LINDEMAN GREAT BARRIER REEF RESORT PROJECT **ENVIRONMENTAL IMPACT STATEMENT**

APPENDIX J - CONTAMINATED LAND

Addendum: This EIS was initially prepared assuming that the safe harbour was to be part of the Lindeman Great Barrier Reef Resort Project. With the commencement of the Great Barrier Reef Marine Park Authority's (GBRMPA) Dredging Coral Reef Habitat Policy (2016), further impacts on Great Barrier Reef coral reef habitats from yet more bleaching, and the recent impacts from Tropical Cyclone Debbie, the proponent no longer seeks assessment and approval to construct a safe harbour at Lindeman Island. Instead the proponent seeks assessment and approval for upgrades to the existing jetty and additional moorings in sheltered locations around the island to enable the resort's marine craft to obtain safe shelter under a range of wind and wave conditions. Accordingly, remaining references to, and images of, a safe harbour on various figures and maps in the EIS are no longer current.

Contaminated Land Technical Report

Lindeman Island

HRP15078

Prepared for White Horse Australia Lindeman Pty Ltd

15 December 2016

(with minor edits dated 11/06/2017)







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Acronyms and Abbreviations

ACM –	Asbestos Containing Material
AHD –	Australian Height Datum
AMA –	Area Management Advice
ASS -	Acid Sulfate Soil
AST –	Aboveground Storage Tank
CLA –	Contaminated Land Auditor
CLR -	Contaminated Land Register
DNRM –	Department of Natural Resources and Mines
EHP -	Department of Environment and Heritage Protection
EMR -	Environmental Management Register
EPBC -	Environment Protection and Biodiversity Conservation Act 1999
IBC –	Intermittent Bulk Container
NEPC –	National Environment Protection Council
	Notice of Casher and Desta stice (Assessment of City Contention)

- NEPM National Environment Protection (Assessment of Site Contamination)
- NPRSR Department of National Parks, Sport and Racing
- PASS Potential Acid Sulfate Soil



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1 Introduction

1.1 Summary of Design Concept

White Horse Australia Lindeman Pty Ltd ("White Horse Australia") propose to redevelop the existing resort at Lindeman Island into a world class integrated tourist resort with iconic central facility buildings that respond to the visual and tropical character of the Island.

White Horse Australia Lindeman Pty Ltd (WHA) propose to redevelop the existing resort at Lindeman Island into three world class tourist resorts. The proposed design incorporates environmental improvements to protect the values of the Great Barrier Reef World Heritage Area and set new international standards in environmental sustainability and resort design. Key aspects of the proposed development include:

- > Beach Resort redevelopment of the existing resort to achieve a new 5 star beach resort with 136 units, conference centre, beach club and a central facilities building with restaurants, bars and lounges.
- > Spa Resort a new 6 star Spa resort is proposed with 59 units, central facilities, entry lounge, spa, sea view restaurant, pool, and a signature rock bar providing spectacular alfresco dining close to the sea.
- > Eco resort a new 5 Star Eco Resort is proposed near the existing lake gently falling towards the western coastline and is proposed to consist of 41 units, a central facility, a boathouse and a waterside restaurant.
- > Tourist villa precincts two precincts accommodating 89 tourist villas are proposed to the north-east and north-west of the existing resort.
- > Village a central village precinct is proposed that would accommodate a bar, night club, restaurant, conference facility buildings, arrival centre, shops, restaurants, sport and recreation centre, and a staff village.
- > Services infrastructure precinct a new precinct is proposed with services including power (solar with diesel back-up), sewerage and a water treatment plant designed to reflect current best practice.
- > Airstrip the existing airstrip is proposed to be upgraded to provide for near all-weather status, capable of landing light aircraft and helicopters.
- > Golf course a recreational golf course is proposed.
- > Marine access upgrades to the existing jetty and additional moorings in sheltered locations are proposed around the island to enable the resort's marine craft to obtain shelter under a range of wind and wave conditions.
- > Ecotourism facilities a National Park and Great Barrier Reef Educational Centre is proposed, along with opportunities for establishing 30 "glamping" facilities are being investigated in consultation with the State Government.
- > Environmental enhancements native vegetation replanting over previously disturbed areas and improvements to stormwater management are proposed.

1.2 Purpose

The purpose of this technical report is to respond to the Terms of Reference issued for the project and identify any known or potential sources of contaminated land, to assess how any proposed land use may result in land becoming contaminated (if relevant) and to identify potential and actual areas of Acid Sulfate Soils (ASS).

TOR Clause	Task
13.39	Detail any known or potential sources of contaminated land, the location of the development in relation to contaminated land and necessary management measures. Describe how any proposed activity may result in land becoming contaminated and measures to prevent and manage any soil contamination.

This report is intended to provide technical information which is required as an input into the overall site constraints analysis and which will eventually form the basis for the EIS.



1.3 Scope

This report summarises the site conditions relevant to ASS, contaminated soil and contaminated land. The scope of the report is limited to a review of the likely significance of the aforementioned issues to the development. This technical study consists of:

- > A site visit to confirm locations of potential issues on the ground;
- > A review of Cardno Ullman & Nolan Preliminary Geotechnical Assessment, dated 7 September 2015 (Cardno Ullman & Nolan 2015);
- > A review of Cardno, Lindeman Island Integrated Tourist Resort Environment Protection and Biodiversity Conversation Act 1999 (EPBC) Referral of Proposed Action Form, dated 09 April 2015;
- > A review any other environmentally relevant information;
- > A review of relevant mapping resources for the site;
- > Completion of an aerial photograph review and review of historical aerial photos; and
- > Completion of Environmental Management Register and Contaminated Land Register (EMR/CLR) searches.

The technical report did not require, nor have any asbestos investigations been undertaken as part of this investigation. However, an assessment was conducted for the purposes of the Non-Indigenous Cultural Heritage (NICH) technical report which is further discussed in **Section 3.8.6**.

1.4 Legislative Framework

The following legislation, policy and guidelines are relevant to identifying values, mitigating and managing potential impacts associated with land contamination:

- > Environmental Protection Act 1994 and subordinate legislation;
- > Australian Standard 4482.1-2005 Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil;
- > Queensland Auditor Handbook for Contaminated Land, Module 5: Contaminated Land Investigation Documents, Auditor Certification and Compliance Assessment, DEHP, 2015.



