



Great Keppel Island
REVITALISATION PLAN

6. HAZARD AND RISK







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6. HAZARD AND RISK

6.1 Hazard and Risk Assessment

The management of risk is an integral part of the proposed GKI Revitalisation Plan. The Proponent will have specific requirements for assessing and managing risk for all stages of the Project and the EIS is only one part of the broader project development process. Hazard identification and risk assessments will be conducted for the construction and operation phase of the Project. The risk assessment conducted for the purpose of the EIS should be read in this broader context.

The preceding EIS chapters have assessed the consequential impact of the Project in relation to known and identified ecological, economic, cultural and social parameters. This section details risk assessments focused on unplanned or accidental impacts that could be reasonably associated with the Project during the construction and operation phases, which may include:

- failure of utilities, environmental protection control devices or treatment plants;
- climate change and natural hazards such as storm surges, cyclones, bush fires and implications related to climate change;
- major spills or leakages of hazardous materials;
- transport risks including the use of the airstrip and marina; and
- security risks.

The assessment does not consider finance, business, legal or commercial risk associated with the Project to which the Proponent might be exposed to as a result of undertaking the Project.

Chapter 7 reports on the environmental risks associated with the Project, un-mitigated and mitigated for both the construction and operation phases of the Project.

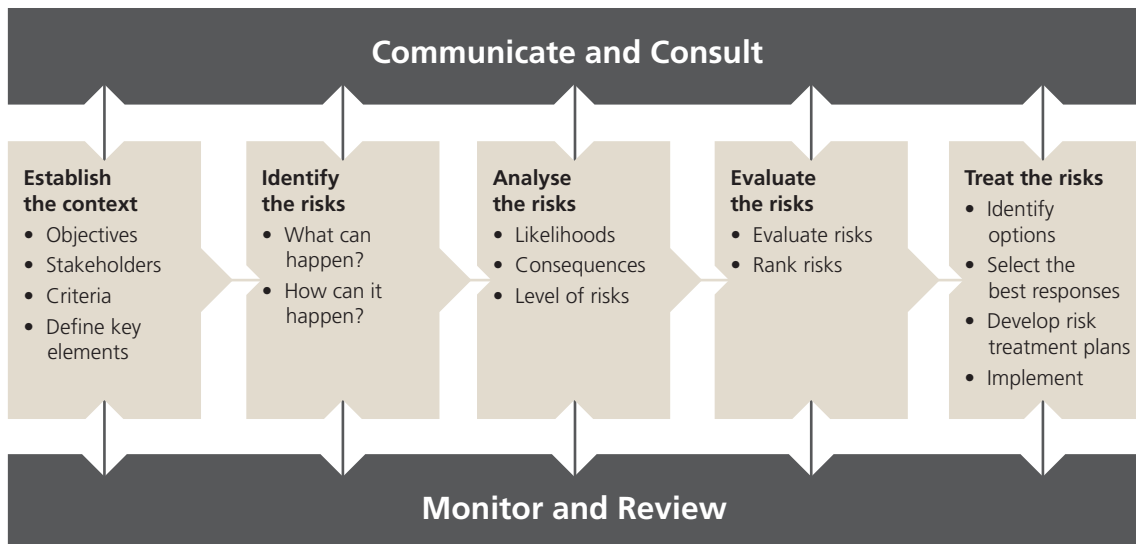
6.1.1 Methodology

The hazard and risk assessment has been undertaken in accordance with *AS/NZS 4360:2004 Risk Management* and the assessment methodology comprised the following key elements / stages:

- identification of potential hazards associated with construction and operation of the Resort;
- summarising potential hazards by theme in the form of a risk register;
- analysis of the hazard, including:
 - the consequence of the hazard if it were to occur; and
 - the likelihood of hazard occurrence.
- evaluating the risk through identification of the level of impact (i.e. likelihood x consequence); and
- identification of appropriate controls and mitigation measures for the management of identified hazard/risk.

Figure 6.1 provides a visual representation of the risk management methodology undertaken for the GKI Revitalisation Plan.

FIGURE 6.1: RISK MANAGEMENT PROCESS



6.1.2 Environmental Impact Statement Risk Register

Table 6.1 presents the assessment of reasonably anticipated unplanned or accidental risks (hazards) associated with the GKI Revitalisation Plan, the table also lists possible causes associated with the hazard, potential impacts, the level of risk if no controls (un-mitigated), risk level if mitigated and the relevant section of the Environmental Management Plan (EMP) will address these controls.

