

DARWIN CITY WATERFRONT

ENVIRONMENTAL ASSESSMENT REPORT AND RECOMMENDATIONS

**by the
OFFICE OF ENVIRONMENT AND HERITAGE
NORTHERN TERRITORY GOVERNMENT**

August 2004



Northern Territory Government
Office of Environment and Heritage

TABLE OF CONTENTS

ABBREVIATIONS	iii
EXECUTIVE SUMMARY	iv
LIST OF RECOMMENDATIONS	v
LIST OF FIGURES	ix
1. INTRODUCTION AND BACKGROUND	1
1.1. The Proposal	1
Master Plan.....	4
1.2. Environmental Assessment History	4
1.3. Issues Outside the Scope of this Environmental Impact Assessment	5
Remediation of existing soil contamination	5
Cruise Ship Facility	6
2. REGIONAL SETTING	7
Physical Features.....	7
Biological Features.....	7
Cultural Features	9
Current Land Uses in Adjacent Areas.	9
3. ENVIRONMENTAL IMPACT ASSESSMENT	11
3.1. Introduction	11
3.2. Cultural Environment.....	12
Aboriginal Cultural Heritage.....	12
European Cultural Heritage	13
3.3. Infrastructure	15
Road Network, Traffic and Transport	15
Associated headworks	16
3.4. Noise Management	16
Noise from Working Wharves.....	16
Traffic Noise	17
Construction Noise	17
Operational Noise.....	17
3.5. Port Security Arrangements.....	18
3.6. Hazards Associated with Fuel Storage and Transfer	19
Storage - Naval Fuel Installation	19
Bulk Fuel Off-loading	19
Refuelling Operations.....	20
3.7. Potential Impact of Odour and Air Emissions from Adjacent Land Use	20
Naval Fuel Installation	20
Refuelling Operations at Fort Hill Wharf and the Iron Ore Wharf.....	20
3.8. Potential Impacts on the Marine Environment	21
Potential Impact of Marine Structures.....	21
Operations involving Dredging and Reclamation in Kitchener Bay	21
Potential Off-shore Development adjacent to the western side of Fort Hill.....	22
3.9. Acid Sulfate Soils/Potential Acid Sulfate Soils.....	23
Acid Sulfate and Potential Acid Sulfate Soils	23
Acid Sulfate and Potential Acid Sulfate Sediments in Kitchener Bay	23
3.10. Waste Management.....	24
3.11. Dewatering During Construction	24

3.12. Biting Insects	25
3.13. Master Plan.....	25
3.14. Integrated Environmental Management.....	25
Land Use Conflicts/Incompatibilities	25
Transfer of environmental responsibility, site constraints and environmental management commitments to eventual developers, land owners and land users	26
Environmental Management Plans.....	27
4. CONCLUSIONS.....	28
APPENDIX 1 - RESPONDENT MATRIX.....	29
APPENDIX 2 - SUMMARY TABLE OF COMMITMENTS AND FUTURE STUDIES	31
APPENDIX 3 - STUDIES AND COMMITMENTS TO BE UNDERTAKEN BY THE PROPONENT TO SUPPORT THE MASTER PLAN	42

ABBREVIATIONS

AAPA	Aboriginal Areas Protection Authority
AHD	above height datum
ASS	acid sulfate soils
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CLA	Contaminated Land Auditor
DCEC	Darwin Convention and Entertainment Centre
Defence	Australian Government Department of Defence
DIPE	Department of Infrastructure, Planning and Environment
EIS	Environmental Impact Statement
NEPM	National Environment Protection Measure
NFI	Naval Fuel Installation
NOI	Notice of Intent
OEMP	Operating Environmental Management Plan
PAH	polycyclic aromatic hydrocarbons
PASS	potential acid sulfate soils
RAP	Remediation Action Plan
SMP	Site Management Plan
TAC	Darwin Harbour Dredging Technical Advisory Committee
TPH	total petroleum hydrocarbons
VICEPA	Victorian Environmental Protection Agency

EXECUTIVE SUMMARY

This report assesses the environmental constraints associated with any future redevelopment by the Northern Territory Department of Infrastructure, Planning and Environment (DIPE) of 25 ha of former industrial land in the vicinity of the Port of Darwin including Fort Hill, Stokes Hill and the former Darwin Power Station Site, a project known as the Darwin City Waterfront.

Environmental impact assessment is the process of defining those elements of the environment which may be affected by a development proposal, and of determining the significance, risk and consequences of the potential impacts of the proposal. Recommendations arising from the assessment address methods to mitigate these impacts.

This Assessment Report reviews the Draft Environmental Impact Statement (EIS), public comments and the proponent's Supplement to the EIS. Information, comments and advice provided by Northern Territory Government agencies have also been used in the preparation of this report.

