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MICROFILMED

FINAL REPORT

ON

TIN PROSPECTING - MONARCH AREA, TASMANIA

(SPL 399)

1964/1965.

W.S. CHESNUT

MELBOURNE. JUNE, 1965.

AMG REFERENCE POINTS ADDED

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FIG. 1

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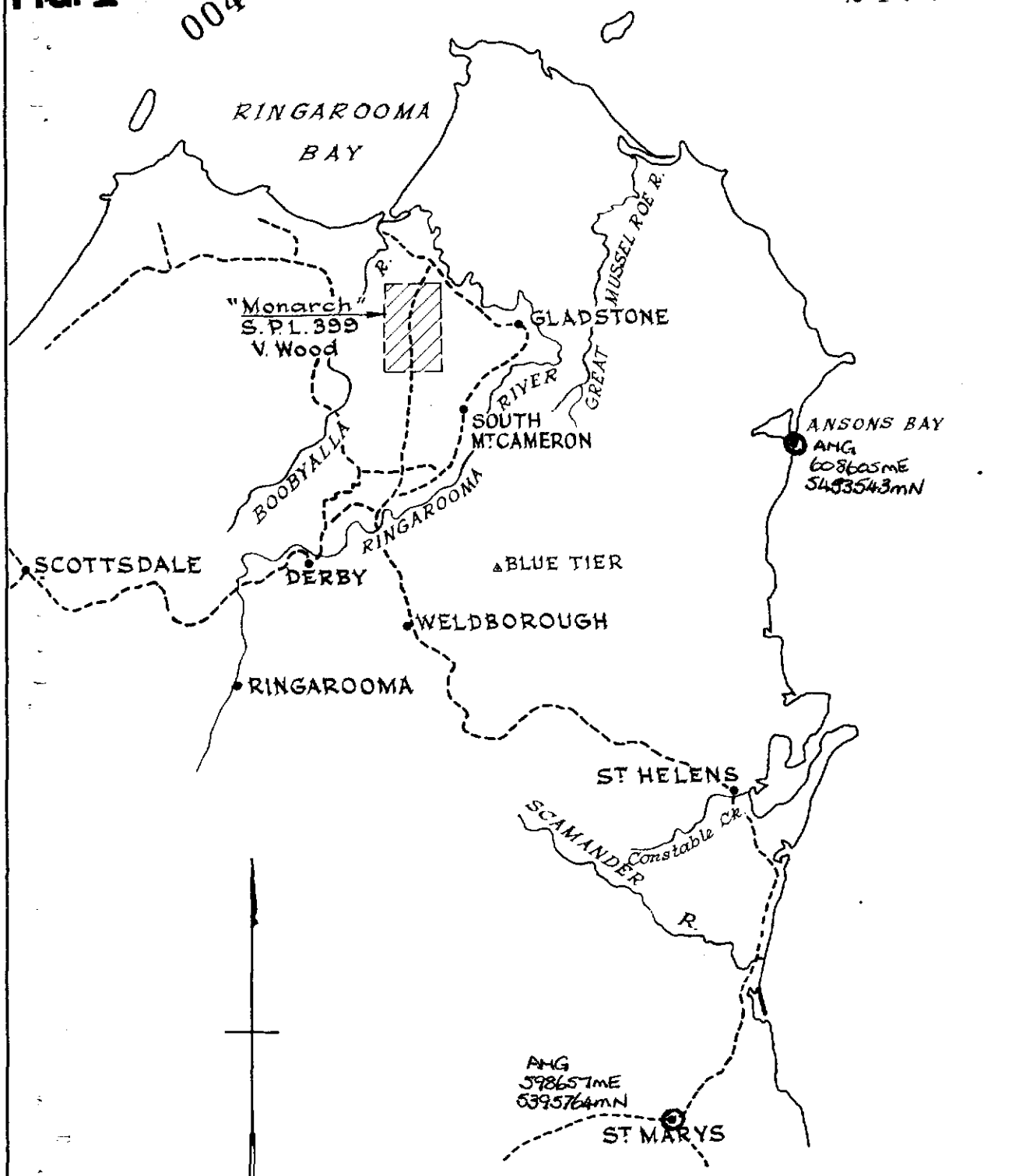

LOCALITY MAP
MONARCH TIN PROSPECT
N.E. TASMANIA

SCALE: 1 INCH = 8 MILES

AMG REFERENCE POINTS ADDED

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TRIM LINE

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SUMMARY.

An area of approximately 14.5 square miles (SPL.399) was held under option to purchase from Mr. V. Wood of Pioneer (N.E. Tasmania). The initial twelve month free option period expired on the 2nd June, 1965, and the option was terminated on that date.

For most of the period from April, 1964, to March, 1965, an average of seven persons, including a geologist and senior prospector, were engaged on the project, together with two drilling machines.

The aim of the prospecting operations was to test the alluvial flats occurring at the base of the north-western side of the Mt. Cameron massif - the Vicary Creek or Monarch area; together with the terraced area on the western side of this same massif - the Bonser Creek area.

Accordingly, a programme of photo-geological interpretation combined with reconnaissance geological mapping was carried out prior to the marking out of a 16-chain grid as a basis for test drilling of the area.

Early drilling results indicated that a 16-chain spacing was too great, hence drill hole spacing was reduced to 4-chains in selected parts of the area drilled.

Overall drilling results confirmed initial interpretations of two distinct fossil drainage areas and indicated that each of the drainage patterns had both a shallow and a deep section.

The Vicary Creek area was tested in detail, while results of scout drilling on the Bonser Creek area indicated that further deep drilling was not warranted.

During the period, the "shallow" drill rig - Werf Conrad 16" pitting machine - drilled 105 holes, totalling 2134 feet, while the deep drill rig - Goldfields 033, 6" percussion plant - drilled 46 holes, totalling 3401 feet.

All drill holes were sampled by usual field dressing and concentrating techniques for Tin - hand panning after screening and cradling.

All drill-holes were surveyed for collar Relative Levels.

Main access roads were constructed as necessary by bulldozer and grader.

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Assessment of the results of the testing programme indicate that only the shallow or eastern end of the Vicary Creek area has any potential for economic mining.

The inferred ore reserves (see figure 6) for this area, based on the relatively wide spaced drill-holes, indicate that a total of about 3 million cubic yards of material averaging 15 to 20 feet in depth with a bulk average grade of about 5½ ozs. of 70% Sn. concentrates per cubic yard exists in a number of individual areas.

Theoretically, on mining, this would yield about 450 tons of concentrates containing 70% Tin metal.

It is apparent that further infill drilling will not substantially increase the volume of material already indicated, but it may increase the grade somewhat.

Hence, it is considered that the prospect is too small to allow for large scale operation, although on a small scale it would appear to be of economic grade.

Recommendations for infill drilling to confirm the writer's inferences of ore reserves are listed in Section "J" of this report.

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A. INTRODUCTION

This report covers the activities of the prospecting party based in the Mt. Cameron area of Northeast Tasmania during the period April, 1964, to March, 1965.

The area was introduced to the Company by Mr. V. Wood of Pioneer in late 1963, at a time when Utah Development (Aust.) Pty. Ltd. was also engaged in assessing the tin potential of North Eastern Tasmania. Mr. Wood had mining titles over a number of areas and indicated his willingness to allow both companies to carry out testing of individual option areas.

The activities consisted of the detailed testing of the "Monarch" flats which cover the northern half of the area held under option by the B.H.P. Co. Ltd. and scout testing of the southern half of the area - Bonser Creek.

This testing campaign included :

(i) Interpretation of geology and ancient drainage from aerial photographs.

(ii) Reconnaissance geological mapping of "basement".

(iii) The laying out of a 16-chain grid over the option area by compass and tape survey.

(iv) A programme of test boring of the inferred alluvial flats initially with a single boring machine but later with two machines.

(v) The necessary reduction and concentration of all samples of spoil recovered from the boring programme.

(vi) A reconnaissance geophysical survey using the Seismic refraction and ground magnetometer techniques.

The boring programme yielded unexpected results in that the apparently extensive alluvial flat of Vicary Creek - below the old Monarch workings - appears to be a series of *channels and small fan deltas, derived from a system of* streams flowing down from the Mt. Cameron massif. This pattern is further complicated by the likelihood that the western half of this area was under tidal influence.

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The graphic assay logs of all bores drilled during the period are bound in folios kept in the Geological Section.

The inferred ore reserves based on boring information have been calculated and are discussed in a later section.

The recommendations listed are based on the writer's assessment of the results of prospecting and are intended to be a basis on which further work can be formulated.

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B. LOCATION AND ACCESS

The area held under option to purchase is shown relative to the island of Tasmania on Fig. 1 and in more detail on Figs. 2 and 16.

The area lies about 80 miles east of Launceston and can be reached by road from a number of directions. There are no airstrips of any calibre in the area, although a variety of light aircraft use paddocks for local flights.

Local flooding can cut road access to the area for short periods on the main highway routes, though actual access from Herrick, Pioneer or South Mount Cameron is always possible.

The weather during the period covered by this report indicates that the rainfall of about 35-40 inches falls mainly during the winter months of June to October. Temperatures range down to heavy overnight frosts. The area receives rainfall from both the southeast (in summer) and northwest (in winter) generally accompanied by strong winds.

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C. TITLES

Mr. Vern Wood of Pioneer held a current Special Prospectors Licence covering an area on the western side of Mt. Cameron. This Special Prospectors Licence nominally covered an area of about 17½ square miles but a block about 3 square miles in area on the south-western side, is part of a Mines Department Reservation covering the inferred position of the Ringarooma Deep Lead.

By verbal agreement with the Mines Department, the Company could test this part of the reservation for shallow alluvial deposits as part of the testing of the Monarch area. However, the Department retains the reservation on possible deep lead deposits.

The Company negotiated an option with Mr. Wood covering the area of his Special Prospectors Licence under the following terms:

(1) Twelve months testing option for £1

(2) Twelve months extension for £1,000

(3) Purchase price to be £20,000 including above payments.

(4) The results of our testing to be made available to the Vendor, should he so desire, if the option is not exercised.

The agreement came into force on the 2nd June, 1964, and was terminated on expiry of the initial 12-month period.

The Special Prospectors Licence No. 399 held by Mr. Wood was dated 28th April, 1964, for six months and prior to expiry was re-applied for. A new licence was granted to Mr. Wood and is current to 28th April, 1965, at which date it can be renewed for a further six months period.

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D. HISTORY

The occurrence of alluvial tin in this area has been known since the turn of the Century, although the first recorded production figures are those listed in the Annual Report of the Secretary for Mines of Tasmania for the year 1923.

During the early part of the century, mining operations were apparently carried out over most of the area on a small scale only, and it was not until the formation of the Monarch Tin Mining Company in 1922 that any appreciable operations were carried out on Vicary Creek.

The Monarch Tin Mining Company does not appear to have had a long life and subsequent to its cessation of operations in the early 1930's, a number of tributors worked isolated patches in and around the older workings on Vicary Creek. Apparently no recent work has been carried out on the Bonser Creek area.

The records of tin production from the area are very vague and the only information available from Mines Department records is:

Year	Tons of Metal Contained in Concentrates
1923	8.99
1924	21.05
1925	6.31
1928	21.214
1929	8.8
1934	2.3
1936	2.85
	71.514 tons of Metallic tin

The only remaining evidence of the old mining operations are the excavations - now all largely full of water, and extensive tailings dumps, together with the remnants of an intricate system of water races.

Parts of the area held by the Company have been close drilled in the past - presumably by the old Monarch Tin Company etc. Some of the boring records are available from

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the Mines Department but the actual ground locations of the bores are obscure.

Some scout drilling was carried out by Mr. V. Wood (Vendor) during the summer of 1963 and in this case while the drill sites are readily discernible, the sample values obtained from the holes are rather vague.

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E. GENERAL.

1. SURVEYING:

The drilling grid was laid out over the entire option area by a compass and tape survey.

With the completion of drilling, all drill holes were surveyed for relative level by a plane table.

2. DRILLING:

(a) Vicary Creek area (old Monarch Mine)

The programme of drilling on this area involved 135 holes, totalling 4,273.3 feet, and was carried out by two different machines. Some details of their operations are discussed below, while further details regarding operation and costs are included in Appendix "B" of this report.

(b) Bonser Creek Area (Monarch Line 15 extended)

The programme of drilling on this area involved 14 holes, totalling 1262.0 feet and was commenced using both machines listed above. However, in view of the depths involved, the "Conrad" drill was only used to drill 1 complete hole and then start another hole.

(1) 16" Pitting Machine:

A "Werf Conrad" 16" pitting machine with operators was hired from The Dorset Tin Division of Storey's Creek Tin Mining Company N.L., during the period 25th June, 1964, to 21st January, 1965.

The unit is highly effective in depths up to 40 ft. (one to 1½ days drilling), and "comes into its own" when bouldery wash is encountered. The size of the sample probably minimises evaluation problems.

(2) 6" Percussion Machine:

A Goldfields type G.33, 6" percussion drilling machine was hired from W.L. Sides & Sons Pty. Ltd. (Melbourne) during the period 9th October, 1964, to 22nd December, 1964, 4th January to 2nd February and 22nd March to 29th March, 1965.

The unit is highly effective at all depths for rapid prospecting - being capable of drilling 60 ft. a day in average ground. Reliability of sample is highly suspect especially in wash material when sampling ahead of the casing.

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2. DRILLING (CONTD.):

(c) 2" Hand Auger

In a number of locations near the old Monarch workings where near surface bedrock was inferred, test boring was carried out using a 2" hand (twisted) auger for confirmation. With the exception of two holes, the locations of these bores are not included in the drilling results.

3. SAMPLING:

The treatment of samples during the testing programme was aimed at obtaining a rough concentrate which contained all the heavy mineral fraction present. Almost all the spoil recovered from both drilling machines was washed, the only materials not treated were the "heavy puggy clays". Early investigations showed that these clayey materials were completely barren of any heavy mineral.

In practice, the following general procedures were used for treatment of the samples, further details are discussed in Appendix "C" of this report.

(a) "Conrad" Samples:

The spoil from the machine was discharged directly into half 44-gallon drums which were carted to a treatment plant (about 8 miles). Here sample volumes were measured, and the material bulked where appropriate and wet screened at ¼" in a trommel, the underflow being deslimed by overflow into a large vat and then "cradled" by hand to give a very rough concentrate which was hand panned, dried and weighed prior to despatch for assay.

