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DEPARTMENT OF SUPPLY AND SHIPPING.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

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REPORT ON THE AREA, APPROXIMATELY 100 FEET WIDE BETWEEN M.L. 180 AND D.C.22, BROADBEACH TO NORTH BURLEIGH.

Southport 704.

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xxxxxxxxxxx SOUTHPORT, Q.

84Q & N/1.

22nd June, 1948.

THE CHIEF GEOLOGIST.

BEACH SANDS INVESTIGATION

Report on the Area, approximately 100 feet wide between M.L.180 and D.C.22, BROADBEACH to NORTH BURLEIGH.

1. A plan and sections of the area dealt with in this report are included herewith.

The eastern boundary of the area (the western boundary of D.C.22) was bored in August, 1947. The bores west of the eastern boundary were put down in April, 1948.

2. Boreholes were put down to water level, using a post-hole digger. When the sand brought up from the borehole appeared to contain appreciable quantities of heavy mineral, it was sampled by quartering.

Samples were dried and weighed and their volumes determined. The samples were then concentrated by panning, and the weights and volumes of the concentrates were determined. The percentage composition of a composite sample of concentrates from each bore line was determined by grain counting.

3. Estimates of the quantities and grades of heavy mineral concentrates, the quantities of overburden and the quantities of each of the heavy minerals are tabulated as follows:-

Table 1. Tonnage of Heavy Mineral Concentrate, Volumes and Average Thicknesses of Mineral-Bearing Sands and of Overburden, and Average Grades of Mineral-Bearing Sands.

Table 2. Tonnages of Heavy Mineral Concentrate, Volumes and Average Thicknesses of Mineral-Bearing Sands and of Overburden, and Average Grade of Mineral-Bearing Sands in a Strip 1 Yard Wide along Each Bore Line.

Table 3. Tonnages of Each of the Heavy Minerals.

The figures of Tables 1, 2 and 3 were derived from data tabulated in the Appendices as follows:-

Appendix.

Table A. Quantities of Heavy Minerals Intersected in Bores.

Table B. Weight of Mineral in 1 Yard Strip along Bore Line.

Table C. Volume and Average Thickness of Mineral-Bearing Sand along Bore Line.

Table D. Volume and Average Thickness of Overburden along Bore Line.

Table E. Average Weight of Heavy Mineral Concentrate per 1 Yard Strip between Bore Lines, and Average Area of Longitudinal Section of Mineral-Bearing Sands and of Overburden between Bore Lines.

/Table F.

Table F. Total Weight of Heavy Mineral Concentrate, Total Volume of Mineral-Bearing Sands, and Total Volume of Overburden between Bore Lines.

Table G. Average Thicknesses of Mineral-Bearing Sands and of Overburden.

4. Reference to the cross-sections shows that the area could be mined without any danger of flooding of the land further west during stormy weather. The land further west is higher than the berm which fronts the beach. During storms, the sea does not encroach on the berm.

D E Gardner

Encls. D. E. GARDNER

TABLE 1. TONNAGES OF HEAVY MINERAL CONCENTRATE, VOLUMES AND AVERAGE THICKNESSES OF MINERAL-BEARING SANDS AND OF OVERBURDEN, AND AVERAGE GRADES OF MINERAL-BEARING SANDS.

AREA BETWEEN BORE LINES.	WEIGHT OF HEAVY MINERAL CONCENTRATE. (TABLE F.) TONS	VOLUME		AVERAGE THICKNESS				AVERAGE GRADE OF MINERAL-BEARING SANDS
		MINERAL-BEARING SANDS (TABLE F.) CUBIC YDS.	OVER-BURDEN (TABLE F.) CUBIC YDS.	MINERAL-BEARING SANDS (TABLE G.)		OVER-BURDEN (TABLE G.)		LBS. OF HEAVY MINERAL CONCENTRATE PER CUBIC YARD.
				FEET	INCHES	FEET	INCHES	
100S-900S	1624.6	13,150.1	24,474.1	4	9	8	9	276.7
900S-1700S	2193.4	11,393.1	26,129.6	3	9	8	7	431.2
1700S-2540S	2834.7	14,090.4	29,781.1	4	7	9	8	450.6
2540S-3300S	2867.1	9,243.4	25,418.0	5	0	11	0	694.8
3300S-4100S	2151.8	9,353.9	21,698.1	4	2	9	8	515.3
4100S- 240N	640.9	11,990.7	15,719.7	6	5	8	0	111.4
TOTAL:	12,312.5	69,221.6	143,220.6	4	7	9	3	398.4

TABLE 2. TONNAGES OF HEAVY MINERAL CONCENTRATE, VOLUMES AND AVERAGE THICKNESSES OF MINERAL-BEARING SANDS AND OF OVERBURDEN, AND AVERAGE GRADE OF MINERAL-BEARING SANDS, IN STRIP 1 YARD WIDE ALONG BORE LINES.

LINE	WEIGHT OF HEAVY MINERAL CONCENTRATE (TABLE G.)		VOLUME		AVERAGE THICKNESS				AVERAGE GRADE OF MINERAL-BEARING SANDS
			MINERAL-BEARING SANDS (TABLE C.)	OVERBURDEN (TABLE D.)	MINERAL-BEARING SANDS (TABLE C.)		OVERBURDEN (TABLE D.)		
	LBS.	TONS	CUBIC YDS.	CUBIC YDS.	FEET	INCHES	FEET	INCHES	LBS. OF HEAVY MINERAL CONCENTRATE PER CUBIC YARD.
100S	15,036.7	6.713	58.81	83.416	6	5	9	5	255.7
900S	12,256.5	5.472	30.82	100.139	2	8	8	7	397.7
1700S	24,599.1	10.981	54.63	95.833	4	11	8	7	450.3
2540S	20,757.0	9.266	46.03	116.889	4	2	10	7	451.0
3300S	29,515.7	13.176	26.972	83.778	3	6	11	5	1094.3
4100S	6,634.7	2.962	43.181	78.958	5	1	9	4	153.6
240N	4,136.0	1.846	46.75	38.94	6	4	5	2	88.5

TABLE 3. TONNAGES OF EACH OF THE HEAVY MINERALS.