Major Issues

The major significant environmental issues associated with the redevelopment are:

- Aboriginal and European cultural heritage;
- provision of infrastructure, including transport and traffic;
- noise management;
- port security arrangements;
- hazards associated with fuel storage and transfer;
- odour and emissions;
- potential impacts on the marine environment;
- acid sulfate soils;
- potential impacts of dewatering; and
- the integration of environmental management planning for the redevelopment.

Conclusions

The Office of Environment and Heritage considers that the environmental issues associated with the proposed Darwin City Waterfront redevelopment, as identified in the Concept Plan, have been fully identified and addressed, recognising that the proposed development for the site is yet to be finalised. Appropriate environmental management of these issues will be addressed through management actions detailed in the Pre-Remediation Environmental Management Plan, Remediation Action Plan, Site Management Plan, Construction Environmental Management Plan and Operational Environmental Management Plan.

The environmental impact of some options for the proposed development could not be adequately assessed at this time, and further environmental assessment may be required once details of the development have been finalised. When the Master Plan for the Darwin City Waterfront has been finalised, the redevelopment will be the subject of a Development Application under the *Planning Act*.

At this time the Master Plan will be forwarded to the Office of Environment and Heritage, and the Minister for the Environment and Heritage will determine if any further environmental assessment is required according to the *Environmental Assessment Act*. Public review of the Master Plan is allowed for during the assessment of the Development Application.

LIST OF RECOMMENDATIONS

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:-

- identified in the Darwin City Waterfront Environmental Impact Statement (the Draft EIS and the Supplement constitute the EIS) as clarified by the proponent; and
- recommended in this Assessment Report (No. 43).

All safeguards and mitigation measures outlined in the EIS are considered to be commitments by the proponent and are summarised in Appendix 2 of this report.

Recommendation 2

In the event that the Department of Lands, Planning and Environment does not remain the proponent for the proposal, all commitments and safeguards identified in this Assessment Report (**Recommendation 1**) will be taken to be the responsibility of the developer.

Recommendation 3

The Master Plan is to be lodged with the Minister for the Environment and Heritage for consideration under the *Environmental Assessment Act*.

Recommendation 4

The proponent is to discuss options for Development Applications and staging for the final Master Plan with the Office of Environment and Heritage and the Lands and Planning Group of the Department of Infrastructure, Planning and Environment.

Recommendation 5

The proponent is to ensure that the Master Plan incorporates the preservation of view lines:-

- a) from the escarpment; and
- b) from and to existing heritage places on the escarpment, including Government House.

The proponent shall consult with the Office of Environment and Heritage with respect to the preservation of the visual amenity of heritage sites adjacent to the Darwin City Waterfront.

Recommendation 6

The site of Goyder's Camp will be retained as an open space feature that retains a 'sense of space' and provides public recognition of the importance of the site and the events associated with it.

Recommendation 7

The Master Plan will demonstrate how interpretation of the range of historical themes relevant to the Darwin City Waterfront will be incorporated into the redevelopment.

These themes include:-

- the natural history of the area;
- Aboriginal occupation before European arrival;
- discovery and first settlement by Europeans;
- contact between Europeans and Aboriginal people;
- maritime history including wrecks;
- the coming of the overland telegraph line;
- the Chinese in Darwin;
- the gold rush era;
- the coming of the railway;
- Darwin as a strategic outpost - oil storage, World War Two, the 1942 bombing, Harbour defence and the boom net;
- aviation history (the flying boats);
- Cyclone Tracy; and
- industrial use of the site, including the power station and the Iron Ore Wharf.

Recommendation 8

The proponent is to establish liaison between Darwin City Council, the relevant groups within the Department of Infrastructure, Planning and Environment, and the preferred developer, to ensure that traffic and transport issues associated with the redevelopment, including the provision and promotion of public transport, are addressed in a coordinated and timely manner.

Recommendation 9

The Master Plan is to be accompanied by:-

- a) a draft Noise Management Plan that demonstrates how the Proponent will achieve the objective of limiting the impact of noise from all aspects and stages of the development to acceptable levels; and
- b) a draft Noise Management System that contains the organisation structure, responsibilities, practices, procedures, processes and resources required for implementing the Noise Management Plan.

Recommendation 10

Security zones associated with berthing of cruise ships and Navy ships is to be modelled and this information used in designing site layout when finalising the Master Plan.

Recommendation 11

The proponent will ensure:-

- a) that the results of hazard modelling related to fuel off-loading are incorporated in the Master Plan;
- b) that no permanent occupation of areas within the hazard zone is permitted while fuel discharge operations remain from the Iron Ore Wharf; and
- c) that adequate arrangements are in place for preventing access by the public into the safety zone when fuel discharge operations are in progress.

