

GAUTENG

Pretoria
Building 45, CSIR Campus
Meiring Naudé Road, Scientia

PO Box 2957
Pretoria, 0001
E-mail: pta@bvigo.co.za
Website: www.bvigroup.co.za.

Tel +27 (0)12 349 0099
Fax +27 (0)12 349 0066

24093C

May 27, 2003

Twoline Trading 332 (Pty) Ltd
P O Box 5862
MEYERSDAL
1448

ATTENTION: MR. V. SCHORMANN
(011) 867 3210/3314 (t/f)

Dear Sir

SILVER WILLOWS: GEOTECHNICAL REPORT

Attached please find the following as requested:

- 1) Geotechnical Report for Portion 12 of Farm Swartkoppies 364 JR.
- 2) Results of Geotechnical survey conducted by Soilab.

Please do not hesitate to contact us if you require any additional information.

Yours faithfully

F SMITH Pr Eng
BVI CONSULTING ENGINEERS
24093CL059

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Trading as BVI, Reg No. 1998/00322 07
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J. Grobler Pr.Eng., B.Eng., M.Eng., HW Maas Pr.Eng., B.Eng. N. Univ.

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ENGINEERING GEOLOGICAL INVESTIGATION OF PORTION 12, SWARTKOPPIES 364 JR.

1. INTRODUCTION.

In terms of the Transvaal Town-planning and Townships Ordinance, 1986, this report describes the results of an engineering geological investigation of Portion 12 of the farm Swartkoppies, 364 JR. The report combines information from previous geohydrological work and recent mapping and soil descriptions, as well as surficial observations deemed important.

2. SITE.

Portion 12 of the farm Swartkoppies is roughly triangular in shape, measuring approximately 1,8, 1,2 and 1,0 kilometers along its southern, northwestern and northern boundaries respectively, extending over some 75 hectare. It is located directly southeast of the Willowglen Intersection on the N4 (Pretoria-Witbank) Motorway, with additional access afforded along its western boundary from Provincial Road K69. Towards the east it bounds the Silver Lakes Development.

3. TOPOGRAPHY.

The site is essentially flat, sloping at a gradient of 1/500 (one in five hundred) towards the north-east. Near the centre of the property the surface forms a small mound, rising some 2 to 3 meters above the surrounds. There are no discernable drainage patterns or features visible from aerial photographs or ground observations. Drainage will be affected as sheet-flow over the entire surface. Storm water drainage designs will therefore be very simplistic, and can be affected along the natural gradient. Similar comments likewise relate to services. Roads running east-west across the breadth of the property will have a natural gradient of 1/1000 (one in a thousand).

4. ENGINEERING GEOLOGY.

The site is almost entirely underlain by a diabase sheet intruded into the Silverton Shale Formation of the Pretoria Group. In the south-western extreme corner a small outcrop of shale is present. There is no evidence of major or minor faulting cutting through the area. Occasional outcrops of diabase are present over small areas in the central, elevated portion of the farm, while surface deposits of ferricrete (commonly known as oukclip) are present in the north-western corner near the present farm buildings.

During 1986 an extensive geohydrological investigation was launched to obtain sufficient water for stock farming purposes. The author conducted Schlumberger electrical depth soundings at 16 locations, without encountering any anomalous zones. The sounding interpretations all indicated a very thin surficial conducting layer lying on a high resistance deeper zone interpreted to be unweathered diabase. The thickness of the sheet could not be established. Subsequent percussion drilling performed by the present owner verified the geophysical interpretations, and indicated a very thin (3 to 5 meter) layer of weathered diabase overlying unweathered diabase bedrock. The geohydrological exercise did not yield any productive boreholes.

Investigations related to founding conditions were performed in 27 (twenty seven) shallow test pits dug with mechanical aid. The test pit logs are appended to this report. Pit sample points were spread uniformly over the site on a 200 X 200 meter nominal grid, with additional pits where conditions indicated potential change. The exposed in-situ material present in the test pit sides were logged and described according to the procedures outlined in Jennings et al (1973), titled : "Revised guide to soil profiling for civil engineering purposes in South Africa."

Test pits 6 and 7 in the far south-western corner of the property were somewhat different from the norm in displaying darkbrown, intensely fissured and slickensided clay, which may represent transported soil of origin weathered Silverton Shale. Pit 6 did not penetrate the clay layer at a depth of 1,000 meter, but pit 7 indicated a thickness of only 0,500 meter.

The remaining 25 test pits were remarkably uniform, containing dry to slightly moist, black, stiff, intensely weathered diabase with minor fissures, slickensides and unweathered diabase cobbles and boulders, varying in thickness between 0,200 meter in the south-east to 0,900 meter thickness in the north-west. This black clay is generally known as turf to the layman. The turf was always underlain by khaki, dry to slightly moist, stiff, weathered diabase rock, clearly showing original intact rock features such as jointing and mineral zoning, as well as the well-known sugarlike texture in crushed form. No samples were taken from the test pits for further testing relating to the quantification of potential heave from the black clay as well as other indicator values normally tested for in engineering investigations. The limited thickness of the clay layer ensures that an engineering solution will always be possible on any portion of the site, even without these test results. It is however recommended that such indicator tests be performed at a later stage prior to foundation designs for future structures. Such tests may then be tailored to suite the proposed structures. Although no samples were taken from the weathered diabase substrate to test the bearing capacity, nor in-situ tests performed to evaluate this parameter, past experience with weathered "sugar" diabase rock suggests that this medium presents excellent founding. It is therefore reasonable to assume that excellent founding conditions with very high bearing capacities will prevail over the entire farm once excavations reach the weathered diabase rock.

The contact between the black clay and the underlying khaki diabase is always very sharp and discernable, even to the untrained. Over a large portion of the area (Fig 1) the black clay overburden is less than 0,500 meter in thickness, thus it may be removed prior to and during construction. An abrupt change in clay thickness is also evident from Figure 1 where the clay layer increases rapidly in thickness from 0,500 to 0,800 meters along a roughly east-west line in the northern sector of the site. The cause of the sudden increase in clay thickness is not apparent, but may be due to weathering characteristics within the diabase.

From the above it is interpreted that the whole site should be classified as being underlain by Soil Zone II as defined in the Guidelines for Engineering Geological Investigations for Township Development. This assessment is based on the presence of the potentially heaving black clay layer. Problems related to potential heaving may however be overcome entirely by founding all structures on the underlying diabase where the clay is thin, or on raft foundations where total removal is not economical.

Apart from precautions against heaving soils of manageable thickness, the site does not reveal any other negative aspects. Bearing capacity will be adequate, compressibility negligible, there is no collapse potential, no slopes that may fail, nor indicators of soil erosion, creep or deep seated failure potential. Groundwater is almost absent, there are no marshy areas and hydrostatic pressures will be low and normal. Ground water chemistry, apart from yielding hard water, will not have any effect on future developments.

It may be noted that existing buildings on the property occupy that area showing the thickest clay development and hence largest heave potential. No damage to any buildings are apparent.

5. DEVELOPEMENT ZONING.

The farm may be further subdivided into two areas - a larger south-eastern zone, termed Zone IIA, with excellent founding conditions within 0,400 to 0,500 meters from the surface. Within this area it may be feasible to remove the overlying black clay layer entirely prior to construction at reasonable costs. Alternatively, especially where the clay layer is very thin, walls may be founded on weathered diabase with floors resting directly on the clay. In these circumstances it would be required that floor slabs are nominally strengthened and uncoupled from walls.

The northern extreme of the farm, termed Zone IIB, has a thicker potentially heaving clay overburden, not likely to be removed during building operations. Smaller structures may here be economically founded on raft foundations, such as conventional, Boucell or Waffel rafts. Larger structures, such as hotels, shopping and conference centres will undoubtedly be founded on weathered diabase in depth, with suspended floors. All services to buildings must provide for flexible couplings between the ground and the structure.

It is evident that the south-eastern portion of the farm (Zone IIA) lends itself to lower cost simplex and duplex structures, while the northern portion closer to the motorways and roads (Zone IIB) be utilised for high cost multi-level buildings.

6. CONSTRUCTION MATERIAL

The site does not have a significant supply of construction material of any sort. Course gravel was found in the vicinity of test pits 7 at the surface, and at test pit 20 at shallow depths. This weathered diabase gravel will provide excellent subbase for roads in the area. Excavations left by such exploitation may be used to dump excess clay removed from building sites, and rehabilitated into parks and sportgrounds.

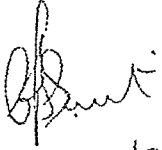
7. CONCLUSIONS.

Portion 12 of the farm Swartkoppies has been investigated and described in terms of the Township Ordonnance. The site does not present any significant geological or engineering geological problems that can not be overcome by well-known and established building techniques. Potentially heaving black clay of origin in-situ weathered diabase soil, occur in variable thickness between 0,200 and 0,900 meters over the site. This results in a soil classification of Soil Type II for the entire property. Building construction may be effected by either removing the clay layer where it is thin, or employing raft foundations where this alternative is more cost effective.

8. RECOMMENDATIONS.

1. The site is found to be suitable for residential building purposes, provided that the outlined precautionary measures are adhered to.
2. Thin occurrences of black clay (Zone IIA) should be removed from building sites entirely where this is economically viable, unless other precautions are taken to minimize damage to buildings resulting from heaving soil.
3. Thick occurrences of black clay (Zone IIB) may be more expediently treated by employing building techniques adapted to heaving soil foundations, such as conventional, Boucell and Waffel raft foundations, unless other precautionary measures are taken to minimize damage to buildings resulting from heaving soil.

4. It is strongly recommended that indicator tests, related to heaving and other foundation parameters be performed prior to construction design, to quantify the potential heave of the clay as well as the bearing capacity of the substrate on which founding is to be placed.

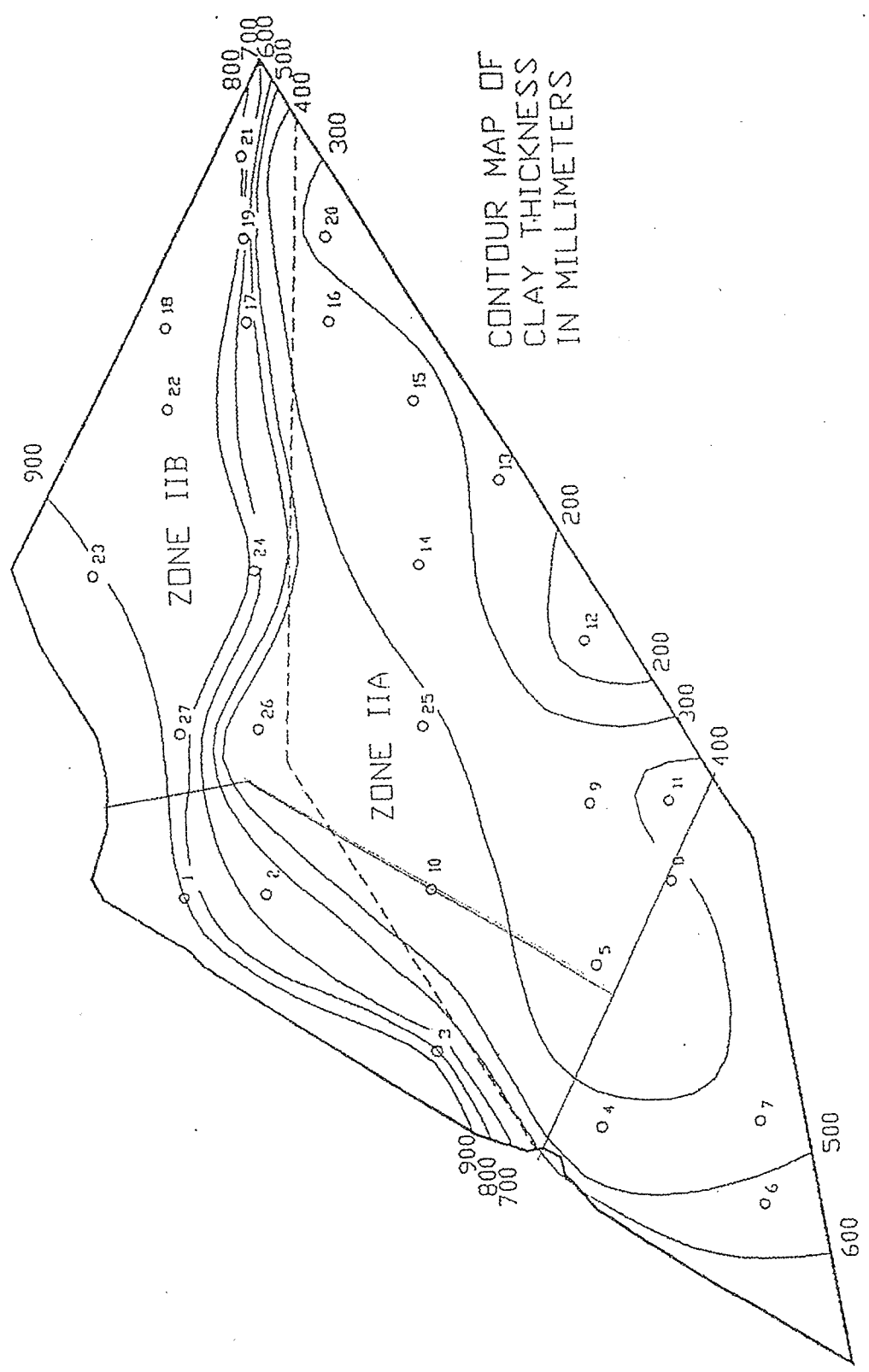


6 August 1994

C J B SMIT.

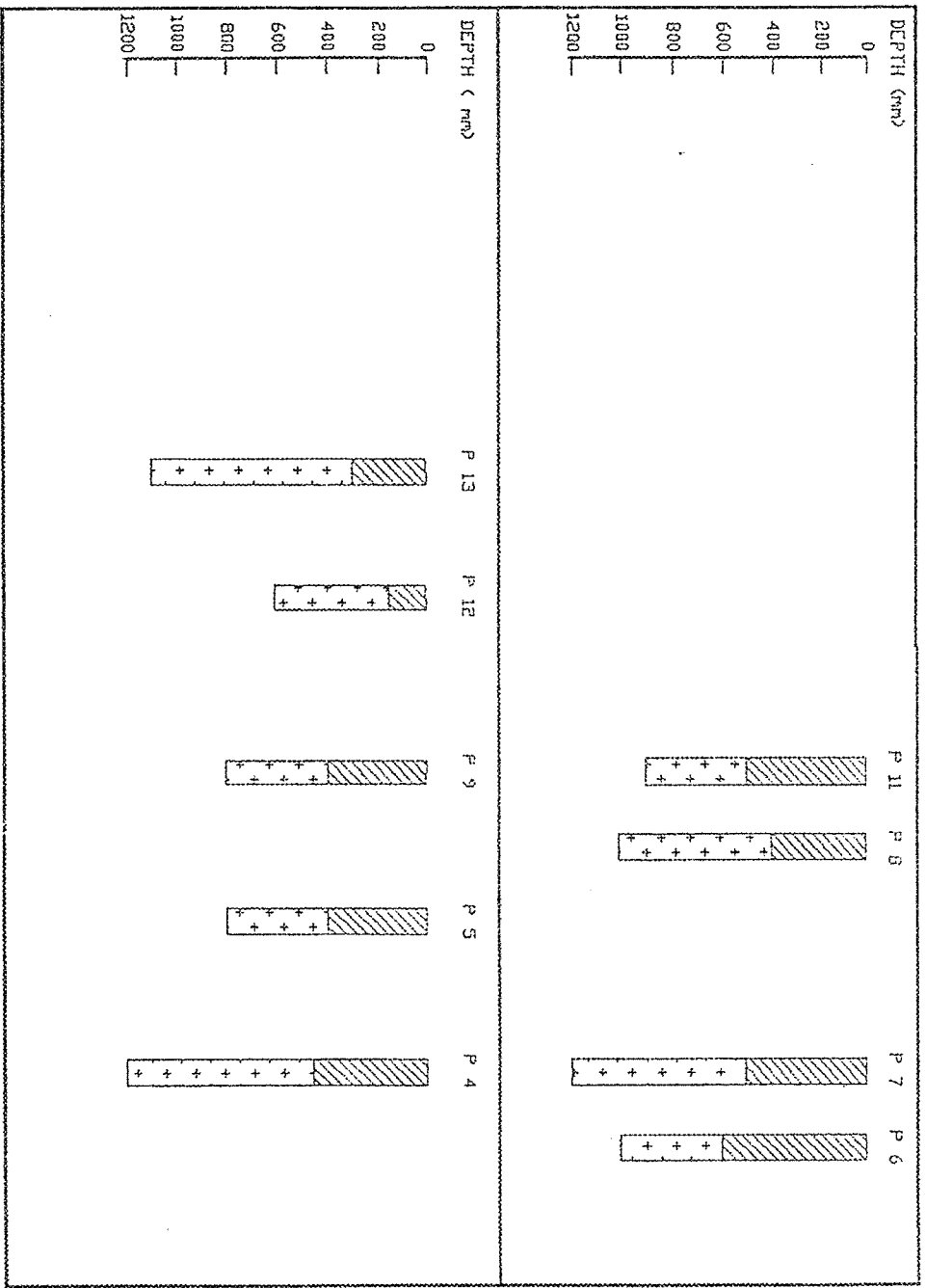
GEOLOGIST (B.Sc. Hons., Pret.)

