



**PORT of TOWNSVILLE**  
Nexus North Queensland

## **Appendix Z Health and Safety**

**Townsville Marine Precinct Project**  
Environmental Impact Statement





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# 1. Health and Safety

## 1.1 Description of Environmental Values

The main community values for public health and safety that may be affected by the construction, operations and decommissioning of marine precinct are air quality and noise levels. The Environmental Protection Policy (Air) and Environmental Protection Policy (Noise) goals are described separately in the EIS under Air Quality and Noise section.

The health and safety aspects of the dredging, construction of a reclamation bund, operations at the marine precinct and decommissioning include the following:

	<i>Environmental Values</i>
Air environment	Qualities of the air environment that are conducive to human health and well being;  Qualities of the air environment that are conducive to protecting agricultural use of the environment; and  Dust and odour.
Noise environment	Qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the sleep, study or learn or be involved in recreation, including relaxation and conversation  Qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Data recorded by Port of Townsville indicated that there were no events during the 2005/06, 2006/07 and the 2007/08 periods where  $PM_{10}^1$  exceeded the Environmental Protection Policy (Air) goal of  $150\mu g/m^3$  as a 24-hour average. Environment Protection Agency annual reporting for 2007 states, carbon monoxide (CO) and lead levels are reasonably expected to be consistently below the relevant National Environment Protection Measure (NEPM) standard. Similarly, nitrogen dioxide levels are expected to be consistently below 40 percent of the NEPM standards. The 1-hour sulphur dioxide statistics at and above the 90<sup>th</sup> percentile at both Pimlico and Stuart are lower than for all other regions in Townsville. The 1-hour and 4-hour NEPM standards for ozone were always met. Further details are provided in the section on Air Quality of this EIS.

During the marine precinct operations, the average sound level experienced at nearby residence is expected to be around 46 dB (A) under worse case conditions. This is similar to existing noise levels in

<sup>1</sup> Particulate Matter 10 micrometers or less in diameter



the area and it is expected that further noise attenuation will likely occur. Further details are provided in the section on Noise Levels.

Mosquito and biting midge have public health implications particularly since this project is near the coastal area which will bring humans in close contact with them. Project activities may also be expected to create potential mosquito and biting midge breeding sites if this hazard was not recognised and controlled.

The mosquitoes are known carriers of malaria, dengue fever, Ross River virus, Barmah Forest virus, Japanese encephalitis and Murray Valley encephalitis. Polluted waters, freshwater swamps, brackish waters, construction ground sites, water storage tanks and drains are breeding sites for mosquitoes. Mosquito life cycle depends on environmental factors such as temperature and humidity. Townsville area has saltmarsh mosquitoes (*Aedes vigilax*, *Culex sitiens*, *Verrallina funerea*) dengue fever (*Aedes aegypti*) and freshwater mosquitoes (*Aedes aegypti*, *Aedes notoscriptus*, *Culex annulirostris*, *Verrallina funerea*, *Aedes vittiger*, *Aedes alternans* and *Mansonia uniformis*)

Biting midges do not currently transmit human disease in Australia but can be a severe pest if adults are in abundance, they can impact on humans due to irritable bites and skin reaction from their saliva. Blisters and weeping serum may occur from the site of bite. Biting midges are attracted to human settlement and are found resting on screens, fences and vegetation. They are active during dull still days with high humidity.

## **1.2 Potential Impacts on Workforce**

A total of 550 workers will be working during the construction phase. The number of workers during operation phase is not yet known. Potential safety hazards associated with construction and operation activities include drowning when working over water on barge or vessel, injury or fatality while handling dangerous goods, suffocation during working in confined space, electrocution and injury to self or others while undertaking lifting activities. Table 1 outlines potential health and safety hazards to personnel on site during the construction and operation of the marine precinct. To increase site safety and to assist in preventing injuries during construction or operation phase it is recommended that persons on site wear appropriate Personal Protective Equipment (PPE) such as hard hat, safety glasses, steel capped boots, high visibility vests, ear protection, dust masks or any other specific PPE as required.

Details of wastewater treatment and reuse are not known at this stage. However, water recycling measures are being considered by the Port of Townsville (POTL) within the marine precinct. Individual facilities within the marine precinct will also be encouraged to adopt the water recycling measures. The project area is likely to have breeding sites for mosquito and biting midge. The recreational, commercial and industrial development is expected to expose a number of people including workers to mosquitoes and biting midges.



