

1987/65. Gravel on King Island.

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Abstract

The gravel (beach shingle) deposits on the west coast of King Island have been extensively worked as a source of aggregate for concrete making and for road metal. Past usage has been, in places, wasteful and inefficient. The deposits are described and suggestions made to maximise the efficiency of current and future operations.

INTRODUCTION

Following a request from the King Island Council for a follow-up report from the 1980 interim report on gravel on the island, a visit was made and all available information collated. A summary map was compiled to provide the council with information so that the supervision and issuing of gravel leases could be more easily made.

PREVIOUS WORK

A survey of the gravel deposits on the west coast of King Island was made by V. M. Threader in 1980, in which some forty-seven backhoe pits were dug. The locations, and the results obtained, are shown in Figure 1. The coast was examined and mapped by Jennings (1959) as part of a geomorphological study.

The beach shingle on the west coast of the island occurs as a flat terrace a few metres above the current high water mark. Jennings (1959) records a mid-Recent (5000 years ago) sea level horizon 3.3 m above the present, which would have produced this old terrace.

The gravels overlie an irregular rock basement, and on the seaward side the rock is reached often after only digging for about one metre. On the landward side the gravel (shingle) is underlain by clay, which is in turn underlain by bedrock. Recent sand dunes frequently cover the margins of the gravel and these dunes are often quite wet. In some areas the deposits near dunes could not be mined at any time of year due to the very boggy nature of the ground.

OWNERSHIP OF GRAVEL

Land charts of King Island show a Crown Reservation along most of the coastline of the west coast. This reservation extends from high water mark to designated survey points inland. The strip of reservation is approximately 30 m wide along most of the coastline, although the actual width varies by a few metres on some properties.

The land surrounding the Currie Lighthouse does not have the Crown Reservation adjacent to the foreshore. The whole of the piece of land around the lighthouse, down to the high water mark, is designated a Lighthouse Reserve and is administered by the Commonwealth. There is virtually no gravel in this area in any case.

Titles to the properties adjoining the waterfront from Clemons Road to Nashs Point (in the Manuka Creek - Three Rivers Creek area) were searched. Copies of the Title Descriptions are given in Appendix 2. The Crown Reservation can be clearly seen extending from high water mark to approximately 30 m inland, all the way along this coast.

All the usable gravel deposits on the west coast of King Island are situated well within the narrow coastal reservation, and so the gravel belongs to the Crown.

Should the need arise to ascertain the exact size of the Crown Reservation for any particular property, the relevant details can be found on the Title Description of the property, available from the Titles Office of the Lands, Parks and Wildlife Department.

DESCRIPTION OF THE GRAVEL DEPOSITS

Dripping Wells to Etterick Rock

North of and adjacent to 'old mine workings' at Dripping Wells is a small patch of gravel, mixed with soil, perhaps 50 m long and 10 m wide. This gravel extends inland under the dunes, and is a remnant of a former sea terrace. This terrace can be traced northwards, virtually all the way to Etterick Rock. In several places the terrace has been eroded, and in several areas old workings are evident. The gravel is quite coarse, pebbles 200 mm to 300 mm long being very common.

A number of pits were dug south of Etterick Rock in 1980. Some of these pits were dug in old workings, where most of the gravel has been removed. The pits show that the gravel in this area is 1.0-1.5 m thick and very coarse. Quantities are limited, as the area of potential excavation (along the old sea terrace) is very small. The gravel does appear to extend under the dunes, but the extension is likely to cover a limited area. Disturbance of the dunes for a small gain of gravel would be both economically and environmentally impractical.

Reserves: 15-20 000 m³ in the Etterick Rock area
10 000 m³ Dripping Wells.

Netherby Point to Burgess Bay

Very small quantities of gravel can be seen on and around Netherby Point. Most of the available gravel in this area has been removed, with only thin, isolated patches remaining. Grassed-over hillocks of gravel occur in a fenced paddock opposite Netherby Point. The gravel appears to be two metres deep in parts, and has been tested by one pit but the quantity available is very small.

North of Netherby Point, towards the golf course, a wide, flat, grassed platform flanks both sides of the road. On the landward side of the road the old gravel terrace is around 20 m wide, and is partly covered by dunes further back in the paddock. Some excavation has been done on the seaward side of the road. Further excavation here would involve repositioning of the road and could cause problems with foreshore receding, leading to loss

of productive land. The small amount of gravel here is, in practical terms, unavailable for extraction. Similarly, a shingle bank two metres high, on the southern margin of the golf course has been partly extracted, but due to the proximity of the golf course no more can be taken. Very small pockets of shingle occur along the coastline from Netherby Point to the Currie Light. Opposite the golf course a small flat area occurs, where in 1980 Pits 4, 5, and 6 were dug. These show that the shingle here is <0.5 m thick. Bedrock can be seen cropping out on this flat, so that shingle evidently occupies small 'pockets' between outcrops of bedrock.

Burgess Bay - Currie Harbour

The flat shingle terrace continues north from Burgess Bay to a point 250 m south of the Currie Light, where in 1980 Pits 1 and 2 were dug. The gravel here is very thin (<0.5 m), evidently lying in pockets or hollows in the bedrock.

A bank of gravel 1.5 m high can be seen on the foreshore just below Currie Light, close to where a new breakwater is to be built. The bank is very steep, only small, and the gravel is too steep to cut into further.