ZWARTKOPPIES 364 JR
PORTION 12



CONTOUR MAP OF
CLAY THICKNESS
IN MILLIMETERS

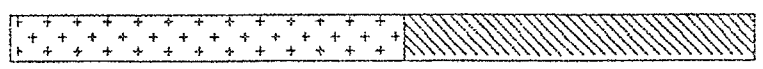
TEST PIT LOGS



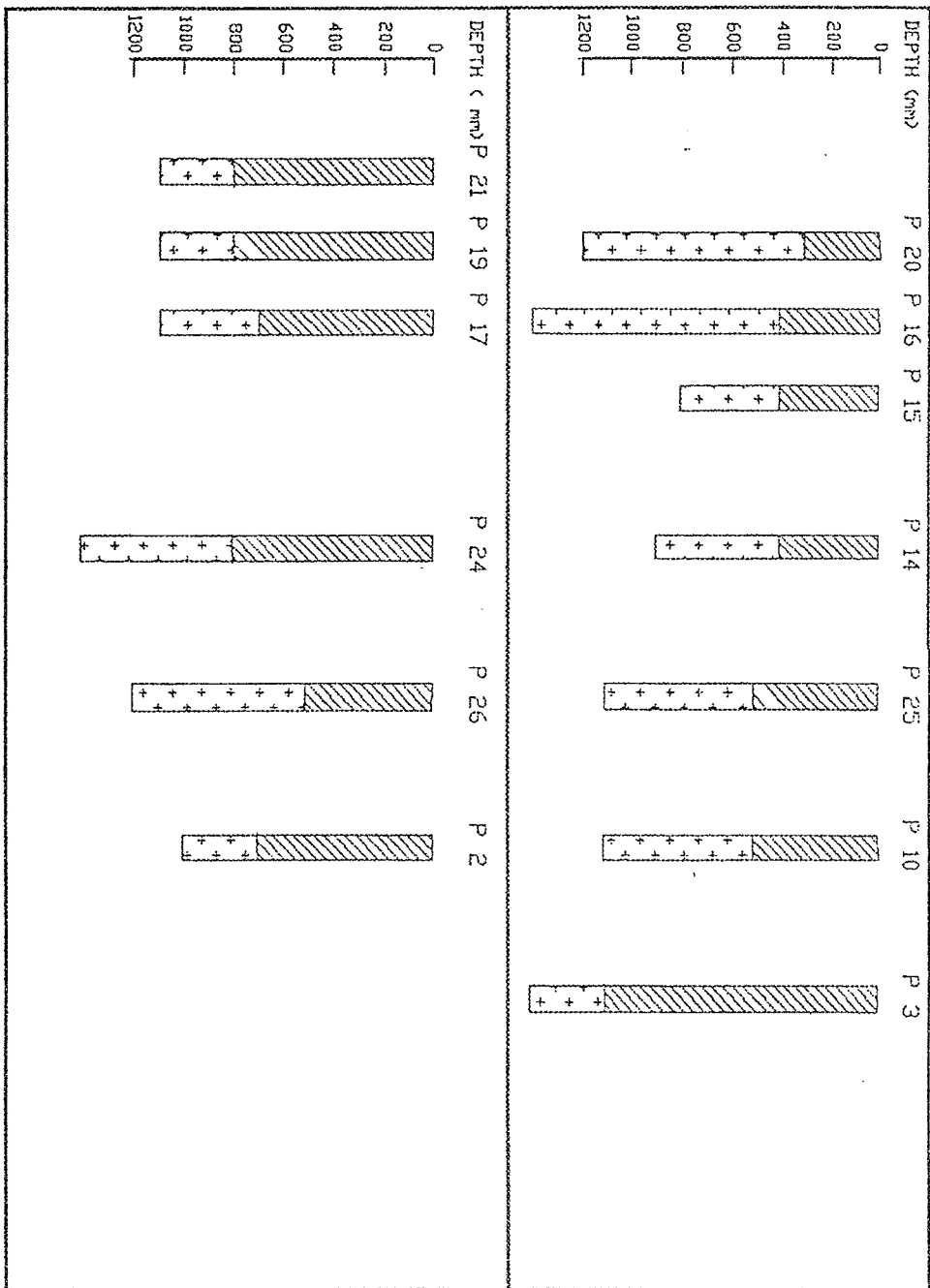
LEGEND

BLACK
 DRY TO MOIST
 STEEP
 SLIGHTLY FISSURED
 TO FISSURED
 WITH ROUNDED
 PEBBLES AND BOULDERS
 CLAY
 WEATHERED DIABASE

KHAKI TO
 BRIGHT ORANGE
 DRY TO MOIST
 STIFF
 WEATHERED DIABASE
 DISPLAYING
 ROCK TEXTURES



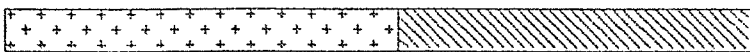
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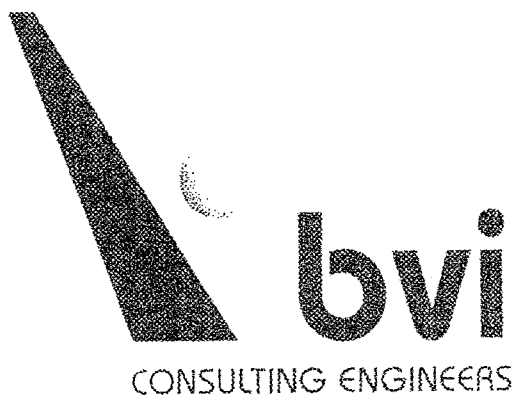
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 STIFF
 SLIGHTLY FISSURED
 TO FISSURED
 WITH ROUNDED
 PEBBLES AND BULDERS
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KHAKI TO
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 ROCK TEXTURES

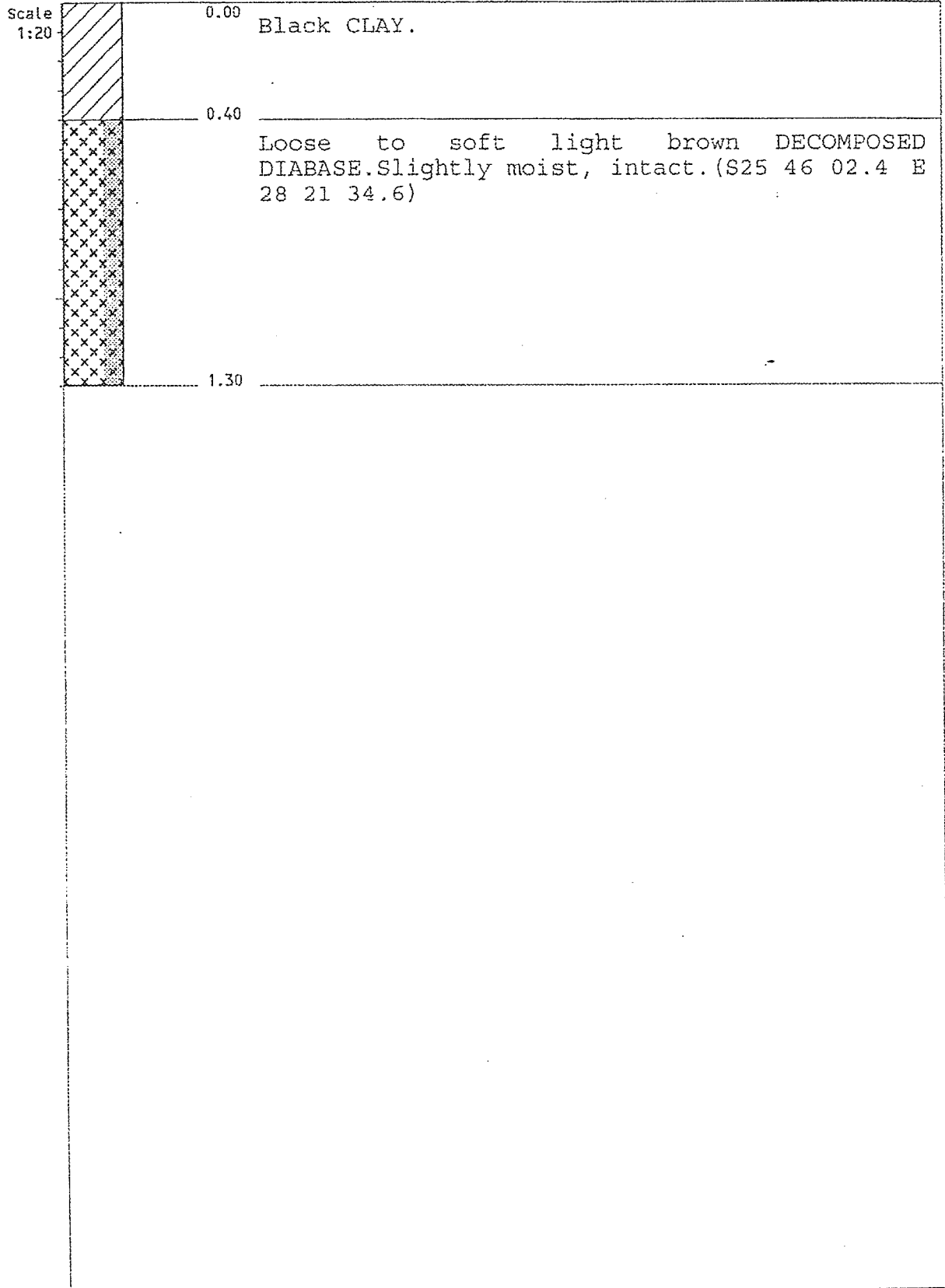


SILVER WILLOWS

RESULTS OF GEOTECHNICAL SURVEY CONDUCTED BY SOILLAB



Civil, Structural, Electrical Engineers,
Refuse Management Consultants and Project Managers
Building No 45, CSIR Campus, Meiring Naud Road, Scientia
P O Box 2967, PRETORIA, 0001
email: pta@bvigp.co.za
Tel: 012-349 0099
Fax: 012-349 0066



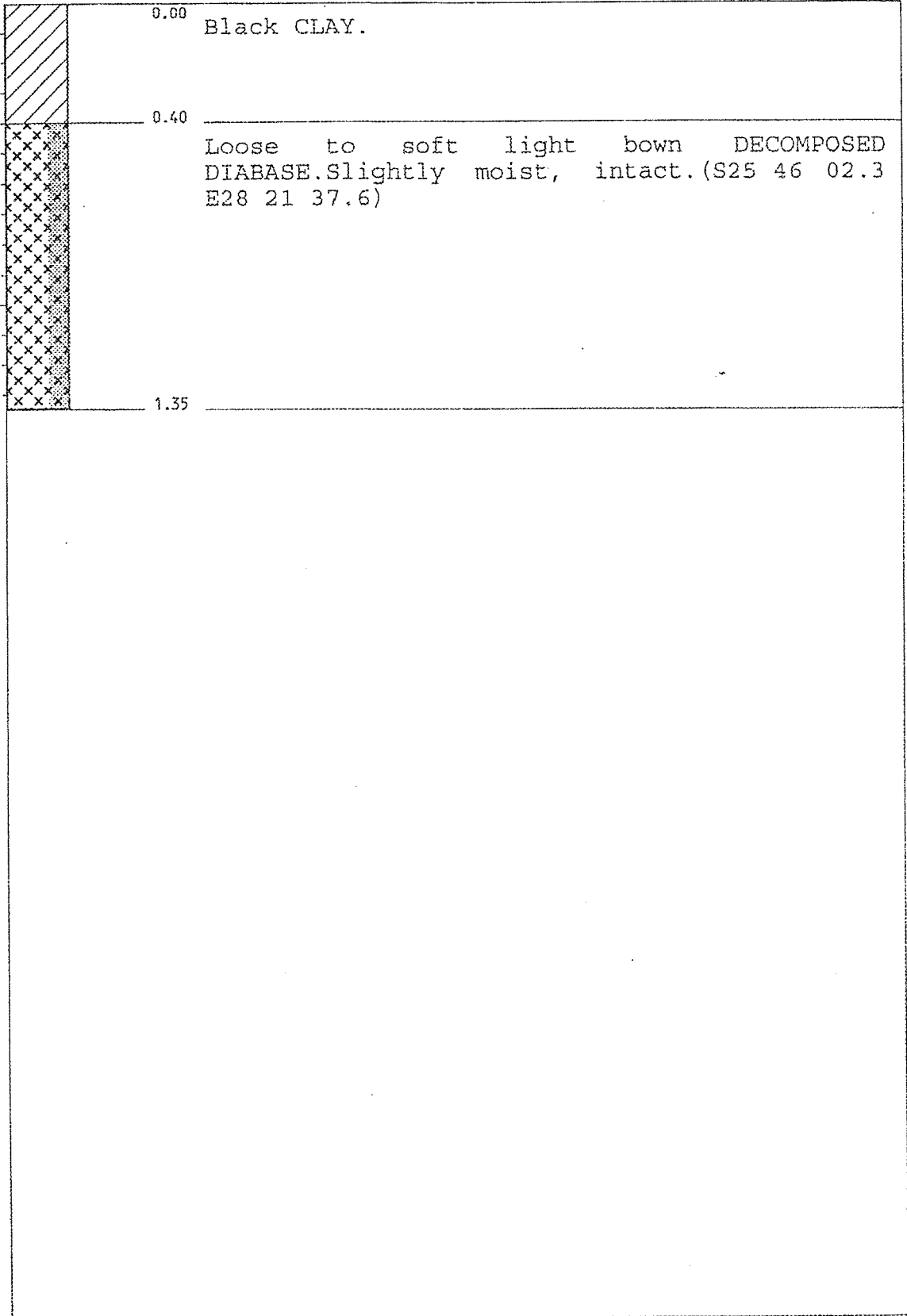
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X-COORD :
Y-COORD :

HOLE No: TP1

Scale
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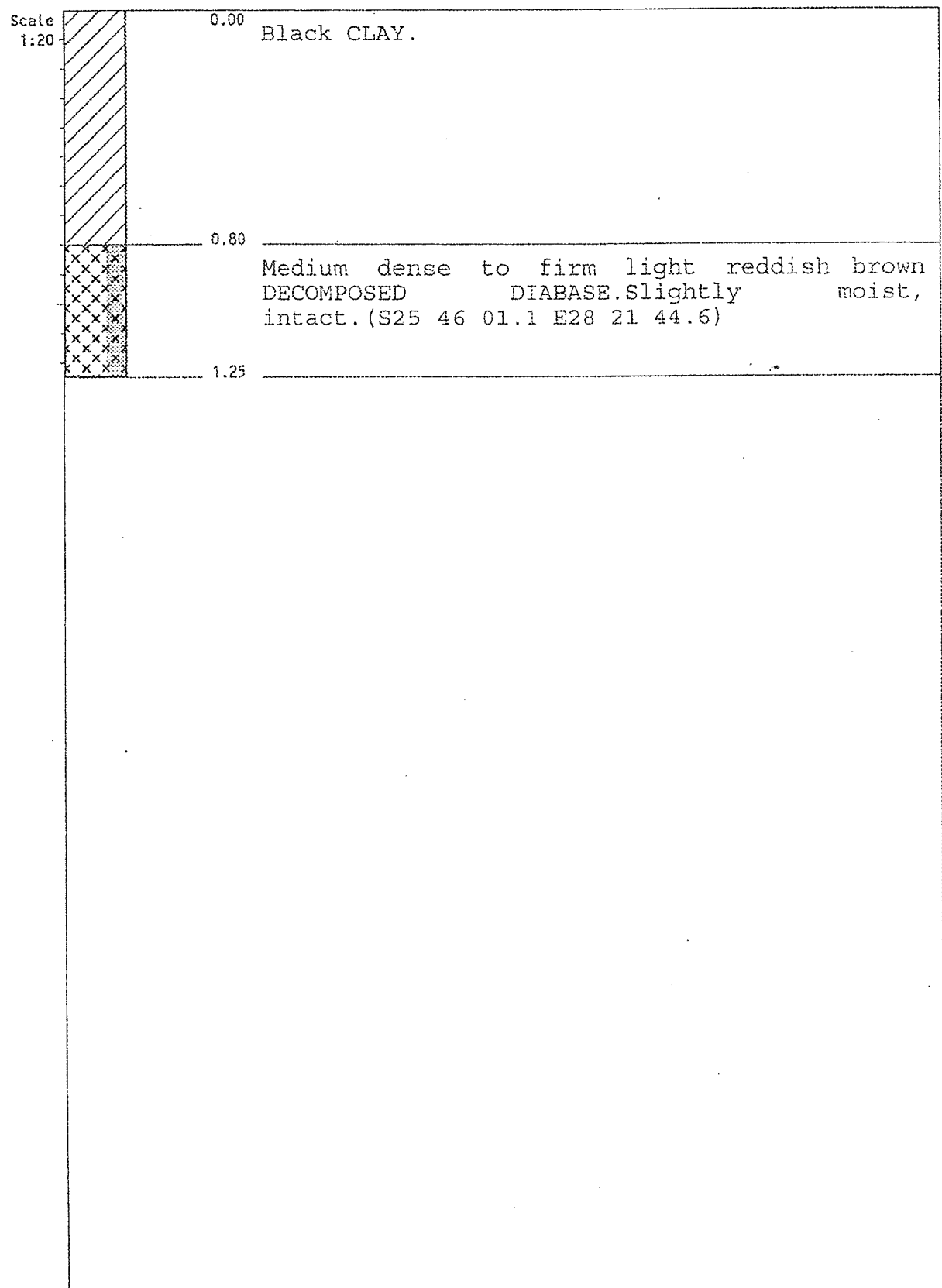


