

Preliminary Environmental Site Assessment Kanangra Drive Gwandalan, NSW

10 September 2007

Prepared for:

Rose Property Group C/- Lakeside Living Pty Ltd
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Woolloomooloo NSW 2011

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HLA Ref: N4080801_RPT_10Sep07



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Preliminary Environmental Site Assessment
Kanangra Drive
Gwandalan, NSW
10 September 2007

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HLA ENSR's professional opinions are based upon its professional judgement, experience, and training. These opinions are also based upon data derived from testing and analysis described in this document. HLA ENSR has limited its investigation to the scope agreed upon with its client. HLA ENSR believes that its opinions are reasonably supported by the testing and analysis that have been done, and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area at this time. That standard of care may change and new methods and practices of exploration, testing, analysis and remediation may develop in the future, which might produce different results. HLA ENSR's professional opinions contained in this document are subject to modification if additional information is obtained, through further investigation, observations, or validation testing and analysis during remedial activities.

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GLOSSARY

AC	Asbestos Cement
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Aboveground Storage Tank
bgs	below ground surface
BTEX	Benzene, Toluene, Ethyl benzene and Xylene
CBD	Central Business District
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DECC	Department of Environment and Climate Change
DIPNR	Department of Infrastructure, Planning and Natural Resources
DO	Dissolved Oxygen
DQO	Data Quality Objectives
DNR	NSW Department of Natural Resources
EC	Electrical Conductivity
EILs	Environmental Investigation Levels
EMP	Environmental Management Plan
ESA	Environmental Site Assessment
ESIS	Environmental Site Investigation Services
GME	Groundwater Monitoring Event
HBSIL	Health Based Soil Investigation Levels
HILs	Health Investigation Levels
LOR	Limit of Reporting
LPG	Liquefied Petroleum Gas
MAH	Monocyclic Aromatic Hydrocarbons
mbtoc	Metres below top of casing
µg/l	micrograms per litre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
MW	Monitoring well
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
NHMR	National Health and Medical Research Council
NSW EPA	Environment Protection Authority of New South Wales
OH&S	Occupational Health and Safety
PAH	Polynuclear Aromatic Hydrocarbons
PI	Preliminary Investigation
PID	Photoionisation Detector
PBILs	Phytotoxicity-Based Investigation Levels
ppm	parts per million
PQL	Practical Quantitation Limit
PSH	Phase Separated Hydrocarbons
PULP	Premium Unleaded Petrol
RPD	Relative Percentage Difference
QA	Quality Assurance
QC	Quality Control
RL	Reduced Level
RPD	Relative Percentage Difference
SB	Soil Bore
SILs	Site Investigation Levels
SOP	Standard Operating Procedures
SVOC	Semi Volatile Organic Compound
SWL	Standing Water Level
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
Type I	Analytical Suite – TPH, BTEX and Lead
Type II	Analytical Suite – PAH, Total Phenols
ULP	Unleaded Petrol
UST	Underground Storage Tank
VOC	Volatile Organic Compound



EXECUTIVE SUMMARY

Introduction

Rose Property Group C/- Lakeside Living Pty Ltd engaged HLA-Envirosciences Pty Limited (HLA ENSR), a subsidiary of ENSR Corporation, an AECOM company to conduct a Preliminary Environmental Site Assessment (ESA) at the property located at Kanangra Drive, Gwandalan, New South Wales (the Site) Australia.

The objective for the project was to assess the Site, using Preliminary ESA techniques, for potential sources of contamination from current or past land uses.

The Site is being considered by Lakeside Luxury Living Pty Ltd for low density residential development.

Scope of Works

- Preliminary Investigation comprising of desktop investigation of current and historical activities and a Site inspection;
- Submission of this report on the findings of the Environmental Site Assessment.

Site Location

- The Site is situated on Kanagra Drive, Gwandalan, NSW;
- General topography of the Site is a gentle slope towards the east with some areas of the property sloping towards various dams located across the Site. Topography of the surrounding areas is undulating; and
- The Site is located adjacent to residential properties and a state recreation area. The residential properties are located to the east of the Site with state recreation areas occurring to the North and West.

Site Features

- The Site is currently part of a large residential property.
- Based on available information and a Site inspection conducted on 27 August 2007, the areas of interest are listed below:
 - Fruit orchard where possible pesticide use may have taken place.
 - On-site biological sewage treatment system connected to house near main entrance.
 - Possible quarry in North West corner of the Site.

Site Geology and Hydrogeology

- General topography of the Site slopes to the East;
- The subsurface soil beneath the Site was not investigated by HLA ENSR ;
- Groundwater inferred flow direction is estimated to be to the North East towards Lake Macquarie.

