

TITLE: UNDERGROUND EXTENSION OF "PIPELINE TARGET"

Introduction

At the northwest end of the Faro pit a large zone of iron staining is clearly visible down the wall. It extends from surface at about the 4350 foot elevation to 3850 foot elevation, a vertical extent of 500 feet. The staining is several hundred feet wide and is limited on its northwest side by the northwest dyke, a diorite dyke which cuts off the Faro orebody at its northwest end. A narrow zone of high grade ore, previously named the "Pipeline Target", was known to occur on this dyke contact. Additional sampling on three benches during August 1991, indicates true widths of 20 (4030 bench and 4310 bench) to 60 feet (3850 elevation), and grades in excess of 15% combined lead/zinc. If the ore is substantially continuous between these benches, as it appears to be, the ore zone contains approximately 1500 tonnes of ore for each available foot of strike length. Since a strike length of 200 feet or more appears reasonable, total available tonnage on the dyke contact is calculated as 300,000 tonnes. No internal or external dilution or mining recovery is included with any of these reserve numbers. Additional lenses of ore are known to occur in the iron stained zone, however, their extent and grade are yet to be determined. The ore grade tonnages remaining in the pit wall cannot be mined using open pitting methods, so a suitable underground mining technique must be found. The following discusses the part that diamond drilling should play in making these decisions.

History

The Zone I section of the Faro pit, its northwest end, was originally diamond drilled in the years 1965-1967, and mined starting in late 1960's. Diamond drill section lines were at 140 foot intervals and holes were spotted on these lines also at about 140 foot intervals. However, the drilling grid is incomplete as some erstwhile hole locations were not drilled. All holes are vertical, and for this reason do not adequately test for ore on the contact of the northwest dyke, which has a near vertical dip.

A report "Faro Zone I Reserves" by G.I. Hall, dated September 7, 1984, examines the potential for more ore in the Zone I pit area, but the emphasis was on further open pitting and no mention is made of underground mining.

In 1984 R. Tolbert drilled two holes (84F-11,12) to test the down dip extension of the Faro orebody in this area, but neither intersected mineralization. They in no way limit the extent of the ore in the Pipeline Zone (see sections).

A geological map of the "Pipeline Target" made by an unknown author on July 27, 1987, includes preliminary tonnage and grade estimates, presumably for open pitting purposes. These were as follows:

Area	Tonnes	% Pb	% Zn	Pb + Zn	% Fe	Glt Ag
1	13,000	3.53	7.19	10.72	26.03	58
2	9,000	4.57	9.53	14.10	23.53	64
TOTAL	22,000	3.96	8.15	12.21	25.01	60

The grades were obtained from "channel sampling". Area 1 is on the contact of the northwest dyke, and Area 2 about 600 feet away, and both lie between the 4030 (Pipeline Bench) and 4100 benches. This material has probably not been mined, as the 4030 bench is in the same condition now as it was on the 1987 geology map. No other work is known to have been done in this area.

Old bench plans showing blastholes and geological mapping, which may have given a better indication of the extent and grade of the ore, have not been found.

Location Grids

Mine co-ordinates have been used for plotting all information, including the 1965-67 diamond drill holes. However, the current "mine grid" is not identical to the original "mine grid" used to survey the 1965-67 drill hole collars. Apparently, the original survey monuments were destroyed, and when they were replaced a small angular discrepancy was introduced. The attached Table 1, shows the original hole location taken from the diamond drill hole log sheets compared with a digitized location provided by Whitehorse. The differences, which are for the most part less than 5 feet, are not likely to cause significant problems. (In the sections attached, the drill log co-ordinates are used.)

Geology of Pipeline Target

The high grade of ore the "Pipeline Target" is in the Faro pit wall from 3850 to 4350 elevation and lies on the contact of a Cretaceous diorite dyke. This dyke, the "Northwest Dyke", has large dimensions along strike and an unknown width. It cuts off the ore at the northwest end of the Faro pit. Three holes drilled to test for the continuation of the Faro orebody on the other (northwest) side of the dyke stayed in the diorite, consequently only the southeast dyke contact has been seen. It is very irregular on a small scale, but on a large scale appears to have a near vertical, or even northerly dip. The strike is about 280°, taken at the 3870 elevation, which is the lowest point in the pit that this section of dyke is exposed. The irregularity is a result of emplacement, and doubtless also faulting. The dyke contact with the adjacent ore, where it can be inspected, is not faulted or particularly broken, and in one place (3870 elevation) was healed.

The ore is mainly strongly pyrrhotitic massive sulphides containing some pyrite. In places it grades to more siliceous material. Sphalerite and galena are present as coarser grained crystals visible without the aid of a hand lens. This ore is doubtless remobilized and would be expected to be at least coextensive with where the Faro orebody meets the dyke. Other lenses of ore occur further from the dyke contact such as that seen on the 4030 bench ("Pipeline Area 2"), and in some drill holes (65-1, 66-19, 66-48, FRH-4). There is some prospect that these intersections represent the northwestward extension of the underground mine, which will be covered by a separate report. The Pipeline ore mineralization was chip-sampled on three benches during August 1991 with the following results:

Elevation	Length*	True Width	Additional Unsampld	% Pb	% Zn	Comb.
4340	40'	21'	0'	4.47	11.63	16.10
4035	35'	21'	0'	7.35	12.02	19.37
3850	55'	45'	20' (?)	6.08	9.59	15.67

* Assayed in 5' lengths

This sampling covers the whole vertically exposed extent of the zone, which amounts to 500 feet. However, owing to the slope of the pit wall the average vertical extent of the exposed ore is only 250 feet. Greater unseen vertical extent is possible within the wall of the pit. On strike the ore occurs from section 100+000E (at 4350 elevation) nearly to section 105+000E (at 3850 elevation). As the sections are 140 feet apart this represents a strike length of 700 feet. From these data a tonnage in excess of 300,000 tonnes grading over 15% combined lead/zinc may be calculated. As the zone is near vertical it has not been well tested by diamond drilling as all the holes are also vertical. It is possible holes 66-1 and 66-25 were drilled down dip on the zone.