ESTIMATED FROM PERCENTAGE COMPOSITIONS DETERMINED BY GRAIN COUNTING.

AREA BETWEEN BORE LINES.	TONNAGES OF HEAVY MINERAL CONCENTRATES.	PERCENTAGE COMPOSITIONS# AND TONNAGES OF HEAVY MINERALS											
		MONAZITE		ZIRCON		RUTILE		ILMENITE		GARNET		OTHER MINERALS	
		PER CENT	TONS	PER CENT	TONS	PER CENT	TONS	PER CENT	TONS	PER CENT	TONS	PER CENT	TONS
100S- 900S	1624.6	0.5	8.12	34.3	557.3	36.8	597.8	24.1	391.5	1.65	26.8	2.65	43.0
900S-1700S	2193.4	0.5	10.97	34.3	752.4	36.8	807.2	24.1	528.5	1.65	36.2	2.65	58.1
1700S-2540S	2834.7	0.5	14.17	34.3	972.4	36.8	1043.1	24.1	683.2	1.65	46.8	2.65	75.1
2540S-3300S	2867.1	0.5	14.34	34.3	983.5	36.8	1055	24.1	691.0	1.65	47.3	2.65	76.0
3300S-4100S	2151.8	0.5	10.76	34.3	738.0	36.8	792.0	24.1	518.6	1.65	35.5	2.65	57.0
4100S- 240E (4760S)	640.9	0.5	3.20	34.3	219.9	36.8	236.0	24.1	154.4	1.65	10.6	2.65	17.0
100S- 240E (4760S)	12,312.5	0.5	61.56	34.3	4223.5	36.8	4531.0	24.1	2967.2	1.65	203.2	2.65	326.2

Determined by grain counting a composite sample made up from the concentrates obtained from each bore line. Determinations of other samples have shown that the percentage compositions of the concentrates are virtually constant over the area. (c.f. Table G. in Report on the "Broadbeach Area (Bored by Students)".

APPENDIX. TABLE A. QUANTITIES OF HEAVY MINERALS INTERSECTED IN BORES.

BORE NO. & R.L.	CO-ORDINATES FROM N.W. CORNER OF DC.22.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY.	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS. PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER. CENT.	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)	REMARKS
LINE 100S									
1.	100S/023W.	1	L4083	0	16'	15.4	0.6		
25'		2	L4084	16'	16'10	633.7	20.8	528.1	
		3	L4085	16'10	18' 6	14.6	0.5		
			Thickness of 10 inches:			333.7		528.1	
2.	100S/56W.	1	L2715	4' 6	5' 6	239.6	8.6	239.6	
17-0'		2	L2716	9'	9' 9	2103.0	58.8	1577.2	
		3	L2717	11'	11' 6	497.9	11.5	248.9	
			Thickness of 7 ft.-			295.1		2065.7	
3.	100S/106W	1	L2709	0	6'	21.2	0.8		
23'-0		2	L2710	11'	13'	54.7	2.1	109.4	
		3	L2711	13'	16'	109.5	4.0	328.5	
		4	L2712	16'	17' 4	158.2	5.8	210.9	
		5	L2713	17' 4	18' 9	519.5	17.7	692.7	
		6	L2714	19'	20'	287.1	10.1	287.1	
			Thickness of 9 ft. -			180.9		1628.6	

APPENDIX.

TABLE A. (Continued)- Page 2.

BORE NO. & R.L.	CO-ORDINATES FROM N.W. CORNER OF DC.22.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY.	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS. PER CU.YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT.	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)	REMARKS
LINE 900S									
1.	900S/00	1	92	6' 6	7' 3	411.1	14.5	308.4	D.C.22
15'		2	93	10' 6	11' 6	219.9	8.0	219.9	Bore 9A.
			Thickness of 5 ft. -			105.6		528.3	
2.	900S/56W	1	L2723	9' 6	10' 3	1884.0	54.3	1413	
19'		2	L2724	13' 3	13' 6	132.2	4.9		
			Thickness of 9 inches:			1884.0		1413	
3.	900S/105W	1	L2718	0	9'	Tr.	Tr.		
18'		2	L2719	9'	9' 6	111.2	4.2	55.6	
		3	L2720	10' 3	11'	116.2	4.3	87.2	
		4	L2721	11' 9	12' 3	1266.0	39.4	633.0	
		5	L2722	12' 3	13'	128.6	4.8	96.4	
			Thickness of 4 ft. -			218		872.2	

APPENDIX.

TABLE A. (Continued) - Page 3.

BORE NO. & R.L.	CO-ORDINATES FROM N.W. CORNER OF DC.22.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS. PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)	REMARKS
LINE 1700S									
1.	1700S/06W	1	L2732	3'	4'	45.3	1.8		
16'		2	L2733	5' 6	6' 6	75.3	[illegible]	225.9	
		3	L2734	8' 6	10' 6	1483.0	41.6	2966.0	
			Thickness of 5 ft. -			637.0		3191.9	
2.	1700S/56W	1	L2729	6'	7'	121.4	4.7		
22'		2	L2730	11' 6	13'	161.0	6.1	241.5	
		3	L2731	13' 9	14' 9	2402.0	65.1	2402.0	
			Thickness of 3 ft. 3 inches:			813.4		2643.5	
3.	1700S/106W	1	L2725	0	6'	Tr.	Tr.		
17'		2	L2726	6'	12'	38.6	1.5	231.6	
		3	L2727	12'	13'	100.0	3.8	100.0	
		4	L2728	14'	14' 2	224.7	8.4	37.4	
			Thickness of 8 ft. 2 inches:			45.2		369.0	

TABLE A. (Continued) - Page 4.

