

APPENDIX J

STAGE 1 PRELIMINARY CONTAMINATION ASSESSMENT

GOLDCORAL PTY LTD STAGE 1 PRELIMINARY CONTAMINATION ASSESSMENT

Iron Gates Development – Evans Head NSW

08 JULY 2019



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GOLDCORAL PTY LTD IRON GATES DEVELOPMENT – EVANS HEAD NSW

STAGE 1 PRELIMINARY CONTAMINATION ASSESSMENT

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EXECUTIVE SUMMARY

Arcadis Consulting Pty Ltd (Arcadis) has been commissioned by Goldcoral Pty Ltd to undertake a Stage 1 Preliminary Contamination Assessment (PCA) of the proposed Iron Gates residential development, Evans Head.

The scope of this study was the “development area” as detailed in the locality plan provided below. The development site is located approximately 1.7 kilometres south-west of Evans Head township. This is the area that will be directly disturbed as a result of the construction required for the development. This includes bulk earthworks, road construction and ancillary activities such as stockpile and compound sites, utility installation and access requirements, and any alterations to intersections. The purpose of the investigation was to identify high risk activities with the potential to cause substantial contamination which may have occurred or are occurring within and adjacent to the development area. Such activities may require remediation or management through construction. The investigation was undertaken in accordance with the relevant Office of Environment and Heritage (OEH) guidelines and standard industry practice.

As part of the investigation, the following was undertaken:

- A desktop review of available aerial photographs, land title certificates, contaminated sites databases, groundwater, soil and geology databases and relevant available historical reports and documentation as required; and
- A visual, non-intrusive site inspection of the proposal area.

Based on information obtained from the desktop review, potential environmental issues at the site can be summarised as follows:

- During the 1970s and early 1980s sand mining activities took place. As a result, tailings dams may have concentrated monazite separated out as part of the mining process. Monazite tailing can be responsible for elevated radiation levels and potentially causes health risks.

A site inspection was undertaken on 22 May 2014. The site visit involved identifying activities or site features that may be associated with potential contamination being present. These locations were closely inspected and reference made to the concept plan of the development works proposed. Site inspection photographs are provided in Appendix 3. No contaminating activities or evidence of contamination was identified during the site inspection.

A subsequent Preliminary Radiation Site Assessment was also undertaken by Arcadis on 17 June 2014 (Provided in Appendix D). The site visit involved identifying activities or site features that may be associated with past sand mining activities being present in areas identified in historic aerial photographs. These locations were closely inspected and reference made to the concept plan of the development works proposed.

No contaminating activities or evidence of mineral sand staining was identified during the site inspection. Surface radiation levels were also monitored on the Iron Gates site in areas where previous sand mining activities were located are all equivalent to background levels displayed at the three off site background control locations. Surface radiation levels generally varied between 0.00 uSv/Hr to 0.3 uSv/Hr. Some discrete areas displayed levels of 0.4 and 0.5 uSv/Hr however these areas are still below Action Level Criteria for dwellings.

Based on the desktop reviews and site assessment undertaken, further surface radiation level monitoring should be undertaken in areas where earthworks more than 1 metre below current surface levels during construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with sand mining activities.

1 INTRODUCTION

1.1 Background

Arcadis Consulting Pty Ltd (Arcadis) has been commissioned by Goldcoral Pty Ltd to undertake a Stage 1 Preliminary Contamination Assessment (PCA) of the proposed Iron Gates residential development, Evans Head.

The purpose of this investigation was to identify any risks and constraints to the proposal through identification of areas of potentially contaminated land. This report has been produced as a requirement of the NSW Department of Planning Director General's Requirements under Section 75F of the Environmental Planning and Assessment Act 1979. This report specifically addresses SEPP 55 – Remediation of Land.

This assessment has been carried out in accordance with the relevant guidelines entitled "Contaminated Sites – Guidelines for Consultants Reporting on Contaminated Sites" and standard industry practices outlined by the NSW Office of Environment and Heritage (OEH).

This report will:

- Identify past and present potentially contaminating activities.
- Identify potential contamination sites.
- Discuss the site condition.
- Provide a preliminary assessment of potential site contamination.
- Assess the need for further investigations.

1.2 Site Identification

The scope of this study was the "development area" as detailed in the locality plan provided below. The development site is located approximately 1.7 kilometres south-west of Evans Head township. This is the area that will be directly disturbed as a result of the construction required for the development. This includes bulk earthworks, road construction and ancillary activities such as stockpile and compound sites, utility installation and access requirements, and any alterations to intersections. The location of the proposal is illustrated in Figure 1 (A detailed locality plan with development layout is provided in Appendix 1).



Figure 1: Site locality plan showing the development area

1.3 Objective

The objective of this contamination investigation was to identify potential risks associated with contamination based on past and present land uses in the study area and to identify areas that may require remediation or management through construction phases.

Carrying out the Stage 1 Preliminary Contaminated Assessment will provide the Goldcoral Pty Ltd with information on potential risks associated with contamination based on past and present land uses. The process will identify where there is a contamination risk that warrant additional intrusive investigations to characterise the presence and extent of any impact on the development area. The outcomes of this Stage 1 Preliminary Contaminated Assessment will inform management actions for ongoing protection of the environment and provide baseline information to monitor future change.

1.4 Scope of Works

To achieve the above outlined objectives the following scope of works was undertaken:

- Desktop review of site history information of the proposal site and adjoining sites to identify potential areas of environmental concern. Where available, this included review of the following information sources:
 - Historical titles.
 - Historical aerial photographs (from 1953 to present, where available).
 - Previous environmental reports for the site.
 - Licences and notices (i.e. water discharge licences, hazardous materials, trade waste etc.).
 - Groundwater bore database search.
 - Publicly available records comprising topographic, geological and hydrogeological maps.
 - Trade waste plans and EPA licence (where available).
- A site walkover by an Arcadis representative; which included:
 - Identification of current activities within the study area.
 - Identification of any chemical or fuel storage areas.
 - Identification of potential sources of contamination.
 - General review of current and/or previous operations within the area of impact.
 - Identification of the current uses of adjoining properties.
 - Checking the validity of publicly available information (as listed above).
 - General description of structures, storage facilities, disposal areas etc., within the study area.
 - Checking for signs of ground contamination that are visible on the ground surface.
 - Detailing waste disposal locations along the study area.
- Preparation of a Stage 1 Preliminary Contaminated Assessment Report for the proposal.

1.5 Limitations

The results of this assessment are based on the site inspection undertaken by Arcadis personnel and specialists from accessible areas, information provided by Goldcoral Pty Ltd and publically available background information. This assessment is limited strictly to identifying typical environmental conditions associated with the study area. All environmental and contaminated land work is subject to general limitations related to the heterogeneity of the natural environment, variability of contaminant distribution and constraints imposed by the investigation methods utilised. Arcadis has performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental consulting profession. No warranties expressed or implied are made. All conclusions and recommendations are the professional opinions of the Arcadis personnel and specialists involved in the project, subject to the qualifications made above. While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from external sources, or developments resulting from situations outside the scope of this project.

Specifically, with regard to this report, it should be noted that the scope of works carried out herein is not intended to include sufficient information to enable completion of a statutory audit of the site, and as such does not include the following:

- Any intrusive soil/groundwater sampling and analysis.
- Sampling and analysis of any emissions to air, wastewater discharges or solid and liquid wastes.

Please ensure that these limitations are understood before utilising or basing decisions on the information presented in this report.

2 GEOLOGY AND HYDROLOGY

2.1 Geology

The Australian Stratigraphic Units Database describes the Evans Head area (Evans Head Coal Measure) as Thin- to thick-bedded, crossbedded, coarse-grained quartz to sublithic arenite, thinly-bedded grey siltstone, claystone, minor coal, as partings and very thin bands. The Evans Head area belongs to the Ipswich Basin Geological Province.

Basic geological mapping of the area indicates that the Evans Head headlands are comprised of different types of sediments. These are all very recent which geologically places them at Quaternary (or more specifically Pleistocene to Holocene aged) comprising mainly sands in the beach and dune systems and silts and clays around the river estuary. Many of the Holocene aged sediments contain potential acid sulfate soils, which are common in the region. Acid sulphate soils are covered in more detail in section 2.3 of this report.

2.2 Contaminated Land Search

A contaminated land search of the NSW EPA online contaminated land record was undertaken to identify contaminated sites in the area. Results of these searches are summarised below in Table 1.

Table 1: contaminated Land search for Evans Head

Suburb/City	Site description and address	EPA initial assessment	EPA site management class
Evans Head	Bundjalung National Park Gap Road	Unclassified	The EPA is awaiting further information to progress its initial assessment of this site.
Evans Head	Evans Head Aerodrome Memorial Airport Drive	Other Industry	Based on the information made available to the EPA to date, the contamination of this site is considered by the EPA to be not significant enough to warrant regulatory intervention under the <i>Contaminated Land Management Act 1997</i> .
Evans Head	Evans Head Residential subdivision Bounded by Currajong, Woodburn, Carrabeen Streets and Tuckeroo Cres	Unclassified	Based on the information made available to the EPA to date, the contamination of this site is considered by the EPA to be not significant enough to warrant regulatory intervention under the Contaminated Land Management Act 1997.