Reserves: Area between Netherby Point and Currie harbour extensively worked. Around 5-10 000 m³ remaining.

Devils Rock

Opposite Devils Rock, on the northern side of Currie Harbour, a small shingle beach occurs, with a shingle bank behind the beach and in front of some steep dunes. The quantity of shingle here would be very small.

Peerless Point - Johnson Rock

At Peerless Point a flat shingle terrace (former sea level terrace) continues along the coast northwards. Old workings are evident. The gravel is around 1.5 m thick. Holes 19 and 20 were dug north of Peerless Point.

The Dirty Beach area is reached from Racecourse Road. A terrace extends all the way around the bay from 0.3 km south of Racecourse Road to within 100 m of Johnson Rock. A number of holes were drilled in this area in 1980. The area would appear to be largely worked out, with the remaining gravel being less than one metre thick.

Reserves: around 2500 m³.

Nashs Point - Clemons Road

A thin gravel terrace extends northwards from Nashs Point. The terrace is not wide, and test holes show the gravel to be very thin, around 0.3 m thick. Close to Three Rivers Creek the gravels are much thicker (over 1.7 m) and are more extensive. Old workings are present. From Three Rivers Creek to Manuka Creek the gravel terrace is virtually continuous. Holes dug in 1980 show the gravel to be over one metre thick. This would be the

best area in which to locate a pit or pits for use by the various gravel consumers. The road may, in part, have to be realigned. Some old workings are visible near Manuka Creek.

Between Manuka Creek and the nearby (unnamed) point, the gravel is very thin, being only 300 mm thick in Hole 46. The thin gravel extends towards Clemons Road, with 0.5 m of gravel being recorded in Hole 47.

Reserves:

Nashs Point 2500 m³

South side of Three Rivers Creek - south side Seaview Point 20 000 m³.

Clemons Road - Seaview Point

A grassy gravel terrace extends north from Clemons Road. The gravel evidently extends under dunes on the landward side of the terrace, as seen in a newly opened pit just north of Clemons Road. Great care must be taken if any gravel is extracted from under these or any other dunes to prevent erosion and dune blowout. Disturbed areas must be properly revegetated after use to stabilise any potential movement of sand. The newly opened small pit shows pebbles of a wide size range (10 - 200 mm diameter) in a sandy matrix bedded with grit and coarse sand. Occasional pebbles of 500 mm diameter occur.

Seaview Point - Whalebone Beach

Old workings can be seen on Seaview Point. The gravel terrace continues around Seaview Point northwards to Whalebone Beach. Intermittent old workings can be seen on the south side of Whalebone Beach. North from the beach, the gravel terrace continues over and around the headland to Little Porky Beach. Whilst the area of gravel here is large, the deposit is also very thin and so the quantity available is very small.

Reserves: Clemons Road - Whalebone Beach; around 10 000 m³.

RESERVES

As no additional information has become available since the pits were dug in 1980, the estimates made by V. M. Threader cannot be improved upon and are listed below:

Locality	Reserves ('000 m ³)		Remarks
	Worked	Remaining	
Dripping Wells	10	10	Some areas worked out.
Etterick Rock	5	15-20	A significant reserve. In part swampy.
Netherby Point to Currie Harbour	50-100	5-10	Extensively worked, small patches of gravel remaining. NOT RECOMMENDED.
Johnson Rock to Three Rivers Creek	20	5	Two areas, one south of Johnson Rock and one south of Three Rivers Creek (Nashs Point) which have been worked.
South side of Three Rivers Creek to Seaview Point	20	20	A significant reserve landward of old workings, 11 test holes dug. RECOMMENDED gravel leases to be confined to the area between Manuka and Three Rivers Creek.
Seaview Point to Whalebone Beach	15	10	A significant reserve is estimated to lie landward of the worked areas.
Little Porky Beach - Porky Beach		3	Narrow coastal strip.
Unlucky Bay - Pass River Bay		5	Shingle and coarse sand.
1 km north of Pass River Bay	2-3	2-3	Partly worked (probably by kelp harvesters).
Pass River Bay - Bungalee Creek	?	?	Coarse sand and grit used for cement making.
Bungalee Creek - Eel Creek	5	10	Several small deposits.
Whistler Point		2	Shingle, coarse sand.

CURRENT USES AND PRODUCTION

The current consumption of gravel on King Island is around 6000 cubic metres per year. The users are (K. Graves, pers. comm.):

User	Approximate amount used (m ³ /year)	Use	Size fraction
Graeme Bros.	<760	Cement bricks, posts etc.	small
D. Helbig	760	Crushed aggregate	large
Kelp Harvesters	1500	Road making and filling potholes	small size would suffice
Coates & Addison	760	Cementing	small
Ratepayers	760	Various	small size would suffice
	<u>4540</u> m ³		

Consumption of gravel has not significantly increased since 1980, as the interim report by V. M. Threader notes an approximate monthly production of 450 m³ or 5000+ m³ per annum from all sources, excluding the Graeme Brothers cementing operations.

CONCLUSIONS

To maximise the utilisation of the gravel resource, gravel must be extracted in an orderly and methodical fashion, and all the fractions of gravel used. Past workings are untidy and scattered throughout the gravel reserves, and this type of 'picking' pockets of gravel is both wasteful of the resource and inefficient in the use of men and machinery. Whilst the amount of gravel may appear to be large, the reserves are the major source of aggregate and concrete-making material on King Island, and so should not be frittered away needlessly.