2 Methodology

2.1 Methodology and Assumptions

The methodology for the assessment consists of a desktop review and limited site walkover to identify potential constraints and issues related to the proposed redevelopment project.

The assessment provided is based on an interpretation of the significance of environmental attributes as evidenced by desktop information, onsite observations and the observations of others.

2.2 Data Integrity and Study Limitations

The data assessed in connection with this EIS assessment and conclusions drawn should be viewed as preliminary only.

The EMR/CLR register is an administrative management tool which enables the recording of a property on register of sites which are potentially contaminated. Sites included on the EMR/CLR are sites which are known or suspected of being contaminated. The extent or severity of contamination on a property included on the EMR/CLR is not considered confirmed until an investigation has been conducted. The EMR/CLR results relevant to the assessment are further discussed in section 3.6.

Similarly risk of ASS/PASS occurrence can be assessed by inspection of topographic features, geological feature and geological mapping (refer to section 3.2). Indicative extents of potential ASS/PASS can be derived by delineating the likelihood of the presence of low low-lying marine Holocene sediments and coastal wetlands.

However, detailed field investigations are generally required in order to confirm the nature and severity of ASS/PASS present at any particular property if risk factors are present and finalise its significance in terms of constraint and cost for any particular project.



3 Existing Environmental Values

3.1 General Site Description

Lindeman Island is located approximately 35 kilometres south-east from Shute Harbour on the mainland and some 15 kilometres from Hamilton Island. Lindeman Island has a total area of approximately 637 hectares. The resort redevelopment on land occupies perpetual and term leases totalling approximately 139 hectares. The balance of Lindeman Island is declared National Park and included in Lot 429 NPW622. Lindeman Island is within the jurisdiction of Mackay Regional Council.

The existing resort previously owned by Club Med is located on the south-west corner of Lindeman Island. All infrastructure has remained since the resort closure in 2012 which currently comprises of 225 rooms, restaurant/s, golf course, staff accommodation, administration buildings, two grassed airstrips and recreational facilities including tennis courts, one guest and one staff swimming pool.

Various infrastructure ancillary to and necessary for the function of the Resort were established and include sewage and waste water treatment plants, two water storage dams, staff recreational buildings and walkways.

3.2 Topography Geology and Soils

The southern part of the island's topography is predominantly flat sloping towards the coastline. The island's vegetation varies from woodlands and vineforest gullies, to grassed slopes and headlands.

The Whitsunday Volcanic Province has been defined as comprising the Early Cretaceous volcanic and intrusive rocks exposed in the Whitsunday, Cumberland and Northumberland Island groups, as well as onshore exposures to the east of Proserpine. A within-plate, silicic-dominated pyroclastic belt developed along the eastern Australian plate margin, with the volcanic activity caused by the onset of continental breakup of Gondwana during the Cretaceous period.

The majority of Lindeman Island comprises pyroclastic deposits, under petrological examination this is resolved into a tuft comprising pale green hornblende, plagioclase, fine grained volcanic rock fragments and quartz set in a devitrified and recrystallised matrix. Tuftaceous cobble conglomerate is found with andesite and pyroclastics on the south coast, and small outcrops of andesite, welded crystal tuft and trachyte are found along the north-northeast coast. The geology is not one that is conductive to the formation of aquifers.

The lithology reported on the Island consists of clayey gravels or gravelly clays up to 0.3m thick with an organicrich extremely shallow topsoil (Cardno Ullman & Nolan 2015).

3.3 Potential for Occurrence of Acid Sulfate Soils

Acid Sulfate Soils (ASS) are the common name given to naturally occurring sediments and soils containing iron sulphides. The Queensland Acid Sulfate Soil Technical Manual (2014) stipulates that ASS is associated with low lying areas below 5m Australian Height Datum (AHD) include sediments of recent geological age (Holocene) within marine or estuarine sediments and tidal lakes.

ASS can be found or can form in any anoxic, aqueous environment where sulfate-reducing bacteria are provided with organic matter (their energy source) and available sulfate ions. Examples include bottom sediments in drains, dams, constructed and natural waterways, swamps and billabongs, periodically stagnant creeks and places with perched watertables. These environments are not restricted to coastal areas. They can occur anywhere where the above conditions for sulfate reducing bacteria can be met. While most coastal ASS is geologically young (<10,000 years old), inland ASS can be found in much older sediments. These occurrences are not limited by stratigraphy or age.

In an undisturbed and waterlogged state, ASS soils may pose no or low risk. However, the exposure of ASS to oxygen (e.g. during excavation activities) leads to the generation of sulfuric acid and increase bioavailability of metals which has the capacity to directly impact upon soil, water, flora and fauna. These impacts, in turn, can have adverse effects on visual amenity and long-term site management.

The Cretaceous age of the volcanic geology of Lindeman Island is not typical of geologies which contain. Consequently, no previous ASS surveys have been carried out my QASSIT on Lindeman Island.



Mapping and other documentation reviewed for determining the potential for ASS on Lindeman Island included:

- > Queensland Globe Acid Sulfate Soils of the Airlie beach area, North Queensland 1:25 000 series;
- > Queensland Globe Acid Sulfate Soils of the Mackay area, North Queensland 1:50 000 series;
- > Department of Local Government 2007, Planning, Sport and Recreation, Whitsunday Shire Strategic Infrastructure and Service Plan; and
- > Whitsunday Regional Council 2009, Whitsunday Shire Planning Scheme 1:300 000 series (2009 Whitsunday Shire Planning Scheme).

An ASS Natural Hazards Overlay Map ('the map') provided within the 2009 Whitsunday Shire Planning Scheme was the only available map for the region (Refer to **Appendix A**). The map primarily focuses on the mainland with some limited information provided for neighbouring Whitsunday and Hook Islands where no ASS areas were identified. No areas underlain by ASS are shown for Lindeman Island was excluded from the map.

Additionally, a visual inspection of the sides and bottom of existing turning basin and navigation channel (carried out by Cardno Marine Ecologists on 19-21 January 2016) noted the absence of lenses of sediments and soils below the coral and coral derived surface material.