(b) "Sides" Samples:

The bailings from the machine were discharged directly into half 44-gallon drums in 5 ft. intervals. Water tanks on a truck provided water for puddling and desliming (overflow) at the drill site prior to cradling and hand panning, etc. Treatment of these samples at the drill site is essential in view of the nature of the bailings - virtually a "slurry".

4. GEOLOGICAL:

The limited geological work carried out on the area prior to drilling consisted of:

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4. GEOLOGICAL (CONTD.):

(a) Compilation of detailed base map from uncontrolled aerial photographs, in conjunction with photo-geological interpretation and approximate topographical contouring of "river flats" and terrace areas.

(b) Reconnaissance geological mapping of "basement" outcrop to confirm air phto interpretation; and inspections of exposures in major old workings throughout the area.

At this stage, a fossil drainage system was inferred on the basis of basement outcrop and the deeply eroded valleys apparent on the slopes of the Mt. Cameron granite massif.

5. GEOPHYSICAL:

With a view to defining, prior to drilling, the inferred channels occurring in the area to the south of the Monarch Flats - Bonser Creek Area - an extended seismic refraction traverse (about 4 miles long) was carried out by the Company's Geophysical Section during the Christmas-New Year period, 1964/1965.

The traverse was run along line 15 (see Fig.2), commencing from the granite outcrop of Vicary's Hill and traversing south along the line of 4 chain spaced drill holes to the southern granite outcrop of Bonser Creek Hill. This traverse was run for instrument and method evaluation.

The traverse was then continued south across the Bonser Creek - Little Boobyalla River flats to the granite outcrop near Hastie's (Mott's) Workings.

Results were inconclusive as it is not possible to correlate the weathered bedrock profile as determined by drilling with any of the refractors discernible from the seismic traces.

This work is the subject of a separate report by Mr. C.P. Taylor.

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F. GENERAL GEOLOGY & HISTORY

1. REGIONAL:

The main feature of the regional geology of the area is the tin bearing granites of the Mt. Cameron massif, the erosion of which in past geological times, has given rise to alluvial tin deposits in the old streams draining the area.

During relatively recent times, after a long period of erosion (and deposition of placer deposits in suitable localities), a sharp rise in sea-level caused a thick layer of alluvial sediments to be deposited over most of the area. This rise in sea-level was probably of the order of one or two hundred feet.

A subsequent drop in sea-level following this period of sedimentation introduced a period of minor erosion which has given rise to the present topography.

The geological history of this area, as part of a larger area, is discussed more fully in a separate report on part of the North Eastern corner of Tasmania by the writer.

2. OPTION AREA:

The area held under option to purchase, contains two main "streams" whose history largely corresponds with that briefly outlined above.

The erosion "V"s of the old streams are evident on the western face of Mount Cameron, draining westerly down into broad valleys at the base of the mountain (ancient Vicary and Bonser Creeks). These streams almost certainly eventually flowed into the sea to the north-west of the area, perhaps via the ancient Ringarooma River. The area was at least in part inundated by the sea during siltation. Subsequent erosion has modified the old alluvial fans at the base of the mountain and given rise to the terraces, etc., apparent today. During this latest cycle of erosion the old leads have been partly exposed near the base of the mountain and thus allowed their subsequent discovery and mining.

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G. APPRAISAL OF RESULTS

1. DRILLING:

The initial photo-geological (drainage) interpretations have been generally confirmed by the drilling results.

Bearing in mind the normal variability of stream deposits, it was not unexpected that drilling would indicate some variations both in position and nature of the inferred fossil drainage pattern.

(a) Vicary Creek Area:

The initial widely spaced drilling in this area indicated that a single "Monarch" lead did not exist and that depths were likely to be much more variable than originally inferred. Hence it became necessary to reduce the drill hole spacing on the north-south lines from 16 chains to 4 chains. Finally to check the reliability of inferences drawn from information obtained from bores at 4 chain spacing, a line of holes was infilled to a two chain spacing.

It became evident as drilling progressed, that the closer spaced the bore holes the more variations in the nature of the economic wash became apparent. Thus many of the mining operators in the area have indicated that to define wash positions and obtain grade estimates, spacings of one chain are highly desirable, if not essential, especially when dealing with narrow leads, e.g., the main lead in the Endurance open cut is generally only about one chain wide at a depth of about 100 feet.

Reference to Fig. 3 shows the main fossil stream channels as inferred from the bedrock contours derived from drilling results. Comparison with Fig. 4 shows that generally the maximum deposition of wash appears to correspond with these channels indicating, perhaps, their reliability.

If this reliability of interpretation of drilling results does in fact exist, then it seems likely that a basic 4-chain grid will give sufficient general information to make a preliminary evaluation of a prospect of this nature. However, for detailed evaluation, it is necessary to reduce the bore hole spacing to at least 2 chains and possibly to 1 chain.

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1. DRILLING (CONT'D.):

In this regard, reference to Fig.10, which shows the cross-section along the "21" line of drill holes, indicates the bedrock profile revealed by drilling. If the profile apparently indicated by holes at 16 chain spacing is compared with the profiles indicated by successively including bores at 4 chain and then 2 chain spacing, it can be seen that while the overall generalized profile is not altered, a considerable number of minor variations in the profile are indicated. When it is remembered that these minor variations may result in the control of possible economic values in wash deposit, it becomes important that the drilling density be sufficient to allow interpretation of reliable bedrock profiles.

(b) Bonser Creek Area:

In this area a similar problem to that outlined above became apparent.

The initial 16 chain spaced bores along Line 15 merely served to indicate the reliability of the seismic refraction survey results - See Fig. 18.

The initial photo interpretation of possible drainage patterns had shown that no single major stream existed in this area, but that a number of possible channels could be inferred - See Fig.16.

Actual drill hole results were inconclusive in confirming channel existence, but did indicate that similar deep water conditions existed in this area as existed in the deep (western) part of the Vicary Creek area to the north. Hence it was not surprising to find that possible tin values were very low. In fact, only bore P15 encountered values; even drill holes 4 chains to the north and 4 chains to the south of this hole did not encounter values.

2. GEOLOGICAL:

(a) Vicary Creek Area:

The principal features to become apparent as a direct result of the drilling carried out on the prospect are that:

(1) There is no readily definable major lead, but instead a system of small leads ("gutters") of irregular development.

(2) The heavy minerals have been derived from the partial erosion of the western side of the granite body forming Mt. Cameron.

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2. GEOLOGICAL (CONTD.):

(3) Inspection of Fig. 3 shows that the bedrock surface gradients are relatively steep in two main zones separated by a broad "flat" zone. The steep slope zone on the southeastern part of the area drilled represents the basal slopes of Mt. Cameron. The steep slope zone apparent on the western part of the area drilled represents a sudden increase in the original stream gradient (for some unknown reason).

(4) Deposits of heavy mineral can be expected to occur only at points of sudden shallowing of gradients where a suitable source feeder from the mountain is present. Hence the old Monarch workings of the deposits formed at the zones of gradient shallowing of the old Vicary's and Shallamar Creeks. The somewhat broader "flat" downstream from these old workings would no doubt trap any over-carry from the initial depositional phase. This inference is confirmed by drilling results which show that different "gutters" have different sources - the variations in nature of heavy mineral assemblage can only be accounted for in this way.

(5) The heavy mineral assemblage varies mainly according to lead source, but also according to position on the lead, relative to gradient changes. Principal minerals are cassiterite with monazite and zircon, and minor rutile, ilmenite and corundum.

(6) In the western section of the area drilled no deposits of heavy mineral would be expected on the steep slopes, but some deposition of over-carry from the "flat" upstream, could be expected at points of sudden gradient change. This is in part confirmed by minor cassiterite contents in a number of the deeper bores - see Fig. 6 compared with Fig. 3.

(7) The deep western section of the area has apparently been subjected to marine (tidal) influence during deposition of the large thicknesses of wash - Fig. 4. This is evidenced by the partly opalized remains of oyster/mussel shells in the wash. Additional features of this probable marine wash are the remarkably uniform blue green colour and the abundance of pyrite/marcasite as disseminated grains, cementing material and massive nodular horizons.

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2. GEOLOGICAL (CONTD.):

(8) Reference to the various sections along the lines of bores shows that only very vague lithologic correlations are possible. This is as would be expected in alluvial stream deposition subjected to the type of variations in flow required to deposit, at various times, large bouldery wash, puggy clays with frequently abundant logs of wood (now coalified) and fine weathered granite derived "drift".

(9) Further reference to the bore correlation sections shows that generally, whenever wash occurs, it occurs at the bottom of the drill hole - directly on top of the bedrock. In a number of cases, wash occurs at different levels in adjacent bores and individual bores contain a number of wash horizons. These minor depositional variations are associated with sudden steepening or shallowing of gradients in parts of the area.

(10) When valuable heavy mineral is present it occurs almost exclusively in the wash, and generally only in the lowest level of wash in a given bore.

(b) Bonser Creek Area:

The outstanding features indicated by the drilling in this area are:

(1) There are no readily definable leads, although it must be remembered that the 16 chain spacing is too wide to effectively define narrow leads.

(2) The bedrock profile along the line of drill holes is remarkably uniform - See Fig. 17.

(3) The slope evident on the lower western face of the Mt. Cameron massif must continue below alluvium, on the eastern side of the line of drill holes, to give rise to the depths indicated by drilling.

(4) The thickness of wash and general abundance of pyrite, etc. indicates that similar conditions prevailed in this area as occurred on the deep western section of the Vicary Creek area.

(5) The fact that only very minor cassiterite is present in this wash; only one bore actually containing values of any interest.

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2. GEOLOGICAL (CONTD.):

(6) The correlation section (Fig. 17) shows the general lithological features of the alluvial sediments as interpolated from the drilling results.

(7) Factors (3) and (4) above imply that there is not likely to be any shallow section (of comparable area) to that existing in the Vicary Creek area.

(8) On Fig.16 are marked the writer's inferred drainage channels - inferred from bore results and photo interpretation. Only the channels to the east of the line of drill holes are likely to be shallow enough to warrant future interest.

3. GEOPHYSICAL:

When drilling indicated that exceptionally deep alluvial ground existed in parts of the area held under option, the Company's Geophysical Section carried out a seismic refraction survey to determine whether the method could be used to define the channel position in the deep ground and so eliminate the need for some of the drill holes.

The result of this work is the subject of a separate report by Messrs. Taylor and Gunn, but some generalised points are included below:

For evaluation purposes, it was necessary to utilise a line of deep and shallow drill holes and hence the "15" line was selected.

Assessment of the results of continuous profiling along this line indicated that it was not possible to differentiate between in-situ weathered granite bedrock and transported and redeposited materials derived from the weathering of granite generally composed of a clay matrix with quartz grains and mic particles (drift).

The method really only successfully defined the water table and a nebulous horizon - the unweathered bedrock profile - which is between 20 and 100 feet below the weathered bedrock profile as shown by drilling. This is in line with results obtained by the Bureau of Mineral Resources in their seismic survey of the Ringarooma Deep Lead.

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H. ORE RESERVES.

Assessment of the results of the testing programme indicates that only the shallow or eastern section of the Vicary Creek area has any potential for small scale mining.

The wide-spaced drilling pattern is not sufficient to fully delineate channels and grades and to reliably evaluate the prospect, infill drilling of channels would be necessary at 1 chain spacing on north-south lines with a maximum line-spacing of 8 chains longitudinally along the drainage gradient.

In defining ore reserves, the writer has followed the practice of selecting the best possible maximum "working" section and averaging the total valuable mineral content for this section over the selected section. Thus no allowance has been made for the selective discarding of barren clays, etc.

It was initially hoped that it would be possible to define a quantity of economic mineral carrying wash of a specific average grade, together with a specific quantity of barren overburden which could be discarded prior to treatment. However, the "cut and fill" nature of the various wash channels with their associated discontinuity and multiple levels (Fig. 4) has precluded this approach, although during working selective mining would probably be used.

On Fig. 6 are shown all drill holes with grades over the selected depth - generally the total depth of material above the granite "bottom".

The writer has arbitrarily assumed a cutoff value of 3 ozs. of 70% Sn. concentrates per cubic yard of measured bore spoil for purposes of defining areas of inferred ore reserves.

The shapes of these ore reserve areas have been defined on the basis of hole values and the channel patterns indicated on Figs. 3 and 4. It would be essential to confirm most of these inferred channels by drilling additional lines of holes across the channels in between the existing north-south lines of holes - especially between lines 17 and 23.

The reliability of the inferred ore reserve areas decreases with the decrease in size of the area; hence, blocks A and B listed below and shown on Fig. 6 are probably fairly reliably indicated, while the small blocks C, D and E are largely inferred.

Bearing in mind the method of selection, the following ore reserves are quoted as a guide for further definition by test drilling:

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Ore Reserve Block	Approximate Volume Cub. Yds.	Estimated Average Depth	Estimated Average Grade	Calculated Tonnage of contained 70% Sn. Concentrates
A	1,304,380	20 ft.	6 ozs./70% Sn.Concs. Cub.Yd.	218.36
B	745,360	15 ft.	6 oz. "	124.78
C	522,720	17 ft.	5.8 oz."	84.58
D	174,240	9 ft.	3.5 oz."	17.01
E	162,600	21 ft.	5.6 oz."	25.40
	2,909,300 yds.		5.8	470.13 tons

The figures above have had no correction factors applied to take into account recovery, batters of excavation or lack of compaction of bore spoil. These factors would respectively decrease grade; increase yardage with a corresponding decrease in grade; and increase grade. The overall effect of these factors would probably be an increase in yardage at perhaps about the same grade.

In considering the grades in the actual channels, it is apparent that some particularly rich sections exist and actual working of the inferred channel courses could yield considerably higher values than those shown by the majority of drill holes. It is almost certain that the excessively high values shown by odd holes on the 21 line represent random direct intersections of either "potholes" or "gutters".

Details of depths and values used in calculating the above reserves are shown on Fig. 6 and in more detail in Appendix "E".

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I. CONCLUSIONS.

From the foregoing, it is evident that the volume of possible economic material indicated as occurring on this prospect is too small to be of interest to the Compnay.

It is, however, evident that a small scale operator could almost certainly carry out profitable mining of the inferred ore reserve areas.

It is highly unlikely that the volume of material available for exploitation could be substantially increased by further drilling, although no doubt further drilling would reveal variations in inferred channel positions between lines of existing bore holes.