2.3 Surface Hydrology and Hydrogeology

The study area bounds Evans river to the south and has wetlands to the east of the site which drain toward the Evans River to the south. An online search of the Groundwater Bores (<http://www.bom.gov.au/water/groundwater/explorer/map.shtml>) was undertaken. Through this search it was found that the closest groundwater monitoring bores are located east of the development site located in the township of Evans Head. Figure 2 below shows the location of the surrounding groundwater bores.

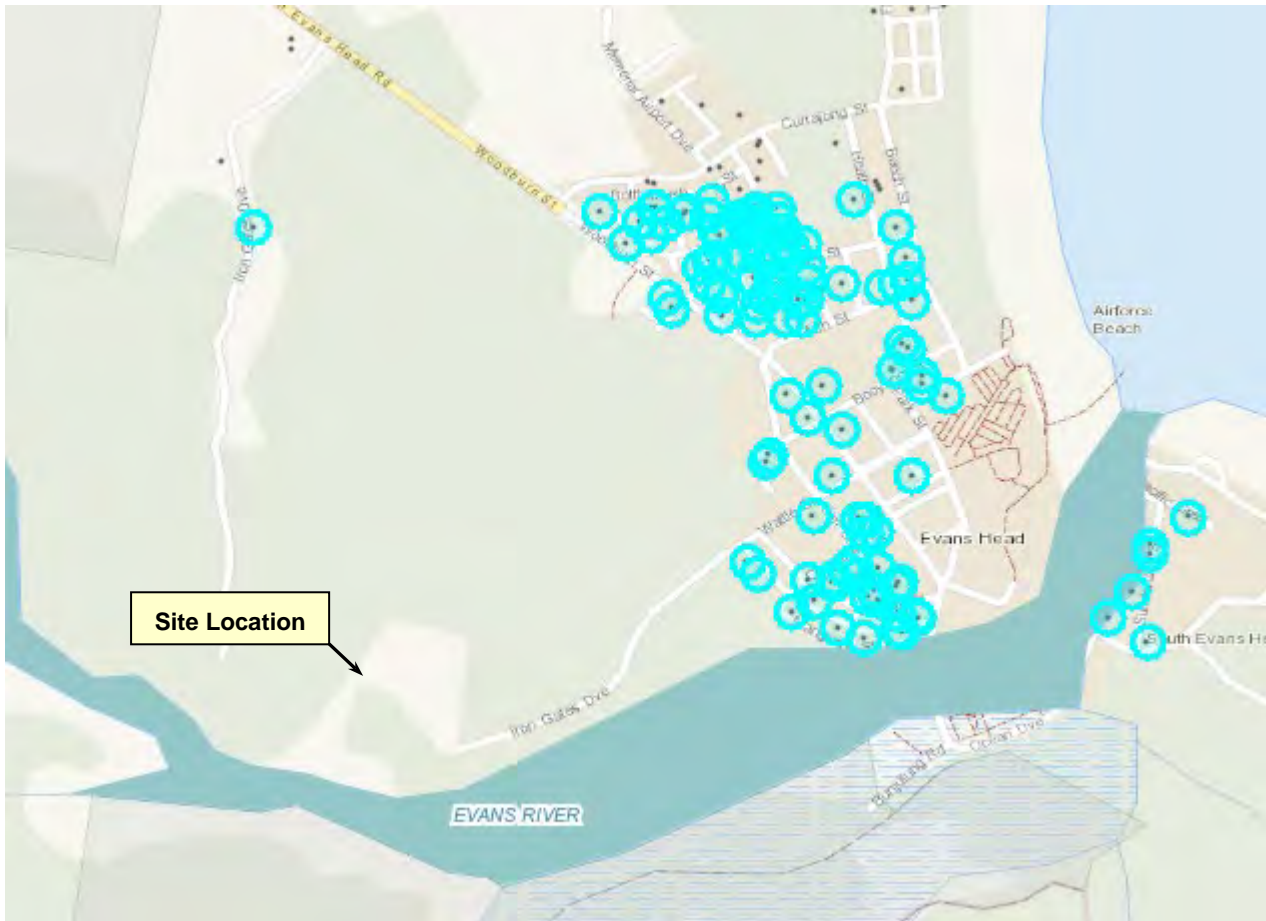


Figure 2: Map outlining locations of groundwater bores (NSW NRAtlas 2011)

Insufficient data was available for the local bores. As the elevation based on Australian Height Datum (AHD) was not provided for any of the bores the actual depth of the water table, and likelihood of there being a common groundwater system below the bores, could not be determined. Further investigation on the local aquifer depth, nature and contamination status of groundwater underneath the site was not completed during the preparation of this report.

2.4 Acid Sulphate Soils

Acid sulfate soils are acidic soil horizons or layers formed as a result of aeration of soil materials rich in iron sulphides (predominately pyrite - FeS_2). Such characteristics are likely to be found in:

- Marine and estuarine sediments of the recent (Holocene) geological age.
- Soils usually not more than five metres above mean sea level.

- Marine or estuarine settings.
- Inland environments such as:
 - River and stream channels.
 - Lakes.
 - Wetlands.
 - Seepages overlying mineralized zones.
 - Disposal basins (Evaporation).
 - Billabongs.
 - Marshes.
 - Ground water systems.
 - Sports fields.

A search of the Australian Soil Resource Information System (ASRIS) National Acid Sulphate Soils (ASS) Risk Map was carried out for the study area. The results of this search revealed the site to be located largely within a Low Probability Area with Confidence Unknown.

An acid sulphate soil Investigation was undertaken on site by Coffey Partners International in 1995. The report stated that there was no acid sulphate or acid generating potential for the samples tested. An Acid Sulphate Investigation and Soil Management Plan (F0003-10027302) has been prepared by Arcadis summarising the works undertaken on-site to date with discussions on Council mapping and recommendations moving through construction.

3 SITE BACKGROUND AND HISTORICAL REVIEW

3.1 General Information

Goldcoral Pty Ltd propose to develop the Iron Gates site into a 175 lot residential development. The proposal is located approximately 1.7 kilometres south-west of Evans Head township. Figures 1 shows the proposal in relation to its local and regional context.

Table 2: Site identification details

Site Address:	Iron Gates Road, Iron Gates
Approximate Total Area of Impact	18 Hectares
Postcode	2473
Lot and DP Numbers for site and adjacent lots	Lot 163 DP 831052, Lots 276 and 277 DP 755624, Crown Road Reserve between Lots 163 DP 831052 and Lot 276 DP 755724, Crown Foreshore Reserve and Iron Gates Drive, Evans Head NSW
Local Government Area	Richmond Valley Council
Current Site Zoning	Low Medium Residential
Current Site Use	Vacant Land

3.2 Adjoining Land Use

Land use in the study area is characterised by surrounding undeveloped land zoned Non-Urban. The Proposal area is zoned under the Richmond Valley Council Local Environmental Plan (2012). This planning context is shown in Figure 3 below.