Conceptual Site Model

- Generally any potential contamination from the operation of the Site is only likely to impact on-Site receptors via surface water runoff.
- Potential contamination, if any, especially from surface water, is unlikely to impact off-site as most surface water is collected in on-site dams.
- Given the nature of historical uses of the Site, together with information consolidated into this CSM, the Site is unlikely to have been significantly impacted.

Conclusions

- The Site is considered suitable for the proposed low density residential purposes.
- No further investigations are warranted.

1 INTRODUCTION

Rose Property Group C/- Lakeside Living Pty Ltd engaged HLA-Envirosciences Pty Limited (HLA ENSR), a subsidiary of ENSR Corporation, an AECOM company to conduct a Preliminary Environmental Site Assessment (PESA) at the Site located at Kanangra Dr, Gwandalan, New South Wales (the Site), refer to Figure 1.

The PESA was conducted to identify whether any environmental contamination may be associated with the Site and report on the findings as part of the development application for proposed future development of the Site.

This report presents the findings of the PESA conducted at the Site, including a site inspection by Danielle Martin an Environmental Scientist from HLA ENSR on 27 August 2007.

1.1 Objectives

The Site is being considered for re-development and as part of the development application it is necessary to identify the potential for soil or groundwater contamination across the Site.

The specific objectives of the project were to:

- Assess for potential sources of contamination resulting from past and current land use.

1.2 Scope of Work

HLA ENSR undertook the following agreed scope of work:

- Preliminary Investigation comprising of desktop investigation and Site inspection. Specific components of the desktop study included:
 - Aerial photograph review (one photo per decade from the 1950s);
 - Section 149 planning certificates (assume 1 Lot and DP);
 - Certificates of Title;
 - WorkCover NSW Dangerous Goods Search. HLA would require a letter of authority from the current site owner to undertake this search;
 - Registered groundwater bore search (500 m radius of site);
 - Review published soil, geology, and topographic maps; and
 - DECC website for contaminated sites listed under the Contaminated Land Management Act.
- Preparation of this Preliminary Assessment report.

2 BACKGROUND INFORMATION

Background information was obtained from field observations made during a Site inspection undertaken on 27 August 2007. Other sources include the regional geological and topographic maps for the Site.

2.1 Site Identification

The Site identification details are provided in the following table:

Item	Description
Site Identification	Kanangra Drive, Gwandalan
Site Address	Kanangra Drive, Gwandalan, NSW 2259
Legal Description (Lot and DP)	Lot 3 in DP 588206
Parish/County	Wallarah/Northumberland
Site Owner	Lakeside Luxury Living Pty Ltd
Current Zoning	7B Scenic Protection
Site Area	Approximately 17.5 ha
Geographical Coordinates (AMG)	367676 E, 6333000 N
Site Elevation (m AHD)	20 – 30 m
Site Location	Figure 1
Site Layout	Figure 2

Notes: AMG - Australian Map Grid
AHD – Australian Height Datum

2.2 Site Location

The location of the Site is shown on **Figure 1**. The Site is located on a gentle slope to the east. The slope across the site varies with much of the Site draining into a series of dams located across the property. The land use of the surrounding properties primarily consists of residential and state recreation areas. The surrounding areas are undulating.

2.3 Site Features

General

Site features observed during the Site inspection conducted in August 2007 are summarised below.

- The Site covers an area of approximately 17.5 ha.
- The Site comprises native bushland along with non-native vegetated areas, an orchard, two houses (**Plates 1 & 2**) and a number of dams (**Plate 3**). A poorly vegetated area in the north west corner appears to have previously been a small quarry.
- At the time of this investigation, the Site was predominantly covered with typical lakeside vegetation.

Site features are shown on **Figure 2**. Photographs of the Site and surrounding area are included in **Plates** section of this report.

Site Covering

The Site is predominantly covered with native vegetation. The vegetation was observed to be in good condition with some trees having fallen in a recent storm event. Some areas of the Site contained non-native plantings of palm trees (**Plate 4**) and kikuyu grass along with turfed areas around dams and a fruit orchard. It is understood the orchard (**Plate 5**) contains orange, lemon, mandarin and mango trees.

Possible Source of Impact

Possible sources of impact to the area of investigation were observed to be:

- Residual pesticides in the soils surrounding the fruit orchard. It is understood that the orchard is no longer tended to so it is unclear what level of pesticide use was practiced in the past.
- An on-site biological sewage treatment system connected to the house near the main entrance to the Site.
- Possible quarry in North West corner.