From the erratic high values encountered in a number of bore holes on the 21 line, it is apparent that some rich "gutters" or "potholes" exist within the defined channel areas. These are likely to be more widespread than indicated by the wide spaced drilling - the nature of the deposit as a series of gutters seems to indicate this likelihood - and, hence, mining operations could recover higher grades than those inferred from drilling results.

The inferred ore reserves shown on Fig. 6 must be considered as only a guide to likely yardage and grade. Before any mining venture was started, it would be necessary to drill a number of check holes to confirm the writer's inferences. These check drill holes should be along the lines of the recommendations listed in section "J".

There is little likelihood of an extensive similar type of deposit (shallow gutters) occurring to the east of the line of drill holes on the Bonser Creek area, in view of the proximity of granite outcrop and the depths of material encountered in the holes on this line.

A feature of the deep drill holes on the area is the great thickness of coarse bouldery wash, generally of a greenish colour carrying abundant Pyrite/marcasite and virtually no heavy alluvial minerals. In places, this wash contains partly opalized shell (oyster or mussel) fragments indicating possible sea-shore conditions.

If this wash is, in fact, of a marine environment, then it appears unlikely that any economic deposits of valuable minerals could exist in the deep sections of the area, since the continually encroaching sea would preclude economic development of shore line deposits.

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J. RECOMMENDATIONS.

The recommendations listed below are formulated with a view to providing desirable checks on the writer's inferred ore reserves (on the Vicary Creek area) prior to mining.

There does not appear to be sufficient encouragement to warrant further testing of the Bonser Creek area. With the exception of the swampy flats between the lower slopes of the mountain and the line of drill holes, the area is considered unsuitable for the development of economic deposits.

BLOCK "A":

Requires check drill holes on the 20, 22 and 24 lines to confirm channel extension between existing lines of drill holes. Main emphasis should be on the 24 line of holes to locate channel.

BLOCK "B":

Requires check drill holes on the 18, 20 and 22 lines with emphasis on 18 line to determine reason for depth variation, and 22 line to define upstream limits of channel.

BLOCK "C":

Requires drill hole at 17E 12F and additional holes on each of 14, 16, 18 and possibly 20 lines to confirm inferred channel.

BLOCK "D":

Doubtful whether drilling necessary on this area in view of shallow depth. For confirmation, a hole on each of the 14, 16 and 18 lines and possibly on the 13 line could be desirable.

BLOCK "E":

In view of the fact that this block is the most easily worked since parts of it are already opened from previous mining, check drilling to define the gutter on the 26, 28 and 30 lines could not be classed as essential. They would, however, be desirable, especially to check upstream channel positions.

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APPENDIX A

GENERAL OPERATIONS

1. CAMP:

In view of the proximity of the towns of Gladstone, Pioneer and Winnaleah to the area being tested and the fact that the labour requirements would be drawn from these centres, no Company camp was constructed. Staff personnel were accommodated at the Gladstone Hotel and local labour found their own accommodation. The driller for W.L. Sides Pty. Ltd. lived at the Pioneer Hotel.

A cottage was rented from the Endurance Tin Mining Company N.L. at South Mount Cameron and this served as office and store.

A minor lean-to-type shelter was built over the sampling equipment at the old Dorset Dredge workshops on a back-water of the Ringarooma River.

2. ROADS:

With the need for all-weather heavy-duty access to the areas during the winter period it was necessary to carry out a considerable amount of road work.

This work consisted of partial reconstruction and clearing of the main Herrick to Boobyalla road, over a distance of about 12 miles and the complete reconstruction of a link road from this road to the Endurance Mine at South Mount Cameron over a distance of about 4 miles, together with the construction of a new access road to

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the old Monarch Mine workings.

These roadworks required the provision of numerous culverts (old water pipes supplied by Endurance Tin) and the redecking and in some cases complete rebuilding of a number of bridges and grids and gates (log off-cuts supplied by V. Woods' Pioneer Timber Mill). Some grading of the major roads was carried out in conjunction with Ringarooma Municipal Council.

3. SURVEYING:

The basic 16-chain drilling grid was laid out over almost the entire area held under option by a compass and tape survey. The base line (line 15) was pegged northsouth roughly alongside the main Boobyalla road. The east-west lines were surveyed and pegged from this base.

As infill drilling became necessary the additional pegs at 4-chain spacing were pegged north-south at right angles to the original lines, thus providing a rough check on the reliability of using an assumed grid base for plans. Some variation was noted.

With the completion of drilling, all sites (actual drill holes) were surveyed for relative level and pegs placed alongside holes.

It is mentioned that while numbered pegs are alongside drill holes, many holes were drilled up to one chain away from the original pegged position - because of physical problems of topography and access.

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65-392 (Appx B)

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APPENDIX B (FROM Rpt. 65-392)

FINAL REPORT

ON

TIN PROSPECTING - MONARCH AREA, TASMANIA

(SPL 399)

1964/1965.

W.S. CHESNUT

MELBOURNE. JUNE, 1965.

APPENDIX B

DRILLING OPERATIONS

1. "Werf Conrad", 16" pitting machine

This unit was hired from the Dorset Tin Division of Storeys Creek Tin Mining Co. N.L. for a period of 31 weeks at a rate of £30 per week for the machine, casing and trailer unit. A rubber tyred tractor was on constant hire to move the plant at a rate of £10 per week. Wages for the three operators, operators transport company landrover and all fuel oils and maintenance charges were to the Company's account.

The machine drilled a total of 105 holes for a footage of 2134.3 ft. in a nominal overall working time of 186 days i.e. an average of 11.5 feet per 8 hour day.

Total costs are made up as under:-

31 weeks drill hire at £30 per week	£930. 0. 0.
31 " tractor " " £10 " "	£310. 0. 0.
Total wages maintenance charges paid to Storeys Creek Tin Mining Co.	£1,650. 0. 0.
Estimated total wages and fuels debited to Company account	£1,110. 0. 0.
Total Costs	£4,000. 0. 0.

Hence estimated average cost per foot = £1. 17. 6.

This machine rotates 16" (~~outside~~ diameter) flush coupled casing continuously, or as required, to keep ahead of the cleaning tools. The cleaning tools comprise a 4 jaw grab "digger" for dry ground, a semi-rotating bucket for wet ground and a 6" clay barrel for testing bo[illegible]om. Rarely a massive chisel type jumper bit is used to break up hard bands.

This unit proved to be only reasonably mobile. It is a 4-wheel trailer unit weighing about 4 tons and requiring a rubber tyred tractor to tow the machine. An additional large trailer is required for carting of casing and tools between sites and a truck is required to cart the large bulk of sample material obtained (7 cu.ft. for each 5 ft. advance) to a treatment site. The unit was hired complete with a pilot type treatment plant - trommel and jig with water supply.

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2. Goldfields G.33 type 6" percussion drill

This unit was hired from W.L. Sides and Son Pty. Ltd. (Melbourne) and for a period of 11 weeks it was fully occupied with test drilling on the Vicary Creek area. It was then transferred to the Bonser Creek area for a further 5 weeks. The machine had been stored at Pioneer since the preceeding summer and hence there were no siting charges.

The original contract with Sides' required that transport for the drillers would be to our account and initially whilst Sides' old landrover was operating this applied. However when the landrover became unserviceable about mid way through the contract the company provided transport for the two drillers.

On the Vicary Creek area the machine drilled a total of 33 holes for 2,194 feet in a nominal overall working tir of 66 days, while on the Bonser Creek area the unit drilled 13 holes for 1,207 feet in a nominal working time of 30 days.

i.e. 46 holes for 3,401 ft. in 96 days.
i.e. an overall average of 35.4 ft. per 9 hour day.

Contract rates of hire were:-

Normal machine operating hire rate	£4. 9. 0. per hour.
with a 10% on cost for Saturdays	£4. 18. 0. per hour.
Delays, stand-down and travelling time to B.H.P. account	£2. 12. 6. per hour
Mileage for use of Sides Landrover	1. 6. per mile

All fuels, greases and maintenance were contractors responsibility.

Total charges paid to W.L. Sides' Pty. Ltd. for the 11 weeks drilling on the Vicary Creek area amounted to £2.529.12.4.

Hence average cost per foot = £1.3.0

No costs are available for the Bonser Creek area, but a similar figure would be expected.

This is a standard "mud puncher" type machine which drives 6 inch outside diameter water bore casing ahead of a bailing tool - drive pump (when possible). When heavy wash is encountered it is generally necessary to drill ahead of the casing using a chisel type placer bit to break the boulders sufficiently to allow bailing and subsequent driving of the casing.

The unit proved to be exceptionally mobile in dry conditions, set up time being about 10 minutes. The drill is mounted on a truck (Commer 4 x 4) and carting of casing requires a landrover or small trailer. Samples, ideally, are treated on the site.

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APPENDIX C

1. SAMPLE TREATMENT PROCESSES

(a) "Conrad" Samples

The method of discharging material from the respective digging tools of the unit generally involves a certain amount of sample loss regardless of whether the material is dry or wet. It is considered that the normal loss would amount to about 1-5%. Generally the method of digging prevents contamination of sample materials in the bore hole.

The half 44 gallon drums (with handles) of sample material were carted by truck or landrover to the treatment plant at South Mount Cameron, where drum volume of compacted spoil was measured.

Depending on whether the spoil, as won from the ground, was in the wet or dry state the sample volume was measured respectively wet or dry. Transport of the sample material by truck for the distance of 8 miles was considered to ensure that a uniform degree of compaction applied to all samples - excluding dry puggy clays. Some loss of sample material during transportation occurred with particularly wet samples but this was considered to be relatively minor, probably not exceeding 1-5% by volume.

The material was then fed directly to a rotating trommel with abundant water. The trommel double screened the material at $\frac{3}{8}$" and 3/16", the undersize passing directly to a settling vat. The oversize consisting of clean wash stones or balls of clay is discharged to waste.

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The underflow from the settling vat is then treated in a double tray, 6 ft. long, cradle, and the rough concentrate obtained then panned. This final concentrate then being dried, magneted, weighed and despatched for assay.

In view of the large bulk of these samples, the general sample volume loss of about 5% can perhaps be ignored.

(b) "Sides" Samples

In the case of this machine the effectiveness of discharge of sample, in a slurry form, into half 44 gallon drums is entirely dependent on the driller and offsider. Frequently the loss of sample volume through splash appears to be over 5%, especially in the clayey wash materials.

In view of the slurry nature of the material from this machine it is essential that samples be treated on the site. Accordingly it is necessary to provide abundant water. In this instance two and four hundred gallon ship tanks were mounted on a 4 x 4 truck.

The samples are hand puddled and deslimed by allowing water overflow. The volume of remaining material is then measured as a drum volume.

Then the samples are hand screened and fed to a double tray, 6 ft. long cradle and the rough concentrate then hand panned. The resultant concentrate is then dried, magneted, weighed and sent for assay.

The samples are normally broken at 5 ft. intervals except that a change is made when wash is encountered. The hole was always bailed dry on completion and the clay barrel used to clean bottom.

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2. Sample Calculations

When calculating the volume of material which theoretically should have been recovered by the respective drilling methods it is necessary to consider the various dimensions of different parts of the casing and the drilling method.

	Sides 6" Percussion Drill	Conrad 16" pitting machine
Casing I.D.	5½" (1 ft. = 0.172 cu. ft.)	15¼" (1 ft. = 1.27 cu. ft.)
" O.D.	6" (1 ft. = 0.196 ")	16" (" = 1.40 ")
Shoe O.D.	6⅜" (1 ft. = 0.231 ")	17" (" = 1.58 ")
Drilling Method	Hammer Casing bail cuttings	Rotate Casing Scoop hole

From the figures it can be seen that it is extremely important for a reliably accurate theoretical core volume to be used for all grade calculations. This especially applies to the small diameter machine since the conversion of sample grades into terms of bulk yardage involves a considerable multiplication factor.

In the case of the Conrad pitting machine the casing actually cuts its way into the material by rotation under its own weight. The leading edge of the casing has two "teeth" and is beveled so as to guide most of the material into the casing rather than forcing it into the walls of the hole. Hence it is probably fairly accurate to use a theoretical core volume based on a 17 inch diameter hole.

With the percussion drilling machine the problem is complicated by the fact that during hammering of the casing a plug of material is formed at the base of the casing which causes resistance to the entry of additional material

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(under further hammering). This resistance increases with the longer the individual total casing drive (ahead) e.g. the resistance to entry to the casing of further material when 1 ft. of material is in the casing would be considerably less than the resistance when 5 ft. of material was in the casing. Hence some form of drive factor should be applied to the casing volume when calculating theoretical core volumes. This drive factor would be different for different materials - e.g. a different factor would be necessary for penetrating wash as compared with dry clay.

Comparison of the measured volumes with theoretical volumes indicates that it is probably necessary to use a theoretical volume based on a coring diameter of $6\frac{3}{8}$ inches in most materials.

Reference to the individual graphic assay section of the bores drilled by both methods shows that wide discrepancies occur between theoretical and measured volumes. Some of these variations are due to compaction of the sampled materials - e.g. dry clay compared with wet wash; while others can occur through "running" ground.

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APPENDIX D

Methods of Calculation of Ore Reserves

The calculating of ore reserves is primarily intended to differentiate between economic and uneconomic material.

In determining whether an ore is economic consideration must be given to such factors as:-

1. Location for access and labour supply.
2. Method of working and recovery of values.
3. Size of undertaking.
4. Price likely to be realized on sale of valuable material.

In the case of this prospect it is difficult to foresee any problem regarding access; it appears that a strip mining technique would be necessary, probably only on a relatively small scale; and finally it is impossible to arrive at an average price for tin in the future.

Hence the writer intended calculating the ore reserves indicated (and inferred) as a result of the prospecting campaign from two imperical approaches:-

(a) Overall hole value (average grade of a total volume).

(b) Computing a volume of wash at a given grade and calculating the volume of overburden to be removed in order to recover the volume of wash.

(a) Overall Hole Value

In this approach the total concentrates recovered from an individual drill hole are averaged out over the inferred

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highest grade section of the hole generally wash bottom to surface. Thus by inspection of Fig. 6 it can be seen that by arbitary selection of an average hole value, it is possible to define an area for which an average value of the total volume of material can be arrived at - through normal weighting procedure. The volume of material is determined from the isopach plan Fig. 5.