Diamond Drill Programme

The attached Table II shows a proposed diamond drilling programme which could be activated at short notice if necessary. The drilling pattern is approximately 140 feet by 100 feet where the holes are projected to intersect the ore zone, but one complete section, 102+000E, could not be easily drilled owing to lack of suitable diamond drill set up locations. In a few areas a closer pattern is proposed.

The total footage of 6,812 feet is estimated to cost around \$225,000, but some of the "C" priority holes are likely not to be drilled, so the total cost will be less than this. On each section the hole(s) nearest the known outcrop of the ore in the pit wall will be drilled first in order to establish the local dip of the dyke (and therefore the ore). It is upon this information that the drilling that follows will be based. Since one section cannot be drilled the results of the work will not produce a comprehensive ore reserve. However, a more reliable estimate of tonnage grade and continuity will be available than at present. Ore outlines sufficiently accurate to define stoping limits will be difficult or impossible to define from diamond drilling alone owing to the irregularity of the ore dyke contacts: geological mapping underground will be needed.

Mining Methods

Selective methods of mining such as cut-and-fill are preferred for this ore zone as it is somewhat irregular and the grade is relatively high. Bulk mining methods such as long hole open stoping would result in significant internal and external dilution (50% + ?). Owing to the irregularity of the dyke contacts, and the somewhat fractured nature of the dyke material itself. The ore zone is probably more competent than the dyke. There is also the possibility of mega-mining, but there is insufficient information to indicate the likely available tonnage and grade. This option could be investigated further after the extent of the lower grade material in the pipeline zone is defined by any drilling we may undertake in the future. The mega-mining alternative is probably not currently attractive as it would likely supply grades no better than the Faro low grade stockpiles (i.e. 3.5-5% Pb+Zn).

Metallurgy

The pipeline zone is oxidized and rusty, but fresh rock can easily be broken from almost any exposed surface. Oxidation is almost entirely limited to the surface of the rock and to natural breaks (joints slips etc,) within it. This oxidised surface material would not be mined if a surface pillar is left. The main ore types are massive pyrrhotitic sulphides with disseminated crystals of galena and sphalerite. The crystals are relatively coarse grained and so the metallurgy of this ore should be the same as for any other ore from the Faro deposit.

Access

Access for diamond drilling and mining purposes is available at surface (approximately 4350 elevation) and the 4310, 4280, 4030, and 3850 elevation benches. Note that these elevations are taken from the most recent 1:2400 topographic map produced from photographs taken in 1990. An adjustment of +110 feet was made to the elevations shown on the original mylar drawings. They may not coincide with the designations originally given to the benches of the Zone I pit.

Alternatives

Using the information now available it would be possible to start underground development immediately from the 3850 elevation. With undiluted grades in the 15%+ range development drifting costs would be exceeded by value of the ore contained in the round. This may give rise to an improvement in cash flow as no other ore is likely to be displaced from the mill: medium and high grade stockpiles are currently, and are expected to remain, at very low levels. The start-up cost for collaring the portal is estimated at \$100,000 to \$150,000, which is less than we would expect to spend on a preliminary diamond drilling programme. Some surface drilling, however, would eventually be required to give direction to the underground development and to define the extent of the ore.

Recommendation

- 1) That the proposed programme to define the Pipeline Zone comprising 6,812 feet of drilling at a cost of \$225,000 be approved.
- 2) Consideration be given to starting underground development on the 3850 elevation immediately. (This option is only attractive if we cannot afford to wait for diamond drilling results, or if the cost of diamond drilling is to be avoided in the early stages of the project.)

D Tenney.

SEPT 10/91

TABLE I
 DRILL HOLE COLLAR LOCATIONS
 DRILL LOG -vs- DIGITIZED

	From Log			From Digitized	
	N	E	Elev.	N	E
65-01	10,041.9	12,800.6	4304.1	10,399.95	12,800.65
65-02	10,040.84	12,397.77	4282.48	10,035.75	12,395.11
66-01	10,601.82	12,800.76	4329.00	10,598.63	12,799.52
66-17	10,801.74	12,800.82	4359.89	10,798.21	12,799.28
66-19	10,601.92	12,600.53	4341.89	10,600.08	12,599.82
66-21	10,799.97	13,200.36	4338.06	10,797.21	13,199.97
66-25	10,601.28	13,000.27	4321.21	10,599.27	12,999.41
67-34	10,704.54	12,904.00	4339.5	10,697.23	12,898.46
66-37	10,201.91	12,600.70	4294.4	10,198.62	12,600.01
66-40	10,395.21	12,405.70	4304.3	10,391.33	12,411.48
66-42	10,600.21	12,200.18	4345.12	10,594.23	12,205.55
66-45	10,698.61	12,499.09	4360.67	10,697.74	12,498.47
66-48	10,496.84	12,504.43	4331.37	10,493.52	12,507.50
66-51	10,704.01	12,696.89	4359.81	10,703.58	12,697.92
84F-11	10,358.39	12,067.23*	4320.23	10,351.72	12,090.92*
84F-12	10,211.46	12,208.30*	4306.73	10,205.39	12,223.97*

* Larger Differences

Digitized corordinate from Whitehorse plan via G. Jilson

Log coordinates are from original logs.