Given the above lines of evidence and based on an overall understanding of the likelihood of distribution of ASS in similar geologies across Australia, additional intrusive investigations to confirm the absence of ASS is not considered warranted on Lindeman Island. Management measures to be considered to manage any residual risk from naturally occurring soil acidity would include soil baseline sampling and pH testing during construction to ensure acidic soils disturbed are suitable for landscaping and do not generate an inappropriate level of risk to waterways.

3.4 Surface Hydrology

Gap Creek Dam is the primary water supply source on Lindeman Island and has a full supply capacity of approximately 200ML. Black Water Dam is located to the south of the Gap Creek Dam and is used for golf course irrigation purposes.

Stormwater runoff from the island is generally conveyed along natural vegetated gullies and drainage lines to ocean outfalls. The discharge of storm water in the vicinity of the existing resort area relies upon water running within a naturally occurring gully located beside an existing road alignment (Club Med Lindeman Island Road) from the jetty to upper portions of the site.

3.5 Groundwater Resources

A Department of Natural Resources and Mines (DNRM) registered bore search was conducted for the purposes of this investigation. The search identified no registered bores on Lindeman Island.

Six groundwater bores were installed during Club Med operations (Bore Pump 1 - 6) (*pers comm* D Stuart). Anecdotally, water quality and pumping tests have been conducted on these bores during Club Med operations.

The bore water is understood to be suitable for drinking purposes. No data in relation to these groundwater bores were available, with water testing commencing on the only currently operational Bore Pump 5 in March 2016.

3.6 EMR/CLR Searches

Queensland Department of Environment and Heritage Protection (DEHP) is the lead agent for environmental protection. The *Environmental Protection Act 1994 (EP Act)* requires that all persons have a general environmental duty to take all reasonable and practical measures to prevent or minimise environmental harm.

Activities identified as being likely to cause contamination are listed as Notifiable Activities under Schedule 3 of the EP Act. Common land uses which can cause contamination (Notifiable Activities) include, for example, service stations, cattle dips, tanneries, wood treatment sites, landfills, wastewater treatment plants, fuel storage and refuse tips. It is a requirement of the EP Act that DEHP be informed of any land used for Notifiable



Activities or contaminated by hazardous contaminants. DEHP maintains and manages two registers the Environmental Management Register (EMR) and the Contaminated Land Register (CLR).

The EMR is a land use planning and management register that records land that has been used for a Notifiable Activity or land that has been contaminated by hazardous contaminants which pose or are suspected to pose a risk to human health and the environment based on their history. The CLR is a register of 'known risk' sites which have been scientifically proven to be contaminated and actions are required to either remediate or manage the site to reduce the risk of causing harm to human health and the environment.

The EMR also provides 'Area Management Advice' (AMAs) regarding land areas where there is a potential for more widespread contamination from elevated metal concentrations due to natural mineralization or the possibility of unexploded ordnance (UXO) from Department of Defence training activities. An AMA is an administrative arrangement developed by the EPA, Local Government and other parties for land where detailed information is not available but alerts the community to information that aids in managing land contamination.

The results of the DEHP register searches conducted indicated that Lot 2 CP858366, Lot 8 HR1954 and Lot 429 NPW622 are not listed on the EMR and CLR register. Where properties are listed on the EMR and CLR register, all subsequent lot configurations associated with the property remain on the register until such time that it can be shown that it will not result in environmental harm.

Lot B-D HR2029 (strata titles) were recently subdivided from a larger lot which included Lot 429 NPW622. As Lot 429 NPW622 is not included on the EMR, this indicates that any potential contaminating activity associated with Lot B-D HR2029 would be limited to the time period since the boundary realignment. As Lot B-D HR2029 have remained undisturbed since the property subdivision, it is considered likely that Lot B-D HR2029 are not listed on the EMR and CLR register. It should be noted that EMR and CLR register searches are unavailable for strata titles such as Lot B-D HR2029.

A copy of the EMR and CLR register searches are provided in **Appendix B.**

3.6.1 Additional Notifiable Activities

The current diesel storage of 60,000 litres (L) at the site is considered a notifiable activity which warrants inclusion on the EMR. The owner or occupier has a responsibility to notify DEHP when they become aware that their land has been or is being used to carry out a notifiable activity.

The wastewater treatment plant is below the threshold to be classified as a notifiable activity. It should be noted, in cases where Notifiable Activities are positively identified during operations and/or construction works, landowners, or occupiers have a responsibility to notify DEHP when they become aware that their land has been or is being used for a notifiable activity or contaminated by a hazardous contaminant for inclusion on the EMR.

3.7 Aerial Photography and Literature Review

Aerial photography was used to identify the potential nature and frequency of potential contamination within the project area. The results of the aerial photography review are included in **Appendix C**.

A literature review of the preliminary geotechnical assessment undertaken by Cardno Ullman & Nolan Geotechnical Pty Ltd (Cardno Ullman & Nolan 2015) and *"The Whitsunday Islands An Historical Dictionary"* (Blackwood, 1997) was also conducted.

The key findings of the mapping, literature and aerial review pertaining to potential sources of contamination are as follows:

- Since European settlement land uses on Lindeman Island have changed over time from a grazing property through to a Club Med Resort in the 1990s which remains on the island. In 1928, the first guests arrived and were accommodated in grass huts and cabins. Although sheep have been historically grazed on Lindeman Island, anecdotally, it is understood that no dip sites are present on Lindeman Island. The site inspection confirmed the lack of structures associated with historical dipping practices. The likelihood that a dip site exists on the Island is considered low.
- > In the 1940's a number of tracks were constructed to provide access to scenic views. These existing tracks appear to have been maintained by the Forestry Department since 1950.



- In 1956 the existing air-strip was extended to meet Department of Civil Aviation standards for smaller aircrafts. In 1957 a new air-strip was constructed in a north-south direction, cutting across the old northwestsoutheast strip to accommodate larger planes.
- > In 1959 new guest accommodation was built and a swimming pool was added. The last of the grass huts were demolished at this time.
- > In 1961 the whole island was surrendered and replaced by a perpetual lease over 152 acres covering the resort area and airstrip, that area being excised from the national park.
- In 1970 a six-hole golf course was constructed west of the air-strip and running towards Piccaninny Point. To provide water for the golf course and for gardening and general use at the resort a dam was constructed at the same time across Boat Port Creek on the western side of the island north of Piccaninny Point.
- > P&O Cruises Australia operated a small 48 room resort in the 1980s before being purchased by Adelstein Investments who increased the size of the resort by 104 rooms in 1988.
- > The resort was purchased by Club Med in 1990 and the current 225 room resort was opened in January 2012 for business following extensive refurbishment, demolition and construction work that was conducted over a two year period. These demolition works included the demolition of structures containing asbestos.

