentation of the stratigraphy which follows.

#### **Section 18**

Two units are present along the length of this section, a cover unit of cobbles, overlying a basal unit of gravel/sand. At the northern end 1.0 m of cover overlies 2.0 m of basal gravel/sand. The cover progressively diminishes to the south to a minimum of 0.7 m thick 34 m from the northern end of the section. At this point it overlies 2.3 m of basal gravel/sand. The cover thickens to the south and at the southern end of the section 1.5 m of cobbles overlie 1.5 m of basal gravel/sand.

### **LOCATION 19**

Location 19 comprises three sections and is aligned parallel to the baseline in an approximately north - south orientation (see Figure 5-2 and Appendix 1).

#### **Sections 19A, 19B, 19C**

Two units are present throughout location 19. A 1.2 m thick cover unit of cobbles/gravel overlies 1.8 m of gravel. This situation is ubiquitous throughout all three sections.

### **LOCATION 20**

Location 20 comprises a single section and is aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1).

#### **Section 20**

Four units are present at the eastern end of section 20. A 2.1 m unit of cobble/gravel covers 0.9 m of sand/gravel 0.3 m of clay and 0.2 m of basal gravel. 4 metres to the west the sand/gravel unit lenses out completely. The clay unit is of constant thickness throughout the section but the unit dips to the east. As a result 2.2 m of cobble/gravel cover 0.3 m of clay and 1.2 m of basal gravel.

**LOCATION 21**

Location 21 is aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1). No stratigraphy was recorded for location 21.

**LOCATION 22**

Location 22 is aligned perpendicularly to the base line in an approximately east - west orientation (see Figure 5-2 and Appendix 1). No stratigraphy was recorded for location 22.

**LOCATION X**

Location X is aligned parallel to the base line in a north - south orientation (see Figure 5-2 and Appendix 1). No stratigraphy was recorded for location X.