BORE NO. & R.L.	CO-ORDINATES FROM N.W. CORNER OF DC.22.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS. PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT.	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)	REMARKS
LINE 2540S									
1.	2540S/00	1	L3212	0	8' 6	18.7	0.7		
22'		2	L3213	4'6	9'	78.1	2.7	39.0	
			Thickness of 6 inches:			78.1		39.0	
2.	2540S/49W	1	L3207	0'	10'	19.6	0.74		
25'		2	L3208	12'6	13'	223.6	7.8	111.8	
		3	L3209	14'3	14' 6	363.5	12.6	90.9	
		4	L3210	15'	16'	2116.0	58.1	2116.0	?
		5	L3211	17'	17' 4	1016.0	31.1	338.7	
			Thickness of 4 ft. 10 inches:			549.8		2657.4	
3.	2540S/99W	1	L2735	0	3'	140.1	5.1	420.3	
14'		2	L2736	3'	4'	690.2	23.4	690.2	
		3	L2737	4'	10'	73.6	2.8		
		4	L2738	10'	13'	38.4	1.5		
		5	L2739	13'	14'	825.8	27.1	825.8	
		6	L2739A.	14'	15' 6	154.6	5.0	231.9	
			Thickness of 6 ft. 6 inches:			336.6		2168.2	

TABLE A. (Continued) - Page 5.

BORE NO. & R.L.	CO-ORDINATES FROM N.W. CORNER OF DC.22.	SAMPLE NO.		DEPTH		QUANTITY OF HEAVY MINERALS		THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.	REMARKS
		FIELD	LABORATORY.	FROM	TO	LBS. PER CU. YD.	WT. PER CENT		
LINE 3300S									
1.	3160S/00	1	113	8' 6	9' 4	2578.0	66.1	2148.3	D.C.22
15'		2	114	9' 4	9' 8	2346.0	56.4	782.0	Line 3160S.
		3	115	9'10	10' 3	269.7	9.5	112.4	
		4	116	10' 5	12' 3	1614.0	45.0	1076.0	
			Thickness of 3 ft. 9 inches:			1170.0		4118.7	
2.	3300S/32W	1	L3800	0	11'	24.9	0.9		
22'		2	L3801	11'	12'	506.3	16.9	506.3	
		3	L3802	12'	12' 8	1869.0	49.0	1246.0	
		4	L3803	13'	14' 3	3234	78.25	4042.5	
		5	L3804	14' 7	15' 3	1443	42.9	962.0	
			Thickness of 4 ft. 3 inches:			1304.5		6756.8	
3.	3300S/66W	1	L4093	10'	15'	19.3	0.7		
21-5		2	L4094	15'	16'	393.2	7.7	393.2	
		3	L4095	16'	17'	72.5	2.7	72.5	
		4	L4096	17'	17' 6	517.2	17.3	258.6	
			Thickness of 2 ft. 6 inches:			289.7		724.3	

TABLE A. (Continued) - Page 6.

BORE NO. & R.L.	CO-ORDINATES FROM N.W. CORNER OF DC.22.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS. PER CU. YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT.	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)	REMARKS
LINE 4100S									
1.	4100S/43W	1	L4097	0	13' 9	20.2	0.8		
22-6'		2	L4098	13'9	14'	1033.0	31.7	283.2	
		3	L4099	14'	17'	6.0	.2		
			Thickness of 3 inches:			1033.0		283.2	
2.	4100S/076W	1	L4100	0	22'	28.0	1.5	616.0	
29-1'									
			Thickness of 22 ft:			28.0		616.0	
3.	4100S/00.	1	130	2' 3	3'	2385	84.3	Doubtful	D.C.22
14-5'		2	131	8'9	10' 6	2465	63.8	1848.7	Bore 39.6A
			Thickness of 9 inches:			2465		1848.7	

TABLE A. (Continued) - Page 7.

BORE NO. & R.L.	CO-ORDINATES FROM 126' S. OF PEERLESS AVENUE.	SAMPLE NO. FIELD	SAMPLE NO. LABORATORY	DEPTH FROM	DEPTH TO	QUANTITY OF HEAVY MINERALS LBS. PER CU.YD.	QUANTITY OF HEAVY MINERALS WT. PER CENT	THICKNESS OF SAMPLE (FT.) X (LBS. PER CU. YD.)	REMARKS
LINE 240N.									
3.	240N/66E	1	155	9' 3	9' 7	684.2	23.0	228.1	DC.22
14'	(4760S/66E)	2	156	10'	10' 9	337.1	11.9	539.8	Line 47.6
		3	157	10' 9	11' 9	719.7	23.8	719.7	
			Thickness of 2 ft. 6 inches:			480.3		1487.6	
2.	240N/33E	1	L3839	0	6'	11.8	0.45		
17-2'	(4760S/33E)	2	L3840	6'	12'	46.2	1.8	277.2	
		3	L3841	12'	15' 3	Tr.	Tr.		
		4	L3842	15' 3	15' 6	82.3	2.9		
			Thickness of 6 ft:			46.2		277.2	
1.	240N/00	1	L3835	0	9' 6	34.6	1.25	328.7	
19-3'	(4760S/00)	2	L3836	9' 6	11'	114.7	4.5	172.1	
		3	L3837	11'	16' 6	28.2	1.1	155.1	
		4	L3838	16' 6	17'	130.2	3.9	65.1	
			Thickness of 17 ft.:			45.5		721.0	

