CONSULTING EARTH SCIENTISTS

STAGE 1 ENVIRONMENTAL SITE ASSESSMENT:
58 TONGARRA ROAD, ALBION PARK, NSW
PREPARED FOR DELMO ALBION PARK PTY LTD

REPORT ID: CES060714-AM-01-F
Revision: 2

Written by: K. Weir
Field Scientists: K. Weir
Reviewed by: B.C. Furr

Authorised by:
Dr Michael Petrozzi

Client:
Delmo Albion Park Pty Ltd
C/- Ashe Morgan Property Services
Level 32, 126 Phillip Street
Sydney NSW 2000

Date: 5 March 2007

Telephone: 02 8585 4888 • **Fax**: 02 9550 9566 • 1/111 Moore St • Leichhardt, NSW 2040 • Australia

Document Control

STAGE 1 ENVIRONMENTAL SITE ASSESSMENT:
58 TONGARRA ROAD, ALBION PARK, NSW
PREPARED FOR DELMO ALBION PARK PTY LTD

REPORT ID: CES060714-AM-01-F
Revision: 2

Distribution Register

Copy Number	Hard Copy	Digital copy	Recipient	Location
1-2	✓	✓	Mr Flavio Roncolato	AMPS
3	✓	✓	Ms Kelly Weir	CES

The Distribution Register identifies the recipients of issued copies of this report.

Revision Register

Revision Number	Revision Date	Description
0	28/08/2006	Draft Report Id: CES060714-AM-01-D
1	12/09/2006	Final Report Id: CES060714-AM-01-F
2	5/03/2007	Final Report including client revisions: CES060714-AM-01-F (Revision 2)

The revision register tracks changes to the document.

The latest revision of this document supersedes all previous revisions. It is the responsibility of the recipient to ensure that superseded revisions of this document are removed from circulation.

Documents are only valid if they are signed, original documents issued by CES. CES does not accept any liability for actions taken based upon incomplete photocopies of this document.

STAGE 1 ENVIRONMENTAL SITE ASSESSMENT:

58 TONGARRA ROAD, ALBION PARK, NSW.

PREPARED FOR ASHE MORGAN PROPERTY SERVICES.

Report ID: CES060714-AM-01-F (Revision 2)

EXECUTIVE SUMMARY

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Delmo Albion Park Pty Ltd (Delmo Albion Park) to conduct a Stage 1 Environmental Site Assessment of the site located at 58 Tongarra Road, Albion Park, NSW.

The purpose of the assessment was to identify and assess any likely contaminants or potential environmental issues, resulting from past and/or present activities undertaken on or adjacent to the site which may affect the sites suitability for the proposed commercial/industrial land-use.

The ESA comprised a detailed site inspection and a review of historical and background information including historical title documents; historical aerial photographs; NSW WorkCover records; Department of Defence records; Department of Energy, Utilities and Sustainability (DEUS) records; Shellharbour City Council planning certificates, topographic, geological, soil and acid sulfate risk maps; and preparation of a report detailing the results of the ESA. The findings of the assessment are presented below:

- The site address is 78 Tongarra Road, Albion Park, NSW and comprises Lot B in Deposited Plan 109816, Lot 6 in Deposited Plan 1100435 and Lot 1 in Deposited Plan 955731;
- Lot B occupies an area of approximately 4.5 hectares, Lot 6 occupies an area of approximately 69 hectares and Lot 1 occupies an area of approximately 7.1 hectares;
- The site is immediately surrounded to the north, south and west by rural grazing land and to the east by the runway of the Illawarra Regional Airport.
- Historical documents indicated that the site had most likely been used for farming/rural grazing purposes since at least 1901;
- At the time of the assessment the site was used predominantly for cattle grazing with associated dairy, residential properties and machinery maintenance sheds. In addition, the south eastern portion of the site was used for soil mixing as part of a landscaping business and may have been used for this purpose since 1977;
- Natural soils on the site comprise alluvial loams and siliceous sands of the Fairy Meadow soil landscape group which typically have high permeability and are of low wet bearing strength;

- Site geology comprises alluvium, gravel, beach and dune sand across the majority of the site, while the south east corner of Lot 6 is underlain by Berry Siltstone comprising mid-grey to dark-grey siltstone to fine sandstone of the Shoalhaven Group;
- The site has an approximate elevation of less than 10 m AHD and is located on the valley flat below the Illawarra Escarpment. Observations made by CES during a site inspection revealed that there is a general down gradient slope of less than 5 degrees to the south east toward Frazers Creek. The portion of Lot 6 surrounding Frazers Creek is noted on the Albion Park topographic map as being subject to inundation;
- The closest water receptor is Frazers Creek which enters the southern portion of the site (Lot 6) and flows north north east through an onsite wetland and to the Macquarie Rivulet located approximately 800 m north of the northern corner of Lot 6. The Macquarie Rivulet, which flows into Lake Illawarra located approximately 1.5 km to the north east of the site, also forms the western boundary of Lot 1 on the western side of Illawarra Road;
- The exact direction of groundwater flow was not determined from the available information; however, it is likely that the groundwater will follow the regional topography and flow generally to the north east and may follow the Frazers Creek and Macquarie Rivulet watercourses;
- The WorkCover and DEUS search provided no evidence of the presence of aboveground or underground storage tanks. However, three above ground storage tanks (ASTs) containing diesel and an above ground waste oil storage tank were observed during the site inspection in the southern portion of Lot 6. In addition, steel pipes which may possibly indicate the presence of an underground storage tank (UST) were also noted south of the dairy in this area;
- Shoalhaven City Council planning certificates indicated that no notices have been issued on the site regarding the Contaminated Land Management Act 1997;
- Three residential cottages and other buildings in the southern portion of Lot 6 are constructed with Asbestos Containing Materials (eg fibrous cement sheets) and may have been painted in the past with lead-based paint. Remnants of former structures adjacent to a concrete silo in the central portion of the site suggest the presence of these construction materials in this location also;
- A number of stockpiles of soil, concrete and fill are located in the south eastern portion of the site, which is associated with the landscaping business. In addition, anecdotal evidence suggests that an area adjacent to the silo was used for soil mixing;
- A machinery maintenance shed is located in the southern portion of Lot 6 where various chemicals including engine oils and degreasers are stored;
- An above ground vehicle maintenance ramp and adjacent drainage channel is located in the southern portion of Lot 6 approximately 500 m from Frazers Creek;
- Anecdotal evidence suggests that a section of land in the south west portion of Lot 6 as well as other low lying land and gullies have been filled in the 1980s to make paddocks

level for working with farm machinery and these areas are now covered with pasture; and

- Farm tracks throughout the property have been previously built up with shale and gravel and other fill material over the decades to enable travel during wet periods.