Aircraft related incidents are separately detailed in **Section 6.1.3**.

TABLE 6.1 GKI REVITALISATION PLAN ACCIDENT RISK REGISTER (PRELIMINARY)

Hazard	Causes	Impacts	Risk (un-mitigated)	Risk (mitigated)	EMP ID
Failure of utilities, environmental protection control devices or treatment plants					
Uncontrolled overtopping of wastewater storage facilities.	<ul style="list-style-type: none"> • Damage to ocean outfall pipeline preventing emergency discharge of recycled water when required. 	<ul style="list-style-type: none"> • Localised flooding resulting in damage to life and property. • Exposure to A + treated wastewater. 	Medium	Low	2.4, 3.4
Release of untreated sewerage to the environment.	<ul style="list-style-type: none"> • Mechanical malfunction or electricity failure affecting the sewerage collection system. • Mechanical malfunction of the sewerage treatment plant. • Loss of electricity supply resulting in shutdown of sewerage collection and treatment systems. 	<ul style="list-style-type: none"> • Damage to flora, fauna, and surrounding waterways. • Human health impacts. 	High	Low	2.4, 3.4, 2.12, 3.12
Disruption to electricity supply services on the Island.	<ul style="list-style-type: none"> • Damage to mainland electricity supply connection. 	<ul style="list-style-type: none"> • Reduced quality of life. • Increased reliance on diesel electricity generators resulting in the following temporary impacts: <ul style="list-style-type: none"> · greenhouse gas emission increases; · air quality impacts; and • Noise amenity impacts (night-time). 	Medium	Low	2.12, 3.12



TABLE 6.1 GKI REVITALISATION PLAN ACCIDENT RISK REGISTER (PRELIMINARY)

Hazard	Causes	Impacts	Risk (un-mitigated)	Risk (mitigated)	EMP ID
Disruption to water supply services on the Island.	<ul style="list-style-type: none"> • Damage to mainland water supply connection. 	<ul style="list-style-type: none"> • Backup water supply dependence increases. • Failure of wastewater collection system. • Reliance on groundwater 	High	Medium	2.12, 3.12
Stormwater system failure.	<ul style="list-style-type: none"> • Rainfall events exceed the design capacity of stormwater drainage systems. 	<ul style="list-style-type: none"> • Flooding of buildings and other facilities, and possible flooding of neighbouring properties. 	High	Medium	2.2, 2.4, 3.2, 3.4
Release of untreated stormwater runoff.	<ul style="list-style-type: none"> • Rainfall events exceed the design capacity of stormwater drainage systems. 	<ul style="list-style-type: none"> • Potential human health impacts. • Environmental nuisance. • Minor land contamination. 	High	Low	2.2, 2.4, 3.2, 3.4
Climate Change and Natural Hazards					
Storm surge.	<ul style="list-style-type: none"> • Natural occurrences. 	<ul style="list-style-type: none"> • Damage to berthed vessels in the marina. • Marina infrastructure damage. • Human injury or death. 	Medium	Low	2.1, 2.12, 3.1, 3.12
Tropical cyclone.	<ul style="list-style-type: none"> • Natural occurrences. 	<ul style="list-style-type: none"> • Loss of ecological habitat. • Fauna injury or death. • Human injury or death. • Damage to or loss of infrastructure. 	High	Medium	2.1, 2.12, 3.1, 3.12
Bushfire.	<ul style="list-style-type: none"> • Natural occurrence. • Arson. • Aircraft accident. • Building or system failure resulting in bushfire. 	<ul style="list-style-type: none"> • Loss of ecological habitat. • Fauna injury or loss of life. • Human injury or death. • Damage to or loss of infrastructure. 	High	Medium	2.1, 2.12, 3.1, 3.12



TABLE 6.1 GKI REVITALISATION PLAN ACCIDENT RISK REGISTER (PRELIMINARY)

