1947.

VICTORIA.

REPORT

of

STATE ELECTRICITY COMMISSION OF VICTORIA

on

FURTHER DEVELOPMENT OF THE BRIQUETTE INDUSTRY BASED ON THE BROWN COAL RESOURCES IN THE LATROBE VALLEY

PRESENTED TO BOTH HOUSES OF PARLIAMENT BY HIS EXCELLENCY'S COMMAND.

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STATE ELECTRICITY COMMISSION OF VICTORIA

REPORT

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FURTHER DEVELOPMENT OF THE BRIQUETTE INDUSTRY BASED ON THE BROWN COAL RESOURCES IN THE LATROBE VALLEY.

22 William-street,
Melbourne, C.1.

The Honorable John Cain, M.L.A.,
Premier of Victoria,
Treasury Gardens,
Melbourne, C.2.

SIR,

PART I.—INTRODUCTION.

1. Following the Commission's report to the Government in October, 1941, which recommended that the Commission prepare a long-range plan for the further development of brown coal as a source of high-grade solid fuel, the Commission proceeded with field explorations and investigations to ascertain the most suitable location for a new open cut and briquette factory.

2. These investigations continued throughout the war period. All the brown coal areas in the State were examined, with the resulting conclusion that the deposits in the Latrobe Valley offered the most favourable area for the development contemplated. It was not until some time after the cessation of hostilities in September, 1945, that sufficient skilled staff was available to complete the preliminary investigations and to prepare definite plans.

3. These plans have now been brought to a stage where the Commission in this report can set before the Government its proposals for a further increase in briquette production. In this report, also, and in accordance with your letter of the 26th July, 1946, the Commission submits information which is more specifically related to the Government's policy of rendering Victorian industry independent of New South Wales black coal, as referred to in the Cabinet Sub-Committee's Report on Brown Coal Development of April, 1946.

PART II.—RESPONSIBILITY OF THE COMMISSION FOR FUEL SUPPLIES.

4. Since its foundation in 1919, the Commission's primary duty, as declared by Parliament in the Commission's Acts, has been the co-ordination and extension of electricity supply throughout Victoria, and in particular the development of the brown coal deposits at Yallourn for purposes of electricity generation. In being given by Parliament a virtual monopoly in the field of electricity supply, the Commission has always recognized its responsibility to ensure that the electrical requirements of the State are fully met and that the benefits of electricity are made available to the greatest extent compatible with the financial stability of the undertaking.

5. The position with regard to fuel supplies, however, is entirely different. Except for limited periods when importations of New South Wales coal have been interrupted by industrial unrest, there was before the war a keenly competitive market in fuel, and any entry by the State has necessarily been in opposition to a well-established trade and at considerable financial risk. The first briquette factory built at Yallourn in 1924 was looked upon as an experiment which, although successful in demonstrating the practicability of manufacturing brown coal briquettes and applying them as a fuel for all purposes, has not been able to show a satisfactory financial return.

6. A summarized statement of the year-to-year development of the briquette industry since the inception of the Commission is given in Appendix No. 1. From the brief historical outline given, it will be noted that the Commission has continued to expand its briquette production in spite of a generally unprofitable market. In 1943, the State declared, as a post-war objective, its intention to accept the responsibility involved in providing the State's fuel supply from local sources. Up to 1943, the State regarded penetration of the fuel market as constituting a very uncertain commercial venture and, moreover, as being unnecessary since private enterprise appeared to be capable of fulfilling all requirements for imported fuel. The value of the industry from a national standpoint, however, was particularly emphasized during the war period.

7. The Commission still can give no assurance that in an open market the output of an enlarged briquette industry could be disposed of profitably at all times. Nevertheless, the Commission recognizes that the development of a reliable source of local fuel has now assumed an importance which such development did not possess before the war and that consequently a further measure of responsibility devolves upon the State to meet the immediate and steadily growing fuel needs of the community.

8. In view of this change in outlook, it clearly will be necessary for the State to declare the extent of the Commission's responsibility in the matter. In anticipation of such a declaration, and subject to the passing of appropriate legislation which would safeguard the finances of electricity supply, the Commission, in this report, submits its proposals for the establishment of a new open cut and two briquette factories at Maryvale South, to give a combined production of about 1,300,000 tons per annum ; this output, together with the normal output from the Yallourn factory of 450,000 tons per annum on a 6-day per week basis, would give a total briquette production of about 1,750,000 tons per annum. Additionally, the Commission presents in this report an indication of what further briquette production capacity would be required to meet the full needs of general industry, excluding railway locomotives and town's gas, within the next fifteen years.

PART III.—SOLID FUEL REQUIREMENTS OF VICTORIA.

(*a*) GENERAL INDUSTRY AND GENERATION OF ELECTRICITY.

9. In Appendix No. 2 are shown the quantities of the various fuels used by general industry and for electricity generation in each year since 1925–26 ; the figures given include also domestic use, but only in the case of briquettes does this materially affect the trend indicated. In Plate No. 1 are shown in graphical form the fuel consumptions of general industry and electricity generation expressed in terms of black coal of 12,000 B.T.U's. per lb. heating value. Appendix No. 3 gives the total annual production of the various fuels. It will be noted from these tables that there have been increases in the consumption of New South Wales black coal and brown coal briquettes, together with a marked expansion in the use of raw brown coal for electricity generation ; and that there has been some decrease in the consumption of Victorian black coal and in coke for industrial purposes and electricity generation. Representative figures from Appendix No. 2 are given in the following table :—

FUEL CONSUMPTIONS FOR GENERAL INDUSTRY, GENERATION OF ELECTRICITY AND DOMESTIC PURPOSES.

Year.	Quantities of Fuel Used (Thousands of Tons).					
	New South Wales Black Coal.	Victorian Black Coal.	Raw Brown Coal.	Briquettes.	Coke.	Total (expressed in Terms of Black Coal of 12,000 B.T.U's. per lb. Heating Value).
1925–26	610	305	511	82	250	1,316
1930–31	345	333	968	217	165	1,212
1935–36	507	264	1,585	336	156	1,544
1940–41	837	180	2,820	438	182	2,201
1944–45	780	201	3,574	443	230	2,412

(*Note.*—The above table excludes firewood.)

10. In order to forecast the likely fuel requirements for general industry and electricity generation in the next 25 years, the Commission's Fuel Sales Branch undertook an extensive market survey. This survey, which was interpreted in conjunction with the abovementioned trends, forms the basis of the estimates given in Appendix No. 4 and shown graphically also in Plate No. 1. These estimates indicate that, assuming a continuation of Victorian black coal production and the total exclusion of New South Wales black coal, there is at present a potential requirement by general industry and for electricity generation (including electricity for railway traction) for 1,900,000 tons of briquettes per annum, increasing by 1961–62 to over 2,600,000 tons per annum. In addition, electricity generation will require 4,950,000 tons of raw brown coal per annum by 1961–62 after allowing for hydro-electric development. These consumptions would require a total raw brown coal production of about 14,000,000 tons per annum by 1961–62 : production would need to be increased to over 17,000,000 tons per annum by 1970–71, i.e., more than three times the output of the Yallourn Open Cut. A summary of Appendix No. 4 is given in the following table :—

POTENTIAL FUEL REQUIREMENTS FOR GENERAL INDUSTRY AND GENERATION OF ELECTRICITY. *Including Electricity for Railway Traction—Assuming a Total Exclusion of New South Wales Black Coal.*

Year.	Quantities of Fuel Required (Thousands of Tons).			
	Victorian Black Coal.	Raw Brown Coal.	Briquettes.	Total (expressed in Terms of Black Coal of 12,000 B.T.U's. per lb. Heating Value).
1946–47	173	3,490	1,912	2,456
1951–52	163	4,000	2,302	2,869
1952–53	161	4,000	2,196	2,780
1956–57	153	4,370	2,423	3,046
1961–62	143	4,950	2,610	3,320
1966–67	133	5,000	3,115	3,703

(*b*) VICTORIAN RAILWAYS' LOCOMOTIVES AND TOWN'S GAS.

11. Consumptions by Victorian Railways' locomotives and for town's gas production since 1925–26 are given in Appendix No. 2. For purposes of completeness in its fuel survey of future requirements, the Commission, in collaboration with the authorities concerned, has estimated the future potential needs of railway locomotives and town's gas in terms of briquettes. These estimates are given in Appendix No. 4, but they should be regarded as being of a very tentative nature only.

12. The Commission has noted the Government's intentions ultimately to use brown coal in railway locomotives in complete substitution of New South Wales black coal, and to convert the gas supply of the metropolitan area to a system based entirely on brown coal. But in the absence of more precise information concerning the form in which the fuel for these purposes will be used, and the time programme to be followed in changing over to brown coal, the Commission is not in a position to comment further. In this connection the Commission awaits the discussions with the Government on the supply of brown coal for town's gas and with the Victorian Railways regarding fuel for locomotives, as contemplated in your letter of the 26th July, 1946.

(*c*) DOMESTIC.

13. An approximate estimate of the consumption of local firewood, which is by far the most used domestic fuel, places the present demand at not more than about 650,000 tons of firewood per annum. Firewood consumption may increase to about 800,000 tons per annum by 1970–71.

14. Under the present conditions of Commonwealth control, briquettes are not available for domestic consumption, but before the war the Commission was able to sell for this purpose quantities of up to 100,000 tons per annum. The Commission believes that there is a latent demand by householders for at least the pre-war quantities of briquettes, and that this demand may exceed 200,000 tons per annum by 1960–61 and reach at least 300,000 tons per annum by 1970–71. If these quantities of briquettes were consumed, the estimates of firewood given in the preceding paragraph would vary accordingly.

PART IV.—PRINCIPAL FUEL RESOUCES.

(*a*) NEW SOUTH WALES BLACK COAL.