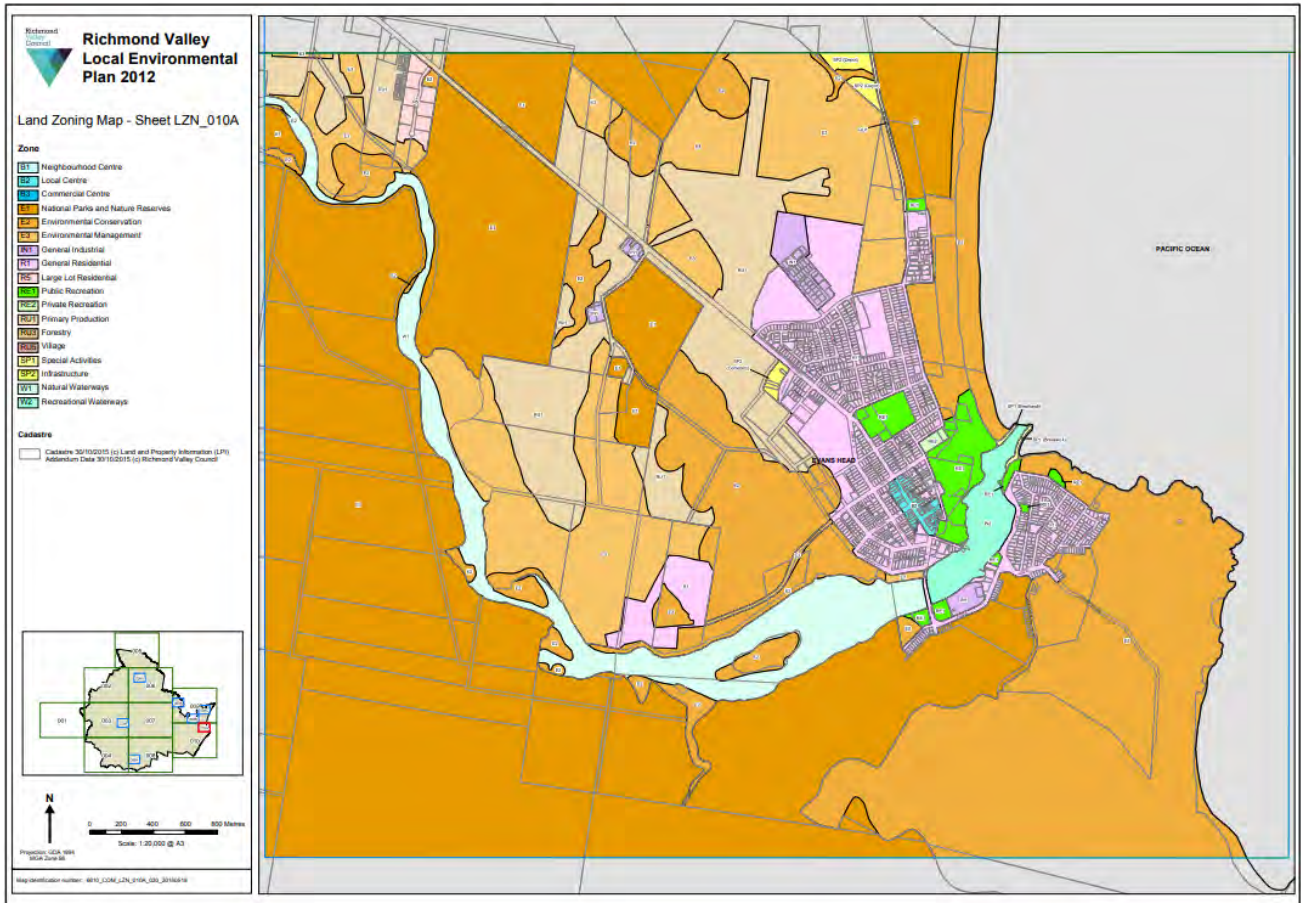


Figure 3: Richmond Valley Council Local Environmental Plan for the study area

3.3 Title Searches

Arcadis conducted a title search of “properties of interest” with the aim of tracing ownership details through a search of title records. The proposed Iron Gates development comprises of three separate properties. No historical potentially contaminating activities were identified by the historical title search.

3.4 Aerial Photography

Historical aerial photographs were obtained from the Land and Property Management Authority (LPMA). A review of the historical aerial photographs of the site is presented in the Table 1. Aerial photographs are presented in Appendix 2.

Table 1: Review of historical aerial photographs

Year	Site History Details	Potential contamination Implications
1953	Sole Dwelling with surrounding cleared land for rural use.	
1964	Sole Dwelling with surrounding cleared land for rural use.	
1971	Sole Dwelling with surrounding cleared land for rural use.	
	Eastern portion and adjacent property to the Iron Gates property has evidence of substantial sand mining activities.	Potential sand mining residues with elevated radiation levels

Year	Site History Details	Potential contamination Implications
1980	Sole Dwelling with surrounding cleared land for rural use. Sand mining activities seem to have down sized and revegetation of areas is evident.	Potential sand mining residues with elevated radiation levels
1988	Sole Dwelling with surrounding cleared land for rural use. Sand mining activities have ceased.	
1998	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development.	
2001	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development.	
2014	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development.	

3.5 Summary of Site History

The information obtained from the site history review can be summarised as follows:

- Previous to 1971 the area was generally rural with a sole dwelling.
- There is evidence that sand mining activities were undertaken between 1965 and 1981
- Sand mining activities ceased before 1988.
- In 1996 the Iron Gates urban development was partially constructed.
- The site has remained unchanged since 1996.

3.6 Potential areas of Concerns

Based on information obtained from this site history review, it is evident that during the 1970s and early 1980s sand mining activities took place. As a result, tailings dams may have concentrated monazite and illminite separated out as part of the mining process. Monazite and illminite tailing can be responsible for elevated radiation levels and potentially causes health risks.

As a result of these findings a Preliminary Radiation Site Assessment was undertaken and comprised of:

- A preliminary site investigation, to establish whether radioactive sand residues from former mineral sand mining activities exists on the site; and
- If required, establishing the extent of soil contamination, and possible environmental, health and safety impairment risks, with a view to establishing a suitable remediation/management strategy.

The above assessment was carried out in accordance with NSW Government Department of Health – Radiation Branch publication, “No. 12 Clean-Up and Disposal of Radioactive Residues from Commercial Operations Involving Mineral Sands”.

4 SITE INSPECTION

A site inspection was undertaken by Arcadis Consulting on 22 May 2014 by Simon Groth of Arcadis Consulting. The site visit involved identifying activities or site features that may be associated with potential contamination being present. These locations were closely inspected and reference made to the concept plan of the development works proposed. Site inspection photographs are provided in Appendix 3. No contaminating activities or evidence of contamination was identified during the site inspection.

Conditions at Site Boundary

There were no visible signs of contamination or staining identified during the site inspection.

Presence of Dangerous goods, Wastes and Fill Material

No dangerous goods, wastes or fill material was identified as part of the site inspection.

Odours

There were no odours encountered on site that may indicate land contamination.

Condition of Buildings and Roads

There were no signs of contamination associated with any roads or structures on or around the site.

Further Preliminary Radiation Site Assessment

A subsequent Preliminary Radiation Site Assessment was also undertaken by Arcadis on 17 June 2014 (Provided in Appendix D). The site visit involved identifying activities or site features that may be associated with past sand mining activities being present in areas identified in historic aerial photographs. These locations were closely inspected and reference made to the concept plan of the development works proposed.

No contaminating activities or evidence of mineral sand staining was identified during the site inspection.

A surface radiation survey of the development site was also undertaken using a calibrated HPI Cypher 5000 Digital Radiation Alert Monitor to measure surface gamma radiation levels and detect and locate any areas of elevated radiation levels.

The surface radiation levels monitored on the Iron Gates site in areas where previous sand mining activities were located are all equivalent to background levels displayed at the three off site background control locations. Surface radiation levels generally varied between 0.00 uSv/Hr to 0.3 uSv/Hr. Some discrete areas displayed levels of 0.4 and 0.5 uSv/Hr however these areas are still below Action Level Criteria for dwellings.

5 FURTHER INVESTIGATIONS

Based on the desktop reviews and site assessment undertaken, further surface radiation level monitoring should be undertaken in areas where works are more than 1 metre below current surface levels during construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with sand mining activities.

6 CONCLUSIONS AND RECOMMENDATIONS

Desktop studies revealed that eastern parts of the site and the property adjacent of the Iron Gates development was subject to sandmining activities during the 1970s and early 1980s. As a result there may be potential for the existence of sand mining residues with elevated radiation levels on site that may have been associated with tailings dams from rutile separation processes.

Site investigations were undertaken and surface radiation levels monitored on the Iron Gates site in areas where previous sand mining activities were located are all equivalent to background levels displayed at the three off site background control locations. Surface radiation levels generally varied between 0.00 uSv/Hr to 0.3 uSv/Hr. Some discrete areas displayed levels of 0.4 and 0.5 uSv/Hr however these areas are still below Action Level Criteria for dwellings.



It is recommended that further surface radiation level monitoring should be undertaken in areas where works are more than 1 metre below current surface levels during construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with sand mining activities so appropriate management strategies can developed if required.

APPENDIX A PROPOSED DEVELOPEMENT

Lot	Area
1	969 m ²
2	612 m ²
3	612 m ²
4	612 m ²
5	612 m ²
6	612 m ²
7	612 m ²
8	612 m ²
9	612 m ²
10	612 m ²
11	612 m ²
12	612 m ²
13	612 m ²
14	612 m ²
15	612 m ²
16	612 m ²
17	612 m ²
18	612 m ²
19	612 m ²
20	612 m ²
21	649 m ²
22	615 m ²
23	600 m ²
24	600 m ²
25	600 m ²
26	600 m ²
27	600 m ²
28	600 m ²
29	627 m ²
30	600 m ²
31	600 m ²
32	600 m ²
33	600 m ²
34	600 m ²
35	600 m ²
36	788 m ²
37	674 m ²
38	775 m ²
39	612 m ²
40	604 m ²
41	604 m ²
42	604 m ²
43	604 m ²
44	604 m ²
45	604 m ²
46	604 m ²
47	609 m ²
48	605 m ²
49	600 m ²
50	600 m ²
51	600 m ²
52	600 m ²
53	600 m ²
54	600 m ²
55	600 m ²
56	600 m ²
57	623 m ²
58	623 m ²
59	633 m ²
60	632 m ²
61	618 m ²
62	604 m ²
63	604 m ²
64	605 m ²
65	606 m ²
66	606 m ²
67	607 m ²
68	607 m ²
69	608 m ²
70	609 m ²



