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AAR LIMITED

EXPLORATION LICENCE 20/80 - LAUNCESTON

22 MAR 1982

EXPLORATION PROGRESS REPORT

FOR SIX MONTH PERIOD

ENDED 19 JANUARY 1982

Prepared by:

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1. SUMMARY

Exploration during the six monthly period has been directed at defining brown coal resources in the Launceston Basin as well as testing the occurrence of Triassic coal in the Longford area. Three lignite bearing sub-basins in the Rosevale, Westwood and Selbourne areas of the Tertiary Launceston Basin have been delineated by the October-December 1981 drilling programme. The sub-basins are referred to as the Loatta, Pipers Lagoon and Selbourne sub-basins respectively.

Four lignite seams have been intersected. These Seams, 1 to 4 inclusive, (where used for reserve calculations) occur at depths generally less than 60m. Drilling within the Pipers Lagoon and Loatta sub-basins has delineated 51 Mt Class II Indicated Reserves and a small tonnage* of Inferred Reserves, (Mengel, 1977)

One drill hole, R019, has intersected significant lignite seams within the Selbourne sub-basin. All other scout drill holes in the Selbourne area have intersected lateral facies equivalents of the main lignite bearing horizons.

* small is defined as between 20 and 100 million tonnes.

2. INTRODUCTION

2.1 Scope of Report

This report details exploration for brown coal by CSR Limited on behalf of AAR Limited within EL20 Launceston during the six monthly period ended 19 January 1982.

2.2 Tenement Details

EL20 Launceston covering an area of 2,339km² was granted to AAR Limited on 19 September 1980 for a term of one year. An application to renew the licence in July 1981 has extended the term of the EL until 22 February 1982.

2.3 Location and Access

EL20 Launceston extends from Campbell Town in the south-east, west to Deloraine, east to Launceston, and north to Rosevale, (Figure 1). It is located on the Meander, South Esk, and Tamar 1:100,000 Topographic Map Series.

The Bass and Midlands highways traverse the area from east to west and north-west to south-east, respectively. The Western Line Railway also crosses the area in an east-west direction, through Perth, Longford and Westbury. The Southern Line Railway parallels the Midlands Highway between Powranna and Campbell Town, and junctions with the Western Line Railway at Western Junction (Figure 2).

2.4 Climate, Physiography and Land Use

The climate of the area is temperate. The annual average rainfall throughout the area ranges from approximately 500 to 1,000mm, and generally falls during the winter months, (Mathews, 1974).

The Launceston Basin is flat to gently undulating. It is surrounded on all sides by much higher terrain, notably the Great Western Tiers to the west and Ben Lomond to the east.

The major land use of EL20 Launceston is farming, predominantly sheep and cattle grazing. The Carrick-Westbury area is notable for its large number of horse, cattle and sheep studs, and intense cultivation of peas, beans, opium poppy, and cereal crops.

3. REGIONAL GEOLOGY

3.1 Stratigraphy

The regional stratigraphy of EL20 Launceston is summarised in Table 1.

3.2 Formation of the Basin

The Launceston Basin, contains the largest continuous area of unconsolidated Tertiary sediments in Tasmania. The sediments are primarily fluvial in origin and have been unconformably deposited on Permian and Triassic sediments and Jurassic dolerites.

The main structural elements of the Launceston Basin were formed by pre-Tertiary and Tertiary faulting producing two grabens, the Cressey and Tamar Troughs which are separated by a central horst, the Hummocky Hills.

The Cressey Trough extends from Campbell Town through Cressey to Westbury, and the Tamar Trough extends from the present mouth of the Tamar River, through Launceston to Campbell Town.

Although the initial formation of the basin was structurally controlled, erosional processes and isostatic subsidence in response to loading of the land surface by Tertiary sediments may have played a secondary role.

3.3 Sedimentation

Deposition of sediments commenced in the Palaeocene - Lower Eocene and continued until the Upper Oligocene (Mathews, 1974). Sediments are predominantly non-marine clays, silts, sands and gravels with minor marine or brackish environment influences.

Environments of deposition were in a state of constant flux during the Tertiary, alternating from fluvial to lacustrine, with swamps and subaerial facies. This is reflected by the rapid lateral facies changes intersected whilst drilling.

The primary source of the sediments was the sandstones, siltstones and mudstones of the Permian and Triassic strata, and the Jurassic dolerite.

4. EXPLORATION

4.1.1 Exploration during the Six Month Period

An examination of all available previous drill hole and geophysical information was undertaken to assess the potential for shallow economic Tertiary lignite deposits within the EL.

Following the assessment, a field mapping programme was conducted during early September 1981 to become familiar with lithotypes of the Launceston Basin, and to meet landowners and advise them of CSR's intended drilling programme.

4.1.2 Exploratory Drilling

The drilling was undertaken by H.J. Stacpoole of Launceston, using a Foxmobile B40-L Truck mounted rig during the period 5 October to 7 December 1981. A total of 35 rotary chip holes and 7 partially cored holes have been drilled for an aggregate of 2,373.5m rotary chip and 218.8m of 100mm (KMLC) core.

A summary of the exploration statistics for the six month period are contained in Table 2 while details of drill hole statistics are contained in Appendix 1. The location of all holes drilled during the six monthly period plus relevant previous drilling is shown in Figure 2.

All borehole information is currently being placed on the CSR computer based Coalbor system. Detailed english and graphic logs of the drill holes will be included in the next quarterly report.

TABLE 2
EL20 LAUNCESTON
EXPLORATION STATISTICS FOR SIX MONTHLY PERIOD
ENDED 19 JANUARY 1982

| AREA | NO. HOLES | | | METRES CHIPPED | | METRES |
|--|---------------------------|------|--------------------|-----------------|---------------|--------|
| | DRILLED ROTARY CHIP | CORE | WIRELINE LOGGED | ROTARY HOLES | CORE HOLES | |
| Selbourne - Rosevale - Westwood | 26 | 6 | 24 6 | 1851.1 | 190.8 | 199.48 |
| AAR Programme Carrick - Hagley - Bracknell | 4 | 1 | 4 1 | 217.2 | 28.2 | 28.6 |
| Rufus Lagoons - Gayfield | 3 | | 3 | 150 | | |
| Pateena - Hadspen | 2 | | 2 | 155.2 | | |
| TOTALS | 35 | 7 | 40 | 2373.5 | 218.28 | 228.08 |

4.1.4 Geophysical Logging

Forty of the forty-two holes were geophysically logged. An analogue printout was supplied in the field, and a digital recording was made. The following suite of logs were run: gamma, resistivity, caliper, and long-spaced density. The logging was undertaken by Murdoch Geophysics Australia (using SIE portable logging equipment). Copies of geophysical logs will be forwarded with the next quarterly report.

4.1.4 Core Drilling and Coal Sampling

Six sites were chosen within the Loatta, Pipers Lagoons and Selbourne sub-basins to cut 100m diameter cores (KMLC) of significant lignite seams. A Triefus triple tube type barrel was used. These drill holes were usually chipped to 1m above the coal, and the full lignite section of the strata was cored. Two of the six cored holes were redrilled due to excessive core loss.

The six cores cut were logged within 20 to 30 minutes to avoid moisture loss. Selected representative samples were taken for moisture analysis and sealed in airtight PVC casing. The sample intervals were selected to represent changes in lithology and/or composition and/or texture. All core, excepting samples taken for moisture analysis, was sampled and bagged for analysis. Samples were submitted to the NATA registered CSR Exploration and Evaluation Group Laboratories in Brisbane.

4.3 Future Exploration

A second exploration drilling programme is planned for late March or early April 1982.

Work will be directed at delineating the extent of seams within all three sub-basins and upgrading reserves to Class II indicated status, and defining the limits of the sub-basin boundaries.

Exploration of other areas in the EL will also be undertaken to look for shallow occurrences of Tertiary brown coal, and Triassic black coal.

5. GEOLOGY

5.1.1 Introduction

Three lignite bearing sub-basins have been delineated in the October-December 1981 drilling programme. The sub-basins are located in the Rosevale, Westwood and Selbourne areas of the Tertiary Launceston Basin. The sub-basins are referred to as the Loatta, Pipers Lagoons, and Selbourne sub-basins respectively.

Four lignite seams have been intersected. The four seams (where used for reserve calculations) occur at depths generally less than 60m and are amenable to open cut mining methods.

Development of ligneous facies within the Launceston Basin has occurred in narrow linear belts immediately adjacent to basement highs, and in restricted embayments of pre-Tertiary basement occurring along the Basin margins. The Loatta and Pipers Lagoons sub-basins are two examples of ligneous facies developing in such restricted embayments.

Ligneous facies display two trends of vertical and lateral migration in response to basin infilling. One example is shown in Figure 3, where T₁, T₂ and T₃ represent time lines.

The second trend is for lateral migration of ligneous facies away from basement highs in response to vertical sediment accretion. This occurs in the Loatta sub-basin where seams 1 and 2 are developed south of R021 in a more rapidly subsiding section of the sub-basin.

Lignite seams are characterized by rapid lateral facies changes. For example, a 12m thick lignite intersection can grade laterally into a 6m thick ligneous sand horizon within 800m. Such lateral facies changes are common, and hence reserves are based on a lateral confidence of up to 500m from drill holes.

Seam 1 has not been intersected in the Pipers Lagoon sub-basin, and north of R021 in the Loatta sub-basin due to one of, or a combination of the following factors: non deposition of lignite or its lateral facies equivalents and/or erosion of ligneous facies.

There has been at least two major episodes of erosion affecting the distribution of ligneous facies. A period of erosion dated as post Seam 1 preceeded Tertiary basalt flows, and removed Seam 1 in the Loatta sub-basin. The erosion produced topographically low areas in which basalt lava flowed. Post Tertiary basalt and Quaternary peneplanation have produced the present landform.

Lignite seams within the Pipers Lagoon and Loatta sub-basins have been correlated by use of cross sections and characteristic geophysical log signatures. The most distinctive signatures are the Gamma and Density logs of Seam 3. This has enable correlation between Seam 3 of the Pipers Lagoon and Loatta sub-basins.

5.1.2 Nomenclature

The following nomenclature has been used to name the seams and seam splits. The lignite seams are named from the youngest S1 to the oldest S4. Splits of the seams are identified as follows: S3₁, refers to Seam 3, Split 1, which is the uppmost of the Seam 3 splits.

5.2 Loatta Sub-basin

5.2.1 Introduction

The northern limit of the Loatta sub-basin, that is north of cored hole C021, is constrained by outcropping Jurassic dolerite basement. Basement highs which were intersected in rotary drill holes R017, R011 delineate the maximum extent of the sub-basin to the south and southeast. Ligneous facies of the Loatta sub-basin have been delineated by the 1.5m Seam 2, and Seam 3 lignite isopachs (Figure 4).