**Table 1 Qualitative Summary of Hazards, Consequences and Mitigation Measures**

<b>Activity</b>	<b>Hazard</b>	<b>Consequence</b>	<b>Mitigation Measures</b>
Construction dust	Struck by wind blown particles, (i.e. from unloading trucks, traffic)	Injury to personnel, environment impact	Health Safety and Environment (HSE) awareness, Job Safety Analysis (JSA), competent workers, dust suppression, PPE (eye protection must be worn at all times when onsite - signage), watering of roads
Construction works	Noise - excessively noisy Plant and equipment	Injury to personnel, damage and Environment damage	Competent workers, HSE awareness, JSA, Personal Protective Equipment (PPE), in compliance with noise regulations, boundary noise criteria.
Exposure to chemicals/ dangerous goods	Inappropriate handling, leaks, inappropriate storage	Fatality, injury to personnel, time delays.	HAZOP used during design, maintenance to include inspection of storages, pipelines and connections of chemical storages, chemical storages designed in accordance with Australian Standards and <i>Dangerous Goods Safety Management Regulation 2001</i> , copies of Material Safety Data Sheet (MSDS) at site.
Fitness for work	Drugs, alcohol, fatigue, mental state and stress	Injury to personnel, fatalities, environment damage, equipment damage	Pre-employment screening. Drug and alcohol policy. Fatigue awareness. Induction training
General site work	Poor housekeeping	Slips, trips and falls for persons. Obstruction to vehicle movements	JSAs, HSE awareness, supervisor monitoring, emergency response procedures and services.
Loading and unloading of goods and equipment	Dropped object, slips, trips, falls, moving loads, inappropriate rigging.	Injury to personnel, damage to equipment. time delays	JSA, safe work instructions, competent and certified personnel, controlled lay down areas, supervision and training.
Manual handling	Ergonomics, inappropriate body position, unstable footing, excessive loads, poor lifting practices.	Injury to personnel, loss of working hours, time delays	Induction to workers and re-training on safe manual handling practices, increase awareness on health and safety issues and first aid training.



<b>Activity</b>	<b>Hazard</b>	<b>Consequence</b>	<b>Mitigation Measures</b>
Natural events	Lightning, strong winds, flooding	Injury to personnel, equipment damage	Controls as per the Emergency Response Procedure (ERP), JSAs to specifically consider imminent weather conditions.
Pre-inerted vessels, equipment and containers, fumes and vapours from paints.	Asphyxiation, chemical Inhalation, pressure	Injury to personnel, fatality, time delays	JSA, HSE awareness, competent workers, confined space entry procedure.
Security	Unauthorised access	Injury to personnel and environment damage	Security fencing, security personnel, controlled access, perimeter patrols.
Third Party onsite	Third parties are less familiar with site safety and environmental requirements and pose enhanced risk to themselves and others.	Injury to personnel, fatalities, environment damage, equipment damage	Inductions for all contractors and visitors, escort all short term visitors. Site entry procedure
Vehicle traffic on site	Vehicle collision, pedestrian and vehicle collision	Fatality, Injury to personnel, time delays damage to vehicle/ equipment	Vehicle movement plan for the site for construction as well as operation phase, signage, scheduling of larger deliveries. Only certified and authorised drivers on work-site, lower speed limits on site, high visibility clothes.
Working in wet weather	Wet conditions, slips, trips, falls, electrocution.	Injury to personnel, time delays	Proper drainage at the construction working area, proper laying of cables, insulated hooks and stands, earth leakage circuit breaker. Suitable undercover work areas to be provided.
Working in hot conditions	Dehydration, exposure to sun	Heat stress, heat stroke, sun burns, time delays	HSE awareness programs, induction to include working in heat, use of PPE, provision of drinking water, JSA
Working with equipment and tools	Faulty tools, defective equipment.	Injury to personnel, damage to equipment. time delays	JSA, training to workers, competent workers, HSE awareness, inspection and maintenance program.



