Long Island Resort Development

Oil Spill Environmental Management Plan

Prepared for:

Humfrey Land Developments

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Status

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1. Introduction

The proposed construction and operation of the Long Island Resort has the potential to result in the spillage of diesel or petrol on the island or into the surrounding waters through a variety of pathways, discussed in Section 3.0. This document sets out the risks and the management procedures that will be implemented to minimise them.

1.1 Construction

The construction will be supported from the existing fishing facilities on adjacent islands. Temporary diesel fuel storage on Long Island will be required during construction to power generators.

A Construction Management Plan has been prepared and is appended to the PER.

1.2 Operations

During operations, at any one time the resort will have up to 2500 L of diesel fuel stored to power generators and up to 500 L of unleaded petrol stored to power the small water craft and service vehicles (quad bikes and powered "golf" carts) based at the resort.

Fuel will be brought to Long Island by a supply vessel and pumped to storage tanks onshore.

1.3 This document

This document comprises the Long Island Resort Oil Spill Environmental Management Plan (the Plan) and describes the risks and approach to prevent, contain and manage any hydrocarbon spills occurring on Long Island.

The Plan will be draft until completion of EPA approvals and finalisation prior to commencement of operations in consultation with Department of Planning and Infrastructure (DPI) and Department of Fisheries (DoF).

2. Relevant legislation

Oil spill response capability is legislated at National and State levels. The Australian Maritime Safety Authority (AMSA) administers the National Plan to Combat Pollution of the Sea by Oil and other Noxious and Hazardous Substances (the National Plan). AMSA is the agency responsible for response to oil spills and other marine pollution in Commonwealth waters.

WestPlan Marine Oil Pollution (WestPlan MOP) applies to all spills of oil in WA state waters, within ports and on shorelines. WestPlan MOP has been prepared in accordance with the Pollution by Waters by Oil and Noxious Substances Act 1987. This Act implements MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978) and details the liabilities and penalties for discharges from ships and enables WA to take measures to respond to spills.

3. Risk of spill

The risk of fuel spills comes about by the need to maintain stores of diesel (up to 2500L) for running the power generation system and unleaded petrol (up to 500L) for refuelling of the resort's dinghies, quad bikes and small service carts ("golf" carts).

A standard oil spill risk assessment approach has been used, where Oceanica has consulted with the client to establish the suite of activities and incidents that may result in an oil spill. The likelihood (Table 3.1) and consequence (Table 3.2) of each activity/incident type was estimated and the risk assessment matrix (Table 3.3) used to generate a risk category for each activity/incident type. The assessment included the mitigating management factors. The complete assessment is provided in Table 3.4.

Table 3.1 Definitions of likelihood used in Long Island Risk Assessment

Likelihood	
Expected	Expected to occur during the life cycle of the system
Probable	Will probably occur at normal circumstances during the life
Moderate	Likely to occur during the life cycle of the system
Unlikely	Unlikely, but possible to occur during the life cycle of the system
Rare	May occur under exceptional circumstances

Table 3.2 Definitions of consequence used in Long Island Risk Assessment

Consequence	
Serious	Large scale, adverse effect on ecosystem (e.g. abundance, fecundity, age, structure). Decades to recover
Significant	Adverse effect on significant local ecosystem factors. Years to decades to recover.
Moderate	Impact causing detectable change in ecosystem factors. Months to years to recover.
Minor	Incidental changes in biota of affected area. Insignificant impact on ecosystem function. Months to recover.
Negligible	Short-term, localised and insignificant impacts. Recover in days to months.