Three lignite seams have been intersected within the Loatta sub-basin. The seams have been designated Seam 1, Seam 2 and Seam 3 from the uppermost to stratigraphically lowest seam respectively (Figure 5 section AA').

A basement fault of undetermined orientation has been detected between drill holes R021 and C021. The vertical displacement of Tertiary strata between the two drill holes is 6.5m when Seam 3 split 1 is used as a stratigraphic marker horizon. Tertiary strata are envisaged to drape over the basement fault. Lignite seams south of R021 split appreciably in response to an increased rate of syndepositional subsidence which occurred along the basement fault.

The lignite seams are essentially flat lying north of C004. South of C004, the lignite seams dip at less than 1° towards the southeast.

Isopach maps of seam 3 of the Loatta Sub-basin are included in Appendix 2.

5.2.2 Seam 1

Seam 1 was intersected in drill holes R007, R014, R015, R021, C021 and R025 at depths between 5.3 and 1.3m. Seam 1 is characterized by having up to 5 seam splits, each of

1410b
10.

between 1 and 2m thickness. Reserves for Seam 1 are expressed as Inferred Reserves due to the wide drill hole spacing, of up to 2.5km, and the unknown effects of erosion prior to Tertiary basalt flows, and Quaternary erosion.

5.2.3 Seam 2

Seam 2 has been intersected in rotary drill holes R007, R013, R014, R015 and R018 at depths ranging from 42.3 to 47.6m. Two seam splits have been identified. Rotary drill holes R007 and R017 were the only holes to intersect potentially economic lignite, with cumulative lignite thicknesses of 3.8 and 2.2m respectively. No reserves have been calculated for Seam 2.

5.2.4 Seam 3

Seam 3 is the thickest seam intersected in the Loatta sub-basion and has up to 6 known seam splits. The upper seam split has been designated S₃, and the stratigraphically lowest split, S₃₆.

Seam 3 occurs at depths ranging from 9.35m in R004 and 64.4m in R007.

S₃₁ has a thickness ranging from 1.8 to 3.85m. Thickness of the seam split is at least 3.5m and is relatively constant between drill holes R020 and C021. S₃₁ decreases in thickness between drill holes C021 and R007.

S₃₂, which has a lignite thickness ranging from 6.2 to 12m between drill holes R020 and C004, thins dramatically between C004 and R021, to 0.5m. In cored hole C021, S₃₂ splits into four seams over a depth of 7.5m with a cumulative lignite thickness of 5.1m, but thins to 2.5m in R007, where no splits are greater than 0.5m. Interburden of the C021 S₃₂ splits is ligneous clays.

S₃₃ has a thickness of between 2.6 and 4.0m in R004 and R020 respectively. S₃₃ was not intersected in R021. A 1.95m and 2.1m thick S₃₃ intersection was made in C021 and R007 respectively.

Lignite bearing S₃₄ splits were intersected in R001, R020 and C004. S₃₄ grades into lateral facies equivalents of highly interbanded inferior lignites and ligneous clays in R021 and C021.

S₃₅ was intersected in C004, R021 and C021. Lignite thicknesses range from 1.2 to 1.5m, but lignite is not highly interbanded with carbonaceous or ligneous clays.

The data suggests that syndepositional subsidence due to movement associated with the basement fault which is situated between R021 and C021 was more active during the development of S₃₂, S₃₃ and S₃₄, than it was during the accretion of S₃₁ and S₃₅.

5.3 Pipers Lagoons Sub-basin

5.3.1 Introduction

The northern and eastern extent of the Pipers Lagoons sub-basin is constrained by outcropping Jurassic dolerite. Basement highs which were intersected in rotary drill holes BH22, and R011, and R010, constrain the limits of the sub-basin to the south, southwest and northwest respectively.

Reserves of the Pipers Lagoons sub-basin have been delineated by the 1.5m seam isopachs, (Figure 4).

Three lignite seams have been intersected within the Pipers Lagoons sub-basin. The seams have been designated Seam 2, Seam 3 and Seam 4 from the uppermost to stratigraphically lowest intersected seam respectively, (Figure 6) (X section BB').

Seam 3 is considered to be equivalent to Seam 3 of the Loatta sub-basin. Correlation between seam 3 of the two sub-basins was based on the similarities between density and gamma log signatures.

Isopach maps of Seam 3 and 4 of the Pipers Lagoon sub-basin are appended in Appendix 3.

5.3.2 Seam 2

Seam 2 was intersected in C033 and R023 at depths of 9.7 to 12.7m respectively. Two seam splits have been identified. Lignite thickness of Seam 2 ranges from 1.6 to 2.7m. Cumulative seam 2 lignite thickness ranges from 4.0 to 4.4m. Lateral facies equivalents of Seam 2 lignites were intersected in C032 and R009. The Seam 2 facies equivalents are highly interbanded inferior lignites, ligneous clays and carbonaceous clays.

5.3.3 Seam 3

Seam 3 is the most consistently developed seam within the Pipers Lagoons sub-basin, in particular the S3₂ seam. Six seam splits have been identified. The entire sequence of 6 seam splits has only been intersected in R023 and C033. Seam 2 occurs at depths ranging from 9.2 to 36.3m.

5.3.4 Seam 4

Potentially economic Seam 4 lignite was only intersected in C022, at a depth of 47.9m. Lateral facies equivalents of the lignite were intersected in C032, C033 and R009, at depths ranging from 52 to 72m.

5.4 Selbourne Sub-basin

Only R019 has intersected lignite seams of economic thickness. Four seams were intersected in a carbonaceous zone 31.2m thick occurring at a depth of 4.2m. The four seams, expressed in terms of potential working sections were intersected at depths of 8.1m, 10.8m, 17.7m and 26.8m with thicknesses of 2.1m, 1.7m, 4.55m and 4.0m respectively. All other scout drill holes in the Selbourne area have intersected lateral facies equivalents of the main lignite bearing horizons.

6. COAL RESOURCES6.1 Lignite Reserves

51 Mt of Class II Indicated Reserves and small (28 Mt) Inferred Reserves (Mengel, 1977) have been defined in the Loatta and Pipers Lagoons sub-basins, (Table 3). Detailed reserve calculations are appended in Appendix 4.

Reserves have been calculated using a minimum 1.5m seam isopach and a Relative Density of 1.2.

TABLE 3
COAL RESERVES EL20 LAUNCESTON

| <u>SUB-BASIN</u> | <u>INSITU RESERVES</u> | |
|------------------|---|-----------------|
| | <u>INDICATED</u> (x10 ⁶) tonnes) | <u>INFERRED</u> |
| LOATTA | 21 | small |
| PIPERS LAGOONS | 30 | |
| TOTALS | 51 | small |

6.2.1 Stage I Coal Analysis

Lignite samples taken from the 100mm diameter cores were submitted to the Thiess Laboratories for the following analysis:

- in situ moisture
- relative density
- proximate analysis)
- specific energy) air dried basis
- total sulphur)

The results of the moisture analysis have been received, and are summarized in Table 4. The results of any further analyses will be submitted during the next report period.

6.2.2 Stage II Coal Analysis

Stage II analysis will not be commenced until the results of Stage I analysis have been received and assessed.

Stage II will involve composite samples of proposed mining sections to be tested for:

- proximate analysis
- specific energy
- total sulphur
- specific energy
- sodium
- trace elements)
- ultimate analysis) for selected coal composites
- ash analysis)

6.3 Coal Quality

Table 4 summarizes the analyses of samples submitted for moisture analysis. There are insufficient analyses to give indicated coal quality for each individual sub-basin.

TABLE 4
COAL QUALITY LOATTA PIPERS LAGOONS AND SELBOURNE
SUB-BASINS

| INSITU BASIS (as mined) | | | | DRY COAL BASIS | | |
|-------------------------|----------|--------------|-----------------------------|----------------|--------------|-----------------------------|
| Moist- ure % | Ash % | Sulphur % | Specific Energy MJ/kg | Ash % | Sulphur % | Specific Energy MJ/kg |
| 48.6 | 19.4 | 0.14 | 8.10 | 37.8 | 0.27 | 15.75 |

* Note: Average coal quality from weighted analysis of 68 samples.

7. TRIASSIC COAL MEASURES

Rotary chip holes R030 and R031 were drilled in the Longford area close to the Norwich coal field, to test the occurrence of Triassic black coal. Black coal was intersected in R030 at depths of 39.2, 71.6 and 74.3m. Seam thicknesses are 0.8, 1.1 and 0.4m respectively.

Coal measure sediments are soft mid grey coloured clayey feldspathic sand and siltstones.