Hence using this approach the bulk ore reserves listed in section H of this report were calculated. The actual method of calculation was largely impirical - the surface areas were calculated from Fig.6; estimated average depths were derived from the sections along the lines of drill holes together with the isopachs of the volume of material overlying bedrock. The estimated grades are averages of the typical values indicated by the majority of drill holes in the given area. Excessively high values were weighted as for the average high value.

(b) Volume and Grade of Wash Material

In this approach the concept of strip and selective mining was borne in mind, in view of the fact that almost invariably the economic minerals are contained in the wash material which normally occurs at the base of a hole and is of only small thickness. Hence it appeared feasible to consider a method of working involving the stripping of the barren overburden and then selective collection of wash material. This technique would considerably reduce the amount of material which had to be treated for the recovery of the valuable minerals.

This method of calculation could be used reliably if only one level of economic wash existed. However, in this case

with a number of different levels of wash (see Fig.4) the calculations become exceedingly complicated and less exact - both in regard to the wash value and the wash and overburden volumes.

In view of the fact that the drilling results had indicated that the prospect was too small to be of interest to the company this method of calculation was not used. However, the wash values are shown on the respective graphic assay sections of the drill holes, and in the summary of drill hole results - Appendix E.

BONSER CREEK AREA - MONARCH LINE 15 EXTENDED

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of wash Ozs. of 70% Sn of cons. c/y	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
N15	6	156.2	30.0	28.0	-		-	0.29 ozs.		84.0 South	
O15	"	185.9	88.0	84.5	50.0	84.5	0.1	0.70	1.87 ozs./cu.yd. over 0-30.0 ft	95.0 "	
15O12P	"	211.8	123.0	112.5	71.5	107.0	-	Tr		102.5 "	
P15	"	212.5	122.0	115.0	84.0	120.0	3.5.0	1.42		105.5 "	
15P4Q	"	218.3	125.0	123.0	80.0	109.5	-	Tr		108.0 "	
Q15	"	171.5	100.0	93.0	59.0	88.0	-	.33		115.5 "	
R15	"	156.5	90.0	84.0	28.0	84.0	-	.26		200 ft. east of 126.5 "	
					14.0	18.0	-	Tr		100 ft. west of 137.0 "	
S15	"	161.5	87.0	83.0	19.0	74.5	-			100 ft. west of 147.5 "	
T15	"	176.5	62.0	57.0	29.0	57.0	-	Tr			
					48.0	77.0	-				
U15	"	203.5	95.0	92.0	81.0	92.0	-	Tr		158.0 "	
V15	"	234.4	110.0	106.0	84.5	106.0	-	Tr		168.5 "	
W15	"	245.1	72.0	68.0	65.0	68.0	-	.16		179.0 "	
X15	"	331.2	103.0	97.0	-		-	Tr		190.5 "	
X15	16	331.2	10.0	Not Bottomed	-		-	Tr		190.5 "	
Y15	"	357.4	45.0	41.0	-		-	Tr		201.0 "	

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VICARY CREEK AREA

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of wash ozs. of 70% Sn cons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
11E12F	6	129.5	15.5	13.5	Nil		-	0.5 (ozs. of 70% Sn Concentrates per cubic yard).			Soft granite bottom unless indicated.
F11	"	161.5	15.0	6.0	Nil		-	0.05			
11F4G	"	141.0	25.0	3.0	Nil		-	Tr			
11F12G	"	147.5	70.0	67.0	28.0	55.0	0.15	0.1			
G11	"	156.5			37.0	38.0	-	0.3			
"			85.0	82.0	44.0	82.0	-				
11G4H	"	164.0	85.0	81.0	37.5	81.0	0.1	.09			
11G8H	"	167.0	99.5	97.5	45.0	97.5	0.04	.06			
11G12H	"	173.0	135.0	130.0	49.0	130.0	0.15	0.11			
H11	"	175.0	133.0	Not Bottomed	50.5	133.0 plus	0.1	.18			Not Bottomed
11H4J	"	168.0	124.0	119.0	43.0	119.0	-	.39			
11H8J	"	174.5	121.0	112.0	55.0	112.0	-	.22			
11H12J	"	173.5	105.0	100.0	54.0	97.0	-	.15			
J11	"	182.5	48.0	40.0	Nil		-	.16			
13E12F	"	131.6	15.0	11.0	Nil		-	.32			
F13	"	153.6	8.5	5.0	Nil		-	.78			

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Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of wash ozs. of 70% Sn dons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks.
13F4G	"	163.7	20.0	9.5	8.5	9.5	-	.47			
13F8G	"	164.0	20.0	14.0	13.5	14.0	6.7	.27			
13F12G	"	168.2	45.0	41.0	Nil		-	.07			
G13	"	159.4	91.0	87.0	52.0	87.0	-	.13			
13G8H	"	141.2	101.5	99.0	38.0	99.0	-	.40			
13G12H	"	150.6	80.0	77.0	44.0	77.0	-	.21			
15D8E	16	158.3	12.0	12.0	11.5	12.0	3.9	.18		5 North	
15D12E	"	135.9	5.0	5.0	4.0	5.0	2.4	.46		3.0 N	
E15	"	124.5	12.0	2.5	Nil		-	.15		0/0	
15E4F	"	126.0	9.0	9.0	8.0	9.0	2.0	3.89		3.0 South	
15E8F	"	129.5	14.5	14.5	11.0	14.5	1.0	.29		5.0 "	
15E12F	"	134.5	14.0	9.0	Nil		-	Not Sampled		8.0 "	
F15	"	149.0	14.5	12.7	9.0	12.7	29.6	7.62		10.5 "	
15F4G	6	160.0			19.0	21.0	.72	.42		13.0 "	
"	"		60.0	47.0	45.0	47.0	1.55				
15F8G	"	171.5	79.5	78.5	68.0	78.5	8.16	1.64		16.0 "	
15F12G	6	174.5	82.0	80.0	Nil		-	.36		18.5 "	

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247039

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of wash ozs. of 70% Sn cons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
G15	16	175.5			9.0	10.0	.61	.57		21.0 South	
"	"		60.0		14.5	23.5	.25				Hole deepened to soft granite bottom.
"	6		81.0	78.5	73.5	78.5	.98				
15G4H	"	175.5	76.0	72.0	68.0	72.0	6.99	.89		23.5 South	
15G8H	"	173.5	78.5	76.0	71.0	76.0	17.59	1.18		26.0 South	
15G12H	"	174.0	75.0	72.0	58.5	72.0	-	.23		29.0 South	
H15	16	159.0			18.5	20.0	-	.13		31.0 South	
"	"		67.5	67.5	37.5	67.5	-				
15H4J	6	168.0			52.0	59.0	.37	.15		34.0 South	
"	"		83.0	78.0	62.5	76.0	-				
15H8J	"	182.0	30.0	22.0	Nil		.20	.20		37.0 South	
J15	16	188.0	58.0	26.0	14.0	15.7	-	.05		42.0 South	
K15	"	197.0	28.2	8.2	1.5	8.25	-	.27		52.5 South	
L15	"	228.0	6.0	5.5	Nil		-	.02		63.0 South	
E17	"	141.0	2.5	2.5	2.5	Nil	-	Not Sampled			
17E4F	"	133.5	9.0	9.0	6.5	9.0	3.84	3.32			
F17	"	132.0			11.0	12.5	6.0	6.1			

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Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of wash ozs. of 70% Sn cons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
F17	16	132.0	27.0	27.0	20.5	27.0	20.0				
17F4G	"	150.0	14.5	14.5	12.0	14.5	15.0	2.93			
17F8G	"	156.5			13.0	16.0	3.5	1.35			
"	"		20.0	20.0	18.0	20.0					
17F12G	"	171.0	68.0	68.0	66.0	68.0	.60	.21	0.27 ozs. over 0-42.0 ft.		
G17	6	175.5	70.0	67.0	17.0	27.0	2 1.0	3.62	8.31 ozs. over 0-30.0 ft.		
17G4H	"	180.5	70.0	67.0	65.0	67.0	8.69	1.45	5.57 ozs. over 0-10.0 ft.		
17G8H	16	183.5	78.0		73.0	74.0	-	0.39			Hole deepened to soft granite bottom.
"	6		102.0	100.0	98.0	100.0	-				
17G12H	16	184.5			65.0	66.0	-	.13			
"	"		76.0	76.0	75.0	76.0	-				
H17	"	185.5	73.75	72.75	63.5	72.5	-	.06			
17H4J	"	175.0	55.5	55.5	50.0	55.5	0.21	.06			
17H8J	"	173.5	11.5	6.5	Nil		-	Not Sampled			
17H12J	"	180.0	11.5	11.5	11.0	11.5	0.5	0.1			

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247041

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of Wash ozs. of 70% Sn cons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
J17	16	194.0	8.5	8.5	Nil		-	Not Sampled			
E19	"	147.6	12.0	12.0	Nil		-	.28			
19E4F	"	133.2	12.0	12.0	10.0	12.0	-	1.95			
19E8F	"	146.9	2.0	2.0	Nil		-	.48			
19E12F	"	139.1	10.0	10.0	6.0	10.0	-	3.66			
F19	"	136.5			9.0	10.0	-	.51			
"	"		19.0	19.0	18.5	19.0	16. 0				
19F4G	"	137.5	15.0	15.0	14.0	15.0	10.0	2.19			
19F8G	"	139.0	19.5	19.5	18.0	19.5	45.0	4.34			
19F12G	"	141.5	14.0	14.0	Nil		-	.39			
G19	"	147.5	19.0	9.5	Nil		-	.63	1.34 ozs. over 0-9.5 ft.		
19G4H	"	154.5	16.3	14.7	14.0	14.7	117.0	6.44			
19G8H	"	171.5	18.0	18.0	17.0	18.0	96.0	5.59			
19G12H	"	182.5	15.0	8.0	Nil		-	.11	0.20 ozs. over 0-7.0 ft.		Probable weathered shale bottom.
H19	"	190.5	15.0	4.0	Nil		-	.01	0.02 ozs. over 0-6.0 ft.		Weathered metamorphosed sandstone bottom.
19H4J	"	192.5	38.7	10.7	Nil		-	.13			

040

247042

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of Wash ozs. of 70% Sn cons	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
19H8J	16	196.5	27.0	27.0	15.0	27.0	1.6	.71			
19H12J	"	200.5	8.5	8.5	Nil		-	.29			
J19	"	206.0	18.0	18.0	Nil		-	.09			
19J4K	"	213.0	23.0	5.0	Nil		-	.02			
J19.5	"	202.5	9.0	1.0	Nil		-	.01			
J20	"	210.4	16.0	4.0	Nil		-	.03			
J20.5	"	215.2	12.0	2.0	Nil		-	Not Sampled			
E21	"	154.5	8.0	8.0	Nil		-	.09			
21E4F	"	144.8	10.5	10.5	10.0	10.5	-	.47			
21E8F	"	148.4	10.0	10.0	9.0	10.0	-	.36			
21E12F	"	146.0	9.5	9.5	8.5	9.5	-	.39			
F21	"	144.7	12.0	2.0	Nil		-	.65			
21F4G	"	144.6	16.0	16.0	15.0	16.0	-	.79			
21F6G	"	145.4	18.0	18.0	13.0	18.0	3.02	.86			
21F8G	"	145.9	16.0	16.0	15.0	16.0	11.0	.98			
21F10G	"	145.7	13.5	13.5	10.5	13.5	8.5	2.52			

041

247043

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of Wash ozs. of 70% Sn cons	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
21F12G	16	145.6	23.5	23.5	21.0	23.5	336.0	34.72			
21F14G	"	144.7			13.0	16.0	38.4	18.8			
"	"		21.5	21.5	19.0	21.5					
G21	"	145.0	15.0	15.0	14.0	15.0		7.13			
21G4H	"	144.9	9.0	9.0	Nil		-	Not Sampled			
21G6H	"	149.7	13.5	13.5	13.0	13.5	6.0	0.30			
21G8H	"	152.5	12.0	12.0	10.0	12.0	41.0	10.56			
21G10H	"	159.1	7.5	7.5	7.0	7.5	2.0	.39			
21G12H	"	165.0	16.0	16.0	14.0	16.0	137.99	17.35			
21G14H	"	171.3	15.0	15.0	14.0	15.0	270.2	19.49			
H21	"	179.0	16.0	16.0	14.5	16.0	26.7	4.57			
21H2J	"	185.4	11.0	11.0	Nil		-	.72			
21H4J	"	191.0	15.0	12.0	9.0	12.0	0.6	1.85	2.41 ozs. over 0-9.0 ft.		
21H6J	"	196.2	12.0	12.0	11.5	12.0	-	1.34			
21H8J	"	201.0	13.0	7.5	Nil		-	Not Sampled			
21H12J	"	205.5	13.0	3.0	Nil		-	"			
J21	"	210.0	6.0	1.0	Nil		-	"			