TABLE II

DIAMOND DRILLING PIPELINE ZONE - FARO PIT

Section	#	E	Az	Dip	Depth	Priority	
100+000	A	21,316	E	-60	620	C	
100+000	B	21,373	E	-60	530	C	
100+000	C	21,430	E	-60	420	B	
100+000	D	21,489	E	-60	295	A	
100+000	E	21,542	E	-58	130	A	Drill First
TOTAL					1995		
101+000	F	21,245	*	-90	160	C	
101+000	G	21,300	W	-77	130	B	
101+000	H	21,315	E	-60	630	C	
101+000	I	21,378	E	-60	490	C	Off. Sect.
101+000	J	21,438	E	-60	400	B	Off Sect.
101+000	K	21,477	E	-60	320	A	Off Sect.
101+000	L	21,535	E	-58	195	A	Drill First
TOTAL					2325		
103+000	M	21,802	W	-70	160	A	Drill First
103+000	N	21,846	W	-70	200	A	
103+000	O	21,849	W	-87	212	A	
103+000	P	21,870	+	-90	260	A	
103+000	Q	21,895	E	-89	300	B	
TOTAL					1132		
104+000	R	21,493	W	-78	110	A	
104+000	S	21,527	E	-49	580	C	
104+000	T	21,682	E	?	200	A	Off. Sect.
104+000	U	22,050	W	-50	470	A	Drill First
TOTAL					1360		
GRAND TOTAL	21				6812		

"A" Priority (11)

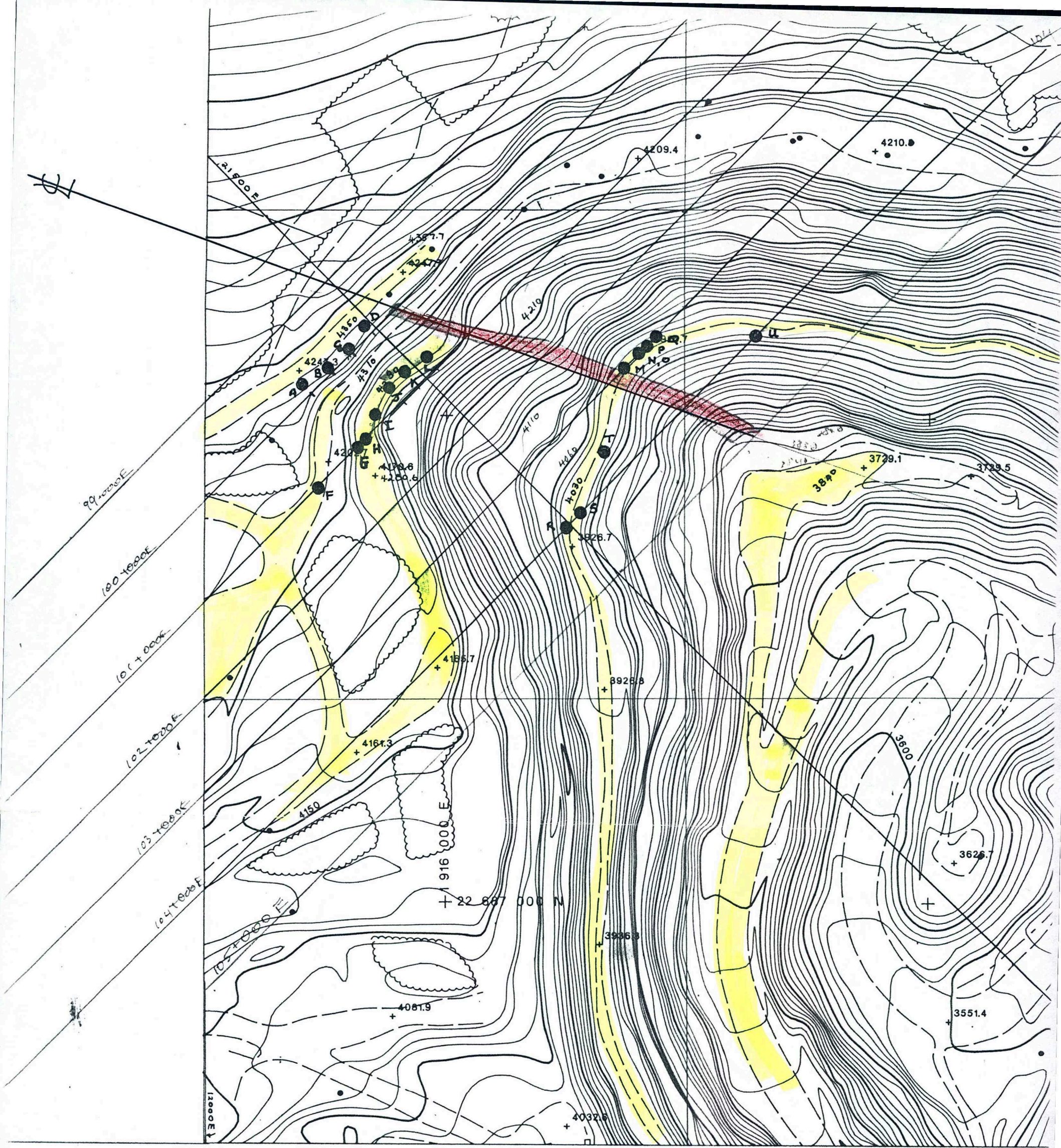
2,552

"B" Priority (4)