15. In the past, Victoria has relied for the major portion of its fuel requirements on imports of black coal from New South Wales, and, whatever may be the factors influencing the short supply of this fuel in recent years, it is worthy of note that the reserves themselves remain very extensive. The following figures are taken from "The Mineral Industry of New South Wales" published by the New South Wales Mines Department in 1928. These are the latest figures available, but the Standards Association of Australia is at present engaged in a close examination of the deposits, and Mr. Justice Davidson in his report of March, 1946, on "The Coal Mining Industry" expresses the view that as a result of this examination the estimate of reserves may be reduced.

	Actual Reserves.	Probable Reserves.
	(Millions of tons.)	(Millions of tons.)
Main Coal Area—		
Northern	3,062	2,976
Central	97	470
Southern	1,469	4,421
Western	629	425
	5,257	8,292
Ashford Area	..	10
Coorabin Area	..	370
North-Eastern Area	..	(No estimate available)
Totals	5,257 (millions)	8,672 (millions)

(*b*) VICTORIAN BLACK COAL.

16. The total reserves of black coal in Victoria, according to estimates of the Departments of Mines, do not exceed 17,500,000 tons, of which possibly 14,000,000 tons could be mined. The principal deposits are :—

Wonthaggi	9,000,000 tons
Korumburra	5,000,000 ,,
Jumbunna–Outtrim	3,000,000 ,,
Others, including Kilcunda, Cape Otway, and Wannon ..	500,000 ,,
	17,500,000 tons

17. The seams are for the most part thin and disturbed by numerous faults and the quality of coal is not high. At the present time there are four mines in production—Wonthaggi, Korumburra, Jumbunna, and Kilcunda; the total output in 1944–45 was about 271,000 tons, of which the Wonthaggi mine contributed 235,100 tons. Production is likely to decline because seams are becoming more difficult to work and reserves are becoming exhausted.

(*c*) BROWN COAL.

18. The brown coalfields of Victoria have been reported on extensively by the Department of Mines. In its Bulletin No. 45 by Dr. H. Herman the geological characteristics of the deposits and the physical qualities of the coal are described in detail. There are three areas known to contain brown coal in sufficient quantities for large-scale exploitation, and a number of small areas which, on the information at present available, are not suitable for the high rate of production—millions of tons per annum—necessary to meet the State's requirements. In the first category are the Latrobe Valley (including Yallourn, Maryvale, Loy Yang and Yinnar areas), Gelliondale and the Altona deposits; and in the second, Bacchus Marsh, Lal Lal, Wensleydale, Dean's Marsh and other scattered deposits of minor importance. Plate No. 2 shows the location of the main known deposits of brown coal in Victoria.

19. In November, 1941, Mr. J. M. Bridge, B.E., was appointed Consultant to the State Electricity Commission to investigate and report on the opening of a new open cut. In March, 1942, Mr. Bridge recommended that only four areas, namely, Maryvale, Loy Yang, Yinnar and Gelliondale, be closely investigated. These areas were selected to the exclusion of other deposits because they were the only ones in which it was probable that sufficient tonnage of brown coal existed at a depth below ground surface which would permit economic open cut working. On the basis of information available at 30th June, 1944, Mr. Bridge prepared the table given in Appendix No. 5 showing a comparison of the deposits explored in Gippsland.

PART V.—MARYVALE SOUTH PROJECT.

(*a*) THE OPEN CUT.

20. Resulting from Mr. Bridge's investigations, an area in the parish of Maryvale South, situated south of the township of Morwell, has been selected as the site for a new open cut. The location of the proposed workings is shown in Plate No. 3. The overburden in this area averages 43·5 feet and overlies a coal seam with an average thickness of 380 feet. It is estimated that, with an open cut of 470 acres at grass level, it will be possible to win by open cut methods, and to a depth of 320 feet, a total of 122·5 million tons of coal. The reasons for selecting this site are as follows :—

(*a*) The briquette factories and the initial overburden dump could be located on an area which is unsuitable for open cut working.

(*b*) The briquette factories, also, would be conveniently situated in relation to the main Gippsland railway line.

(*c*) The open cut would be on the eastern edge of a coalfield of considerable extent, thus allowing for eventual extension of operations, more particularly to the west and south.

(*d*) The ratio of thickness of overburden to thickness of coal is favourable for open cut working on this area.

(*e*) The coal has an average moisture content of 61 per cent., compared with 66 per cent. at Yallourn, which has marked advantages for the manufacture of briquettes.

(*f*) In an emergency, raw brown coal could be made available from Maryvale South for power generation at Yallourn.

21. To win the coal to a depth of 320 feet it would ultimately be necessary to develop five working faces, as shown in Plate No. 4, but this development would be gradual. Initially, to meet the requirements of one briquette factory, the open cut would be operated by an overburden dredger and one coal dredger. When the second factory came into production, a second coal dredger would be required, with a third coal dredger as standby.

(*b*) THE BRIQUETTE FACTORIES.

22. The briquette factories would be situated 1½ miles to the south-east of Morwell in an area lying east of the ridge which runs north and south (see Plate No. 3). The area chosen is devoid of coal to at least 200 feet below the natural surface and is unsuited to open cut mining operations. The processes associated with the manufacture of briquettes, stated in sequence, are :—

(*a*) treatment of the raw wet coal to produce a uniformly graded material ;

(*b*) removal of surplus moisture from the coal by steam drying ;

(*c*) cooling of the dried coal ;

(*d*) pressing the cooled dry coal into briquettes of the required form ;

(*e*) cooling of the freshly pressed briquettes and loading into railway trucks.

23. In addition to the production of briquettes, the works would supply by-product electrical energy to the Commission's system. A complete unit briquette factory would comprise a raw coal storage and preparation plant, coal drying, cooling, pressing and briquette loading plants, and power generating plant with feeders to the Yallourn Power Station. (See Plate No. 5.)

(c) ANCILLARY SERVICES.

24. The establishment of the open cut and briquette factories would require ancillary works and services of very considerable magnitude, as follows :—

(i) *General Facilities.*—These would include administrative offices, camp accommodation, central stores, workshops, railway sidings, roads, power supply and a communication system.

(ii) *Water Supply.*—The most suitable source of water is the Tyers River, and it is proposed that water be diverted at a point five miles downstream from Gould by building a small central weir and offtake structure. Reservoirs would be constructed on high ground to the east of Morwell, and water led to the works through large-diameter pipes. (See Plate No. 6.)

(iii) *Rail Connection with Yallourn.*—Provision would need to be made for the transport of raw coal between the works at Maryvale South and Yallourn and eventually also for the carriage of overburden from Maryvale for disposal in the Yallourn Open Cut. (See Plate No. 6.)

(d) CAPITAL AND OPERATING COSTS.

25. The capital expenditure on overburden equipment, coal winning and transport plant, construction of the two briquette factories, acquisition of land and provision of ancillary services as described above is estimated at approximately £14,500,000 based on present-day wages conditions and prices. The operation of the factories, when both were in full production, is estimated on present-day wages conditions and prices to give a unit production cost in the vicinity of 19s. per ton of briquettes in railway trucks at Maryvale South.

26. Details of the abovementioned capital and operating costs are relatively as follows :—

(i) *Capital Costs*—	One Factory (1952/53) £	Two Factories (1956/57) £
Establishing and equipping open cut	2,159,800	2,736,800
Building and equipping briquette factories	5,833,000	10,286,000
Acquisition of land	300,300	300,300
Provision of general services and facilities	495,000	519,000
Water supply works and storage	382,000	382,000
Inter-connecting 90 cm. gauge railway—Maryvale South to Yallourn	202,000	202,000
	9,372,100	14,426,100
(ii) *Operating Costs*—		
Overburden—		
Quantity removed (cu. yds.)	2,200,000	1,900,000
Total operating expenditure	£276,900	£254,000
Cost per cubic yard	2s. 6d.	2s. 8d.
Coal—		
Output (tons)	2,100,000	4,200,000
Total operating expenditure	£329,100	£615,300
Cost per ton (including overburden proportion)	3s. 2d.	2s. 11d.
Briquette Factories—		
Output of briquettes (tons)	630,000	1,380,000
Total net operating expenditure	£748,300	£1,311,000
Cost per ton in railway trucks at Maryvale South	23s. 10d.	19s.

27. To provide for the distribution to customers of the enlarged briquette output from the two Maryvale South factories, it would be necessary to augment considerably the existing distribution facilities. An expenditure to the order of £250,000 would be incurred on new storage depots and the provision of further handling equipment.

28. In addition to the capital expenditure which would be incurred by the Commission, there would be required further outlays by other public authorities on housing, main line railway facilities and general community services.

(*e*) TIME PROGRAMME AND LABOUR REQUIREMENTS.

29. The estimated time programme and labour requirements for the project are as follows :—

Year.	Description.	Men Employed at Site.	
		Construction.	Operation.
1946–47	Preliminary design	100	..
1947–48	Portion of land purchased		
	Interconnecting railway commenced	1,000	..
	General services commenced		
	Briquette factory site works commenced ..		
1948–49	Remainder of land purchased	1,200	..
	Interconnecting railway completed		
1949–50	.. ..	1,300	..
1950–51	Water supply commenced	1,400	500
	Removal of overburden commenced		
1951–52	Water supply completed		
	Main part of general services completed ..	1,150	1,200
	First coal dredger commences operation ..		
	First briquette factory commences operation ..		
1952–53	First briquette factory in full production ..	700	1,200
1953–54	.. ..	650	1,250
1954–55	Second coal dredger commences operation ..	450	1,800
	Second briquette factory commences operation ..		
1955–56	Second briquette factory in full production ..	..	1,800

(*f*) DISTRIBUTION AND SALE OF BRIQUETTES.