APPENDIX. TABLE B. WEIGHT OF MINERAL IN 1 YARD STRIP ALONG BORE LINE.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS.) (FROM TABLE A.)	WEIGHT OF MINERAL IN 1 YD. STRIP BETWEEN BORES. (LBS.)
100S.				
1.	$\frac{633.7}{1} \times \frac{10}{36} = 176.0$	432.3	11.0	4755.3
2.	$\frac{295.1}{1} \times \frac{84}{36} = 688.6$			
2.	688.6	615.65	16.7	10281.4
3.	$\frac{180.9}{1} \times \frac{9}{3} = 542.7$			
Total for line:				15036.7
900S				
1.	$\frac{105.6}{1} \times \frac{60}{36} = 176$	323.5	18.7	6049.5
2.	$\frac{1884}{1} \times \frac{9}{36} = 471$			
2.	471	380.8	16.3	6207.0
3.	$\frac{218}{1} \times \frac{48}{36} = 290.7$			
Total for line:				12,256.5

APPENDIX. TABLE B. (Continued) - Page 2.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS.) (FROM TABLE A.)	WEIGHT OF MINERAL IN 1 YD. STRIP BETWEEN BORES. (LBS.)
LINE 1700S				
1.	$\frac{637}{1} \times \frac{60}{36} = 1061.7$	971.2	16.7	16,219.0
2.	$\frac{813}{1} \times \frac{39}{36} = 880.7$			
2.	880.7	501.8	16.7	8,380.1
3.	$\frac{45.2}{1} \times \frac{98}{36} = 123.0$			
Total for line:				24,599.1
LINE 2540S				
1.	$\frac{78.1}{1} \times \frac{6}{36} = 13.0$	449.4	16.3	7,325.2
2.	$\frac{549.8}{1} \times \frac{58}{36} = 885.8$			
2.	885.8	804.3	16.7	13,431.8
3.	$\frac{333.6}{1} \times \frac{78}{36} = 722.8$			
Total for line:				20,757.0

APPENDIX.

TABLE B. (Continued) - Page 3.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS. WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS.) (FROM TABLE A.)	WEIGHT OF MINERAL IN 1 YD. STRIP BETWEEN BORES. (LBS.)
LINE 3300S.				
1.	$\frac{1170}{1} \times \frac{45}{36} = 1462.5$	1655.2	10.7	17,710.6
2.	$\frac{1,304.5}{1} \times \frac{51}{36} = 1848.0$			
2.	1848.0	1044.7	11.3	11,805.1
3.	$\frac{289.7}{1} \times \frac{30}{36} = 241.4$			
Total for line:				29,515.7
LINE 4100S.				
3.	$\frac{2465}{1} \times \frac{9}{36} = 616.2$	351.15	14.33	5,032.0
1.	$\frac{1033}{1} \times \frac{3}{36} = 86.1$			
1.	86.1	145.7	11.0	1,602.7
2.	$\frac{28}{1} \times \frac{22}{3} = 205.3$			
Total for line:				6,634.7

TABLE B. (Continued) - Page 4.

BORE NOS.	LBS. OF MINERAL PER SQ. YD. AT BORE. (FROM TABLE A.)	AVERAGE LBS WEIGHT OF MINERAL PER SQ. YD. BETWEEN BORES.	DISTANCE BETWEEN BORES (YDS.) (FROM TABLE A.)	WEIGHT OF MINERAL IN 1 YD. STRIP BETWEEN BORES. (LBS.)
LINE 240N.				
1.	$\frac{45.5}{1} \times \frac{11}{3} = 166.9$	129.6	11.0	1425.6
2.	$\frac{46.2}{1} \times \frac{6}{3} = 92.4$			
2.	92.4	246.4	11.0	2710.4
3.	$\frac{480.3}{1} \times \frac{30}{36} = 400.3$			
Total for line:				4136.0

APPENDIX. TABLE C. VOLUME AND AVERAGE THICKNESS OF MINERAL-BEARING SAND ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE INCHES	AV. BETWEEN BORES INCHES	AV. BETWEEN BORES FEET	DISTANCE BETWEEN BORES. (TABLE A.) FEET	AREA OF LONGITUDINAL SECTION BETWEEN BORES. SQ. FEET	SQ. YDS.	COMPLETE BORE LINE AV. THICKNESS FEET	INCHES	VOLUME OF 1 YD. STRIP CUBIC YDS.
LINE 100S.									
1.	10								
2.	84	47	3.917	33.0	129.261	14.362			
2.	84								
3.	108	96	8.0	50	400.0	44.444			
Total:				83.0	529.261	58.806	6.4	77	58.81
LINE 900S.									
1.	60								
2.	9	34.5	2.875	56	161.0	17.889			
2.	9								
3.	48	28.5	2.375	49	116.375	12.931			
Total:				105	277.375	30.820	2.6	32	30.82
LINE 1700S.									
1.	60								
2.	39	49.5	4.125	50	206.25	22.917			
2.	39								
3.	98	68.5	5.708	50	285.4	31.711			
Total:				100	491.65	54.628	4.92	59	54.63
LINE 2540S.									
1.	6								
2.	58	32	2.667	49	130 .683	14.520			
2.	58								
3.	78	68	5.667	50	283.35	31.483			
Total:				99	414.033	46.003	4.18	50	46.003