Lot	Area
71	607 m ²
72	608 m ²
73	682 m ²
74	766 m ²
75	600 m ²
76	600 m ²
77	600 m ²
78	600 m ²
79	600 m ²
80	601 m ²
81	601 m ²
82	601 m ²
83	601 m ²
84	608 m ²
85	614 m ²
86	634 m ²
87	696 m ²
88	602 m ²
89	602 m ²
90	602 m ²
91	859 m ²
92	856 m ²
93	603 m ²
94	603 m ²
95	954 m ²
96	616 m ²
97	663 m ²
98	657 m ²
99	602 m ²
100	723 m ²
101	605 m ²
102	609 m ²
103	620 m ²
104	714 m ²
105	602 m ²
106	604 m ²
107	602 m ²
108	602 m ²
109	602 m ²
110	602 m ²
111	601 m ²
112	600 m ²
113	600 m ²
114	600 m ²
115	608 m ²
116	601 m ²
117	602 m ²
118	600 m ²
119	601 m ²
120	600 m ²
121	600 m ²
122	647 m ²
123	619 m ²
124	603 m ²
125	600 m ²
126	646 m ²
127	661 m ²
128	626 m ²
129	600 m ²
130	639 m ²
131	602 m ²
132	602 m ²
133	600 m ²
134	618 m ²
135	623 m ²
136	604 m ²
137	602 m ²
138	600 m ²
139	600 m ²
140	600 m ²

Lot	Area
141	600 m ²
142	600 m ²
143	605 m ²
144	600 m ²
145	600 m ²
146	601 m ²
147	600 m ²
148	600 m ²
149	601 m ²
150	601 m ²
151	600 m ²
152	665 m ²
153	629 m ²
154	834 m ²
155	765 m ²
156	603 m ²
157	627 m ²
158	644 m ²
159	601 m ²
160	601 m ²
161	601 m ²
162	601 m ²
163	601 m ²
164	601 m ²
165	600 m ²
166	601 m ²
167	602 m ²
168	602 m ²
169	602 m ²
170	602 m ²
171	602 m ²
172	602 m ²
173	602 m ²
174	614 m ²
175	600 m ²
176	2.188ha
177	4.857ha
178	47.418ha

LEGEND:
 SITE BOUNDARY
 PROPOSED EASEMENT



Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894

CLIENT	
GOLDCORAL PTY LTD	
PROJECT	
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP831052, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831052 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)	
LOCAL AUTHORITY	
RICHMOND VALLEY	
NOTES	
<p>(i) This plan was prepared for the purpose and exclusive use of THE INGLES GROUP to accompany an application to RICHMOND VALLEY for approval to reconfigure the land described in this plan and is not to be used for any other purpose or by any other person or corporation. LandPartners Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising from any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (ii) or (iii) hereof.</p> <p>(ii) The dimensions, areas, number of lots, size and location of improvements & flood information (if shown) are approximate only and may vary.</p> <p>(iii) This plan may not be copied unless these notes are included.</p>	
Aerial Photography sourced from Neamap 13-3-2019. Date of photography - 03/07/2012	
LOTS	TOTAL AREA
Residential Lots (175)	16.884ha
Residue Lots (3)	54.463ha
Public Reserves (4)	0.8366ha
Drainage Reserve (1)	0.1124ha
Pump station lot (1)	0.0127ha
TOTAL	72.309ha
ADDITIONAL NOTES	
SCALE BAR	
0 5 10 20 30 50 80m	
SCALE 1:1250 @ A1	
 LANDPARTNERS built environment consultants	
Brisbane Office Level 1 - CDOPE 15 Little Crab Street, Milton Qld 4064 PO Box 1399 Milton Qld 4064 p: (07) 3842 1000 f: (07) 3842 1001 e: info@landpartners.com.au www.landpartners.com.au	
 ISO 9001 Registered	
LEVEL DATUM	AHD
LEVEL ORIGIN	-
CONTOUR INTERVAL	-
COMPUTER FILE	BRJD6396-100-33-16-COPY
DRAWN	CGW
DATE	27/06/2019
CHECKED	CMJ
DATE	27/06/2019
APPROVED	CGW
DATE	27/06/2019
PLAN NUMBER	SHEET 2 OF 2
BRJD6396.100-013	REV H

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE NSW LAND REGISTRY SERVICES