042

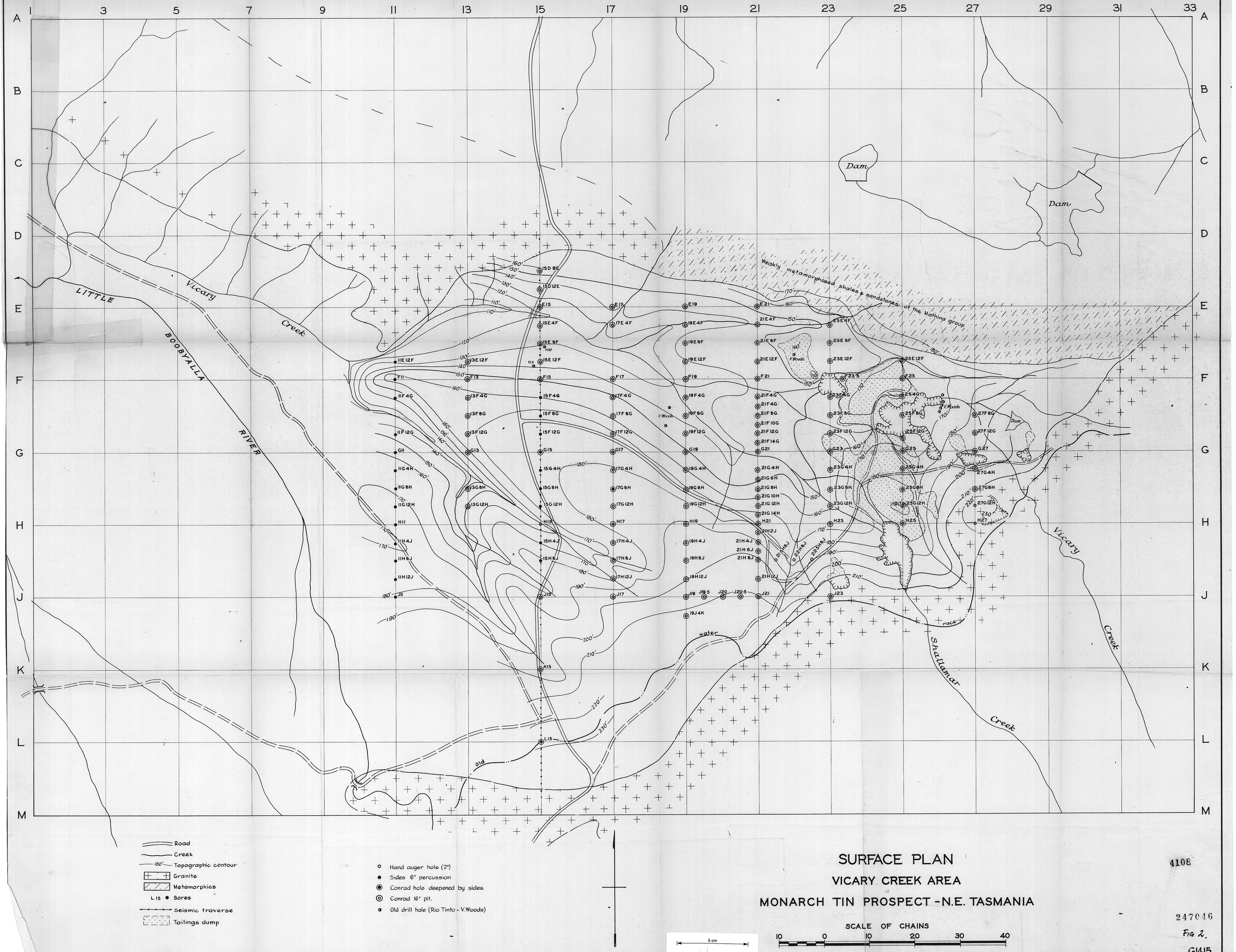
247044

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of Wash ozs. of 70% Sn cons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
21.5H8J	16	189.4	10.0	1.0	Nil		-	-			
22H8J	"	175.6	10.0	1.0	Nil		-	-			
22.5H8J	"	190.3	1.5	1.5	Nil		-	0.45			
23E4F	"	153.5	11.0	9.0	Nil		-	"			
23E8F	"	155.0	14.0	14.0	12.0	14.0	-	.37			
23E12F	"	152.0	12.0	12.0	10.0	12.0	2.19	.63			
F23E2	"	158.0	17.0	17.0	Nil		-	.38			Tailings in old workings.
23F4G	"	156.5			5.00	8.00	-	1.64			
"	"		14.0	14.0	12.25	14.00	-				
23F8G	"	156.5	30.0	18.0	10.5	18.0	1.68	.46	0.75 ozs. over 0-18.0 ft.		
23F12G	"	156.5	25.5	13.5	Nil		-	.53	0.31 ozs. over 0-13.5 ft.		
G23	"	154.5	18.0	18.0	16.0	18.0	50.0	6.80			
23G4H	"	156.5	20.5	19.5	18.0	19.5	12.0	1.16			
23G8H	"	158.0	27.7	27.7	26.0	27.7	66.0	5.30			
23G12H	"	159.5	18.0	18.0	12.0	18.0	1.86	0.73			
H23	"	164.5	15.0	15.0	Nil		-	.9			
J23	"	222.5	6.0	3.5	Nil		-	3.27			

043

Bore Hole No.	Hole Size Inches	Collar R.L.	Ft. Total Depth	Ft. Depth to Bottom	Wash From Ft.	Wash To Ft.	Value of Wash ozs. of 70% Sn cons.	Overall Value of Hole	Best Maximum Section of Hole	Location on Seismic Traverse	Remarks
25E12F	16	169.58	23.0	23.0	Nil		-	.047			
TIPE5	"	173.68	19.0	19.0	Nil		-	.83			Tailings in old workings
F25	"	176.5	19.5	19.5	Nil		-	.24	0.34 ozs. over 0-13.0 ft.		Tailings in old workings
25F4G	"	164.0	17.5	12.5	Nil		-	5.26			
25F8G	"	161.5	14.5	14.5	Nil		-	1.34			
25F12G	"	163.5	21.0	21.0	Nil		-	.19			
G25	"	170.5	32.7	21.7	21.0	21.7	3.76	.37			
25G4H	"	175.0			20.5	21.1	-	.14			
"	"		34.5	25.5	24.5	25.5	-				
25G8H	"	182.0	38.5	38.5	36.0	38.5	29.5	2.30			
25G12H	"	190.5	40.0	39.0	35.5	39.0	20.0	2.01			
H25	"	188.5	38.0	35.5	33.5	35.5	26.0	3.34			
27F8G	"	185.5	26.5	26.5	23.5	26.5	3.19	.41			
27F12G	"	186.5	26.0	26.0	25.7	26.0	-	.37			
G27	"	190.0	29.5	29.5	26.5	29.5	50.0	7.01			
27G4H	"	202.5	14.5	14.5	12.0	14.5	32.0	4.36			
27G8H	"	210.0	12.0	6.5	Nil		-	1.35			
27G12H	2	230.0	2.5	1.0	Nil		-	Not Sampled			
H27	"	223.6	2.5	1.0	Nil		-	Not Sampled			

044



SURFACE PLAN

VICARY CREEK AREA

MONARCH TIN PROSPECT - N.E. TASMANIA

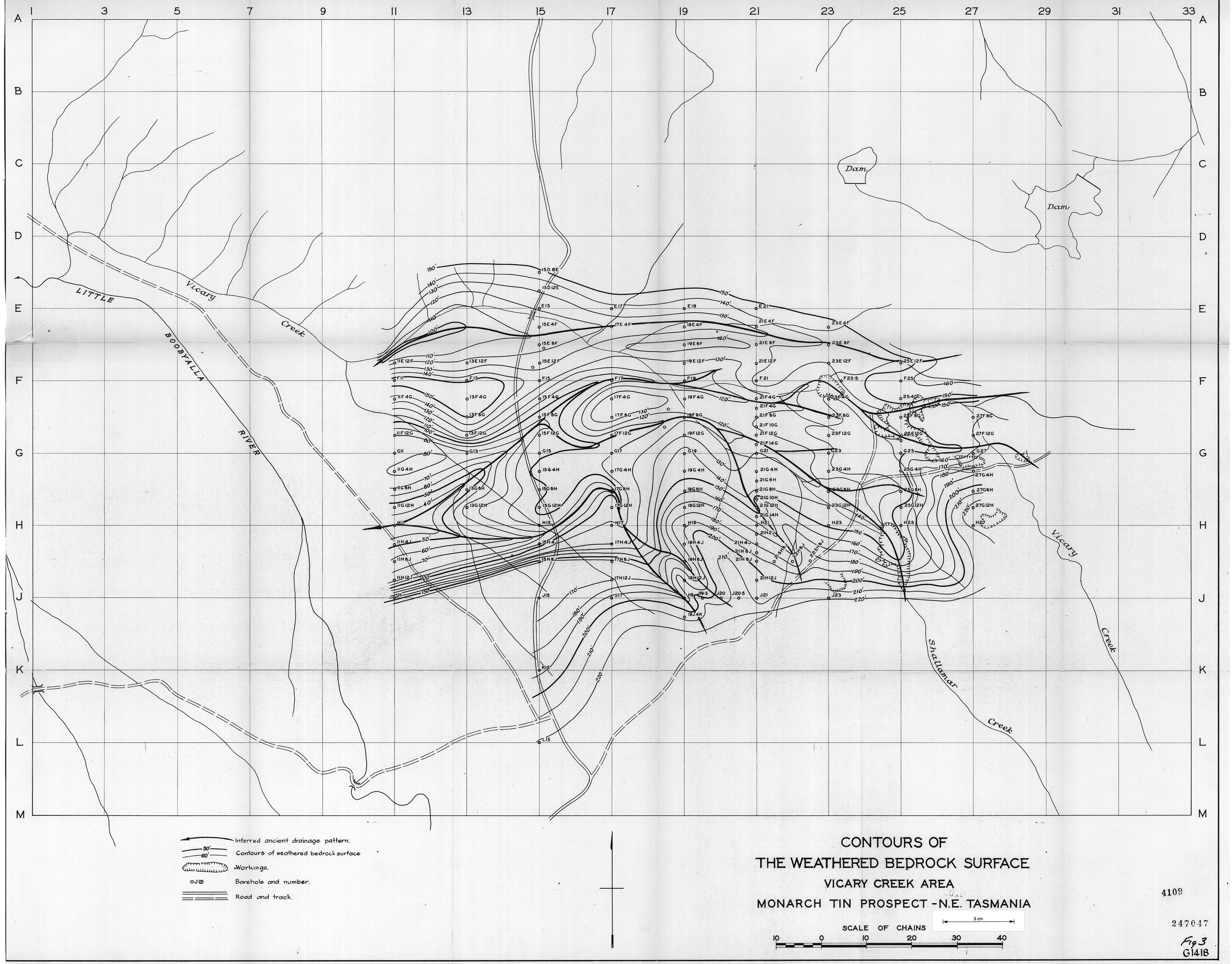
4108

247046

FIG 2.

G1415

G.T.