Based on the results of the assessment, CES conclude the following:

Potentially contaminating activities associated with the use of a site as rural grazing land and a landscaping business include:

- Uncontrolled filling;
- Maintenance of farm machinery;
- Storage of chemicals, including petroleum hydrocarbons;
- Pesticide and/or herbicide application;
- Landscaping operations; and
- Asbestos containing materials and lead paint associated with structures.

CES have identified the following areas where past and present activities have had the potential to cause contamination as follows:

- Areas used for a landscaping business including: adjacent to the silo, stockpiled soil between the cottages and the south eastern portion of the site adjacent to the airport runway;
- A machinery maintenance shed and nearby vehicle carport;
- An above ground vehicle maintenance ramp and adjacent drainage channel;
- An area in the vicinity of three ASTs;
- An area surrounding an above ground waste oil storage tank;
- An area to the south of a dairy building where steel pipes may indicate the presence of underground fuel storage tanks;
- Land surrounding existing residential cottages and other buildings constructed with Asbestos Containing Materials (eg fibrous cement sheets) and which may have been painted in the past with lead-based paint;
- Potentially filled areas including land in the south west sector of Lot 6; farm tracks and an old well; and
- Former structures surrounding a silo.

CES conclude that further investigation is required in the identified areas of environmental concern to determine the presence, nature and extent of potential contamination in these areas.

CES conclude that pending the results of further investigations in these areas, it is likely that the site can be made suitable for the proposed commercial/industrial land-use following any necessary remediation and validation of any identified contamination.

CES recommend the following:

- A Stage 2 Environmental Site Assessment, complying with EPA guidelines, should be conducted to characterise the degree and extent of potential contamination at the site. It is recommended that the sampling program target the areas identified as being of potential environmental concern (using a judgemental sampling pattern) and elsewhere, where contamination is unlikely, a grid (systematic) sampling be undertaken. The laboratory results should be interpreted statistically and compared against guidelines appropriate to the proposed future use of the site;

- Based on the results of the Stage 2 investigation, and as required, remediation and validation of any contamination at the site be conducted to achieve the necessary clean up criteria.

- A hazardous materials audit of the buildings on the site to be carried out and hazardous materials identified as likely to be disturbed in any future demolition works. These works should be conducted in accordance with the relevant Australian Standards and Worksafe Codes of Practice; and

- Given the limitations relating to the Fairy Meadow soil landscape group on which the site is located, CES recommend that a geotechnical investigation be carried out to confirm the ground conditions, determine suitable founding mediums and allow design of appropriate foundations for the proposed development.

LIST OF ABBREVIATIONS

AMPS	Ashe Morgan Property Services Pty Ltd
AST	Aboveground Storage Tank
CES	Consulting Earth Scientists Pty Ltd
DEC	Department of Environment and Conservation
DEUS	Department of Energy, Utilities and Sustainability
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
LEP	Local Environment Plan
LGA	Local Government Area
LPI	Land and Property Information
mAHD	metres Australian Height Datum
NSW	New South Wales
OHS	Occupational Health and Safety
PSP	Project Safety Plan
UST	Underground Storage Tank

STAGE 1 ENVIRONMENTAL SITE ASSESSMENT:

58 TONGARRA ROAD, ALBION PARK, NSW.

PREPARED FOR ASHE MORGAN PROPERTY SERVICES.

Report ID: CES060714-AM-01-F (Revision 2)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

STAGE 1 ENVIRONMENTAL SITE ASSESSMENT:

58 TONGARRA ROAD, ALBION PARK, NSW.

PREPARED FOR ASHE MORGAN PROPERTY SERVICES.

Report ID: CES060714-AM-01-F

1 INTRODUCTION

Consulting Earth Scientists (CES) was commissioned by Delmo Albion Park Pty Ltd (Delmo Albion Park) to undertake a Stage 1 Environmental Site Assessment (ESA) of the site located at 58 Tongarra Road, Albion Park, NSW (Figure 1).

It is understood that the site is proposed to be developed for commercial/industrial land-use. The ESA was required to facilitate the approval and rezoning required for the development of the site.

This report has been prepared in general accordance with the requirements specified for a Stage 1 Preliminary Site Investigation as published by the Department of Environment and Conservation (DEC), now incorporating the NSW Environment Protection Authority (NSW EPA) in the *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 1997) and State Environmental Planning Policy 55 (SEPP 55) – Remediation of Land.

2 OBJECTIVES AND SCOPE

The objectives of the Stage 1 ESA were to:

- Identify past and present land uses of the site that may have resulted in contamination, as possible from the information available; and
- Prepare a report, in accordance with DEC guidelines, detailing the results of the assessment.

The scope of work undertaken by CES to attain these objectives was as follows:

- A review of historical information relating to the site including:
  - Historical land title records;
  - NSW Department of Lands, Land and Property Information Division (LPI) historical aerial photographs;
  - WorkCover NSW records;
  - Department of Energy, Utilities and Sustainability records;
  - Department of Defence records;
  - Shellharbour City Council planning certificates; and
  - An excerpt from the current contract of sale.
- Preparation of a Project Safety Plan (PSP) that identified foreseeable hazards associated with the site works and measures employed to manage or remove the associated risk;
- A detailed site inspection;
- A review of topographic/and or orthophoto maps;
- A review of geological and soil landscape maps;
- A review of Acid Sulfate Soil Risk maps; and
- Preparation of an ESA report that assesses the results of the ESA and makes recommendations on any further site investigations required.

3 SITE INFORMATION

Site information is presented below.

3.1 SITE IDENTIFICATION

The site address is 78 Tongarra Road, Albion Park, NSW. The current legal description of the site is:

- Lot B in Deposited Plan 109816;
- Lot 6 in Deposited Plan 1100435; and
- Lot 1 in Deposited Plan 955731.

The site is located in the Local Government Area (LGA) of Shellharbour, Parish of Jamberoo and County of Camden. The geographical coordinates for the approximate centre of the site are 296444E and 6172837N and the general locality of the site is shown in Figure 1.

Lot B occupies an area of approximately 4.5 hectares, Lot 6 occupies an area of approximately 69 hectares and Lot 1 occupies an area of approximately 7.1 hectares. The site is immediately surrounded to the north, south and west by rural grazing land and to the east by the runway of the Illawarra Regional Airport. The existing site layout is shown in Figure 2.

3.2 SITE ZONING AND LANDUSE

At the time of the assessment the site was used predominantly for cattle grazing with associated dairy, residential properties and machinery maintenance sheds. From the site inspection, it was also apparent that a section of land in the south eastern portion of the site was previously used for the sorting and storage of materials as part of a landscaping supplies business.

It is understood that the land is to be developed for commercial/industrial land-use.