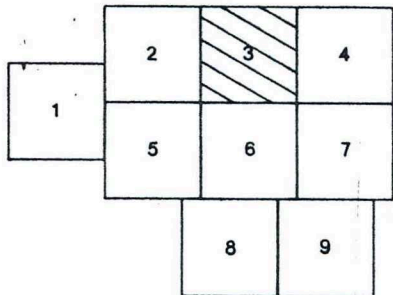
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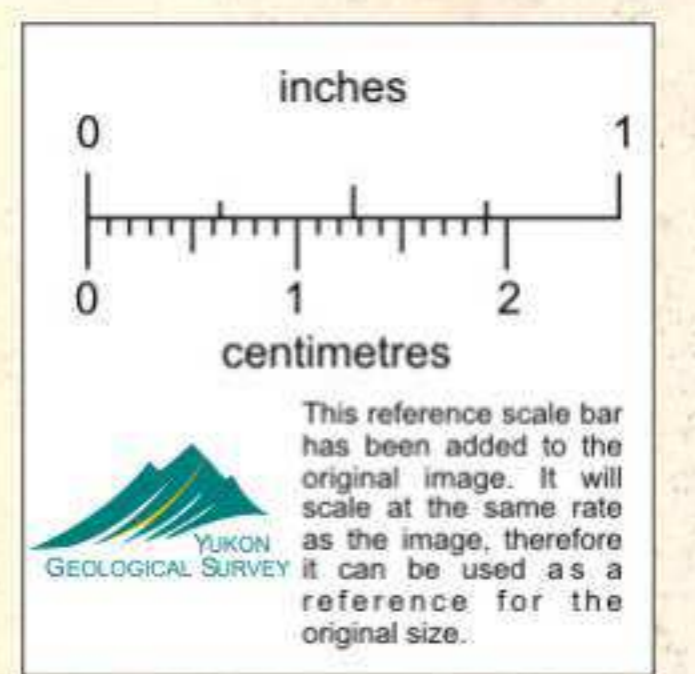
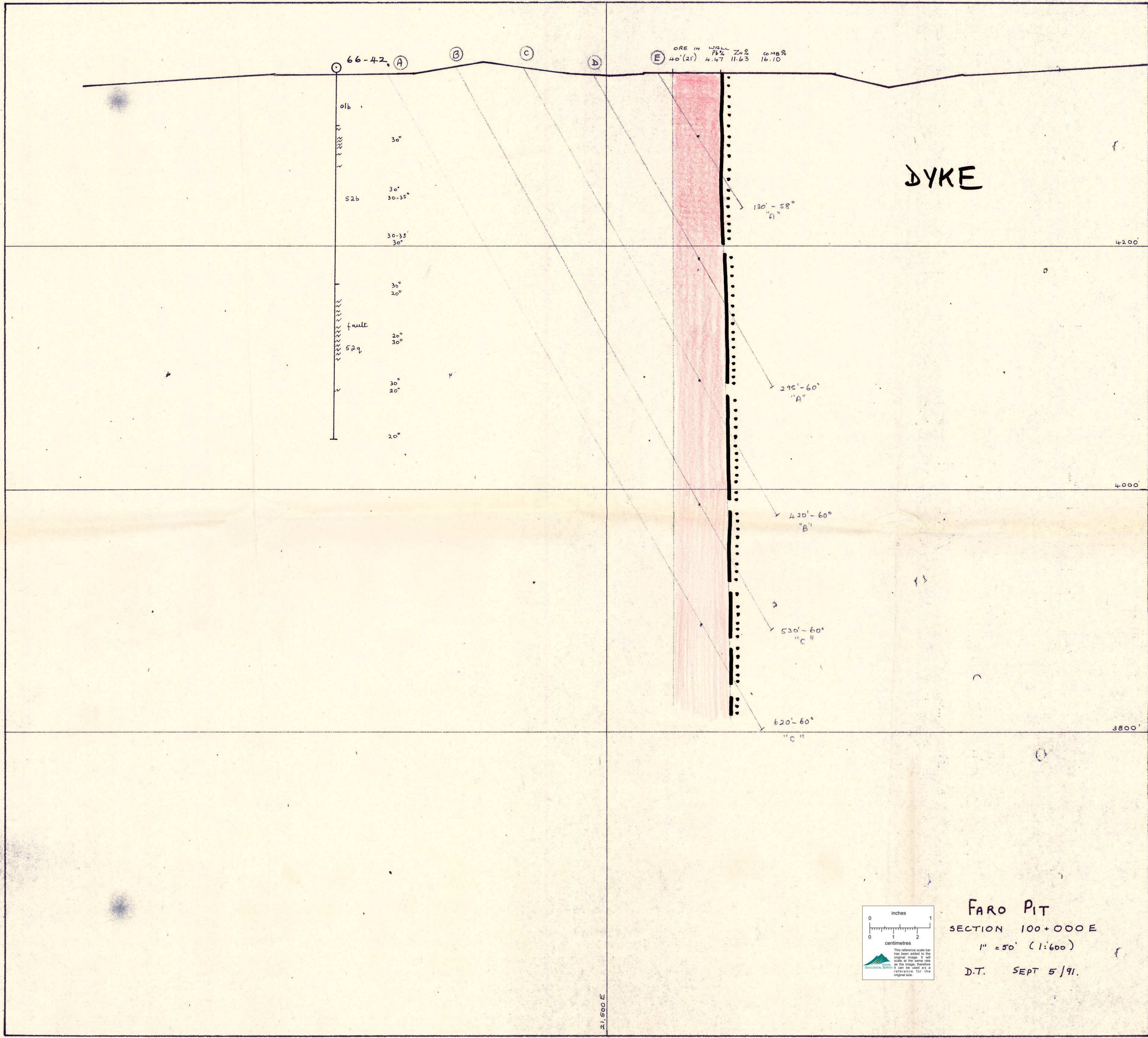
"C" Priority (6)