Visible Products and or/ Surface Staining:

There was no visible surface staining identified during the site inspection.

Evidence of Stressed Vegetation:

There was no stressed vegetation observed during the inspection (**Plate 6**). Non-native vegetation covered some areas of the Site and there were a number of fallen trees across the Site which it is understood are the result of a recent storm event in the area.

Underground Utilities, Conduits and Pipelines:

The locations of underground utilities, conduits and pipelines were not identified as part of this ESA.

Site Topography and Drainage

The topography of the Site varies. The nearest surface water body is Lake Macquarie located approximately 300 m east of the Site. Three large dams and a number of smaller dams are also present on the property. Drainage on the Site is mostly into these dams. The eastern boundary of the Site slopes to the East with a drainage line collecting the water and directing it around the property and onto the neighbouring property.

Fences and/or Retaining Walls

The Northern boundary of the Site is bounded by a barbed wire fence. The remainder of the Site's boundary is fenced by timber wall in excess of two metres high with locked gates at the two entrances to the property off Kanangra Drive (**Plate 7**).

Excavation

There was no evidence of recent excavation or stockpiled soil on the Site. An area in the North West of the Site could have potentially been used for extractive purposes in the past. The area appeared to have been dug out and is now poorly vegetated (**Plate 8 & 9**).

Surrounding Land use

The land use of adjacent properties is shown on **Figure 2**. Based on general survey of the surrounding area within a 500 m radius surrounding land uses are:

- North: Point Wolstoncroft Sport and Recreation Centre
- South: Gwandalan Public School
- West: State Recreation Area
- East: Medium density residential

Potentially sensitive areas located within a 500 m radius of the Site include:

- Gwandalan Public School located adjacent the Site ;
- Residential areas to the east of the Site ; and
- Lake Macquarie located approximately 300 m East of the Site.

Photographs of the Site and surrounding areas are included in **Plates** section of this report.

2.3.1 Site Equipment

General

There were no site equipment observed during the inspection with the exception of two small LPG gas tanks connected to the house and two underground tanks used for on-site biological sewage treatment.

Based on available information and a Site inspection conducted on 27 August 2007, the existing areas of interest are listed below:

- On-site biological sewage treatment system connected to house near main entrance.

Site Equipment Testing

HLA ENSR is not currently aware of any tank or line integrity testing that has taken place at the Site.

Equipment Abandonment, Removal, Replacement or Repair

HLA ENSR is not currently aware of any equipment abandonment, removal, replacement or repair. A small amount of rubbish was observed near the Northern boundary of the Site (**Plate 11**) consisting of half a large metal tank and an empty, rusted drum. This was the only rubbish observed during the inspection.

2.3.2 Chronology of Activities

Information regarding the history of the Site is presented in **Section 2.5**. Title search information suggests the Site may have been used for mining purposes in the early 1900's, but since then little is known of the land use. The Site was acquired by the current owner in 2003, and has since been operating as a residential property.

2.3.3 Regional and Local Geology

Geological information, obtained from the Department of Land and Water Conservation (DLWC) Soil Landscape Series Sydney Sheet S1 56-5 indicates the Site forms part of the Narrabeen Group, Clifton sub-group comprising claystone, sandstone and shale from late Permian to early Triassic.

2.3.4 Regional and Local Hydrogeology

In an RCA geotechnical investigation (2003) groundwater was reported across the flat section of the Site between 0.3 and 1 m below ground surface (bgs). No groundwater assessment was conducted by HLA ENSR.

No groundwater wells were reported within the vicinity of 500 m radius from the Site. Based on the topography of the surrounding vicinity and surveying results, the inferred groundwater flow is likely to flow in an Easterly direction.

A registered groundwater bore search was carried out by HLA ENSR (refer to **Appendix A**). One bore was identified within a 2 km radius of the Site near the Southern boundary of the Site. This bore is understood to be used for domestic purposes.

2.4 Section 149 Certificate

Copies of the Planning Certificate from Wyong Council, issued under Section 149 of the Environmental Planning and Assessment Act 1979 were obtained and reviewed by HLA ENSR. The review is summarised below.

The certificate, dated 30 August 2007, provided the following information:

- Wyong Local Environmental Plan 1991 (as amended), Wyong Development Control Plan 2005 as well as a number of State Environmental Planning Policies apply to the land;

- The land is zoned 7B Scenic Protection;
- The land is subject to the Shire-wide Contribution Plan for the development of public facilities;
- The land is not subject to Unhealthy Building Land Policy;
- The land is not affected by the operation of sections 38 or 39 of the Coastal Protection Act 1979, to the extent that council has been so notified by the Department of Public Works;
- The land is proclaimed to be located in a mine subsidence district;
- The land is not affected by road widening and/or realignment under the Roads Act 1993;
- The land is not affected by flood related development controls;
- The land is not subject to any restrictions related to bush fire however it is considered to be bush fire prone;
- The land is considered to be affected by acid sulphate soils; and
- The land is not affected by a policy adopted by the council that restricts the development of the land because of the likelihood of land slip, bush fire subsidence, or any other risk.