<b>Activity</b>	<b>Hazard</b>	<b>Consequence</b>	<b>Mitigation Measures</b>
Working at heights on platforms, man boxes, baskets etc	Changes to scaffolding, fall from heights, dropped objects, manual handling, incorrect assembly.	Fatality, injury to personnel, time delays	JSA, training to workers, competent workers, HSE awareness, review of work packages, safe work instructions on use of equipments, procedure for working at height. All scaffolding will be constructed under the supervision of a certified scaffolder.
Working in confined spaces	Dropped objects, manual handling issues, restricted access.	Injury to personnel, potentially poor body position, asphyxiation, long term health problems.	JSA, HSE awareness, training to workers, competent workers, confined space procedure, low voltage lights.
Working with compressed air	Hoses become uncoupled, hose burst, inappropriate use of air	Injury to personnel, time delays	JSA, HSE awareness, competent workers, inspection and testing.
Working with electrical	Contact with electricity - general (defective electrical leads, electric leads in contact with metal, electric leads in damp areas, etc.)	Electrocution, time delays	Elevating cables, insulated hooks and stands, earth leakage circuit breaker. Inspection and maintenance program including testing and tagging for all electrical tools/equipment onsite. Use of battery operated tools and low voltage lighting (where practicable).
Mosquito and biting midge	Biting to humans	Fever, fatigue, itching and skin reaction, time delays	Minimise areas of stagnant water or ponding of surface waters. Regular monitoring and control measures at breeding sites.



## **1.3 Impacts on Community**

### **1.3.1 Air Quality Impacts**

Dust is the predominant health and safety issue for communities during construction as well as operations. Odour has been considered and is likely to be well below levels of concern.

Dust impacts to the community during construction of the reclamation area are unlikely to be substantial due to separation distances and the moist nature of the dredged material being used to reclaim.

Air dispersion modelling for construction phase was done for PM<sub>10</sub> dust concentration and for dust deposition and reported in section on Air Quality. For both the suburban areas, dust concentrations are always below 50 mg/m<sup>3</sup> at distances greater than 600m from the construction activity. The dust deposition, expressed as annual average g/m<sup>2</sup>/month, shows a similar pattern with all areas beyond 70m being below the recognised critical level for nuisance dust complaints. Dust emissions from construction and operation can be managed to ensure that adverse impacts do not occur at sensitive locations offsite. Mitigation measures for dust during construction and operations are outlined in section on Air Quality.

### **1.3.2 Noise Level Impacts**

#### **Construction phase**

Received noise produced by anticipated activities, during the construction of the marine precinct with no noise barriers or acoustic shielding in place and with each plant item operating at full power was calculated. Anticipated noise levels compare to existing daytime ambient noise levels for all plant activity except pile driving. Hence, the predicted noise levels are considered to be acceptable.

In general the quietest equipment will be used in conjunction with appropriate management measures with appropriate monitoring mechanism. Noise mitigation strategies will be considered and implemented during evenings and night time work periods. AS 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites" will be applied where possible (refer section on Noise under this EIS).

Construction related traffic will likely use Boundary Street as the major access route to site. No traffic counts have been made available and no estimates of construction related traffic are available to predict any noise related impact on the residents of Boundary Street.

#### **Operation phase**

Noises from Marine Precinct during operation phase are expected to be generated from the individual facilities. It is unknown at this stage about the occupant details of the proposed marine precinct. It is expected that these will include industrial activities such as boat building, abrasive blasting, surface coating, workshops, storage of goods, and packaging. Other noise generating activities associated with this will include trucks and forklifts, trawlers and boats.

Received noise produced by anticipated activities, during operation with no noise barriers or acoustic shielding in place and with each plant item operating at full power was calculated. During the marine precinct operations, the average sound level experienced at nearby residence is expected to be around 46 dB (A) under worse case conditions. This is similar to existing noise levels in the area and equal to the project specific noise criteria.



It is expected that further noise attenuation will likely occur due to activities located inside the buildings, blocking of noise sources from site receivers due to buildings, walls and barriers, and location of the source at a distance further from 350m from the nearest sensitive receptors.

Locating these types of industry within the marine precinct should not impact on the amenity of noise sensitive receivers with appropriate planning, design and management procedures in place.

Not enough detail is known to assess evening and night time impacts of the potential marine precinct users on the nearby sensitive receivers. Without management or mitigation, some activities will have to potential to exceed the project specific criteria and also cause sleep disturbance. It is recommended that each user of the marine precinct be subject to a noise assessment if planned operations are outside the day time period.

### 1.3.3 Mosquito and Biting Midge

The project area is likely to have breeding sites for mosquito and biting midge these include water recycling. However, POTL and individual facilities will have to ensure that it does not enhance mosquito breeding and disease transmission.

Populated areas, which are in the path of the dominant prevailing wind from mosquito and biting midge breeding sites, may be regularly affected by biting insects that are carried by wind. The range could be from few metres to few kilometres depending on the climatic conditions and type of mosquito species.