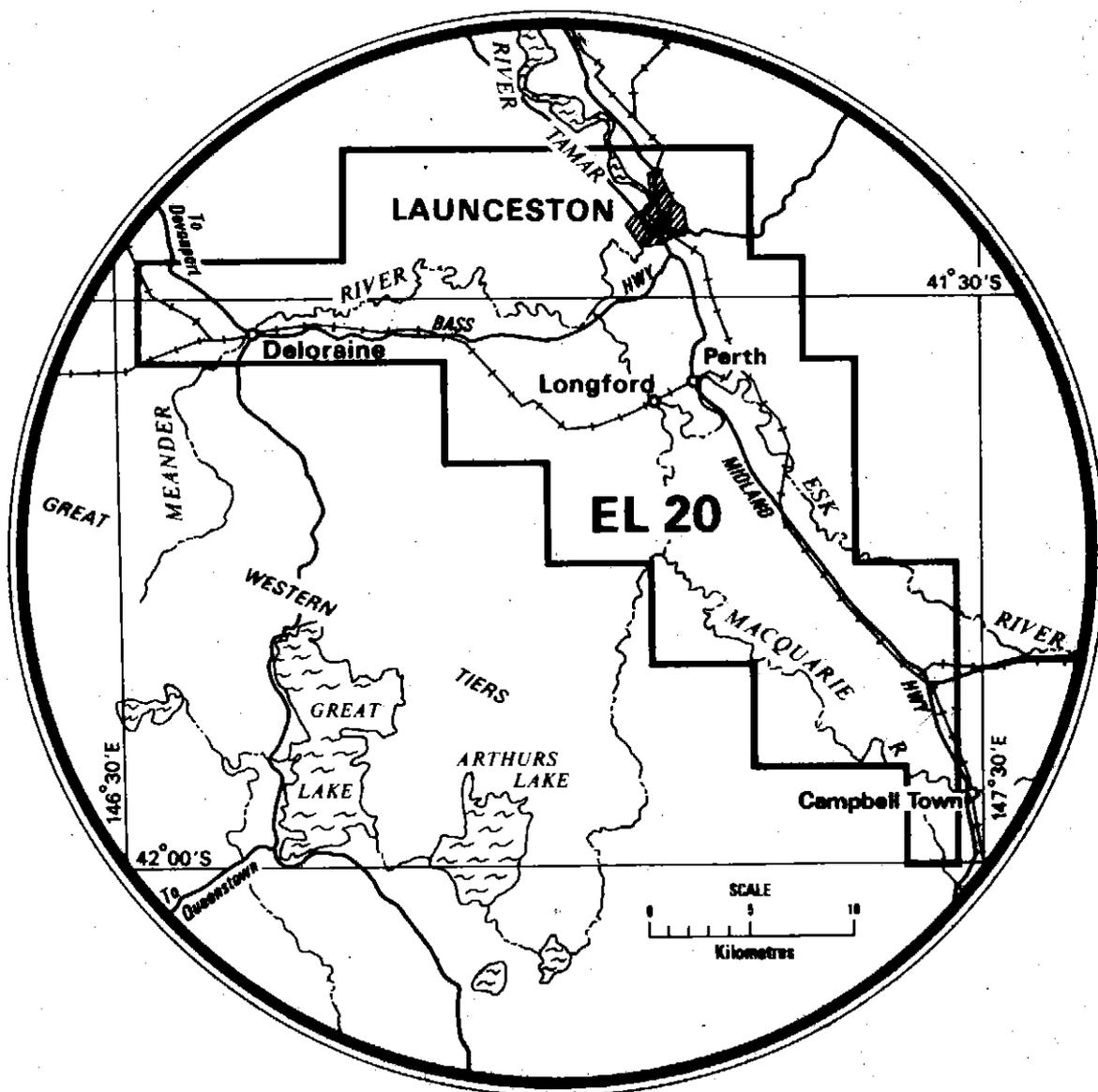
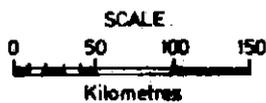
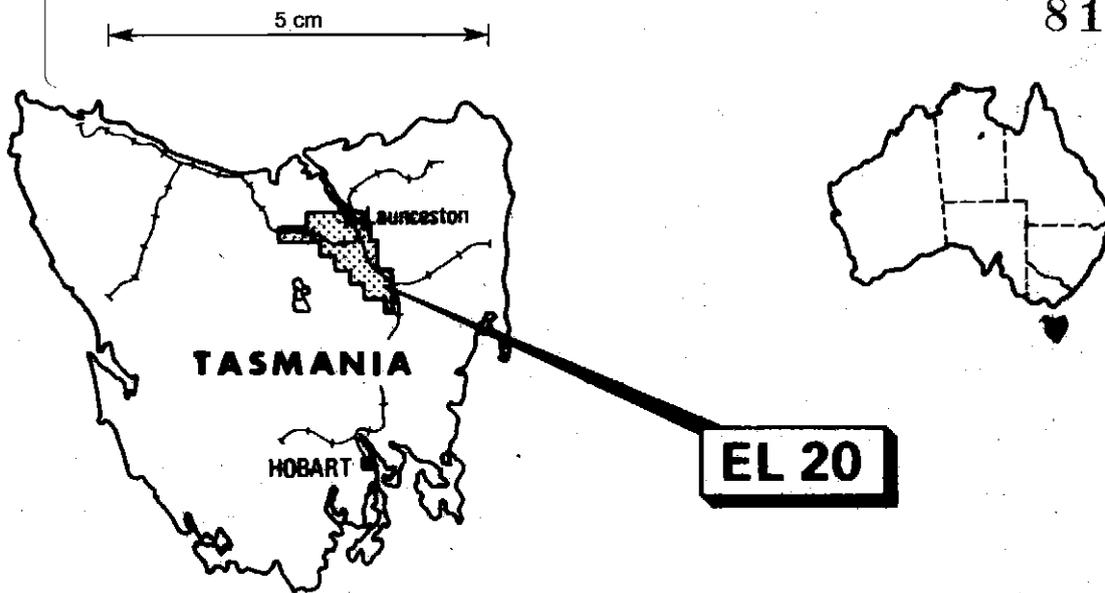
R031 was drilled to a depth of 72m and did not intersect coal measure strata, but intersected Tertiary clayey sands. This tends to indicate that the Triassic coal measures have been eroded, most probably by the South Esk River.

8. REFERENCES

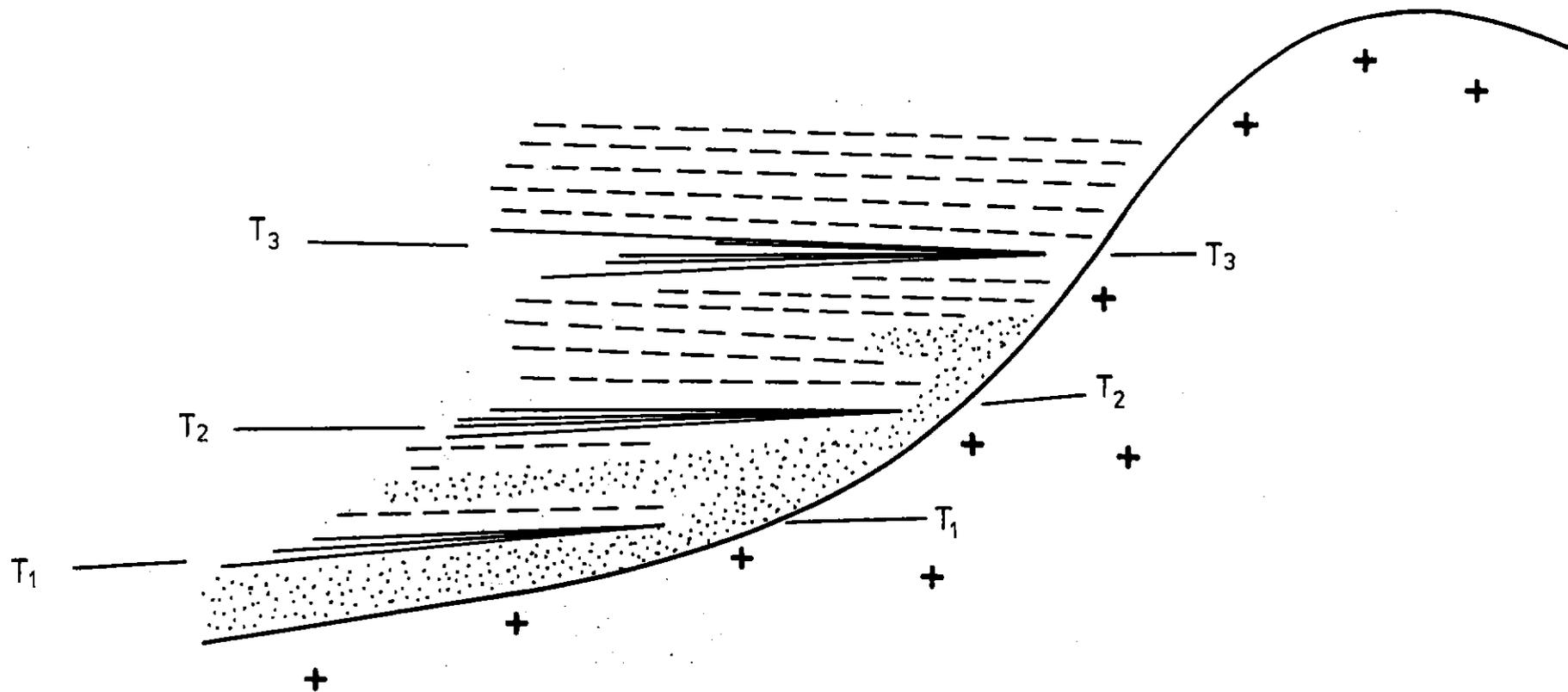
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EL 20 LAUNCESTON TASMANIA