APPENDIX B HISTORIC AERIAL PHOTOGRAPHS



1953

c. 1002. 5062

WOODBURN RUN 3W NOV 53 152 21 MM 15100 →

LANDSPH



NSW
1220
5192

WOODBURN

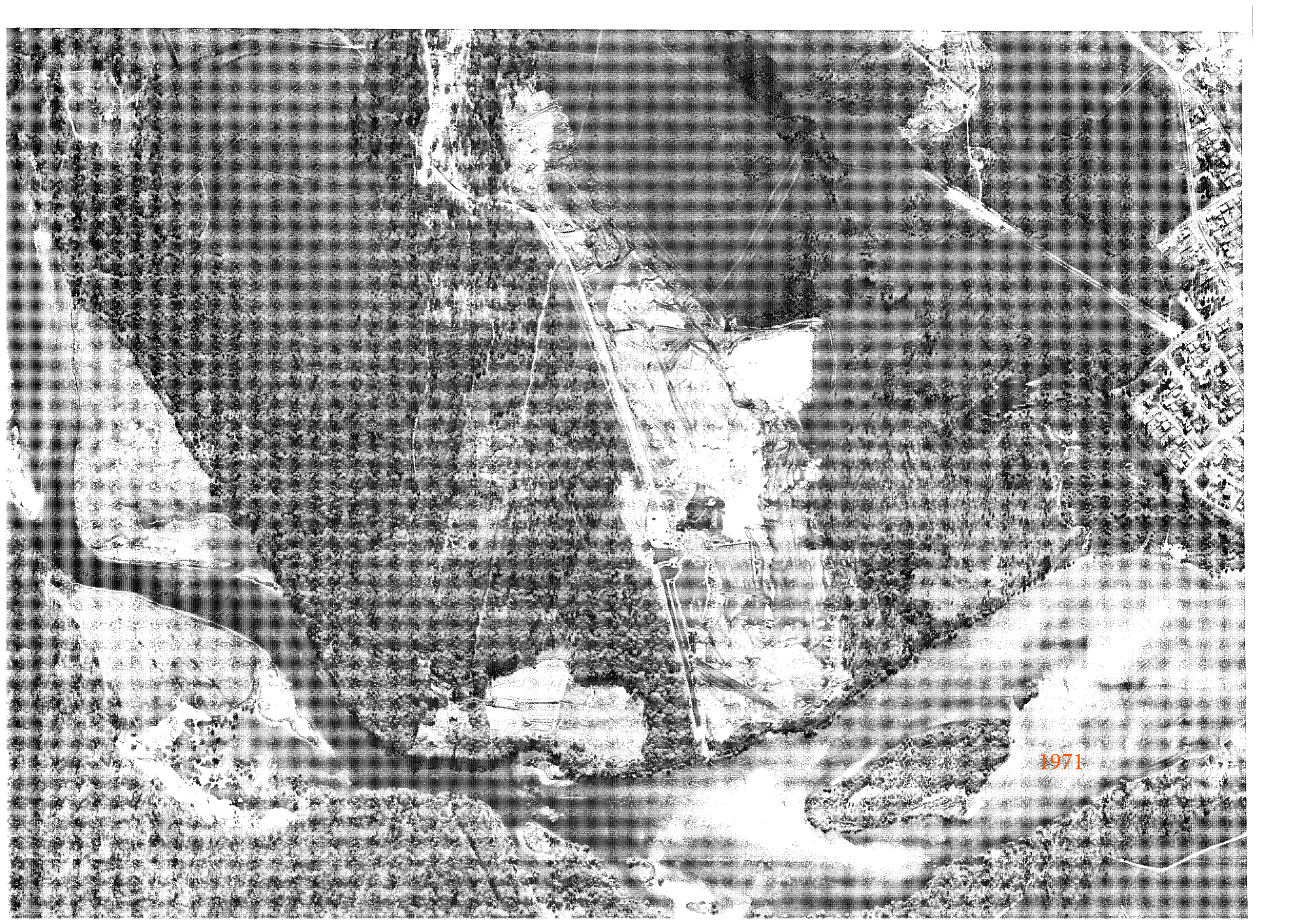
JUN 30
JUNE 64

15,000' ASL
114.44MM

1964

FROWN
EDGE N.W.
LAND PHOTO
100.1

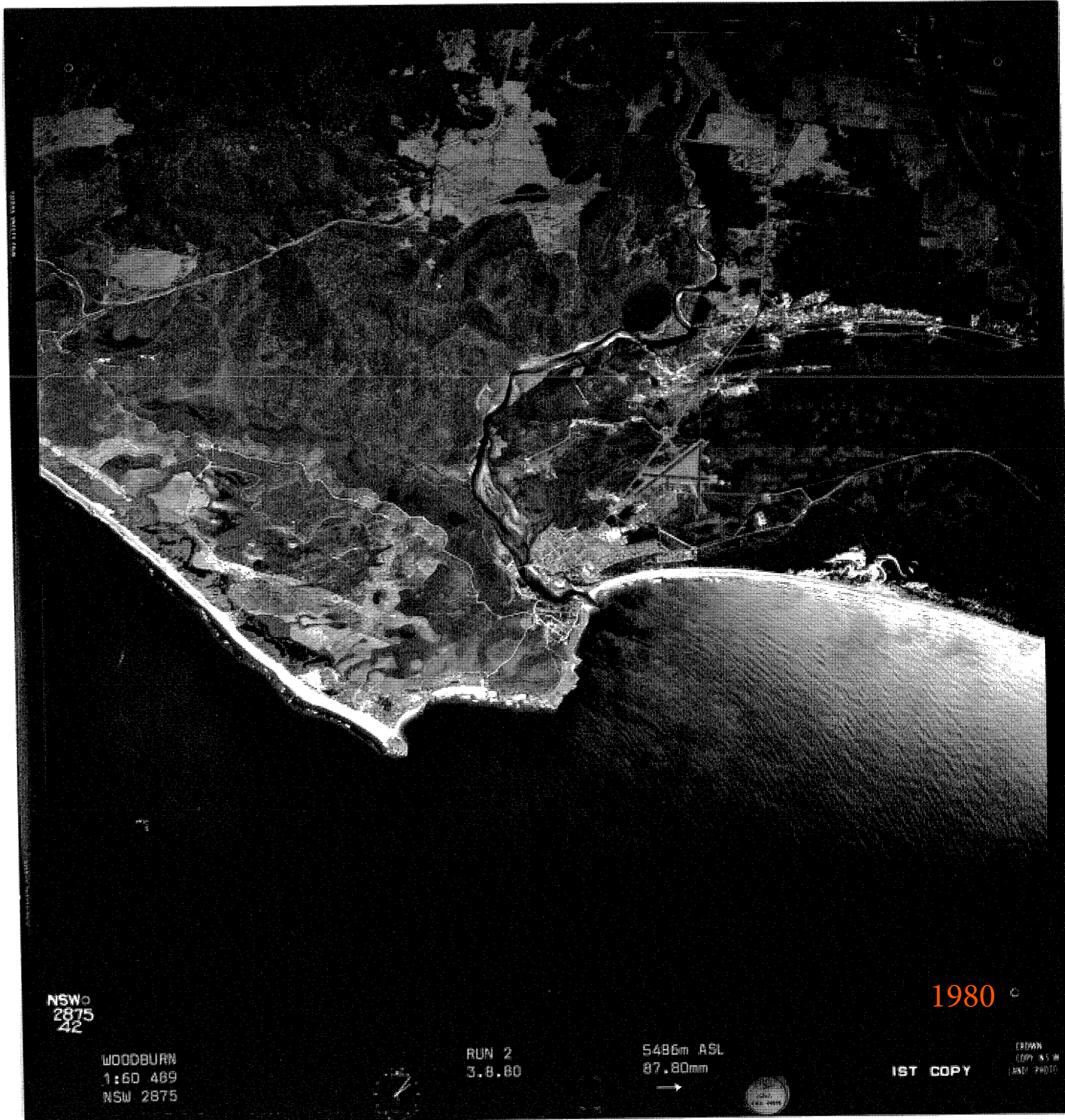
NSW 1220



1971



1964



NSW
2875
42

WOODBURN
1:60 489
NSW 2875

RUN 2
3.8.80

5486m ASL
Ø7.80mm

1980

1ST COPY

CROWN
COPY IN S W
LAND PHOTO



1980

OF
4278
O MSN

20-8-88

UAGI 305715310

0075

1988



1988



WILD 15/4 JAG-S
No 13217 152.76

0022

10:35:32 09/05/01 09190 NSW4554 R02 N232

PS100 1' 340 f/4.0 FF2.0 EC.0 *3P-

2001

WOODBURN
1:50000 Approx. Scale
NSW4554 (M2232)

RUN 2
09-05-01
14-24

152.76 mm
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2001



2014

APPENDIX C SITE INSPECTION PHOTOGRAPHS



Photographic Illustration 1: Cleared area adjacent to Evans Creek with sole dwelling in the background.



Photographic Illustration 2: Open drain located on the eastern boundary of the site.



Photographic Illustration 3: Previously constructed road on the Iron Gates estate.



Photographic Illustration 4: Photograph of the North West portion of the Iron Gates property.

APPENDIX D PRELIMINARY RADIATION SITE ASSESSMENT

GOLDCORAL PTY LTD PRELIMINARY RADIATION SITE ASSESSMENT

Iron Gates Development – Evans Head NSW

10 JULY 2019



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GOLDCORAL PTY LTD IRON GATES DEVELOPMENT – EVANS HEAD NSW

PRELIMINARY RADIATION SITE ASSESSMENT

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Report No F0006-10027302-01
Date 10/07/2019
Revision Text 01

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REVISIONS

Revision	Date	Description	Prepared by	Approved by
0	28/08/14	PRELIMINARY RADIATION SITE ASSESSMENT	Simon Groth	Simon Groth
1	10/07/19	AMENDED TO ARCADIS LAYOUT	Simon Groth	Simon Groth

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1 INTRODUCTION

1.1 Background

Arcadis has been commissioned by Goldcoral Pty Ltd to undertake a Preliminary Radiation Site Assessment of the proposed Iron Gates residential development, Evans Head. This assessment comprises of:

- A preliminary site investigation, to establish whether radioactive sand residues from former mineral sand mining activities exists on the site; and
- If required, establishing the extent of soil contamination, and possible environmental, health and safety impairment risks, with a view to establishing a suitable remediation/management strategy.

The above will be carried out in accordance with NSW Government Department of Health – Radiation Branch publication, “No. 12 Clean-Up and Disposal of Radioactive Residues from Commercial Operations Involving Mineral Sands”.

This report covers:

- The results of the on-site inspection and preliminary in-situ analysis, (to identify, likely areas of contamination, and prepare a sampling and analysis protocol);
- Recommendations for ongoing site management.

1.2 Site Identification

The scope of this study was the “development area” as detailed in the locality plan provided below. The development site is located approximately 1.7 kilometres south-west of Evans Head township. This is the area that will be directly disturbed as a result of the construction required for the development. This includes bulk earthworks, road construction and ancillary activities such as stockpile and compound sites, utility installation and access requirements, and any alterations to intersections. The location of the proposal is illustrated in Figure 1 (a detailed locality plan with development layout is provided in Appendix 1).



Figure 1: Site locality plan showing the development area

1.3 Objective

The objective of this contamination investigation was to identify potential risks associated with radioactive sand residues from past sand mining activities in the study area and to identify areas that may require remediation or management through construction phases.

Carrying out the Preliminary Radiation Site Assessment will provide the Goldcoral Pty Ltd with information on potential risks associated with contamination based on past sand mining operations adjacent to and on portions of the site. The process will identify where there is a contamination risk which warrants additional intrusive investigations aimed at characterising the presence and extent of any impact within the vicinity of the proposal. The outcomes of the assessment will inform management actions for ongoing protection of the environment and will provide baseline information to monitor future change.

1.4 Scope of Works

To achieve the above outlined objectives the following scope of works was undertaken:

- Desktop review of site history information of the proposal site and adjoining sites to identify potential areas of environmental concern. Where available, this included review of the following information sources:
 - Historical titles.
 - Historical aerial photographs (from 1953 to present, where available).
 - Previous environmental reports for the site.
- A site walkover by an Arcadis representative; which included:
 - Evidence of past sand mining activities.
 - Identification of sand mining residues or former tailings.
 - General review of previous operations within the area of impact.
 - Checking for signs of ground illminite or monozite that are visible on the ground surface.
 - A radiation survey recording surface radiation levels.
- Preparation of a Preliminary Radiation Site Assessment Report for the proposal.

1.5 Limitations

The findings in this report are based on a preliminary environmental desktop study described in the scope of works. Arcadis has performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental consulting profession. No warranties, expressed or implied are made. Arcadis' assessment is limited strictly to identifying typical environmental conditions associated with the study area. All environmental and contaminated land/radiation survey work is subject to general limitations related to the heterogeneity of the natural environment, variability of contaminant distribution and constraints imposed by the investigation methods utilised.

The results of this assessment are based on the site inspection undertaken by Arcadis personnel from accessible areas, information provided by Goldcoral Pty Ltd and publically available background information. All conclusions and recommendations are the professional opinions of the Arcadis personnel involved in the

project, subject to the qualifications made above. While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from external sources, or developments resulting from situations outside the scope of this project.

Specifically, with regard to this report, it should be noted that the scope of works carried out herein is not intended to include sufficient information to enable completion of a statutory audit of the site, and as such does not include the following:

Any intrusive soil/groundwater sampling and analysis.

Sampling and analysis of any emissions to air, wastewater discharges or solid and liquid wastes.

Please ensure that these limitations are understood before utilising, or basing decisions on the information presented in this report.

2 GEOLOGY AND HYDROLOGY

2.1 Geology

The Australian Stratigraphic Units Database describes the Evan Head area (Evans Head Coal Measure) as Thin- to thick-bedded, crossbedded, coarse-grained quartz to sublithic arenite, thinly-bedded grey siltstone, claystone, minor coal, as partings and very thin bands. The Evans Head area belongs to the Ipswich Basin Geological Province.