Hazard	Causes	Impacts	Risk (un-mitigated)	Risk (mitigated)	EMP ID
Heatwaves.	<ul style="list-style-type: none"> Natural occurrences. 	<ul style="list-style-type: none"> Anthropogenic and fauna health impacts. Human injury or loss of life. 	Medium	Low	2.12, 3.12
Major spill or leakage of hazardous material					
Marine water contamination.	<ul style="list-style-type: none"> Improper storage, use or transport of hazardous materials. Spills of hydrocarbons and other contaminants. Improper dredging methods. 	<ul style="list-style-type: none"> Marine flora/fauna and recreational swimmer health impacts. 	Medium	Low	2.2, 3.2, 2.5, 3.5
Contamination of groundwater.	<ul style="list-style-type: none"> Improper storage, use or transport of hazardous materials. Spills of hydrocarbons and other contaminants. 	<ul style="list-style-type: none"> Damage to flora, fauna, and surrounding waterways. Human health impacts associated with aquifer use (during early construction phases). 	Medium	Low	2.4, 3.4
Surface water contamination.	<ul style="list-style-type: none"> Improper storage, use or transport of hazardous materials. Spills of hydrocarbons and other contaminants. 	<ul style="list-style-type: none"> Freshwater flora/fauna health impacts. 	Medium	Medium	2.4, 2.8, 3.4, 3.8



TABLE 6.1 GKI REVITALISATION PLAN ACCIDENT RISK REGISTER (PRELIMINARY)

Hazard	Causes	Impacts	Risk (un-mitigated)	Risk (mitigated)	EMP ID
Land contamination.	<ul style="list-style-type: none"> • Improper use of hazardous materials. • Spills of hydrocarbons and other contaminants. 	<ul style="list-style-type: none"> • Damage to flora, fauna, and surrounding waterways. • Human health impacts associated with aquifer use (during early construction phases). 	Medium	Low	2.4, 3.4
Transport Risk					
Major water vessel collision.	<ul style="list-style-type: none"> • Loss of control of vessel or operator error. • Adverse weather conditions. 	<ul style="list-style-type: none"> • Human injury or loss of life. • Contamination of marine waters (hydrocarbons and other contaminants). • Direct disturbance to marine environment. 	High	Medium	2.9, 2.12, 3.9, 3.12



6.1.3 Airstrip Hazards and Risk

This section includes an analysis of the following:

- probability analysis of aircraft accidents with reference to aircraft incidents within Australia;
- the impact of flight paths and frequency of aircraft movements on the risk of accidents involving residential and industrial areas;
- identification of sites on or near the upgraded airstrip that attract birds or bats and the typical routes used by birds and bats taking into account seasonal variation; and
- the relative risk of bird or bat strike, including quantitative and qualitative discussion of:
 - how the risk of bird or bat strike is to be managed;
 - how successful planned measures are likely to be; and
 - what the consequences of that level of risk are expected to be.

The airstrip hazards and risks, mitigation measures, and evaluated risk assessments associated with the GKI Revitalisation Plan are outlined in **Table 6.3**.

6.1.3.1 Probability Analysis of Aircraft Accidents

For practical reasons, predicting the probability of aeroplane crashes can only be based on historical data. This method assumes that the historical rate of accidents will continue into the future, however it is more likely that ongoing safety improvements in aviation will serve to reduce crash rates in future years.

Australia has not experienced a high capacity Regular Public Transport (RPT) fatal accident since 1968 and has never had a fatal accident involving an RPT jet aircraft. In estimating crash risk the assessment therefore needs to rely on international data from comparable first world countries – primarily from European and North American airports which have a much higher number of aircraft movements, often in more challenging weather conditions.

Historical data indicates that the average crash rate is 0.148 per million movements for modern jet aircraft, and 0.288 per million movements for the modern turboprop. Using the higher of these values and the 2920 annual movements forecast when the Resort is fully operational the annual probability of an air transport jet or turboprop crash at the Island is 0.000841. This can be expressed as 0.84×10^{-3} , or approximately one crash in 1000 years.

6.1.3.2 Risk of Accidents Involving Residential and Industrial Areas

Historical data indicates that 75-80 percent of RPT aircraft crashes occur in the immediate proximity to the airport runway, with the distribution shown in **Table 6.2**.



TABLE 6.2 AIRCRAFT CRASH DISTRIBUTION STATISTICS

Type of crash	Percent of crashes
Landing overruns	20%
Landing crashes from flight	52%
Take-off overruns	8%
Take-off crashes from flight	20%

CASA standards are designed to ensure that the vast majority of aircraft involved in a landing or take-off overrun impact solely on the airport by coming to rest within the runway strip or the runway end safety areas. This means that the risk of accidents involving residential and industrial areas is primarily related to the risk of an aircraft crash on landing or after take-off.

In planning terms this ideally means that no permanent residents, uses that attract large numbers of people or the bulk storage of hazardous materials should be located at the runway ends. This principle has been observed in developing the GKI Revitalisation Plan.