## 1.4 Management Plans

### 1.4.1 Health and Safety

Management Plan for health and safety has been summarised as follows:

<b>Health and Safety Management Plan</b>	
<b>Elements</b>	Incidents and hazards in the workplace
<b>Management Objectives</b>	To provide a healthy and safe workplace for employees, clients contractors and visitors.
<b>Performance Criteria</b>	Adhere to applicable Australian and other recognised standards, applicable code of practises and relevant statutory provisions, especially the Dangerous Goods Safety Management Act, 2004 and Workplace Health and Safety Act, 1995  Implementation of Identified Hazards  Implementation of Safety Management System.  Implementation of Emergency Response Plan.  Preparation of JSA's to manage workplace risks.
<b>Implementation Strategy</b>	<b>Responsibility</b>
Implement a Hazard and Operability Study (HAZOP) system during	Respective Industries within the



<b>Health and Safety Management Plan</b>	
detailed design to identify all potential causes of chemical leakage and spillage or hazards to workers and ensure that appropriate protective systems are implemented.	Marine Precinct through Design Contractor
Develop an Emergency Response Plan in conjunction with local authorities and emergency services. Submit Emergency Response Plan to the Department of Emergency Services CHEM Unit for approval prior to the commencement of construction.	Construction Contractor/ Developers Project Manager
Prepare and implement a Safety Management System to address hazards associated with construction and operation and specify safe working procedures.	Construction Contractor/ Developers Project Manager
Maintain site security systems.	Construction Contractor/ Developers Project Manager
Ensure contractors working on-site adhere to the Safety Management System and complete JSAs as appropriate.	Construction Contractor/ Developers Project Manager
Provide personnel with training in chemical management and spill response and workplace health and safety.	Construction Contractor/ Developers Project Manager
Provide personnel involved in Emergency Response with appropriate training.	Construction Contractor/ Developers Project Manager
Submit Safety Management Plan to the Department of Emergency Services CHEM Unit for approval prior to the commencement of construction.	Developers Project Manager
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Maintain a training register for all staff and contractors.</li> <li>» Undertake regular monitoring of the performance of staff and contractors in terms of compliance with Safety Management System.</li> </ul>
<b>Reporting</b>	<ul style="list-style-type: none"> <li>» Daily or weekly reports (as appropriate) will be completed on-site and reviewed by each Supervisor and / or Superintendent.</li> <li>» Immediately notify Superintendent and Queensland EPA in the event of an uncontained spillage.</li> <li>» Report all incidents and investigate.</li> <li>» Incident or non-compliance corrective action shall be closed out by senior management according to an agreed responsibility and timescale.</li> <li>» Workplace Health and Safety representative will be responsible for enforcing all occupational and public health directives and keeping all related records and communications.</li> </ul>



<b>Health and Safety Management Plan</b>	
<b>Corrective Action</b>	<ul style="list-style-type: none"> <li>» The Construction Manager and the Environmental Representative are to be notified in the event of non-compliance.</li> <li>» Redesign control measure if inadequate.</li> </ul> <p>The following constitute incidents or failure to comply with occupational and public health policies:</p> <ul style="list-style-type: none"> <li>– directives and procedures contained in the site safety system are not being followed;</li> <li>– directives and procedures contained in the site safety system are not being enforced;</li> <li>– site safety system does not encompass all required topics and situations;</li> <li>– high rate of work-related injury and illness; or</li> <li>– the emergency response plan is not prepared or implemented.</li> </ul> <p>In the event of an incident or failure to comply, a selection of the following actions will be undertaken as appropriate:</p> <ul style="list-style-type: none"> <li>– investigate why the incident occurred and investigate and implement mitigating measures;</li> <li>– ensure safety information provided is adequate and up-to-date and revise regularly as               <ul style="list-style-type: none"> <li>– appropriate;</li> <li>– ensure employees, contractors and visitors to the site are familiar with the procedures and                   <ul style="list-style-type: none"> <li>– policies relevant to their positions;</li> <li>– ensure safety directives and procedures are enforced; and ensure safety documents are readily available to everyone on the site.</li> </ul> </li> </ul> </li> </ul>

#### **1.4.2 Mosquito and Biting Midge Management Plan**

The Local Government Association of Queensland has produced a Mosquito Management Code of Practice (LGAQ 2002) which contains detailed advice to be followed for control of mosquitos in Queensland. It is necessary that this is followed by POTL and the facilities that will be housed within this marine precinct. Queensland Health (2002) has published guidelines to minimise mosquito and biting midge problems in new development areas. This document provided advice on how to prevent or minimise the impact of mosquitoes and other biting insects in new development areas. Water storage tanks must be constructed and installed in accordance with Division 2, Part 1A, Public Health Regulation 2005.