NOTE : LEGEND AS FOR FIGURE 6

EL 20 LAUNCESTON
 DEVELOPMENT OF LIGNEOUS FACIES
 IN RESPONSE TO BASIN INFILLING

5 cm

APPENDIX I
EL20 DETAILS OF EXPLORATION STATISTICS

APPENDIX 1
EL20 DETAILS OF EXPLORATION STATISTICS

| DRILL HOLE NO. | AMG CO-ORDINATES | | DATE COMMENCED | DATE COMPLETED | TOTAL DEPTH(m) | ROTARY OPEN HOLE (m) | KMLC CORE (m) | GEOPHYSICAL LOGGING | | | | LOGGED DEPTH (m) |
|----------------|------------------|---------|----------------|----------------|----------------|----------------------|---------------|---------------------|-------|---------|---------|------------------|
| | NORTHING | EASTING | | | | | | DENSITY | GAMMA | RESIST. | CALIPER | |
| RO01 | 5414360 | 0493680 | 05.10.81 | 06.10.81 | 35.0 | 35.0 | - | 1 | 1 | 1 | 1 | 22.0 |
| RO02 | 5413200 | 0494160 | 06.10.81 | 07.10.81 | 72.0 | 72.0 | - | 1 | 1 | 1 | 1 | 37.0 |
| RO03 | 5411640 | 0486710 | 07.10.81 | 09.10.81 | 87.0 | 87.0 | - | 1 | 1 | 1 | 1 | 20.0 |
| RO04 | 5412960 | 0493260 | 09.10.81 | 12.10.81 | 90.0 | 90.0 | - | 1 | 1 | 1 | 1 | 56.0 |
| CO04 | 5412960 | 0493260 | 03.12.81 | 03.12.81 | 43.14 | 13.81 | 29.33 | 1 | 1 | 1 | 1 | 43.0 |
| RO05 | 5409370 | 0494590 | 13.10.81 | 14.10.81 | 53.60 | 53.6 | - | 1 | 1 | 1 | 1 | 30.0 |
| RO06 | 5410590 | 0496130 | 14.10.81 | 15.10.81 | 75.0 | 75.0 | - | 1 | 1 | 1 | 1 | 44.0 |
| RO07 | 5410920 | 0494140 | 15.10.81 | 17.10.81 | 87.0 | 87.0 | - | 1 | 1 | 1 | 1 | 84.0 |
| RO08 | 5408890 | 0495950 | 18.10.81 | 21.10.81 | 95.0 | 95.0 | - | 1 | 1 | 1 | 1 | 66.0 |
| RO09 | 5409490 | 0497360 | 21.10.81 | 22.10.81 | 75.0 | 75.0 | - | 1 | 1 | 1 | 1 | 58.0 |
| RO10 | 5412260 | 0494920 | 22.10.81 | 22.10.81 | 58.4 | 58.4 | - | - | - | - | - | 0 |
| RO11 | 5407490 | 0494650 | 23.10.81 | 27.10.81 | 28.8 | 28.8 | - | 1 | 1 | 1 | 1 | 27.0 |
| RO12 | 5409030 | 0487310 | 27.10.81 | 28.10.81 | 73.6 | 73.6 | - | 1 | 1 | 1 | 1 | 47.0 |
| RO13 | 5409000 | 0492720 | 28.10.81 | 30.10.81 | 80.0 | 80.0 | - | 1 | 1 | 1 | 1 | 64.0 |
| RO14 | 5410080 | 0492360 | 30.10.81 | 31.10.81 | 80.0 | 80.0 | - | 1 | 1 | 1 | 1 | 78.0 |
| RO15 | 6409060 | 0491340 | 31.10.81 | 01.11.81 | 54.4 | 54.4 | - | 1 | 1 | 1 | 1 | 51.0 |
| RO16 | 5407840 | 0490690 | 02.11.81 | 02.11.81 | 64.0 | 64.0 | - | 1 | 1 | 1 | 1 | 63.0 |
| RO17 | 5406310 | 0492140 | 03.11.81 | 03.11.81 | 33.0 | 33.0 | - | 1 | 1 | 1 | 1 | 30.0 |
| RO18 | 5408950 | 0492000 | 04.11.81 | 04.11.81 | 80.0 | 80.0 | - | 1 | 1 | 1 | 1 | 67.0 |
| RO19 | 5410940 | 0488160 | 04.11.81 | 05.11.81 | 80.0 | 80.0 | - | 1 | 1 | 1 | 1 | 54.0 |
| CO19 | 5410940 | 0488160 | 02.11.81 | 02.12.81 | 34.78 | 6.79 | 27.99 | 1 | 1 | 1 | 1 | 33.0 |
| RO20 | 5413720 | 0493150 | 05.11.81 | 06.11.81 | 80.0 | 80.0 | - | 1 | 1 | 1 | 1 | 78.0 |
| RO21 | 5412350 | 0493630 | 09.11.81 | 09.11.81 | 83.2 | 83.2 | - | 1 | 1 | 1 | 1 | 69.0 |
| CO21 | 5412350 | 0493600 | 04.12.81 | 06.12.81 | 79.47 | 40.84 | 38.63 | 1 | 1 | 1 | 1 | 79.0 |
| RO22 | 5413340 | 0495520 | 10.11.81 | 10.11.81 | 76.8 | 76.8 | - | 1 | 1 | 1 | 1 | 65.0 |
| CO22 | 5413340 | 0495520 | 25.11.81 | 28.11.81 | 63.55 | 31.66 | 31.86 | 1 | 1 | 1 | 1 | 63.0 |
| RO23 | 5410360 | 0497240 | 10.11.81 | 11.11.81 | 76.8 | 76.8 | - | 1 | 1 | 1 | 1 | 56.0 |
| RO24 | 5411150 | 0489430 | 11.11.81 | 12.11.81 | 76.2 | 76.2 | - | 1 | 1 | 1 | 1 | 75.0 |
| RO25 | 5410820 | 0491250 | 12.11.81 | 12.11.81 | 76.8 | 76.8 | - | 1 | 1 | 1 | 1 | 75.0 |
| RO26 | 5412960 | 0488610 | 13.11.81 | 14.11.81 | 79.5 | 79.5 | - | - | - | - | - | 0 |
| RO27 | 5396800 | 0535500 | 15.11.81 | 15.11.81 | 32.0 | 32.0 | - | 1 | 1 | 1 | 1 | 30.0 |
| RO28 | 5277000 | 0515500 | 21.11.81 | 21.11.81 | 70.2 | 70.2 | - | 1 | 1 | 1 | 1 | 66.0 |
| RO29 | 5390950 | 0512720 | 22.11.81 | 23.11.81 | 47.8 | 47.8 | - | 1 | 1 | 1 | 1 | 46.0 |
| RO30 | 5409790 | 0500760 | 23.11.81 | 23.11.81 | 33.0 | 83.0 | - | 1 | 1 | 1 | 1 | 72.0 |
| RO31 | 5409160 | 0500200 | 24.11.81 | 25.11.81 | 72.2 | 72.2 | - | 1 | 1 | 1 | 1 | 72.0 |
| RO32 | 5402160 | 0495360 | 28.11.81 | 30.11.81 | 50.21 | 36.52 | 13.69 | 1 | 1 | 1 | 1 | 50.0 |
| RO33 | 5410550 | 0496690 | 30.11.81 | 01.12.81 | 50.28 | 19.77 | 30.51 | 1 | 1 | 1 | 1 | 50.0 |
| CO04 | | | | | | | | | | | | |
| Redrill | 5412960 | 0493260 | 09.12.81 | 07.12.81 | 17.73 | 10.04 | 7.69 | 1 | 1 | 1 | 1 | 17.0 |
| CO33 | | | | | | | | | | | | |
| Redrill | 5410550 | 0496690 | 06.12.81 | 07.12.81 | 39.67 | 27.04 | 12.63 | 1 | 1 | 1 | 1 | 38.0 |
| CO21 | | | | | | | | | | | | |
| Redrill | 5412350 | 0493150 | 04.12.81 | 04.12.81 | 9.27 | 7.0 | 2.27 | - | - | - | - | - |

818025

APPENDIX 3
RESERVE CALCULATIONS EL20 LAUNCESTON

APPENDIX 3
RESERVE CALCULATIONS EL20 LAUNCESTON

LOATTA SUB-BASIN

| SEAM | CUM. COAL THICKNESS (m) | | INDICATED CLASS II RESERVES | |
|-----------------|-------------------------|------------|--------------------------------------|--|
| | RANGE | VALUE USED | AREA (km ²) | INSITU COAL VOLUME m ³ x 10 ⁶ |
| S3 ₁ | 1.3 - 3 | 2 | 0.54 | 1.05 1.08 |
| | 3 - 4 | 3 | 0.79 | 2.37 2.57 |
| | 4 - 5 | 4 | 0.04 | 0.06 0.16 |
| | | | | <u>3.61</u> 3.61 |
| S3 ₂ | 1.5 - 3 | 2 | 0.69 | 1.38 1.38 |
| | 3 - 4 | 3 | 0.31 | 0.93 1.3 |
| | 4 - 5 | 4 | 0.3 | 1.2 1.2 |
| | 5 - 6 | 5 | 0.41 | 2.06 2.05 |
| | 11 - 12 | 11 | 0.05 | 0.55 0.55 |
| | | | | <u>6.12</u> 6.11 |
| S3 ₃ | 1.5 - 3 | 2 | 0.34 | 0.69 0.68 |
| | 3 - 4 | 3 | 0.16 | 0.48 0.8 |
| | 4 - 5 | 4 | 0.05 | 0.2 0.2 |
| | | | | <u>1.37</u> 1.36 |
| S3 ₄ | 1.5 - 3 | 2 | 0.43 | 0.86 |
| | 3 - 4 | 3 | 0.82 | 2.46 |
| | 4 - 5 | 4 | 0.09 | 0.36 |
| | | | | <u>3.68</u> |
| S3 ₅ | 1.5 - 2 | 1.5 | 1.22 | 1.84 1.83 |
| | 2 - 3 | 2 | 0.51 | 1.02 1.02 |
| | | | | <u>(2.36)</u> 1.85 |
| | | | TOTAL VOLUME TONNES (R.D. 1.2) | 17.64 17.61 21 Mt |

APPENDIX 3
RESERVE CALCULATIONS EL20 LAUNCESTON (continued)

LOATTA

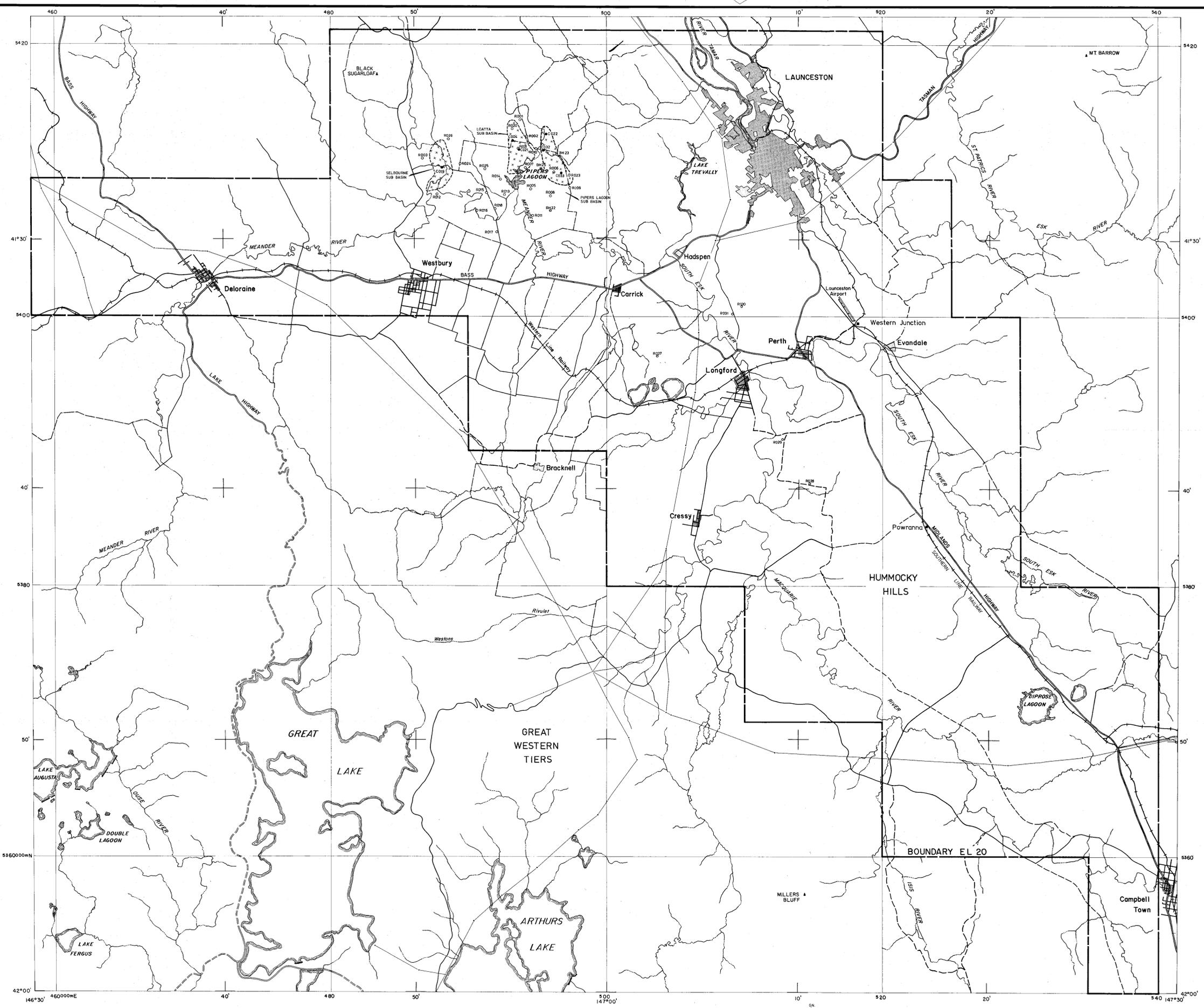
| SEAM | CUM. COAL THICKNESS (m) | | INFERRED RESERVES | |
|-----------------|-------------------------|------------|--------------------------------------|--|
| | RANGE | VALUE USED | AREA (km ²) | INSITU COAL VOLUME m ³ x 10 ⁶ |
| S1 ₂ | 2 - 3 | 2 | 2 | 4 |
| S1 ₃ | 1.5 - 2 | 1.5 | 3 | <u>4.5</u> |
| S3 ₁ | 1.5 - 3 | 2 | 0.51 | 1.02 |
| | 3 - 4 | 3 | 1.32 | 3.96 |
| | 4 - 5 | 4 | 0.42 | 1.66 (6.68) |
| | | | | 6.64 <u>6.66</u> |
| S3 ₃ | 1.5 - 2 | 1.5 | 1.2 | <u>1.8</u> |
| S3 ₄ | 1.5 - 3 | 2 | 0.87 | <u>1.74</u> |
| S3 ₅ | 1.5 - 2 | 1.5 | 1.22 | 1.84 1.83 |
| | 2 - 3 | 2 | 0.51 | 1.02 |
| | | | | 2.86 <u>2.85</u> |
| S3 ₆ | 4 - 5 | 4 | 0.5 | <u>7</u> |
| | | | TOTAL VOLUME TONNES (R.D. 1.2) | 23.54 <u>24.55</u> 28 MT |