3,010

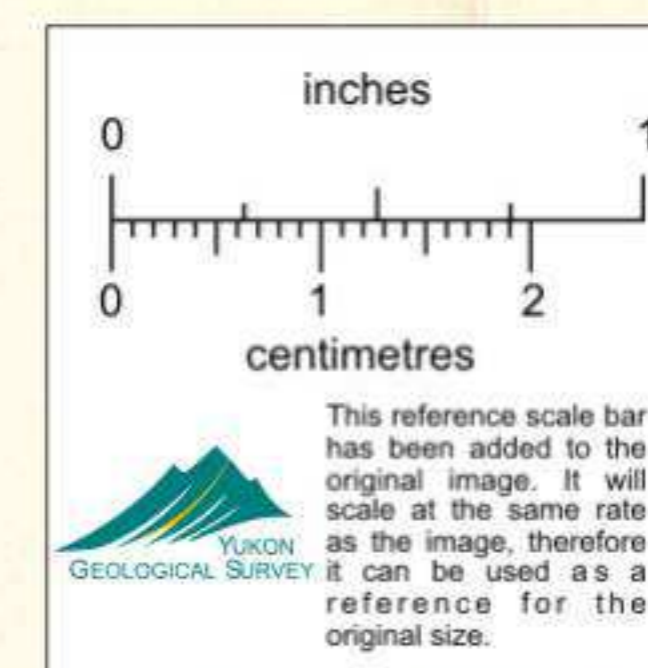
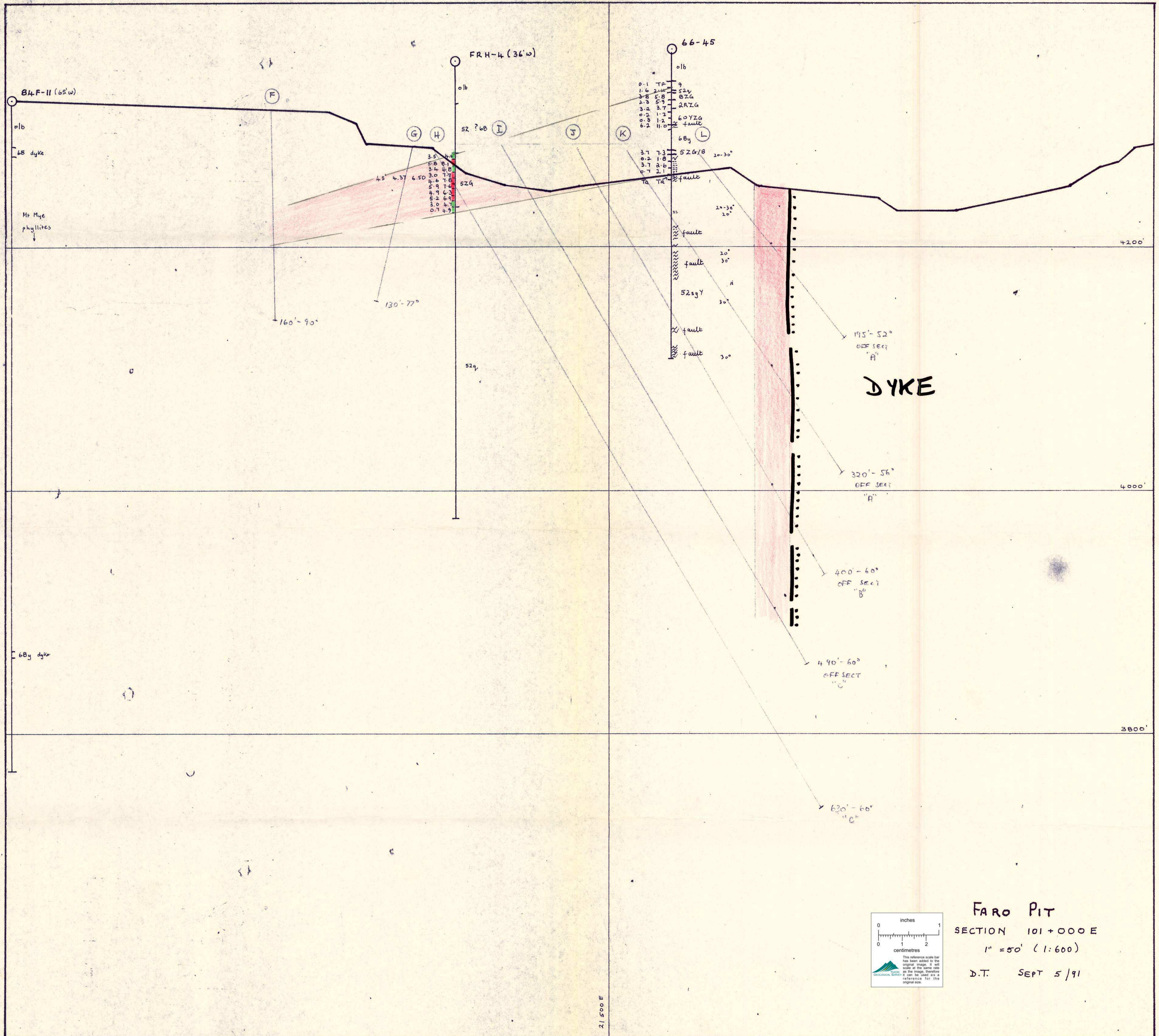