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HOLE No: TP2

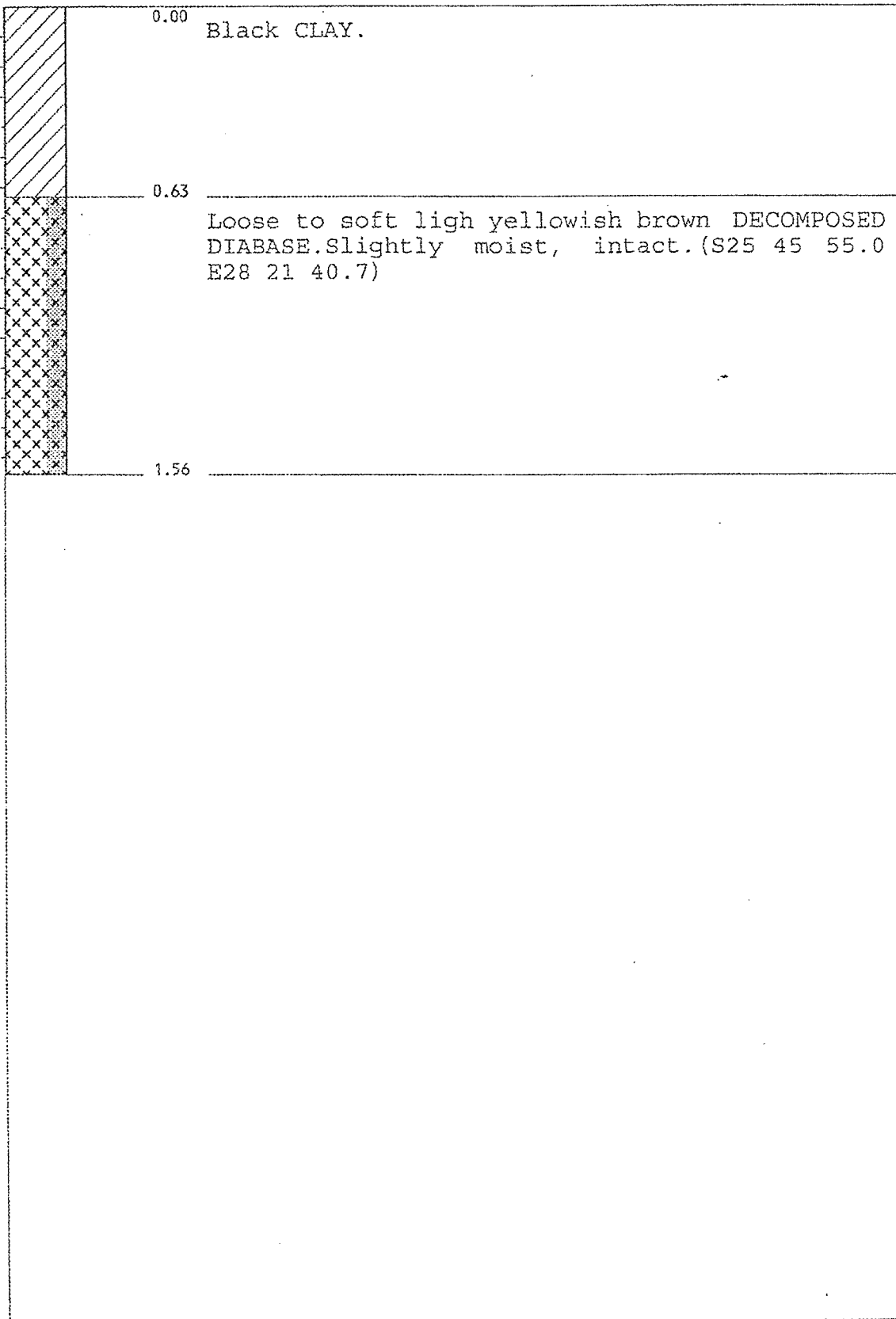


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 HOLE No: TP3

Scale
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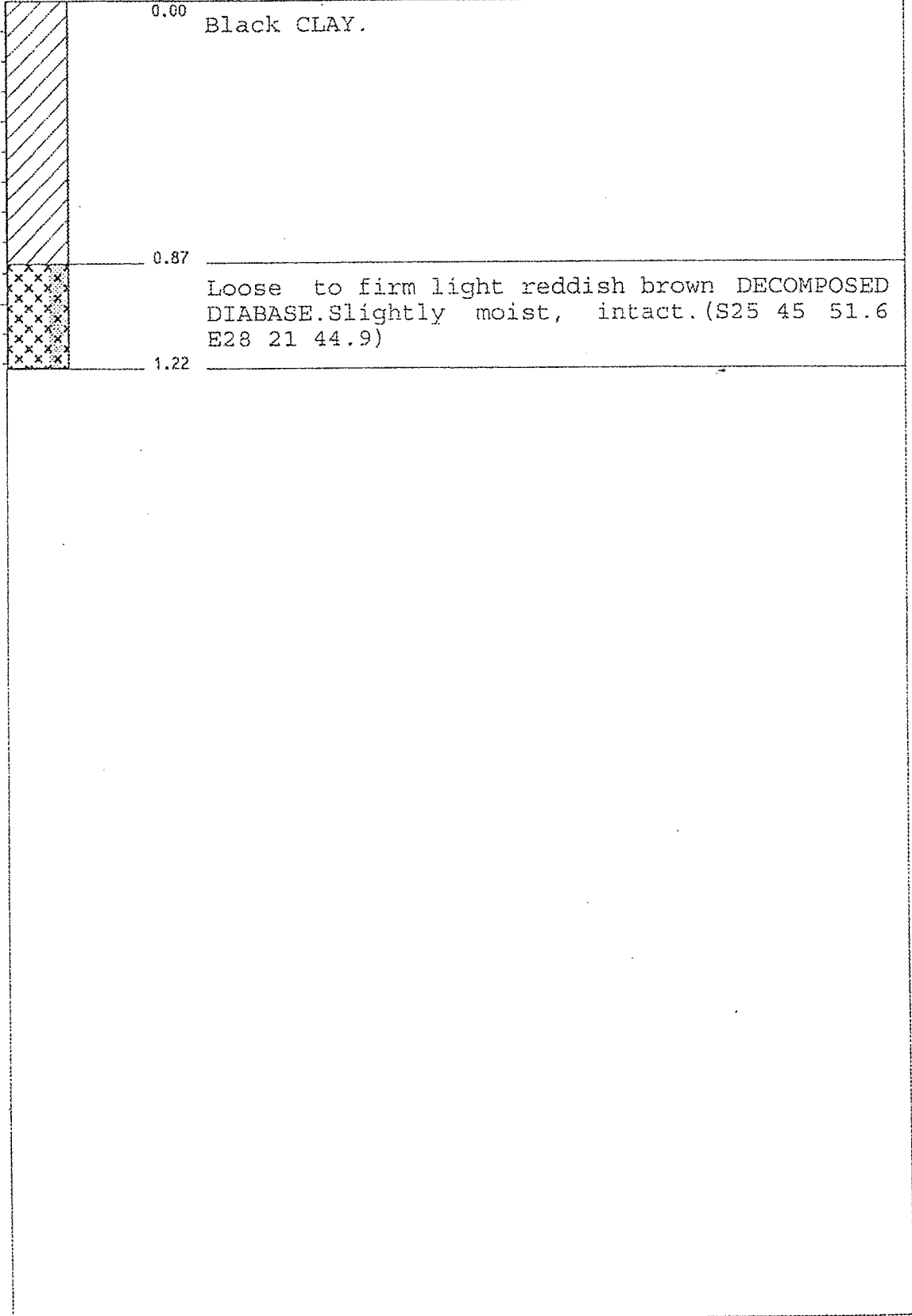
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 X-COORD :
 Y-COORD :

HOLE No: TP4

Scale
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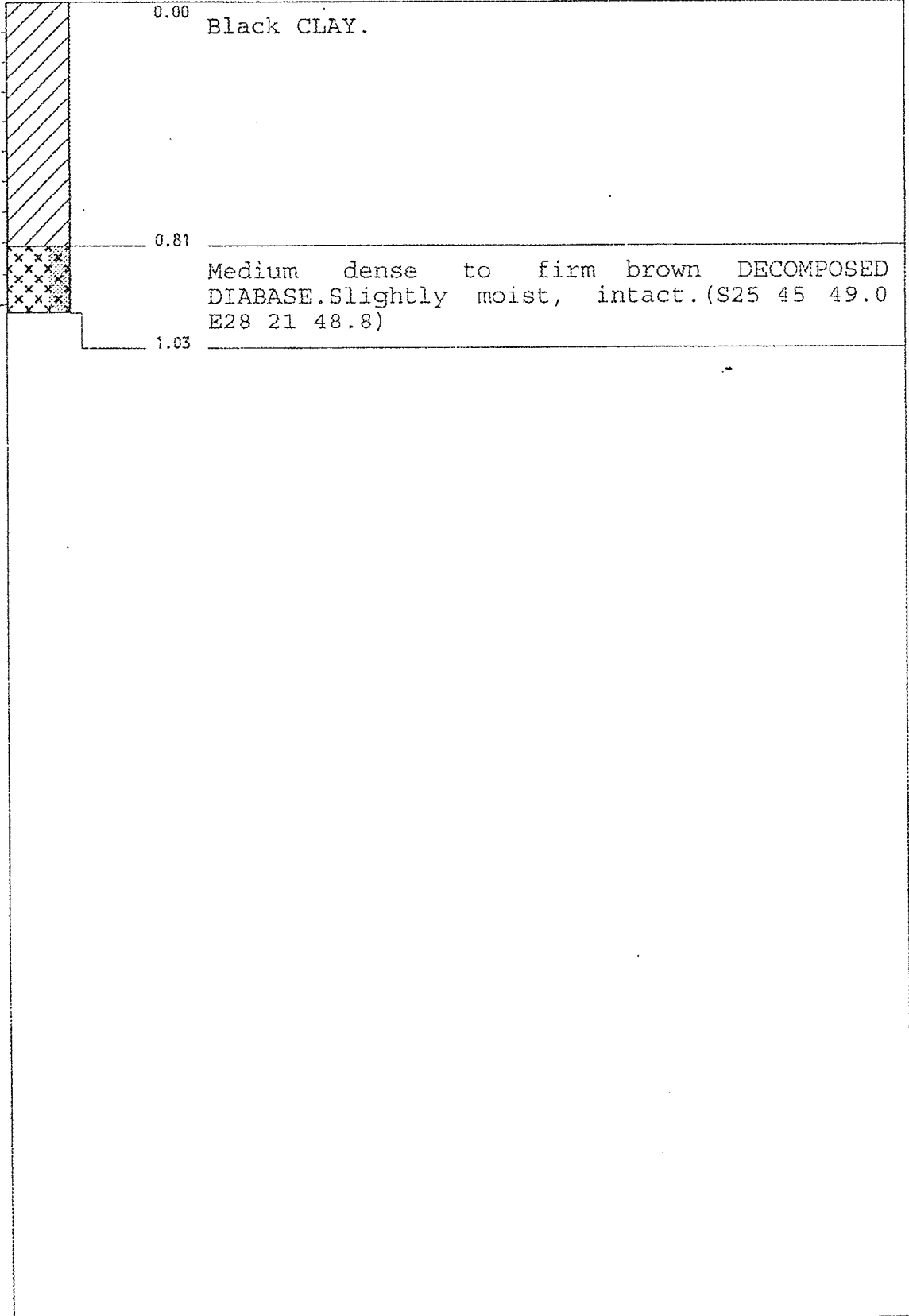
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ELEVATION :
 X-COORD :
 Y-COORD :

HOLE No: TP5

Scale
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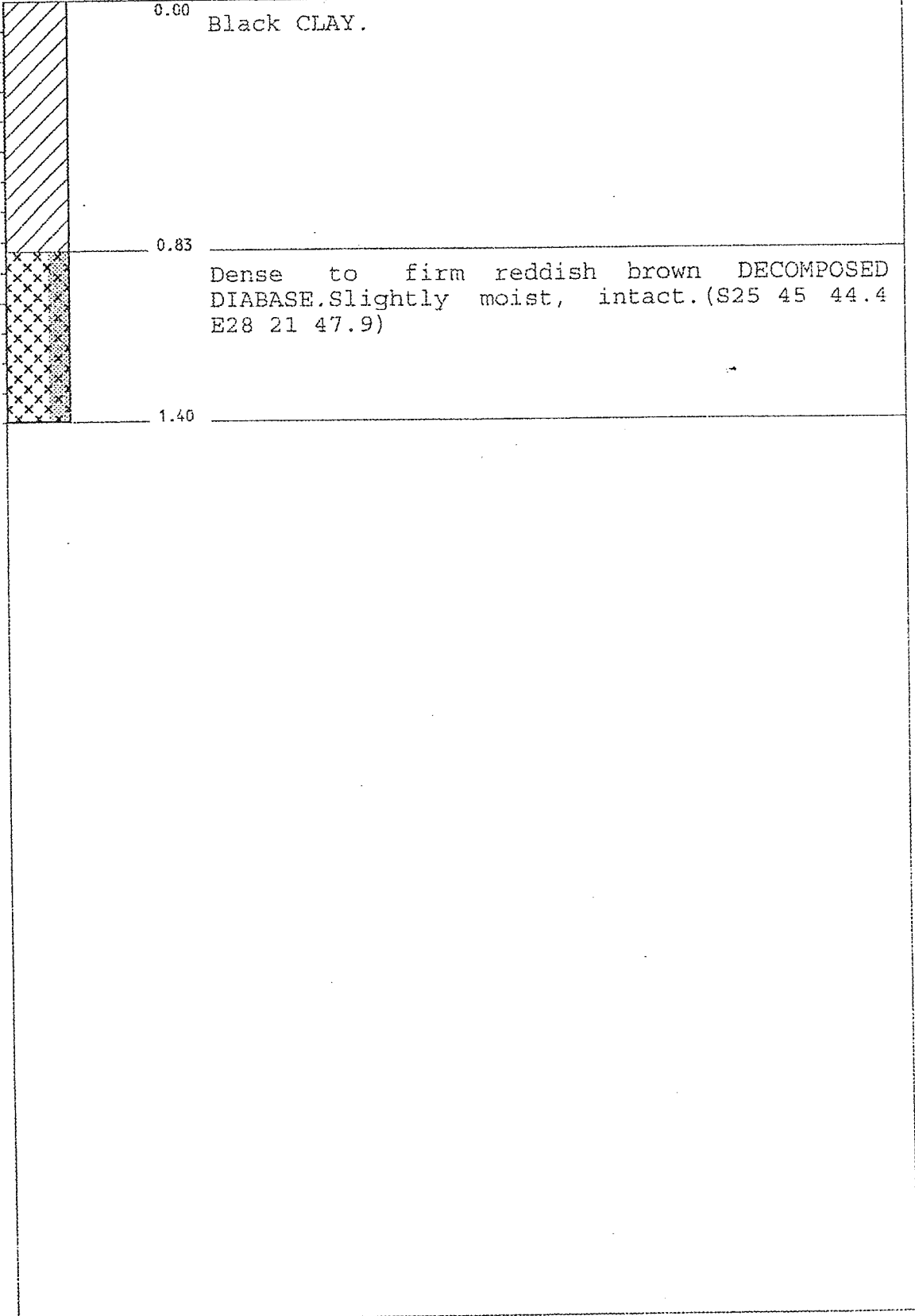
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ELEVATION :
 X-COORD :
 Y-COORD :

HOLE No: TP6

Scale
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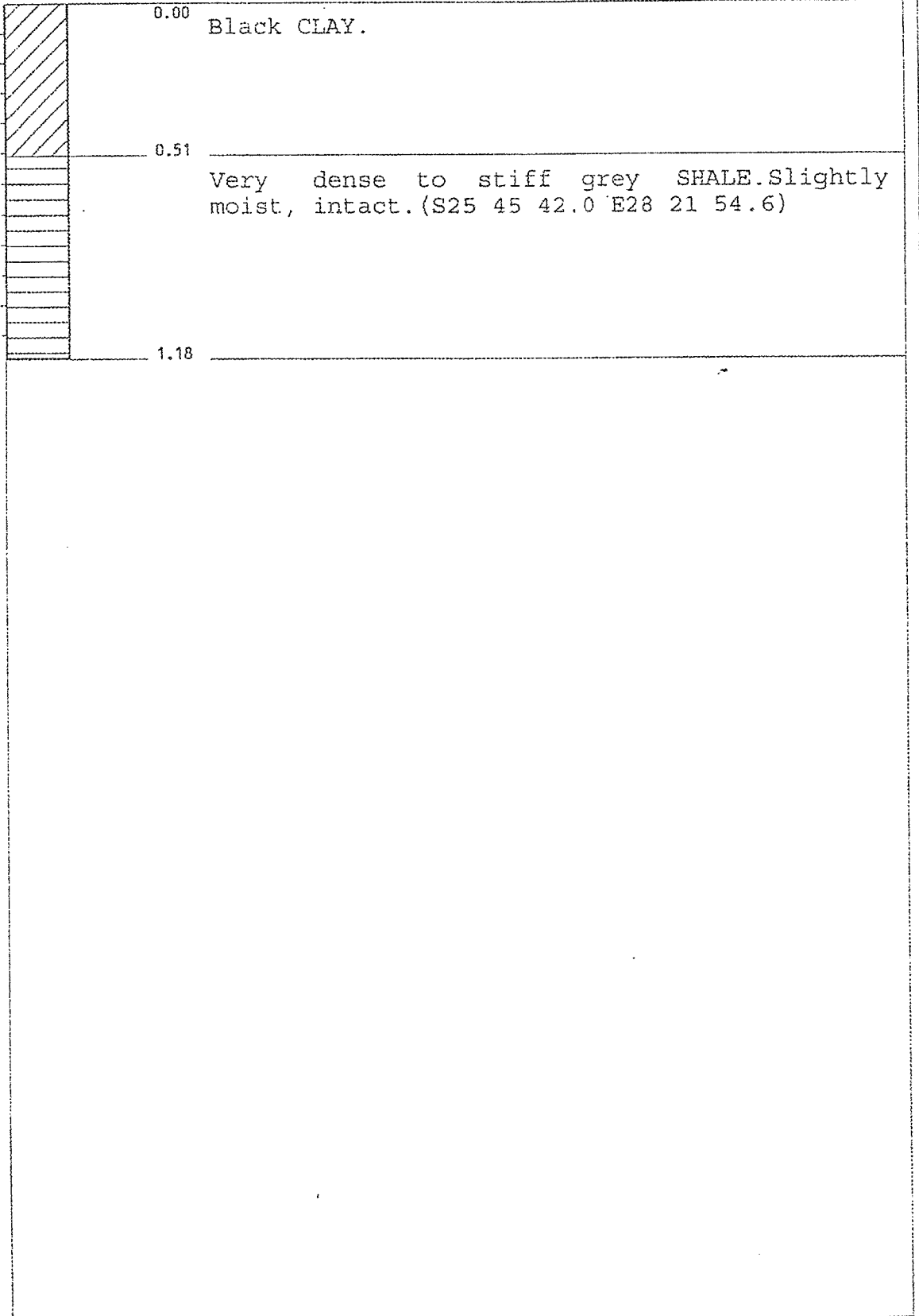


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Y-COORD :

Scale
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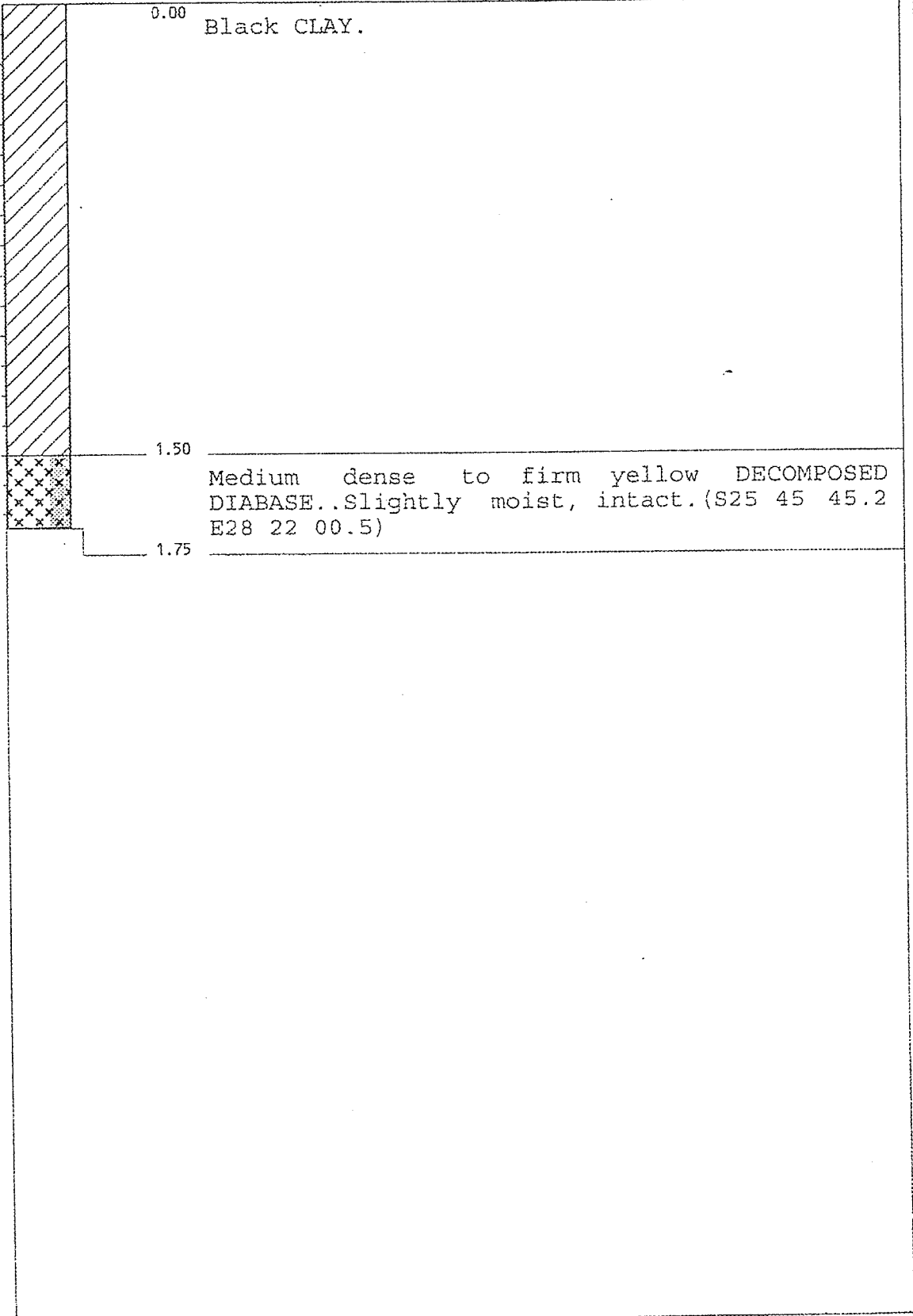
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HOLE No: TP8