An overview of potential environmental impacts from historic and current activities based on the aerial and literature review are detailed below in **Table 3-1**.

Current Activity Summary	Activity Details	Comments
Accommodation Areas	Large scale accommodation	 Potential for minor fuel/chemical/oil/waste oil storage/spills
Airstrip Unsealed airstrip		> Potential minor fuel/oil storage and spills
·	•	> Potential use of herbicides/pesticides
		> Potential imported fill of unknown origin
Golf Course	Golf Course	 Potential imported material of previously contaminated soil into area
		> Potential contamination from irrigated effluent
		 Potential contamination from the irregular use of insecticides, pesticides, herbicides and fungicides
Water and Sewage Treatment Plants	Water and Sewage Treatment Plant	 Potential contaminants of concern including aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc, nitrates and micro- organisms
Black Water Dam	Proposed conversion of the dam to a golf course	> Potential contaminants of concern including aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc in sediments from historic effluent disposal to dam.
Fuel and chemical storage tanks	Fuel/chemical storage in above ground storage tanks	> Potential for fuel spills during transportation from the jetty to the stored tank via a aboveground pipeline
Workshop	Vehicle maintenance workshop	 Potential for minor fuel/chemical/oil/waster oil storage/spills
Backfilling of Swimming	Fill material from unknown	> Potential unregistered asbestos disposal area
Pool Area during 1990s refurbishment	origins	 Potential for hazardous material storage
Nicholson's Residence	Identified Asbestos area	 Potential exposure to Asbestos Containing Material (ACM)

Table 3-1 Potential Sources of Contamination



3.8 Consultation and Site Inspections

A site inspection was conducted by an experienced Cardno Senior Environmental Scientist (Lynn Morrissey) on 27th October 2015. The Cardno representative interviewed a Lindeman Island Resort employee (Caretaker - Darren Stuart) with explicit knowledge of the history of the operation. Mr. Stuart was a caretaker during Club Med operations and remained in that role following the resort closure in 2012.

Observations made during the site inspection were recorded on field documentation with features of interest photographed (**Appendix D**) and are denoted on a site plan (**Figure 1**).

The following notes of potentially contaminating activities observed to be present were made during the site inspection and are detailed below.

3.8.1 Water and Sewage Treatment Plants

The water and sewage treatment plants were observed in the maintenance and services area and surrounds. Mr Stuart indicated that a number of chemicals were typically used during operations which ceased following resort closure. Chemicals used are detailed in **Table 3-2.** Mr. Stuart indicated these non-hazardous chemicals were stored in the maintenance and services area.

Table 2-2	Chomicale	hood	in fl	ho	Mator	and	Sowago	Trootmont	Dlant
Table 3-2	Chemicals	useu	III U	ne	vvaler	anu	Sewaye	Treatment	rialli.

Chemical	Use/Purpose
Copper sulphate	Used to control algae
Hydrated lime and Soda ash	Used to control bicarbonate and noncarbonated hardness
Sodium bicarbonate	pH adjustment
Flocon	Flocculent
Bulk sodium hypochlorite	Disinfection of wastewater effluent

No incidents or accidental spills resulting in environmental harm were reported during or following resort operations. The treatment plant appeared to have been well maintained during operations.

3.8.2 Golf Course Irrigation Areas

Recycled wastewater from the resort facilities was used for irrigation water on the golf course. This eliminated the need to discharge wastewater. Following processing in the water and sewage treatment plant, waste water was transferred to the Black Water Dam for storage prior to irrigating activities resulting in the additional sedimentation of remaining sludge particles. The quality of irrigated effluent is unclear and analytical results for irrigated effluent and soil quality were unavailable. Site management discussions confirmed irrigation activities has not occurred since the resort closure and therefore it is considered environmentally low risk.

Potential contaminants of environmental concern include metals, nitrates and micro-organisms. **Table 3-3** below provides guidance concentrations of potential contaminants of environmental concern¹

 Table 3-3
 Anticipated Concentrations of Contaminants of Environmental Concern within Recycled

 Wastewater
 Wastewater

Chemical	Anticipated Concentrations	Chemical	Anticipated Concentrations
Aluminium	2.2 mg/L	Lead	0.06 mg/L
Arsenic	0.015 mg/L	Mercury	0.007 mg/L

¹ As provided in Table 4.4 of the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2), 2008



Chemical	Anticipated Concentrations	Chemical	Anticipated Concentrations
Cadmium	0.004 mg/L	Nickel	0.6 mg/L
Chromium	0.11 mg/L	Zinc	0.25 mg/L
Copper	0.4 mg/L	Nitrogen	25-30 mg/L
		Phosphorus	5 mg/L

A baseline soil assessment should be undertaken to determine the contamination status of subsurface soils prior to recommencing irrigation activities within the golf course area.

3.8.3 Black Water Dam

As discussed in **Section 3.8.3**, treated wastewater was stored in Black Water Dam for storage and sedimentation purposes. Potential contaminants of environmental concern including metals, nitrates and micro-organisms may have been present within historic wastewater flows. These contaminants may be concentrated in the sludge and in remaining water in the dam. It is understood that Black Water Dam will be backfilled and this area will be used as a golf course. Testing of sludge will be required should sludge removal and disposal from Blackwater Dam be necessary.

3.8.4 Composting Areas

Sludges and biosolids from the sewage treatment plant and green waste were composted in an area to the north of the site. Potential contaminants of concern as a result of the sewage treatment process include heavy metals, organic pollutants and pathogens which have not been removed during treatment may be concentrated in biosolids.

During construction stage sampling of the composting area will be required to establish a baseline of remaining contamination prior to establishing the new composting area.