30. The competitive position of briquettes is influenced primarily by the price of New South Wales black coal. In the past the average price has varied from about 13s. 9d. to 47s. per ton on wharf Melbourne (Commonwealth Bureau of Census and Statistics) and at present it is about 42s. 6d. per ton. It may be anticipated that there will be a general upward trend in this price, but experience indicates that falls are likely to occur periodically, although not to the extent that the price in any year will decrease much below 40s. per ton.

31. The equivalent prices of briquettes and New South Wales black coal in the metropolitan area, based on their relative heat values, are given graphically in Plate No. 7. In this comparison, account has been taken of all costs into customers' bunkers. It is shown, for example, that with New South Wales black coal at 42s. 6d. per ton on wharf Melbourne the equivalent price of briquettes is 19s. 6d. per ton f.o.r. Maryvale South. In a competitive market it is unlikely that briquettes can be sold above this heat parity price ; indeed, in the past it has sometimes been necessary to sell below that price because of the disinclination of customers to change their fuel unless accompanied by a decrease in costs. It must be recognized that industrial fuel users in general will buy in the cheapest market, irrespective of whether the fuel is imported or of local origin.

32. With the present price of black coal at about 42s. 6d. per ton on wharf Melbourne, the Commission could not expect to obtain for briquettes an average net return at the Maryvale South factories of more than 19s. 6d. per ton. On an output of 1,300,000 tons per annum and a production cost of 19s. per ton (para. 25) this would give an annual margin of revenue over operating expenditure of about £32,500. This favourable margin would be slightly increased by charging against electricity generation at Yallourn a small amount on account of the insurance value of a second open cut, but the charge would not be sufficiently high to alter materially the extent of the margin.

33. In the early stages of development, the project would operate at a loss since the production cost of the first factory would be 23s. 10d. per ton. This cost would fall to 19s. per ton only when the second factory came into full production. Thus there would accumulate a deficit which is estimated to reach a maximum of £745,100 in 1955–56, as shown in the following table :—

Year.	Briquette Production (Thousands of Tons).	Result of Year's Operation.				Accumulated Deficit (Including Interest at 3½ Per Cent.).
		Production Cost Per Ton.	Net Revenue Per Ton at Factory.	Margin.		
				Per Ton.	Total.	
		s. d.	s. d.	s. d.	£	£
1951–52	157	47 8	19 6	−28 2	−221,000	−221,000
1952–53	630	23 10	19 6	− 4 4	−137,000	−365,700
1953–54	630	23 10	19 6	− 4 4	−137,000	−515,500
1954–55	787	23 10	19 6	− 4 4	−171,000	−704,500
1955–56	1,260	19 9	19 6	− 0 3	− 16,000	−745,100
1956–57	1,380	19 0	19 6	+ 0 6	+ 34,000	−737,200

(*g*) RAILWAY FREIGHT.

34. In assessing the probable price obtainable for briquettes, it has been assumed that current railway freight rates remain unaltered. The freight on briquettes is calculated at firewood rates, and a comparison with freights for black coal is given in the following table :—

VICTORIAN RAILWAY FREIGHT RATES PER TON.

—	New South Wales Black Coal (from Melbourne).	Wonthaggi Black Coal (from Wonthaggi).	Briquettes (from Maryvale South or Yallourn).
	s. d.	s. d.	s. d.
To Melbourne	..	6 5	8 7
„ Ballarat	9 3	12 3	11 7
„ Bendigo	11 5	13 7	12 7
„ Geelong	5 11	10 4	10 4
„ Shepparton	12 7	14 4	13 4
„ Mildura	26 5	26 4	18 11

(*h*) REQUIREMENTS OF COMMISSION POWER STATIONS.

35. In keeping with the practice of using briquettes exclusively in the Commission's steam power stations, other than Yallourn, there will be required varying annual quantities up to about 500,000 tons per annum, according to plant and loading conditions, and after allowing for hydro-electric development.

(*i*) ALTERNATIVE FORMS OF PROCESSING THE RAW BROWN COAL.

36. As an alternative to the processing of the raw brown coal into briquettes, consideration has been given to the use by industry of the coal either in its raw state or in some other prepared condition. As the result of its long experience, the Commission is satisfied that, except in a few special instances, the drying and briquetting of the raw brown coal offers the most economical and convenient form for the use of this fuel in general industrial plants and for domestic purposes.

(*j*) REGIONAL PLANNING.

37. An essential corollary to the establishment of a briquette works at Maryvale South would be the construction of housing and the provision of adequate social amenities of all kinds. Over 1,000 men would be employed on construction and, when the second factory came into production, nearly 2,000 men would be permanently occupied in operation and maintenance. Limited camp accommodation would be provided by the Commission for temporary construction employees, but immediately construction were commenced there would be an urgent need for implementing a comprehensive programme of regional housing

to cater for the needs of staff and employees. The Commission attaches great importance to the provision of adequate housing from the very beginning of the project, and, as such a task would fall within the ambit of the State housing authority, the Commission would rely upon that body for the carrying out of the necessary works.

38. In the strong belief that these large operations should not be undertaken without regional planning in the Latrobe Valley on a wide scale, the Commission has caused a study of this aspect to be made by the Chief Architect of the Commission, Mr. W. E. Gower, A.R.A.I.A., A.R.V.I.A., in collaboration with a consulting architect, Mr. F. Heath, Dip. Arch., A.R.V.I.A. The results of this investigation will be available to those State authorities which have since been established to deal with matters of this kind and which ultimately may be concerned in the planning of the region. The Commission offers its full co-operation in any such work which may be undertaken.

39. The area initially required for the open cut and briquette works is about 8,000 acres, but eventually a much larger area to the south, north, and west of the town of Morwell may be developed. For at least the next 60 years any proposed works would not encroach on Morwell closer than the boundaries given in Plate No. 8. Moreover, not all the initial area mentioned above would be taken immediately out of agricultural production but would be left until actually needed for works purposes.

(*k*) MANUFACTURE OF PLANT AND EQUIPMENT.

40. With the exception of Victoria, brown coal deposits are extensively worked only in Central Europe, and, in consequence, manufacturers of the highly specialized plant required for the removal and disposal of overburden, winning of brown coal and the production of briquettes have up to the present been located solely in Germany. The Commission considers, however, that local sources of manufacture should be established as soon as possible, so that progress would not be dependent on overseas manufacturers. Particularly in the early stages of development, efforts will be made to apportion the manufacture of plant between overseas and Australian firms. In addition to the requirements of Maryvale South, there is an even more urgent need for new plant to replace and augment the seriously overloaded equipment at Yallourn.

PART VI.—SUBSEQUENT DEVELOPMENT AT MARYVALE SOUTH AND ITS ECONOMIC INFLUENCE ON THE PROJECT.

(*a*) ULTIMATE PRODUCTION CAPACITY.

41. The Maryvale South project, as above described, provides for two briquette factories only, but the production economics of the project would be markedly improved if the briquette output were still further increased. The general layout of the works has been designed to permit a very large expansion. It is considered that, ultimately, if found desirable, the output from the open cut could be increased in stages to at least 8,000,000 tons of raw brown coal per annum. This output would be sufficient to supply four factories, giving a total production from Maryvale South of about 2,600,000 tons of briquettes per annum.

42. This quantity of briquettes, together with the output of the Yallourn factory, would be sufficient for general industry and electricity generation to achieve independence from New South Wales black coal within fifteen years, i.e., up to 1961–62, as foreseen by the Cabinet Sub-Committee on Brown Coal Development, and also to provide a supply for the domestic market.

(*b*) CAPITAL AND OPERATING COSTS.

43. Capital expenditures required for the development of the project to a stage of four factories, estimated on the same basis as in paragraph 25, are as follows :—

	£
1 factory	9,372,100
2 factories	14,426,100
3 factories	20,834,100
4 factories	25,874,100

NOTE: If the project were to rest at the two factory stage, the capital expenditure of £14,426,100 would be increased by about £500,000 on plant included above for the third factory stage.

44. There would be a substantial decrease in operating costs per ton of briquettes as more factories were added, and it is estimated that, whereas for a project involving two factories the final production cost would be in the vicinity of 19s. per ton (paragraph 25), this figure would be improved with larger outputs, based on present-day wages conditions and prices as follows :—

	s.	d.	
1 factory	23	10	per ton
2 factories	19	0	,,
3 factories	17	9	,,
4 factories	16	11	,,

PART VII.—FINANCIAL CONSIDERATIONS.

45. The briquette industry, since its inception, has involved the Commission in an accumulated loss as at 30th June, 1946, of £438,900, details of which are given in Appendix No. 1. Necessarily, this loss has been borne by electricity consumers in general, but the Commission considers that, in view of the State's changed outlook, the time has arrived when the briquette industry should be financially independent of the electricity side of the Commission's business, especially as any further expansion of the industry is based on the fundamental need for a secure and reliable supply of fuel, from which the whole community, and not electricity consumers only, would benefit.

46. It is predicted that, under current competitive conditions, the output from two or more factories at Maryvale South could be sold without financial loss. There is no certainty, however, that the relative costs of brown coal and New South Wales black coal would always remain favourable to brown coal as at present. A situation might easily arise in which it would be impossible to dispose of the whole of the briquette output at a favourable price in a freely competitive fuel market. Yet, once the State were committed to a capital investment of the magnitude proposed, it would be essential to the State that the full production capacity of the plant should be utilized continuously. It follows, therefore, that manufacturers and industry in general could not regard briquettes as a standby fuel to be used only when imported fuels were more costly or in short supply.

47. Therefore, as a necessary corollary of a further entry into the solid fuel market, the Commission considers that its overall financial position should be safeguarded by the inclusion in the enabling legislation of the following measures, namely :—

(*a*) Provision for the State to require fuel consumers to use brown coal or brown coal briquettes produced by the Commission. Such a power was included in the *Leigh Creek Coal Act* 1942 enacted by the State Parliament of South Australia ; and

(*b*) Provision for the State to pay a subsidy from Consolidated Revenue to the Commission if it were necessary to sell below cost price as the result of competition from New South Wales black coal or other forms of competition.