The site is currently zoned under the Shellharbour Rural Local Environment Plan (LEP) 2004 as follows:

- Lot B is zoned 1(a) Agriculture Zone;
- The majority of Lot 1 is zoned 1(a) Agriculture Zone, while a section of Lot 1 bordering the Illawarra Highway is currently zoned 9(b) Arterial Roads Reservation;
- The south eastern corner of Lot 6 is zoned 9(b) Arterial Roads Reservation, the wetland in the centre of Lot 6 is zoned 7(w) Wetlands and the remainder of the site is zoned 1(a) Agriculture Zone.

The previous zoning of the site was not determined.

3.3 TOPOGRAPHY

A review of the Albion Park 1:25 000 topographic map, Sheet 9028-1-N (CMA, 1986) revealed that the site has an approximate elevation of less than 10 m AHD and is located on the valley flat below the Illawarra Escarpment. Observations made by CES during a site inspection revealed that there is a general down gradient slope of less than 5 degrees to the south east toward Frazers Creek. The portion of Lot 6 surrounding Frazers Creek is noted on the map as being subject to inundation.

Frazers Creek enters the southern portion of the site (Lot 6) and flows north north east through an onsite wetland and to the Macquarie Rivulet approximately 800 m north of the northern corner of Lot 6. The Macquarie Rivulet, which flows into Lake Illawarra located approximately 1.5 km to the north east of the site, also forms the western boundary of Lot 1 on the western side of Illawarra Road. Surface water falling on the site would follow local onsite drainage and either infiltrate directly into the underlying soil or flow toward Frazers Creek or Macquarie Rivulet.

3.4 GEOLOGY AND SOILS

3.4.1 Regional Geology

Review of the Kiama 1:50 000 Geological Series Sheet 9028-1 (NSW Department of Mines, 1974) indicated that the majority of the site is underlain by alluvium, gravel, beach and dune sand of the Quaternary Period. However, the south east corner of Lot 6 (underlying the existing onsite residences) is underlain by Berry Siltstone comprising mid-grey to dark-grey siltstone to fine sandstone of the Shoalhaven Group of the early-late Permian Period.

3.4.2 Soils

Review of the Kiama 1:100 000 Soil Landscape Series Sheet 9028 (Department of Conservation and Land Management, 1993) indicated that the site was situated on the Fairy Meadow soil landscape group. As described by the soil map, the landscape in which soils of the Fairy Meadow soil landscape group are found comprises alluvial plains, floodplains, valley flats and terraces bellow the Illawarra Escarpment. Local relief is less than 10 m with slopes usually less than 5%.

Soils of the Fairy Meadow soil landscape group are described as shallow to moderately deep (50-100cm) alluvial loams and siliceous sands on terraces with prairie soils and yellow podzolic soils occurring on the drainage plains. The limitations of this soil landscape group are noted as being a flood hazard, of low wet bearing strength and having highly permeable topsoils with high seasonal water tables.

3.5 HYDROGEOLOGY

The exact direction of groundwater flow was not determined from the available information; however, it is likely that the groundwater will follow the regional topography and flow

generally to the north east and may follow the Frazers Creek and Macquarie Rivulet watercourses. Local usage of surface waters was not determined.

A search of the groundwater database at the Department of Infrastructure, Planning and Natural Resources (DIPNR) was performed (Appendix 1). The search indicated that at the time of the search there were three registered bores which exist within a 2 km radius of the centre of the site. The closest bore (GW072794) as shown on the map provided by DIPNR appears to be located on the site. However, the corresponding Work Summary sheet describes the well as being located on Lot 6 in Deposited Plan70360, which is not part of the site. This bore is registered for Domestic Stock use and encountered water bearing zones within shale bedrock from 20 m to 20.5 metres Below Ground Level (mBGL). The salinity was recorded as being 'salty'.

Two further bores (GW031499 and GW031515) are located approximately 1 km to the north west of the site and west of Macquarie Rivulet. These bores are registered for Irrigation and Stock uses respectively. GW031515 encountered a water bearing zone in shale at 21.90 m to 22.80 m and the salinity is recorded as being 'salty'. Further water quality data was not available.

3.6 ACID SULPHATE SOIL RISK

Clause 41 of the Shellharbour Rural Local Environment Plan 2004 states that any disturbance of more than one tonne of soil, or works likely to lower the water table must address impact relating to potential acid sulfate soils.

Review of the Albion Park 1:25 000 Acid Sulfate Soils Risk map (Land and Water Conservation, 1997) revealed that Lot 1 and Lot B and the majority of Lot 6 are described as Class AP4, that is, as having a low probability of acid sulfate materials being present. In these areas, the map indicates that acid sulfate materials, if present, will be widespread, sporadic and may be buried by alluvium or windblown sediments. The depth to acid sulfate materials in areas classified as AP4 is estimated by the map to be greater than 3 m below the ground surface at the time of mapping. The map indicates that land management is generally not affected by acid sulfate soils in these areas, but highly localised occurrences may be found.

The south eastern portion of Lot 6 is noted on the map as having no known occurrence of acid sulfate materials. Land management activities in this area are not likely to be affected by acid sulfate materials.

Refer to the Preliminary Geotechnical Assessment Report, CES060714-AM-02-F (Revision 1) (CES, 2007) for a site specific assessment of acid sulfate soils.

4 SITE HISTORY

Several sources have been investigated to determine the history of land use at the site. The following list details the sources of historical information and a summary of information provided by each source:

- Land Titles Office of New South Wales: Historical title information;
- Shellharbour Council: Section 149 certificate including notices and remediation orders issued under the Contaminated Land Management (CLM) Act;
- Department of Defence: Notices of unexploded ordnances;
- Department of Infrastructure, Planning and Natural Resources: Historical aerial photograph interpretation (1949 to 2002);
- WorkCover NSW: Searches of Dangerous Goods licensing records;
- Department of Energy, Utilities and Sustainability: Records of cathode-protected fuel tanks;
- An excerpt of the current contract of sale between Johnstone (Marks Villa) Pty Limited & G.H. Johnstone Pty Limited and Delmo Albion Park Pty Limited as provided by AMPS.

4.1 HISTORICAL TITLE INFORMATION

A title deeds search was conducted through the Land Titles Office of New South Wales and a copy of the titles deeds as well as a summary of the results are provided in Appendix 2.

The search indicated that the three lots which form the site were owned by a number of individuals from 1901 to the present. At the time of the assessment, Delmo Albion Park Pty Ltd had a caveat on the titles for the future purchase of the property. From 1901, the site was owned by Annie Raftery until 1908 when John Russel acquired the site.