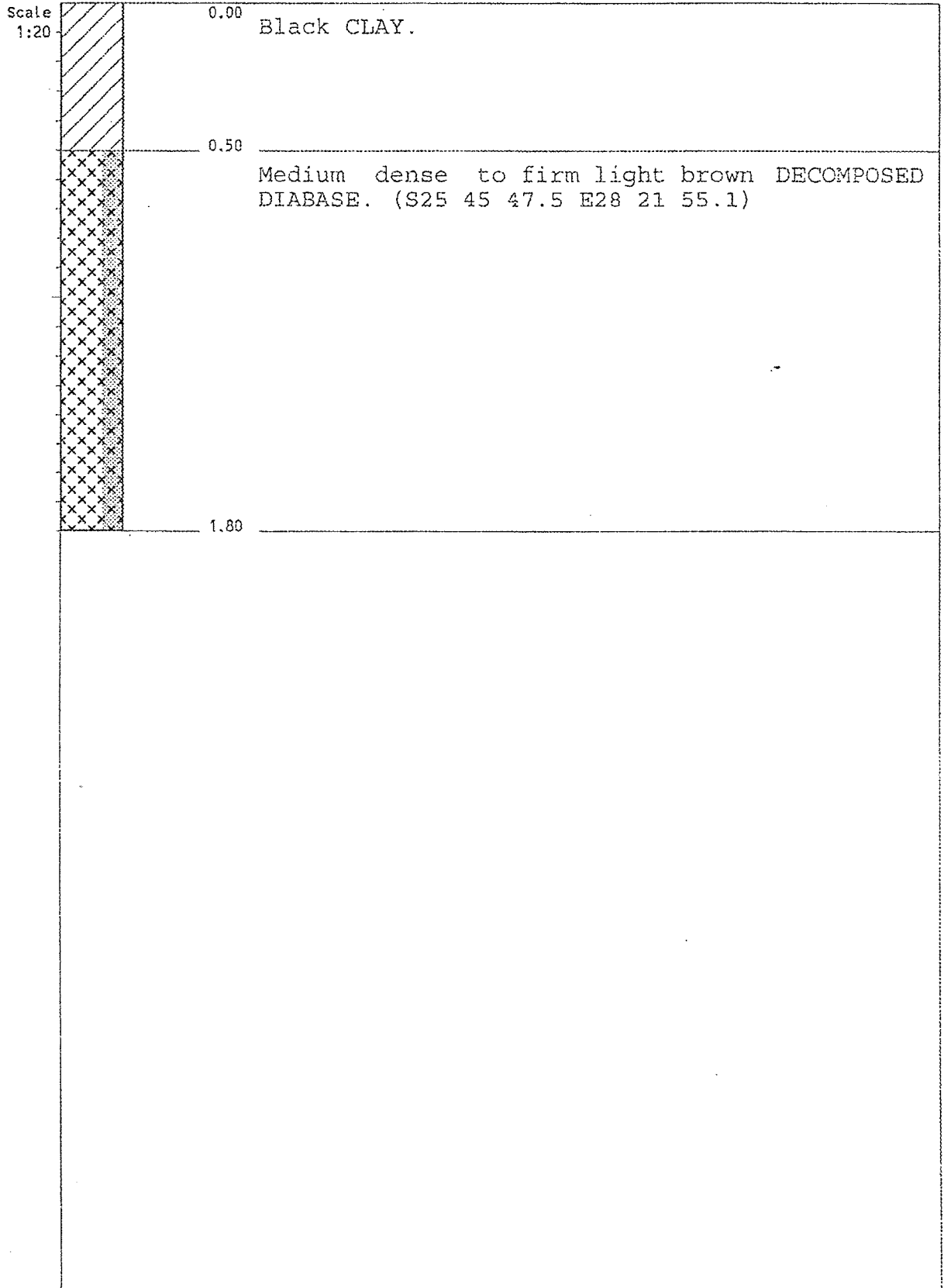
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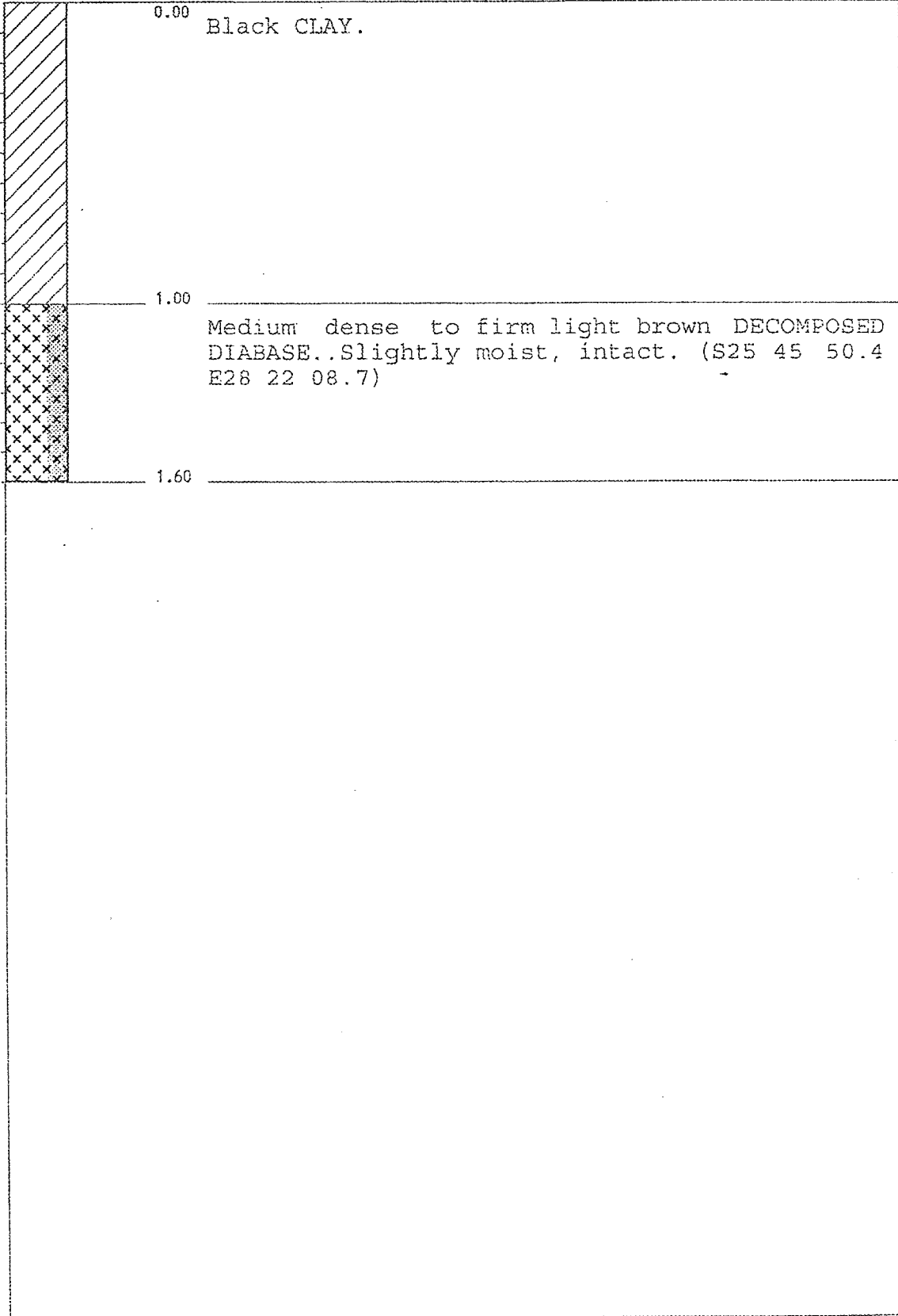
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ELEVATION :
 X-COORD :
 Y-COORD :

HOLE No: TP10

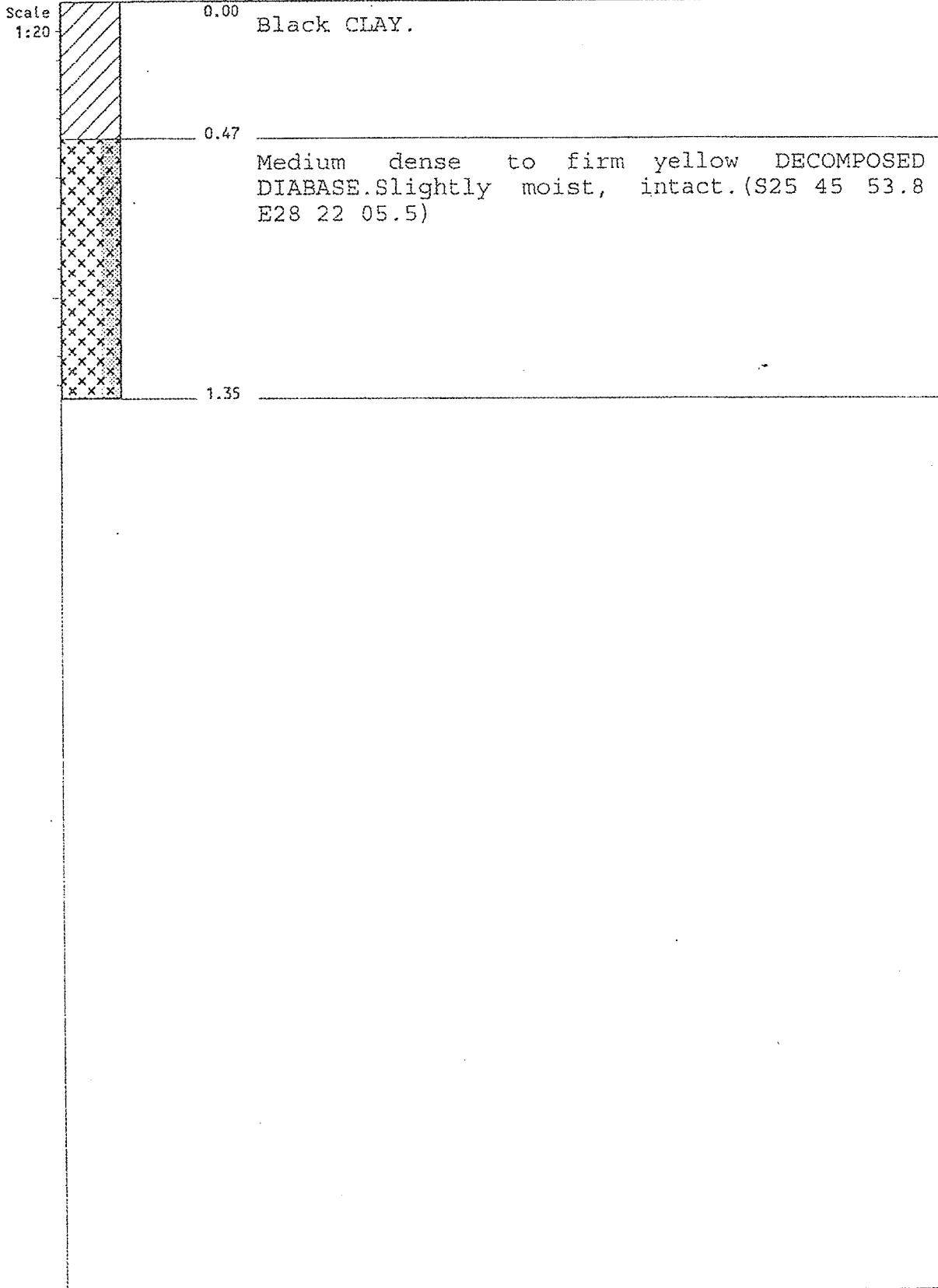
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 X-COORD :
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 HOLE No: TP11

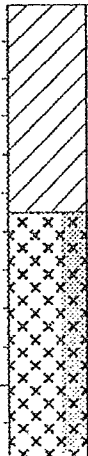


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ELEVATION :
X-COORD :
Y-COORD :

Scale
1:20



0.00 Black CLAY.

0.55 Medium dense to stiff brown DECOMPOSED
DIABASE. Slightly moist, intact. (S25 45 50.0
E28 22 01.4)

1.20

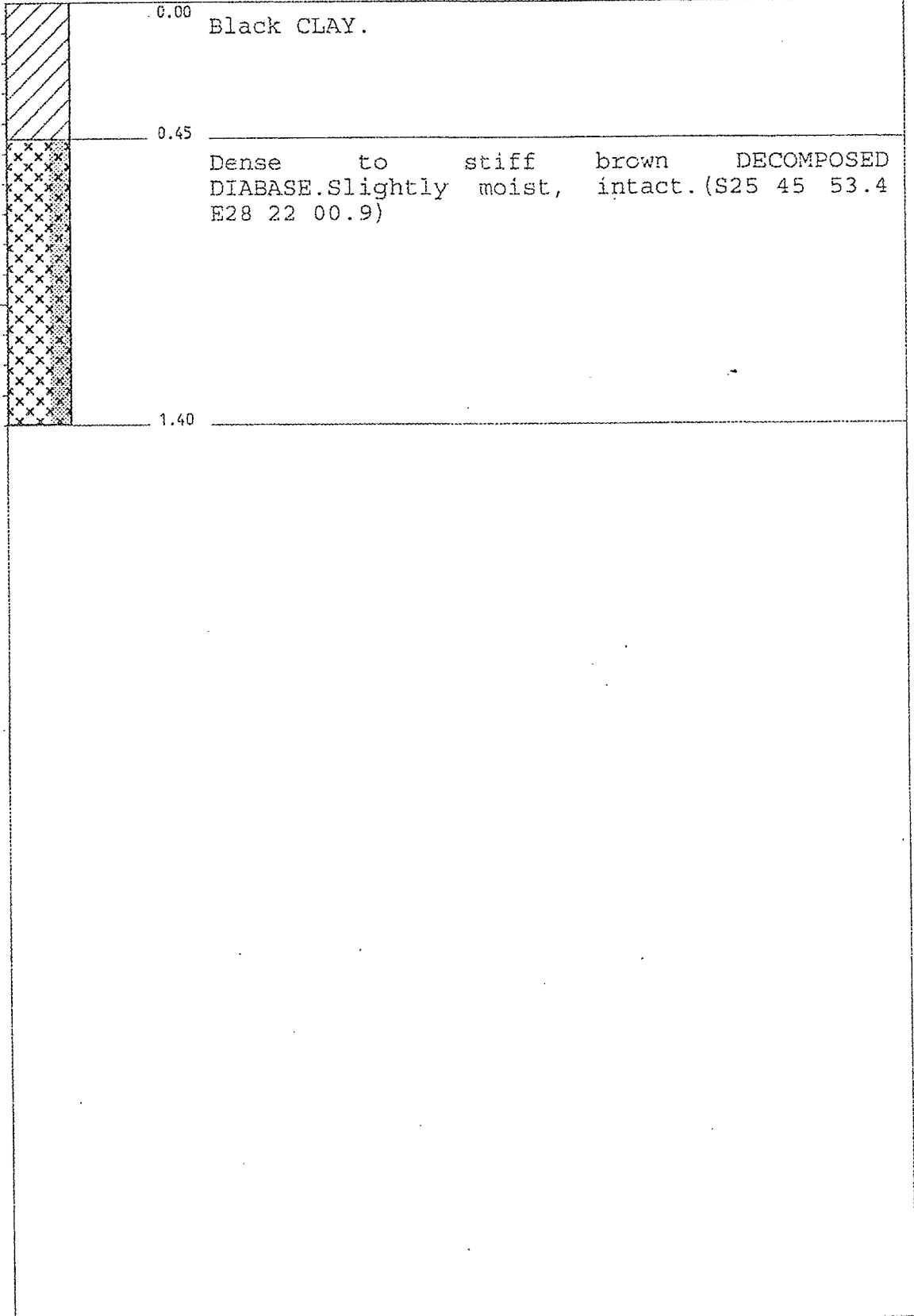
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ELEVATION :
X-COORD :
Y-COORD :

HOLE No: TP13

Scale
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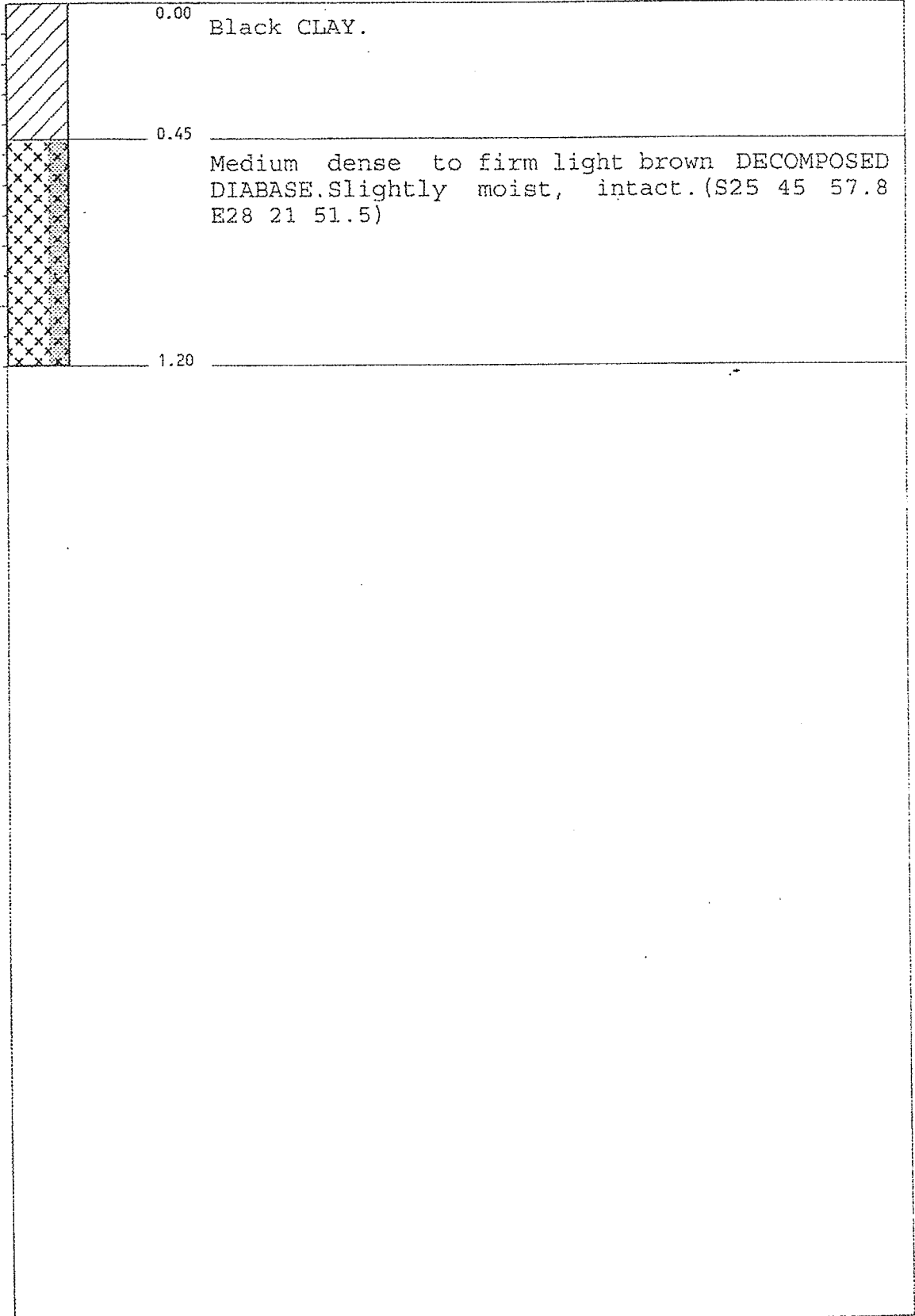
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ELEVATION :
 X-COORD :
 Y-COORD :