3.8.5 Industrial Compound

3.8.5.1 Fuel Storage and Associated Infrastructure

Three Above Ground Storage Tanks (ASTs) Containing Class C1 Combustible Diesel were observed during the site inspection in the maintenance and services area. The ASTs were located in a bunded area and were found to be in good condition with no evidence of corrosion or rusting. During operations, fuel was transported from the jetty to the ASTs from a pipeline. The pipeline is both aboveground and below ground in places as indicated in **Figure 23-1**. No other petroleum storage was observed during the site inspection.

No incidents or accidental spills resulting in environmental harm were reported during or following resort operations.

The condition of the pipeline is currently unknown. Integrity testing and a visual inspection of all fuel related infrastructure with possible follow up sampling is required prior to re-commissioning and ongoing usage. Should evidence of hydrocarbon related impacts be identified, remediation activities should be undertaken under the supervision of a Suitably Quality Person (SQP).

3.8.5.2 Landscaping and Nursery Maintenance Shed

Minor chemical storage was observed in the landscaping and nursery maintenance shed as outlined in **Table 3-3**. All chemicals were appropriately stored and labelled. The shed is also surrounded by a well maintained concrete hardstand. No major stains were observed during the site investigation.

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Chemical Name	Chemical Composition	Use/Purpose	Approximate Volume		
Asulox	Asulam present as sodium salt concentrate		20 litres		
Broadside	MCPA present as iso-octyl ester, bromoxynil present as octanoate ester, dicamba, hydrocarbon solvent	-	40 litres		
Brushkiller 600	Tricopyr present as the butoxyethyl ester, picloram present as hexyloxypropylamine salt	Herbicide	500 grams		
Chipco Fairway	oxadiazon	-	20 litres		
Sempra Monsanto	Halosulfuron-methyl	-	5 litres		
Weedmaster Duo	Glyphosate	-	20 litres		
Albarol	white oil	Insecticide	20 litres		
Pyrethrum	Pyrethrum, piperonyl butoxide, ethanol	Pesticide	1 litres		
Daconil	Chlorothalonil	Fungicide	20 litres		
Liquid Potash	Potassium, phosphorus	Liquid fertiliser	20 litres		
Chelated Iron	A soluble complex of iron, sodium and a chelating agent (e.g. ethylenediaminetetraacetate)	Used to make the iron soluble in water for the purposes of making it accessible to plants	250 grams		
Ken-Met 600	Metsulfuron Methyl	Herbicide	500 grams		
Cypricide	Copper Ethanolamine	Algicide	20 litres		
Chipco Dimension	Dithiopyr	Herbicide	5 litres		

Table 3-4 Chemicals Storage in the Landscaping and Nursery Maintenance Shed

Given the small volume of chemicals, the application rates and concentrations used for landscaping purposes, any environmental risk is considered low. This low risk rating is based on the assumption that products are used as per the manufacturers' specifications and have not been applied prior to heavy rainfall events.

3.8.5.3 Workshop

Additional chemical storage was observed in the workshop used for vehicle and motor maintenance as detailed in **Table 3-4**. General maintenance products observed included degreaser, WD40 and numerous tins of paint and varnish. All chemicals and products stored in the workshop appear to be labelled and stored appropriately. The workshop located in the industrial compound is surrounded by a well maintained concrete hardstand which is in good condition. No major stains were observed during the site investigation.



Table 3-5 Chemicals Storage in the Workshop

Chemical	Chemical Composition	Use/Purpose
Oasis Compact Cleaner Disinfectant	Quaternary ammonium compound, non- ionic surfactant	Disinfectant
Slime puncture sealant	Green colour thixotropic liquid with mild odour	Sealant
Septone Rust Prime	Phosphoric acid	Rust Prime
Brake Cleaner	Heptone, acetone	Brake Cleaner
Sta-bil fuel stabiliser	isoparaffins petroleum hydrotreated HFP	Fuel Stabiliser

As the workshop is surrounded by a concrete hardstand and due to the small volume chemicals stored, any environmental risk is considered low. This low risk rating is based on the assumption that products are used as per the manufacturers' specifications and all maintenance activities were conducted in the workshop.

3.8.5.4 Waste Transfer Station

A Waste Compactor was observed in the accommodation area adjacent to the beach area. During operations it had capacity to cater for waste generated by up to 700 guests and staff. Waste was managed and collected by JJ Richards group during operations. The waste transfer station infrastructure appears to be well maintained and in good condition.

3.8.5.5 Additional Industrial Compound Infrastructure

Other environmentally relevant infrastructure observed in the industrial compound concrete hardstand area included:

- > An Intermittent Bulk Container (IBC) in a bunded area;
- > Four fuel drums and an intermittent bulk container containing hypochlorite solution;
- > A corroding steel tank formerly used for water storage; and
- > Coolant storage tank used for the site generator.

3.8.6 Asbestos

Asbestos products commonly found in older buildings include:

- > Flat sheeting (known as 'fibro' or 'AC sheeting');
- > Corrugated sheeting (larger profile is known as 'super six');
- > Water or flue pipes;
- > Roof slates;
- > Flexible, profiled, textured or coloured building boards; and
- > Imitation brick cladding.

Undisturbed asbestos firmly interwoven in a material is described in the above examples are referred to as bonded Asbestos Containing Material (ACM). Bonded ACM is not of high concern until disturbed through renovations or demolishing of structures whereby asbestos particles can become airborne and represent a significant human health risk.



3.8.6.1 Staff Quarters

An asbestos survey of the buildings was not conducted as part of this contaminated land technical report as it was considered outside the objectives of this assessment. However, the 'Staff Quarters' prefabricated buildings were inspected and were found to contain ACM.

3.8.6.2 Nicholson's Residence

It is understood that the Nicholson's residence was built by 1936 and is located in the centre of the main resort area (**Figure 1**). The building has undergone various extensions and changes since its construction and is externally clad with weatherboard and asbestos. The building is also lined with asbestos internally (*Converge Heritage and Community, February 2016*).

3.8.6.3 Areas of Uncontrolled Fill

The pool area was backfilled during refurbishments works conducted by Club Med (Refer to **Figure 1**). It is understood that works were conducted over a two year period prior to the resort reopening in 1990.

The source of pool filling material is unknown. It appears likely that filling material was sourced from building debris from nearby demolition works. Due to the age of the buildings this debris is likely to contain ACM.

It has been established that activities on site have been limited to sheep grazing and use as a resort.