In 1915, the site was sold to Malcolm Mathie (farmer) and in 1917 the site was acquired by Charles Vicar Johnston and John Alfred Johnstone (farmers). John Alfred Johnstone (farmer) was the sole person on the title from 1947 to 1965 when John Lindsay Johnston and Garnet Hedley James Johnstone acquired the site. The title was converted to Johnstone (Marks Villa) Pty Ltd and G.H. Johnston Pty Ltd in 1977 and these companies remain the owners of the property to date. Historically, the site was most likely used for pastoral purposes.

4.2 SHELLHARBOUR CITY COUNCIL

The Section 149(2) and 149(5) planning certificates for the site were obtained from Shellharbour City Council to determine if any notices regarding site contamination had been issued under Section 9(2) of the Contaminated Land Management Act 1997. No such notices have been issued on the site. A copy of the certificates is provided in Appendix 3.

4.3 AERIAL PHOTOGRAPH INTERPRETATION

Historical aerial photographs from the NSW Department of Lands, Land and Property Information Division (LPI) were examined for the years: 1949, 1963, 1974, 1984, 1993 and 2002. Copies of the photographs are provided in Appendix 4. The findings of air photo investigations are as follows.

Year	Description
1949	**Site:** Substantially undeveloped, mainly pastoral land with few trees and a chain of ponds along western part of site. Buildings/structures evident in south eastern corner (Area A) and in central part of site (Area B, close to end of east-west runway of adjacent aerodrome). Tall structure in Area B may be a silo (possibly grain storage). Photograph unclear but appeared to be evidence of cultivation in southern part of the site and on present-day Lot 1. Also evidence of recent flooding of western parts of site. Parallel striations in area of ponds may indicate area of site subject to flooding had been improved possibly to mitigate the effects of flooding (i.e. allow quicker draining of the land) **Surrounding area:** Substantially undeveloped agricultural land to the south, west and north of the site. Albion Park township is located to the south west of the site. The aerodrome that was to become the present-day Illawarra Regional Airport was located to the east of the site with uncleared land to the east of that. Landing strips had no markings and may have been unsealed.
1963	**Site:** Substantially as for 1949 photograph. More evidence of improvement of pastures and possibly cultivation but may be due to better quality photograph. No noticeable change to buildings/structures in Area A, but one building/structure in Area B appeared to have been removed. Striations around ponds were still evident. **Surrounding area:** Substantially as for 1949 photograph. Development of Albion Park had extended to the west. Landing strips on aerodrome appeared sealed and with markings. Some clearing of the land to the west of the landing strips to accommodate possibly aircraft parking areas and a building.
1974	**Site:** Substantially as for 1963 photograph. Greater contrast between apparent different paddocks possibly suggesting different levels of improvement. Striations still visible around northern pond. Increase in number of buildings in Area A, Area B similar to 1963 photograph. **Surrounding area:** Substantially as for 1963 photograph. Urban area of Albion Park to south west had extended north. Area to east of aerodrome had been mostly cleared with small area of bushland remaining in the south and north. Aircraft parking areas had been extended and additional buildings constructed.
1984	**Site:** Substantially as for 1974 photograph. A low lying section in the south western portion of the site as noted in the 1974 aerial appears to be level and may have been filled. **Surrounding area:** Substantially as for 1974 photograph. Further clearing of bushland to

the east of the aerodrome.

1993 **Site:** Substantially as for 1984 photograph. Further development of Area A including additional buildings/structures and earthworks evident. Evidence of what is thought to be a trotting track in east of Area A. Track running north from Area A appeared better defined and may have been upgraded. Bare patches around southern pond suggested earthworks in those areas

Surrounding area: Substantially as for 1984 photograph. Urban area of Albion Park appeared similar to previous photograph but more rural residential developments on the periphery of the township. Further development of the aircraft parking areas and buildings to the east. Development appeared ongoing with earthworks evident in the vicinity of the original parking area.

2002 **Site**: Substantially as for 1993 photograph. Further development of Area A including additional buildings/structures as wells as better defined internal roads and tree planting apparent. Trotting track no longer evident to east of Area A and that area appeared to have been excavated or filled, with a track running to Area A and to the road to the south. A structure was evident in the approximate centre of this area. Similarly the ground around Area B appears to be bare and may have been subject to some earthworks. The silo appeared to be the only structure to remain in this area. Separate paddocks are visible with some colours and patterns suggesting cultivation/improvement may have been carried out.

Surrounding Area: Substantially as for 1993 photograph. Aerodrome has been further developed with additional buildings/structures. Development appeared ongoing with a large earthworks area to the south of the existing development.

4.4 DEPARTMENT OF DEFENCE

The Department of Defence advises that there is no record of the site being used for military purposes of a nature that may have resulted in ordnance-related contamination. A copy of the Department of Defence search record is provided in Appendix 5.

4.5 WORKCOVER NSW RECORDS

A search of the NSW Stored Chemical Information Database (SCID) and microfiche records pertaining to a Licence to Keep Dangerous Goods was undertaken by WorkCover but did not locate any such records relating to the site. A copy of the WorkCover search record is provided in Appendix 6.

4.6 DEPARTMENT OF ENERGY, UTILITIES AND SUSTAINABILITY

A search of records of cathode-protected tanks, maintained by the Department of Energy, Utilities and Sustainability (DEUS) was also conducted. Records maintained by the Department did not indicate the presence of any cathodic protection systems on the site. A copy of the DEUS search record is provided in Appendix 7.

4.7 ANECDOTAL INFORMATION

The following information related to the site history was obtained from an excerpt of the contract of sale between Johnstone (Marks Villa) Pty Limited & G.H. Johnstone Pty Limited and Delmo Albion Park Pty Limited:

- Bottles, tins and general refuse has been dumped in an old well and gullies and buried on the property as was the practice at the time;
- A section of creek and swampy land in the south west sector (affected by a RTA proposal) was filled in and converted to grazing land in the 1980s;
- Farm tracks throughout the property have been built up with shale and gravel and other fill material over the decades to enable travel during wet periods;
- Pipes have been placed across creek crossings;
- Small sections of fill have been placed in low lying land or in gullies to make paddocks more level for working with farm machinery. These areas are covered in pasture;
- Some concrete has been placed in the creek as an erosion control;
- Salvinia and other weeds in creeks and waterways and blackberries have been sprayed;
- Overhead diesel tanks have been used for fuelling of vehicles and spillage can be expected in this location;
- Machinery sheds have been used for maintenance of machinery. Sump oil has been collected and removed by contractors;
- There was a soil mixing area for landscape supplies near the ruins of the old silo. Old building foundations are present there and rubbish was dumped in the old well;
- Three houses, the dairy and some other buildings in the south eastern section of the site are built with asbestos or materials containing asbestos and many are run down and are in disrepair; and
- Landscaping has been carried out in the south east corner which contains scrap metal, bags of perlite, a screening machine, piles of soil, shale and concrete, two shipping containers, truck bodies and other items.