For the most efficient use of the resource, the Council should consider:

1. Allowing mining in only one or two areas, and prevent 'piecemeal' removal of gravel.
2. Issuing licences for a specific size of gravel, relevant to the user's needs. Gravel outside the specified size range must not be taken. If necessary, impose conditions in the licence such as the need to leave the unwanted fraction of gravel untouched for a period of time, two weeks or so, to enable the gravel to be collected by other users. Specifically, users of the small size fraction must leave the large size fraction for use in the making of crushed aggregate. All users other than D. Helbig can satisfy their needs with the small size (<50 mm) fraction, and the taking of large-sized gravel where the smaller fraction would suffice must be discouraged. As an illustration of this point, various dirt tracks used for kelp harvesting purposes have been repaired or even made with large sized shingle. This rock could have been more sensibly used to manufacture crushed aggregate.
3. The best deposits of gravel occur in the Three Rivers Creek - Manuka Creek area. The Council could either allocate sections of this area to the users of gravel and allow several small pits to operate, or

encourage all the users to use one larger, Council-supervised pit. The logistics of the second option would be far more difficult to arrange than letting individuals work their own, small area, so the first solution is, in practical terms, probably the best. Confining mining activity to one small area will encourage maximum use of the reserves and hopefully discourage wasteful practices.

- 4. Mined out areas should be properly rehabilitated before they are closed to mining.

REFERENCES

JENNINGS, J. N. 1959. The coastal geomorphology of King Island, Bass Strait, in relation to changes in the relative level of the land and sea. *Rec. Qn Vic. Mus.* NS 11.

APPENDIX 1

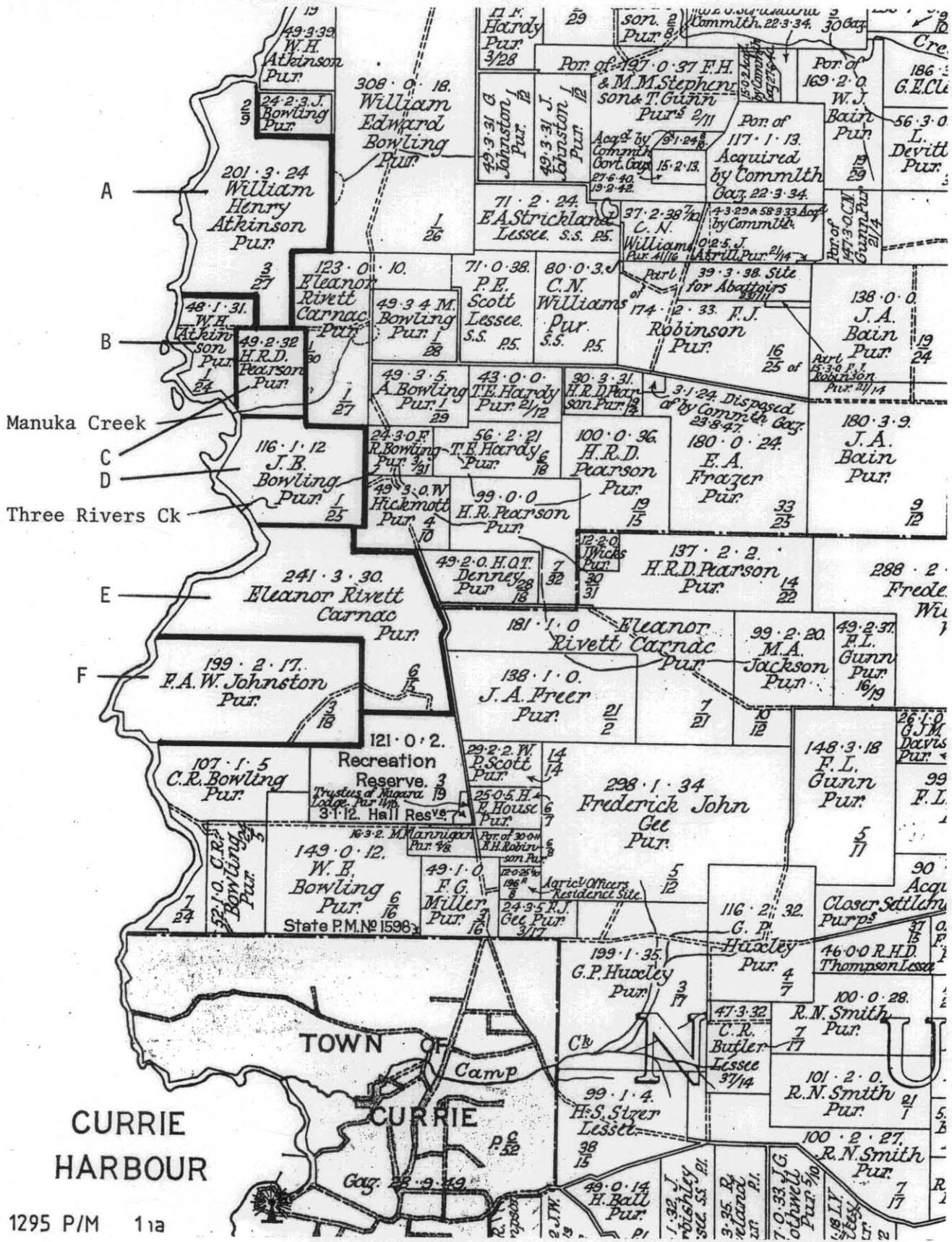
King Island beach shingle test pits (1980)