6.1.3.3 Bird and Bat Strike Risk Management

CASA requires airports to be certified if serviced by air transport operations using aircraft with more than 30 seats. Operators of certified airports must satisfy CASA that they have suitably qualified staff available and that staffing arrangements will ensure the airport is operated in a manner that ensures the safety of aircraft operations. With this objective in mind CASA requires the operator to establish a Safety Management System (SMS) which provides a framework for risk assessments and identification of measures required to reduce and/or keep risks as low as reasonably practicable.

CASA requires the risk of bird strikes at or in the vicinity of an airstrip to be assessed and suitable control measures to be identified. Although these measures will be site specific they will typically include management of the airport environs to minimise or where practicable eliminate bird attractants.

Areas disturbed during construction will be revegetated using grass and plant species known not to provide bird or bat food or shelter and landscaped to ensure that water does not pond adjacent to the airstrip or under the immediate approach/take-off flight paths.

Operational measures will be undertaken where necessary to deter bird roosting or flocking in the immediate airstrip areas. It is important to note that no protected bird fauna impacts are identified in association with the airstrip (refer **Chapter 3**). Further, bird and bat deterrent measures are implemented at all certified airports to manage bird hazards and minimise the risk of a bird strike.

Figures published by the Australian Transport Safety Bureau (ATSB) show that Queensland's major coastal airports reported an average of 4.42 bird strikes per 10,000 aircraft movements in the period 2002-2009, while using risk mitigation and control measures accepted by CASA. If this strike rate was replicated at the Island this would equate to four bird strikes every three years.

The combination of both passive and active management should ensure that bird strike incidents are isolated and cause only minor damage to aircraft and/or inconvenience to passengers when delayed.

All bird strikes will be reported to the ATSB and investigated to determine if additional measures are warranted to manage the risk of further occurrences.

6.1.3.4 Aircraft Risk Register

Table 6.3 presents the assessment of reasonably anticipated risks associated with the GKI Revitalisation Plan.

TABLE 6.3 AIRCRAFT RISK REGISTER (PRELIMINARY)

Hazard details					
Hazard	Causes	Impacts or consequences	Risk (unmitigated)	Mitigation measures	Risk (mitigated)
Major Aircraft Crash.	<ul style="list-style-type: none"> • Pilot error. • Aircraft malfunction. • Severe weather. 	<ul style="list-style-type: none"> • Possible human and animal fatalities (multiple). • Bush fires. • Hazardous spills resulting in impact to waterways. • Loss of habitat. 	(5, 2) Medium	<ul style="list-style-type: none"> • Ensure flight conditions are safe. • Adequate airstrip length (i.e. preferred airstrip Option 7B). Regular visual monitoring of all aircraft. • Ensure all aircraft maintenance schedules are current. • Firebreaks in place. • Personnel are trained in emergency and evacuation procedures. • All aircraft and infrastructure to meet <i>Australian Standards</i> and relevant legislation. • Emergency response programs. • Infrastructure built to withstand extreme conditions. 	(4,1) Low
Minor Aircraft Crash.	<ul style="list-style-type: none"> • Pilot error. • Aircraft malfunction. • Severe weather. 	<ul style="list-style-type: none"> • Possible human and animal injuries. • Fire. • Minor hazardous spills. 	(3,2) Medium	<ul style="list-style-type: none"> • Ensure flight conditions are safe. • Adequate run-way length. • Regular visual monitoring of all aircraft. • Ensure all aircraft maintenance schedules are current. • Firebreaks in place. • Personnel are trained in emergency and evacuation procedures. • All aircraft and infrastructure to meet <i>Australian Standards</i> and relevant legislation. • Emergency response programs. • Infrastructure built to withstand extreme conditions. 	(2,2) Low



TABLE 6.3 AIRCRAFT RISK REGISTER (PRELIMINARY) (CONTINUED)