CONTOURS OF THE WEATHERED BEDROCK SURFACE

VICARY CREEK AREA

MONARCH TIN PROSPECT - N.E. TASMANIA

SCALE OF CHAINS

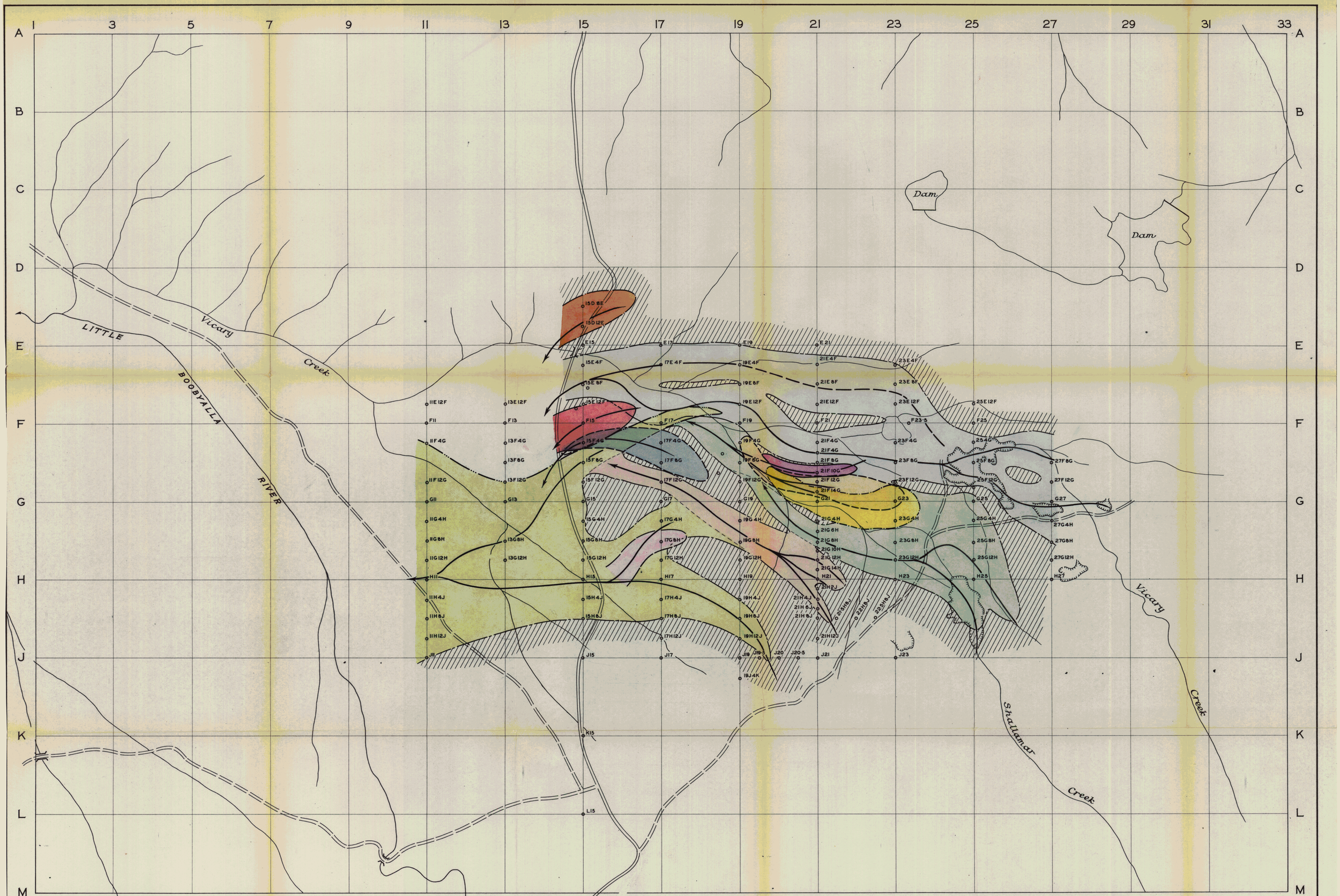
5 cm

10 0 10 20 30 40

4109

247047

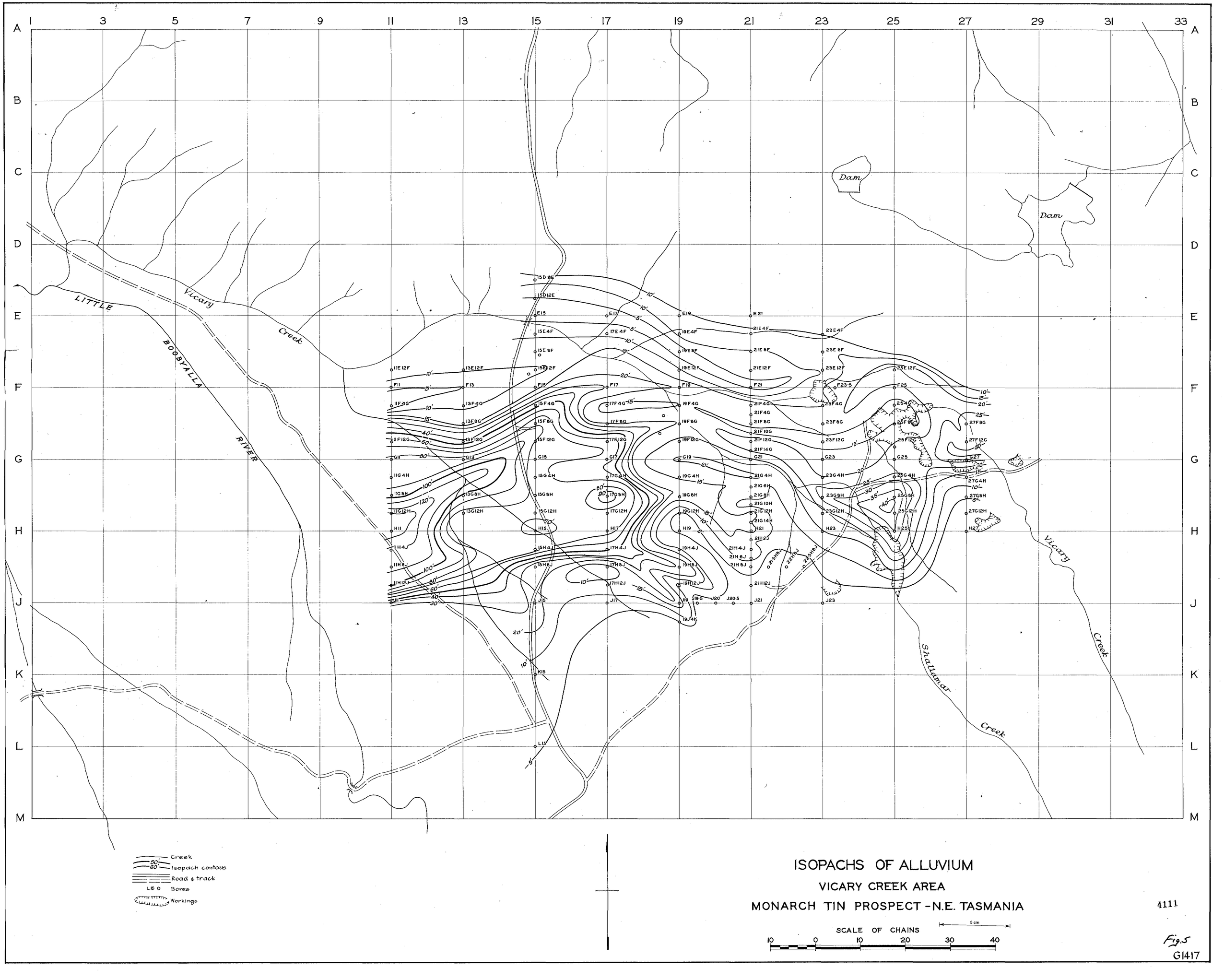
Fig 3
G1418



PLAN SHOWING
EXTENT OF WASH HORIZONS
(COLOURS INDICATE VARYING WASH HORIZONS)
VICARY CREEK AREA
MONARCH TIN PROSPECT - N.E. TASMANIA

SCALE OF CHAINS
10 0 10 20 30 40
5 cm

4110
247048
Fig. 4
G1416



ISOPACHS OF ALLUVIUM

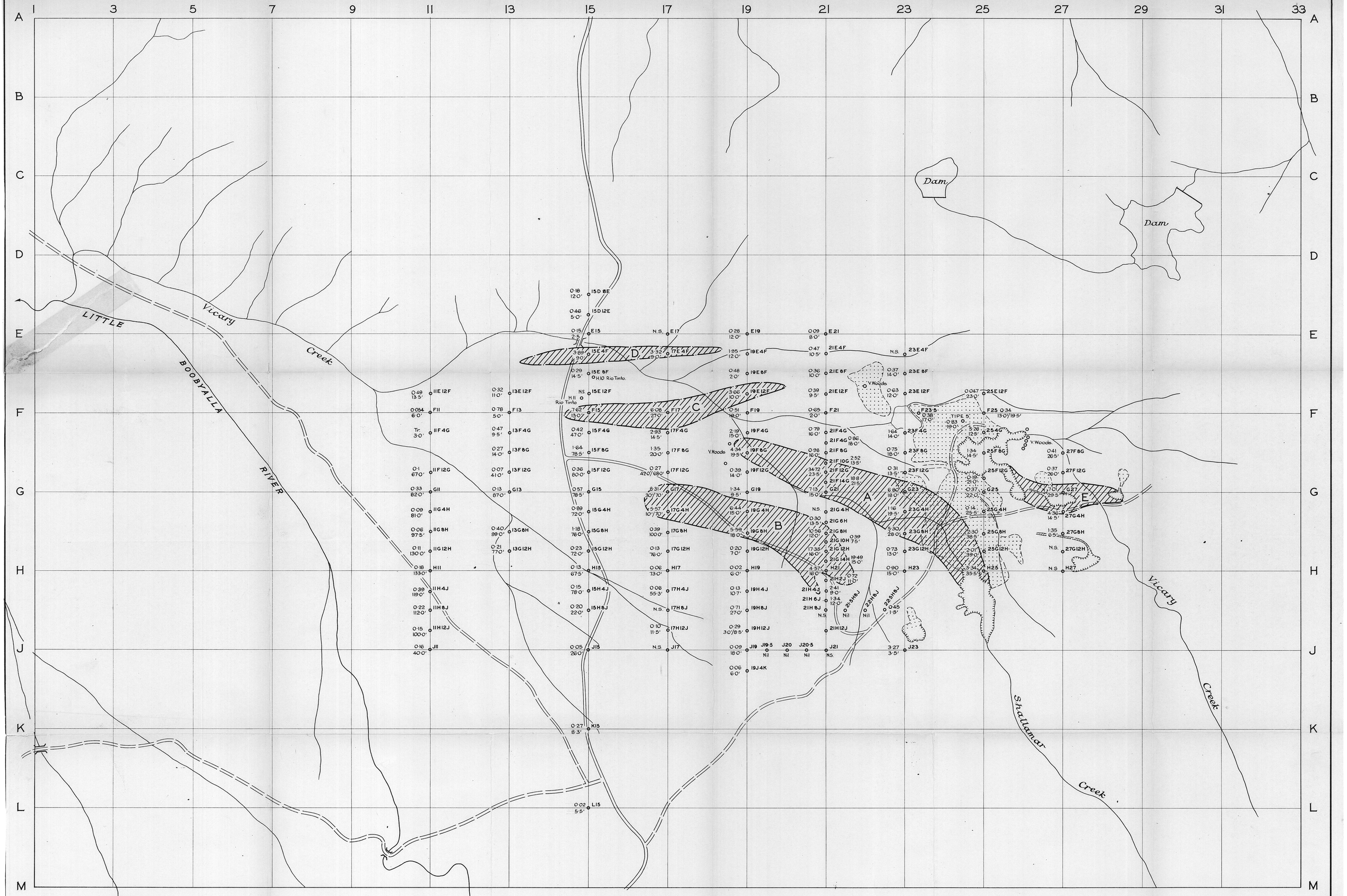
VICARY CREEK AREA

MONARCH TIN PROSPECT - N.E. TASMANIA

4111

Fig.5

G1417



LEGEND.

- Inferred ore reserve areas.
- 0G17 — Bore hole and number.
- 8·31 30'/70' — Value of bore (8·31) in ozs of 70% SnO_2 concentrates per cubic yard. taken over best section (30') &/or total depth (70')
- Workings.
- Tailings dump.
- Road and track.

Block	Approx Volume Cub yards	Average Depth Feet.	Average Grade Ozs/cub. yd.
A	1,304,380	20	6·0
B	745,360	15	6·0
C	522,720	17	5·8
D	174,240	9	3·5
E	162,600	21	5·6
TOTAL	2,909,300 yds.		5·8

ORE RESERVES

VICARY CREEK AREA

MONARCH TIN PROSPECT - N.E. TASMANIA

SCALE OF CHAINS

10 0 10 20 30 40

5 cm

4112

247049

Fig. 6

G1414

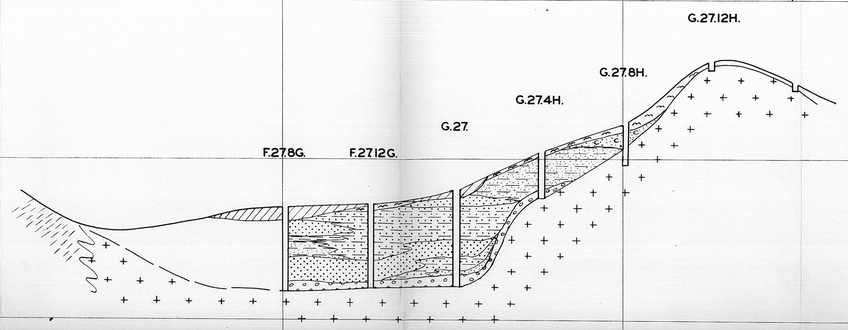
9·7·65 G.B.

FIG. 7

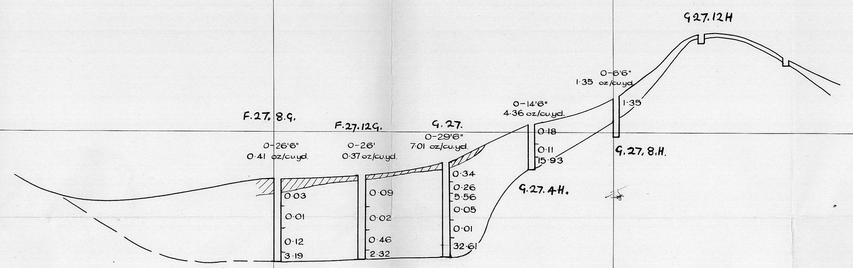
D E F G H J K

R.L. 250
R.L. 100

NATURAL SCALE: 1" = 200'



HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 20'



LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 27.

(LOOKING UPSTREAM)

5 cm

4113

247050

G1420K

FIG. 8

D E F G H J K

R.L. 200
R.L. 50

NATURAL SCALE: 1" = 200'

R.L. 200
150
100
R.L. 50

E.25.12F.
F.25.
F.25.4G.
F.25.8G.
F.25.12G.
G.25.
G.25.4H.
G.25.8H.
G.25.12H.
H.25.

HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 20'

R.L. 200
150
100
R.L. 50

E. 25. 12 F.
0-23'
0·47 oz/cu.yd.
·03
·003
·006
·14

F. 25.
0-13'0"
0·34 oz/cu.yd.
0-19'6"
0·24 oz/cu.yd.
·47
·14
Not sampled
·18

F. 25. 4. G.
0-12'6"
5·26 oz/cu.yd.
·85
9·81
8·51

F. 25. 8 G.
0-4'6"
1·34 oz/cu.yd.
·30
2·63

F. 25. 12. G.
0-21'
0·18 oz/cu.yd.
·07
·03
·04
·68

G. 25.
0-21'8"
0·37 oz/cu.yd.
Not sampled
·02
·08
3·76

G. 25. 4. H.
0-25'6"
0·14 oz/cu.yd
·07
Not sampled
·08
·04
Tr.
1·78

G. 25. 8. H.
0-38'6"
oz/cu.yd.
·32
·03
·04
1·23
29·50

G. 25. 12. H.
0-39'
2·01 oz/cu.yd
·47
·03
·03
·02
10·11

H. 25.
0-35'6"
3·34 oz/cu.yd.
5·18
·23
·31
·72
·10
21·13
·13

R.L. 200
150
100
R.L. 50

D E F G H J K

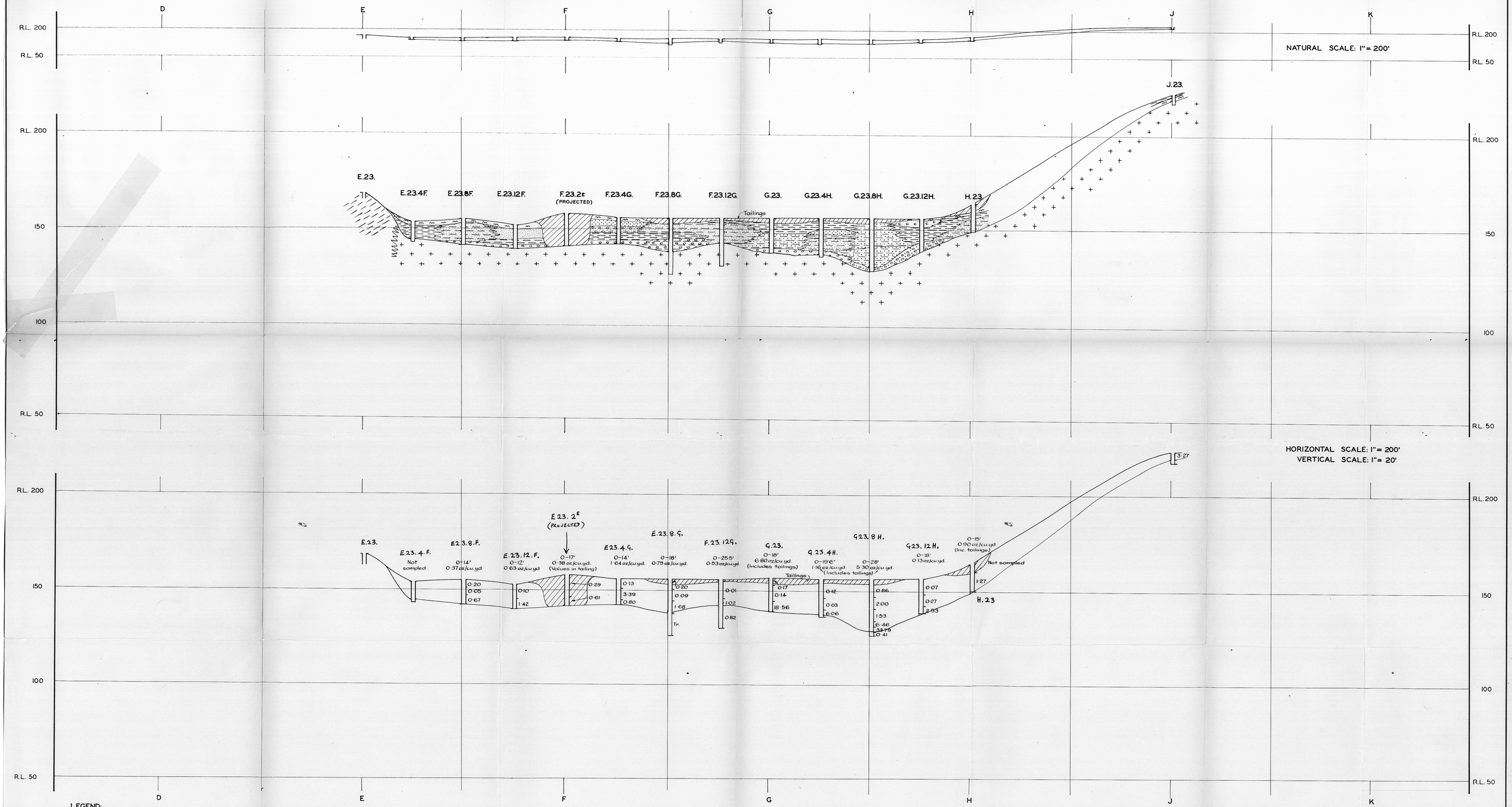
LEGEND:
SEE LINE II.