Table 3.3 Risk Assessment Matrix

Risk Assessment Matrix		Consequence				
		Serious	*Significant*	*Moderate*	*Minor*	*Negligible*
Likelihood	*Expected*	U	U	U	B	N
	Probable	U	U	A	B	N
	Moderate	U	A	B	B	N
	Unlikely	A	A	B	N	N
	Rare	A	B	N	N	N

Legend for Table 3.3

Category	Description and Response
Unacceptable (U)	Immediate changes to design or procedures required
High (A)	Risk reduction measures and monitoring required
Low (B)	Acceptable risk, monitor activity and manage as required
Negligible (N)	Risks are acceptable, no further management

Table 3.4 Long Island oil spill risk assessment, management and actions

Cause of Spill	Management	Likelihood (with management in place)	Consequence (with management in place)	Risk Rating	Action
Oil Leaks	Power system subject to programmed maintenance	Unlikely	Negligible	Negligible	Implement Programmed Maintenance Contract
	Drip trays installed at fuel line break points				Engineering design
Broken line	Refueling equipment subject to programmed maintenance	Unlikely	Minor	Negligible	Implement Programmed Maintenance Contract
	Dry break couplings on diesel transfer line				Engineering design
Operator error	Refueling only undertaken by trained personnel	Unlikely	Minor	Negligible	Implement fuel handling and spill response training for key staff
	System in place to ensure that fuel discharged is received entirely at the storage tank during the fueling process				Staff to check fuel is reaching tank during refilling (i.e. that there are no losses between the supply and the storage or valves left open)
	Spill response kit maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
Operator error	Refueling/tank operations only undertaken by trained personnel	Unlikely	Moderate	Low Risk	Implement fuel handling and spill response training for key staff
	Tank bunded				Engineering design
Tank failure	Tank built to AS1940 (1993)	Unlikely	Moderate	Low Risk	Engineering design
	Storage tank subject to programmed maintenance				Implement Programmed Maintenance Contract
	Tank bunded				Engineering design
Valve failure	Design specifications to meet appropriate Australian Standards	Unlikely	Minor	Low Risk	Engineering design
	Valves subject to programmed maintenance				Implement Programmed Maintenance Contract
	Tank bunded				Engineering design
Operator error	Refueling by trained staff	Moderate	Minor	Low Risk	Implement fuel handling and spill response training for key staff
	Refueling only at Jetty				Appropriate signage installed
	Oil spill kit maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
Equipment failure	Equipment subject to programmed maintenance	Unlikely	Minor	Low Risk	Implement Programmed Maintenance Contract
	Refueling by trained staff				Implement fuel handling and spill response training for key staff
	Refueling only at Jetty				Appropriate signage installed
	Oil spill kit maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
Operator error	Refueling by trained staff	Moderate	Negligible	Low Risk	Implement fuel handling and spill response training for key staff
	Refueling only at designated area				Appropriate signage installed
	Oil spill kit maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
Equipment failure	Equipment subject to programmed maintenance	Unlikely	Negligible	Negligible	Implement Programmed Maintenance Contract
	Refueling by trained staff				Implement fuel handling and spill response training for key staff
	Refueling only at designated area				Appropriate signage installed
	Oil spill kit maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
Operator error	Fuel handling by trained staff	Unlikely	Minor	Negligible	Implement fuel handling and spill response training for key staff
Tank failure	Tank built to AS1940 (1993)				Implement Programmed Maintenance Contract
	Tank bunded				Engineering design
Valve failure	Design specifications to meet appropriate Australian Standards	Unlikely	Minor	Low Risk	Engineering design
	Valves subject to programmed maintenance				Implement Programmed Maintenance Contract
	Tank bunded				Engineering design
Vessel sinking	Vessel mooring only in designated areas	Unlikely	Minor	Negligible	Appropriate navigation markers installed
	Spill response equipment maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
Vessel collision	Low vessel speeds in mooring area	Rare	Negligible	Negligible	Appropriate signage installed
	Spill response equipment maintained on Long Island				Training of key staff in emergency response procedures
Vessel Fire	Spill response and fire fighting equipment maintained on Long Island	Unlikely	Minor	Negligible	Training of key staff in emergency response procedures
Accidental or deliberate discharge	Staff and contractor inductions regarding vessel management	Moderate	Minor	Low Risk	Vessel staff inductions
	Spill response equipment maintained on Long Island				Training of key staff in emergency response procedures
	Illegal discharges reported to DoE and DoF				Training of key staff in emergency response procedures
Leaking of aviation fuel	No aviation fuel will be stored at Long Island	Rare	Negligible	Negligible	Training of key staff in emergency response procedures
	Helicopters maintained by accredited commercial aviation organisation				Captured in process of awarding aviation contract
	No aviation fueling activities will occur at Long Island				Stipulated in conditions of aviation contract
Spill from helicopter accident	Helicopter charters run through accredited commercial aviation organisation	Rare	Minor	Negligible	In the event of helicopter accident, civil aviation authority and FESA will be involved immediately
	Spill response equipment maintained on Long Island				Purchase and maintain response equipment for minor spills on water and land (up to 50L)
	Staff and contractor emergency response training				Training of key staff in emergency response procedures