Hazard details					
Hazard	Causes	Impacts or consequences	Risk (unmitigated)	Mitigation measures	Risk (mitigated)
Aircraft Fire.	<ul style="list-style-type: none"> Fuel spillage. Electrical fault. Incorrect storage of hazardous substances. Natural combustion. 	<ul style="list-style-type: none"> Aircraft damage; Injuries. 	(4,3) High	<ul style="list-style-type: none"> Fire emergency plans are in place and continually reviewed. Correct storage of all hazardous substances. Routine aircraft maintenance. Personnel are trained in fire and evacuation procedures. All fire fighting equipment and practices to meet <i>Australian Standards</i> and all relevant legislation. 	(2,2) Low
Hazardous spill.	<ul style="list-style-type: none"> Improper use of hazardous materials. Accidental spill. Lack of training. 	<ul style="list-style-type: none"> Damage to flora, fauna, and surrounding waterways. Increased risk of fire. Cost of clean-up. 	(4,3) High	<ul style="list-style-type: none"> Containment measures on site including MSDS. Spill kits readily accessible. Training and education for all personnel. Small volumes of hazardous substances kept on site. Hazardous substances stored in compliance with <i>Australian Standards</i>, and all relevant legislation. 	(2,2) Low
Runway incursion.	<ul style="list-style-type: none"> An intrusion of a vehicle, person, animal or object within a runway strip that creates a collision hazard. 	<ul style="list-style-type: none"> Damage to aircraft and other vehicles. Prevention/delay of flights. Animal deaths. 	(3,3) Medium	<ul style="list-style-type: none"> Adequate fencing. Strict security measures in place. Visual monitoring of the airstrip throughout the day. Security policy to be continually reviewed. Compliance with <i>EPBC Act 1999</i> and all relevant legislation. Review animal control measures. 	(3,1) Low



TABLE 6.3 AIRCRAFT RISK REGISTER (PRELIMINARY) (CONTINUED)

Hazard details					
Hazard	Causes	Impacts or consequences	Risk (unmitigated)	Mitigation measures	Risk (mitigated)
Bird/bat strike.	<ul style="list-style-type: none"> Bird/bats coming in contact with moving vehicles, aircraft and equipment. 	<ul style="list-style-type: none"> Damage to aircraft and machinery*. 	(3,5) Medium	<ul style="list-style-type: none"> Adequate fencing is in place. Bird/bat control policy. Visual checks daily. Landing/take-off policies. Preparation and implementation of a Bird and Animal Hazard Management Plan (Civil Aviation Safety Authority (CASA) Manual of Standards Pt 139 – Aerodromes 10.14). 	(2,2) Low
Landing/ take-off.	<ul style="list-style-type: none"> Under-shooting, over-running or running off the side of a runway. 	<ul style="list-style-type: none"> Damage to: <ul style="list-style-type: none"> aircrafts; infrastructure; and ecological habitat. Fire. Human and animal injury. 	(4,2) Medium	<ul style="list-style-type: none"> Buffer zones around the airstrip. Adequate airstrip length (i.e. preferred airstrip Option 7B). Aircraft maintenance schedules are up to date and maintained. All personnel are trained in emergency plans. All aircraft procedures are to comply with <i>Australian Standards</i> as well as all relevant legislation. 	(3,1) Low

*Fauna impacts are detailed in **Section 3** - no identified impacts on protected bird / bat fauna have been identified by the ecological specialists.



6.2 Health and Safety

6.2.1 Description of Public Health and Safety Community Values

This section describes the existing health and safety values of the residents, workforce, tourists, suppliers and other stakeholders in terms of the environmental factors that can affect human health, public safety and quality of life, such as air pollutants, odour, lighting and amenity, dust, noise and water.

Existing land uses on the Island include residential, commercial and tourist facilities. Existing sensitive receptors are discussed in full in **Chapter 3** of the EIS. Health and safety issues will require comprehensive risk assessments and appropriate mitigation during the different phases of the Project. Residents and tourists could be exposed to health and safety hazards from construction if controls not managed correctly.

During the community consultation process, the following health and safety concerns relating to the GKI Revitalisation Plan were raised:

- housing of workers during the construction phase and the potential for undesirable behaviours;
- location and method of providing essential services such as water, sewerage and electricity;
- location and method for storage and removal of wastes generated during construction and operation; and
- reduction in aesthetic value of natural environment.

Additional health and safety concerns related to:

- construction site management;
- vector management; and
- feral animal management.

The issues identified above are discussed in the relevant sections of the EIS. Mitigation of the health and safety issues are outlined in this document.

6.2.1.1 Potential Impacts and Mitigation Measures

Management of health and safety is applicable to the construction and operational phases of the GKI Revitalisation Plan. Construction of the proposed Project will occur over a 12 year period (refer **Appendix S – Project Schedule**) and will overlap with the staged operation of the Resort. Health and safety related hazards therefore have the potential to impact on the full range of sensitive receptors identified above and appropriate management strategies, including mitigation is essential to minimise health and safety risks to affected persons.

The potential public and workplace health and safety risks and associated mitigation measures directly related to the construction and operation of the Project are presented in **Table 6.4**.