Recommendation 12

If off shore reclamation is to be undertaken as part of the redevelopment, strategies for the prevention or management of mud-waving are to be included in the Construction Environmental Management Plan.

Recommendation 13

Any future development related to the Darwin City Waterfront, outside the redevelopment area, is to be referred to the Minister for the Environment and Heritage for assessment in accordance with the *Environmental Assessment Act*.

Recommendation 14

The sediments of Kitchener Bay shall be further characterised with regard to acid sulfate potential at depths to which sediment disturbance is likely.

Recommendation 15

The studies listed in Appendix 3 are to be completed before the final Master Plan is lodged for approval. Copies of the completed studies are to be lodged with the Master Plan as supporting information.

Recommendation 16

The proponent is to convene a consultation program as soon as the preferred development has been determined to allow an examination, review and input of the site's design and layout to allow the up-front identification and resolution of any issues of potential impact between land uses. The consultation committee is to be made up of, but not limited to:-

- The proponent;
- The preferred developer;
- Aboriginal Areas Protection Authority;
- relevant local Aboriginal Community Groups
- the Office of Environment and Heritage;
- Defence;
- Darwin Port Corporation;
- Department of Infrastructure, Planning and *Environment (Transport and Infrastructure and Lands and Planning Groups)*; and
- Darwin City Council.

Recommendation 17

The Master Plan is to provide a draft Darwin City Waterfront Management Plan which:-

- **shall include commitments in EIS and recommendations made in this assessment report;**
- **shall be informed by the results of studies listed in Appendix 3;**
- **shall include the**
 - **Remediation Action Plan**
 - **Site Management Plan**
 - **Construction Environmental Management Plan**
 - **Operational Environmental Management Plan****(and their sub-plans);**
- **shall include details of appropriately qualified environmental personnel to be employed by the proponent, and training and induction to be given to the proponents' employees, contractors and agents;**
- **shall include arrangement for regular external audit by an environmental auditor with industry recognised accreditation; and**
- **shall include a mechanism for ongoing review by OEH.**

The requirement for preparation, implementation and review of the Darwin City Waterfront Management Plan shall be included as a condition of all leases or agreements issued by the proponent.

The Darwin City Waterfront Management Plan will be referred to relevant Northern Territory Government agencies for review prior to finalisation, after which it will become a public document.

The Darwin City Waterfront Management Plan shall form the basis for approvals and licences issued under relevant NT legislation.

LIST OF FIGURES

(From the Draft EIS prepared by URS Australia P/L, May 2004)

Figure 1. Location and Layout of Darwin City Waterfront.	2
Figure 2. Darwin Waterfront Revitalisation Concept Plan.	3
Figure 3. Regional Setting of the Darwin City Waterfront.	8

1. INTRODUCTION AND BACKGROUND

This report assesses the environmental constraints associated with any future redevelopment by the Northern Territory Department of Infrastructure, Planning and Environment (the proponent) of 25 ha of former industrial land in the vicinity of the Port of Darwin including Fort Hill, Stokes Hill and the former Darwin Power Station Site, a project known as the Darwin City Waterfront. The location and layout of the site is shown in Figure 1.

This Environmental Assessment Report is based on a review of the Draft EIS, comments on the Draft EIS received from the public and the Northern Territory Government, and the Supplement (including the Addendum to the Supplement) to the Draft EIS in response to those comments.

A summary of issues raised in submissions on the Draft EIS is provided in [Appendix 1](#).

1.1. The Proposal

The Northern Territory Department of Infrastructure, Planning and Environment proposes to redevelop the existing disused industrial area known as the Darwin Wharf Precinct. The proposed Darwin City Waterfront redevelopment incorporates features including a convention and exhibition centre, residential accommodation, and commercial, entertainment, tourist and recreational facilities.