Test hole	Depth (m)	Log	Comment
1	0.5	Mixed gravel and sand	Rock bottom
2	0.1	Gravel	Rock bottom
3	2.0	Gravel	Gravel bottom, water at 1000, too wet to continue.
4	0.1	Sandy gravel	Rock bottom
5	0.3	Soil with scattered pebbles	Clay bottom (old workings)
	0.6	Sand	
	0.3	Clay	
6	0.3	Sandy soil	Rock bottom
7	0.3	Sandy soil	
	0.3	Sandy gravel	
	0.9	Yellow sand	Sandy bottom
8,9,10	0.3	Granitic gravel	Sandy bottom
	0.9	Yellow sand	
11	1.0	Gravel mixed angular and rounded pebbles	Old working
12	1.0	Coarse angular gravel with black soil matrix	Yellow clay bottom
13	0.45	Black soil with scattered cobbles	Yellow sand bottom
14	0.1	Gravel	Mined out, Yellow sand bottom
15	0.25	Gravel	Sandy bottom Mined out
16	0.8	Gravel and black sandy soil	Workings on seaward side of hole
17	0.8	Gravel and soil - an unworked area	Clay bottom
18	0.3	Gravel - unworkable	Clay bottom, old workings nearby
19	0.8	Fine gravel and shell (50:50)	
20	1.4	Gravel and shell (75:35)	Poor access. Gravel bottom. Wet.
21	0.5	Gravel	Sand bottom
22	0.5	Gravel	Sand bottom. 1.5 m gravel worked on seaward side of test hole
23	1.4	Gravel	Gravel bottom, too wet to continue, water coming from all sides
24	1.5	Coarse gravel (up to 250 mm)	

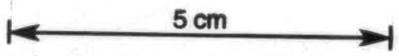
	0.5	Fine gravel and shelly sand	
	0.8	Same but soft, wet and caving	Gravel bottom
25		Same above - not bottomed	
26	1.0	Soil - water saturated	
	1.0	Coarse gravel	Rock bottom
	0.3	Gravel with sandy matrix	
27	1.0	Sand	Lignitic
	1.7	Gravel	Clay bottom
28	0.5	Sand	
	1.5+	Gravel mostly (-200 mm)	Very wet, hole caving. Gravel bottom
29	1.8	Sandy shelly gravel	Dug in floor of old workings water level 1000 mm on completion of hole.
30	1.8	Fine gravel (50-100 mm)	Dug in floor of old workings. Clay bottom.
31	0.3	Fine gravel	Dug in old workings, 1 m deep. Rock bottom.
32	1.8	Gravel and black sandy soil	
	0.3	Light grey sand	
	0.3	Black clayey sand	
33	0.3	Soil	
	0.3	Coarse gravel	
	0.5	Yellow sand	
34	1.0	Gravel and black soil (up to 400 mm pebbles)	Yellow sand bottom
35	0.3	Gravel	Clay bottom
36	0.8	Coarse gravel	Clay bottom
37	0.3	Gravel	Sand
38	1.8	Coarse sand and fine gravel	Dug in old workings, 1500 mm deep
39	2.5	Fine and coarse gravel	Dug in bank 2.5 m above old workings - gravel bottom - hole caving.
40	1.0	Gravel	
	0.3	Micaceous clay	Clay bottom
41	1.0	Gravel	
	0.3	Micaceous clay	Dug in old workings Clay bottom
42	1.8	Gravel and sand (50:50) (ironstained)	Gravel bottom hole caving
43	0.5	Hard soil and clay	
44	1.0	Gravel (up to 300 mm but mostly 150 mm)	Clayey gravel bottom
45	1.3	Gravel (100-150 mm)	Clay bottom
46	0.3	Gravel	Clay bottom
47	0.5	Gravel	Clay bottom
	0.3	Sandy limestone (?)	
	0.5	Clayey soil	

APPENDIX 2

Descriptions of land titles in the Three Rivers Creek - Manuka Creek area showing the Crown Reserve along the foreshore.