A copy of the certificate is included in **Appendix A**.

2.5 Historical Certificates of Title

Certificate of Title information was obtained from the Land Titles Office to provide an indication of previous site owners and possible land uses (refer **Appendix A**). Site ownership history is summarised below:

Lot / DP	Dates	Owner/s	Possible Site Use
Lot 3, DP 588206	4.01.2003 to date	Lakeside Living Pty Limited	Rural/residential
	5.01.1999 to 4.01.2003	Raymond Reginald Williams	Not known
	19.04.1985 to 5.01.1999	Anders Fredrick Josephson	Not known
	25.08.1939 to 19.04.1985	Cam & Sons Pty Limited	Not known
	1.08.1939 to 25.08.1939	John Reid, Master Mariner	Not known
	12.10.1926 to 1.8.1939	Charles Colin Capp (and Estate), Thomas Ivory Capp, Edward Moor and Henry Moore, Graziers	Possibly purchased for cattle farming
	29.06.1915 to 12.10.1926	North Wallarah Colliery Company Limited	Purchased for the purposes of mining
	26.06.1906 to 29.06.1915	Alexander Amos	Purchased for the purpose of mining other than gold mining



The lands title office information reviewed suggests that the site ownership history is unlikely to have resulted in significantly contaminating activities however it appears probable that mining activities took place on the Site in the early 1900's. Since then title information suggests that the site has been utilised for rural residential activities.

2.6 Aerial Photographs

Historical aerial photographs were obtained from the NSW DNR for review. The following information was derived from reviewing the historical aerial photographs for the Site and the surrounding area.

Photograph Details	Description
Mar 1954 Black and White Run 3	Site: The Site is vegetated. There are no visible signs of clearing or construction. Surrounds: Kanangra Drive is visible. There are no signs of other clearing or construction in the area.
Aug 1965 Black and White Run 12	Site: The Site remains largely vegetated however a patch has been cleared in the north west corner. There are no buildings or structures visible. Surrounds: To the south of the Site a number of streets are visible along with a number of residences. There are some buildings visible to the north of the Site also.
May 1975 Black and White Run 3	Site: The Site appears to be in similar condition as in the 1965 photograph. Surrounds: The surroundings area appears to be similar to 1961 aerial photograph with the addition of more residences to the south of the Site.
Apr 1984 Black & White Run 3	Site: The Site appears to be in similar condition as in the 1975 aerial photograph. Surrounds: The surroundings area appears to be similar to 1961 aerial photograph. The primary school appears to be visible to the south of the Site.
May 1996 Colour, Run 12	Site: The house near Kanangra Drive is now visible, along with a number of tracks across the Site. The orchard is visible as are three dams. Surrounds: The surroundings area appears to be same as previous photograph of 1984.
Feb 2006 Colour, Run 4	Site: Further clearing has taken place around the houses. The clearing in the north west of the property contains more heavily vegetated than in the previous photograph. Surrounds: The surrounding area appears to be same as previous photograph of 1996.

The review of aerial photographs has not identified any additional information to suggest previous land use that may be different to the current land use. Scans of aerial photographs are included in **Appendix A**.

2.7 Dangerous Goods

HLA ENSR requested WorkCover NSW to undertake a search of the Stored Chemical Information Database to identify if historical dangerous goods license information was available for the Site. WorkCover information (refer **Appendix A**) indicated that no records of dangerous goods licences were found for the Site.

2.8 NSW DECC Website

The NSW EPA register did not contain Notices relating to the Site under the provisions of the Contaminated Land Management Act 1997 (refer **Appendix A**). The register listed three properties in the Wyong local government area with current Notices. All properties are well removed from the subject site and are unlikely to have the potential to impact the Site.

2.9 Previous Contamination Assessment Reports

No previous contamination assessment reports for the Site are reported to have been undertaken. One geotechnical report (RCA 2003) was provided and no significant contamination issues were identified in that report.

3 CONCEPTUAL SITE MODEL

3.1 General

The purpose of a Conceptual Site Model (CSM) is to identify potential risks present at the Site relative to the surrounding environment. The potential sources, potential transport mechanism and exposure pathways, and potential sensitive receptors to the Site, based on the findings of this investigation are presented in the following sections.