BORE NO.	THICKNESS (TABLE A.) AT BORE INCHES	AV. BETWEEN BORES INCHES	AV. BETWEEN BORES FEET	DISTANCE BETWEEN BORES. (TABLE A.) FEET	AREA OF LONGITUDINAL SECTION BETWEEN BORES. SQ. FEET	SQ. YDS.	COMPLETE BORE LINE AV. THICKNESS FEET	AV. THICKNESS INCHES	VOLUME OF 1 YD. STRIP CUBIC YDS.
LINE 3300S.									
1.	45								
2.	51	48	4.0	32	128.0	14.222			
2.	51								
3.	30	40.5	3.375	34	114.75	12.75			
Total:				66	242.75	26.972	3.7	44	26.972
LINE 4100S.									
3.	9								
1.	3	6	0.5	43	21.5	2.389			
1.	3								
2.	264	133.5	11.125	33	367.125	40.792			
Total:				76	388.625	43.181	5.1	61	43.181
LINE 240N.									
1.	132								
2.	72	102	8.5	33	280.5	31.167			
2.	72								
3.	30	51	4.25	33	140.25	15.583			
Total:				66	420.75	46.750	6.4	76	46.75

APPENDIX. TABLE D. VOLUME AND AVERAGE THICKNESS OF OVERBURDEN ALONG BORE LINE.

BORE NO.	THICKNESS (TABLE A.) AT BORE	THICKNESS (TABLE A.) AVERAGE BETWEEN BORES	DISTANCE BETWEEN BORES (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE AVERAGE THICKNESS	COMPLETE BORE LINE VOLUME OF 1 YD. STRIP
	FEET	FEET	FEET	SQUARE FEET	SQUARE YARDS	FEET	CUBIC YARDS
LINE 100S.							
1.	10.0						
2.	4.5	10.25	33	338.25	37.583		
2.	4.5						
3.	11.0	8.25	50	412.5	45.833		
TOTAL:			83	750.75	83.416	9.04	83.416
LINE 900S.							
1.	6.5						
2.	9.5	8.0	56	448.0	49.778		
2.	9.5						
3.	9.0	9.25	49	453.25	50.361		
TOTAL:			105	901.25	100.139	8.58	100.139
LINE 1700S.							
1.	5.5						
2.	11.5	8.5	50	425.0	47.222		
2.	11.5						
3.	6.0	8.75	50	437.5	48.611		
TOTAL:			100	862.5	95.833	8.625	95.833
LINE 2540S.							
1.	8.5						
2.	12.5	10.5	49	514.5	57.167		
2.	12.5						
3.	9.0(?)	10.75	50	537.5	59.722		
TOTAL:			99	1052.0	116.889	10.62	116.889

BORE NO.	THICKNESS (TABLE A.) AT BORE	THICKNESS (TABLE A.) AVERAGE BETWEEN BORES	DISTANCE BETWEEN BORES (TABLE A.)	AREA OF LONGITUDINAL SECTION BETWEEN BORES.		COMPLETE BORE LINE AVERAGE THICKNESS	COMPLETE BORE LINE VOLUME OF 1 YD. STRIP
	FEET	FEET	FEET	SQUARE FEET	SQUARE YARDS	FEET	CUBIC YARDS
LINE 3300S.							
1.	8.5						
2.	11.0	9.75	32	312.0	34.667		
2.	11.0						
3.	15.0	13.0	34	442.0	49.111		
TOTAL:			66	754.0	83.778	11.42	83.778
LINE 4100S.							
3.	8.75						
1.	13.75	11.25	43	483.75	53.75		
1.	13.75						
2.	0.0	6.875	33	226.875	25.208		
TOTAL:			76	710.625	78.958	9.3	78.958
LINE 240N.							
1.	0.0						
2.	6.0	3.0	33	99.0	11.0		
2.	6.0						
3.	9.25	7.62	33	251.46	27.94		
TOTAL:			66	350.46	38.94	5.21	38.94

APPENDIX. TABLE E. AVERAGE WEIGHT OF HEAVY MINERAL CONCENTRATE PER 1 YARD STRIP BETWEEN BORE LINES, AND AVERAGE AREA OF LONGITUDINAL SECTION OF MINERAL-BEARING SANDS AND OF OVERBURDEN BETWEEN BORE LINES.

LINES	ALONG BORE LINES			AVERAGE BETWEEN BORE LINES		
	WEIGHT OF MINERAL PER 1 YARD STRIP.	AREA OF LONGITUDINAL SECTION OF		WEIGHT OF MINERAL PER 1 YARD STRIP.	AREA OF LONGITUDINAL SECTION OF	
		MINERAL-BEARING SANDS	OVERBURDEN		MINERAL-BEARING SANDS	OVERBURDEN
	FROM TABLE B.	FROM TABLE C.	FROM TABLE D.			
	LBS.	SQ. YARDS	SQ. YARDS	LBS.	SQ. YARDS	SQ. YARDS
100S	15,036.7	58.806	83.416	13,646.6	49.313	91.778
900S	12,256.5	30.82	100.139			
900S	12,256.5	30.82	100.139	18,427.8	42.724	97.986
1700S	24,599.1	54.628	95.833			
1700S	24,599.1	54.628	95.833	22,678.0	50.323	106.361
2540S	20,757.0	46.003	116.889			
2540S	20,757.0	46.003	116.889	25,136.3	36.487	100.334
3300S	29,515.7	26.972	83.778			
3300S	29,515.7	26.972	83.778	18,075.2	35.077	81.368
4100S	6,634.7	43.181	78.958			
4100S	6,634.7	43.181	78.958	5,385.3	44.965	58.949
240N	4,136.0	46.750	38.94			

APPENDIX. TABLE F.

TOTAL WEIGHT OF HEAVY MINERAL CONCENTRATE, TOTAL VOLUME OF MINERAL-BEARING SANDS AND TOTAL VOLUME OF OVERBURDEN BETWEEN BORE LINES.