1295 P/M 1a



COUNTY OF
KING ISLAND
PARISH OF TAROONA

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11/17

Scale 8 chains to an inch

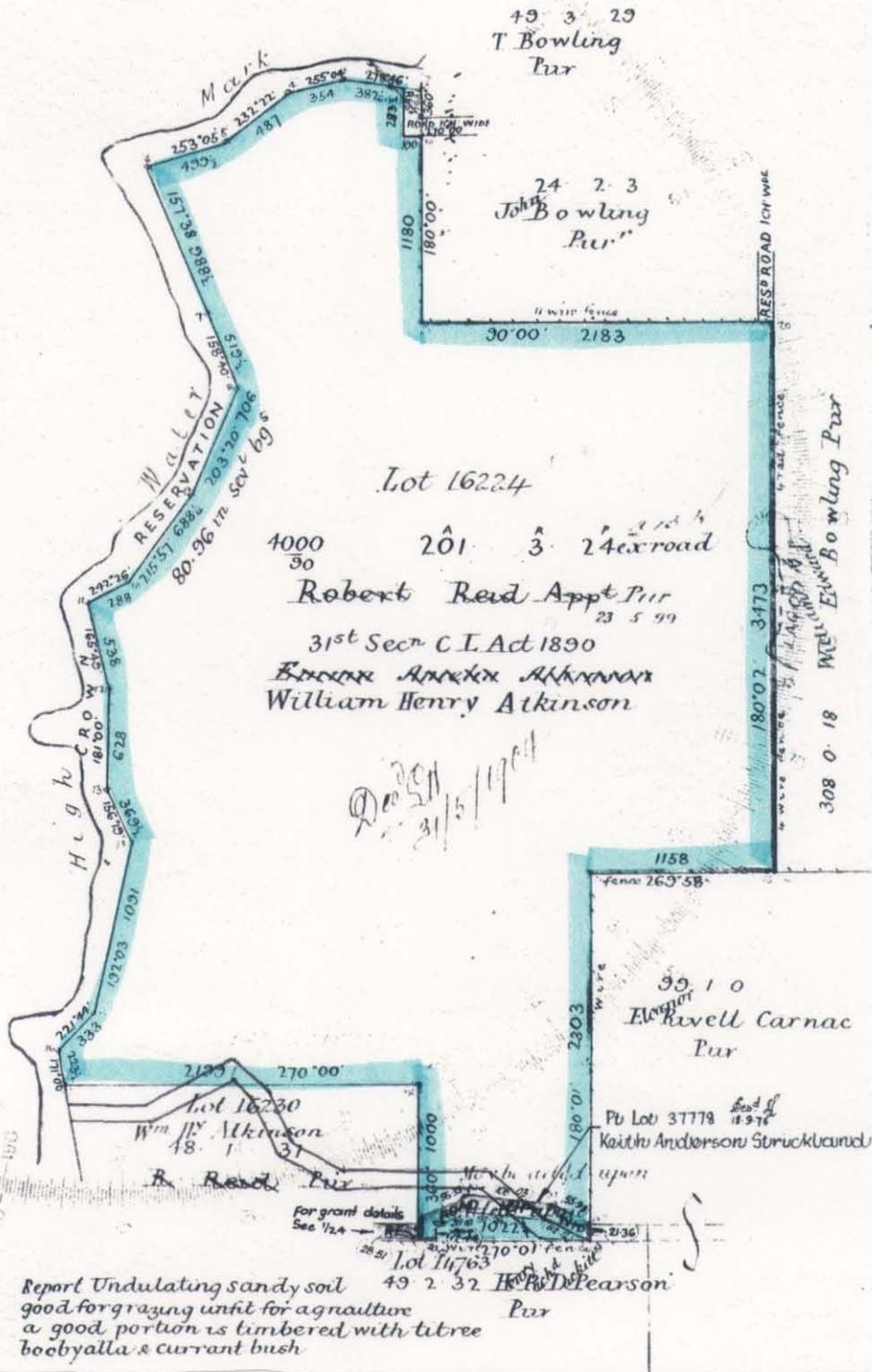
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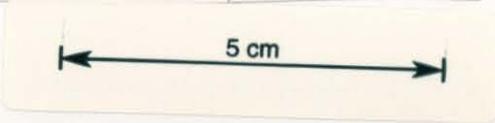
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SOUTHERN OCEAN



v. E. P. 24.4.99
25.4.99

Q. 201
31/5/1901



~~COUNTY~~ OF KING ISLAND

PARISH OF TAROONA

Scale Five chains to an inch.