HOLE No: TP14

Scale
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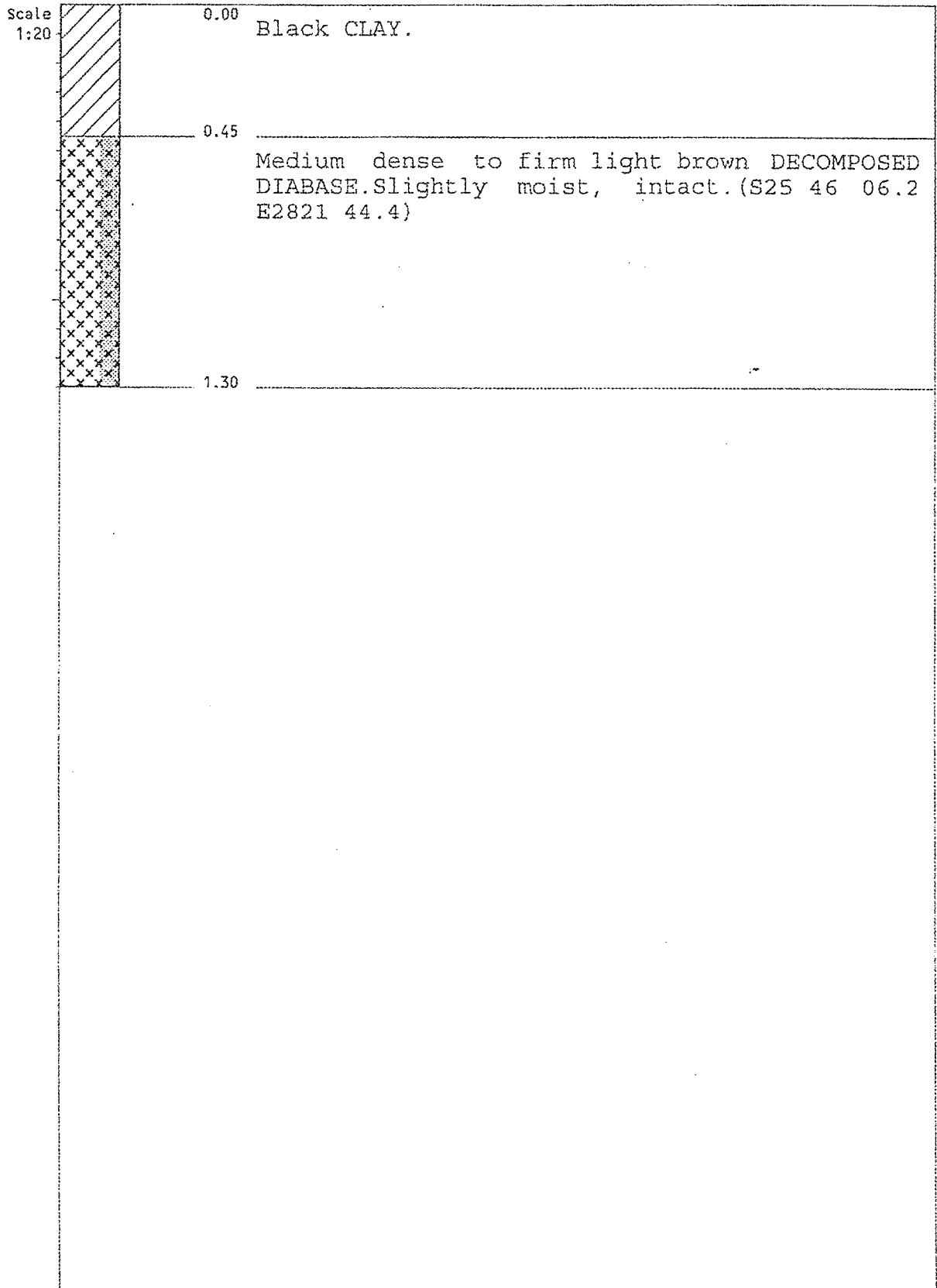


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ELEVATION :
X-COORD :
Y-COORD :

HOLE No: TP15



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ELEVATION :
 X-COORD :
 Y-COORD :

HOLE No: TP16

Lab reference No. : S02-821

Date Printed: 2002-12-10

Customer: BVI

Job Number: S02-821

Job Description: SILVER WILLOWS

Contract Number

Road Number

Date: 2002-11-15

SAMPLE DESCRIPTION		07139	07140	07142	07141	07143	07144
Sample Number		07139	07140	07142	07141	07143	07144
Sample Position		TP 1	TP 2	TP 3	TP 3	TP 4	TP 5
Sample Depth (mm)	400-1300	400-1350	0-800	800-1250	630-1560	870-1220	
Material Description	DARK BROWN DEC. DIABASE CLAYEY SAND	DARK BROWN FINE GRAVEL	DARK BROWN SANDY SILT	DARK BROWN FINE GRAVEL	LIGHT BROWN DEC. DIABASE FINE GRAVEL	DARK BROWN SAND	
Max size of boulder (mm)	-	-	-	-	160	-	
SCREEN ANALYSIS (% PASS)							
75,00 mm	100	100	100	100	100	100	100
63,00 mm	100	100	100	100	84	100	100
53,00 mm	100	100	100	100	82	100	100
37,50 mm	100	100	100	100	80	100	100
26,50 mm	100	100	100	100	79	100	100
19,00 mm	100	100	100	100	77	100	100
13,20 mm	100	100	100	100	77	100	100
4,750 mm	98	100	99	100	74	100	100
2,000 mm	82	94	98	98	63	93	93
0,425 mm	25	29	70	36	22	30	30
0,075 mm	11	9	46	18	8	17	17
SOIL MORTAR							
Coarse Sand 2,000-0,425	69	69	28	62	64	68	68
Coarse Fine Sd 0,425-0,250	7	9	9	9	11	6	6
Medium Fine Sd 0,250-0,150	6	7	7	6	7	4	4
Fine Fine Sand 0,150-0,075	5	5	8	5	5	4	4
Material <0,075	13	10	48	18	13	18	18
CONSTANTS							
Grading Modulus	1.82	1.68	0.86	1.46	2.07	1.60	1.60
Liquid Limit	31	23	39	32	29	39	39
Plasticity Index	11	6	8	6	4	10	10
Linear Shrinkage (%)	5.5	3.0	4.0	3.0	2.0	5.0	5.0
Sand Equivalent							
Classification - TRB	A-2-6 (0)	A-1-b (0)	A-4 (2)	A-1-b (0)	A-1-b (0)	A-2-4 (0)	A-2-4 (0)
Classification - TRH14	G7				G7	G7	G7
CBR / UCS VALUES		CBR				CBR	CBR
MOD. AASHTO							
Max Dry Density (kg/m ³)	2098				2119	2081	2081
Optimum Moisture Cont (%)	10.2				9.4	10.7	10.7
Moulding Moisture Cont (%)	10.2				9.1	10.6	10.6
Dry Density (kg/m ³)	2082				2115	2058	2058
% of Max Dry Density	99.2				99.8	99.9	99.9
100% Mod CBR/UCS	30				50	43	43
% Swell	0.4				0.0	0.3	0.3
NRB							
Dry Density (kg/m ³)	2008				2025	1948	1948
% of Max Dry Density	95.7				95.6	94.5	94.5
100% NRB CBR/UCS	28				26	28	28
% Swell	0.2				0.1	0.5	0.5
PROCTOR							
Dry Density (kg/m ³)	1916				1976	1866	1866
% of Max Dry Density	91.3				93.3	90.5	90.5
100% Proc CBR/UCS	15				23	16	16
% Swell	0.1				0.0	0.6	0.6
CBR / UCS VALUES							
100% Mod AASHTO	30				51	44	44
98% Mod AASHTO	29				38	37	37
97% Mod AASHTO	29				32	34	34
95% Mod AASHTO	25				25	29	29
93% Mod AASHTO	19				23	23	23
90% Mod AASHTO	12				19	15	15

Customer : BVI

Job Number : S02-821

Job Description : SILVER WILLOWS

Contract Number :

Road Number :

Date : 2002-11-15

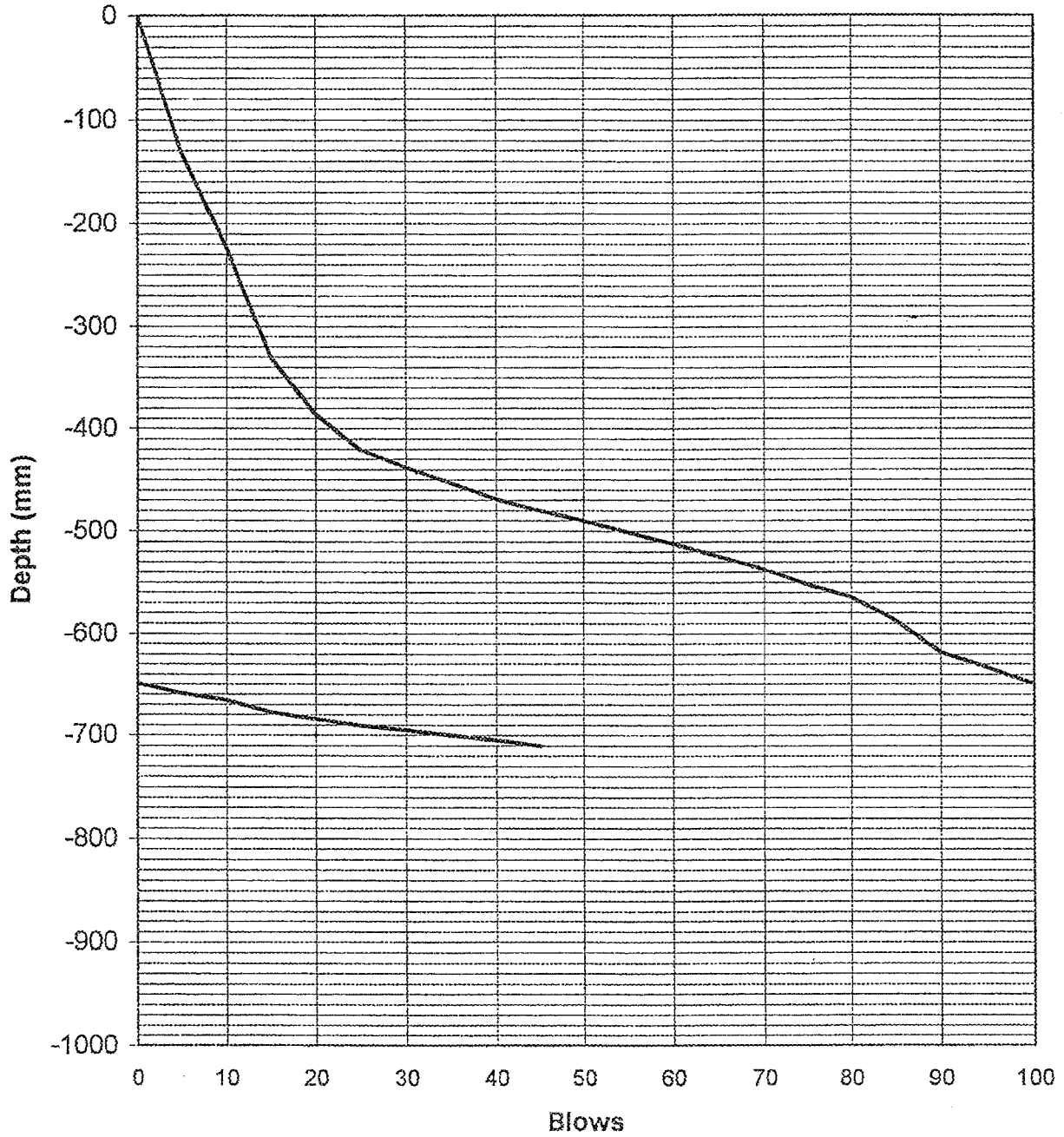
SAMPLE DESCRIPTION	07145	07146	07147	07148	07149	07150
Sample Number	07145	07146	07147	07148	07149	07150
Sample Position	TP 6	TP 7	TP 8	TP 9	TP 10	TP 11
Sample Depth (mm)	810-1030	830-1400	510-1180	0-1500		100-1600
Material Description	LIGHT OLIVE DEC. DIABASE FINE GRAVEL	DARK R/B DEC. DIABASE SILTY GRAVEL	DARK GREY SHALES SILTY GRAVEL	LIGHT GREY DEC. DIABASE SANDY CLAY	LIGHT GREY DEC. DIABASE SAND	LIGHT BROWN DEC. DIABASE SAND
Max size of boulder (mm)	-	-	120	-	-	-
SCREEN ANALYSIS (% PASS)						
75,00 mm	100	100	100	100	100	100
63,00 mm	100	84	85	100	100	100
53,00 mm	100	82	75	100	100	100
37,50 mm	100	80	69	100	100	100
28,50 mm	100	79	49	100	100	100
19,00 mm	100	77	47	100	100	100
13,20 mm	100	76	45	100	100	100
4,750 mm	98	64	24	100	94	98
2,000 mm	84	45	15	96	61	78
0,425 mm	22	33	9	62	18	23
0,075 mm	9	27	7	49	10	13
SOIL MORTAR						
Coarse Sand 2,000-0,425	75	26	42	35	70	71
Coarse Fine Sd 0,425-0,250	7	4	3	4	6	5
Medium Fine Sd 0,250-0,150	4	4	2	5	4	4
Fine Fine Sand 0,150-0,075	3	5	2	5	4	4
Material <0,075	11	61	51	51	16	16
CONSTANTS						
Grading Modulus	1.85	1.95	2.69	0.93	2.11	1.86
Liquid Limit	32	53	75	67	40	36
Plasticity Index	4	14	26	22	10	8
Linear Shrinkage (%)	2.0	7.0	12.0	11.0	5.0	4.0
Sand Equivalent						
Classification - TRB	A-1-b (0)	A-2-7 (0)	A-2-7 (0)	A-7-5 (8)	A-2-4 (0)	A-2-4 (0)
Classification - TRH14		>G10	G8	>G10		
CBR / UCS VALUES						
		CBR	CBR	CBR		
MOD. AASHTO						
Max Dry Density (kg/m ³)		1892	1978	1691		
Optimum Moisture Cont (%)		12.6	11.5	16.7		
Moulding Moisture Cont (%)		12.9	11.7	17.0		
Dry Density (kg/m ³)		1897	1962	1695		
% of Max Dry Density		100.3	99.2	100.2		
100% Mod CBR/UCS		25	28	3		
% Swell		1.9	0.4	11.3		
NRB						
Dry Density (kg/m ³)		1798	1864	1485		
% of Max Dry Density		95.0	94.2	87.8		
100% NRB CBR/UCS		9	16	2		
% Swell		2.5	0.6	9.4		
PROCTOR						
Dry Density (kg/m ³)		1658	1749	1437		
% of Max Dry Density		87.6	88.4	85.0		
100% Proc CBR/UCS		3	10	2		
% Swell		2.0	0.4	5.9		
CBR / UCS VALUES						
100% Mod AASHTO		24	31	3		
98% Mod AASHTO		16	24	3		
97% Mod AASHTO		13	22	3		
95% Mod AASHTO		9	17	3		
93% Mod AASHTO		7	14	2		
90% Mod AASHTO		4	11	2		

Customer : BVI
 Job Description : SILVER WILLOWS
 Road Number :
 Job Number : S02-821
 Contract Number :
 Date : 2002-11-15

SAMPLE DESCRIPTION						
Sample Number	07151	07152	07153	07154	07155	
Sample Position	TP 12	TP 13	TP 14	TP 15	TP 16	
Sample Depth (mm)	470-1350	550-1200	450-1400	450-1200	450-1300	
Material Description	DARK BROWN CLAYEY SAND	LIGHT GREY DEC. DIABASE SILTY SAND	LIGHT BROWN DEC. DIABASE SAND	LIGHT BROWN SAND	LIGHT BROWN DEC. DIABASE FINE GRAVEL	
Max size of boulder (mm)	-	-	-	-	-	
SCREEN ANALYSIS (% PASS)						
75,00 mm	100	100	100	100	100	
63,00 mm	100	100	100	100	100	
53,00 mm	100	100	100	100	100	
37,50 mm	100	99	100	100	100	
26,50 mm	100	98	100	100	100	
19,00 mm	100	97	100	100	100	
13,20 mm	100	97	100	100	100	
4,750 mm	100	94	99	99	99	
2,000 mm	94	82	76	89	89	
0,425 mm	37	31	21	31	29	
0,075 mm	18	17	8	13	6	
SOIL MORTAR						
Coarse Sand 2,000-0,425	61	62	72	65	68	
Coarse Fine Sd 0,425-0,250	9	7	8	9	13	
Medium Fine Sd 0,250-0,150	6	5	5	6	7	
Fine Fine Sand 0,150-0,075	5	5	4	6	5	
Material <0,075	19	21	11	14	7	
CONSTANTS						
Grading Modulus	1.51	1.70	1.95	1.67	1.76	
Liquid Limit	36	43	32	29	24	
Plasticity Index	11	12	9	8	6	
Linear Shrinkage (%)	5.5	6.0	4.0	3.5	2.0	
Sand Equivalent						
Classification - TRB	A-2-6 (0)	A-2-7 (0)	A-2-4 (0)	A-2-4 (0)	A-1-b (0)	
Classification - TRH14		G7	G7		G7	
CBR / UCS VALUES						
		CBR	CBR		CBR	
MOD. AASHTO						
Max Dry Density (kg/m ³)		2089	2144		2128	
Optimum Moisture Cont (%)		9.8	7.5		8.2	
Moulding Moisture Cont (%)		9.8	7.7		8.2	
Dry Density (kg/m ³)		2072	2119		2137	
% of Max Dry Density		99.2	98.8		100.4	
100% Mod CBR/UCS		43	46		31	
% Swell		0.8	0.1		0.1	
NRB						
Dry Density (kg/m ³)		1945	2026		2052	
% of Max Dry Density		93.1	94.5		96.4	
100% NRB CBR/UCS		20	19		19	
% Swell		1.2	0.1		0.1	
PROCTOR						
Dry Density (kg/m ³)		1847	1939		2005	
% of Max Dry Density		88.4	90.4		94.2	
100% Proc CBR/UCS		10	14		18	
% Swell		0.8	0.0		0.1	
CBR / UCS VALUES						
100% Mod AASHTO		48	58		29	
98% Mod AASHTO		37	39		23	
97% Mod AASHTO		33	32		20	
95% Mod AASHTO		25	21		18	
93% Mod AASHTO		20	17		17	
90% Mod AASHTO		13	14		16	