48. The present borrowing limit of the Commission is £10,500,000, against which £6,000,000 has been raised. In order to finance planned electricity works up to 1961, and after allowing for the Commission's own resources, the borrowing limit would need to be raised by legislation to £25,000,000. The limit would need to be further raised to £40,000,000 to provide for the Maryvale South project.

49. During the war years, particularly, the Commission has been able to finance its capital works programme with only limited recourse to loan raisings, but such will not be the case in the immediate future.

50. The Commission's requirements of loan moneys necessarily will continue to be in competition before the Loan Council with all other Victorian public requirements, and the serious consequences of having large-scale construction activities delayed once they have commenced, particularly before they have to a substantial degree become revenue earning, need no comment.

PART VIII.—LEGISLATIVE REQUIREMENTS.

51. To carry into effect the Maryvale South project, described in this report, would require the sanction of Parliament in the form of an Act which, in addition, should clearly define the extent of the Commission's obligations for fuel supply and provide for the financial independence and economic stability of the industry. The Commission assumes that such an Act would also reflect the Government's policy as declared in the Cabinet Sub-Committee's Report of April, 1946, and, in particular, would include provisions for the following main items, namely :—

(*a*) the carrying out of the Maryvale South project, including the basis of land acquisition (see para. 52 below) ;

(*b*) the safeguarding of the Commission's overall financial position as discussed in paras. 45–50.

(*c*) the intentions of the Government regarding self-sufficiency in the State's fuel requirements, including, in addition to general industry and electricity generation, the undermentioned purposes :—

(i) the supply of briquettes and/or brown coal to the Victorian Railways and for the production of town's gas ;

(ii) the supply of briquettes for domestic purposes.

52. As regards the basis of land acquisition, the *State Electricity Commission Act* 1928, Section 15 (i) and (ii), provides that the Commission may compulsorily acquire land in the township of Morwell, or within a radius of 20 miles thereof and that the price of any such land shall not exceed its value on the 9th July, 1918, but with due regard to permanent improvements subsequently effected. This limitation on value was made as a check on land speculation and the inflation of land values in anticipation of the establishment of the Yallourn scheme and any extension thereof. It has fulfilled those purposes satisfactorily, and as the Commission is not proposing at this stage to acquire the whole of the lands covered by the provision, the view is held that the section should not be repealed. Nevertheless, it obviously would be unfair to revert to 1918 prices for present-day acquisitions ; accordingly the Commission suggests that in the enabling legislation for the Maryvale South project the date of valuation should be altered to the date at which land values were pegged by the Commonwealth, namely, 10th February, 1942.

PART IX.—BROWN COAL RESEARCH.

53. The Commission recognizes that the brown coal deposits offer wide opportunities for research, with the object of improving present methods of use and of producing chemical and synthetic materials. Already considerable work of this nature has been done by the Commission and will be continued. The Commission considers, however, that there is ample scope also for the active participation by the Council for Scientific and Industrial Research, and it would welcome the establishment by that body of a Fuel Research Station and a Fuel Research Advisory Board. It is understood that such a development is already under investigation by the Commonwealth.

54. As soon as the decision of the Commonwealth in this matter is known, the Commission intends to take appropriate steps to ensure that further research into both fundamental problems and practical applications will be vigorously pursued.

PART X.—USE OF RAW BROWN COAL IN RELATION TO ELECTRICITY GENERATION.

55. The Maryvale South project is concerned solely with the production of briquettes. The site is not considered to be suitable for power generation, a more favourable site than Maryvale South being required in respect of circulating water supply. Therefore, for power generation purposes, development will be at the present Yallourn Power Station and later at another site further down the Latrobe River.

PART XI.—SUMMARY OF COMMISSION PROPOSALS EGARDING INCREASED BRIQUETTE PRODUCTION.

56. To provide for a further increase in briquette production, the Commission submits the following proposals :—

(*a*) that appropriate legislation be enacted in terms of the Government's policy regarding fuel supplies and incorporating the matters discussed in paras. 51–52 ;

(*b*) that an open cut and two briquette factories having a combined capacity of 1,300,000 tons of briquettes per annum, together with ancilary services, be established at Maryvale South ; and

(*c*) that authority be given for a capital outlay of £14,500,000 within the next nine years on the Maryvale South project as defined in this Report.

PART XII.—APPRECIATION.

57. This Report rests on an investigation carried out by the Commission's Planning Committee, consisting of Messrs. E. Bate, M.C., B.Sc., Whit.Sch., A.M.I.E. Aust. (Chief Engineer and Chairman of the Committee), R. A. Hunt, D.S.O., B.C.E., A.M.I.E. Aust. (General Superintendent, Yallourn), R. J. McKay, B.E., A.C.S.E., A.M.I.C.E. (Lond.) (Engineer-in-Charge Coal Supply), and J. M. Bridge, B.E. (Consultant to the Commission on open cut development) ; also, in the early stages of the Committee's work, Mr. C. Boehm, Dip. Mech. Eng. (Engineer-in-Charge Briquette Production), whose place was taken later by Mr. A. Wilson, A.M.I.E. Aust. (Mechanical Engineer, Briquette Production). The Committee had the advice and co-operation of other departmental officers, including Mr. W. Thorn, M.E.E., A.M.I.E. Aust. ; also Mr. R. M. Watson, Dip. Com. (Fuel Sales Manager), on matters connected with briquette distribution and sales. The Commission wishes to acknowledge the services rendered by the Committee and other officers concerned who, although much engaged in day–to–day operational problems associated with their normal duties, have with great keenness and ability devoted themselves to a very thorough examination of the many engineering and economic aspects involved in a developmental project of this magnitude. The Commission desires, also, to record its appreciation of the assistance afforded by Mr. R. A. K. Palmer, M.Mech.E., B.E.E., Dip. Com., A.M.I.E. Aust., in the compilation of this Report.

58. The Commission considers that a report dealing with increased briquette production would be incomplete without a special reference to Dr. H. Herman, D.Sc., B.C.E., M.M.E., who was so closely identified with the establishment and early history of brown coal and briquette development in Victoria. As Engineer-in-Charge of Briquetting and Research from October, 1920, to August, 1940, Dr. Herman was the Commission's officer responsible for the design, construction and operation of the Yallourn factory, and it is due in no small measure to his enthusiasm that the briquette industry has been brought to its present stage of advancement. If the State now decides on a still larger expansion, it will, in fact, reflect the general view expressed in the Report of the Investigatory Committee on Yallourn Brown Coal for Essential Services, of July, 1941, over which Committee Dr. Herman presided.

We have the honour to be,

Sir,

Your obedient servants,

G. G. JOBBINS, Chairman.

ANDREW W. FAIRLEY, Commissioner.

W. D. CHAPMAN, Commissioner.

A. W. HENDERSON, Commissioner.

R. LIDDELOW, Manager.

W. J. PRICE, Secretary.

13th December, 1946.

Appendix No. 1.

State Electricity Commission of Victoria.

HISTORY OF THE BRIQUETTE INDUSTRY IN VICTORIA.

Date.	Item.
1919	Government agreed to expenditure of £30,000 for initial experimental briquetting machinery. (Nov.–Dec., 1919)
1920–21	Commission sent Dr. (then Mr.) H. Herman abroad to investigate briquetting processes and arrange plant purchases. Contracts let for briquetting plant (Aug., 1921): capacity 320 tons per day
1922	Additional plant ordered (Oct., 1922) to increase factory capacity to about 400 tons per day
1925	Briquette factory commenced commercial operation. (Feb., 1925.) Commission recommended that the factory capacity be increased to 1,100 tons per day, programme to extend over 3–4 years. (June, 1925)
1926	Royal Commission into Commission affairs recommended postponement (May, 1926), but Commission resubmitted proposals (Dec., 1926)
1927	To permit a production of 440 tons per day, Commission accepted tender for two additional presses; also, spares for third press. (Mar., 1927)
1928	Government approved acceptance of tenders for plant extensions under 1925 programme. (June, 1928)
1930–33	Depression years. Extensions approved in 1928 were completed in 1931
1934	Commission authorized installation of two additional presses. (Feb., 1934)
1935	Commission decided (June, 1935) to send Dr. Herman and two assistants abroad as a measure of preparedness for further expansion of production. Two additional presses installed and factory output raised to 1,200 tons per day
1936	Dr. H. Herman and Messrs. W. G. Smellie and A. Wilson abroad. (Oct., 1935–Oct., 1936)
1937–38	Commission reviewed proposals for major extensions. The Government (March, 1938) accepted the view that the duty of providing insurance to Victorian users of fuel, contemplated by the establishment of the State's briquetting industry, had been adequately discharged according to the necessities of the then existing conditions. No major extensions proceeded with, but the Commission authorized minor improvements to the existing factory
1939–40	Commission further reviewed demand for briquettes
1940	Commission sought and obtained approval (Dec., 1940) to increase factory capacity to 1,500 tons per day
	Government set up Investigatory Committee (Sept., 1940) into use of brown coal for essential services, and Committee presented first report (Dec., 1940), which was approved and adopted by the Government
1941	Committee's second report (July, 1941) recommended an additional three briquette factories of not less than 1,500 tons per day capacity each. Commission, without endorsing all the technical features of this report. recommended (Oct., 1941) that a long-term post-war plan be prepared and that field exploration be proceeded with for a new open cut and site for new briquette factories
1943	Government accepted the Commission's 1941 recommendation and declared its desire to minimize dependence of Victoria on imported fuel (Nov., 1943)
1944	Extensions approved in 1940, and installed under war conditions, commenced production (Oct., 1944)
1946	Cabinet Sub-Committee submitted Report on Brown Coal Development (April, 1946). Premier advised Commission (July, 1946) that Government intended each and all of the recommendations in Sub-Committee's Report should be implemented as circumstances from time to time permitted. Government desired that Commission include in its Report on the Morwell South project "an indication of what would be involved in the way of further coal winning and briquette production capacity, and associated measures, to enable Victoria to achieve complete independence from New South Wales black coal for general industrial use within, say, fifteen years, and thereafter to maintain that independence."