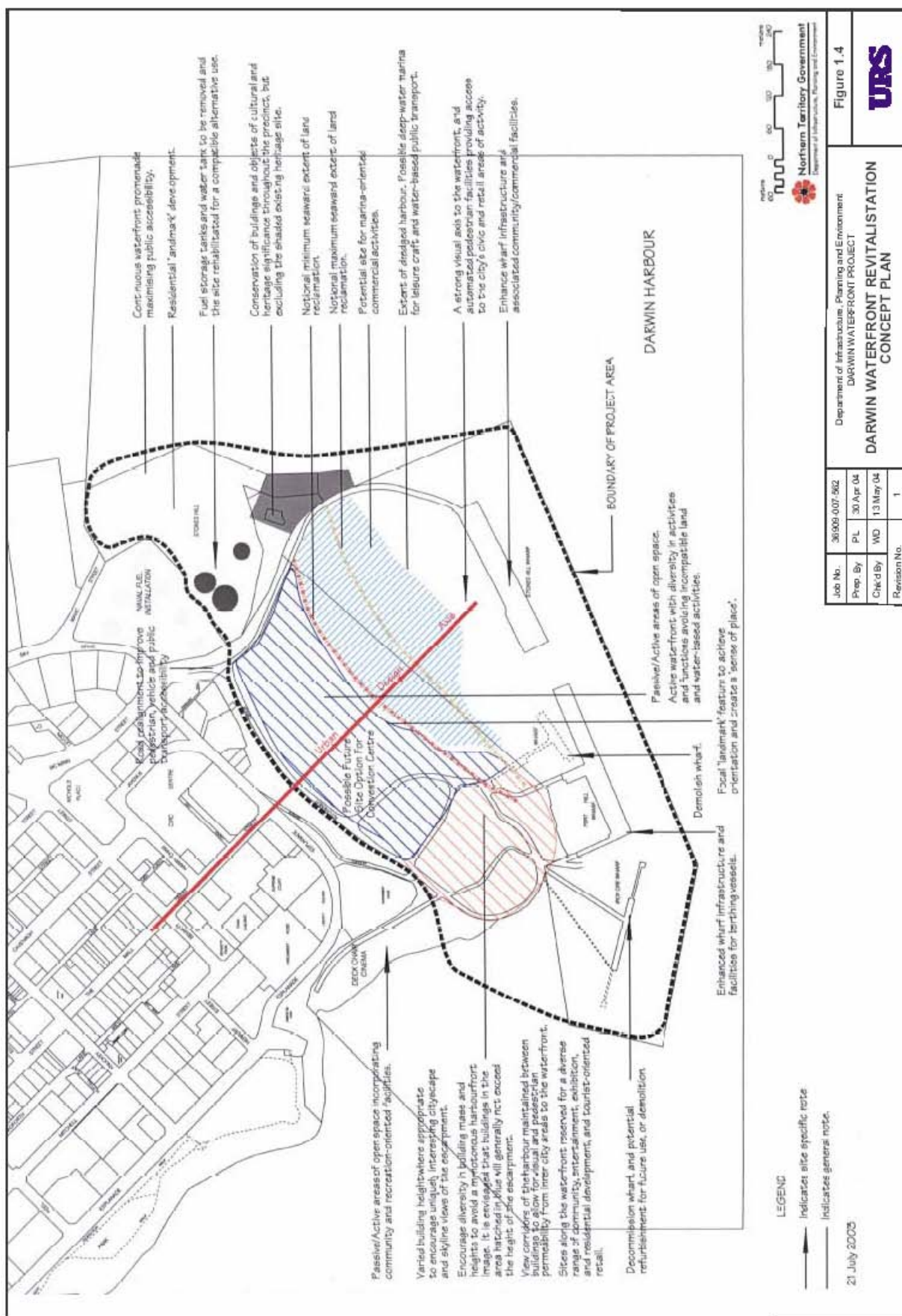
A number of redevelopment proposals for portions of the site now designated as the Darwin City Waterfront have been received by the Department of Infrastructure, Planning and Environment and its predecessors over the last five years, but have not been accepted. Of particular concern was the lack of an integrated approach to the redevelopment of the whole site to ensure a range of optimum uses and activities that suited the Darwin community were included. As a result, the Darwin Wharf Precinct Redevelopment Taskforce was formed to oversee this planning process. Community consultation resulted in the Darwin Waterfront Revitalisation Concept Plan (the Concept Plan), released in July 2003. The Concept Plan is shown in Figure 2.

Detailed descriptions of the major components of the proposal are presented in the Draft EIS and include:

- passive and active areas of open space;
- community uses and tourist attractions such as a visitor centre;
- cultural/heritage centre, and public buildings;
- Darwin Convention and Exhibition Centre (DCEC);
- residential development, most likely focussed on the Fort Hill and Stokes Hill areas of the site;
- commercial and retail activities such as cafes and kiosks;
- hotel(s);
- serviced apartments;
- leisure craft moorings and associated marina-oriented commercial and public transport facilities;
- a focal “landmark” feature;
- raising the level of low lying land above predicted storm surge level;
- a revetment structure along the coast, or sea wall offshore;
- land reclamation in Kitchener Bay; and
- minor reclamation and/or a jetty adjoining the western side of Fort Hill.