SHEET KEY



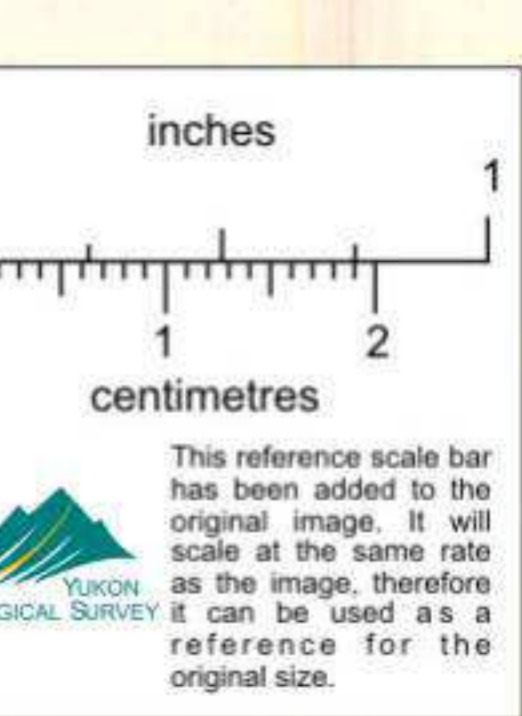
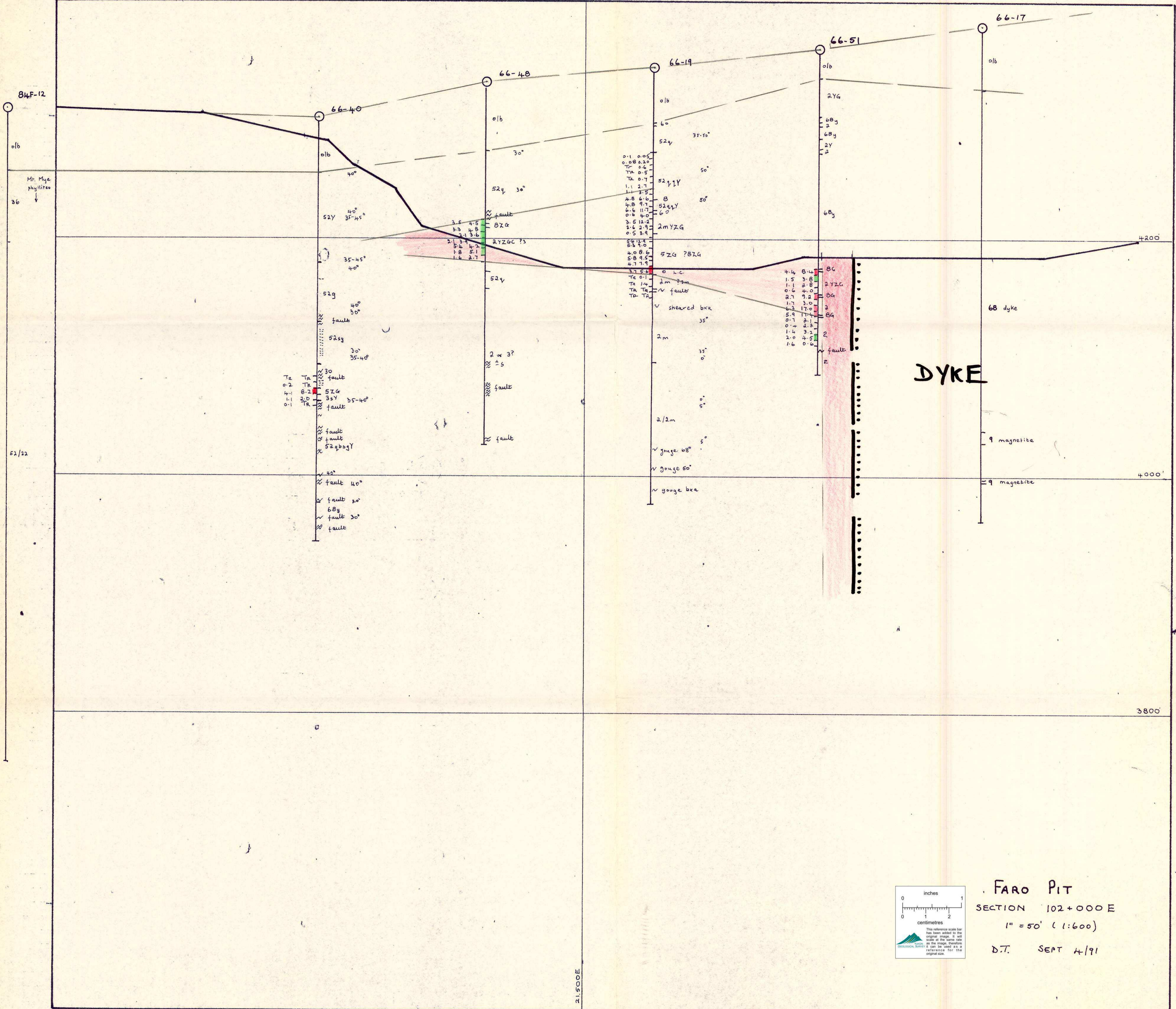


FARO PIT
 SECTION 100+000 E
 1" = 50' (1:600)
 D.T. SEPT 5/91.



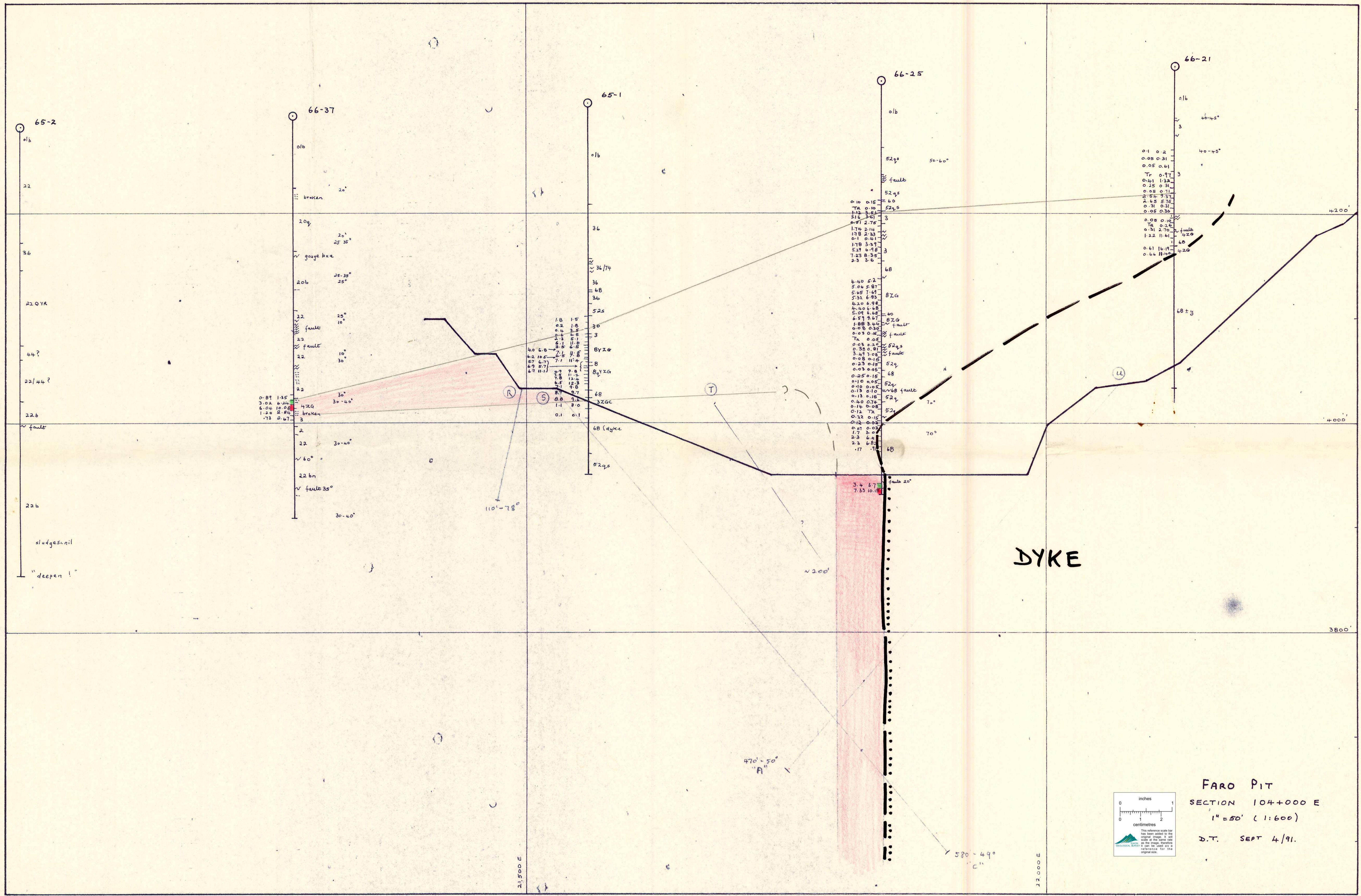
FARO PIT
 SECTION 101+000 E
 1" = 50' (1:600)
 D.T. SEPT 5/91