Table 3.4 shows that the highest consequences will result from the storage of diesel on the island. This is because the volumes are highest and diesel is known to be highly toxic to marine fauna. The worst case scenarios would be the loss of the contents of storage tank either through failure or operator error. As such the key management actions are to:

- ensure that the storage facility is designed to minimise risk of leakage and failure (built to meet Australian Standard 1940-1993 The Storage and Handling of Flammable and Combustible Liquids);
- procedures and training are developed to ensure that risk of losses due to operator errors are minimised; and
- a scheduled maintenance program is in place to ensure that there is minimal risk of failure of fuel related infrastructure

Because of the ability to manage against the loss of large amounts of diesel spillage, the likelihood of a large diesel spill event is assessed as "Unlikely" and the overall rating was "Low Risk".

There is considered to be a higher likelihood of small spills during refuelling of small craft and Island vehicles as these events are more frequent and may be undertaken by a wider range of staff. This risk is offset by the fact that the consequences will be much lower due to the small volumes involved and the fact that only petrol will be involved. The following management will be in place:

- Refuelling only undertaken by staff trained to do so;
- Refuelling only undertaken in designated areas;
- Oil spill kits on site for minor spills of up to 50 L on land and in water; and
- Signage to mark refuelling areas and list key actions in event of a spill.

HLD will consult with a specialist supplier to ensure that the oil spill kit(s) supplied are suitable for the requirements.

The risk of spills from boating activity will be managed by minimising the risk of vessels running aground by having suitable navigation equipment in place, ensuring vessels associated with the resort are operated by trained crew and posting speed restrictions in mooring areas. In addition, key staff will be trained in emergency response so that they may interact with Fire and Emergency Services Authority (FESA), DPI and/or Geraldton Port Authority (GPA) in the event of a major incident.

4. Environmental Sensitivity Index (ESI) Mapping

4.1 Overview

ESI maps are generally comprised of three general types of information; shoreline classification, biological resources and human-use resources (http://response.restoration.noaa.gov), with each variable ranked to indicate areas of highest value/sensitivity.

4.1.1 Ranking

Shorelines are ranked according to their sensitivity to oil and the expected ease of cleanup (low = low sensitivity or relatively easy to clean, high = high sensitivity or relatively difficult to clean).

Biological resources are ranked according to the presence of oil-sensitive animals as well as habitats that either are used by oil-sensitive animals or are themselves sensitive to spilled oil (for example coral reefs) (low = low sensitivity or relatively rapid recovery, high = highly sensitive or relatively slow recovery).

Human-use resources and places important to humans are also ranked according to their relative value to humans (low = relatively low value, high = relatively high value).

4.1.2 Shoreline classification

Oil fate and effects vary significantly by shoreline type, with unconsolidated sediments having the potential to bury and increase the persistence of oil. Bedrock, in contrast, is likely to recover more rapidly and make cleanup less difficult, although mapping should differentiate between solid rock surfaces and rubble slopes which tend to trap oil (Fingas, 2000; http://response.restoration.noaa.gov).

4.1.3 Biological resources

The biological productivity and sensitivity of the shoreline is an integral component of the ESI, with vegetated habitats gaining the highest ranking due to the potential for long-term impacts from both exposure to oil and potential damage associated with cleanup activities. It is important to identify the types of species that tend to be vulnerable to spilled oil and the types of habitat where they occur. The goal is to map the locations of the highest concentrations of sensitive organisms.