SILVER WILLOWS

TP 1



NOTE: DKP WEIER BY 760mm

DKP/821-01A

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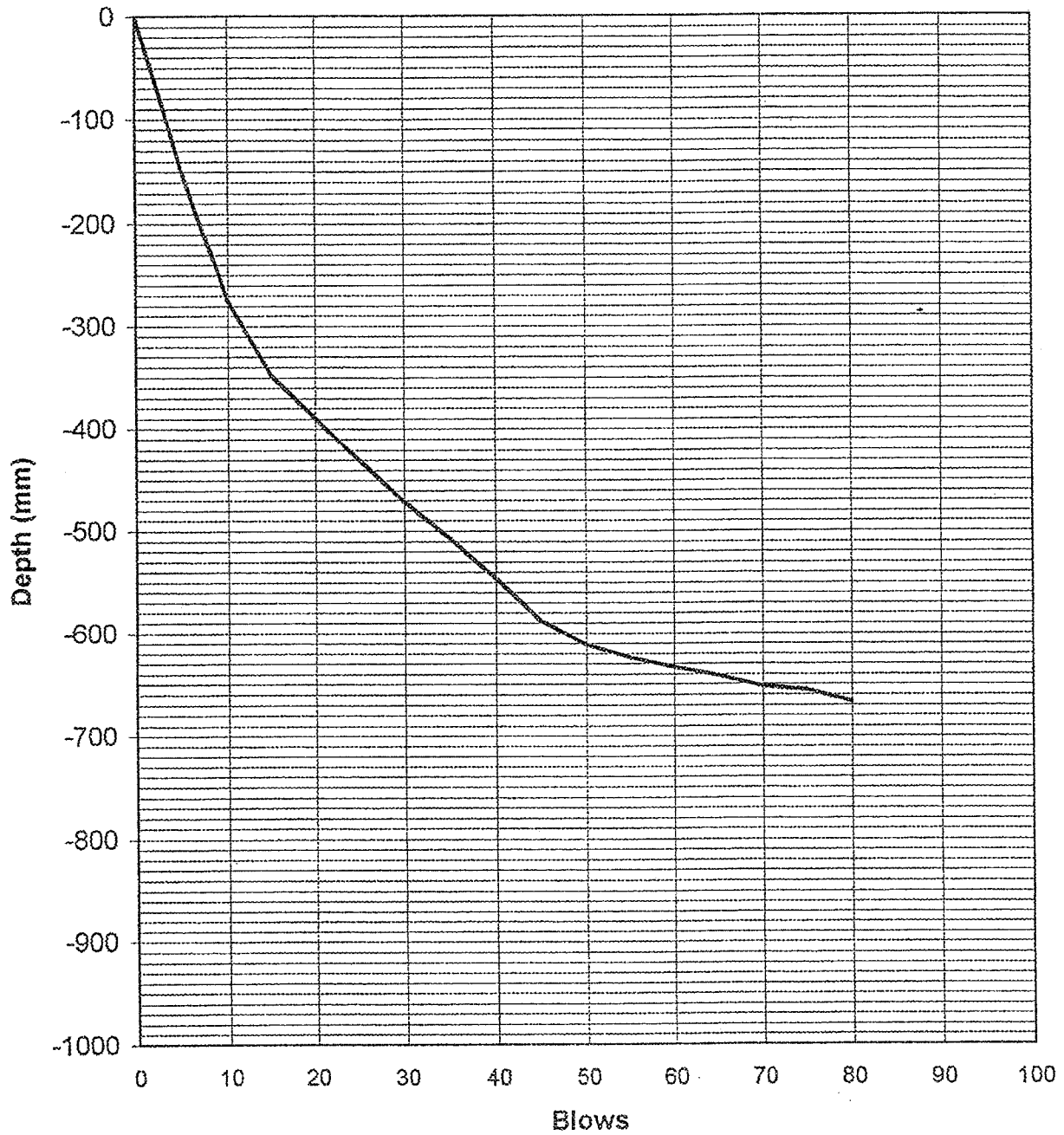
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SILVER WILLOWS
TP 2



NOTE: DKP WEIER BY 704mm

DKP/821-01B

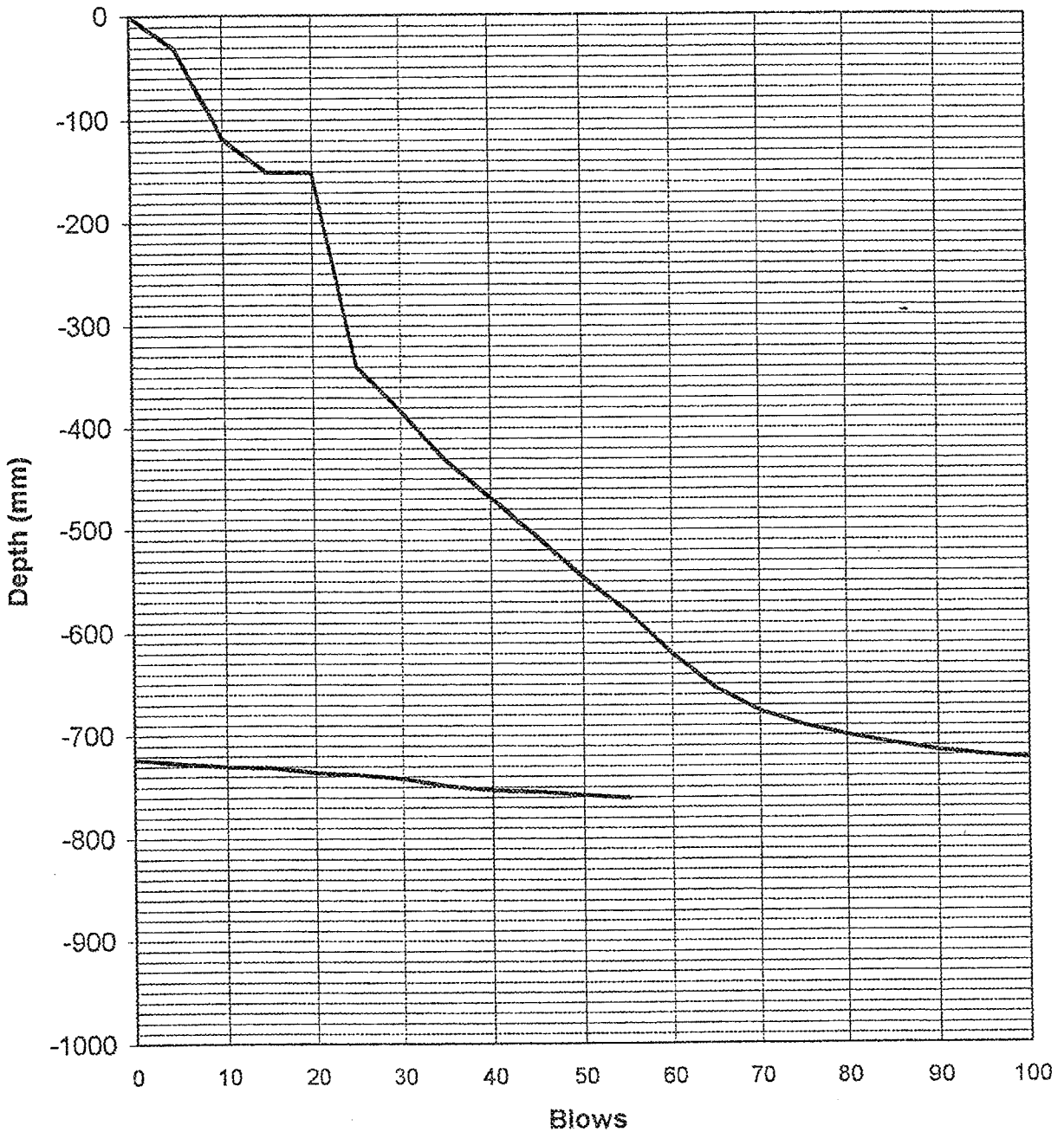
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TP 3



NOTE: DKP WEIER BY 790mm

DKP/821-01C

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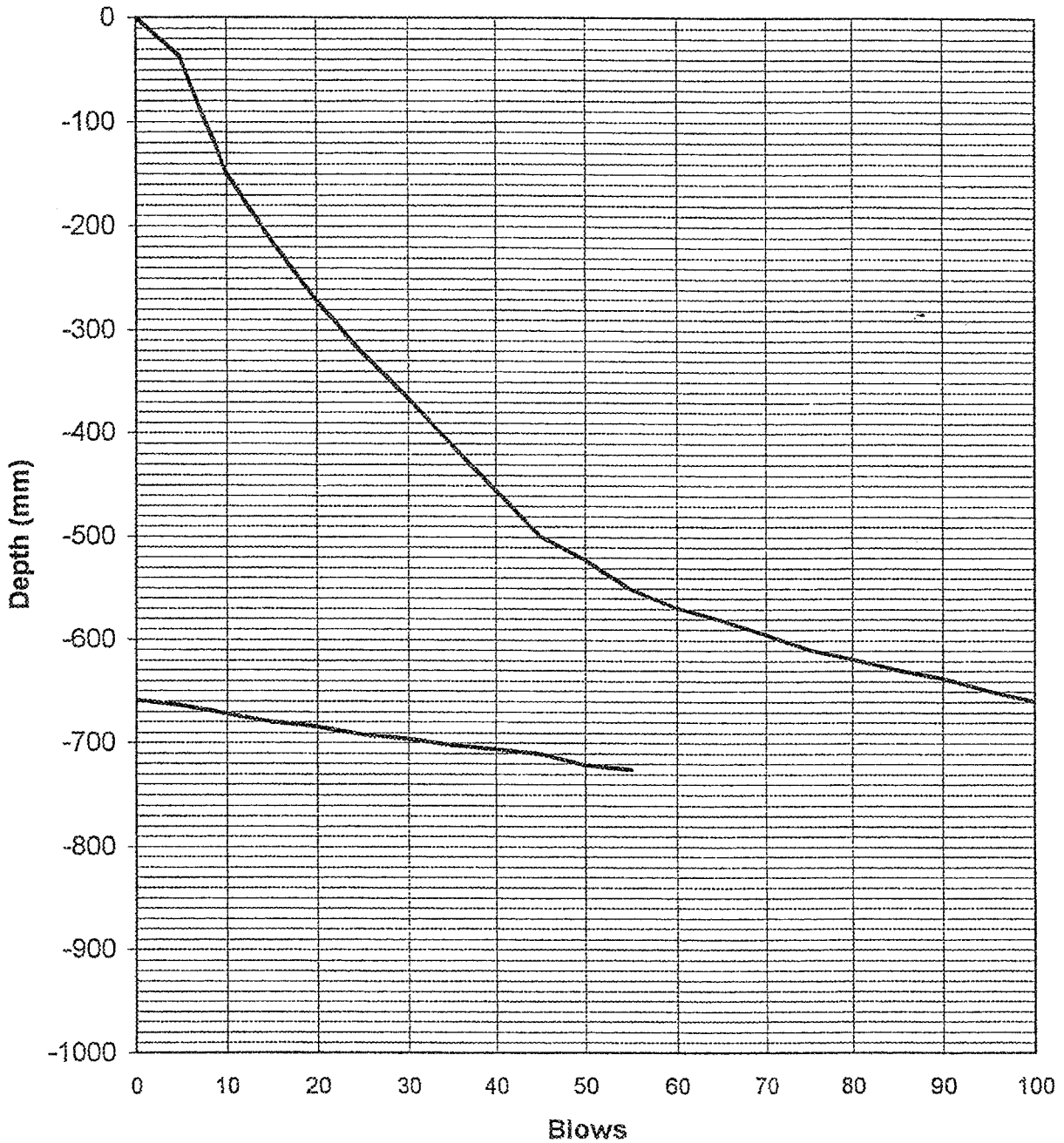
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SILVER WILLOWS

TP 4



NOTE: DKP WEIER BY 762mm

DKP/821-01D

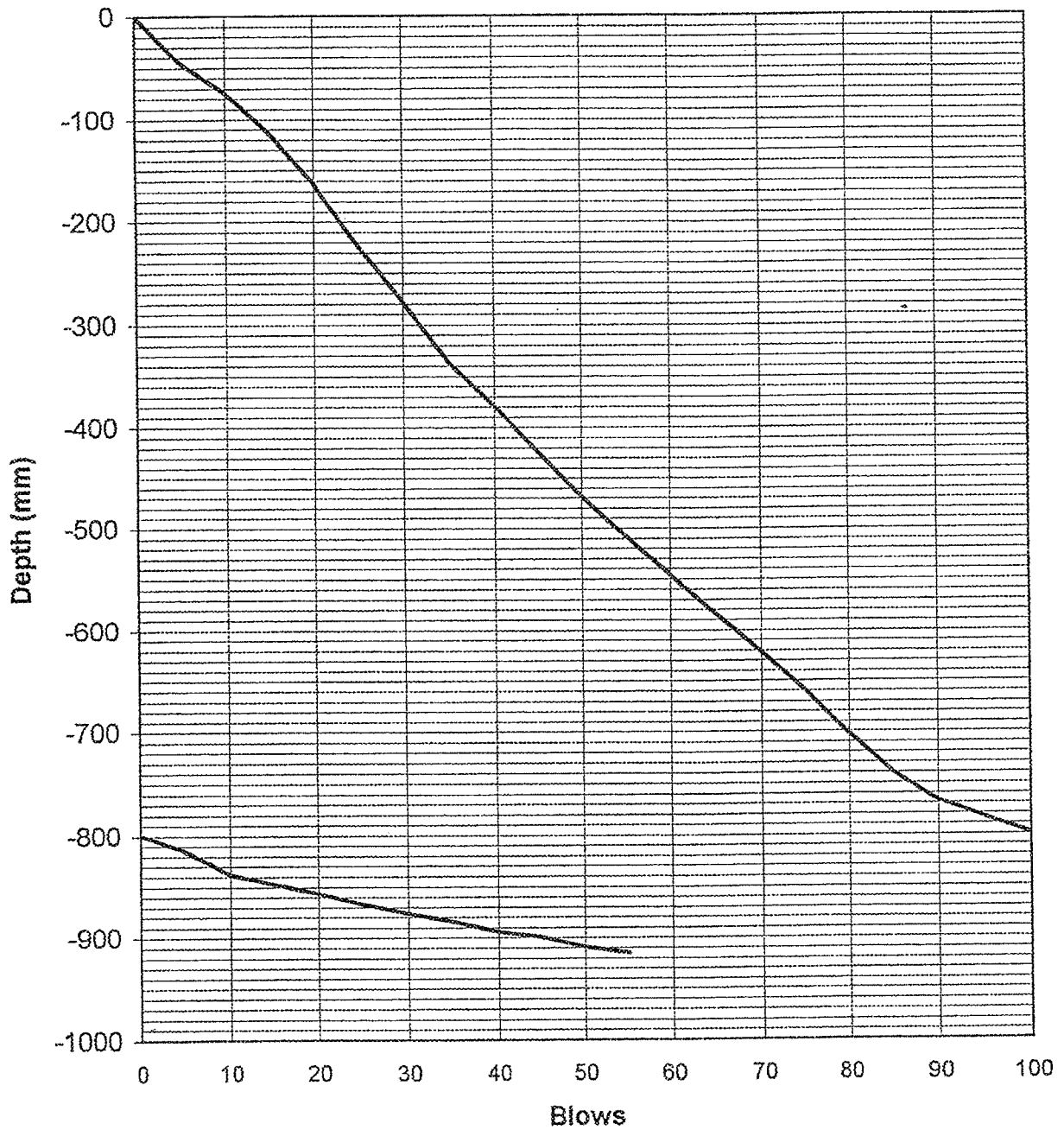
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SILVER WILLOWS
TP 5



NOTE: DKP WEIER BY 952mm

DKP/821-01E

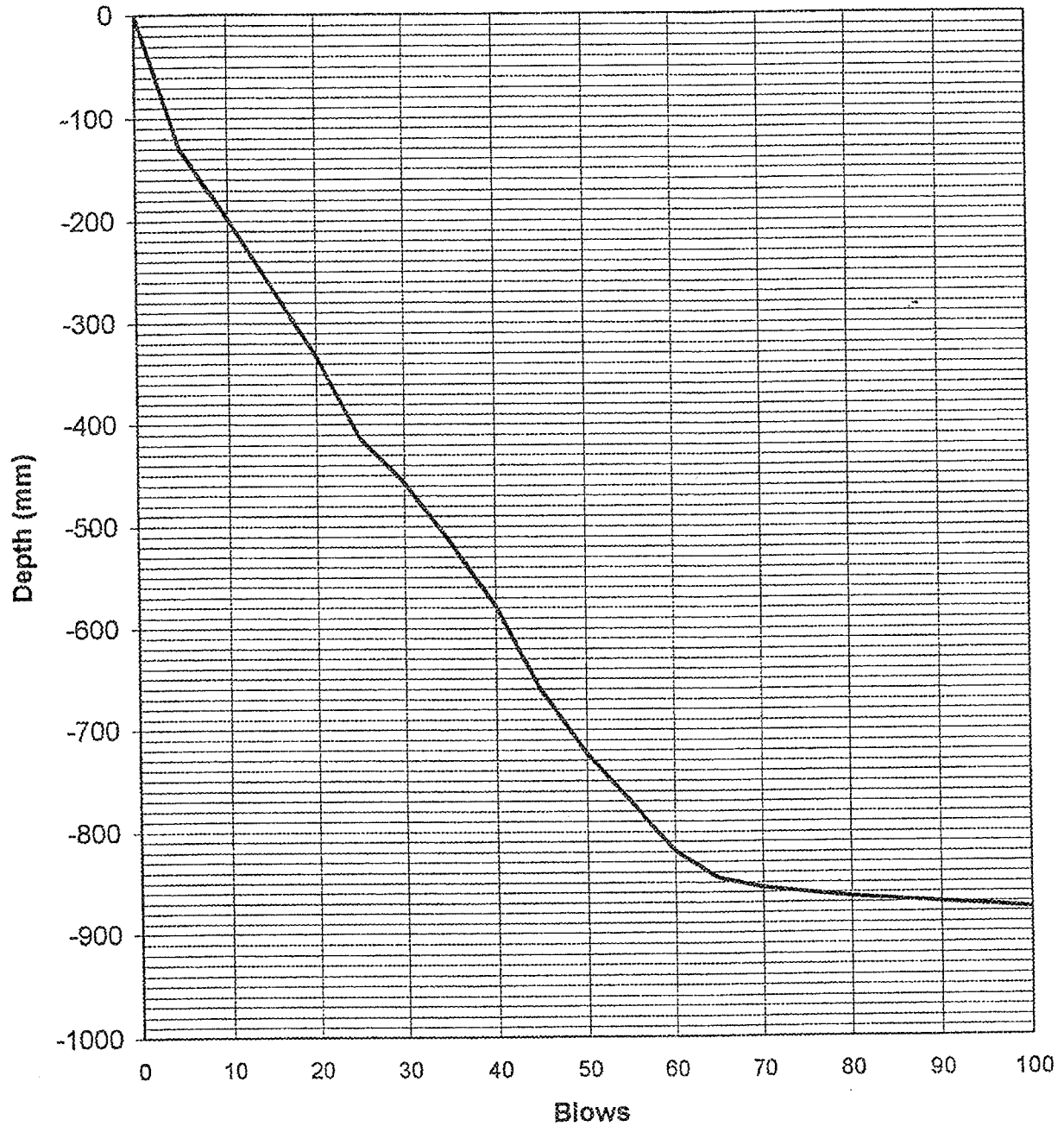
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SILVER WILLOWS
TP 6