3.8.6.4 Asbestos Management Strategy

An asbestos survey shall be conducted by a qualified specialist to confirm the presence of ACM prior to disturbance activities. A comprehensive management plan shall be developed and any identified ACM shall be removed by a licensed asbestos removalist.

3.9 Summary of Existing Contamination Sources

Based on the review undertaken above, existing activities to be considered as potential sources of contamination are as follows:

- > The above ground diesel storage within the industrial compound and transfer of diesel from the jetty to the existing storage has the potential to impact both soil and groundwater;
- > Historic effluent irrigation of the golf course has the potential to create minor impacts soil and groundwater, however the flows are not considered sufficient to create impact to groundwater. No analytical results for irrigated effluent and soil quality were available at the time of preparation of the EIS;
- > Historic storage and sedimentation in Black Water Dam;
- > Minor chemical storages in the workshop and landscaping shed. Chemicals of potential environmental concern include pesticides, herbicides, fungicides, insecticides and vehicle maintenance products;
- Potential ACM in the staff quarters prefabricated building and Nicholson's residence has the potential to contaminate soil if improperly disposed;
- Historic uncontrolled filling of the beachside pool area (old swimming pool location) has the potential to contain ACM; and
- > Historic localised soil contamination may be present within the composting area.



4 Impacts, Mitigation and Management

Potential contaminated land related impacts from the project fall into two basic categories:

- > Existing contamination: Potential impacts from existing contamination within the project affected area through increased contact/ exposure to the sites. This could include increased human contact during construction and/ or post construction activities, and possible human and aquatic ecosystem exposures if the contamination migrates to watercourses, making the contaminants potentially available in the water column and sediments; or
- > *Potential future contamination:* Potential impacts of project construction, operation and maintenance activities that could cause releases of substances that could cause land to become contaminated.

Each of these categories is discussed below.

Due to the low likelihood of Acid Sulfate Soil occurrence, proposed mitigation and management measures are not proposed but measures to manage residual risk from soil acidity are mentioned in **section 4.3**.

4.1 Potential Contamination Impacts

It has been established that activities on site have been limited to sheep grazing and use as a resort.

Existing activities to be considered as potential sources of contamination are as follows:

- > The above ground diesel storage within the industrial compound and transfer of diesel from the jetty to the existing storage has the potential to impact both soil and groundwater both prior to and following demolition;
- Historic effluent irrigation of the golf course has the potential to have impacted soil, however the flows are not considered sufficient to have impacted groundwater. No analytical results for irrigated effluent and soil quality were available preparation of the EIS;
- > Historic sediments from effluent in Black Water Dam may contaminate soils during works in this area and possibly groundwater if dam integrity is breached;
- Minor chemical storages in the workshop and landscaping shed may impact the surrounding area if spilled or released to the environment. Chemicals of potential environmental concern include pesticides, herbicides, fungicides, insecticides and vehicle maintenance products;
- > Potential ACM in the staff quarters prefabricated building and Nicholson's residence has the potential to contaminate soil if improperly disposed or managed during demolition via transmission of asbestos fibres;
- > Historic uncontrolled filling of the beachside pool area has the potential to contain ACM which may impact human health once disturbed; and
- > Historic localised soil contamination may be present within the composting area with the potential to impact human health if disturbed.

4.2 Management Framework

Management of contaminated land in Queensland is regulated by the *Environmental Protection Act 1994* (EP Act) and subordinate policies and regulations. Methodologies are based largely on the following Australian guideline publications:

- > the Australian Standard AS4482.1-1997 Guide to the sampling and investigation of potentially contaminated soil Part 1:Non-volatile and semi-volatile compounds (Standards Australia 1997);
- National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No 1) (NEPM); and
- > Queensland Auditor Handbook for Contaminated Land, Module 5: Contaminated Land Investigation Documents, Auditor Certification and Compliance Assessment, DEHP, 2015.



These documents provide a framework for assessing and managing contaminated soil and/or groundwater based on an evaluation of three related items.

- > Contamination source: Soil and/or groundwater contamination must be present. Contamination is the release of a hazardous contaminant into the environment that is likely to cause serious or material environmental harm because of its physical, chemical, infectious characteristics or concentration;
- > Receptors: Humans and/or a receiving environment must be present and be potentially impacted by the identified contaminants; and
- > Pathways: The contamination must be able to contact receptors by means such as:
 - humans ingestion, skin contact, inhalation; and
 - environment seepage into waterways, wind-blown deposition on plants, root uptake, ingestion, skin contact and inhalation by various life forms.

For a contamination risk to exist, each of these items in the 'risk chain' must be linked.

To ensure that contaminated sites are thoroughly assessed, the DEHP guidelines provide information on how contaminated sites investigations are to be progressively managed through a staged approach, in accordance with national guidelines. These stages include:

- > Preliminary site investigation;
- > Detailed site investigation;
- > Health and environmental assessment and determination of remediation plan; and
- > Implementation of agreed remediation plan and validation sampling.

A brief summary of each stage is provided below.

4.2.1 Preliminary Site Investigation

A preliminary site investigation includes the following components:

- > development of a site history;
- > EHP register searches;
- > an inspection of the site;
- > a basic sampling program to determine if contamination is present; and
- > report preparation.

The most important part of a preliminary site investigation is the preparation of a comprehensive site history to identify all past and present potentially contaminating activities.

4.2.2 Detailed Site Investigation

A detailed site investigation is required when the results of preliminary site investigation indicate potential or actual contamination. The detailed site investigation should delineate the lateral and vertical extent of contamination, and provide information about:

- > maximum and average concentrations of the various contaminants,
- > volumes of soil requiring remediation,
- > leachability and mobility of contaminants,
- > potential for groundwater contamination, and
- > possibility of off-site migration through soil, surface water or groundwater.

The decision on how to proceed in the second stage of investigation requires professional judgement of the site specific issues and is dependent on the findings of the preliminary investigation.



4.2.3 Health and Environmental Assessment

The results obtained from the detailed site investigation are used to determine the potential human exposure and environmental impact of the contaminants on the current and proposed land uses.