4.1.4 Human-use resources

Human-use resources can be divided into four major components; high-use recreational and shoreline access locations, management areas, resource extraction locations and archaeological and historical cultural resource locations. For Long Island the most relevant of these components are management areas, with the northern tip of the island lying within a Reef Observation Area.

4.2 Environmental Sensitivity Index mapping

As discussed in Section 3, the highest likelihood for a spill is thought to be from the petrol refuelling of small craft and Island vehicles as these events are more frequent and may be undertaken by a wider range of staff. The highest consequences, however, would result from the spillage of diesel because the volumes are larger.

The refuelling of small volumes of petrol will occur in designated hard-stand areas, mostly within the interior of Long Island, so is unlikely to result in the direct contamination of the surrounding waters. Therefore, the ESI mapping focused on the area surrounding the jetty where refuelling and transfer of large volumes of diesel and small volumes of petrol will occur.

4.2.1 Oil spill movement

Summer winds at the Abrolhos are most commonly from the south-east and south-west with high wind speeds consistently recorded in the afternoons on the Islands from September through to March. Calm conditions are most likely to occur in winter (Fisheries WA, 1998). Therefore a spill originating at the jetty is most likely to be blown inshore to the north of the jetty or offshore to the north-west. However, for the purposes of ESI mapping, all habitats in the vicinity of the jetty have been mapped (Figure 4.1).

4.2.2 Shoreline classification

Shoreline habitats are most vulnerable to the effects of oil spills with sheltered areas generally more susceptible than exposed habitats (http://response.restoration.noaa.gov). The shoreline of Long Island adjacent to the jetty is relatively sheltered and is predominantly composed of sand and coral rubble, with intertidal reef far (~500 m) to the south. Spilt oil may persist in sand habitat due to burial and readily penetrates pebble-cobble beaches through the open spaces between the rocks (Fingas, 2000), making it more difficult to remove. Bedrock shorelines, largely impermeable to oil and therefore less vulnerable to oil spills (Fingas, 2000), are not found in the vicinity of the jetty site.

4.2.3 Biological resources

Subtidal habitats are generally less vulnerable than shoreline habitats as the water column acts as a buffer between the seabed and the oil (Hart and Edmunds, 2004). The toxic water-accommodated fractions (WAFs) in diesel fuel tends to mix into the water column and the lighter fractions evaporate (Neff et al., 2000). Conditions at Long Island are such that a diesel spill is likely to impact subtidal habitats due to the toxicity of the WAFs and the larger degree of mixing into the water column.

Along the central western coast of Long Island the shoreline habitats are generally unvegetated, supporting no coral or macroalgal communities. A relatively large area of benthic habitat away from the shoreline lies in very shallow water.

The value score for each area was determined from a combination of the value (percentage cover of primary producers) and sensitivity (with corals considered the most sensitive organisms) of each habitat type.

The risk score for each area was determined from the likelihood of impacts given an oil spill. The ‘coral rubble and sand with live sub-massive corals and brown macroalgae’ habitat running along the shoreline and the ‘bedrock/coral rubble with *Acropora* spp.’ habitat found 150 m south of the jetty both occur in shallow water (≥ 1 m below sea level) and may be impacted by floating oil. The dense *Acropora* spp. ‘stands’ further offshore from the shoreline, although consisting of dense, sensitive corals, are further from the water surface and therefore less susceptible to damage from floating oil.

4.2.4 Human-use resources

The coastline along Long Island cannot be readily divided up by human-use value, except for the northern tip which lies within a Reef Observation Area and therefore attracts a higher value.

4.2.5 ESI map for Long Island

The different scores for each area were determined in terms of the risk of impacts resulting from an oil spill, the value of the habitat and the difficulty involved with cleaning up following a spill (if practical/possible). The ESI map for Long Island is given in Figure 4.1. The dense coral habitats are valued highest but in deeper waters may be safe from floating oil. Areas exhibiting a lower coral cover but in shallow water are highlighted as being at greater risk. Areas known to be used as sealion haul-out sites are marked as are areas of particular value to seabirds.