4.8 SITE HISTORY SUMMARY

From 1901 to 1977, the site was owned by individuals and farmers and was most likely used for rural grazing purposes during this period. In 1977, it appears that the owners changed the name on the title to a company name, i.e. Johnston (Marks Villa) Pty Ltd and G.H. Johnston Pty Ltd. Site use from 1977 to the present was not determined however anecdotal evidence suggests that the majority of the site was used for grazing cattle, while an area near an old silo in the central portion of the site and an area in the south east corner of the site was potentially used for soil mixing for a landscaping business.

4.9 INTEGRITY ASSESSMENT

Historical and site information was sourced from reputable NSW Government departments with no known interest in the site or from the contract of sale which is a legal document. CES

have relied on the accuracy of the documentation provided and our experience in historical document interpretation. Whilst there is a small margin for error in interpretation, CES consider the information presented in this assessment to be accurate.

5 SITE CONDITION AND THE SURROUNDING ENVIRONMENT

5.1 CURRENT OCCUPIER AND OPERATIONS

The site is currently owned by Johnston (Marks Villa) Pty Limited and G. H. Johnston Pty Limited and is used as a rural property with associated dairy, three residences and machinery maintenance sheds.

5.2 SITE DESCRIPTION

The site description is based on observations made during a site inspection by Kelly Weir of CES on 15 August 2006. Site Photographs are provided in Appendix 8. The existing site layout is shown in Figure 2. Site features from the southern portion of Lot 6 are shown on Figure 3.

5.2.1 Lot 1

Lot 1 is approximately rectangular in shape, relatively flat and occupies an approximate area of 7.1 hectares (Photograph 1). With the exception of a small number of trees at the site boundaries, the site is cleared and is covered with grass. Vegetation and grass appear healthy with no bare patches, staining or odours noted during the site inspection. Lot 1 is noted on the planning certificate as being susceptible to flooding. The lot is fenced with an electric fence and is bound to the west by Macquarie Rivulet. There are no structures on the lot.

5.2.2 Lot B

Lot B is approximately trapezoidal in shape, relatively flat with an approximate 3 degree fall to the west and occupies an approximate area of 4.5 hectares (Photograph 2). The site has been cleared and is covered with grass. Grass appeared health with no bare patches, staining or odours noted during the site inspection. At the time of the inspection, the lot was in use as a paddock for cattle grazing. The lot is fenced with an electric fence and is bound to the south and east by the airport runway and to the north and south by grazing land. There are no structures on the lot.

5.2.3 Lot 6

Lot 6 falls approximately 5 degrees to the south west and occupies an approximate area of 69 hectares. Frazers Creek enters Lot 6 at the southern boundary (Photograph 3) and meanders along the western boundary where it enters a wetland in the centre of the site (Photograph 4). From the wetland, the Creek flows to the north and exits the site at the northern boundary. To the north east of the wetland and south of the airport runway, a concrete silo with a steel roof was noted (Photograph 5). Bricks forming the remnants of former structures were also observed adjacent to the concrete silo (Photograph 6). An area to the south west of the silo appeared uneven and anecdotal evidence suggests this was used for soil mixing as part of the landscaping business (Photograph 7). No asbestos containing materials (ACM), staining or odours were noted in this portion of the site.

A number of stockpiles of soil, shale and concrete were observed in the south eastern portion of the site. Anecdotal evidence suggests that this area was used for soil mixing as part of a landscaping supplies operation. A steel soil screening machine was located in the centre of this area (Photograph 8). The stockpiles were covered with grass suggesting that this area had not been used for landscaping operation for a short period of time and it appeared that the stockpiled soil was used as a recreational bike track. A number of bags of perlite (a siliceous rock, generally used for horticultural applications) were present to the north of the screening machine (Photograph 9). Two shipping containers, truck bodies and other items were also noted as being stored in this general area.

To the west of the landscaping area, in the southern portion of the site, a number of structures were present including three residential cottages and garages constructed of fibrous cement sheets and corrugated iron (Photograph 10 and 11). A machinery maintenance shed was located to the north of the south western most residence which had a concrete sealed floor and was constructed of timber and corrugated iron (Photograph 12). A number of chemicals were observed to be stored in this area including engine degreasers, engine oils and waste oil. To the north of the machinery maintenance shed, an above ground waste oil storage tank was located on an unsealed surface with oil staining and odour noted in this area (Photograph 13). Other drums, which were empty but formerly contained waste oil, were stored in this area.

Further north, a dairy constructed of brick and fibrous cement sheet with a corrugated iron roof was noted. A number of steel pipes were observed to the south of the dairy building that may suggest the presence of an underground storage tank, however this was not determined (Photograph 14). At the time of the inspection the dairy was not in use. The floor was concrete sealed and there were numerous steel barriers established to direct the flow of cattle during milking. To the north east of the dairy, a number of older corrugated iron structures including a former silo were noted and were not in use at the time of the inspection (Photograph 15).

Three above ground storage tanks (ASTs) were located to the west of the dairy with minor localised surface staining to the unsealed soil beneath the ASTs (Photograph 16). Anecdotal evidence suggests that the ASTs contain diesel fuel for refuelling farm machinery. A corrugated steel machinery shed was located to the west of the ASTs, the floor of which was unsealed with minor localised oil staining from minor vehicle oil leaks. A number of stockpiles of soil, concrete and scrap metal were observed to the south of the ASTs (Photograph 17). The stockpiles were overgrown with grass.

To the south of the residential cottages, adjacent to Frazers Creek, an aboveground concrete sealed vehicle maintenance ramp constructed of concrete blocks and steel was present (Photograph 18). Bunding was absent; however, a drainage channel appeared to have been created mainly from the ramp that may have captured run off from maintenance operations. The drainage channel is located approximately 500 m from Frazers Creek.

A bitumen road was located between the residences in the southern portion of the site with the remainder of the area covered with grass. The remainder of the lot comprised grassed paddocks which were fenced with an electric fence. The lot was predominantly cleared and used for grazing land with remnant vegetation observed along Frazers Creek. Vegetation appeared healthy.

With respect to all lots, soil stability was good with only minor erosion observed in the gully surrounding Frazers Creek in the south east of the site. CES consider there to be flooding potential on Lot 6, as confirmed by Shellharbour City Council (Appendix 2).

5.3 TANKS AND ASSOCIATED SERVICES

The WorkCover and DEUS search provided no evidence of the presence of aboveground or underground storage tanks. However, as noted during the site inspection, three aboveground storage tanks (ASTs) were located north east of the southern most residence. There appeared to be minor surface oil staining below the ASTs.