APPENDIX 3
RESERVE CALCULATIONS EL20 LAUNCESTON (continued)

PIPERS LAGOONS

| SEAM | CUM. COAL THICKNESS (m) | | INDICATED CLASS II RESERVES | |
|-----------------|-------------------------|------------|-----------------------------|---|
| | RANGE | VALUE USED | AREA (km ²) | INSITU COAL VOLUME m ³ x 10 ⁶ |
| S3 ₁ | 1.5 - 2 | 1.5 | 1.15 | 1.73 |
| | 2 - 3 | 2 | 0.39 | 0.77 ⁷⁸ |
| | 3 - 4 | 3 | 0.16 | 0.48 |
| | | | | 2.98 <u>2.99</u> |
| S3 ₂ | 2 - 3 | 2 | 0.55 | 1.10 |
| | 3 - 4 | 3 | 2.46 | 7.38 |
| | 4 - 5 | 4 | 1.22 | 4.38 ^{4.88} |
| | 5 - 6 | 5 | 0.06 | 0.30 |
| | 6 - 8 | 7 | 0.05 | 0.35 |
| | 8 - 9 | 8 | 0.06 | 0.48 |
| | | | | 14.49 ✓ |
| S3 ₃ | 1.5 - 3 | 2 | 1.74 | 3.48 |
| | 3 - 4 | 3 | 0.34 | 1.02 |
| | | | | 4.50 ✓ |
| | | | TOTAL VOLUME S3 | 26.36 ^{21.98} |
| S4 ₁ | 8 - 9 | 8 | 0.27 | 0.68 ^{2.16} |
| S4 ₃ | 2.5 - 3 | 2.5 | 0.27 | 0.68 ✓ |
| | | | TOTAL VOLUME S3 | 3.47 2.84 |
| | | | TOTAL TONNES (R.D. 1.2) | 29.77 MT ⁷ <u>24.82</u> |

2.96



DRILLHOLE KEY

○ CSR drillhole, coal cored.
 ● CSR drillhole, chip sampled.
 ○ AAR drillhole.

Compiled from Tasmania 1:100 000 Topographic Survey Series 8215 Tamar, 8315 St Patricks, 8314 South Esk, 8214 Meander Edition 3 1979.

SCALE 1:100,000

0 1 2 3 4 5 6 7 8 9 10

5 cm

TRUE NORTH, GRID NORTH AND MAGNETIC NORTH ARE SHOWN GRAPHICALLY FOR THE CENTRE OF THE MAP. MAGNETIC NORTH DEVIATES 12° 01' FROM TRUE NORTH IN ABOUT THREE YEARS.

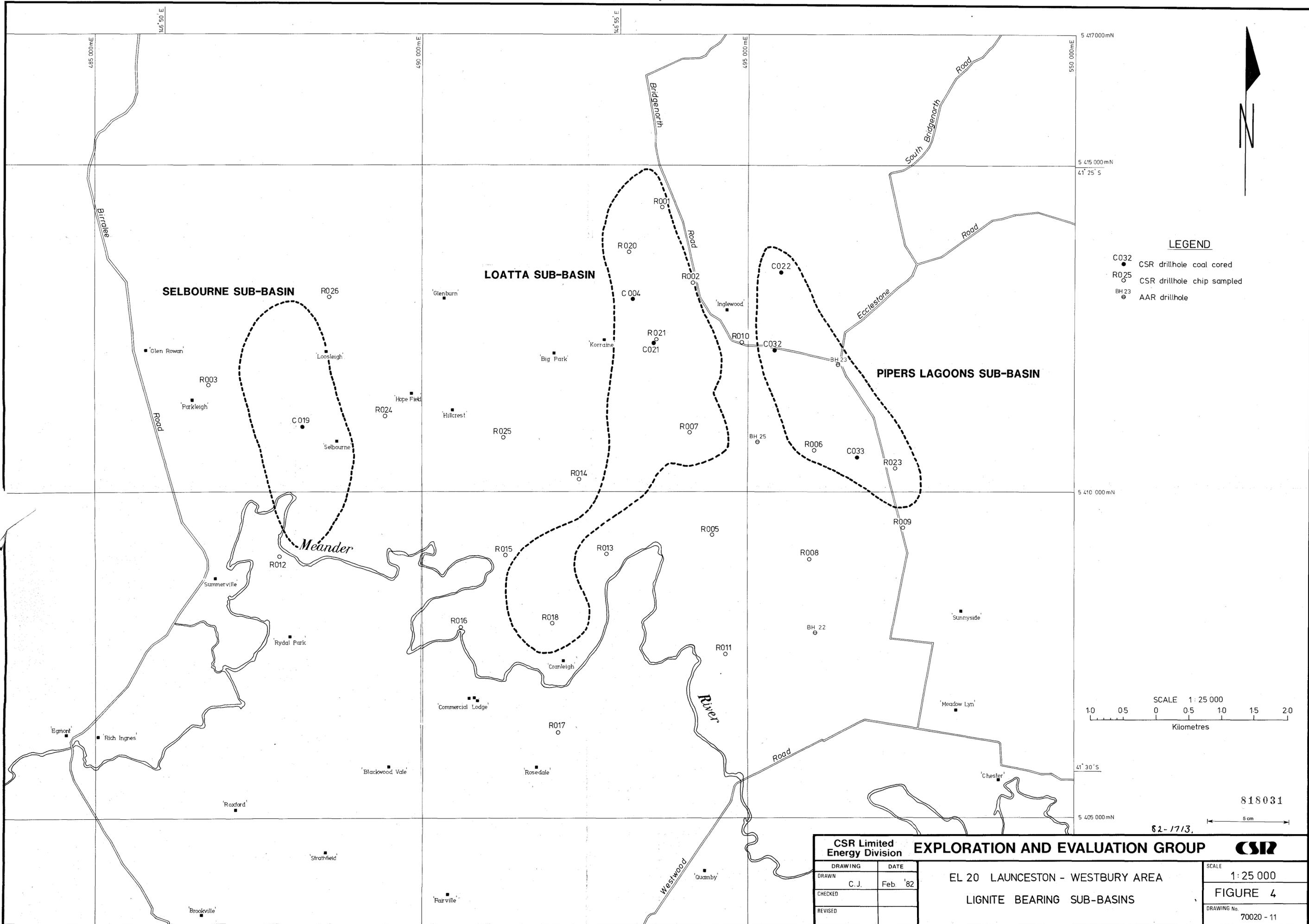
ON 12N, MK
 GRID CONVERGENCE 0.2"
 GRID/MAGNETIC ANGLE 121°

LEGEND

HIGHWAY SEALED, UNSEALED
 ROAD SEALED, UNSEALED
 RAILWAY
 POWER TRANSMISSION LINE

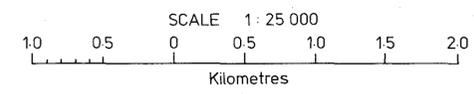
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| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | |
| DRAWING DATE B. A. W. JULY '81 | E.L. 20 - LAUNCESTON | | | SCALE 1:100 000 |
| CHECKED C. J. Feb. '82 | LOCATION OF EXPLORATION Oct-Dec. 1981 PROGRAMME | | | FIGURE 2 |
| | LIMIT OF RESERVES IN SUB-BASINS | | | DRAWING No. 70020-17 |

82-17/3.