Figure 1. Location and Layout of the Darwin City Waterfront



Master Plan

To implement the Concept Plan, the Darwin Wharf Precinct Redevelopment Taskforce identified the need to develop a Master Plan for the redevelopment. The Taskforce further concluded that the optimum way to meet the objectives of the Concept Plan was a public-private partnership between the Northern Territory Government and a private developer. The *Darwin City Waterfront Call for Detailed Proposals (Call for Detailed Proposals)* was issued in January 2004. The *Call for Detailed Proposals* document details a range of requirements, based on the Concept Plan, that developers were required to incorporate in draft Master Plans. Three potential developers were short listed and invited to submit detailed Master Plan proposals. Once selected, the preferred developer will finalise their Master Plan, after public exhibition. The Supplement to the Draft EIS anticipates that two Development Leases are expected to be established and issued to the preferred developer, one for the DCEC and one for the remainder of the site until the completed stages of the development are sold or leased. In this report, “the proponent” refers to the Department of Infrastructure, Planning and Environment, and “the developer” refers to the eventual preferred developer.

1.2. Environmental Assessment History

A Notice of Intent (NOI) for the proposed Darwin City Waterfront was submitted to the Northern Territory Office of Environment and Heritage in September 2003. In October 2003, the Minister for the Environment and Heritage determined that the proposal would be assessed at the level of an Environmental Impact Statement (EIS). Draft guidelines covering issues to be addressed in the EIS were subject to public review from 18 - 31 October 2003.

The proponent submitted a referral for the proposed project to the Australian Government Minister for the Environment on 20 October 2003. In November 2003 the Australian Government determined that assessment was not required under the *Environment Protection and Biodiversity Conservation Act 1999*.

Following this determination, the NT Minister for the Environment and Heritage directed the proponent to prepare an EIS addressing the matters set out in the final guidelines, which were issued to the proponent on 24 November 2003.

The Draft EIS was submitted on 28 May 2004 and was placed on public review for six weeks until 12 July 2004. It was also circulated to Northern Territory Government agencies for review and comment. Four public submissions were received, and comments from Northern Territory Government agencies, with the exception of the Office of Environment and Heritage, were consolidated into one submission. The Office of Environment and Heritage provided its comments on the Draft EIS separately. All submissions were forwarded to the proponent at the end of the public review period.

The proponent prepared a Supplement to the Draft EIS addressing the issues raised by the public, the Northern Territory Government submission and the Office of Environment and Heritage. The Supplement was submitted to the Office of Environment and Heritage on 27 July 2004.

The Supplement was circulated to Northern Territory Government advisory bodies for review. The Draft EIS, the Supplement, public comments and comments from Northern Territory Government advisory bodies have been taken into account in the preparation of this Assessment Report.

The current EIS was prepared on the basis of the Concept Plan, recognising that finalisation of the Master Plan may result in further environmental assessment being required. The final Master Plan will be the subject of a Development Application under the *Planning Act 2003*, and will be referred to the Minister for the Environment and Heritage. If the Master Plan differs substantially from the Concept Plan, additional environmental assessment may be required in accordance with the *Environmental Assessment Act 1982*.

1.3. Issues Outside the Scope of this Environmental Impact Assessment

Remediation of existing soil contamination

Owing to the past industrial and related land uses throughout the Darwin City Waterfront area, there is a range of contaminants in the soils across the site. These include:

- elevated concentrations of metals, principally associated with stockpiling of iron ore and mixed ore concentrate in the Fort Hill area, and spillage of these materials;
- hydrocarbons, including total petroleum hydrocarbons, (TPH), polycyclic aromatic hydrocarbons (PAH), and chlorinated hydrocarbons;
- tri-butyl tin;
- significant areas of material visually impacted by ore concentrates; and
- small quantities of miscellaneous contamination associated with waste fill materials.

Groundwater contamination beneath the site varies, and includes dissolved hydrocarbons (in the vicinity of Kitchener Drive and the previous extent of Kitchener Bay) and elevated levels of metals (Fort Hill).

The Northern Territory Government has undertaken to bear the cost of remediation of contamination resulting from previous land use on the site, although some remediation works may be carried out in future by the eventual developer.

Assessment and remediation of historical contamination on the Darwin City Waterfront redevelopment site is being undertaken in accordance with the National Environment Protection [Assessment of Site Contamination] Measure (NEPM). The contaminated site assessment process seeks to balance the high cost of remediation work with the risk of different proposed land uses to ensure that land is not locked away and can be reutilised for appropriate land uses. More sensitive land uses, for example, ones involving direct human contact with soil, require more stringent remediation.

Using the findings of the contaminated site assessment process detailed in the NEPM, a Remediation Action Plan (RAP) is being prepared, and will be assessed by an environmental auditor (the Auditor) accredited under the Victorian Environmental Protection Agency Accredited Contaminated Land Auditor (VICEPA CLA) Accreditation Scheme. The RAP and the remediation activities of the RAP will define, and will remove, treat or contain the contaminants that cannot be managed adequately on the site in their current form.