4.2.4 Remediation and/ or Site Management

When results of a contaminated site investigation indicate that remediation is required, a remediation plan is prepared. The draft remediation plans may include a request for a disposal permit in accordance with the requirements of the EP Act, if necessary, to remove contaminants from the site. Contaminated soil must not be removed from an EMR/CLR listed site without a disposal permit.

In some cases, contamination associated risks can be safely managed on- site. Specific procedures for this management are detailed in a Site Management Plan (SMP), including construction, maintenance, and long term monitoring. Approval for this SMP can be sought from the EHP.

Many contaminated sites in Queensland have been effectively assessed and managed according to this process, including diesel storage impacted sites. Typical mitigation options include:

- Do nothing (contaminated site left as is if results of site investigation and assessment of risk determines no action necessary);
- > On-site treatment/remediation to reduce contamination;
- > Capping of contaminated sites, in place;
- > Excavation and off-site disposal to landfill/ monocell disposal facility; and
- > Excavation and on-site disposal to a suitable location within the project area, with appropriate engineered controls (e.g. liner, cap).

In accordance with the above processes, White Horse Australia Pty Ltd will conduct site investigations and assessments of these sites to determine the need for mitigating actions. Investigation, assessment and management of contaminated sites will be undertaken in cooperation with EPA's Contaminated Land Unit and in accordance with the *Queensland Auditor Handbook for Contaminated Land, Module 5: Contaminated Land Investigation Documents, Auditor Certification and Compliance Assessment (DEHP, 2015),* NEPM and national water quality criteria.

All investigations will be carried out by a suitably qualified person in accordance with requirements of *the EP Act (1994)*. Site investigation reports will be submitted with a statutory declaration by the investigator as required by the DEHP. All work will also be subject to review and approval by a DEHP- approved Contaminated Land Auditor (CLA) where required.

Based on these reports and CLA advice, DEHP will determine when the health and environmental risks associated with the sites have been appropriately addressed and managed.

Based on the desktop review of the potential for contamination at the site the specific areas to be investigated by intrusive sampling for the applicable contaminants of concern specified in the desktop assessment are as follows.

- > Black Dam Effluent Pond sediment and bottom sludge.
- > Decommissioned waste water treatment plant.
- > Diesel transfer pipeline area and historic diesel storages.
- > The historic green waste composting area.
- > Historic effluent irrigation areas.
- > Groundwater.
- > The uncontrolled fill around the pool area.
- > Buildings with the potential to contain ACM.



The sampling density for any intrusive investigation will be as specified in *AS4482: 2005 Guide to the investigation and sampling of sites with potentially contaminated soils*. All required remediation, asbestos removal and/ or site management will be completed and approved prior to commencement of construction. In addition a full Asbestos Register will be compiled for existing resort buildings prior to the commencement of demolition. As such therefore the potential for disturbance of existing contaminated land will be appropriately managed. Any required long-term monitoring will be provided for in the resort operation plans.

4.3 Management Measures- Construction and Operation

Land contamination could potentially result from the spillage or on-site disposal of hazardous materials or wastes generated by the demolition of the existing resort and construction and/or operation of the resort. This potential for impact includes the potential for impact and disposal of dredging materials and sediments on land (if required). Project materials and wastes will be managed in a manner that will prevent such contamination. It is the specific intention of White Horse Australia Pty Ltd that project construction and operation activities will not cause contamination that will result in the land requiring listing on the EHP's Environmental Management Register or Contaminated Land Register.

Project waste streams and their planned management are detailed in the EIS. Procedures for the proper storage and management of hazardous materials are detailed in the Environmental Management Plan, the Hazard and Risk chapter of the EIS and the Emergency Management Plan.

Chemicals, fuels, oils and any other substances such as liquid wastes that, if spilled would cause pollution or contamination of the land or water, will be stored appropriately to minimise the risk of environmental impact. Chemical storage will comply with Australian Standards and Safety Data Sheets (SDS) requirements. SDS for products kept on site will be readily available to employees and contractors.

Smaller quantities of chemicals, fuels and oils will be stored in self bunded pallets, within a bunded area in the workshop, or in a bunded container on the site. Diesel will be kept in bulk quantities (up to 130,000 L) in double skinned tanks (self-bunding).

Waste products, (e.g oil/water separator waste, sludges and residues), will be contained within weatherproofed, sealed and bunded areas to ensure stability of the waste containment receptacles and prevent any leakages or spills causing environmental harm to soils, surface water or groundwater.

Regular inspections will be carried out of the tanks, bunds and storage areas to ensure integrity. If additional baseline contamination sampling is required additional to the intrusive investigations is required to manage construction risk, this will be carried out immediately prior to commencement of demolition and construction.

Whilst every care will be taken to avoid contamination of soils, if soil contamination does occur, this will be disposed to landfill or a constructed containment cell on the island with the relevant approvals if required.



5 References

- > Cardno, Lindeman Island Redevelopment, Non-Indigenous Cultural Heritage Report, dated February 2015
- > Cardno, Preliminary Geotechnical Assessment, Lindeman Island Redevelopment, dated 7 September 2015
- > Cardno, Lindeman Island Integrated Tourist Resort Environment Protection and Biodiversity Conversation Act 1999 (EPBC) Referral of Proposed Action Form, dated 09 April 2015
- > Blackwood, Ray, 1997, The Whitsunday Islands: An Historical Dictionary, CQU Press, Rockhampton, QLD
- > Department of Environment and Heritage Protection (EHP) 2012, Guidelines for Contamination Professionals
- > NEPC, 2013, Variation National Environment Protection (Assessment of Site Contamination) Measure (NEPM), National Environmental Protection Council
- > Queensland Acid Sulphate Soils Technical Manual Soil Management Guidelines v4.0, Department of Science, Information Technology, Innovation and the Arts
- > Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2), 2008

Lindeman Island

FIGURES Figure 1 Site Location





Lindeman Island Resort

Areas of Potential Environmental Concern

FIGURE 1

Lindeman Island

APPENDIX A ACID SULFATE SOILS NATURAL HAZARDS OVERLAY MAP

DISCLAIMERS: While every care is taken to ensure the accuracy of this data, the Department of Natural Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason.	Please address all correspondence to: The Chief Executive Officer Whitsunday Regional Counc	Civic Centre 83/85 Main Street. Il PROSERPINE OLD 4800	Whitsunday By SH	Title Natural Hazards C Acid Sulphate Soil Commencement Date 9 January 2009	
All due care and attention has been taken to ensure the data displayed within this map is true and correct. However Whitsunday Regional Council does not accel	PO Box 104 PROSERPINE QLD 4800	TELEPHONE: (07) 4945 0200	Date 14/6/2005	Directory	y Path I:\PLANNING & DEVELOPME