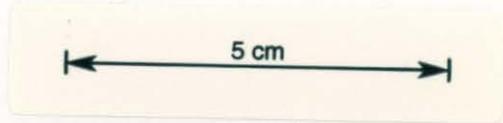
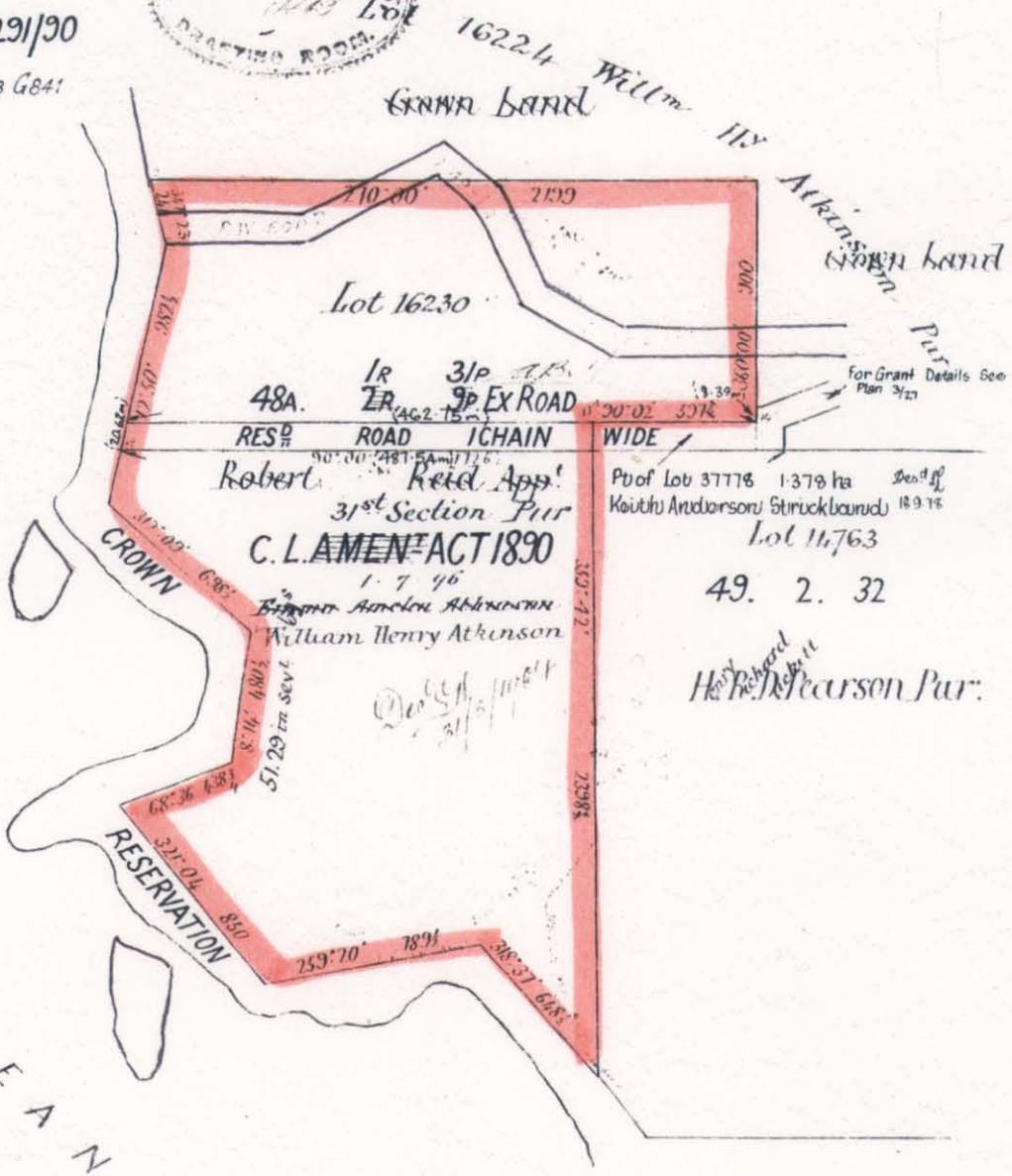
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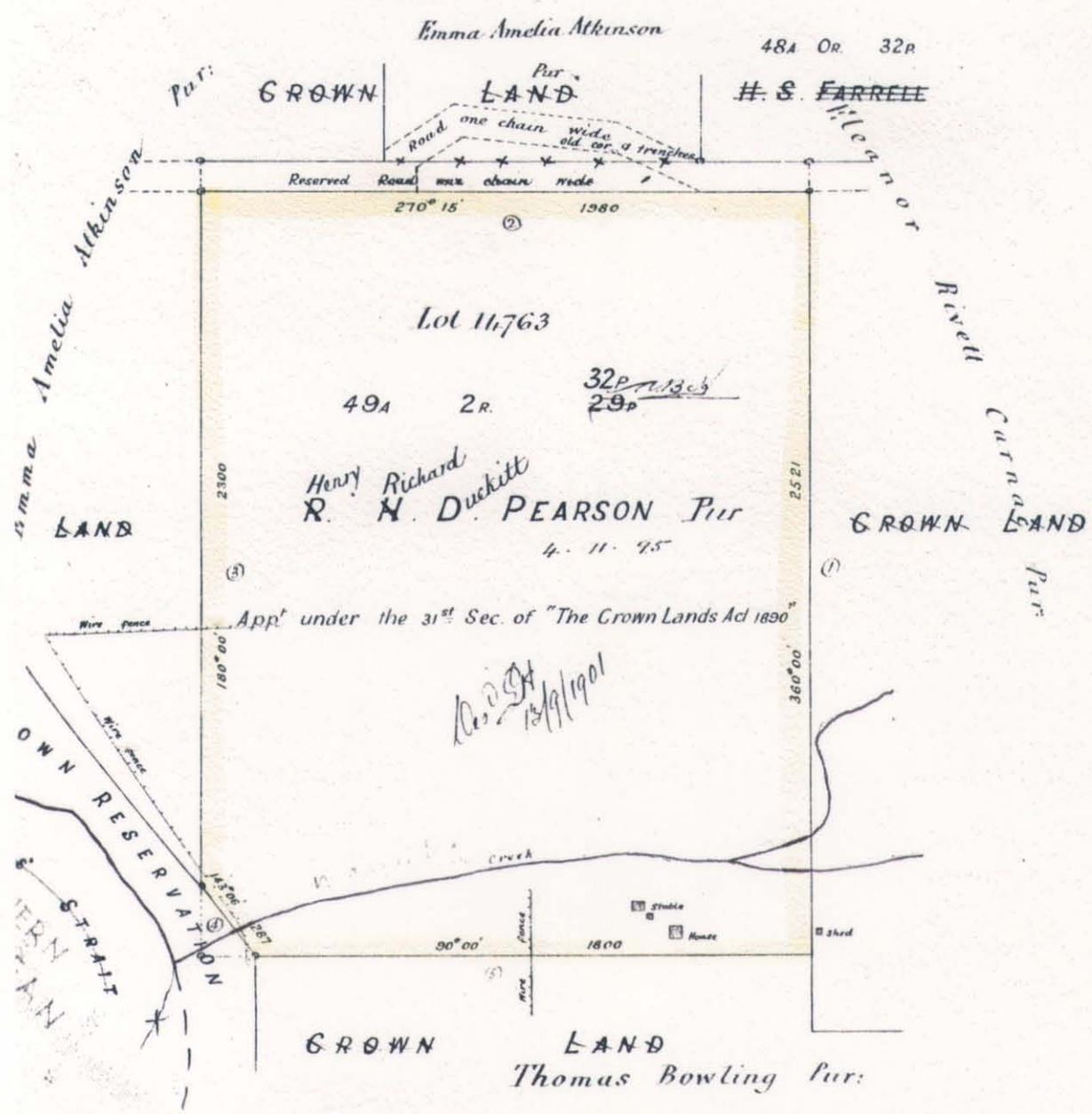
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Appl for Road C.T.3739/28 G841