In addition, an above ground waste oil storage tank is located north of the southern most residence between the machinery maintenance shed and the dairy. This is located on an unsealed surface and oil staining was prominent on the ground surface surrounding the storage tank. A number of pipes, which may be vent pipes, were observed approximately 3 m to the west of the waste oil storage tank, suggesting the possibility of underground storage tanks (USTs) in this area; however WorkCover records do not indicate USTs are present on the site.

5.4 CHEMICAL AND WASTE STORAGE

Various chemicals consistent with machinery maintenance were observed stored on the site in sheds and machinery maintenance areas. Chemicals included degreasers, chassis grease, oil and fuel. Numerous empty 200 litre steel drums were observed on the site surrounding the machinery maintenance shed located north of the southern most residence.

5.5 FILL

Anecdotal evidence suggests that filling has occurred in various areas across the site including the south west corner, other, unidentified, low lying areas and gullies, an old well and farm tracks. In addition, piles of fill material, which were overgrown with grass were noted in an area between the three residences and a larger area to the east of the residences. Anecdotal evidence suggests that this area was used for soil sorting as part of a landscaping business and bags of perlite were also present in the area to the east.

5.6 ODOURS AND STAINING

No unusual odours that could be potentially associated with contamination were noted during the site inspection. With the exception of staining associated with the ASTs and the waste oil

storage tank noted in section 5.3, no staining that could be potentially associated with contamination were noted during the site inspection.

5.7 SURROUNDING LAND-USE

Without gaining access, the properties immediately surrounding the site were visually inspected during the site inspection. The observations were as follows:

- North – Rural grazing land followed by commercial/industrial properties most likely associated with the Illawarra Regional Airport;
- South – Tongarra Road followed by rural grazing land;
- East – Illawarra Highway (Lot 6) and Macquarie Rivulet (Lot 1); and
- West – Illawarra Highway (Lot 1) and the Illawarra Regional Airport (remainder of site).

Whilst adjoining properties were not investigated, it is considered unlikely that the surrounding properties had the potential to contaminate the site.

6 CONCEPTUAL MODEL OF POTENTIAL CONTAMINATION

A Conceptual Model of Potential Contamination (CMPC) has been developed to provide a hypothesis on the contamination status of the site, which can be further tested through a programme of soil and groundwater sampling and analysis.

The model was developed from a review of background information and a detailed site inspection and includes potential sources of contamination and their associated Contaminants of Potential Concern (CoPC) as outlined below.

6.1 POTENTIAL SOURCES OF CONTAMINATION AND ASSOCIATED COPC

6.1.1 Uncontrolled filling

Anecdotal evidence suggests that a number of areas across the site (predominantly Lot 6) have been filled with material from an unknown source. Review of the planning certificates provided by Shellharbour City Council indicate that Council has no records to indicate the land has been filled or partially filled, however it recognises that uncontrolled fill may be present on the site.

Areas which may have been filled include:

- A section of creek and swampy land in the south west sector of Lot 6 which was filled in and converted to grazing land in the 1980s;
- Other unidentified low lying land (now pasture land) and in gullies;
- An old well (possibly located adjacent to the old silo) which was filled with rubbish; and
- Farm tracks throughout the site, which have been built up with shale, gravel and other material to enable site access during wet weather.

Imported fill of unknown origin has the potential to be contaminated. The CoPC includes metals and metalloids, TPH, BTEX, PAHs, OCPs, OPPs, PAHs, PCBs and Asbestos Containing Materials (ACM).

6.1.2 Maintenance of farm machinery

The site inspection indicated that maintenance of farm machinery was carried out in the southern portion of Lot 6 including in a maintenance shed and an above ground concrete sealed vehicle maintenance ramp located to the south of the maintenance shed. A drainage channel appeared to have been created from the ramp that may have captured run off from maintenance operations. The drainage channel is located approximately 500 m from Frazers Creek. Possible contaminating activities include the use, storage, disposal and possible spillage of petroleum hydrocarbons and washing of vehicles.

The CoPC includes lead, TPH, BTEX and PAHs.

6.1.3 Storage of chemicals

Chemicals are stored in the southern portion of Lot 6 and include:

- Three above ground storage tanks which probably contain diesel fuel;
- An above ground waste oil storage tank; and
- Areas surrounding the machinery maintenance shed.

Surface staining in these areas suggests minor surface spillage which requires further investigation. In addition, to the east of the above ground waste oil storage tank located to the south of the dairy, a number of pipes which could potentially be vent pipes for an underground storage tank were noted. This requires further investigation to determine the use of these pipes.

The CoPC includes lead, TPH, BTEX and PAHs.

6.1.4 Pesticide/Herbicide Application

The site has predominantly been used for cattle grazing and rural land use and there is the potential for pesticide and herbicide application to control weeds. Anecdotal evidence suggests that herbicides were particularly used on Salvinia, blackberry trees and in creeks and waterways for weed control as directed by a weed inspector. It was not determined whether tick dips were present on the site for livestock drenching.

The CoPCs include OCP and OPP.

6.1.5 Landscaping operations

Three areas on the site (Lot 6) were used for a landscaping business:

- Adjacent to the silo in the central portion of the site;
- An area to the east of the machinery maintenance shed (stockpiled soil); and
- The south eastern portion of the site adjacent to the airport runway.

The area adjacent to the silo was previously used for soil mixing. The area in the south eastern portion of the site contained a number of piles of soil, shale, concrete, bags of perlite and a large screening machine. The stockpiled soil mounds were overgrown with grass and their origin is unknown. In addition, a number of soil piles of unknown origin were observed in an area between the three cottages.

The CoPCs include heavy metals, TPH, BTEX, PAH, OCP, OPP, PCB and asbestos.

6.1.6 Hazardous Materials related to structures

Three existing cottages, the dairy and associated sheds and carports are constructed of Asbestos Containing Material (ACM) and are in various states of disrepair. In addition, given the age of

the structures it is likely that lead paint may have been used. There is also evidence of two former structures adjacent to the silo which may have been constructed with these materials.

The CoPCs include lead and asbestos.

6.2 CHARACTERISTICS OF CHEMICALS OF POTENTIAL CONCERN

6.2.1 Metals and Metalloids

The metals and metalloids analytical suite typically consists of arsenic, cadmium, chromium, copper, lead, nickel, zinc and mercury. They all tend to bind strongly to soil particles, with the exception of zinc which will dissolve in water. Both mercury and zinc accumulate in animal tissue while the others will not. Lead accumulates in the bloodstream. The mobility of all metals increases with increasing acidity.