3.2 Potential Sources of Contamination

On-Site Source

- Residual pesticides in soils surrounding fruit orchard, although the level of usage would be expected to be minimal due to the scale of the orchard; and
- On-site biological sewage treatment system servicing existing residence.

Off-Site Source

- There are no known off- Site potential sources of contamination within 100m of the Site.

3.3 Chemicals of Potential Concern

The Chemicals of Potential Concern (COPC) at the Site are pesticides related to the fruit orchard; organochlorine pesticides (OPPs).

3.4 Potential Transport Mechanisms and Exposure Pathways

Major factors that influence the transport mechanisms and exposure pathways at the Site are as follows:

- General topography of the Site slopes to the East with many internal slopes toward the dams located across the Site;
- The subsurface soil beneath the Site (unknown);
- The groundwater depth level is unknown. RCA (2003) logged five boreholes across the Site to depths of 2.25 m with groundwater not encountered at any of them; and
- Groundwater inferred flow direction is estimated to be to the east towards Lake Macquarie.

Based on the findings above, the potential transport mechanisms are estimated as follows:

- Leaching of contaminants from possibly impacted orchard soil into groundwater beneath the Site; and
- Surface water runoff from orchard.

The potential exposure pathways likely to be:

- Direct contact with possibly impacted soil, surface water and groundwater by humans through incidental ingestion or dermal contact.

3.5 Potential Receptors

In summary, the potential significant on-Site receptors identified within the Site would be limited to:

- Residents occupying the Site in the future.

Given that the potential contaminants of concern at the time of inspection were not being stored on the Site and the orchard was small and for personal use, HLA ENSR considers that the potential for any significant risk arising from the orchard would be negligible and it is unlikely for this exposure pathway to be complete.

The potential off-Site receptors identified within the 500 m radius of the Site are:

- The residents living in the residential houses east of the Site; and
- The public school to the south of the Site.

Given that most of the surface water on-site is collected on site in dams HLA ENSR considers it unlikely that the potential pathway has been completed.

3.6 Discussion

Generally any potential contamination from the historical and current operations of the Site is assessed to be minimal.

Potential contamination, if any, such as from surface water, is unlikely to impact off-site as most surface water is collected in on-site dams.

4 CONCLUSION

Given the nature of historical uses of the Site, together with information consolidated into this report, the Site is unlikely to have been significantly impacted from any of the previous landuse activities.

The Site is considered suitable for the proposed low density residential purposes.

Based on the information provided and HLA ENSR's independent inspections, it is considered that no further environmental investigations are warranted.

References

National Environment Protection Council (NEPC) 1999. National Environmental Protection (Assessment of Site Contamination) Measure.

NSW Environment Protection Authority (NSW EPA) 1997, Guidelines for Consultants Reporting on Contaminated Sites.

Department of Land and Water Conservation (DLWC) Soil Landscape Series Sydney Sheet S1 56-5

Robert Carr & Associates (2003). Geotechnical Investigation August 2003



Figures



Site Location
 Rose Property Group
 Phase I Environmental Site Assessment
 Kanangra Drive, Gwandalan



FIGURE
1

CRANGAN BAY

POINT WOLSTONCROFT SPORT
AND RECREATION CENTRE

House

Possible quarry/
poorly vegetated
area

Dam

Dam

KANANGRA DRIVE

House

Driveway

Orchard

Gwandalan Primary School

Residential

Residential

Residential

ORANA ROAD



Site Layout
Rose Property Group
Phase I Environmental Site Assessment
Kanangra Drive, Gwandalan



FIGURE

2



Plates



Plate P1: Residence located on Kanangra Drive, near main gates. Currently occupied



Plate P2: Bunker located in North East corner of site, currently vacant



Plate P3: Dam located in Southern portion of the Site, residence can be seen in the background



Plate P4: Driveway leading from main entrance on Kanangra Drive to Eastern side of Site



Plate P5: Small Orchard located in south East portion of Site



Plate P6: Bushland in central portion of Site



Plate P7: Timber fencing along Kanangra Drive



Plate P8: Poorly vegetated portion of Site located in the North West corner where possible quarry or other extractive activities may have previously taken place



Plate P9: Part of poorly vegetated portion of Site located in the North West corner where possible quarry or other extractive activities may have previously taken place



Plate P10: Vegetation in Northern portion of the Site



Plate P11: Only sign of rubbish on Site, located close to Northern boundary of the Site consisting of half a large metal tank with a rusted empty drum.



Plate P12: Main entrance to Site



Plate P13: On-site biological sewage treatment system