SOUTHERN

OCEAN



OF APPLICATION 1372
90



instructions 13th Oct. 1893
 commenced 21st Nov. 1893
 finished 23rd Nov. 1893
 of close 1 in 1894.
 by EG 14/2/94
 examined by AS 1/3/94
 on General Plan by 2/2/94

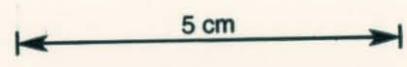
Report Undulating loose sandy soil, rather hilly in parts
 mostly clear land. Watered by small stream.
 Improvements including buildings valued at £50.

Maybe acted upon
 Acted upon

Approved
16.2.94

048682

District Surveyor



COUNTY OF KING ISLAND

PARISH OF TAROONA

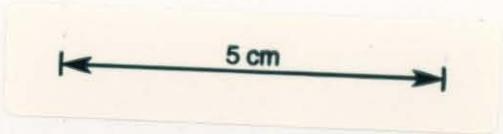
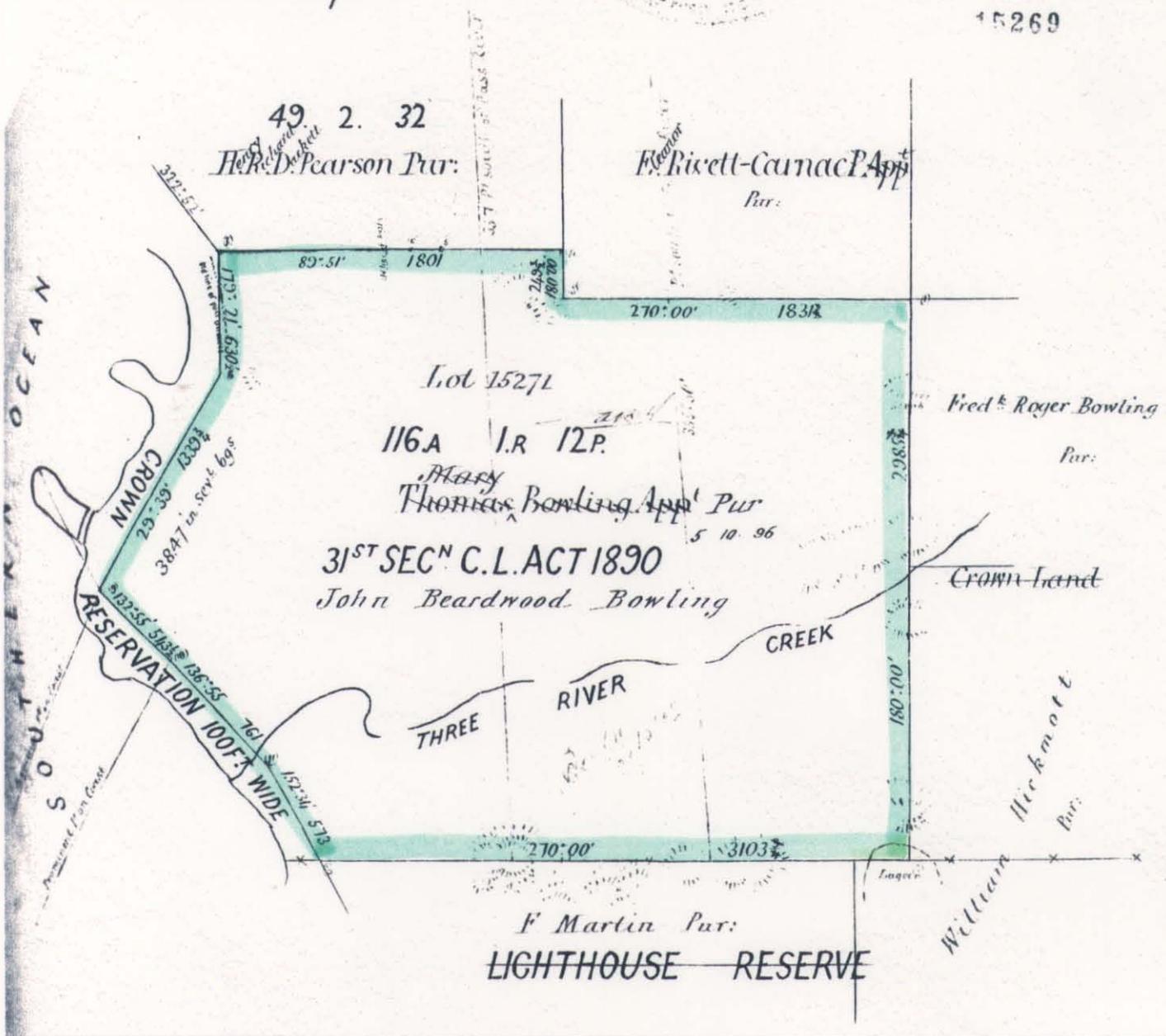
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MAN TRAP