6.2.2 Total Petroleum Hydrocarbons (TPHs) and BTEX Compounds

TPH and BTEX compounds are mostly associated with petroleum products. TPHs are divided into the C_6-C_9, C_{10}-C_{14}, C_{15}-C_{28} and C_{29}-C_{36} fractions based upon the number of carbon atoms within the compound. The C_6-C_9 fraction is considered to be the volatile fraction, with volatility decreasing and density increasing with increasing number of carbon atoms. As a result, the C_6-C_9 fraction and BTEX are generally the most mobile and can volatalise, whereas the C_{29}-C_{36} fraction is the least mobile. TPH and BTEX compound are less dense than water and are typically found at the top of aquifers.

6.2.3 Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are essentially a by-product of incomplete combustion, either by natural or anthropogenic sources. Common sources are coal, soot, charcoal and bitumen. There are hundreds of PAHs in existence but the typical PAHs analytical suite consists of the 16 USEPA priority PAHs which are listed in order of decreasing volatility, with naphthalene being the most volatile.

PAHs are very stable and persistent in the environment and some species are known to be carcinogenic. Most PAHs adsorb strongly to soil particles, although some are capable of migrating into groundwater. They do not dissolve easily in water and are most likely to be associated with particulate matter.

6.2.4 Organochlorine Pesticides (OCPs) and Organophosphate Pesticides (OPPs)

OCPs are chlorine-based pesticides which are now generally banned from use in most parts of the world due to their environmental impact and bioaccumulative potential within fatty tissue. They are generally rapidly broken down by sunlight within about two days and adsorb strongly to soil. Only minor concentrations of OCPs would be expected to be detected in groundwater as they do not dissolve easily. The OPPs are phosphate-based pesticides used widely in

agricultural activities. They tend to dissolve easily in water and are degraded rapidly in the environment into harmless breakdown products. They do not tend to accumulate within animal or plant foods.

6.2.5 Polychlorinated Biphenyls (PCBs)

PCBs are a class of chlorinated aromatic compounds comprising benzene rings and two or more chlorine atoms. Most PCBs are oily liquids whose color darkens and viscosity increases with increased chlorine content. PCBs are thermally stable and excellent electrical insulators. If released to the environment, they persist for long periods of time and can biomagnify in the food web.

PCBs are an organic toxicant suspected of causing cancer, endocrine disruption, and other adverse impacts on organisms. PCBs are very persistent, hydrophobic, and generally do not migrate. PCBs have a high potential for bioaccumulation, which is an important factor to consider due to their ability to accumulate in aquatic environments such as lakes, rivers, and harbors. Plants, however, do not appear to exhibit detectable toxicity responses to PCBs.

6.2.6 Asbestos and Asbestos Containing Materials (ACMs)

Asbestos is a general name for a group of naturally-occurring minerals composed of small fibres. Asbestos has unique properties such as high tensile strength, flexibility, and resistance to heat and chemical degradation which have ensured its success in a large number of building and industrial applications from the 1940s to 1980, such as fibrous cement sheeting, service pipes, insulation and brake linings to name a few. These are called Asbestos Containing Materials (ACMs). ACM may be friable (i.e. easily crushed by hand) or non-friable or bonded (i.e. fibrous cement sheets).

Asbestos can pose a health risk when fibres of an inspirable size become airborne, are inhaled and reach deep into the lungs. The health effects commonly associated with inhalation exposure to asbestos are asbestosis; lung cancer and a rare cancer called mesothelioma.

The potential for airborne fibres to be released into the respiratory environment depends on the type of ACM, its current use, location and condition and whether it has been compromised or disturbed to enable fibre release. Previous manufacturing and building practices; redevelopment of old housing and industrial areas; unsafe demolition practices; and reuse of asbestos waste for fill material have cumulatively resulted in widespread asbestos contamination of soil across many sites throughout NSW.

The results of the sampling and analysis programme will allow the Conceptual Model of Potential Contamination (CMPC) to be developed further into a Site Conceptual Model (SCM) incorporating site conditions and soil characterisation.

7 SITE CHARACTERISATION (SUMMARY)

On the basis of a review of historical information and our detailed site inspection, the findings of the assessment are presented below:

- The site address is 78 Tongarra Road, Albion Park, NSW and comprises Lot B in Deposited Plan 109816, Lot 6 in Deposited Plan 1100435 and Lot 1 in Deposited Plan 955731;
- Lot B occupies an area of approximately 4.5 hectares, Lot 6 occupies an area of approximately 69 hectares and Lot 1 occupies an area of approximately 7.1 hectares;
- The site is immediately surrounded to the north, south and west by rural grazing land and to the east by the runway of the Illawarra Regional Airport.
- Historical documents indicated that the site had most likely been used for farming/rural grazing purposes since at least 1901;
- At the time of the assessment the site was used predominantly for cattle grazing with associated dairy, residential properties and machinery maintenance sheds. In addition, the south eastern portion of the site was used for soil mixing as part of a landscaping business;
- Natural soils on the site comprise alluvial loams and siliceous sands of the Fairy Meadow soil landscape group which typically have high permeability and are of low wet bearing strength;
- Site geology comprises alluvium, gravel, beach and dune sand across the majority of the site, while the south east corner of Lot 6 is underlain by Berry Siltstone comprising mid-grey to dark-grey siltstone to fine sandstone of the Shoalhaven Group;
- The site has an approximate elevation of less than 10 m AHD and is located on the valley flat below the Illawarra Escarpment. Observations made by CES during a site inspection revealed that there is a general down gradient slope of less than 5 degrees to the south east toward Frazers Creek. The portion of Lot 6 surrounding Frazers Creek is noted on the Albion Park topography map as being subject to inundation;
- The closest water receptor is Frazers Creek which enters the southern portion of the site (Lot 6) and flows north north east through an onsite wetland and to the Macquarie Rivulet approximately 800 m north of the northern corner of Lot 6. The Macquarie Rivulet, which flows into Lake Illawarra located approximately 1.5 km to the north east of the site, also forms the western boundary of Lot 1 on the western side of Illawarra Road;
- The exact direction of groundwater flow was not determined from the available information; however, it is likely that the groundwater will follow the regional topography and flow generally to the north east and may follow the Frazers Creek and Macquarie Rivulet watercourses;
- The WorkCover and Department of Energy, Utilities and Sustainability search provided no evidence of the presence of aboveground or underground storage tanks. However, three ASTs containing diesel and an above ground waste oil storage tank were located during the site inspection in the southern portion of Lot 6. In addition, steel pipes which

may possibly indicate the presence of an underground storage tank were also noted south of the dairy in this area;

- The results of searches of the NSW EPA and Shoalhaven City Council have not indicated that any notices have been issued on the site regarding the Contaminated Land Management Act 1997;
- Three residential cottages and other buildings in the southern portion of Lot 6 are constructed with Asbestos Containing Materials (eg fibrous cement sheets) and which may have been painted in the past with lead-based paint. Remnants of former structures adjacent to a concrete silo in the central portion of the site may suggest the presence of these construction materials;
- A number of stockpiles of soil, concrete and fill are located in the south eastern portion of the site which is associated with the landscaping business. In addition, anecdotal evidence suggests that an area adjacent to the silo was used for soil mixing;
- A machinery maintenance shed is located in the southern portion of Lot 6 where various chemicals including engine oils and degreasers are stored;
- An above ground vehicle maintenance ramp and adjacent drainage channel is located to the south of Lot 6 approximately 500 m from Frazers Creek;
- Anecdotal evidence suggests that a section of land in the south west portion of Lot 6 as well as other low lying land and gullies have been filled to make paddocks level for working with farm machinery and these areas are now covered with pasture; and
- Farm tracks throughout the property have been built up with shale and gravel and other fill material over the decades to enable travel during wet periods.