The Auditor will issue a Statement of Environmental Audit which will include a statement of suitable land uses following prescribed remediation and will place conditions of development on future activities on the site via a Site Management Plan (SMP). Accordingly, the contaminated sites assessment process, including the identification of suitable secure landfill sites for containment, is outside the scope of this report.

Should off-site disposal of contaminants be required as part of the remediation process, this would fall under the provisions of the *Waste Management and Pollution Control Act*.

The interactions between the Remediation Action Plan, Site Management Plan and eventual Master Plan and Environmental Management Plans are addressed in Section 3.14 of this Assessment Report.

Remediation of hydrocarbon contamination beneath the former bitumen plant is being undertaken by the lease holder under the term of its lease, and is not considered further in this report. The plant site will be included as part of the Auditor's Statement of Environmental Audit. If ongoing management of contaminants remaining on site is needed, these requirements will be incorporated into the Site Management Plan.

Cruise Ship Facility

The Northern Territory Government has proposed the development of a cruise ship terminal at Fort Hill Wharf. While issues related to the positioning of such a facility in close proximity to the Darwin City Waterfront are referred to in this Assessment Report, environmental assessment of the cruise ship terminal project itself will be considered separately under the *Environmental Assessment Act* when the project is referred to the Minister for the Environment and Heritage.

2. REGIONAL SETTING

The site for the proposed Darwin City Waterfront Redevelopment is the existing Darwin Wharf Precinct, which covers approximately 25 ha on the southern end of the short peninsula supporting the Darwin Central Business District (CBD), Northern Territory. The site is located immediately to the south of the Darwin CBD, and is bounded to the south and west by the Port of Darwin, and to the east by Frances Bay. (Figure 3)

Physical Features

The city of Darwin lies within the monsoonal (Wet/Dry) tropics of Northern Australia and experiences two distinct seasons; a hot, wet season from November to March and a warm, dry season from May to September. April and October are transitional months between the Wet and Dry seasons. The monsoonal tropics also experience cyclonic activity, with tropical cyclones affecting the region on average once every two years.

The Darwin City Waterfront redevelopment site is generally flat. Most of the area ranges in elevation from 4 to 7 m AHD, with Kitchener Drive located at the base of an escarpment ranging in elevation from 6 to 7m. The site has been heavily disturbed by past activities including extensive importation of fill for reclamation of Kitchener Bay, the levelling of the former Fort Hill, and widespread industrial development.

With the exception of the escarpment adjacent to the site, Stokes Hill is the major topographic feature in the area, rising to about 25m. The existing foreshore at the marine interface consists of exposed fill material bounded by a sea wall with a fall of approximately 3-5 m to the intertidal mud flats in Kitchener Bay. (see Figure 1.) The spur at the western edge of the escarpment (the Government House site) is a significant topographic as well as heritage feature adjacent to the site.

The geology underlying the proposed development area generally comprises Quaternary sediments along the foreshore consisting of mud and intertidal marine alluvium (gravelly silty clay). These are underlain by Bathurst Island Formation claystones and sandstones, which in turn are underlain by Burrell Creek Formation phyllite bedrock. The surface material forming much of the site consists of fill (mixture of silt, gravel, cobble and debris).

Darwin Harbour, a drowned river valley with an area of about 500 km², provides the backdrop to the redevelopment site. In its southern and south-eastern portions, the harbour is divided into the East, West and Middle Arms, which converge to form the main harbour before opening to the sea. Kitchener Bay is a relatively small embayment of the main harbour. The maximum tidal range in Darwin Harbour is 7.8m with tidal currents in Kitchener Bay of up to 1.2 knots and up to 3.0 knots at the wharf faces (Fig. 1).

Biological Features

Darwin Harbour has a diverse assemblage of species typical of the Indo-West Pacific biogeographical province. Protected species in the harbour include turtles, sea-snakes, dugongs and dolphins, which are all listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Scattered coral communities occur where the substrate is rocky in the lower intertidal and shallow subtidal zones in Darwin Harbour. Coral species here are tolerant of conditions that would normally exclude most corals, such as high turbidity and low salinity.