Nº OF APPLICATION 3262/90



15269



COUNTY OF
KING ISLAND
PARISH OF NUGARA

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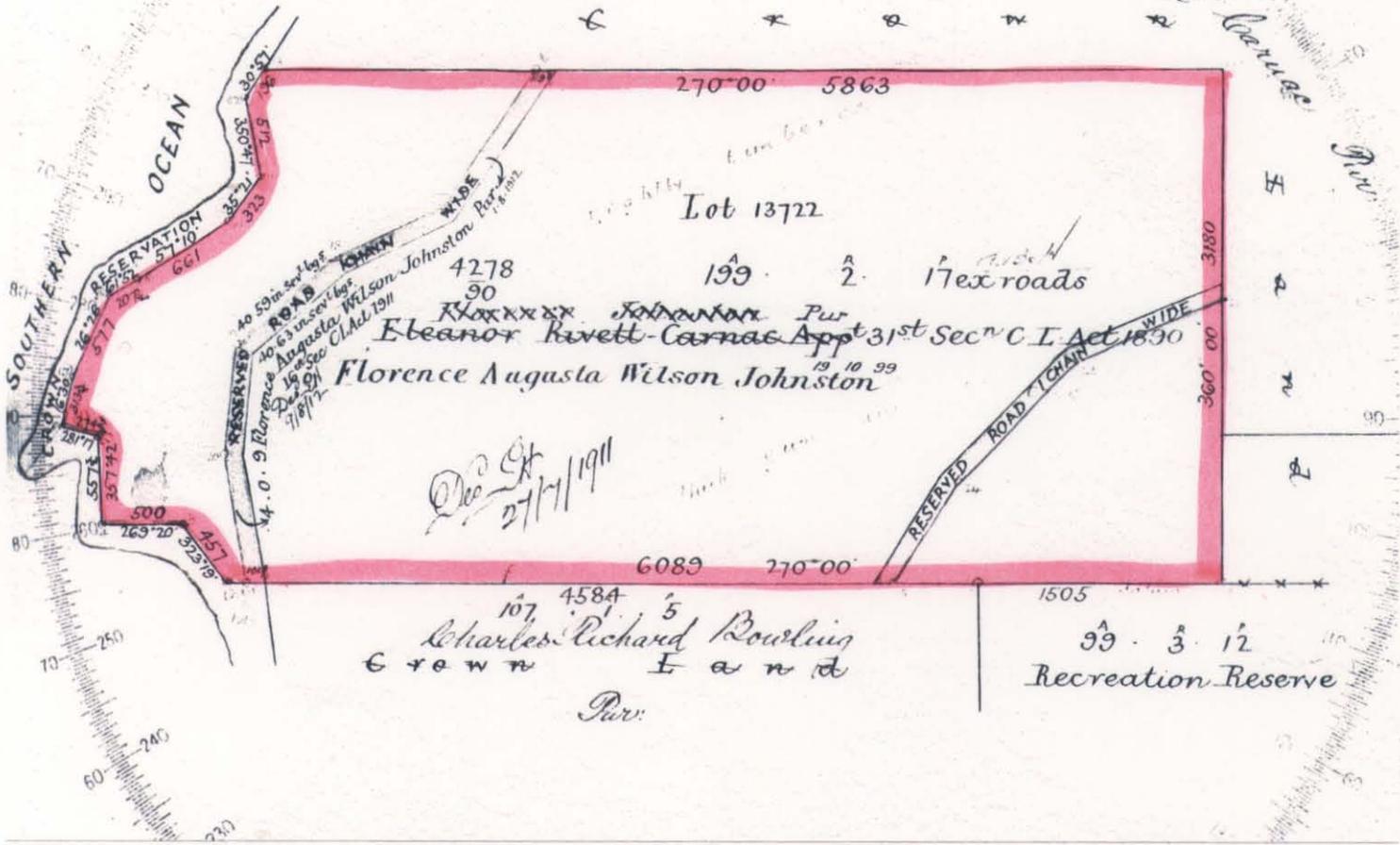
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CORNER	BEARING	DISTANCE IN LINKS	FROM
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Nº OF APPLICATION

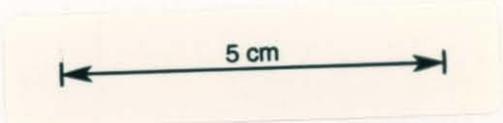
3/18
15000

Lot 15705 Eleanor Rivett Carnage



107 4584 5
Charles Richard Bowling
F a n d
Pur:

1505
99 3 12
Recreation Reserve



KING ISLAND GRAVEL DEPOSITS

C. A. BACON

(After mapping by V.M.Threader)

Scale, 1: 20,000