Basic geological mapping of the area indicates that the Evans Head headlands are comprised of different types of sediments. These are all very recent which geologically places them at Quaternary (or more specifically Pleistocene to Holocene aged) comprising mainly sands in the beach and dune systems and silts and clays around the river estuary. Many of the Holocene aged sediments contain potential acid sulfate soils, which are common in the region.

3 SITE BACKGROUND AND HISTORICAL REVIEW

3.1 General Information

Goldcoral Pty Ltd propose to develop the Iron Gates site into a 175 lot residential development. The proposal is located approximately 1.7 kilometres south-west of Evans Head township. Table 1 shows the proposal in relation to its local and regional context.

Table 1: Site identification details

Site Address:	Iron Gates Road, Iron Gates			
Approximate Total Area of Impact	18 Hectares			
Postcode	2473			
Lot and DP Numbers for site and adjacent lots	544/48550	547/48550	276/55624	277/755624
Local Government Area	Richmond Valley Council			
Current Site Zoning	Low Medium Residential			
Current Site Use	Vacant Land			

3.2 Adjoining Land Uses

Land use in the study area is characterised by surrounding undeveloped land zoned Parcel Boundary.

3.3 Planning Context

3.3.1 Zoning

The Proposal area is zoned under the Richmond Valley Council Development Control Plan (DCP). This planning context is shown in Figure 2 below.

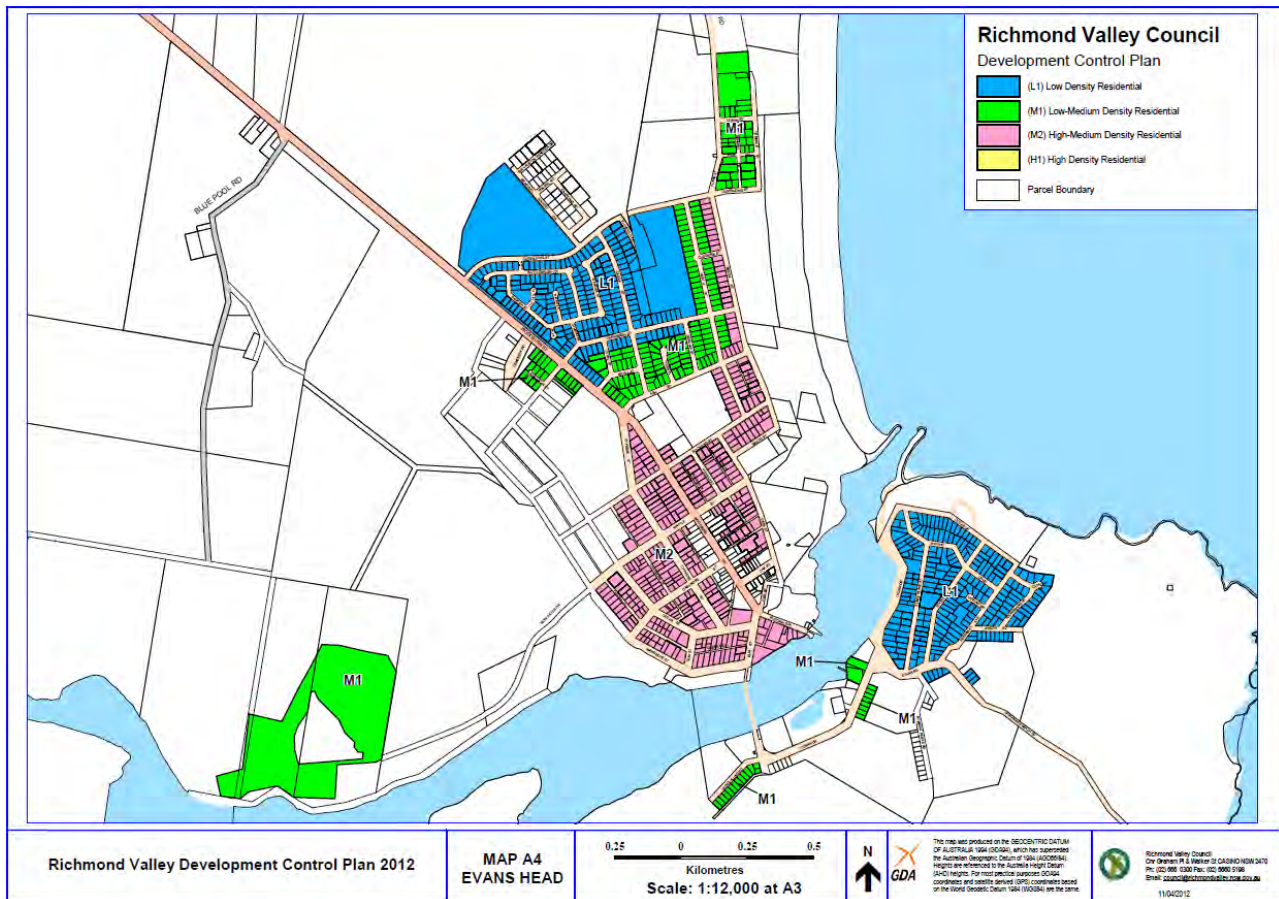


Figure 1: Richmond Valley Council Development Control Plan for the study area

3.4 Title Searches

Arcadis conducted a title search of “properties of interest” with the aim of tracing ownership details through a search of title records. The proposed Iron Gates development comprises of three separate properties. Those properties that have been identified by aerial photography historic searches as having past activities that may have had the potential to contaminate the receiving environment. No historical potentially contaminating activities were identified by the historical title search.

3.5 Aerial Photograph Review

Historical aerial photographs were obtained from the Land and Property Management Authority (LPMA). A review of the historical aerial photographs of the site is presented in the Table 2. Aerial photographs are presented in Appendix 2.

Table 1: Review of historical aerial photographs

Year	Site History Details	Potential contamination Implications
1953	Sole Dwelling with surrounding cleared land for rural use	
1964	Sole Dwelling with surrounding cleared land for rural use	
1971	Sole Dwelling with surrounding cleared land for rural use	
	Eastern portion and adjacent property to the Iron Gates property has evidence of substantial sand mining activities (Refer Figure 2)	Potential sand mining residues with elevated radiation levels
1980	Sole Dwelling with surrounding cleared land for rural use	
	Sand mining activities seem to have down sized and revegetation of areas is evident	Potential sand mining residues with elevated radiation levels
1988	Sole Dwelling with surrounding cleared land for rural use	
	Sand mining activities have ceased	
1998	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development (Refer Figure 3)	
2001	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development	
2014	Sole dwelling and cleared land and constructed roads associated with the Iron Gates development	

3.6 Summary of Site History

The information obtained from the site history review can be summarised as follows:

- Previous to 1971 the area was generally rural with a sole dwelling.
- There is evidence that sand mining activities were undertaken between 1965 and 1981
- Sand mining activities ceased before 1988.
- In 1996 the Iron Gates urban development was constructed.
- The site has remained unchanged since 1996.

3.7 Potential Areas of Environmental Concern

Based on information obtained from this site history review, potential environmental issues at the site can be summarised as follows:

- During the 1970's and early 1980's sand mining activities took place. As a result tailings dams may have concentrated monazite separated out as part of the mining process. Monazite tailing can be responsible for elevated radiation levels and potentially causes health risks.



Figure 3: Aerial photograph of Iron Gates Site in 1971 with sand mining activities evident on the eastern portion of the site and adjacent property



Figure 4: Aerial photograph of Iron Gates Site in 1998 with developed roads.

4 RELEVANT REGULATIONS AND GUIDELINES

The NSW Department of Health - Radiation Branch has developed action level thresholds for the clean-up and disposal of radioactive residues from commercial operations involving mineral sands, and are presented below.

1. Action Level Criteria

- 1.1 For dwellings, schools (including playground), businesses, factories, etc. where occupancies by the same individuals occur regularly on a day by day basis, the remedial action level should be $0.7 \mu\text{Gy h}^{-1}$ (or $70 \mu\text{R h}^{-1}$) for all points at 1 metre above the area of concern on the property.
- 1.2 For other areas, where occupancies are for a few hours per week by the same individuals or by differing individuals and for garden areas, the remedial action level should be $1.0 \mu\text{Gy h}^{-1}$ ($100 \mu\text{R h}^{-1}$) for all points at 1 metre above the lowest surface of the area.
- 1.3 For roads, paths, and other areas with intermittent occupancy, the remedial action level should be $2.5 \mu\text{Gy h}^{-1}$ ($250 \mu\text{R h}^{-1}$) for all points at 1 metre above the surface of the areas.
- 1.4 All values quoted above should include a value for normal natural background of $0.1 \mu\text{Gy h}^{-1}$ ($10 \mu\text{R h}^{-1}$).

5 SITE INSPECTION

A site inspection was on 17 June 2014 by Simon Groth of Arcadis. The site visit involved identifying activities or site features that may be associated with past sand mining activities being present in areas identified in historic aerial photographs. These locations were closely inspected and reference made to the concept plan of the development works proposed. Site inspection photographs are provided in Appendix 3. No contaminating activities or evidence of mineral sand staining was identified during the site inspection.