MONARCH TIN PROSPECT
SECTIONS THROUGH BORES — LINE 25.
(LOOKING UPSTREAM)

5 cm

4114
247051
G1420J

FIG. 9



LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 23.

(LOOKING UPSTREAM)

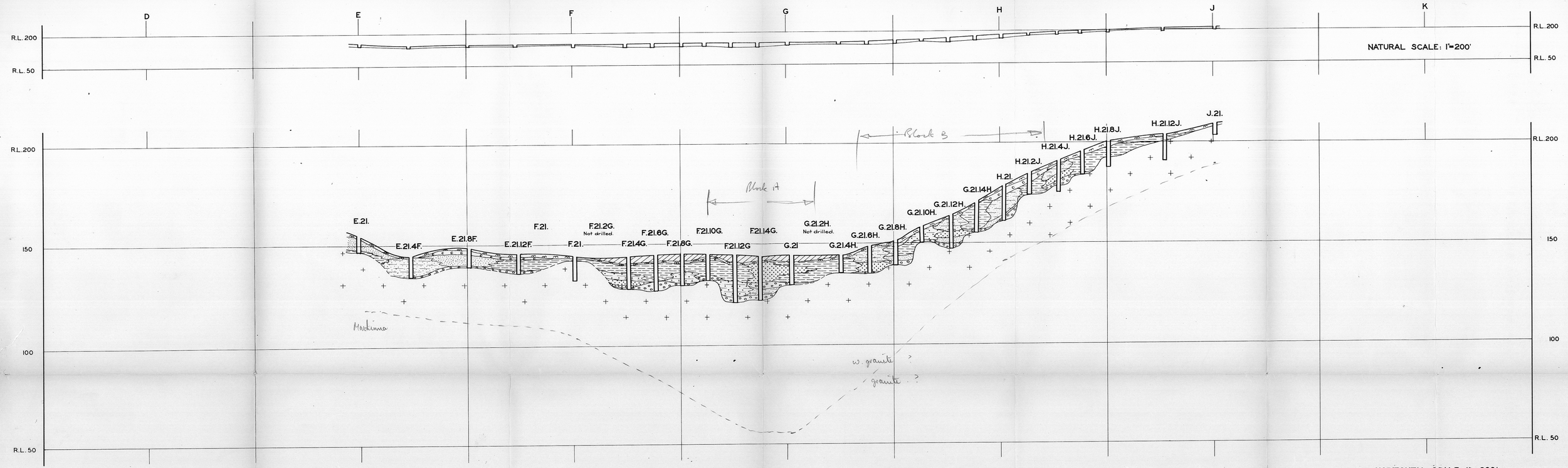
4115

247052

5 cm

G1420H

FIG. 10



LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 21.

(LOOKING UPSTREAM)

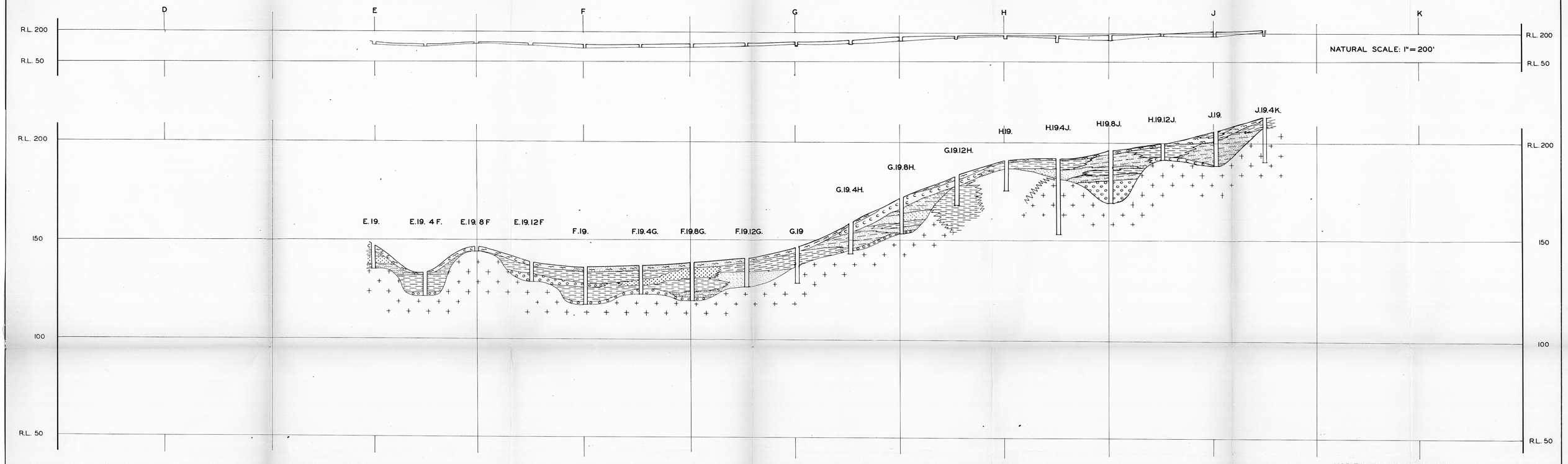
5 cm

4116

247053

G1420G

FIG. 11



LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 19.

(LOOKING UPSTREAM)

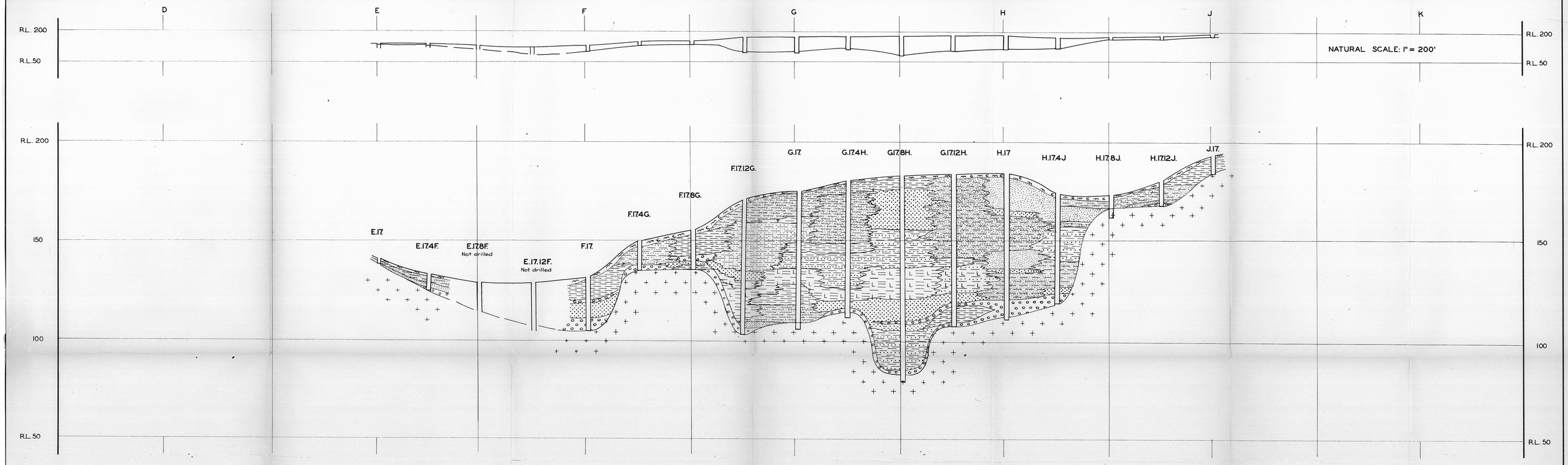
5 cm

4117

247054

G 1420F

FIG. 12



LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 17.

(LOOKING UPSTREAM)

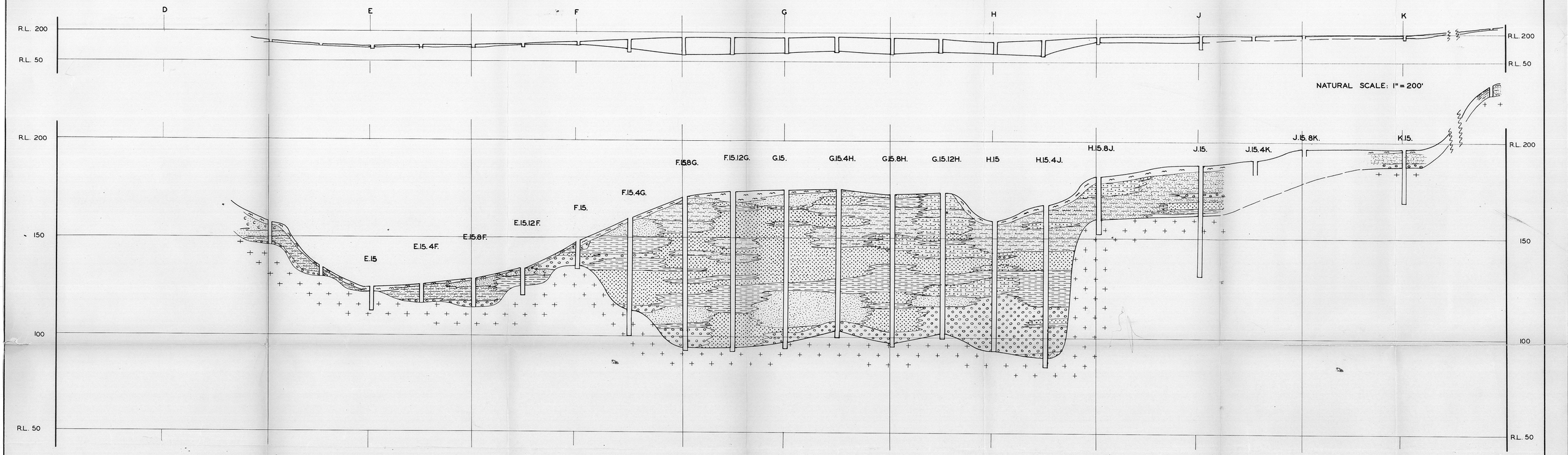
4118

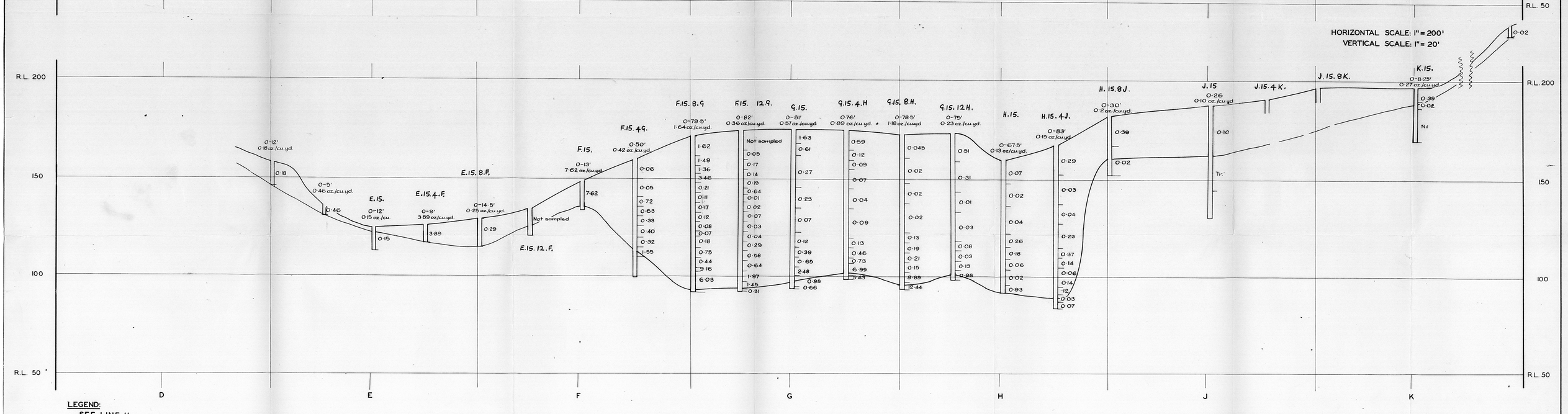
247055

5 cm

G1420E

FIG. 13





LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 15.