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APPENDIX No. 1.—*continued.*

HISTORY OF THE BRIQUETTE INDUSTRY

STATISTICS.

Financial Year.	Briquette Sales.			Financial.			
	Household.	Industrial (including Electricity Generation).	Total.	Revenue.	Expenditure.	Net Result, Profit or Loss.	Accumulated Loss at End of Financial Year.
	Tons.	Tons.	Tons.	£	£	£	£
1924–25 ..	28,037	7,336	35,373	47,734	83,991	L. 36,257	L. 36,257
1925–26 ..	63,161	18,839	82,000	129,354	169,686	L. 40,332	L. 76,589
1926–27 ..	59,630	29,651	89,281	185,187	218,536	L. 33,349	L. 109,938
1927–28 ..	70,458	53,745	124,203	197,427	229,277	L. 31,850	L. 141,788
1928–29 ..	78,561	76,192	154,753	227,849	253,553	L. 25,704	L. 167,492
1929–30 ..	58,276	107,238	165,514	265,850	269,764	L. 3,914	L. 171,406
1930–31 ..	63,386	153,337	216,723	299,665	320,701	L. 21,036	L. 192,442
1931–32 ..	83,555	196,969	280,524	394,514	408,267	L. 13,753	L. 206,195
1932–33 ..	82,855	219,629	302,484	360,940	379,782	L. 18,842	L. 225,037
1933–34 ..	86,069	242,589	328,658	367,889	383,337	L. 15,448	L. 240,485
1934–35 ..	98,540	213,948	312,488	333,727	344,995	L. 11,268	L. 251,753
1935–36 ..	94,105	242,382	336,487	420,056	430,237	L. 10,181	L. 261,934
1936–37 ..	103,562	270,473	374,035	426,581	433,052	L. 6,471	L. 268,405
1937–38 ..	101,581	299,066	400,647	488,258	486,757	P. 1,501	L. 266,904
1938–39 ..	104,963	311,128	416,091	474,756	481,993	L. 7,237	L. 274,141
1939–40 ..	77,253	348,597	425,850	487,193	486,942	P. 251	L. 273,890
1940–41 ..	39,385	398,683	438,068	466,298	462,889	P. 3,409	L. 270,481
1941–42 ..	12,905	389,257	402,162	446,992	472,781	L. 25,789	L. 296,270
1942–43 ..	12,127	395,301	407,428	474,109	484,690	L. 10,581	L. 306,851
1943–44 ..	11,090	416,847	427,937	485,989	546,859	L. 60,870	L. 367,721
1944–45 ..	11,336	431,244	442,580	528,000	575,187	L. 47,187	L. 414,908
1945–46 ..	11,596	479,845	491,441	654,461	678,455	L. 23,994	L. 438,902

Appendix No. 2.

FUEL STATISTICS, VICTORIA—1925–26 TO 1944–45.

Thousands of Tons.

Year.	Imports.	Production.			Total Fuel Expressed in Terms of N.S.W. Black Coal.	Fuel Used.												
						Generation of Electricity.					Town's Gas.	Railway Locomotives.		General Industrial and Domestic.				
	N.S.W. Black Coal.	Victorian Black Coal.	Raw Brown Coal.	Briquettes.		N.S.W. Black Coal.	Victorian Black Coal.	Raw Brown Coal.	Briquettes.	Coke.	N.S.W. Black Coal.	N.S.W. Black Coal.	Victorian Black Coal.	N.S.W. Black Coal.	Victorian Black Coal.	Raw Brown Coal.	Briquettes.	Coke.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1925–26 ..	1,246	562	511	82	1,925	56	183	451	..	..	421	215	257	554	122	60	82	250
1926–27 ..	1,167	638	744	90	1,976	38	163	694	..	..	441	206	281	482	194	50	90	260
1927–28 ..	1,182	672	999	125	2,111	42	233	965	..	..	449	178	282	513	157	34	125	250
1928–29 ..	862	681	1,172	155	1,863	54	231	1,131	..	2	428	180	284	200	166	14	155	238
1929–30 ..	615	704	1,168	165	1,644	57	229	1,125	..	3	390	104	284	64	191	43	165	217
1930–31 ..	755	637	968	217	1,714	20	223	958	17	6	344	66	304	325	110	10	200	159
1931–32 ..	707	502	1,275	281	1,674	7	190	1,275	28	5	309	85	271	306	41	..	253	149
1932–33 ..	883	478	1,356	303	1,866	54	114	1,356	41	7	299	156	190	374	174	..	262	130
1933–34 ..	891	440	1,439	329	1,881	72	117	1,439	53	7	307	149	190	363	133	..	276	126
1934–35 ..	1,062	418	1,007	313	1,912	165	142	1,007	35	7	326	138	199	433	77	..	278	137
1935–36 ..	1,025	452	1,585	336	2,066	75	132	1,585	62	11	349	169	188	432	132	..	274	145
1936–37 ..	1,279	343	1,684	375	2,279	110	86	1,684	78	15	365	243	128	561	129	..	297	135
1937–38 ..	1,335	283	1,993	402	2,372	107	81	1,993	79	14	382	257	130	589	72	..	323	135
1938–39 ..	1,253	336	2,096	416	2,382	115	76	2,096	81	15	453	250	129	435	131	..	335	150
1939–40 ..	1,142	317	2,315	426	2,316	111	74	2,315	67	14	409	238	103	384	140	..	359	128
1940–41 ..	1,543	297	2,820	438	2,834	121	85	2,820	64	17	454	252	117	716	95	..	374	165
1941–42 ..	1,558	319	3,129	402	2,918	119	88	3,096	85	23	519	320	103	600	128	33	317	192
1942–43 ..	1,650	297	3,384	408	3,060	147	76	3,344	93	26	566	378	85	559	136	40	315	207
1943–44 ..	1,564	272	3,303	428	2,948	161	63	3,262	118	30	596	328	68	479	141	41	310	213
1944–45 ..	1,679	272	3,574	443	3,142	167	57	3,527	134	31	569	330	71	613	144	47	309	199

Notes.—Raw brown coal does not include amount used for briquette manufacture, nor amount won from private mines.
Coke is obtained from N.S.W. black coal during manufacture of town's gas.

References.—S.E.C. Annual Reports, Victorian Government Statist, National Gas Association Annual Report, Victorian Railways, Victorian Year Book.

Appendix No. 3.

PRODUCTION STATISTICS.

Tons.

(Black coal figures derived from Commonwealth and State Year Books; raw coal figures from State Electricity Commission Annual Reports).

Year.	New South Wales Black Coal.	Victorian Black Coal.			Raw Brown Coal (Yallourn and Old Open Cuts Only).
		Wonthaggi.	Others.	Total.	
1925–26	11,141,000	500,000	62,600	562,600	864,200
1926–27	11,005,900	571,200	66,400	637,600	1,168,100
1927–28	10,287,200	605,800	65,500	671,300	1,479,700
1928–29	8,533,000	617,900	63,200	681,100	1,701,800
1929–30	7,355,400	636,000	67,600	703,600	1,810,700
1930–31	6,762,700	584,600	52,800	637,400	1,860,400
1931–32	6,608,300	445,500	56,300	501,800	2,563,100
1932–33	6,951,300	401,900	75,700	477,600	2,567,600
1933–34	7,495,800	356,900	83,100	440,000	2,692,600
1934–35	8,285,900	331,200	86,500	417,700	1,990,600
1935–36	8,949,000	374,600	77,000	451,600	2,988,400
1936–37	9,625,500	271,800	70,600	342,400	3,099,800
1937–38	9,811,200	220,500	62,100	282,600	3,597,000
1938–39	10,383,400	282,800	53,300	336,100	3,643,500
1939–40	10,373,000	263,400	52,900	316,300	3,944,500
1940–41	10,657,900	245,200	51,900	297,100	4,485,300
1941–42	12,001,000	273,400	46,200	319,600	4,735,300
1942–43	11,892,600	259,600	37,300	296,900	5,018,000
1943–44	11,315,500	234,900	37,500	272,400	4,916,200
1944–45	10,639,200	235,100	35,900	271,000	5,296,300

Note: The decline in black coal production is in marked contrast to the substantial increase in brown coal production.

Appendix No. 4.

POTENTIAL BRIQUETTE REQUIREMENTS—1945-46 TO 1970-71.

Showing also the Quantities of Raw Brown Coal and Victorian Black Coal likely to be Consumed.

Thousands of Tons.