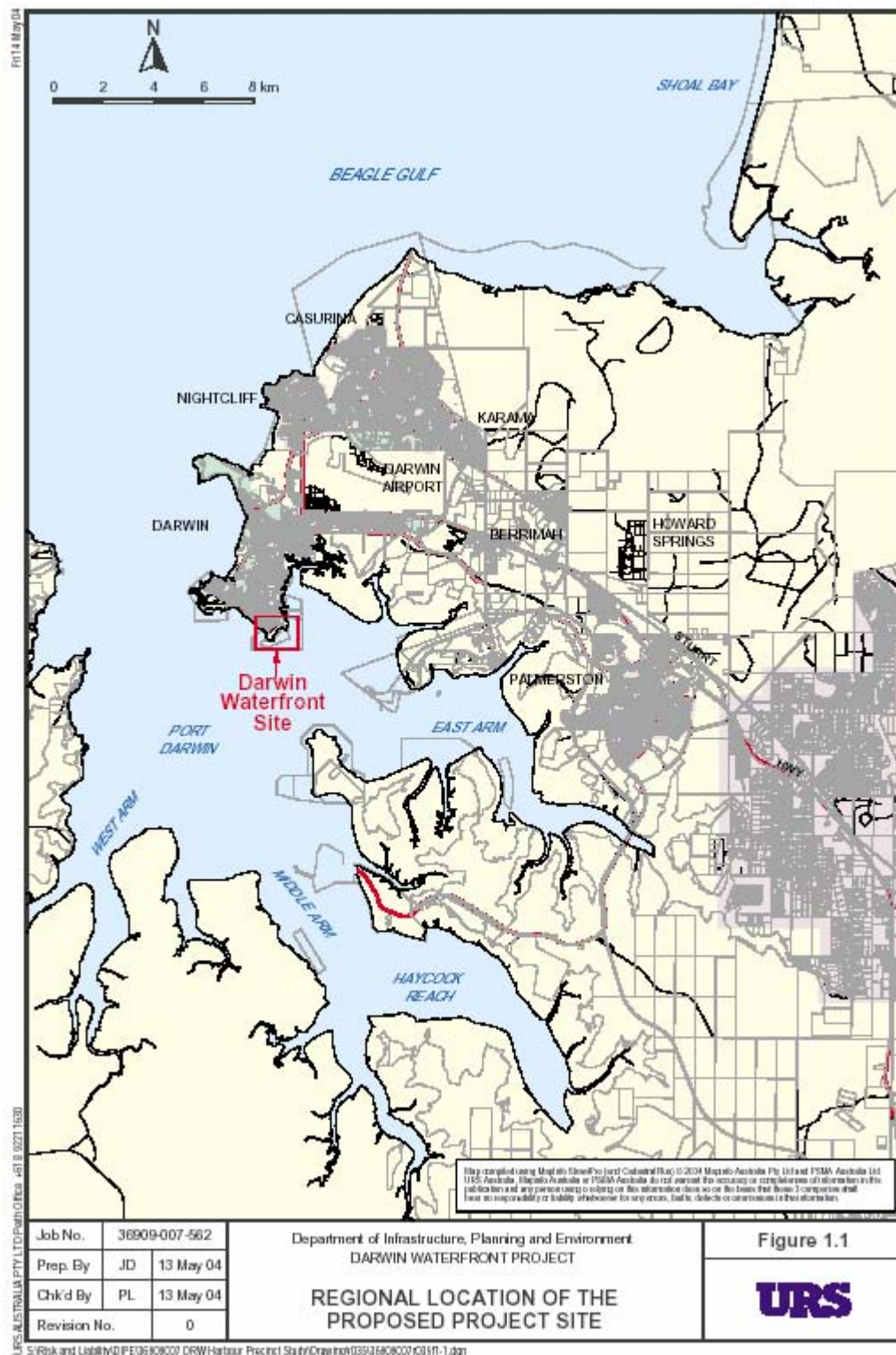


Figure 3. Regional Setting of the Darwin City Waterfront.

Typically, extensive mangrove communities cover the majority of the shoreline of Darwin Harbour, particularly in the estuarine reaches. Other intertidal communities include rocky shores and pavements, sand beaches and sand and mud flats. The Darwin Harbour wetlands (mangroves) are listed as an “Indicative Place” nominated for inclusion on the Register of the National Estate and some mangrove areas are zoned for conservation.

Other areas of conservation significance within the harbour include the Charles Darwin National Park, Casuarina Coastal Reserve, Blackmore River Conservation Reserve, East Point Aquatic Life Reserve and Doctors Gully Aquatic Life Reserve.

Within the Darwin City Waterfront redevelopment area, Kitchener Bay is dominated by an intertidal mud flat, with a small mangrove presence and artificial structures such as the wharves and rocky seawall. These provide habitat for a range of intertidal and subtidal species that are expected to occur in more natural and better represented environments throughout Darwin Harbour.

The site is bordered by a linear band of coastal monsoon vine forest along the escarpment that forms an almost complete western border around the city. Little other terrestrial habitat of any conservation significance remains in or near the site.

Cultural Features

The Darwin region is part of the traditional lands of the Larrakia Aboriginal people who lived in close association with the foreshore and the sea. The abundance of shell middens found in the region indicate the importance of natural coastal resources to the Larrakia. Stokes Hill has been recorded as a Sacred Site under the *Northern Territory Aboriginal Sacred Sites Act 2000*. Since the arrival of European settlers to the area, the Darwin City Waterfront site has undergone extensive disturbance and changes to natural landforms.