(LOOKING UPSTREAM)

Vicary Creek

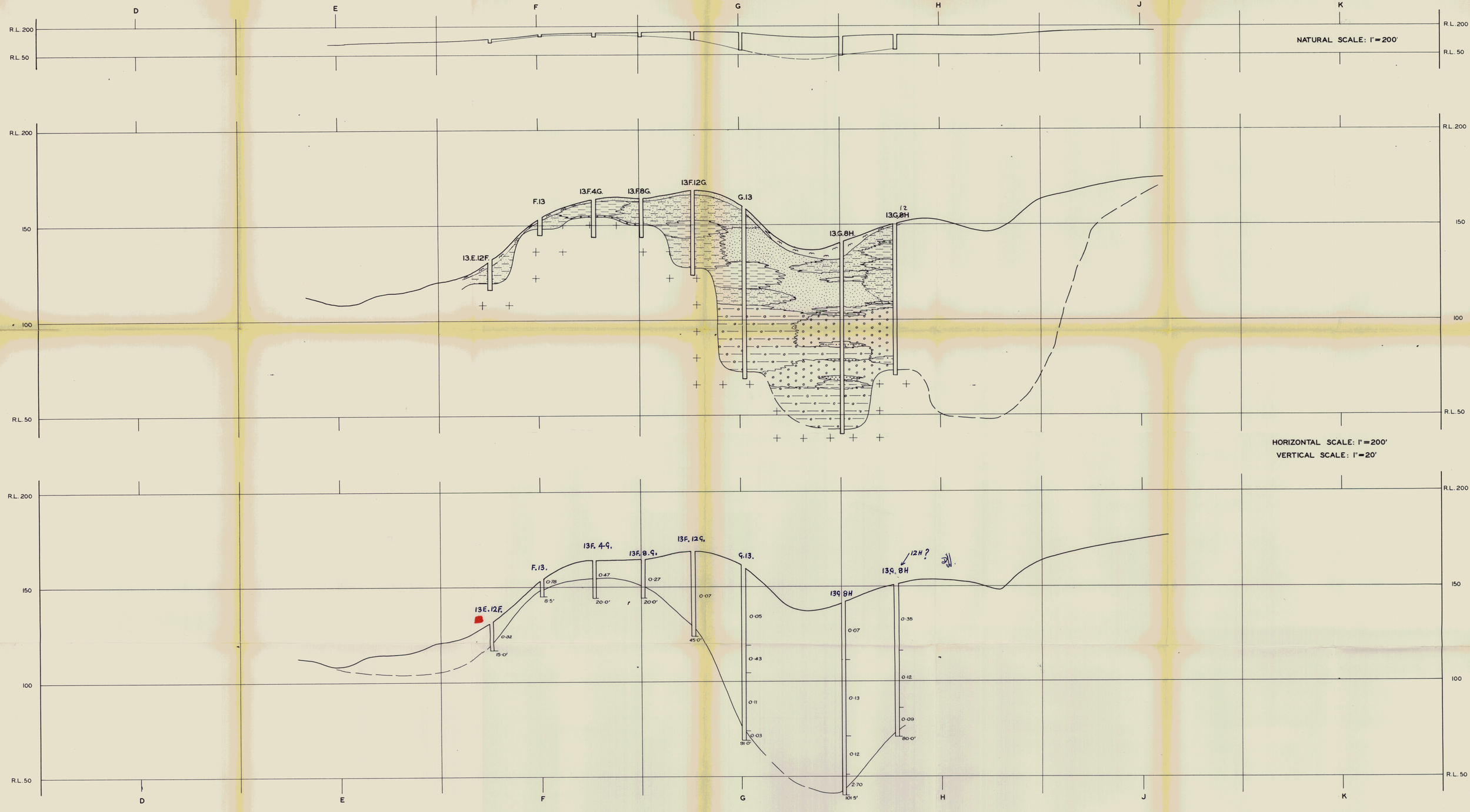
5 cm

4119

247056

G1420C

FIG. 14



LEGEND:
SEE LINE 11.

MONARCH TIN PROSPECT

SECTIONS THROUGH BORES — LINE 13 4120

(LOOKING UPSTREAM)

5 cm

247057

G 1420B

FIG. 15

D E F G H J K

R.L. 200
R.L. 50.

NATURAL SCALE: 1" = 200'

R.L. 200
150
100
R.L. 50

F.11.
F.11.4G.
F.11.8G.
Not drilled.
F.11.12G.
G.11.
G.11.4H
G.11.8H.
G.11.12H.
H.11.
H.11.4J.
H.11.8J.
H.11.12J
J.11.
E.11.12F

HORIZONTAL SCALE: 1" = 200'
VERTICAL SCALE: 1" = 20'

R.L. 200
150
100
R.L. 50

F.11.
E11.12F
0·06
15·0'
0·1
1·1
15·5'
F11.4G
0·14
25·0'
F11.12G.
0·03
0·15
0·14
10·0'
G.11.
0·6
0·08
0·22
85·0'
G11.4H
0·07'
0·12
0·8
85·0'
G11.8H
0·08
0·04
0·04
0·03
99·5'
G11.12H
0·06
0·13
0·12
0·26
0·11
135·0'
H.11.
0·23
0·19
0·38
0·10
0·06
0·11
0·05
0·11
0·06
0·18
1·1
133·0'
Not bottomed
H.11.4J.
0·22
0·06
0·32
0·09
0·05
0·08
0·10
0·007
0·15
0·44
7·3
124·0'
H.11.8J.
0·20
0·10
0·30
0·38
0·20
0·07
0·53
0·07
0·03
121·0'
H.11.12J.
0·22
0·04
0·22
0·07
0·05
0·01
0·15
0·14
105·0'
J.11.
0·02
0·07
48·0'

R.L. 200
150
100
R.L. 50

D E F G H J K

LEGEND:

- Soil.
- Fine sand.
- Drift.
- Wash.
- Muds and clays.
- Cemented.
- Lignite.
- Pyrite.
- Tailings.

All values expressed as ozs of concentrates (containing a calculated 70% Sn.) per cubic yard.
Note:- All values calculated from chemical assay of low-grade concentrates and values calculated using theoretical volumes.

TIN PROSPECTING – MONARCH AREA N.E. TASMANIA

SECTIONS THROUGH BORES — LINE II.

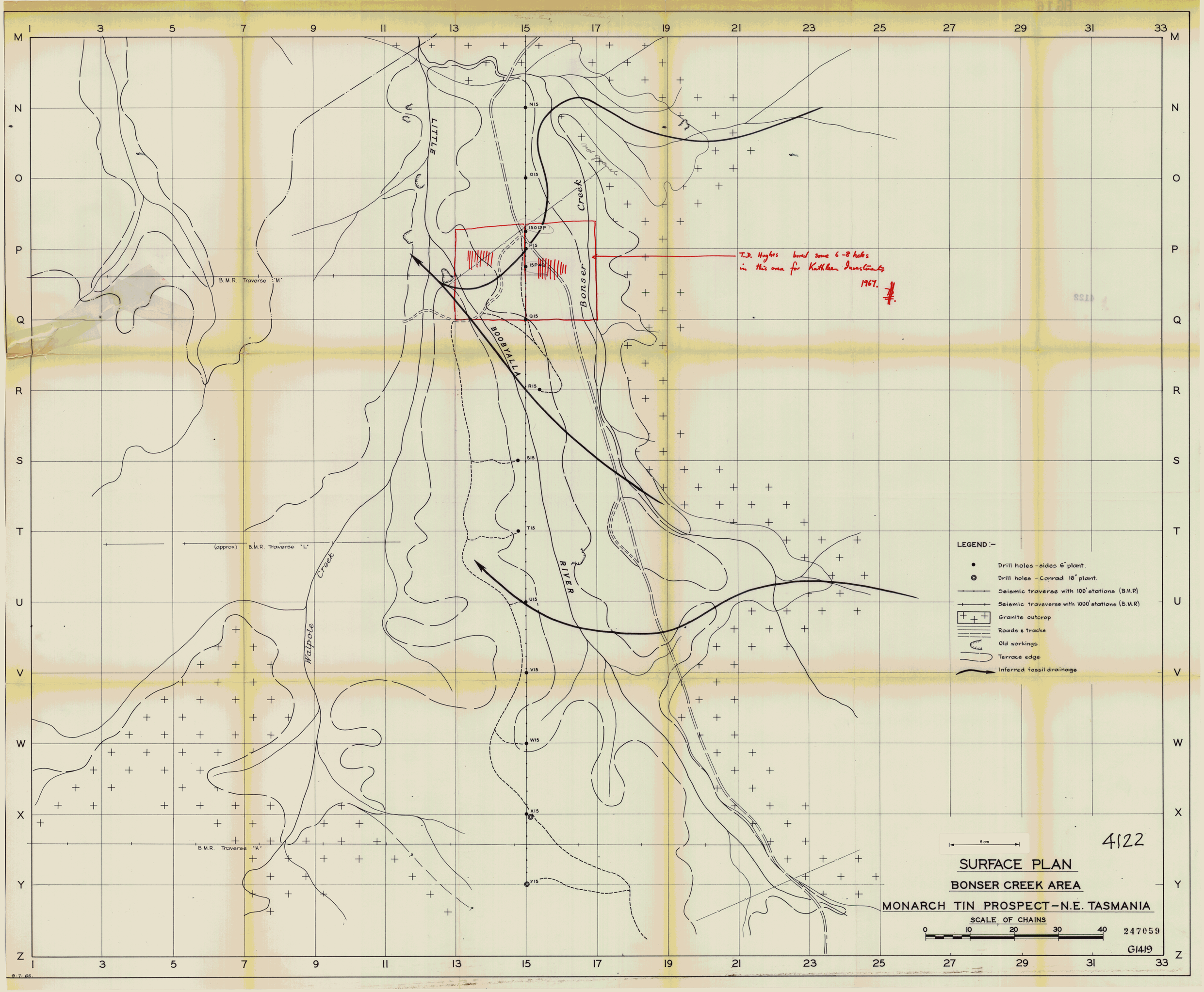
(LOOKING UPSTREAM)

5 cm

4121

247058

G1420A



LITTLE
BOOBYALLA
RIVER
Bonser
Creek
Walpole
Creek
B.M.R. Traverse "M"
(approx.) B.M.R. Traverse "L"
B.M.R. Traverse "K"
N15
O15
15O12P
P15
15P4Q
Q15
R15
S15
T15
U15
V15
W15
X15
Y15
T.D. Hughes bored some 6-8 holes in this area for Kathleen Investments 1967.
LEGEND :-
Drill holes - sides 6" plant.
Drill holes - Conrad 16" plant.
Seismic traverse with 100' stations (B.H.P.)
Seismic traveverse with 1000' stations (B.M.R)
Granite outcrop
Roads & tracks
Old workings
Terrace edge
Inferred fossil drainage
5 cm
4122
SURFACE PLAN
BONSER CREEK AREA
MONARCH TIN PROSPECT - N.E. TASMANIA
SCALE OF CHAINS
0 10 20 30 40
247059
G1419

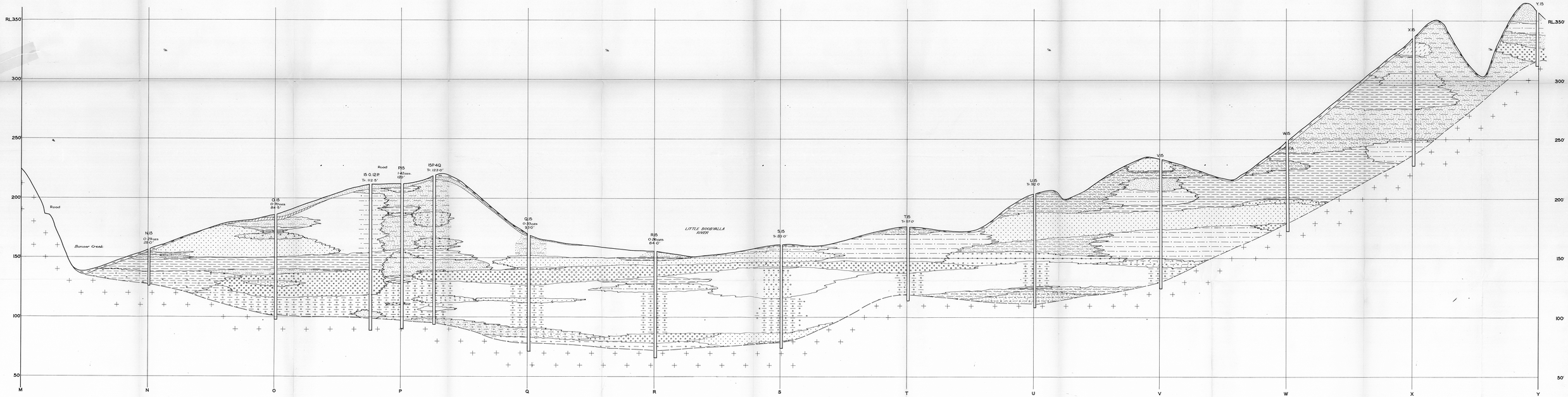
FIG 17



N

S

HORIZONTAL SCALE: 1"=200'
VERTICAL SCALE: 1"= 20'



LEGEND:
SEE LINE 11.

TIN PROSPECTING — MONARCH AREA
N.E. TASMANIA

SECTION ALONG — LINE 15 — EXTENDED.

BONSER CREEK AREA

5 cm

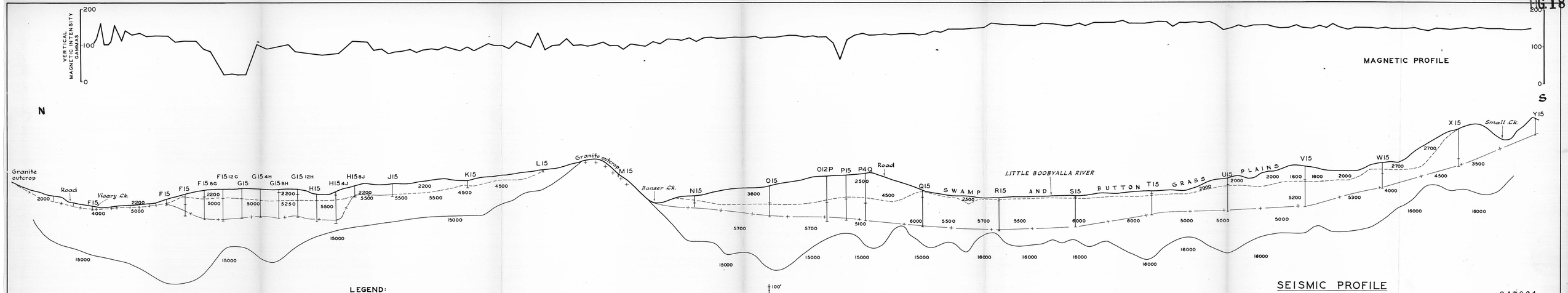
4123

247060

G1420D

4123

FIG. 18



LEGEND:

- Base of top seismic layer.
- Base of middle seismic layer.
- Surface of weathered bedrock from drill logs.
- 2200 Seismic velocity in feet/sec.

G15 Percussion bore №

Depth to water, water from drill logs.
Total depth.

VERTICAL 100' 50' HORIZONTAL 100' 200' 300' 400' 500' 600'

SCALE 5 cm

SEISMIC PROFILE
N-S TRAVERSE ALONG LINE 15
MONARCH TIN PROSPECT TAS.

247061

4124

G 5105

G.T. 11 - 3 - 65
H.N. 28 - 6 - 65