NOTE: DKP WEIER BY 923mm

DKP/821-01F

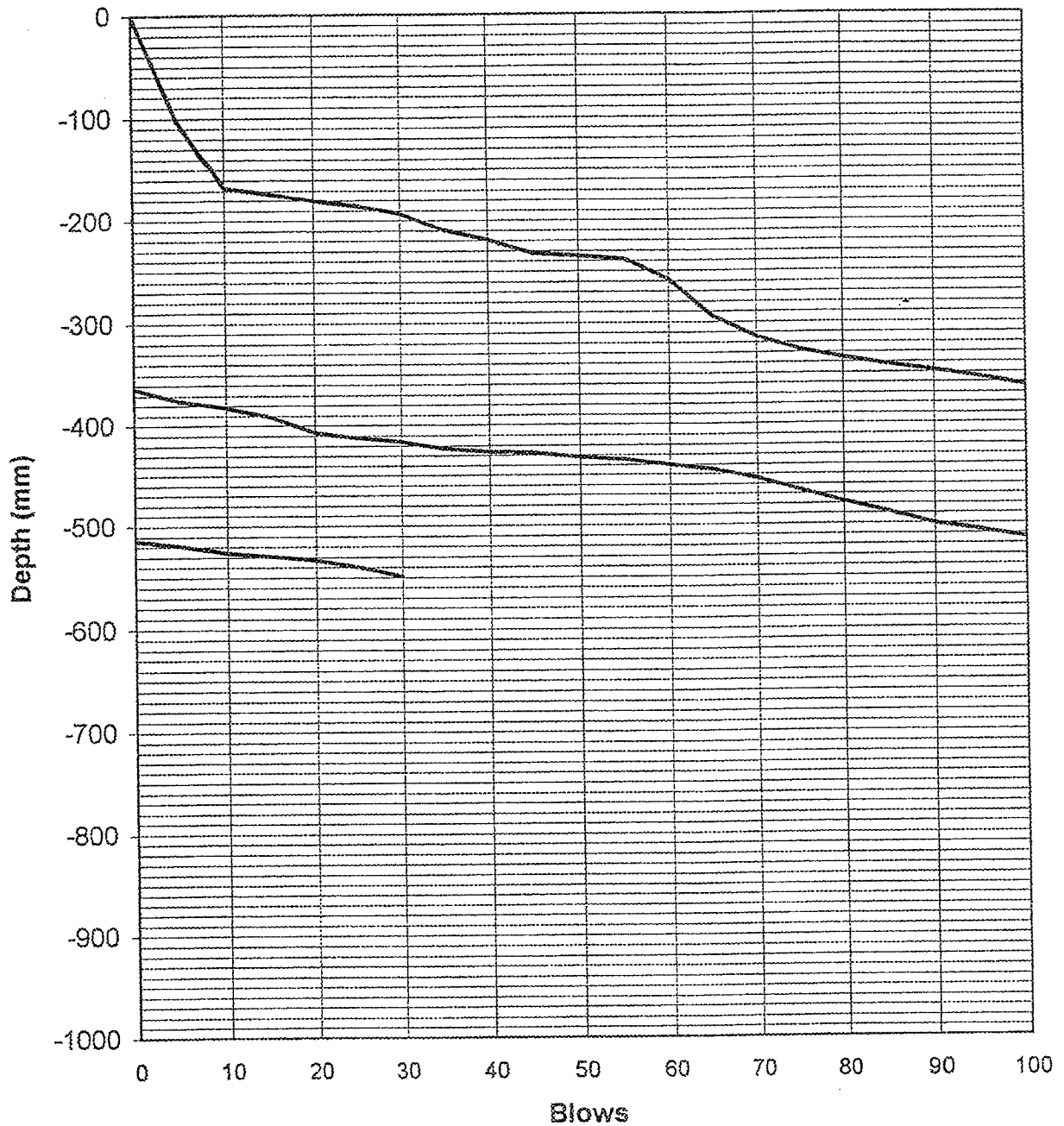
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SILVER WILLOWS
TP 7



NOTE: DKP WEIER BY 600mm

DKP/821-01G

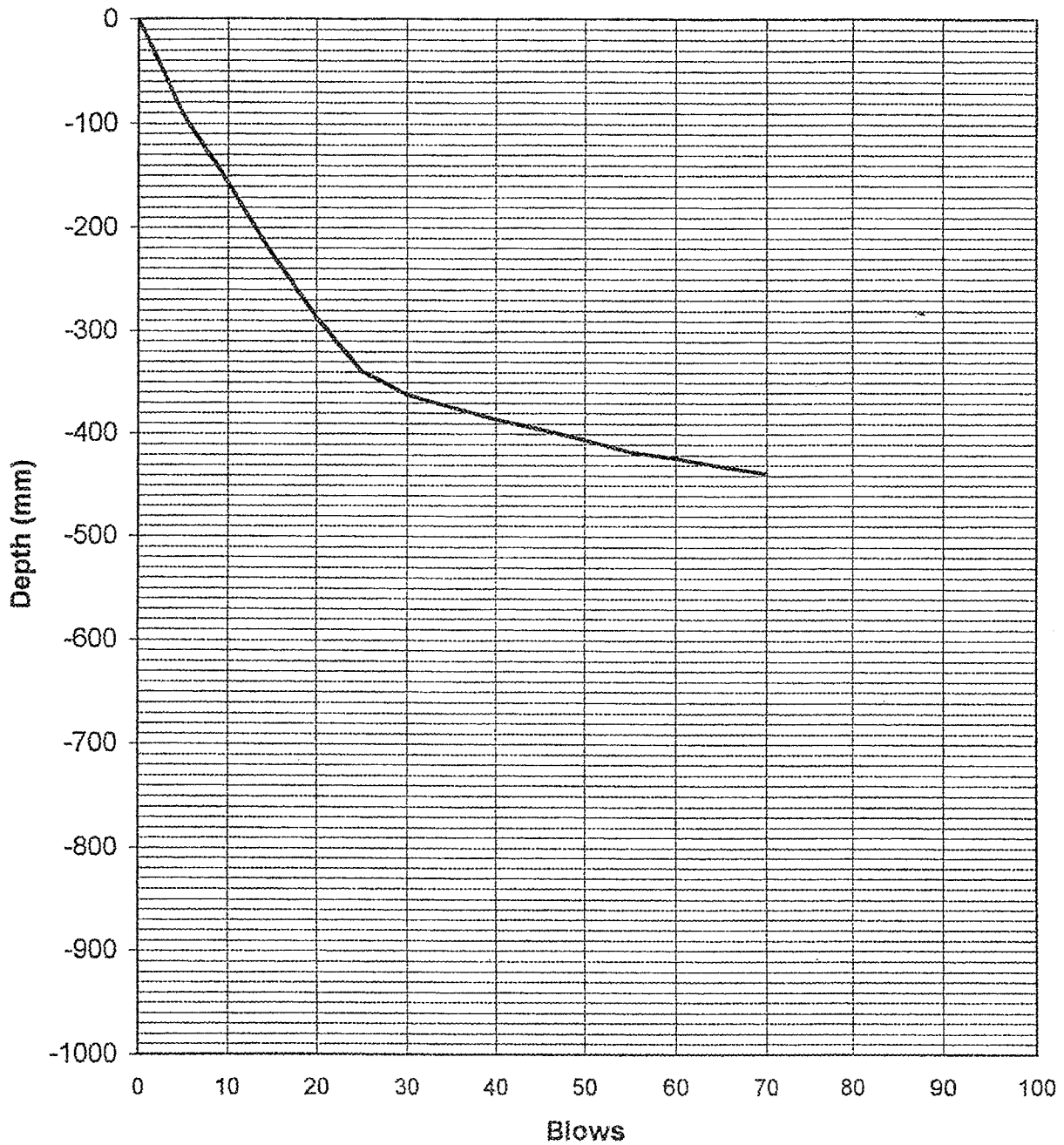
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SILVER WILLOWS
TP 8



NOTE: DKP WEIER BY 471mm

DKP/821-01H

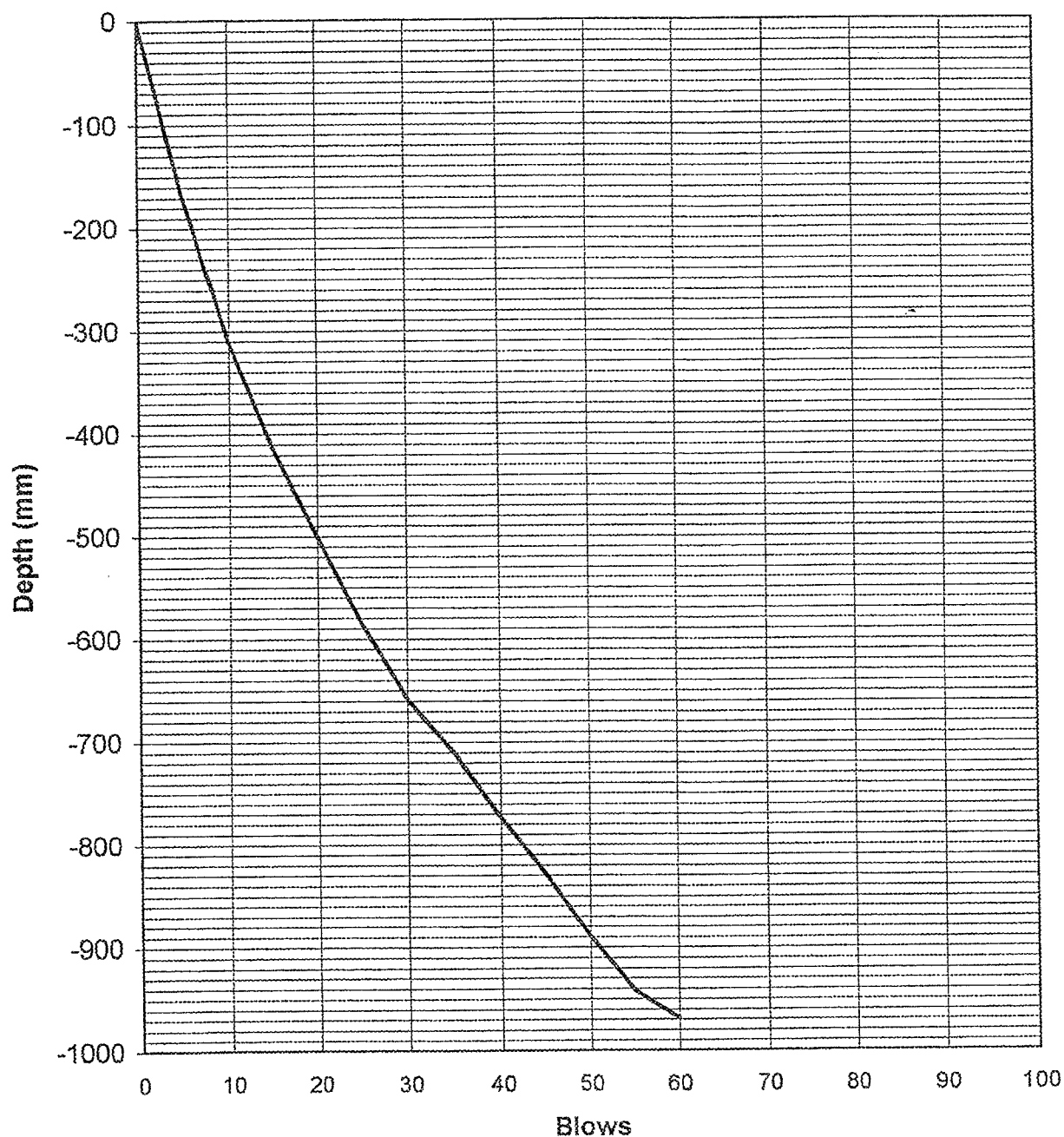
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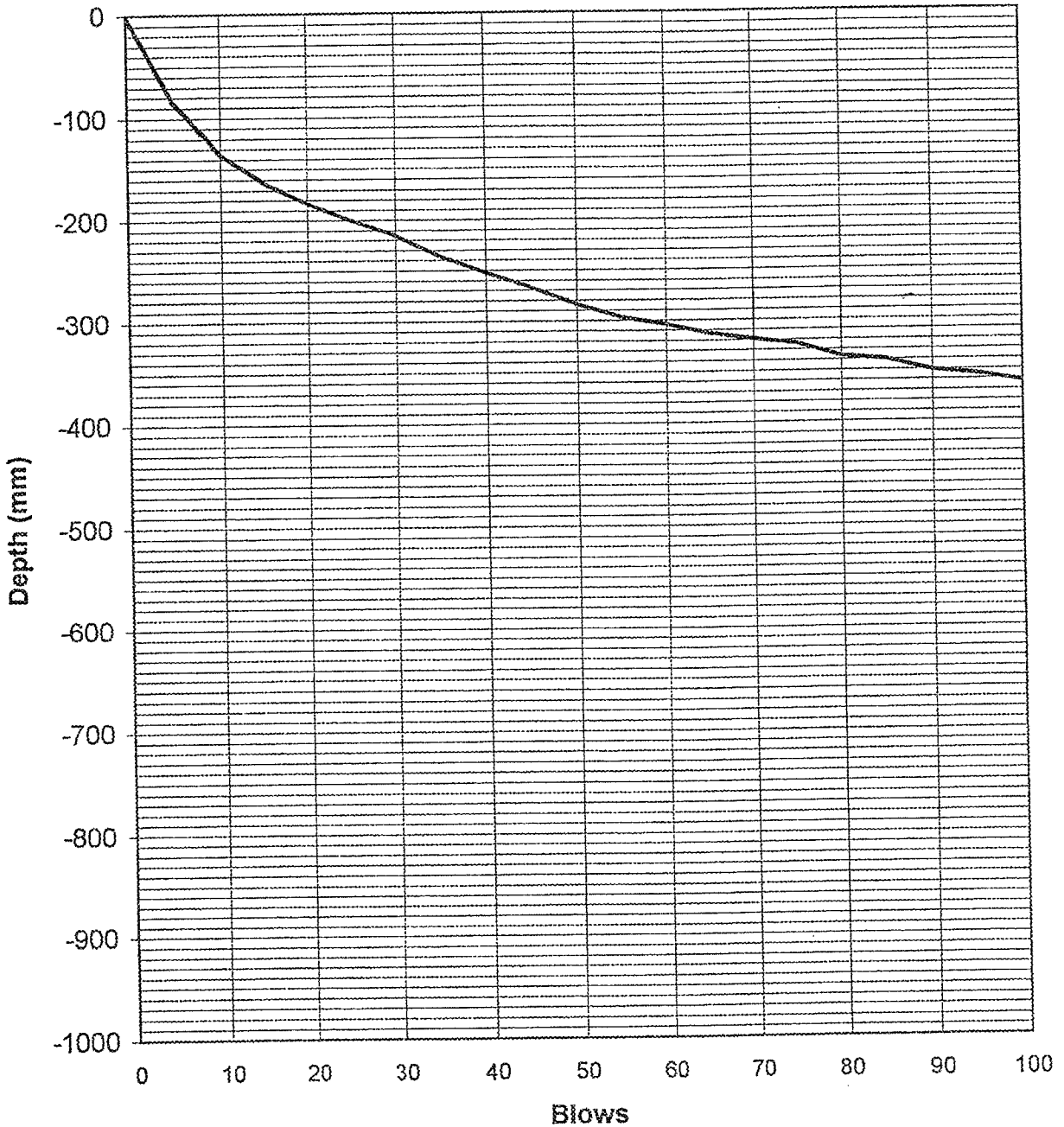
SILVER WILLOWS
TP 9



NOTE: DKP 1000+ mm

DKP/821-011

SILVER WILLOWS
TP 10



NOTE: DKP WEIER BY 384mm

DKP/821-01J

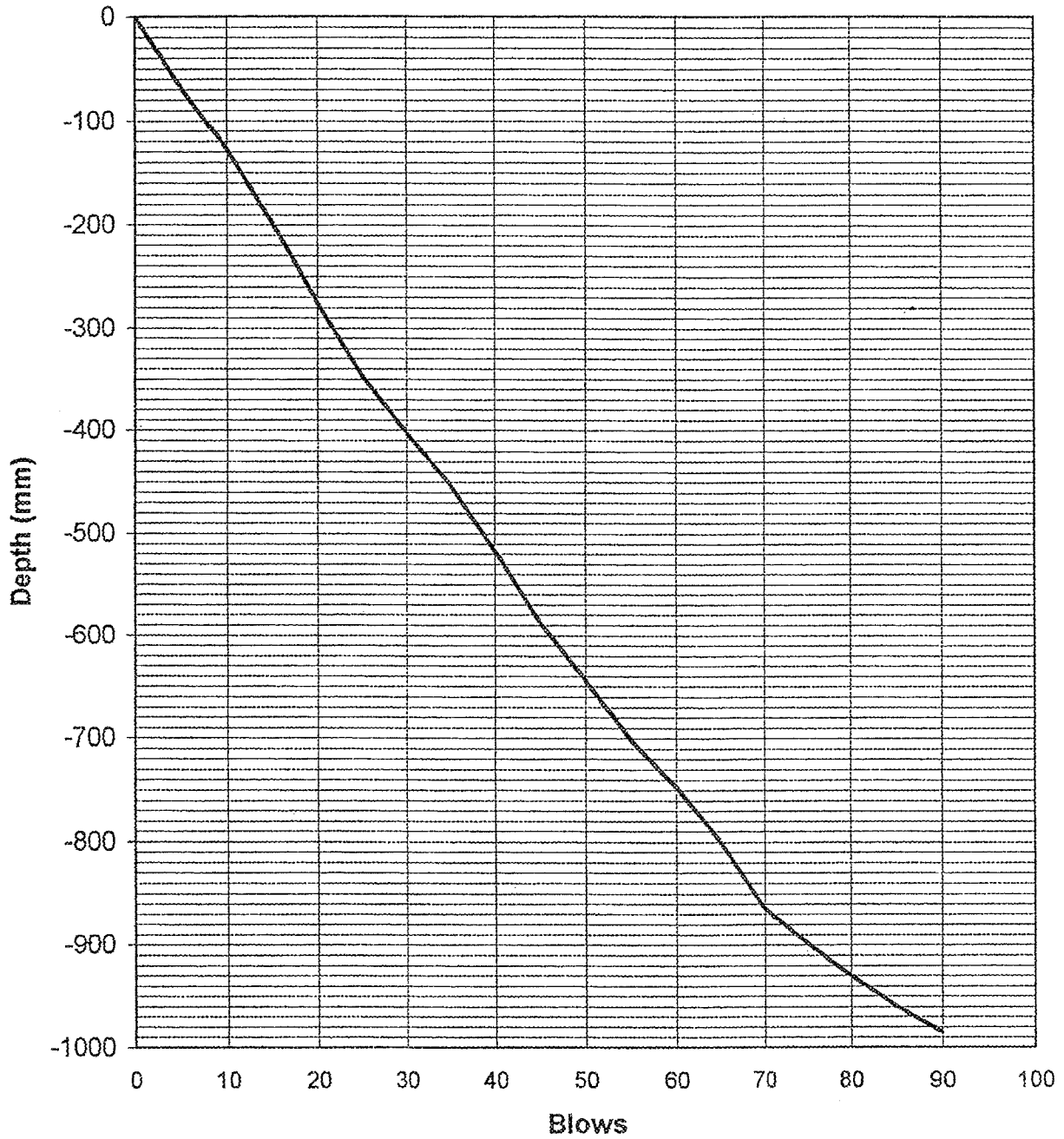
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SILVER WILLOWS
TP 11