Lindeman Island

APPENDIX B ENVIRONMENTAL MANAGEMENT REGISTER/CONTAMINATED LAND REGISTER

Department of Environment and Heritage Protection (EHP) ABN 46 640 294 485 400 George St Brisbane, Queensland 4000 GPO Box 2454 Brisbane QLD 4001 AUSTRALIA www.ehp.qld.gov.au

SEARCH RESPONSE ENVIRONMENTAL MANAGEMENT REGISTER (EMR) CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 50341735 EMR Site Id: This response relates to a search request received for the site: Lot: 429 Plan: NPW622 08 December 2016

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

All search responses include particulars of land listed in the EMR/CLR when the search was generated. The EMR/CLR does NOT include:-

1. land which is contaminated land (or a complete list of contamination) if EHP has not been notified

2. land on which a notifiable activity is being or has been undertaken (or a complete list of activities) if EHP has not been notified

If you have any queries in relation to this search please phone 13QGOV (13 74 68)

Administering Authority

Department of Environment and Heritage Protection (EHP) ABN 46 640 294 485 400 George St Brisbane, Queensland 4000 GPO Box 2454 Brisbane QLD 4001 AUSTRALIA www.ehp.qld.gov.au

SEARCH RESPONSE ENVIRONMENTAL MANAGEMENT REGISTER (EMR) CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 50220871 EMR Site Id: This response relates to a search request received for the site: Lot: 8 Plan: HR1954

11 November 2015

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

If you have any queries in relation to this search please phone 13QGOV (13 74 68)

Administering Authority

Department of Environment and Heritage Protection (EHP) ABN 46 640 294 485 400 George St Brisbane, Queensland 4000 GPO Box 2454 Brisbane QLD 4001 AUSTRALIA www.ehp.qld.gov.au

SEARCH RESPONSE ENVIRONMENTAL MANAGEMENT REGISTER (EMR) CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 50220889 EMR Site Id: This response relates to a search request received for the site: Lot: 2 Plan: CP858366

11 November 2015

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

If you have any queries in relation to this search please phone 13QGOV (13 74 68)

Administering Authority

Lindeman Island

APPENDIX C HISTORICAL PHOTOGRAPHS

Photograph Name	Year	Photograph Description (including Site Details)
Great Barrier Reef Film No. CAB399 Frame No. 139	1969	The aerial is presented in black and white. Development is evident on the island and primarily consists of a number of residential properties and Club Med Lindeman Island Road which has been partially constructed. Additional infrastructure evident includes the airstrip and jetty.
		Club Med Lindeman Island Road currently meanders north from the jetty and terminates south of the airstrip. The airstrip aligns with its current configuration and consists of two transecting grass runways.
		The buildings associated with the resort are concentrated to the north and west of the jetty. Two other buildings are evident on the south west portion of the Island and may be associated with management of the National Park (e.g. rangers hut).
8757 Lindeman Islands	1975	The Island appears relatively unchanged from 1969. An unnamed dam is evident to the west of the airstrip.
Film No. QAP2971 Frame No. 176		A number of tracks are evident which appear to allow access from residential buildings to Gap Creek Dam located west of the airstrip.
St Lawrence to	1981	The aerial is presented in colour.
Townsville		The Island appears relatively unchanged from 1975. It appears that further
Film No. QAP3884		development is underway to the west of the jetty. A swimming pool is now evident.
Frame No. 84/98		A weather station appears to be located in the southwest portion of the Island (Picaninny Point). It is unclear from historical imagery if this weather station was present prior to 1981.
St Lawrence to Townsville	1991	Club Med Lindeman Island Road appears to be constructed in its entirety and aligns with its current configuration.
Film No. QAP5022 Frame No. 242 - 244		A number of resort buildings have been constructed and are situated between the airstrip and the large unnamed dam. It appears that some of the buildings to the north and west of the jetty have been removed and replaced. Further development which appears to be associated with the airstrip are located between the two runways.
St Lawrence to Townsville	1997	Black Water Dam is evident south east of the large unnamed dam. Further development is apparent between the airstrip and the dam. Infrastructure
Film No. QAP5601		now includes a waste water treatment plant, large above ground storage tanks and fuel storage tanks.
Frame No. 131, 137- 138		A number of additional buildings and a possible swimming pool expansion are now evident.
Whitsunday Region	2004	The island appears relatively unchanged from 1997. However, the
Film No. QAP6113		occurred in the main resort areas.
Frame No. 70, 112		
Google Earth	2013	The site and surrounding area appears relatively unchanged from 2004.

Lindeman Island

APPENDIX D SITE PHOTOGRAPHS

Photograph Appendix

Photograph 1: View of Water and Sewage Treatment Plant facing south west.

Photograph 3: View of chemical storage in the Landscaping and Nursery Maintenance Shed

Photograph 2: View of Prefabricated Staff Quarters

Photograph 4: View of chemical storage in the Landscaping and Nursery Maintenance Shed

Photograph 5: View of chemical storage in the Landscaping and Nursery Maintenance Shed

Photograph 6: Four Fuel Drums and Intermittent Bulk Container Storage in the Industrial Compound

Photograph 7: View of Diesel Above Ground Storage Tanks and associated pipeline

Photograph 9: View of the industrial compound

Photograph 8: View of coolant storage tank used for generator

Photograph 10: View of intermittent bulk container in bunded area of the industrial compound

Photograph 11: View of the waste transfer station

Photograph 12: Chemical storage in the vehicle and motor maintenance workshop

Photograph 13: Chemical storage in the vehicle and motor maintenance workshop

Photograph 15: Chemical storage in the vehicle and motor maintenance workshop

Photograph 14: Chemical storage in the vehicle and motor maintenance workshop

Photograph 16: Chemical storage in the vehicle and motor maintenance workshop

Photograph 17: Chemical storage in the vehicle and motor maintenance workshop

Photograph 18:Corroding former water tank