8 CONCLUSIONS AND RECOMMENDATIONS

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Delmo Albion Park Pty Ltd (Delmo Albion Park) to conduct a Stage 1 Environmental Site Assessment of the site located at 58 Tongarra Road, Albion Park, NSW.

The purpose of the assessment was to identify and assess any likely contaminants or potential environmental issues, resulting from past and/or present activities undertaken on or adjacent to the site which may affect the sites suitability for the proposed commercial/industrial land-use.

8.1 CONCLUSIONS

Based on a review of site history and a detailed site inspection, potentially contaminating activities associated with the use of a site as rural grazing land and a landscaping business include:

- Uncontrolled filling;
- Maintenance of farm machinery;
- Storage of chemicals, including petroleum hydrocarbons;
- Pesticide and/or herbicide application;
- Landscaping operations; and
- Asbestos containing materials and lead paint associated with structures.

CES have identified the following areas where past and present activities have had the potential to cause contamination:

- Areas used for a landscaping business including: adjacent to the silo, stockpiled soil between the cottages and the south eastern portion of the site adjacent to the airport runway;
- A machinery maintenance shed and nearby vehicle carport;
- An above ground vehicle maintenance ramp and adjacent drainage channel;
- An area in the vicinity of three ASTs;
- An area surrounding an above ground waste oil storage tank;
- An area to the south of a dairy building where steel pipes may indicate the presence of underground fuel storage tanks;
- Land surrounding existing residential cottages and other buildings constructed with Asbestos Containing Materials (eg fibrous cement sheets) and which may have been painted in the past with lead-based paint;
- Potentially filled areas including land in the south west sector of Lot 6; farm tracks and an old well; and
- Former structures surrounding a silo.

CES conclude that further investigation is required in the identified areas of environmental concern to determine the presence, nature and extent of potential contamination in these areas.

CES conclude that pending the results of further investigations in these areas, it is likely that the site can be made suitable for the proposed commercial/industrial land-use following any necessary remediation and validation of any identified contamination.

8.2 RECOMMENDATIONS

CES recommend the following:

- A Stage 2 Environmental Site Assessment, complying with EPA guidelines, should be conducted to characterise the degree and extent of potential contamination at the site. It is recommended that the sampling program target the areas identified as being of potential environmental concern (using a judgemental sampling pattern) and elsewhere, where contamination is unlikely, a grid (systematic) sampling be undertaken. The laboratory results should be interpreted statistically and compared against guidelines appropriate to the proposed future use of the site;

- Based on the results of the Stage 2 investigation, and as required, remediation and validation of any contamination at the site be conducted to achieve the necessary clean up criteria.

- A hazardous materials audit of the buildings on the site to be carried out and hazardous materials identified as likely to be disturbed in any future demolition works. These works should be conducted in accordance with the relevant Australian Standards and Worksafe Codes of Practice; and

- Given the limitations relating to the Fairy Meadow soil landscape group on which the site is located, CES recommend that a geotechnical investigation be carried out to confirm the ground conditions, determine suitable founding mediums and allow design of appropriate foundations for the proposed development.

9 LIMITATIONS OF THIS REPORT

This report has been prepared for use by the client who commissioned the works in accordance with the project brief and based on information provided by the client. The advice contained in this report relates only to the current project and all results, conclusions and recommendations should be reviewed by a competent person with experience in environmental investigations before being used for any other purpose. Consulting Earth Scientists (CES) accepts no liability for use of interpretation by any person or body other than the client. This report must not be reproduced except in full and must not be amended in any way without prior approval by the client and CES.

The extent of sampling and analysis of soils has been necessarily limited and focused on areas where contamination is considered most likely to occur based on knowledge of site history and visual inspection. This approach has been adopted in order to maximise the probability of identifying contaminants, however the approach may not identify contamination that occurs in unexpected locations or from unexpected sources.

Furthermore, soil, rock and aquifer conditions are variable, resulting in the heterogeneous distribution of contaminants across the site. Contaminant concentrations have been identified at discrete locations, however conditions between sample locations have been inferred based on estimated geological and hydrogeological conditions, the nature and extent of identified contamination. Boundaries between zones of variable contamination are generally unclear and have been interpreted based on available data and professional judgement. The accuracy with which subsurface conditions have been characterised depends on the frequency of sampling, field and laboratory methods, the uniformity of the substrate and is therefore limited by the scope of works undertaken.

This report is based on statistical sampling constructs and does not provide a complete assessment of the environmental status of the site and is limited to the scope defined therein. Should information become available regarding conditions at the site including previously unknown sources of contamination, CES reserves the right to review the report in the context of the additional information.

10 REFERENCES

Central Mapping Authority, 1986: *Albion Park 1:25 000 Topographic Map*. Sheet 9028-1-N (Second Edition).

Consulting Earth Scientists, 2007: Preliminary Geotechnical Assessment, CES060714-AM-02-F (Revision 1). Prepared for Delmo Albion Park Pty Ltd.

Department of Mines, 1974: Kiama *1:50 000 Geological Series Map*. Sheet 9028-1 (First edition).

Department of Conservation and Land Management, 1993: *Kiama 1:100 000 Soil Landscape Series Map*. Sheet 9028.

Land and Water Conservation, 1997: *Albion Park 1:25 000 Acid Sulfate Soil Risk map* (Second edition).

NSW EPA, 1997: Environment Protection Authority 1997: *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*. EPA NSW.

Figures

Appendix 1
Registered Groundwater Bore Information

Appendix 2
Historical Title Records

Appendix 3
Planning Certificates

Appendix 4
Historical Aerial Photographs

Appendix 5
Department of Defence Search Results

Appendix 6
WorkCover NSW Search Results

Appendix 7
Ministry of Energy and Utilities Search Results

Appendix 8
Site Photographs