The ESI map will be used to guide the response in the event of a major spill such that the higher value areas are given the highest priority for protection and clean-up.

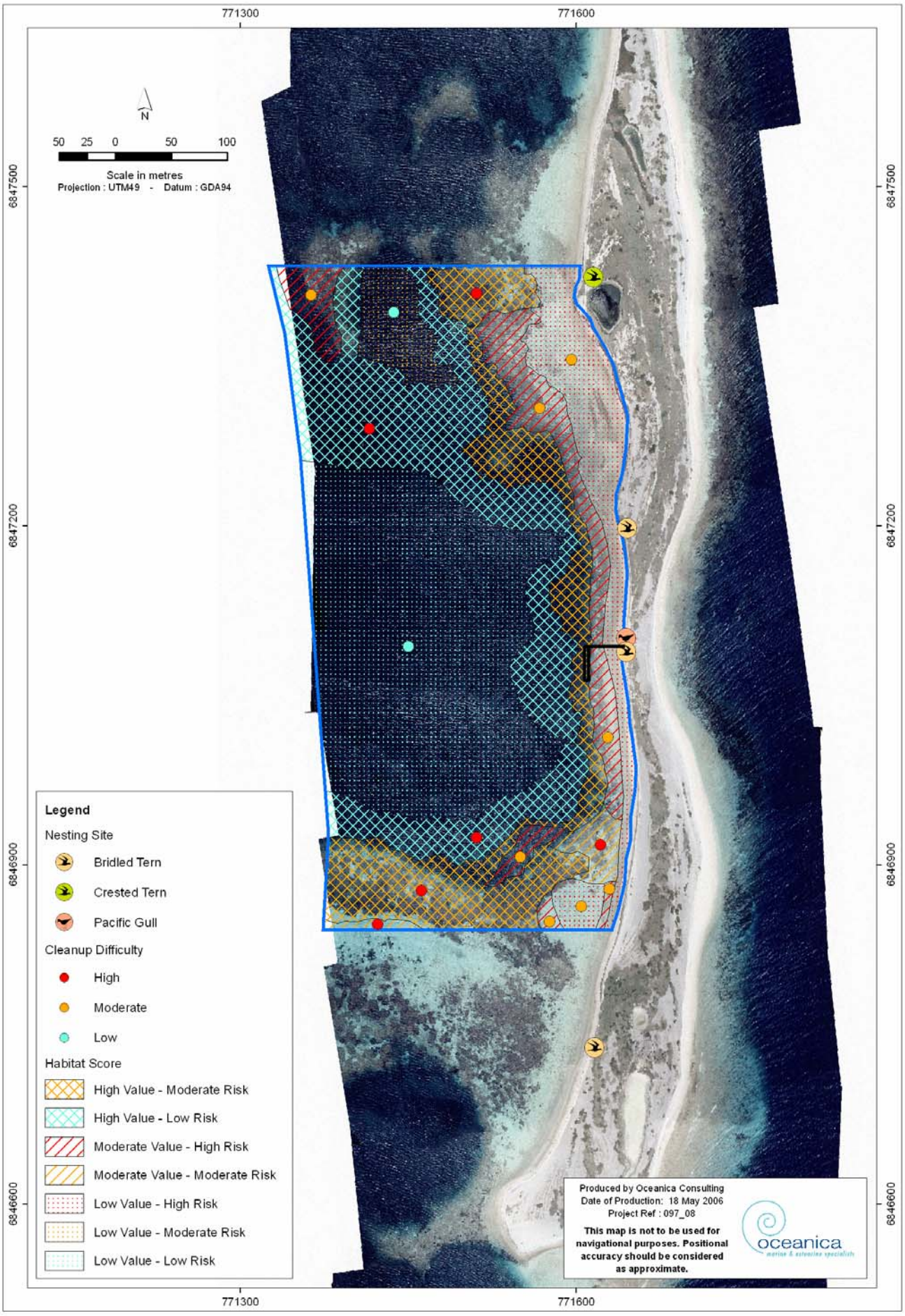

Figure 4.1 ESI map for Long Island (Oceanica 2006)

5. References

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