TABLE 6.4 PUBLIC / WORKPLACE HEALTH AND SAFETY MITIGATION

Phase*		Project	Health and Safety Issue	Cause(s)	Mitigation
C	O	Element			
•	•	Whole of Project.	Workplace accidents.	<ul style="list-style-type: none"> Not following safe work procedures. 	Preparation and implementation of Environment, Health and Safety Management System.
•	•	Whole of Project.	Accidents involving surface mobile equipment (including collisions, run over and rollover).	<ul style="list-style-type: none"> High number of construction vehicles. Human error. 	<p>All plant operators (including contractors) will be certified to operate their designated equipment.</p> <p>Refer also Item 2.9 of the EMP.</p>
•	•	Whole of Project.	Electrocution.	<ul style="list-style-type: none"> Electrocution due to live wire, operator error or systems failure. 	Preparation and implementation of Environment, Health and Safety Management System (EHMS).
•	•	Whole of Project.	Hazardous materials interactions.	<ul style="list-style-type: none"> Failure to identify susceptible workers and/or undesired exposure to hazardous substances. Lack of adequate storage and handling procedures. Human error. 	<p>Preparation and implementation of Environment, Health and Safety Management System.</p> <p>Refer Section 6.1.2.2.</p>
•	•	Whole of Project.	Violence.	<ul style="list-style-type: none"> Anti-social behaviour of transient workforce (due to alcohol or drugs). 	<p>Preparation and implementation of Environment, Health and Safety Management System incorporating best-practice drug and alcohol code of conduct and mandatory drug and alcohol testing.</p> <p>Refer Section 6.1.2.1.</p>

* C = Construction Phase

O = Operational Phase



TABLE 6.4 PUBLIC / WORKPLACE HEALTH AND SAFETY MITIGATION (CONTINUED)

Phase*		Project Element	Health and Safety Issue	Cause(s)	Mitigation
•		Whole of Project.	Unauthorised work site access.	<ul style="list-style-type: none"> Unintentional or deliberate access to construction areas. 	<p>Site management is to include site security and appropriate signage.</p> <p>Refer Section 6.1.2.1.</p>
•	•	Whole of Project.	Noise and vibration impacts: <ul style="list-style-type: none"> hearing related injuries; damage to property; and reduced quality of life. 	<ul style="list-style-type: none"> Construction activities. Aircraft movements. Vehicle movements. Emergency standby electricity generators. 	Refer Item 2.7 and 3.7 of the EMP.
•	•	Whole of Project.	Air quality impacts: <ul style="list-style-type: none"> fugitive emissions causing environmental nuisance / health impacts; and decreased visibility. 	<ul style="list-style-type: none"> Construction traffic. Demolition works. Construction works. Stockpiles. Sewerage Treatment Plant emissions. 	Refer Item 2.6 and 3.6 of the EMP.
•	•	Whole of Project.	Vehicle accidents.	<ul style="list-style-type: none"> Increased Island traffic as a result of construction activities. increasing likelihood of accident. 	Refer Item 2.9 of the EMP.
•	•	Whole of Project.	Potable Water Quality: <ul style="list-style-type: none"> illness / death; loss of potable water supplies; loss of productivity; reduced quality of life; and foul taste/ odours. 	<ul style="list-style-type: none"> Hazardous substance spills near groundwater recharge areas for aquifers. Lack of adequate storage and handling procedures. Human error. 	<p>Ensure all potable water meets the Australian drinking water guideline 2004 (in particular during Stage 1 - Construction)</p> <p>Implement an emergency response plan for water contamination</p> <p>Construction of an underwater potable water pipeline, to connect to the mainland</p> <p>Refer Section 6.1.2.2 and Item 2.4 and 3.4 of the EMP</p>

* C = Construction Phase

O = Operational Phase



TABLE 6.4 PUBLIC / WORKPLACE HEALTH AND SAFETY MITIGATION (CONTINUED)