LEGEND

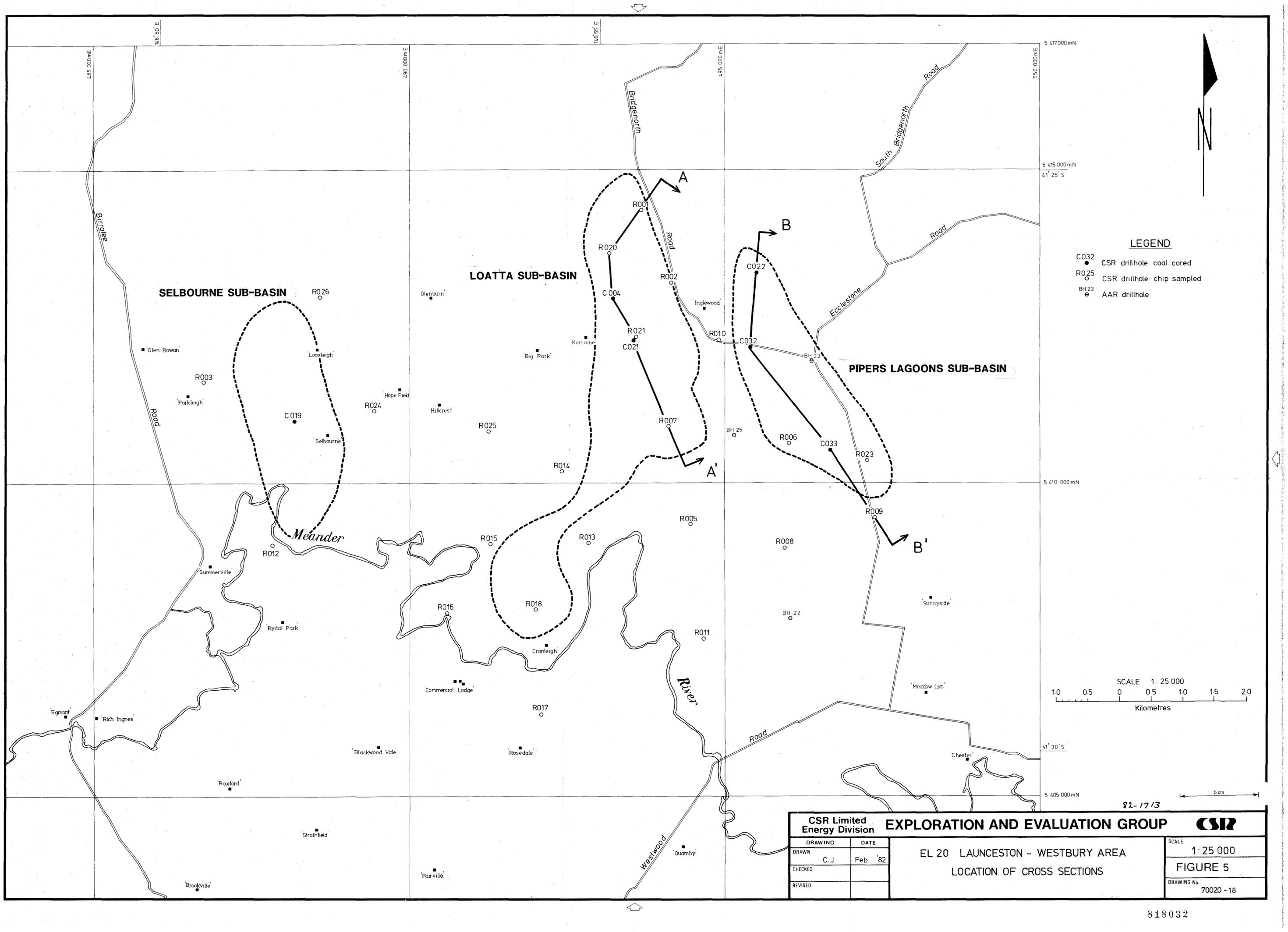
- C032 CSR drillhole coal cored
- R025 CSR drillhole chip sampled
- ⊙ BH 23 AAR drillhole



818031

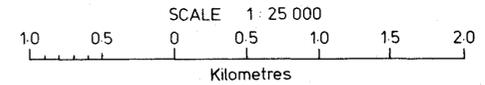
82-1713

| | | | | |
|------------------------------------|---------------|--|--|------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | |
| DRAWING | DATE | EL 20 LAUNCESTON - WESTBURY AREA LIGNITE BEARING SUB-BASINS | | SCALE |
| DRAWN | C. J. Feb '82 | | | 1:25 000 |
| CHECKED | | | | FIGURE 4 |
| REVISED | | | | DRAWING No. 70020 - 11 |



LEGEND

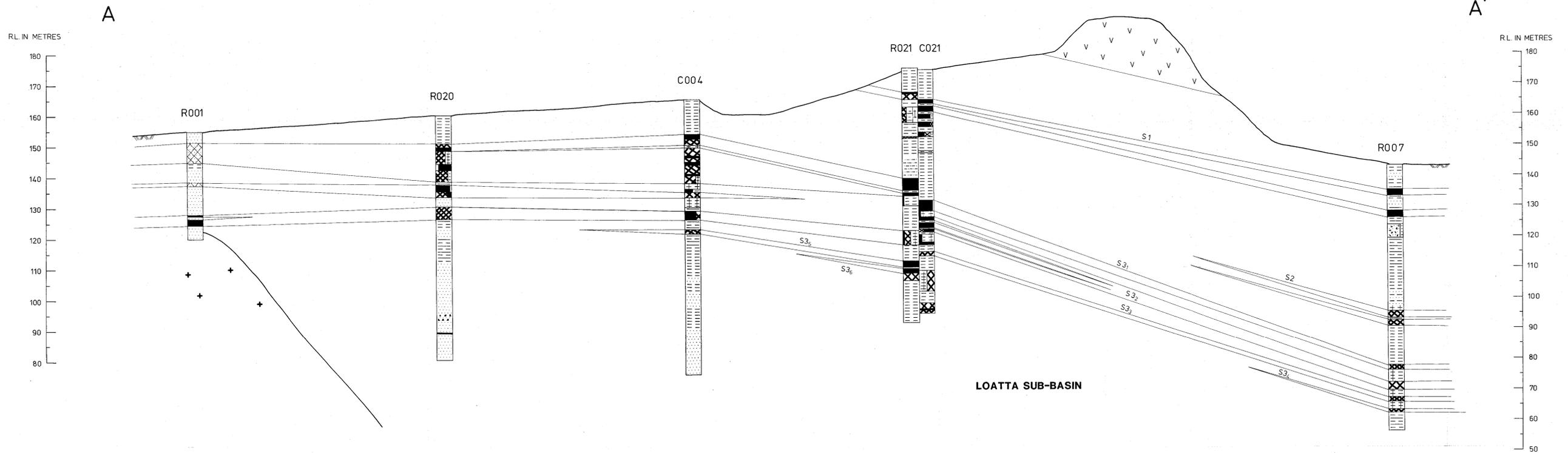
- C032 ● CSR drillhole coal cored
- R025 ○ CSR drillhole chip sampled
- BH 23 ⊕ AAR drillhole



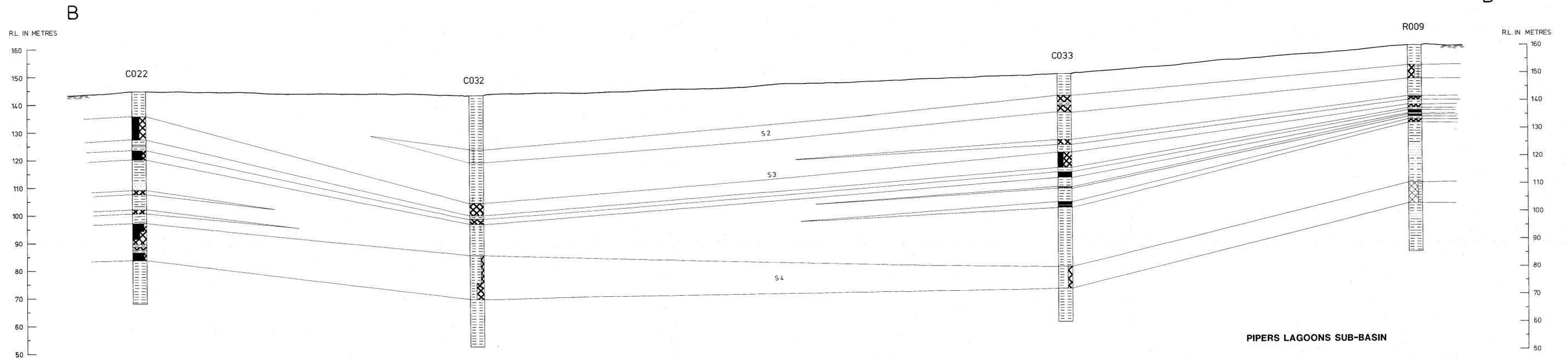
5 cm

| | | | | |
|------------------------------------|---------------|--|--|---------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | CSR |
| DRAWING | DATE | EL 20 LAUNCESTON - WESTBURY AREA LOCATION OF CROSS SECTIONS | | SCALE |
| DRAWN | C. J. Feb '82 | | | 1: 25 000 |
| CHECKED | | | | FIGURE 5 |
| REVISED | | | | DRAWING No. 70020 - 18 |

82-17/3



LOATTA SUB-BASIN

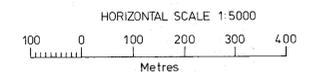


PIPERS LAGOONS SUB-BASIN

LEGEND

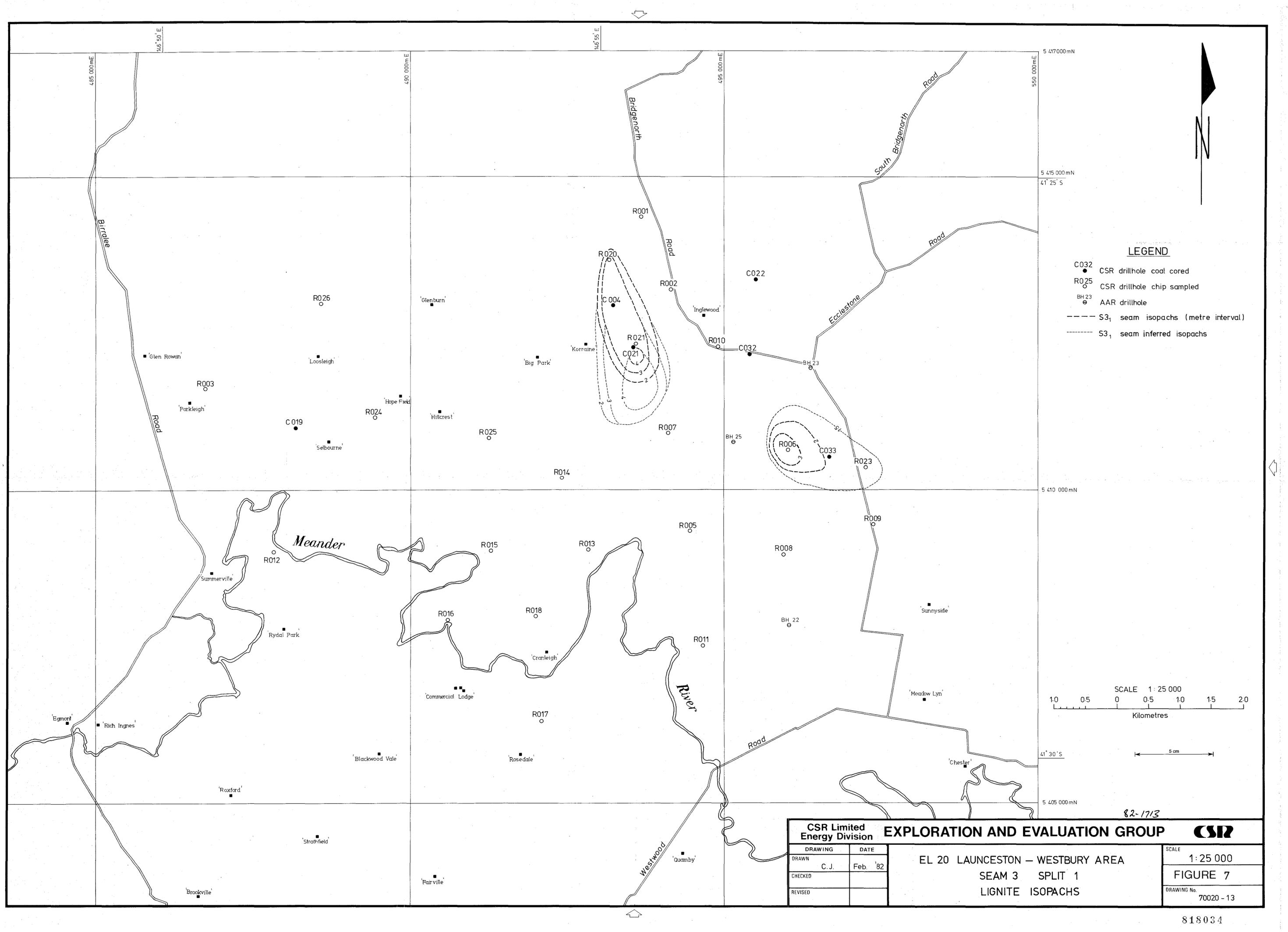
- Tertiary Basalt
- Sandy Clay
- Lignite
- Ligneous Sand
- Inferior Lignite
- Sand with Wood Fragments
- Ligneous Clay
- Sand
- Carbonaceous Clay
- Dolerite (Jurassic)
- Clay