Year.	Generation of Electricity.			Town's Gas.	Railway Locomotives.		Briquette Manufacture. Raw Brown Coal.		General Industrial Use.		Domestic.	Total Raw Brown Coal.		Total Briquettes.		Total Victorian Black Coal.	Total Fuel Requirements Expressed in Terms of N.S.W. Black Coal.
	Raw Brown Coal.	Briquettes.	Victorian Black Coal.	Briquettes.	Briquettes.	Victorian Black Coal.	Including Town's Gas and Railway Locomotives.	Excluding Town's Gas and Railway Locomotives.	Briquettes.	Victorian Black Coal.	Briquettes.	Including Town's Gas and Railway Locomotives.	Excluding Town's Gas and Railway Locomotives.	Including Town's Gas and Railway Locomotives.	Excluding Town's Gas and Railway Locomotives.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1945–46 ..	3,490	376	40	600	450	75	9,228	6,078	1,400	135	100	12,718	9,568	2,926	1,876	250	3,286
1946–47 ..	3,490	472	40	636	450	75	9,774	6,516	1,440	133	110	13,264	10,006	3,108	2,022	248	3,421
1947–48 ..	3,490	605	41	672	450	75	10,588	7,095	1,490	130	120	14,078	10,585	3,337	2,215	246	3,592
1948–49 ..	3,490	706	41	708	450	75	11,376	7,578	1,540	128	130	14,866	11,068	3,534	2,376	244	3,740
1949–50 ..	3,490	699	41	744	450	75	11,740	7,737	1,590	126	140	15,230	11,227	3,623	2,429	242	3,798
1950–51 ..	4,130	522	42	780	450	75	11,408	7,386	1,640	123	150	15,538	11,516	3,542	2,312	240	3,898
1951–52 ..	4,000	612	42	816	450	75	12,132	7,821	1,690	121	155	16,132	11,821	3,723	2,457	238	4,001
1952–53 ..	4,000	456	43	852	450	75	11,872	7,518	1,740	118	160	15,872	11,518	3,658	2,356	236	3,942
1953–54 ..	4,050	456	43	888	450	75	12,256	7,698	1,790	116	170	16,306	11,748	3,754	2,416	234	4,027
1954–55 ..	4,050	484	43	924	450	75	12,752	7,961	1,840	114	180	16,802	12,011	3,878	2,504	232	4,121
1955–56 ..	4,370	367	44	960	450	75	12,668	7,791	1,890	111	190	17,038	12,161	3,857	2,447	230	4,187
1956–57 ..	4,370	483	44	996	450	75	13,516	8,319	1,940	109	200	17,886	12,689	4,069	2,623	228	4,337
1957–58 ..	4,370	562	45	1,032	450	75	14,216	8,736	1,990	106	210	18,586	13,106	4,244	2,762	226	4,470
1958–59 ..	4,690	433	45	1,068	450	75	14,084	8,629	2,040	104	220	18,774	13,319	4,211	2,693	224	4,525
1959–60 ..	4,820	437	45	1,104	450	75	14,464	8,706	2,090	102	225	19,284	13,526	4,306	2,752	222	4,630
1960–61 ..	4,750	538	46	1,140	450	75	15,232	9,174	2,140	99	230	19,982	13,924	4,498	2,908	220	4,757
1961–62 ..	4,950	420	46	1,176	450	75	15,144	9,000	2,190	97	240	20,094	13,950	4,476	2,850	218	4,780
1962–63 ..	4,950	530	47	1,212	450	75	15,968	9,510	2,240	94	250	20,918	14,460	4,682	3,020	216	4,935
1963–64 ..	4,850	645	47	1,248	450	75	16,812	10,035	2,290	92	260	21,662	14,885	4,893	3,195	214	5,071
1964–65 ..	4,950	556	47	1,284	450	75	16,840	9,948	2,340	90	270	21,790	14,898	4,900	3,166	212	5,100
1965–66 ..	4,870	690	48	1,320	450	75	17,760	10,680	2,390	87	280	22,630	15,550	5,130	3,360	210	5,245
1966–67 ..	5,000	675	48	1,356	450	75	18,084	10,860	2,440	85	290	23,084	15,860	5,211	3,405	208	5,338
1967–68 ..	4,850	718	49	1,392	450	75	18,620	11,252	2,490	82	295	23,470	16,102	5,345	3,503	206	5,402
1968–69 ..	4,750	869	49	1,428	450	75	19,588	12,076	2,540	80	300	24,338	16,826	5,587	3,709	204	5,560
1969–70 ..	4,700	967	49	1,464	450	75	20,364	12,708	2,590	78	310	25,064	17,408	5,781	3,867	202	5,682
1970–71 ..	4,700	981	50	1,500	450	75	20,784	12,984	2,640	75	315	25,484	17,684	5,886	3,936	200	5,762

Notes.—Firewood has been omitted from this table.

Ratio of raw brown coal to briquettes for briquette manufacture is taken as 3 : 1 for Maryvale South, and 4 : 1 for other locations.

Appendix No. 5.

BROWN COAL DEPOSITS IN GIPPSLAND.

ANALYSES, TONNAGES, AND RATIO OF COAL TO OVERBURDEN TAKEN TO A MAXIMUM DEPTH OF 350 FEET BELOW GROUND SURFACE.

Item.	Yallourn.	Parishes.				
		Alberton West.	Loy Yang.	Maryvale North.	Maryvale South and Hazelwood.	Yinnar.
Acreage drilled	1,830	..	2,120	3,240	2,730	..
Acreage suitable for open cut	1,830	..	1,960	3,240	1,850	..
Number of holes drilled	206	2	59	81	72	4
Total footage drilled	54,165	376	23,833	28,124	29,398	1,014
Average feet of overburden*	42	28	51	55	50	112
Average feet of coal to 350 feet below surface	214	103	270	200	287	120
Tons of coal in millions	532	1,000+	720	885	720	..
Ratio of feet coal to feet overburden ..	5·0	3·6	5·3	3·7	5·7	..
Ratio of tons coal to cubic yards overburden	4·3	3·0	4·5	3·1	4·8	..
Moisture per cent. as bored†	66·28	65·83	62·03	67·51	60·89	60·07
Proximate Analysis of Coal Dried at 105°C.						
Volatiles (per cent.)	52·36	48·92	50·60	50·37	49·18	51·15
Fixed carbon (per cent.)	45·70	41·97	47·28	47·30	47·67	44·76
Ash (per cent.)	1·86	9·11	2·12	2·33	3·15	4·09
Calorific Value in B.T.U.'s per lb. of Coal Dried at 105°C.	11,126	10,592	11,550	11,119	11,511	10,746
Gross B.T.U.'s as bored†	3,752	3,619	4,364	3,612	4,502	4,291
Net B.T.U.'s as bored†	2,906	2,782	3,539	2,759	3,685	3,488
Comparison of net calorific values, Yallourn taken as 100	100·0	95·7	121·8	95·0	126·8	120·0
Tons raw coal per one ton briquettes ..	..	..	3·225	4·330	2·985	..

* In the case of Loy Yang, the figures given for overburden include the material above the first seam and the intrusions of earthy material between the seams.

† The moisture and gross and net calorific values for Yallourn coal are as mined.

The particulars given under the parish headings are those obtained in the present investigation, with the exception of Alberton West, in which the tonnage and ratio of coal to overburden is based on 94 bores drilled by the Department of Mines. These aggregated 15,990 feet and the coal dried at 105°C., 14·4 per cent. ash. In the case of Yallourn, the figures apply to the area south of the present face and Melbourne Swamp to the Gippsland railway and between the Herne's Oak township and the Morwell River.

By Authority: J. J. Gourley, Government Printer, Melbourne.

STATE ELECTRICITY COMMISSION OF VICTORIA.

FUEL REQUIREMENTS
(EXCLUDING FIREWOOD)
OF

STATE OF VICTORIA.

EXPRESSED IN TERMS OF 12,000 B.T.U./lb. BLACK COAL.

TOTAL FUEL REQUIREMENTS.
ONE UNIT EQUALS ONE MILLION TONS OF 12,000 B.T.U./lb. COAL.

N.S.W. BLACK COAL.
BRIQUETTES.
ONE UNIT EQUALS ONE MILLION TONS.

COAL REQUIRED FOR INDUSTRIAL COMMERCIAL & DOMESTIC PURPOSES.

COAL REQUIRED FOR GENERATION OF ELECTRICITY.

COAL REQUIRED FOR PRODUCTION OF TOWN GAS.