21500 E

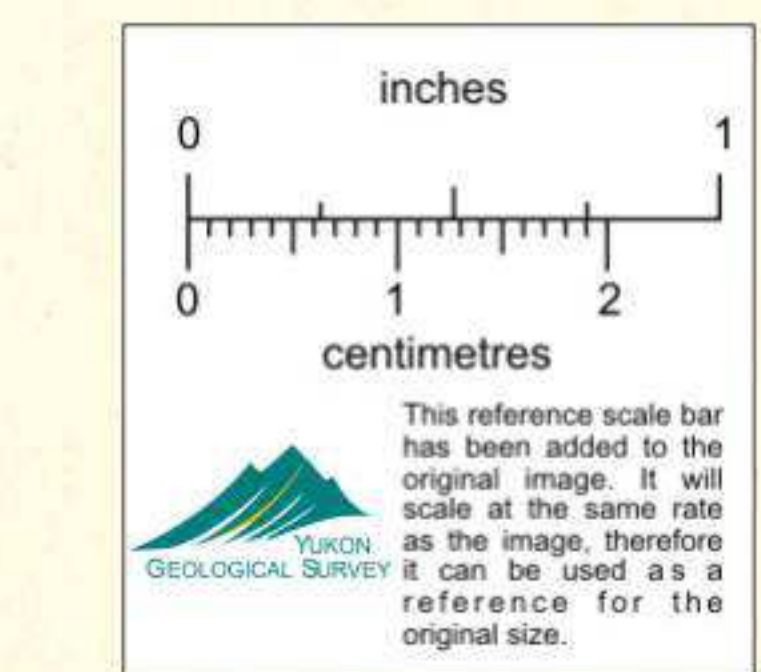


FARO PIT
SECTION 102+000 E
1" = 50' (1:600)
D.T. SEPT 4/91

21500E



DYKE



FARO PIT
SECTION 104+000 E
1" = 50' (1:600)

D.T. SEPT 4/91.

21,500 E

22,000 E

470' - 50'
"A"

580' - 49'
"C"

~200'

110' - 78'

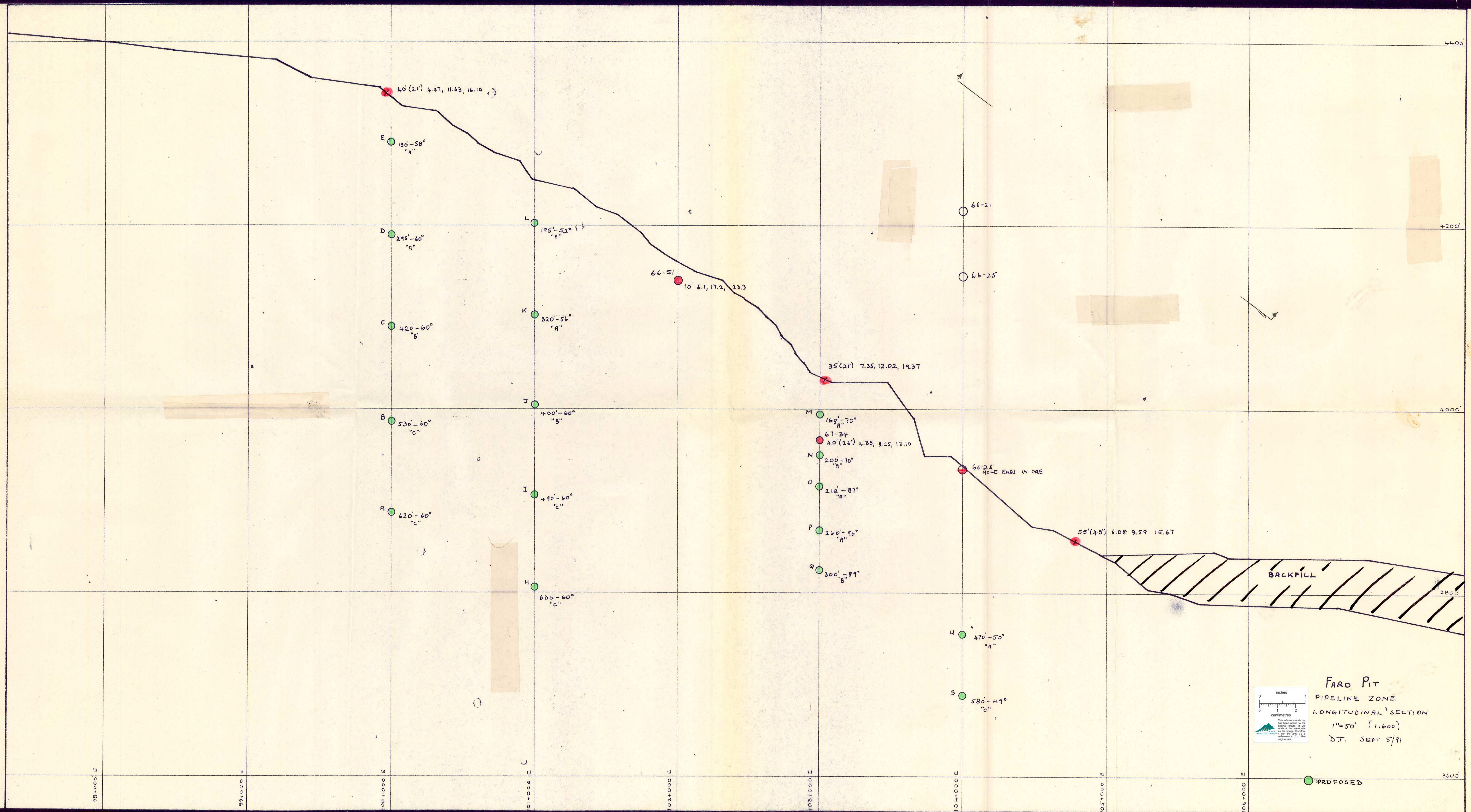
0.81 1.35
3.02 6.24
6.04 12.04
1.20 2.40
7.8 2.67