NOTE: DKP 1000+ mm

DKP/821-01K

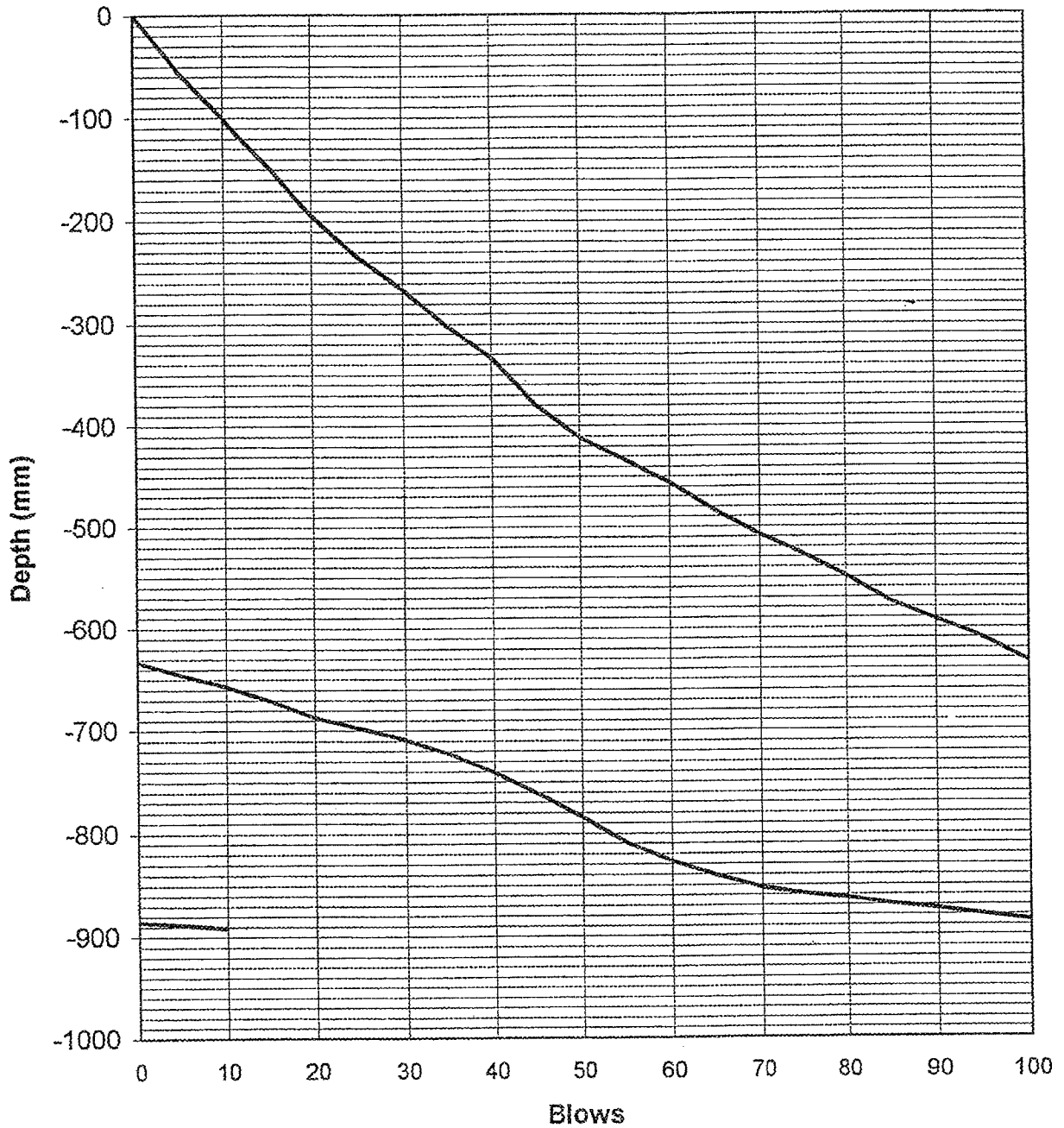
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SILVER WILLOWS
TP 12



NOTE: DKP WEIER BY 927mm

DKP/821-01L

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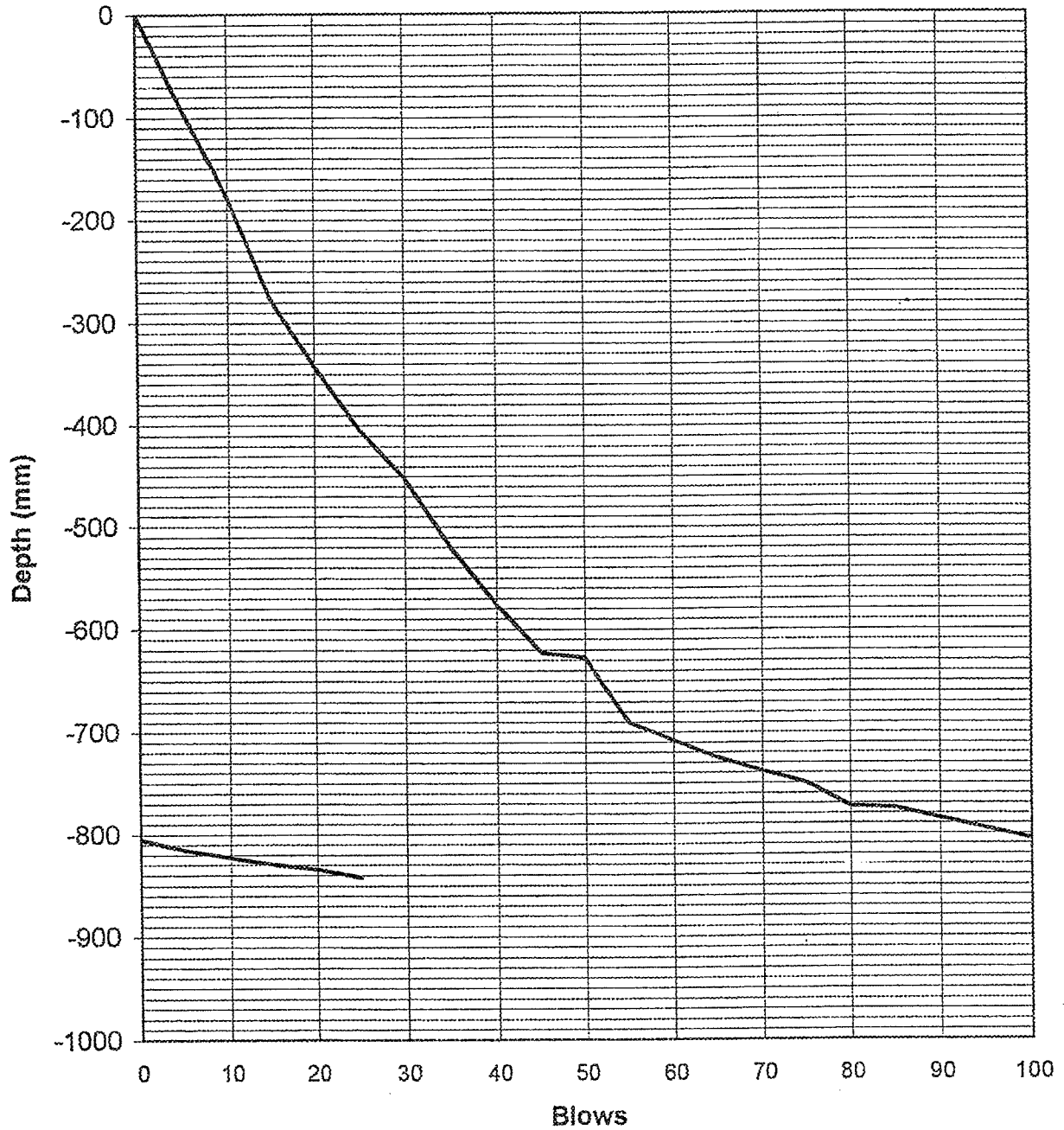
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SILVER WILLOWS

TP 13



NOTE: DKP WEIER BY 898mm

DKP/821-01M

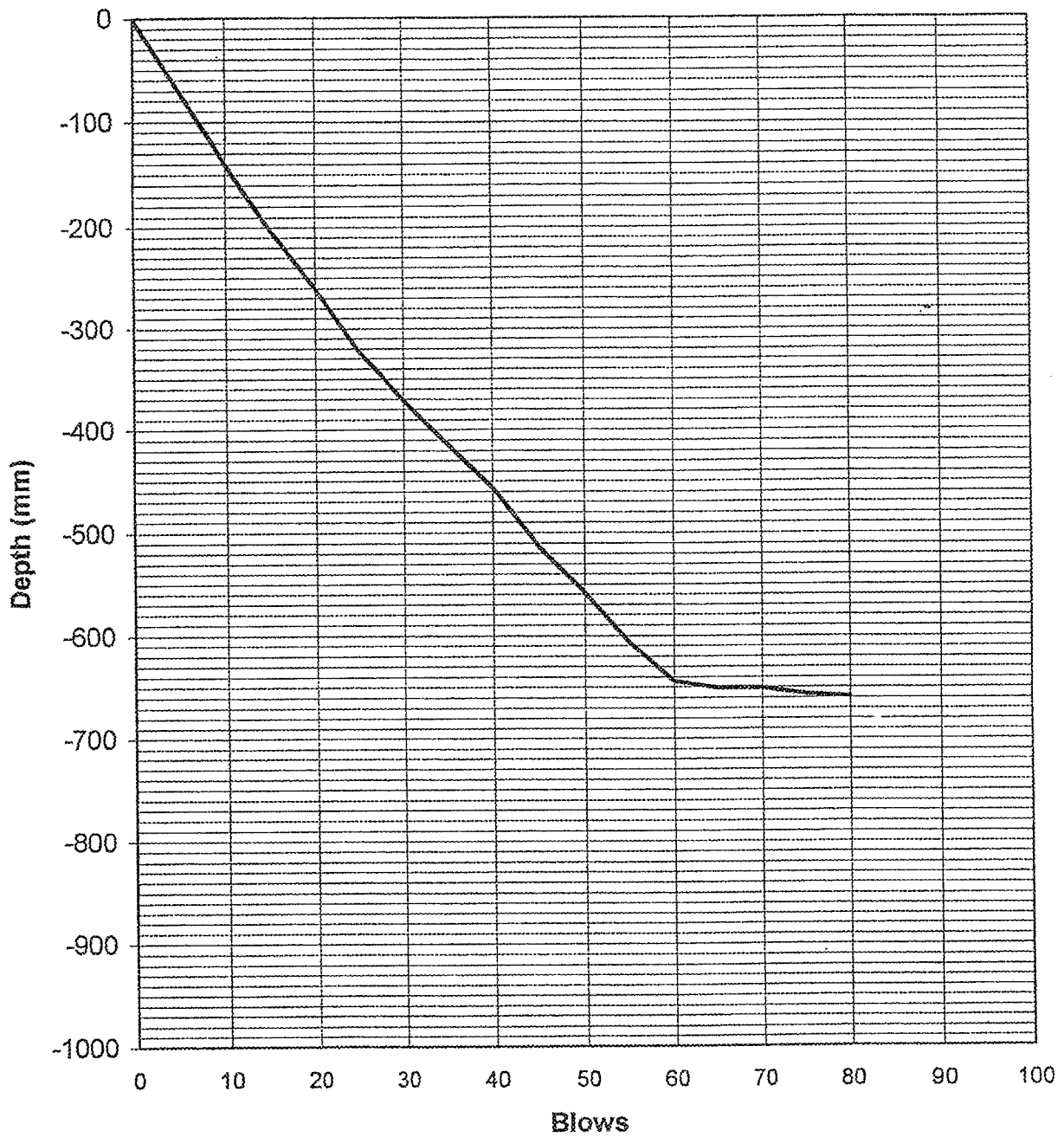
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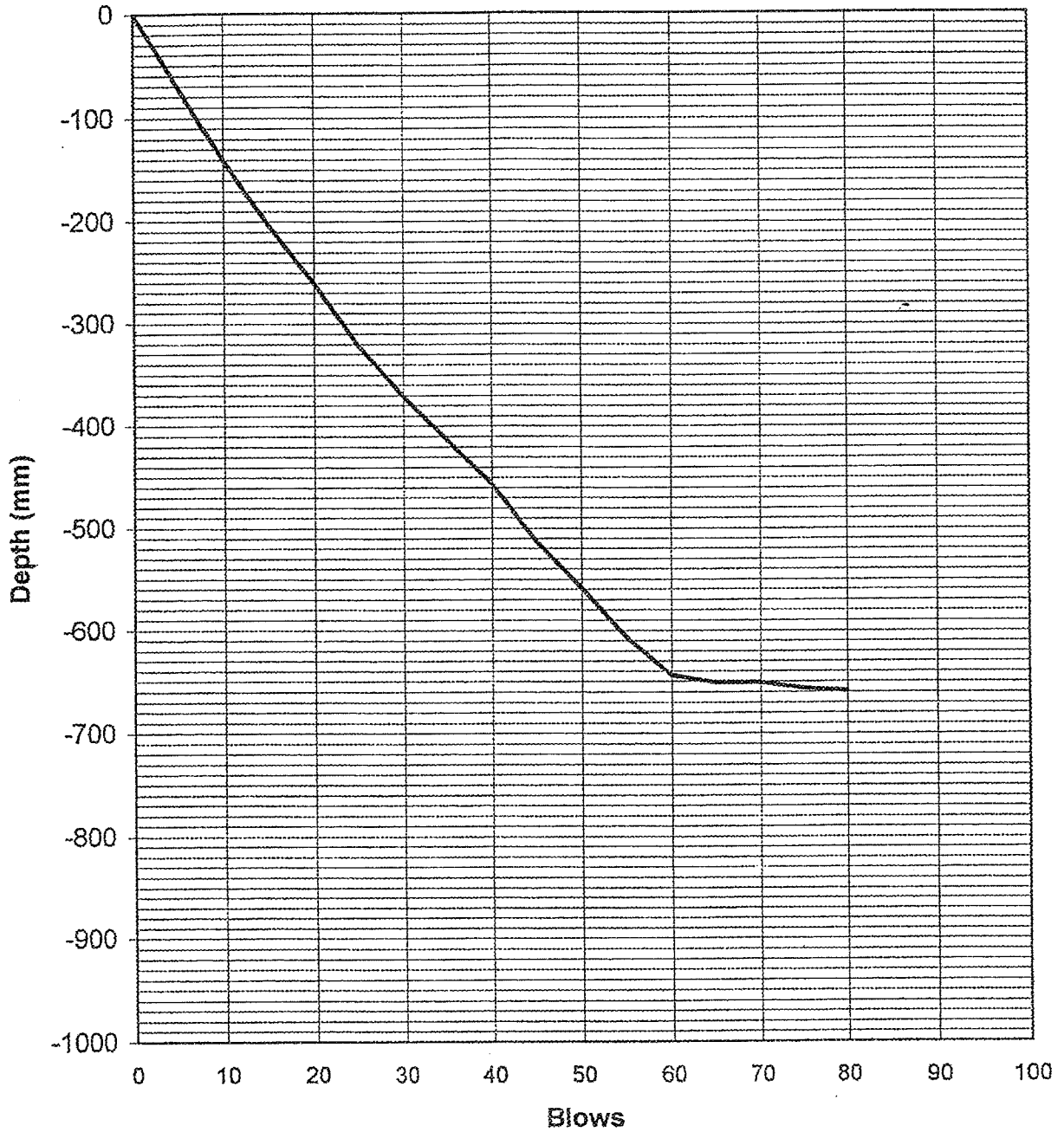
SILVER WILLOWS
TP 14



NOTE: DKP WEIER BY 679mm

DKP/821-01N

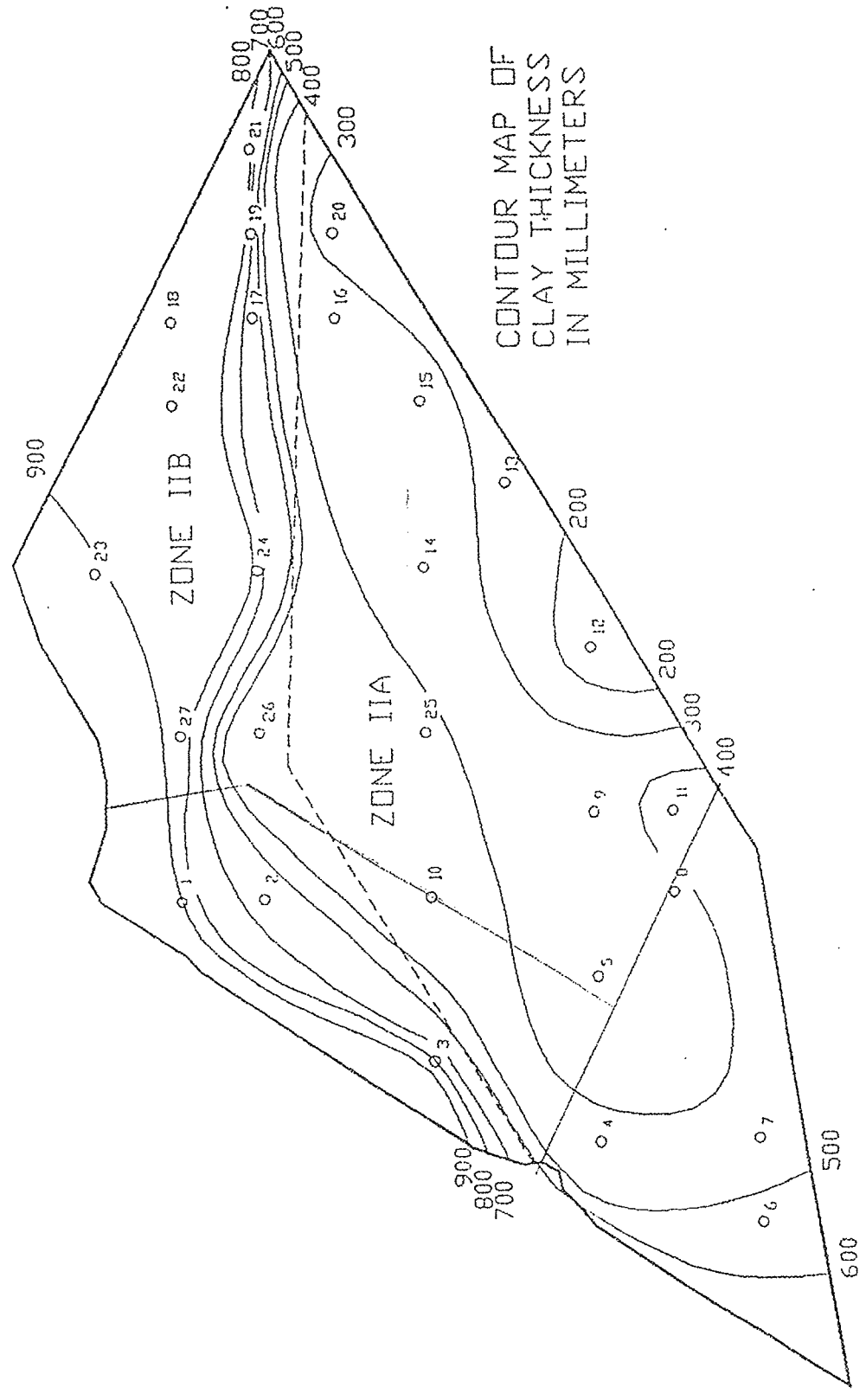
SILVER WILLOWS
TP 16



NOTE: DKP 1000+ mm

DKP/821-010

ZWARTKOPPIES 364 JR
PORTION 12



CONTOUR MAP OF
CLAY THICKNESS
IN MILLIMETERS