BORE LINES (TABLE A.)				WT. OF HEAVY MIN. CONC.		VOL. OF MINERAL-BEARING SANDS		VOL. OF OVERBURDEN	
DESIG-NATION	LENGTH	DISTANCE BETWEEN	AREA BETWEEN	AV. PER 1 YD. STRIP (TABLE E.)	TOTAL BE-TWEEN LINES	AV. AREA OF LONGI-TUDINAL SECTION. (TABLE E.)	VOL. BETWEEN BORE LINES.	AV. AREA OF LONG. SECTION (TABLE E.)	VOL. BETWEEN BORE LINES.
	YDS.	YDS.	SQ. YDS.	LBS.	TONS	SQ. YDS.	CU. YDS.	SQ. YDS.	CU. YDS.
100S to 900S	83/3 105/3	800/3	8,355.5	13,646.6	1624.6	49.313	13,150.1	91.778	24,474.1
900S to 1700S	105/3 100/3	800/3	9,111.1	18,427.8	2193.4	42.724	11,393.1	97.986	26,129.6
1700S to 2540S	100/3 99/3	840/3	9,240.0	22,678.0	2854.7	50.323	14,090.4	106.361	29,781.1
2540S to 3300S	99/3 66/3	760/3	6,933.3	25,136.3	2867.1	36.487	9,243.4	100.334	25,418.0
3300S to 4100S	66/3 76/3	800/3	6,755.5	18,075.2	2151.8	35.077	9,353.9	81.368	21,698.1
4100S to 240N	76/3 66/3	800/3	5,866.7	5,383.3	640.9	44.965	11,990.7	58.949	15,719.7
100S to 240N		1600	46,262.1		12312.5		69,221.6		143,220.6

APPENDIX. TABLE G. AVERAGE THICKNESSES OF MINERAL-BEARING SANDS AND OF OVERBURDEN.

BORE LINES (TABLE F.)		VOLUME (TABLE F.)		AVERAGE THICKNESS			
DESIGNATION	AREA BETWEEN LINES	MINERAL-BEARING SANDS	OVERBURDEN	MINERAL-BEARING SANDS		OVERBURDEN	
	Square Yards	Cubic Yards	Cubic Yards	Feet	Inches	Feet	Inches
100S 900S	8,355.5	13,150.1	24,474.1	4	9	8	9
900S 1700S	9,111.1	11,393.1	26,129.6	3	9	8	7
1700S 2540S	9,240.0	14,090.4	29,781.1	4	7	9	8
2540S 3300S	6,933.3	9,243.4	25,418.0	5	0	11	0
3300S 4100S	6,755.5	9,353.9	21,698.1	4	2	9	8
4100S 240N	5,866.7	11,990.7	15,719.7	6	5	8	0
100S to 240N	46,262.1	69,221.6	143,220.6	4	7	9	3