1.8 1.5
0.2 1.8
0.4 2.5
0.5 6.6
0.3 1.1
0.2 0.6
4.0 6.8
6.2 12.5
6.7 13.4
6.9 13.8
6.7 13.4

3.4 3.7
7.33 10.15

0.10 0.15
7.4 0.10
1.12 3.51
3.16 3.51
0.01 2.75
1.74 2.14
1.78 2.33
0.1 0.44
1.78 3.39
5.27 6.18
7.23 8.35
2.3 3.6
4.40 5.2
2.04 5.87
2.45 7.41
5.32 6.83
4.20 6.98
4.40 6.48
5.09 6.68
6.57 7.67
0.88 3.44
0.08 0.30
7.4 0.05
0.03 0.22
0.30 0.91
3.27 1.02
0.08 0.15
0.23 0.19
0.03 0.05
0.25 0.15
0.10 0.05
0.10 0.05
0.13 0.10
0.13 0.16
0.40 0.76
0.14 0.08
0.12 7.4
0.22 0.15
0.12 0.08
0.01 0.03
1.7 3.0
2.3 4.4
2.3 6.8
0.17 1.1

0.1 0.2
0.08 0.31
0.05 0.61
Tr 0.97
0.41 1.24
0.15 0.31
0.08 0.71
2.54 9.37
2.65 9.35
0.31 0.31
0.05 0.36
0.05 0.16
Tr 0.26
0.31 2.70
1.22 11.61
0.61 16.19
0.66 11.49



46'(21') 4.47, 11.63, 16.10

E 130°-58°
"A"

D 295°-60°
"A"

C 420°-60°
"B"

B 520°-60°
"C"

A 620°-60°
"C"

L 195°-52°
"A"

K 320°-56°
"A"

J 400°-60°
"B"

I 490°-60°
"C"

H 630°-60°
"C"

66-51 10' 6.1, 17.2, 23.3

35'(21') 7.35, 12.02, 19.37

M 160°-70°
"A"

67-34 4.0'(26') 4.85, 8.25, 13.10

N 200°-70°
"A"

O 212°-87°
"A"

P 260°-90°
"A"

Q 300°-87°
"B"

66-21

66-25

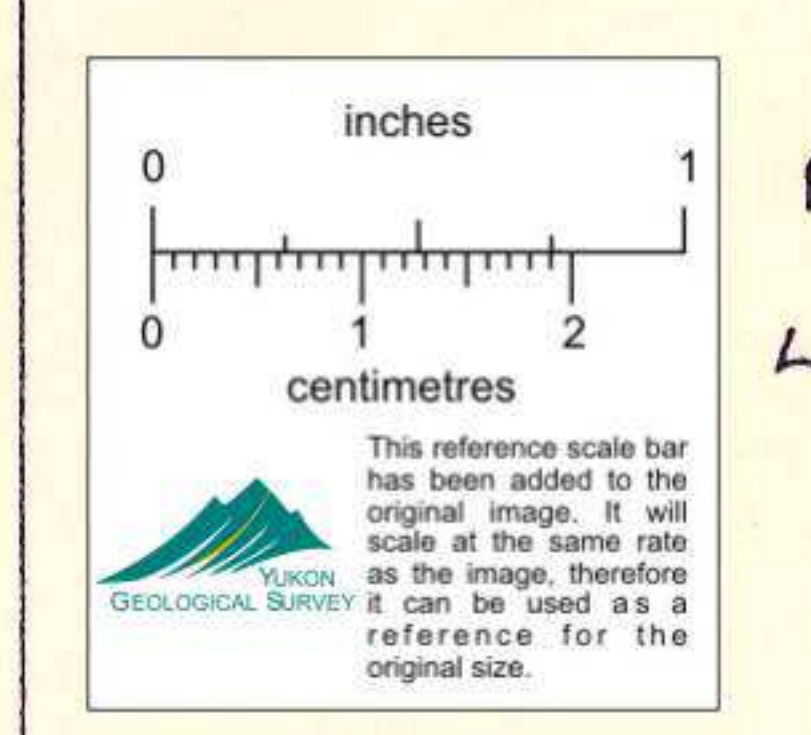
66-25 HO-E ENDS IN ORE

55'(48') 6.08 9.59 15.67

U 470°-50°
"A"

S 580°-49°
"C"

BACKFILL



FARO PIT
PIPELINE ZONE
LONGITUDINAL SECTION
1"=50' (1:600)
D.T. SEPT 5/91

PROPOSED