NOTE: Vertical Exaggeration x10



| | | | |
|-----------------------------|---------------|---|---------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | |
| DRAWING | DATE | EL 20 LAUNCESTON – CROSS SECTIONS A-A' LOATTA SUB-BASIN B-B' PIPERS LAGOONS SUB-BASIN | SCALE 1:500 V 1:5000 H |
| DRAWN | C. J. Feb '82 | | FIGURE 6 |
| CHECKED | | | DRAWING No. 70020-19 |
| REVISED | | | |

82-17/3



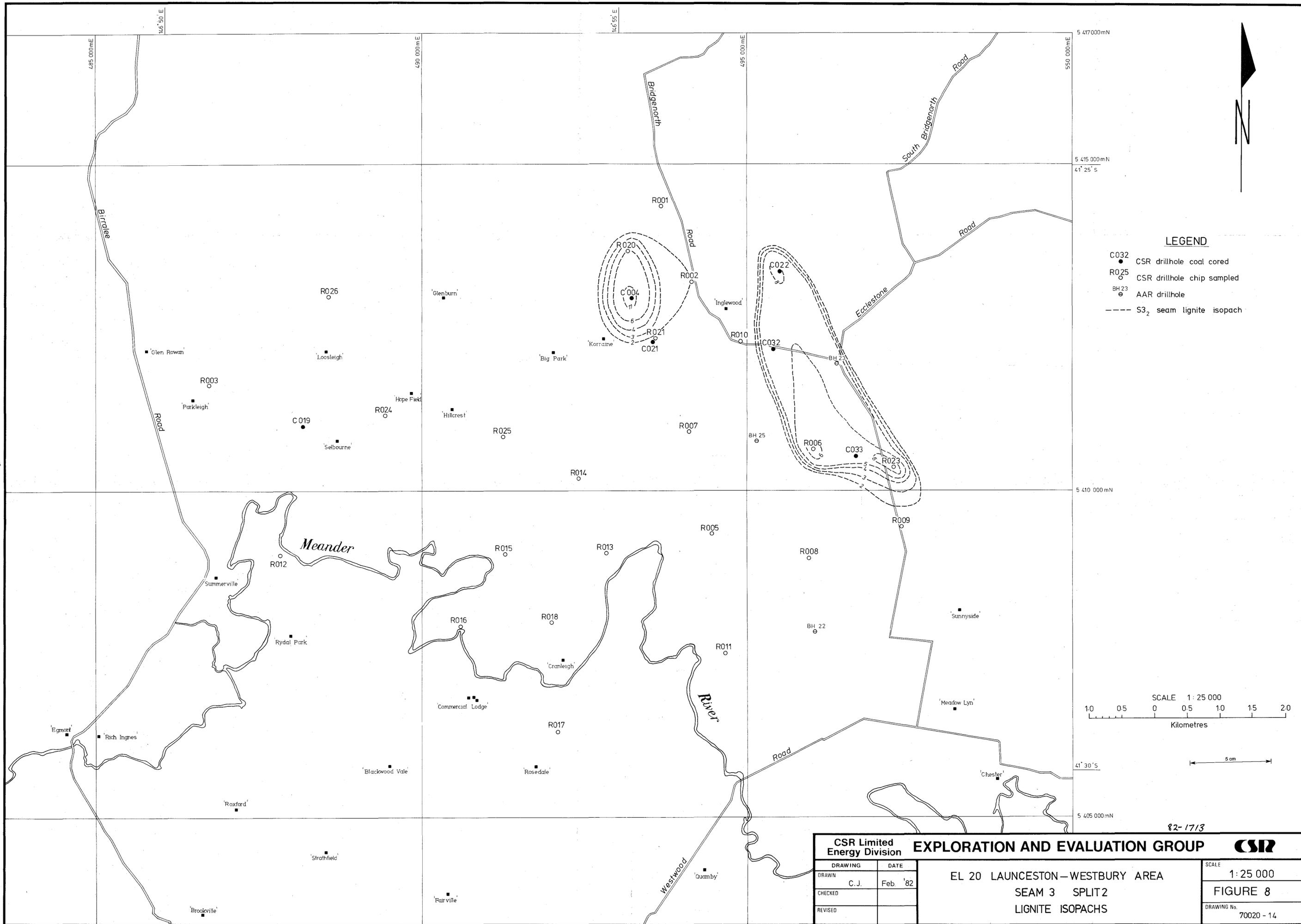
LEGEND

- CSR drillhole coal cored
- CSR drillhole chip sampled
- BH 23 AAR drillhole
- - - S3₁ seam isopachs (metre interval)
- - - S3₁ seam inferred isopachs

SCALE 1:25 000
 1.0 0.5 0 0.5 1.0 1.5 2.0
 Kilometres

82-1713

| | | | | |
|------------------------------------|------|---|--|-------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | CSR |
| DRAWING | DATE | EL 20 LAUNCESTON - WESTBURY AREA | | SCALE 1:25 000 |
| | | SEAM 3 SPLIT 1 | | FIGURE 7 |
| | | LIGNITE ISOPACHS | | DRAWING No. 70020-13 |
| | | | | |



LEGEND

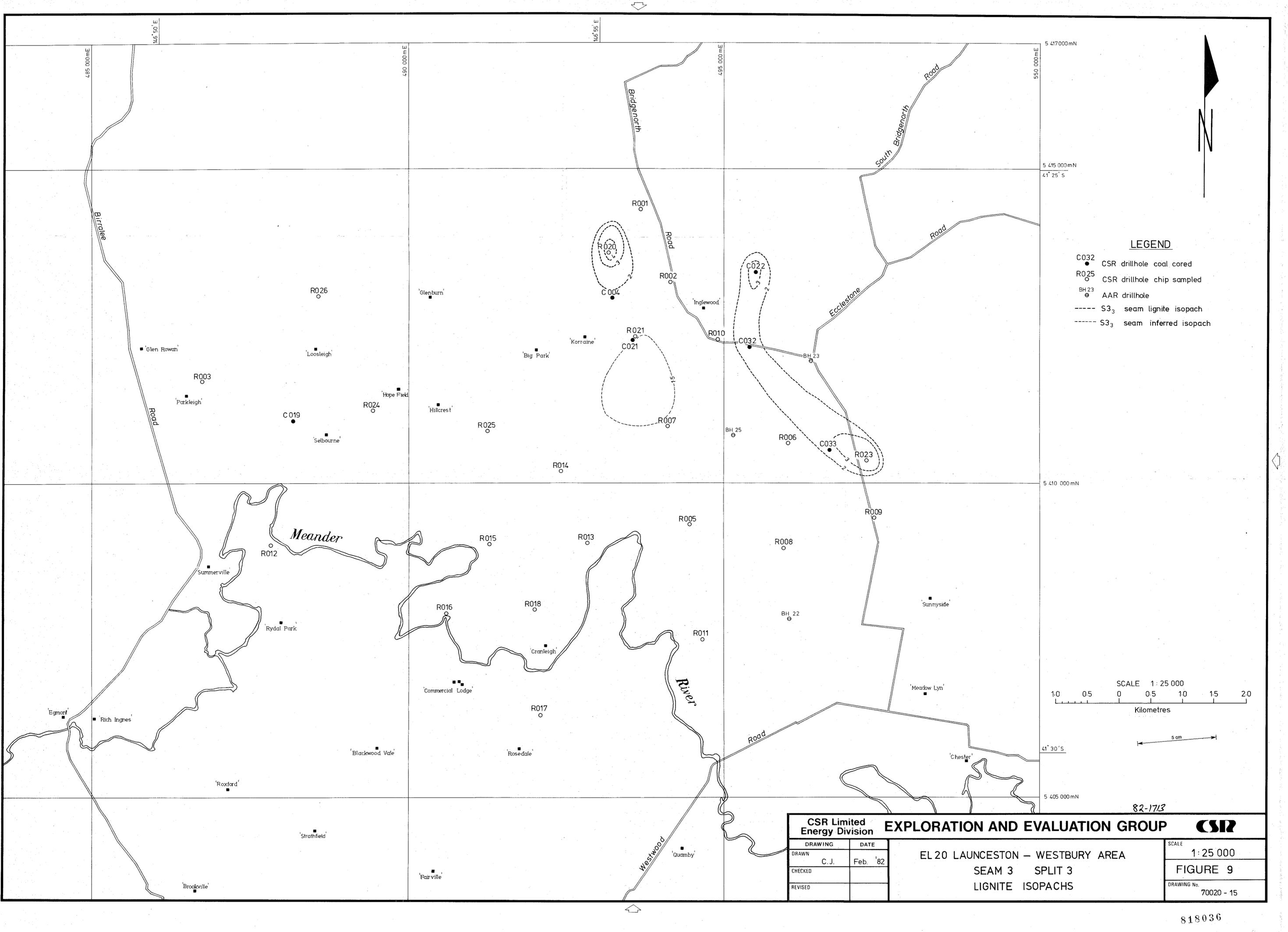
- C032 ● CSR drillhole coal cored
- R025 ○ CSR drillhole chip sampled
- BH 23 ⊕ AAR drillhole
- S₃₂ seam lignite isopach