Phase*		Project Element	Health and Safety Issue	Cause(s)	Mitigation
•	•	Whole of Project.	Marine Vessel Accidents	<ul style="list-style-type: none"> • Collisions. • Human error. • Poor visibility. 	Refer Section 2.9 and 3.9 of the EMP
•	•	Whole of Project.	Waste management impacts: <ul style="list-style-type: none"> • ill health/ death; • disease bacteria and viruses being readily transferred; and • foul odours. 	<ul style="list-style-type: none"> • Non-conforming waste treatment facilities. • Lack of correct waste management procedures. • Rodents/ wildlife entering waste storage facilities. 	Refer Item 2.8 and 3.8 of the EMP.
	•	Sewerage Treatment Plant.	Public exposure to Class A+ recycled water causing nuisance or illness.	<ul style="list-style-type: none"> • Spray drift during recycled water irrigation. • Contact with recycled water in open ponds on the golf course. 	Refer Item 3.4 of the EMP.
•	•	Sewerage Treatment Plant.	Illness and disease spread by water borne biting insect.	<ul style="list-style-type: none"> • Permanent water storages providing habitat for biting insects. 	Permanent water storages are to be constructed and managed in accordance with Australian Mosquito Control Manual (Mosquito Control Association of Australia 2002).
•	•	Whole of Project.	Wildlife hazard (e.g. snake bite).	<ul style="list-style-type: none"> • Disturbance of wildlife resulting in human injury. 	Preparation and implementation of Environment, Health and Safety Management System. Refer Section 6.1.2.2 .

* **C** = Construction Phase**O** = Operational Phase

6.2.1.2 Workplace Health and Safety

Workplace health and safety will meet industry best-practice standards, relevant codes of practice and statutory provisions including but not necessarily limited to the *Workplace Health and Safety Act 1995* (Qld). Health and safety management will include:

- a workplace health and safety policy;
- identification of health and safety risks associated with the GKI Revitalisation Plan;
- identification and implementation of control measures to minimise health and safety risks; and
- monitoring and review of the effectiveness of health and safety management.

6.2.1.3 Storage and Handling of Dangerous Goods

Potential hazards are associated with the type of substances that would be expected to be stored and used during the construction and operational phases of the Project. The Project will use several common hazardous substances which are regulated by the Australian Dangerous Goods Code (Commonwealth) and Code of Practice under the *Workplace Health and Safety Act 1995* (Queensland).

Table 6.5 provides an indication of likely dangerous goods and hazardous substances to be stored and used throughout construction and/or operation of the Project.

TABLE 6.5 DANGEROUS GOODS AND HAZARDOUS SUBSTANCES

Dangerous Good (DG)	DG Class	Storage Volume Requiring Licence	Annual Usage Estimate	UN Number	Purpose
Diesel	C1	10,000L	+ 10,000L	-	Generator / vehicle / machinery fuel supply
Sulphuric Acid	8	250L	TBC	1830	pH adjustment
Caustic Soda (Sodium Hydroxide)	8	250L	TBC	1824	pH adjustment
Chlorine	2.3 Sub class 8	50L	TBC	1017	Disinfectant
Ammonium Hydroxide	8	1,000L	TBC	2672	pH adjustment

TABLE 6.5 DANGEROUS GOODS AND HAZARDOUS SUBSTANCES (CONTINUED)

Dangerous Good (DG)	DG Class	Storage Volume Requiring Licence	Annual Usage Estimate	UN Number	Purpose
Sodium Hypochlorite	8	1,000L	TBC	1791	Disinfectant and pool treatment
Ferric Chloride	8	1,000L	TBC	2582	Flocculant
Hydrogen Gas	2.1	500L	TBC	1049	Generator cooling
Liquid Alum	8	-	TBC	-	Water treatment
LP Gas	2.1	500L	TBC	1075	Vehicle / machinery fuel supply and commercial kitchen

Handling, storage and appropriate separation distances must be maintained in accordance with the following *Australian Standards*:

AS 1692: Tanks for flammable and combustible liquids;

AS 1940: The storage and handling of flammable and combustible liquids;

AS 3780: The storage and handling of corrosive substances; and

AS 4452: The storage and handling of toxic substances.

Through application of appropriate workplace health and safety standards and strict adherence to relevant Australian Standards and other relevant industry codes of practices the risk posed by identified dangerous goods and hazardous substances is considered manageable.



6.2.1.4 Health and Safety Continual Improvement

The Proponent is committed to continuous improvement of the health and safety risk management process as per *AS/NZS ISO 31000:2009 Risk management – Principles and Guidelines*. Based on results of monitoring, reviews of relevant policies, plans and procedures will be undertaken with the intention to reduce the identified health and safety impacts. This will subsequently improve the Project's management of risk and its risk management culture. Additionally, as per the New South Wales Government Department of *Planning Hazardous Industry Planning Advisory Paper No 8 – HAZOP Guidelines*, the Proponent will conduct a hazard and operability study (HAZOP) prior to the construction stage of the Project. A HAZOP will provide a more detailed review of the Project, its equipment and operations in order to thoroughly identify all potential hazards and operational problems.