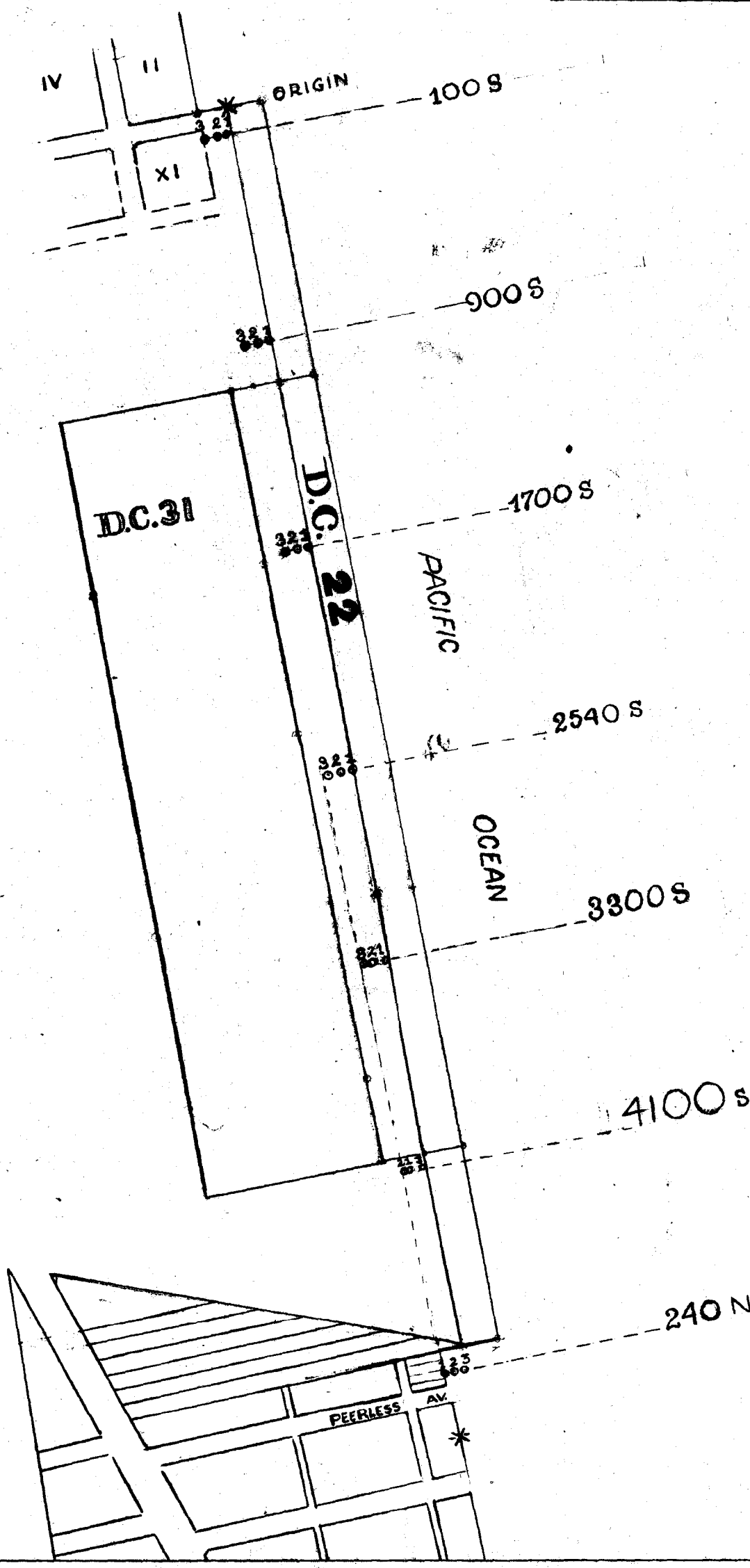
BROADBEACH AREA

PLAN OF BORING

SCALE 1 INCH · 500ft.