A surface radiation survey of the development site was also undertaken using a calibrated HPI Cypher 5000 Digital Radiation Alert Monitor to measure surface gamma radiation levels and detect and locate any areas of elevated radiation levels. The assessment was undertaken by walking transects of the site approximately 20-25 metres apart with the aid of a GPS device. Radiation levels were continuously monitored at all times whilst walking transects. Transects were recorded and plotted in Figure 5 below.

Radiation levels were also recorded at three off site locations to determine endemic background radiation levels for the Evans Head area. These locations are detailed in table 3.

Table 2: Off-site locations to determine endemic background levels for the Evans Head area

Location Description	Distance from Iron Gates Site (km)	Radiation Measurement (microsievert/hour)
Cherry Street, Evans Head	1.0	0.2 - 0.4
Evans Head Rugby League Club	1.8	0.2 – 0.35
Evans Heads River K12 School	1.6	0.2 – 0.385



Figure 5: Surface radiation survey transects continuously monitored (in red) on the Iron Gates site.

Conditions at Site Boundary

There were no visible signs of mineral sand staining identified during the site inspection.

6 RESULTS

The surface radiation levels monitored on the Iron Gates site in areas where previous sand mining activities were located are all equivalent to background levels displayed at the three off site background control locations. Surface radiation levels generally varied between 0.00 uSv/Hr to 0.3 uSv/Hr. Some discrete areas displayed levels of 0.4 and 0.5 uSv/Hr however these areas are still below Action Level Criteria for dwellings.

It should be noted that while radiation dose rate unit results are quoted in uSv/Hr (microsieverts) and Action Level Criteria units are quoted in uGy/Hr (microgray) these units are identical for gamma radiation in this situation.

7 FURTHER INVESTIGATIONS

Based on the desktop reviews and site assessment undertaken, further surface radiation level monitoring should be undertaken in areas where works are more than 1 metre below current surface levels during construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with sand mining activities.

8 CONCLUSIONS AND RECOMMENDATIONS

Desktop studies revealed that eastern parts of the site and the property adjacent of the Iron Gates development was subject to sandmining activities during the 1970's and early 1980's. As a result there may have been potential for the existence of sand mining residues with elevated radiation levels on site that may have been associated with tailings dams from rutile separation processes.

Site investigations were undertaken and surface radiation levels monitored on the Iron Gates site in areas where previous sand mining activities were located are all equivalent to background levels displayed at the three off site background control locations. Surface radiation levels generally varied between 0.00 uSv/Hr to 0.3 uSv/Hr. Some discrete areas displayed levels of 0.4 and 0.5 uSv/Hr however these areas are still below Action Level Criteria for dwellings.



It is recommended that further surface radiation level monitoring should be undertaken in areas where works are more than 1 metre below current surface levels during construction to determine the presence/absence of contaminated materials in the form of radioactive residues associated with sand mining activities so appropriate management strategies can developed if required.

APPENDIX A PROPOSED DEVELOPEMENT

Lot	Area
1	969 m ²
2	612 m ²
3	612 m ²
4	612 m ²
5	612 m ²
6	612 m ²
7	612 m ²
8	612 m ²
9	612 m ²
10	612 m ²
11	612 m ²
12	612 m ²
13	612 m ²
14	612 m ²
15	612 m ²
16	612 m ²
17	612 m ²
18	612 m ²
19	612 m ²
20	612 m ²
21	649 m ²
22	615 m ²
23	600 m ²
24	600 m ²
25	600 m ²
26	600 m ²
27	600 m ²
28	600 m ²
29	627 m ²
30	600 m ²
31	600 m ²
32	600 m ²
33	600 m ²
34	600 m ²
35	600 m ²
36	788 m ²
37	674 m ²
38	775 m ²
39	612 m ²
40	604 m ²
41	604 m ²
42	604 m ²
43	604 m ²
44	604 m ²
45	604 m ²
46	604 m ²
47	609 m ²
48	605 m ²
49	600 m ²
50	600 m ²
51	600 m ²
52	600 m ²
53	600 m ²
54	600 m ²
55	600 m ²
56	600 m ²
57	623 m ²
58	623 m ²
59	633 m ²
60	632 m ²
61	618 m ²
62	604 m ²
63	604 m ²
64	605 m ²
65	606 m ²
66	606 m ²
67	607 m ²
68	607 m ²
69	608 m ²
70	609 m ²

Lot	Area
71	607 m ²
72	608 m ²
73	682 m ²
74	766 m ²
75	600 m ²
76	600 m ²
77	600 m ²
78	600 m ²
79	600 m ²
80	601 m ²
81	601 m ²
82	601 m ²
83	601 m ²
84	608 m ²
85	614 m ²
86	634 m ²
87	696 m ²
88	602 m ²
89	602 m ²
90	602 m ²
91	859 m ²
92	856 m ²
93	603 m ²
94	603 m ²
95	954 m ²
96	616 m ²
97	663 m ²
98	657 m ²
99	602 m ²
100	723 m ²
101	605 m ²
102	609 m ²
103	620 m ²
104	714 m ²
105	602 m ²
106	604 m ²
107	602 m ²
108	602 m ²
109	602 m ²
110	602 m ²
111	601 m ²
112	600 m ²
113	600 m ²
114	600 m ²
115	608 m ²
116	601 m ²
117	602 m ²
118	600 m ²
119	601 m ²
120	600 m ²
121	600 m ²
122	647 m ²
123	619 m ²
124	603 m ²
125	600 m ²
126	646 m ²
127	661 m ²
128	626 m ²
129	600 m ²
130	639 m ²
131	602 m ²
132	602 m ²
133	600 m ²
134	618 m ²
135	623 m ²
136	604 m ²
137	602 m ²
138	600 m ²
139	600 m ²
140	600 m ²

Lot	Area
141	600 m ²
142	600 m ²
143	605 m ²
144	600 m ²
145	600 m ²
146	601 m ²
147	600 m ²
148	600 m ²
149	601 m ²
150	601 m ²
151	600 m ²
152	665 m ²
153	629 m ²
154	834 m ²
155	765 m ²
156	603 m ²
157	627 m ²
158	644 m ²
159	601 m ²
160	601 m ²
161	601 m ²
162	601 m ²
163	601 m ²
164	601 m ²
165	600 m ²
166	601 m ²
167	602 m ²
168	602 m ²
169	602 m ²
170	602 m ²
171	602 m ²
172	602 m ²
173	602 m ²
174	614 m ²
175	600 m ²
176	2.188ha
177	4.857ha
178	47.418ha

LEGEND:
 SITE BOUNDARY
 PROPOSED EASEMENT



Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894

CLIENT
GOLDCORAL PTY LTD

PROJECT
 PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP831052, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831052 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)

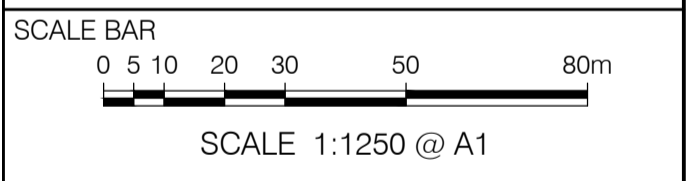
LOCAL AUTHORITY
 RICHMOND VALLEY

NOTES
 (i) This plan was prepared for the purpose and exclusive use of THE INGLES GROUP to accompany an application to RICHMOND VALLEY for approval to reconfigure the land described in this plan and is not to be used for any other purpose or by any other person or corporation. LandPartners Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (ii) or (iii) hereof.
 (ii) The dimensions, areas, number of lots, size and location of improvements & flood information (if shown) are approximate only and may vary.
 (iii) This plan may not be copied unless these notes are included.