6.3 Evacuation and Emergency Response Plan

An Evacuation and Emergency Response Plan (EERP) is a plan which enables all project personnel and emergency service personnel to manage an effective and safe response to emergencies within the Project site. It provides guidelines for actions to be taken during an emergency to minimise the potential for loss of life, injury to people, and damage to the environment and property by covering foreseeable incidents and outlining remediation. GKI Resort Pty Ltd will develop an integrated EERP for the construction and operational phases of the Project. The EERP will be based on the following components:

- analysis of key incidents likely to take place for each operational area;
- assessment of the degree of impact likely to occur from identified incidences;
- assessment of what constitutes an emergency for the Project;
- onsite plan to handle incidents with reference to emergency services potentially needed;
- communication, emergency responsibilities, control centre establishment;
- post emergency procedures, including recovery, debriefing and review of plan;
- testing of plan under emergency-like conditions; and
- analysis of possible evacuation routes and hazardous areas.

The Proponent will seek advice from the following services for guidance when preparing the EERP:

- Department of Community Safety;
- Queensland Police Service;
- Queensland Ambulance Service;
- Professional advisors;
- Rockhampton Regional Council
- Queensland Fire and Rescue Service; and
- Rural Fire Service.

Further to this the Proponent will consult the *Rockhampton Regional Council Counter Disaster Plan* regarding guidance for preparing emergency plans. The Rockhampton Regional Council will be advised of any planned activities which may affect the council and regional emergency plans. The Proponent will also utilise the New South Wales Department of Planning *Hazardous Industry Planning Advisory Paper No 1 – Emergency Planning*.

Local health service providers will be consulted to ensure that provision of emergency health care is included in the procedures. The Proponent will work with local health service providers to ensure that adequate resources are available in the local area to address the added demand that the Project is likely to generate. The operating EERP will be revised regularly throughout the life of the Project and if necessary in response to any emergency situation where deficiencies are noted.

Refer to **Section 4.3.12** Community Safety for the list of organisations that were consulted in preparing the EIS.

6.3.1 Emergency Response, Training and Induction

All project site personnel will undergo a mandatory induction process which will include first aid training, simple fire training and EERP training. Additionally, selected personnel will be trained in advanced resuscitation techniques. First aid stations and emergency response kits will be located at easily accessible and appropriate locations throughout the Project site. In the event of an emergency, the relevant ambulance service to local medical facilities will be utilised where applicable, with Yeppoon hospital utilised where necessary. Alternatively, the Central Queensland Rescue Helicopter service will be utilised for rapid assistance and transfer to Rockhampton Hospital.

6.3.2 Fire Fighting

The Proponent will ensure that all fire fighting equipment utilised throughout the Project life meets Australian Standards and all other legislative requirements. Further to this:

- approved suitably signed fire fighting equipment (including fire hose reels, blankets and hand held extinguishers) will be fitted to all buildings on the Project site, and the retention of on-site fire water (with a fire flow of 25 litres per second with a minimum of four hours fire storage capacity (a total of 360 kilolitres)) or other fire suppressants used to combat emergency incidents will be provided;
- all buildings will be fitted with lighted emergency and exit signage in accordance with relevant Australian Standards;

- fire detection and suppression systems will be located in control rooms, plant rooms, office buildings accommodation villages and all other residential development. The system will be designed and installed in accordance with the relevant Australian Standards and approved by the Queensland Fire and Rescue Service;
- all services will be tested regularly and serviced, maintained and inspected by an approved certification body;
- detailed maps will be developed showing the EERP outline, potential hazardous material stores, incident control points, fire fighting equipment, etc; and
- all personnel will be trained in basic fire fighting procedures utilising hand held extinguishers. Additionally, appropriate personnel will be trained in more advanced fire fighting techniques.

6.3.3 Natural Disaster Strategy

A natural disaster strategy will be developed to respond to all possible natural disasters that may occur within the Project site. The strategy will detail all of the activities that are carried out prior to the advance notice of a possible natural disaster in order to facilitate the use of available resources, relief, and rehabilitation in the most practical approach. The strategy will focus on the following key areas:

- preparation - to ensure the highest level of physical preparedness, as well as the speed and effectiveness of the response when a disaster actually strikes;
- mitigation - to increase the protection of buildings and infrastructure, personnel and the environment against disasters; and
- post-disaster response - to rehabilitate social and economic infrastructure, the surrounding environment and livelihood of the community to ensure the earliest reinstatement of economic activity.

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