COAL REQUIRED FOR V.R. LOCOMOTIVES

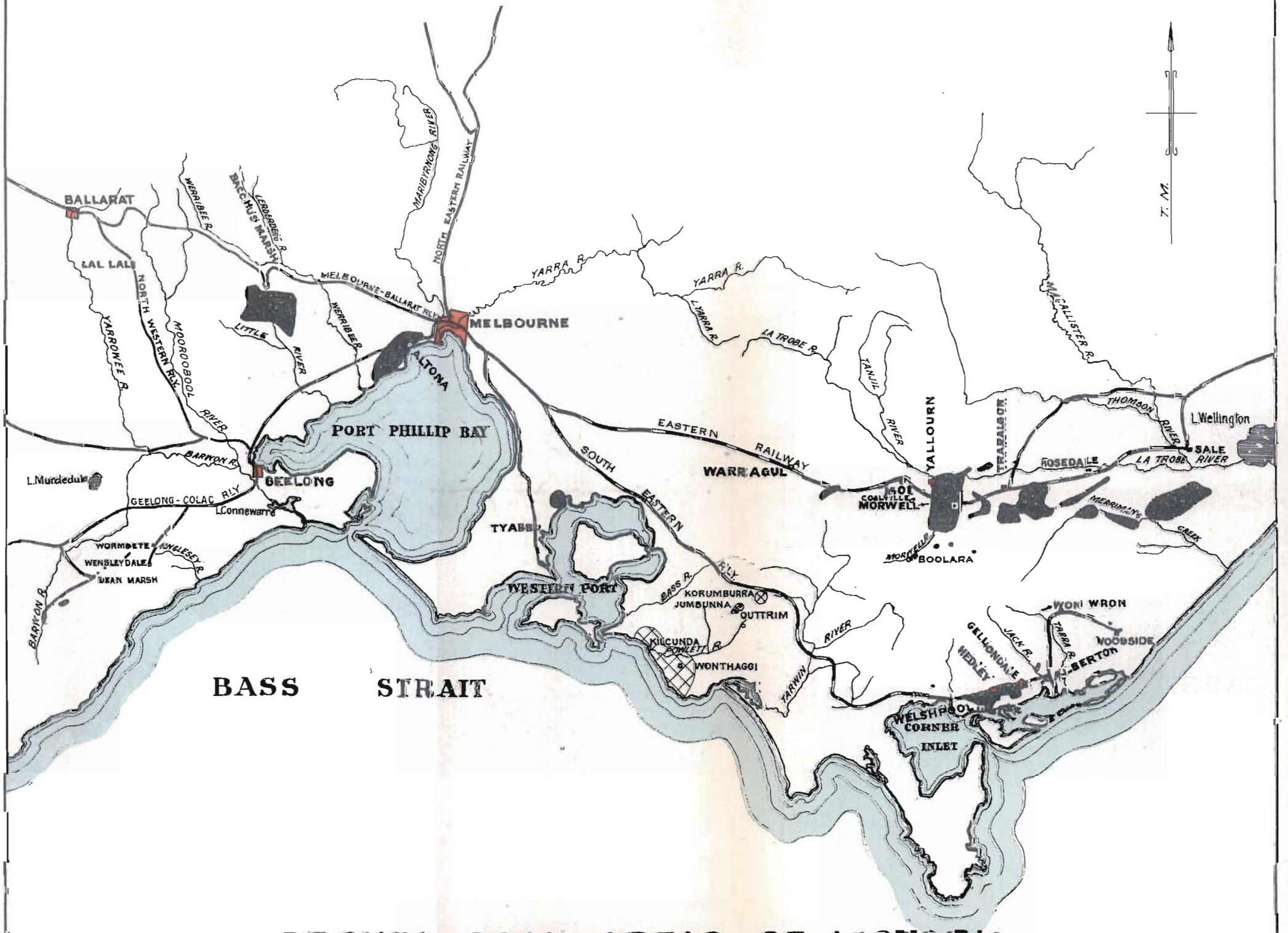
0 1 2 3 4 5 6

0 1 2 3 4 5 6 7 8

1925/26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71

PLATE No. 1

STATE ELECTRICITY COMMISSION OF VICTORIA



BROWN COAL AREAS OF VICTORIA

COAL DEPOSITS SHOWN THUS

BROWN COAL BLACK COAL

SCALE OF MILES

8 4 0 8 16 24 32 40

SCALE 16 MILES TO 1 INCH

PLATE Nº 2

STATE ELECTRICITY COMMISSION OF VICTORIA

MARYVALE SOUTH PROJECT

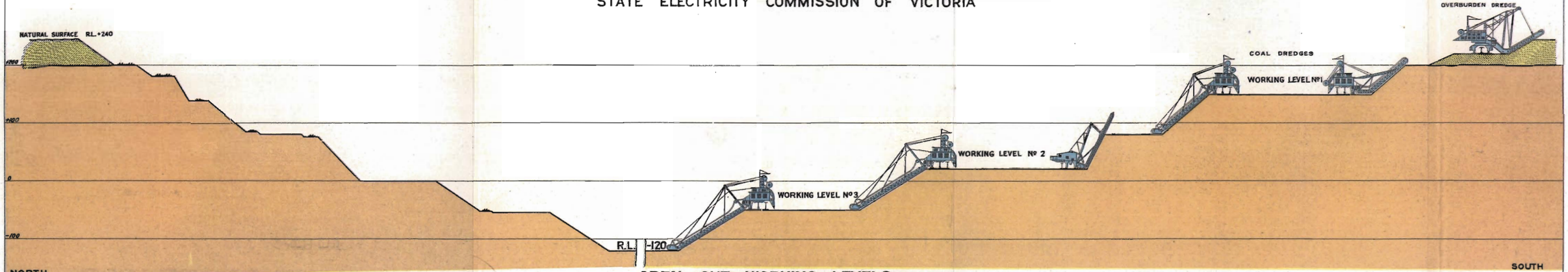
PLAN SHOWING POSITION OF OPEN CUT AND BRIQUETTE FACTORY

SCALE OF FEET (APPROXIMATE)

FEET 1000 0 500 1000 2000 3000

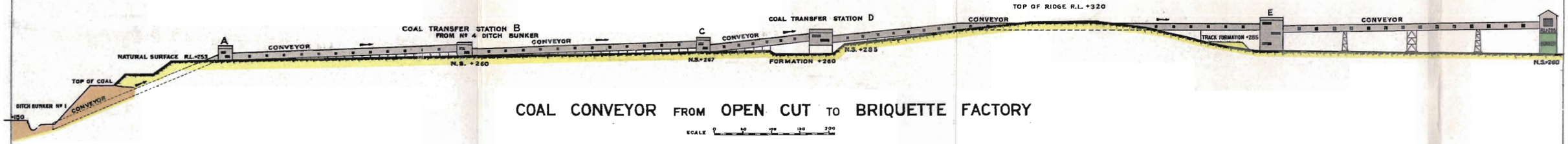
PLATE Nº 3

STATE ELECTRICITY COMMISSION OF VICTORIA



OPEN CUT WORKING LEVELS

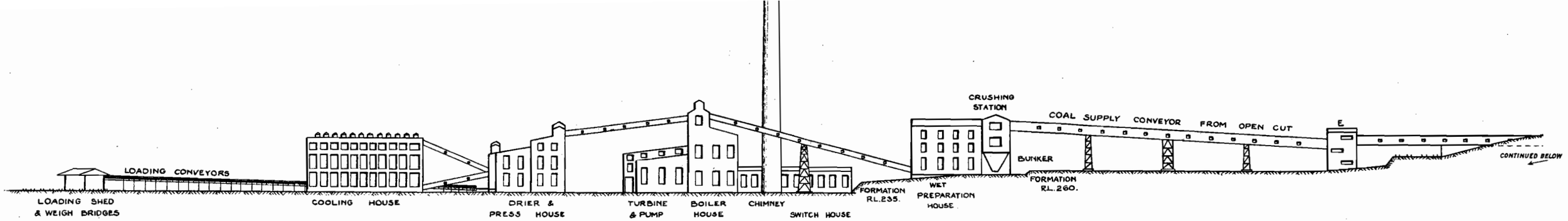
SCALE 0 50 100 150 200

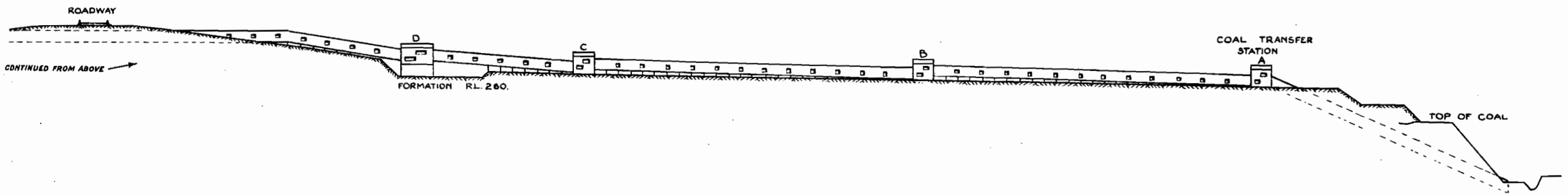


COAL CONVEYOR FROM OPEN CUT TO BRIQUETTE FACTORY

SCALE 0 50 100 150 200

PLATE Nº 4





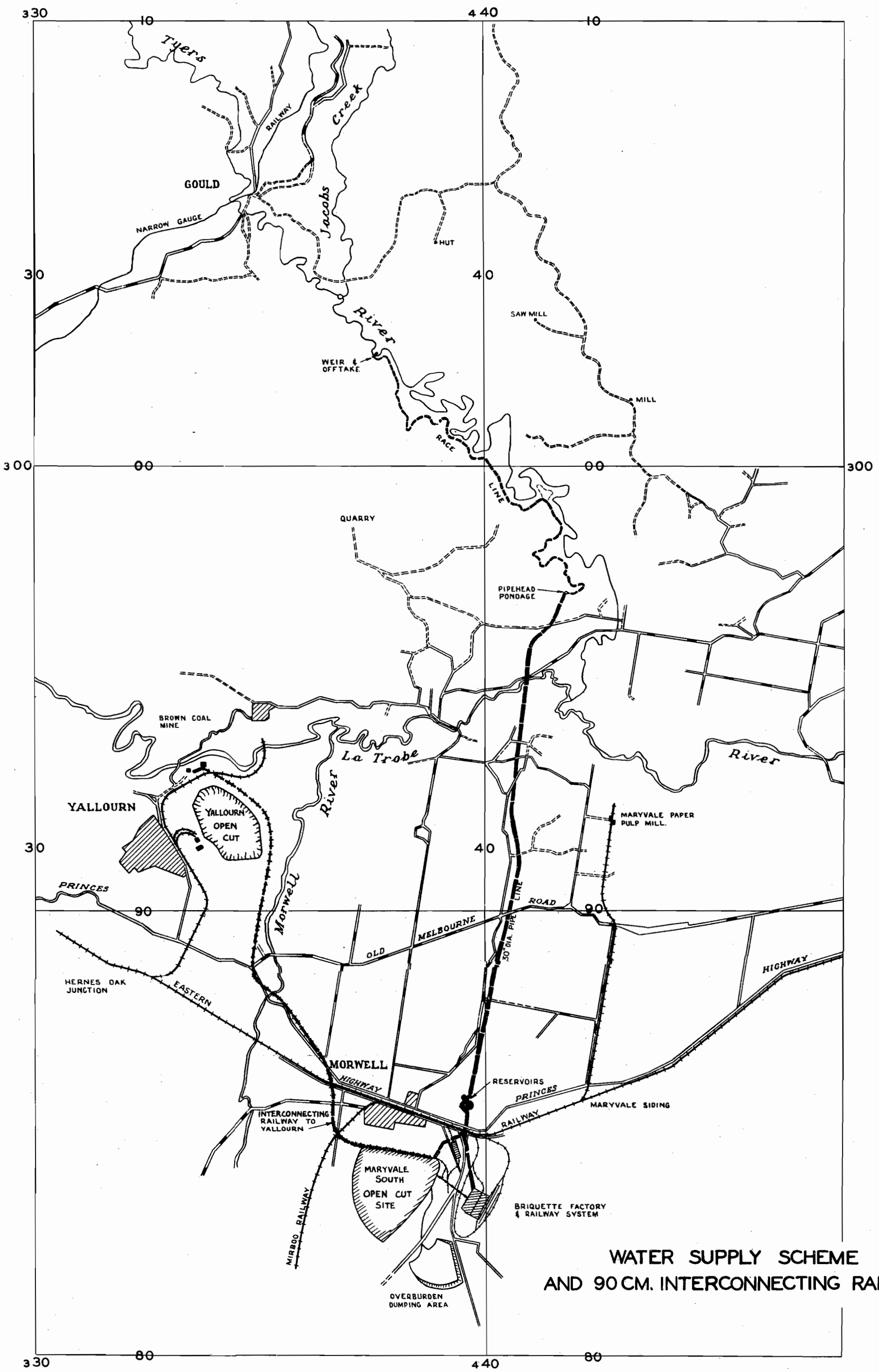
SCALE 100 50 0 100 200 300 400 FEET.