PLAN Nº B1

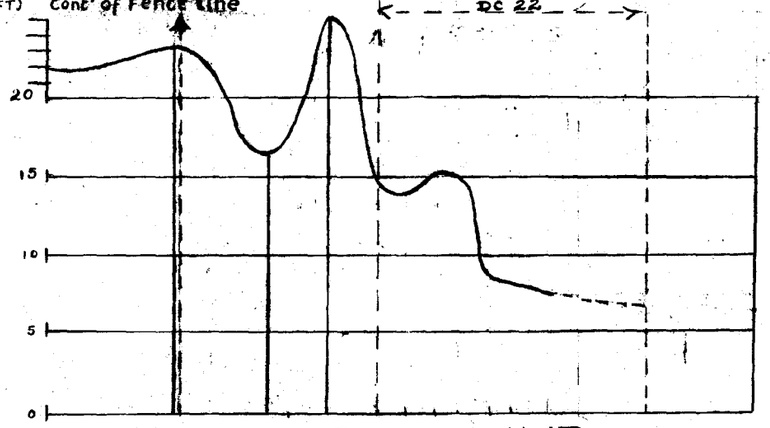
1 CHAIN STRIP



F.L.J

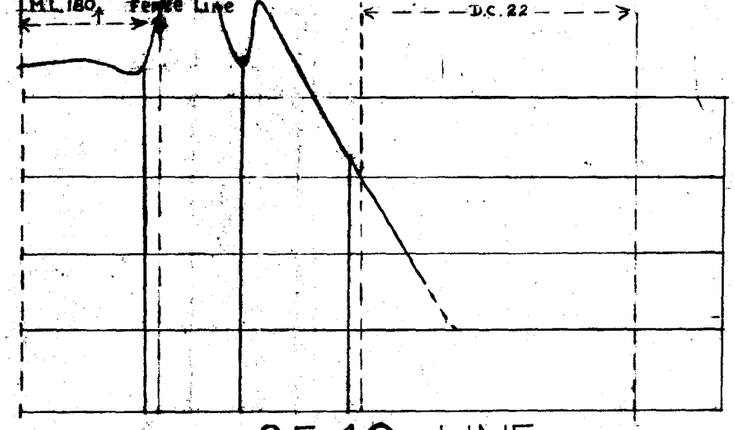
100 s LINE

BORE No. 3 2 1
OVERBURDEN (FT.) 11 4·5 16
SAMPLE (FT.) 9 7 ·85
LBS Per CU. YD. IN SAMPLE (FT.) 180 295 635



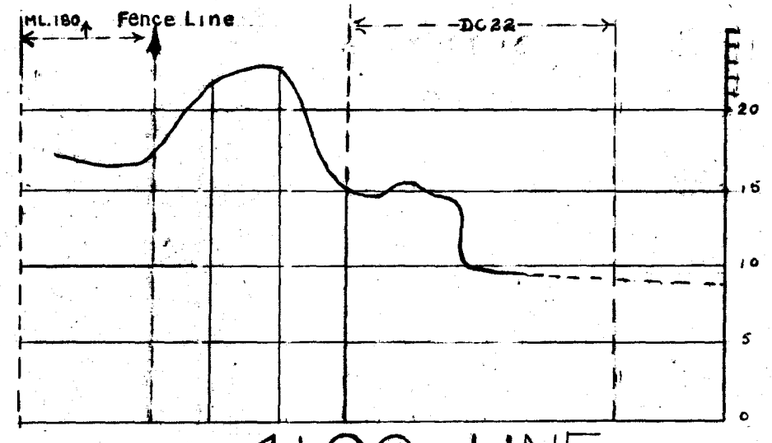
1700 s LINE

BORE No. 3 2 1
OVERBURDEN (FT.) 6 1·6 5·5
SAMPLE (FT.) 8 3·25 5
LBS Per CU. YD. IN SAMPLE (FT.) 45 813 637



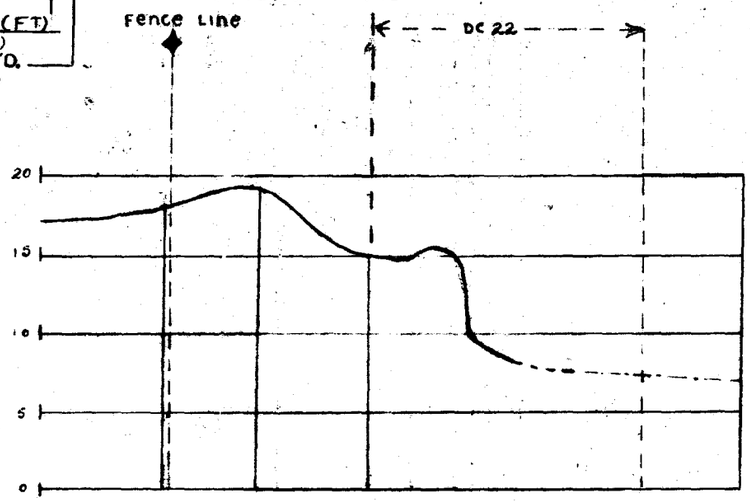
3300 s LINE

BORE No. 3 2 1
OVERBURDEN (FT.) 15 11 8·5
SAMPLE (FT.) 2·6 4·25 3·75
LBS Per CU. YD. IN SAMPLE (FT.) 289 1304 1170



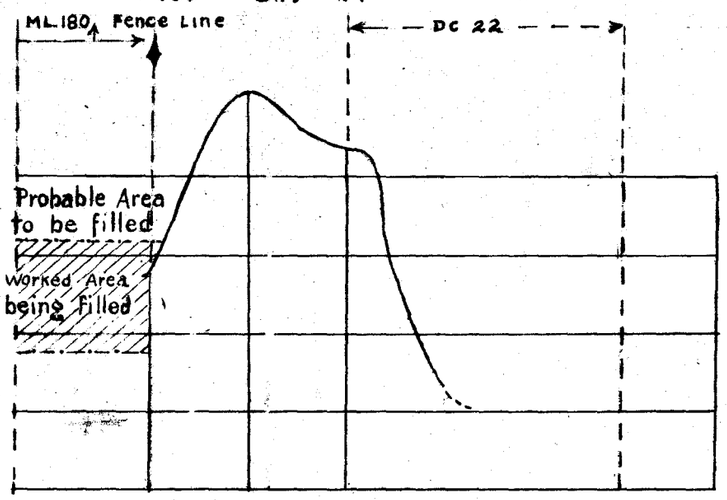
900 s LINE

BORE No. 3 2 1
OVERBURDEN (FT.) 9 9·5 6·5
SAMPLE (FT.) 4 ·75 5
LBS Per CU. YD. IN SAMPLE (FT.) 218 1884 105



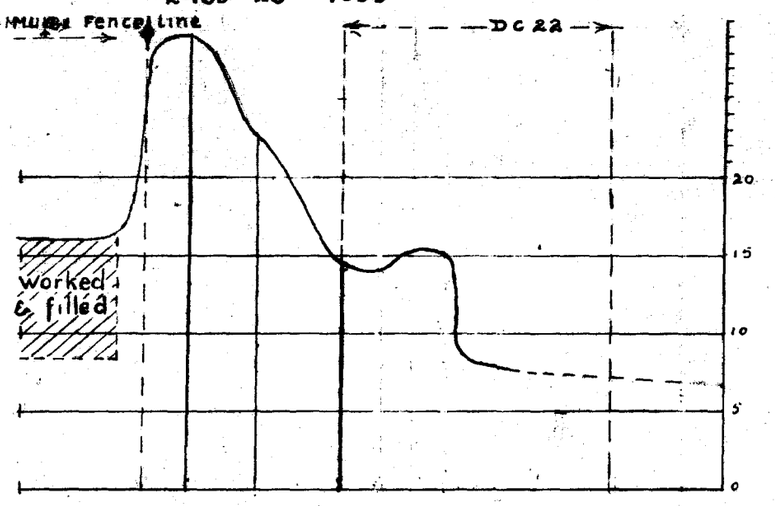
2540 s LINE

BORE No. 3 2 1
OVERBURDEN (FT.) 0 12·5 8·5
SAMPLE (FT.) 15·5 4·8 ·5
LBS Per CU. YD. IN SAMPLE (FT.) 185 549 71



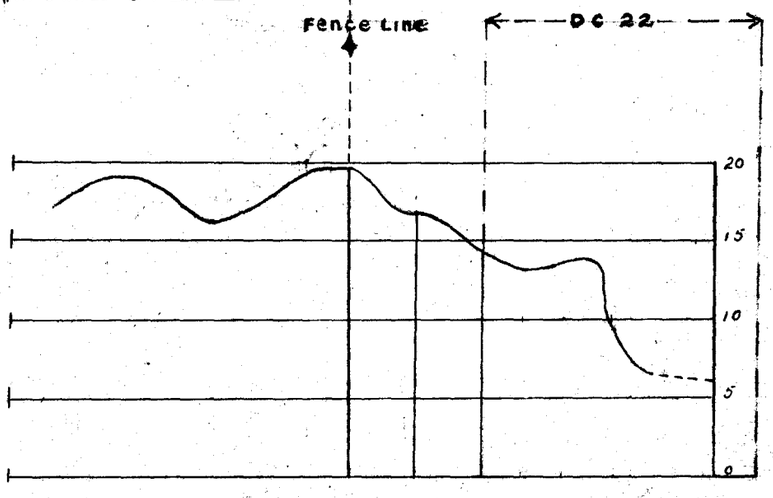
4100 s LINE

BORE No. 2 1 3
OVERBURDEN (FT.) 0 0 2·25
SAMPLE (FT.) 17 22 2·5
LBS Per CU. YD. IN SAMPLE (FT.) 2465 28 1033



240 N

BORE No. 1 2 3
OVERBURDEN (FT.) 0 9·5 9·25
SAMPLE (FT.) 17 6 2·25
LBS PER CU. YD. IN SAMPLE (FT.) 47 462 480



BROADBEACH AREA

— Section along Bore Lines —

SCALE: HORIZONTAL / VERTICAL — 1 inch = 10 feet

PLAN No B1A. 1 CHAIN STRIP

F.L.J.