SCALE 1:25 000
 1.0 0.5 0 0.5 1.0 1.5 2.0
 Kilometres

5 cm

82-1713

| | | | | |
|------------------------------------|---------------|--|--|---------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | CSR |
| DRAWING | DATE | EL 20 LAUNCESTON—WESTBURY AREA SEAM 3 SPLIT 2 LIGNITE ISOPACHS | | SCALE 1:25 000 |
| DRAWN | C. J. Feb '82 | | | FIGURE 8 |
| CHECKED | | | | DRAWING No. 70020 - 14 |
| REVISED | | | | |



LEGEND

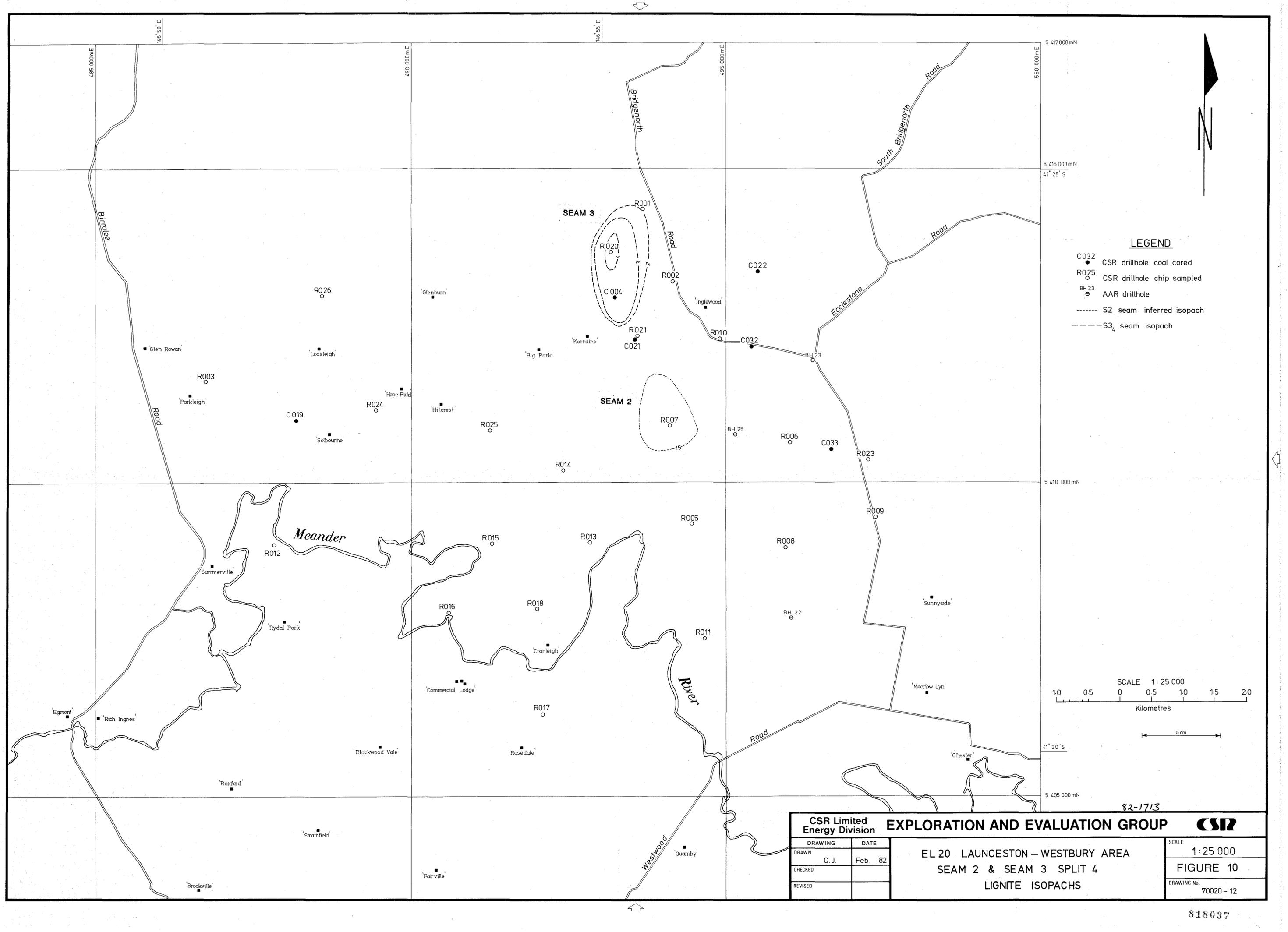
- C032 ● CSR drillhole coal cored
- R025 ○ CSR drillhole chip sampled
- BH 23 ⊖ AAR drillhole
- S3₃ seam lignite isopach
- S3₃ seam inferred isopach

SCALE 1:25 000
 1.0 0.5 0 0.5 1.0 1.5 2.0
 Kilometres

5 cm

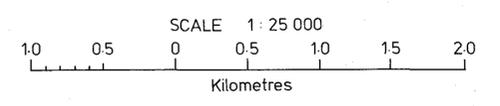
82-1713

| | | | | |
|------------------------------------|---------------|--|-------------|------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | CSR |
| DRAWING | DATE | EL 20 LAUNCESTON - WESTBURY AREA SEAM 3 SPLIT 3 LIGNITE ISOPACHS | | SCALE |
| DRAWN | C.J. Feb. '82 | | | 1:25 000 |
| CHECKED | | | | FIGURE 9 |
| REVISED | | | DRAWING No. | 70020 - 15 |



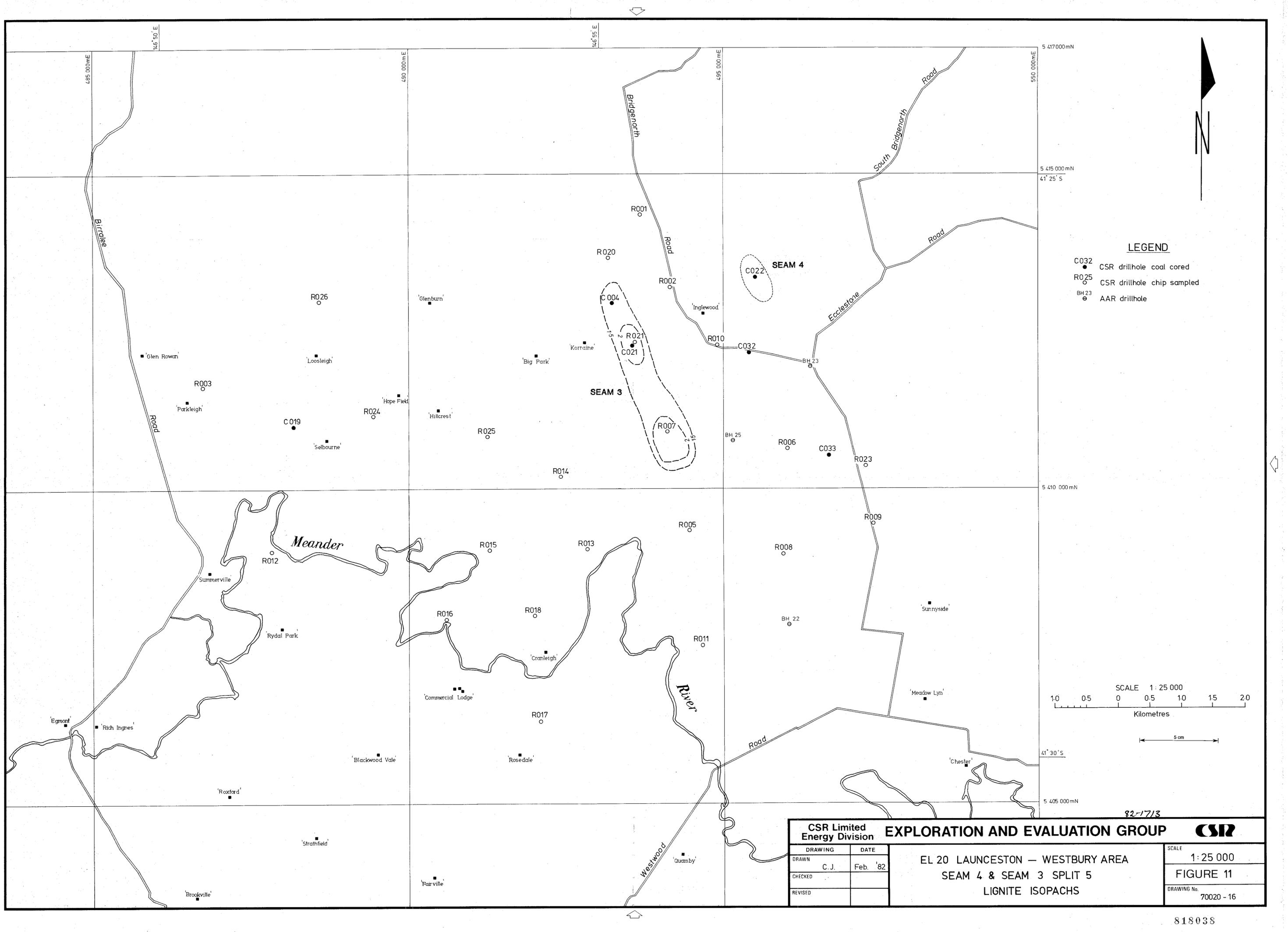
LEGEND

- C032 CSR drillhole coal cored
- R025 CSR drillhole chip sampled
- BH 23 AAR drillhole
- S2 seam inferred isopach
- S3₁ seam isopach



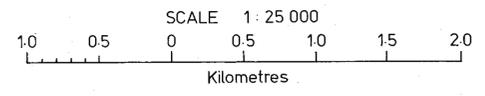
| | | | | |
|---|--|--|--|---------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | |
| EL 20 LAUNCESTON – WESTBURY AREA | | SEAM 2 & SEAM 3 SPLIT 4 | | |
| LIGNITE ISOPACHS | | DRAWING DATE DRAWN C. J. Feb. '82 CHECKED REVISED | | FIGURE 10 |
| | | | | DRAWING No. 70020 - 12 |

82-1713



LEGEND

- C032 ● CSR drillhole coal cored
- R025 ○ CSR drillhole chip sampled
- BH23 ⊕ AAR drillhole



| | | | | |
|------------------------------------|----------|--|--|---------------------------|
| CSR Limited Energy Division | | EXPLORATION AND EVALUATION GROUP | | CSR |
| DRAWING | DATE | EL 20 LAUNCESTON — WESTBURY AREA SEAM 4 & SEAM 3 SPLIT 5 LIGNITE ISOPACHS | | SCALE |
| C.J. | Feb. '82 | | | 1:25 000 |
| CHECKED | | | | FIGURE 11 |
| REVISED | | | | DRAWING No. 70020 - 16 |

82-1713