During operation phase of the marine precinct, following must be considered:



- If POTL or Occupiers of the marine precinct use recycled water for irrigation, surface ponding must be prevented by appropriate irrigation scheduling;
- Regular maintenance of all structures associated with storage or treatment of recycled water is necessary to minimise mosquito breeding. This will include clearing of water plants from the edges of the storage to reduce habitat for larvae;
- Open water recycled storages must be monitored regularly to identify presence of mosquito larvae; and

If a potential health risk from mosquito breeding is identified, biological control using natural predations such as aquatic invertebrates or known fish that prey upon the larvae should be introduced.

Management Plan for mosquito and biting midge has been summarised as follows:

<b>Mosquito/Biting Midge Management Plan</b>	
<b>Elements</b>	Incidents and hazards due to mosquito and biting midges
<b>Management Objectives</b>	Policy: To prevent the occurrence of potential mosquito/biting midge breeding sites and the presence of adult mosquitoes/ biting midge.
<b>Performance Criteria</b>	The number of potential mosquito/biting midge breeding sites created on-site is to be minimised by preventing water from ponding.
<b>Implementation Strategy</b>	<b>Responsibility</b>
The following strategies will be implemented to achieve the objectives of the mosquito/ biting midge management EMP:	
Depressions in the ground surface will be filled to prevent the ponding of water. Pools of stagnant water will be drained and/or the areas filled.	Construction Contractor/ Developers Project Manager
Storage containers capable of ponding water will be either discarded after use or stored in an inverted position (care will be taken to ensure that ponding does not occur in rubbish storage areas)	Construction Contractor/ Developers Project Manager
Consider avoiding creation of favourable habitats for biting midge species.	Design Contractor/ Developers Project Manager
Avoid creation of continuous belt of dense foliage trees as a part of landscaping. Ensure removal and replacement of vegetation conforms to policies set by different government department.	Design Contractor/ Developers Project Manager
All ponds and on-site excavations filled with water will be inspected for the presence of mosquito larvae on a weekly basis by the Environmental Representative	Construction Contractor/ Developers Project Manager



<p>Erosion and wash down practices will be controlled to prevent sediment and debris forming standing water pools in natural water courses adjacent to the site. Mosquitoes will not breed in flowing water</p>	<p>Construction Contractor/ Developers Project Manager</p>
<p>If larvae are detected in large numbers, contact Queensland Health for assistance in choosing a suitable treatment method. Treatment could either be aerial, ground or adulticiding (fogging).</p>	<p>Construction Contractor/ Developers Project Manager</p>
<p><b>Monitoring</b></p>	<p>The Environmental Representative will inspect any potential mosquito breeding areas following rain to monitor the presence of mosquito larvae. The representative will also monitor the frequency of mosquito bites on the site to identify where mitigation measures are not currently successful and to see whether adult eradication programs should be implemented.</p> <p>The Environmental Representative will inspect any potential biting Midges breeding sites including boulder covered foreshores where boulders lie on a mud-sand-shell base and wave action is moderate in a band near high tide levels, clean sandy shores subject to moderate tidal actions, sandy shores in canal estate developments, muddy sand to pure mud areas and subterranean tunnels.</p>
<p><b>Reporting</b></p>	<ul style="list-style-type: none"> <li>» The Environmental Representative will record when and where any larvae or mature mosquitoes are found on-site, as well as when and where any incidences of bites may occur.</li> <li>» Should a large number of larvae or bites be experienced, the Townsville City Council will be contacted for advice on appropriate remedial measures.</li> </ul>
<p><b>Corrective Action</b></p>	<p>Should an incident or failure to comply occur, a selection of the following actions will be taken:</p> <ul style="list-style-type: none"> <li>» An investigation will be undertaken into why directives are not being carried out;</li> <li>» Employees will be re-educated on desired practices; and</li> <li>» Work policies and procedures will be changed to improve the situation.</li> </ul>



## 2. Conclusion

The potential risk to health and safety from the project construction and operations activities and their impact on the workforce and communities exists.

The implementation of workplace health and safety procedures and the management plans will minimise the potential risks to acceptable levels.



## References

1. Local Government Association of Queensland 2002, Mosquitoes Code of Management Practise
2. Queensland Health 2002, Guidelines to minimise the mosquito and biting midge problems in new development areas.
3. Queensland Government, Environmental Protection Agency 2005, Water Recycling Guidelines.
4. Townsville City Council website [www.townsville.qld.gov.au](http://www.townsville.qld.gov.au)
5. Workplace Health and Safety Act, 1995
6. Workplace Health and Safety Regulation, 2008

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