Aerial Photography sourced from Neamap 13-3-2019.
 Date of photography - 03/07/2012

LOTS	TOTAL AREA
Residential Lots (175)	16.884ha
Residue Lots (3)	54.463ha
Public Reserves (4)	0.8366ha
Drainage Reserve (1)	0.1124ha
Pump station lot (1)	0.0127ha
TOTAL	72.309ha

ADDITIONAL NOTES




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 Milton Qld 4064
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 Milton Qld 4064

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 f (07) 3842 1001
 info@landpartners.com.au
 www.landpartners.com.au



LEVEL DATUM	AHD		
LEVEL ORIGIN	-		
CONTOUR INTERVAL	-		
COMPUTER FILE	BRJD6396-100-33-16-COPY		
DRAWN	CGW	DATE	27/06/2019
CHECKED	CMJ	DATE	27/06/2019
APPROVED	CGW	DATE	27/06/2019

PLAN NUMBER	SHEET 2 OF 2	REV
BRJD6396.100-013	H	H

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE NSW LAND REGISTRY SERVICES

APPENDIX B HISTORIC AERIAL PHOTOGRAPHS



1953

c. 1002. 5062

WOODBURN RUN 3W NOV 53 152 21 MM 15100 →

LANDSPH



NSW
1220
5192

WOODBURN

JUN 30
JUNE 64

15,000' ASL
114.44MM

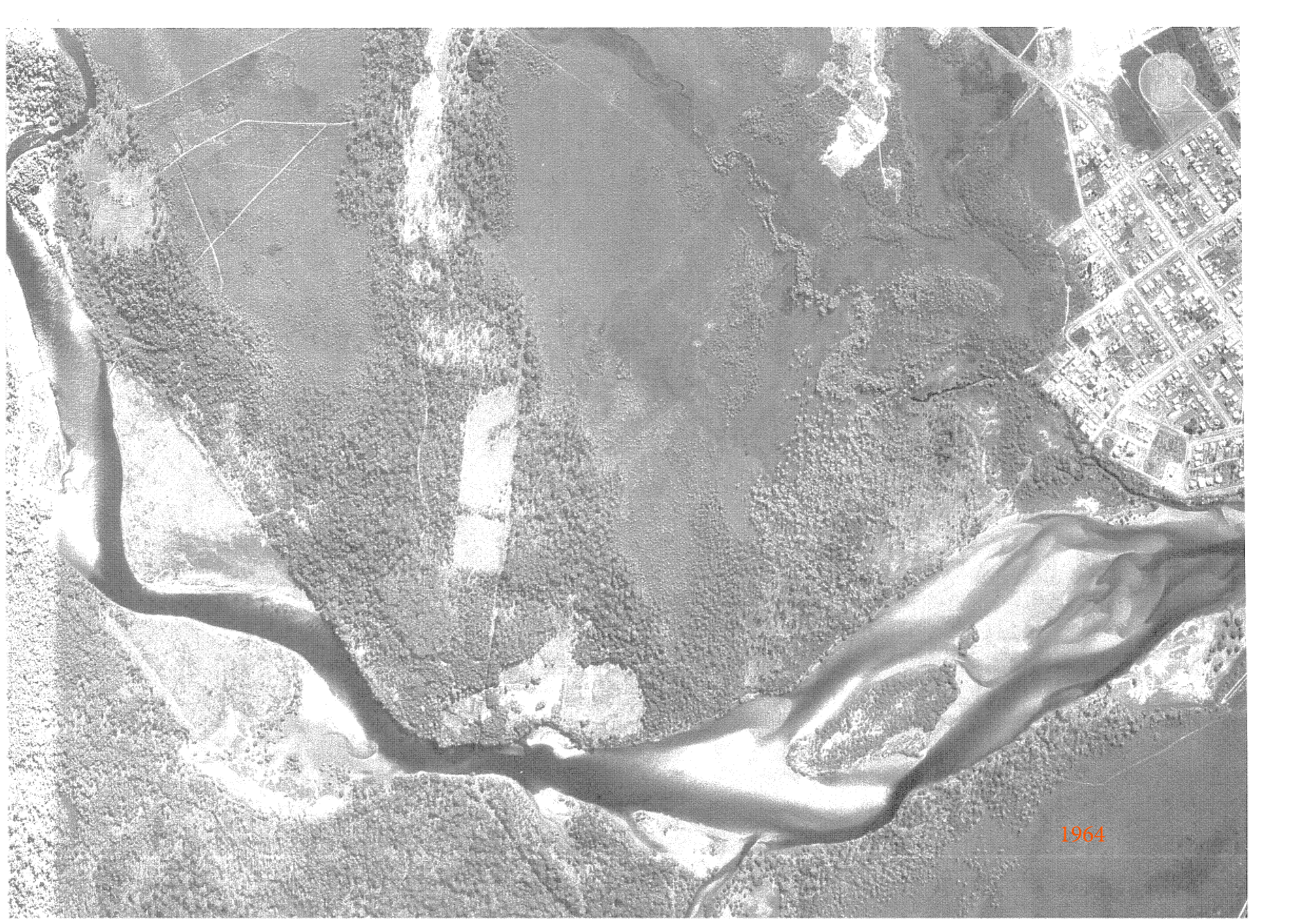
1964

FROWN
LORD N.S.W.
LAND PHOTO
100-1

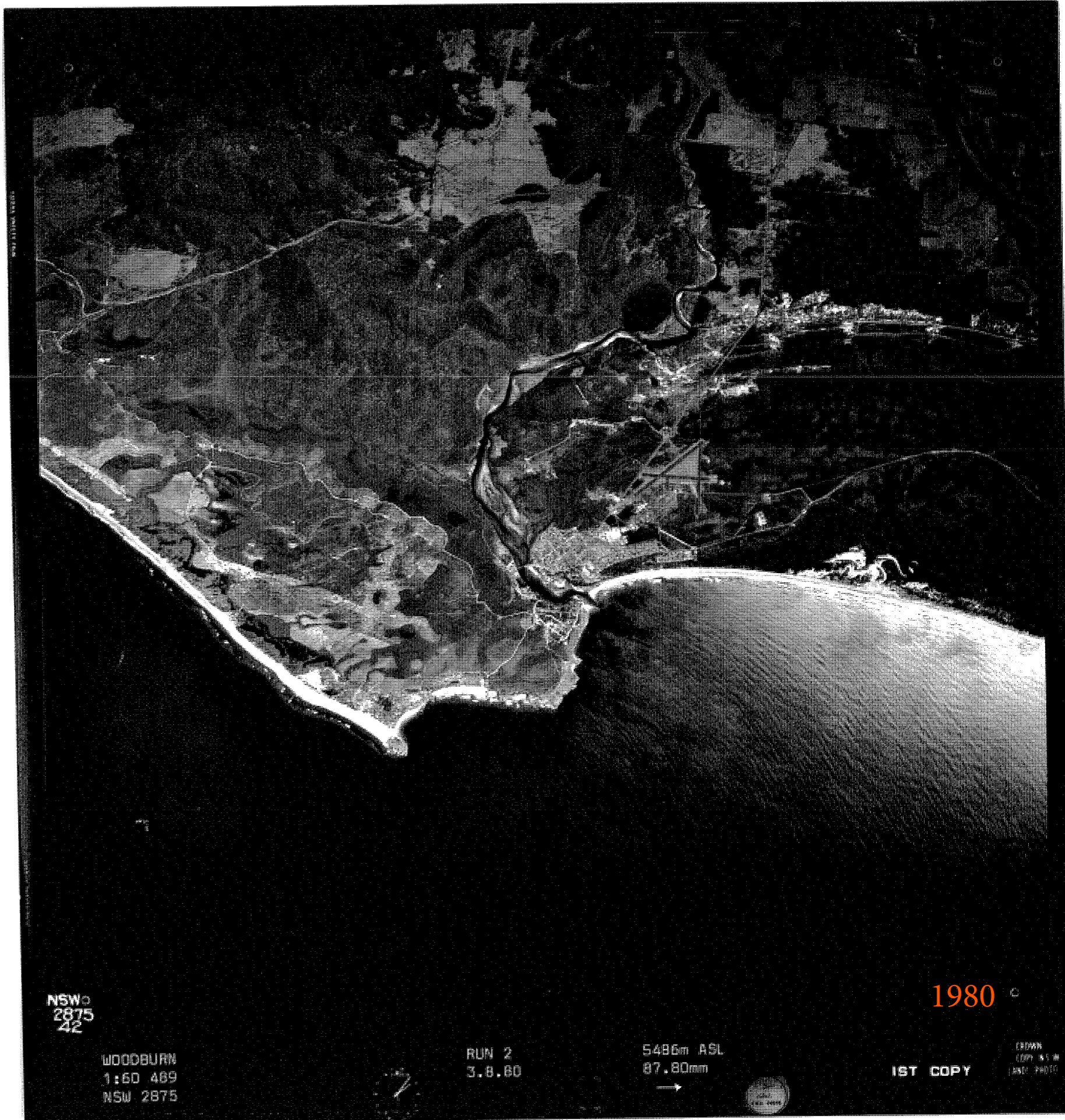
NSW 1220



1971



1964



NSW
2875
42

WOODBURN
1:60 489
NSW 2875

RUN 2
3.8.80

5486m ASL
Ø7.80mm

1980 ©

1ST COPY

CROWN
COPY IN S W
LAND PHOTO



1980

OF
4278
O MSN

20-8-88

UAGI 305715310

0075

1988



1988



WILD 15/4 JAG-S
No 13217 152.76

0022

10:35:32 09/05/01 09190 NSW4554 R02 N232

PS100 1' 340 f/4.0 FF2.0 EC.0 *3P-

2001

WOODBURN
1:50000 Approx. Scale
NSW4554 (M2232)

RUN 2
09-05-01
14-24

152.76 mm
➔

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2014

APPENDIX C SITE INSPECTION PHOTOGRAPHS



Photographic Illustration 1: Cleared area adjacent to Evans Creek with sole dwelling in the background.



Photographic Illustration 2: Open drain located on the eastern boundary of the site.



Photographic Illustration 3: Previously constructed road on the Iron Gates estate.



Photographic Illustration 4: Photograph of the North West portion of the Iron Gates property.