MARYVALE SOUTH PROJECT

PROPOSED BRIQUETTE FACTORY

TYPICAL CROSS SECTION

PLATE Nº 5



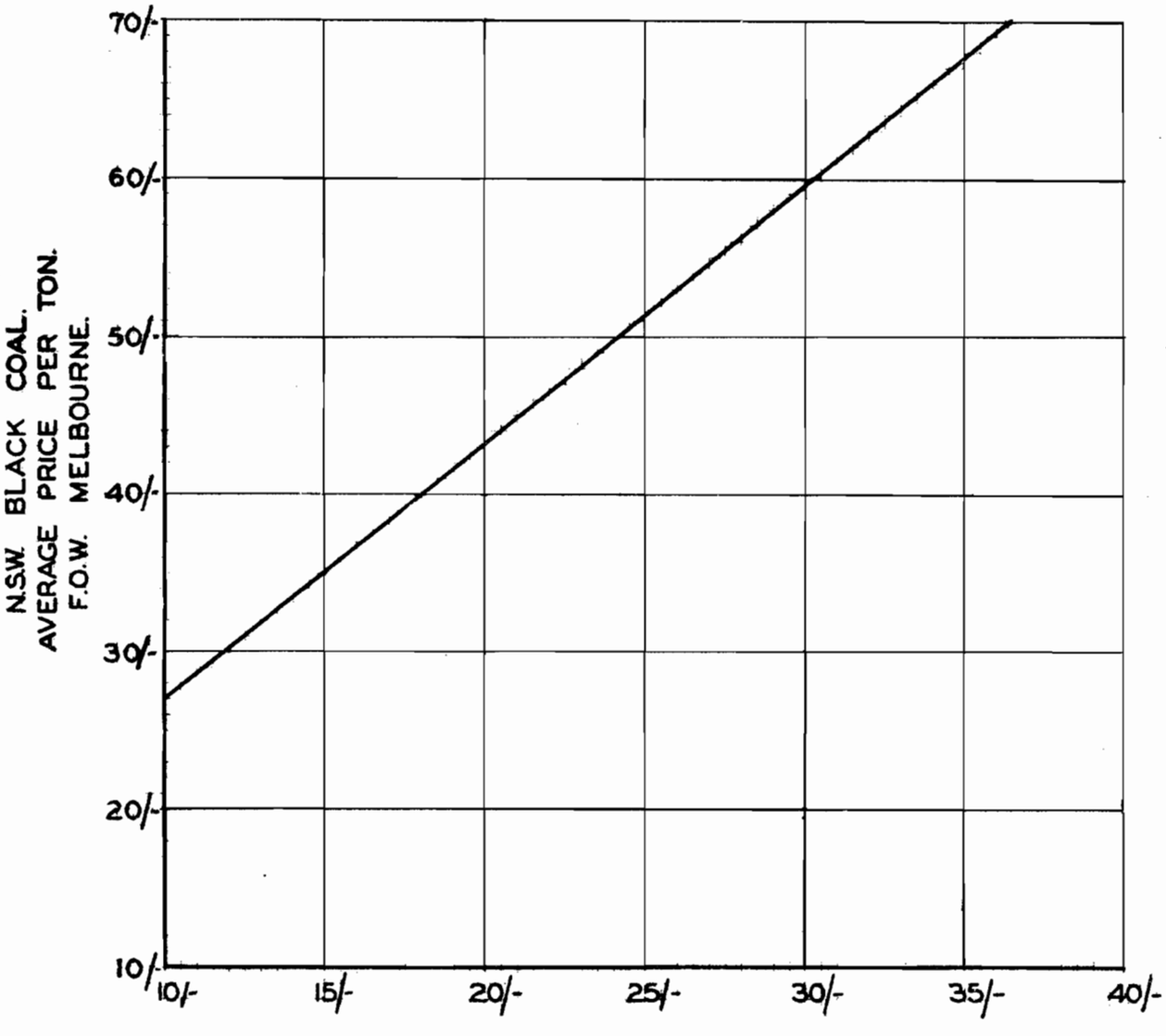
WATER SUPPLY SCHEME AND 90 CM. INTERCONNECTING RAILWAY.

NOTE-
THIS MAP COMPILED FROM MILITARY MAP OF MOE Nº 861, ZONE 7.

LEGEND	
90 CM. INTERCONNECTING RAILWAY	
WATER SUPPLY PIPE LINE	
" " RACE LINE	

PLATE Nº 6

STATE ELECTRICITY COMMISSION OF VICTORIA

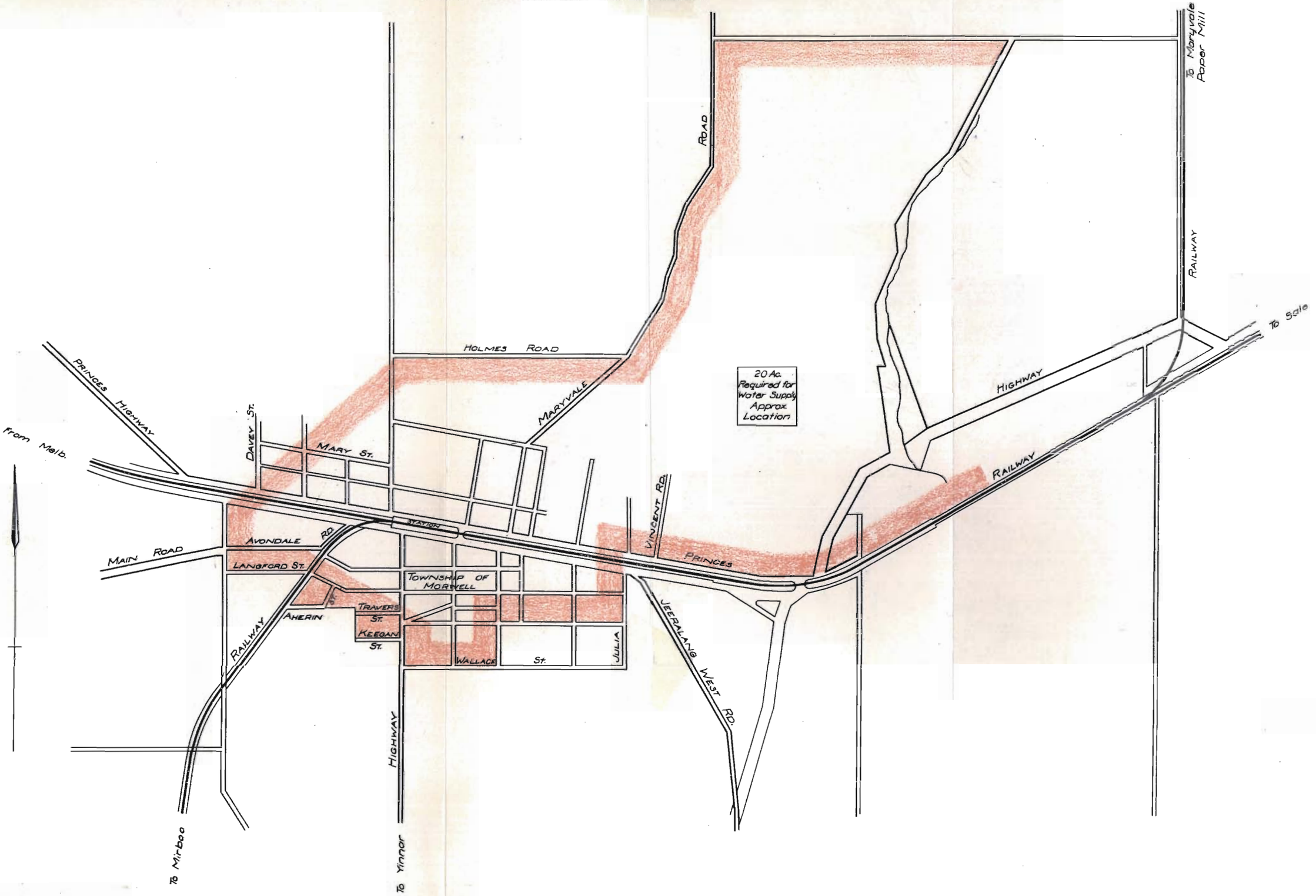


(EXAMPLE: IF N.S.W. BLACK COAL WERE 42/6 PER TON F.O.W. MELBOURNE THEN BRIQUETTES WOULD HAVE TO BE 19/6 PER TON F.O.R. MARYVALE SOUTH IN ORDER THAT THEY MIGHT BE EQUAL IN COST ON A HEAT BASIS IN THE METROPOLITAN AREA.)

N.S.W. BLACK COAL & BROWN COAL BRIQUETTES.
HEAT PARITY PRICES.
METROPOLITAN INDUSTRIAL MARKET.

PLATE Nº 7

STATE ELECTRICITY COMMISSION OF VICTORIA



TOWN OF MORWELL
AREA WHICH WILL NOT BE AFFECTED
BY BROWN COAL DEVELOPMENTS

PLATE Nº 8

SCALE 1 INCH – 20 CHAINS