The Darwin City Waterfront has been linked to the development of Darwin since 1839, when Port Darwin was named by Stokes, on a voyage surveying the north-western coast of Australia. The first permanent European settlement of the site occurred in 1869 with the arrival of the surveyor Goyder and establishment of his camp at the base of Fort Hill. Since that time the Darwin City Waterfront site has been used for port and railway related storage and industrial activities, power generation (Stokes Hill Power Station), and more recently entertainment, tourism and retail use.

Current Land Uses in Adjacent Areas.

Stokes Hill and Fort Hill Wharves, located outside the Darwin City waterfront redevelopment area, currently provide berths for naval ships, cruise liners and commercial and other vessels and Stokes Hill Wharf supports a range of tourism and commercial activities. The facilities at the Darwin wharves also support surveillance, border control and fisheries protection activities for the northern region.

Darwin’s location also makes it a key site for port logistical support facilities and services for both routine defence operations and contingency activities. The facilities are particularly important for staging prolonged naval operations and amphibious operations with the Army in northern Australia and offshore. This importance has been heightened with recent world events and the current security climate. A Deed of Licence for Use of the Darwin Port, for 15 years from June 2003, exists between the Northern Territory Government and the Australian Government Department of Defence (Defence). This requires access to port facilities, through the Darwin City Waterfront site.

A major fuel storage facility, the Naval Fuel Installation (NFI), is located on the northern side of Stokes Hill, immediately adjacent to the Darwin City Waterfront.

The Iron Ore Wharf provides fuel off-loading facilities with pipelines from the wharf to fuel storage tanks at the NFI on Stokes Hill, and to commercial fuel storage temporarily located at Stuart Park. While commercial bulk fuel offloading at Iron Ore Wharf is scheduled to cease, Defence currently receives an average of four bulk fuel deliveries by sea tanker each year at the Iron Ore Wharf.

The NFI supplies fuel to ships berthed at Fort Hill Wharf and the Iron Ore Wharf, and if necessary at Stokes Hill Wharf, via a network of pipelines. Due to structural and security limitations of Stokes Hill Wharf, demand for berthing space at Fort Hill Wharf and the Iron Ore Wharf is high, with some 700 ships visiting the port over the four year period to 2003

A key desired outcome of the Darwin City Waterfront redevelopment is to maintain Stokes Hill and Fort Hill Wharves as working marine facilities. Separate to the Darwin City Waterfront redevelopment, the Northern Territory Government has proposed the development of a cruise ship terminal at Fort Hill Wharf, with associated Customs, transport and possible refuelling facilities.

The Darwin City waterfront is situated in close proximity to existing high rise residential premises, and to tourist and recreational facilities such as wharf eateries and the Deckchair Cinema. The Darwin civic precinct, including Government House, the Supreme Court, Parliament House and Darwin City Council, is situated immediately to the north-west of the site on the plateau above the escarpment.

Part of Sacred Site 5073-93, covering Stokes Hill, extends into the project area. This is a Restricted Works Area under the Aboriginal Areas Protection Authority Certificate. No excavation is allowed on this area, and any other works require formal approval of the senior Aboriginal custodians for the site.

3. ENVIRONMENTAL IMPACT ASSESSMENT

3.1. Introduction

The environmental impact assessment process in the Northern Territory, as controlled by the *Environmental Assessment Act* and the Environmental Assessment Administrative Procedures, has the prevention of unacceptable or unnecessary harm to the environment as its primary purpose.

An EIS is required to assist in assessing environmental impacts that are considered significant in terms of site specific issues, off site issues, conservation values or the nature of the proposal. The current EIS for the Darwin City Waterfront is based upon the Darwin Waterfront Revitalisation Concept Plan (see Figure 2) which was developed following public consultation in 2001 about future uses of the area.

This EIS aims to identify environmental constraints and issues which will guide the formulation of future uses of the site, and ensure that proposed land uses are compatible with current and future adjacent land uses. The contents of the Draft EIS, the Supplement to the EIS and this Assessment Report will inform the development of a Master Plan and associated management plans.

This report evaluates the adequacy of environmental commitments and safeguards proposed by the proponent to avoid or mitigate the potential impacts identified in the assessment process. A summary of environmental management commitments made by the proponent in the Draft EIS and the Supplement to the Draft EIS is provided in Appendix 2. Additional safeguards are recommended in this Assessment Report where appropriate. Each recommendation (in **bold**) is preceded by text that identifies concerns, suggestions and undertakings associated with the project. For this reason, the recommendations should not be considered in isolation. Some issues were adequately addressed in the Draft EIS and/or the Supplement, and do not require further discussion here.

The outcome of the environmental impact assessment for this proposal is that the Office of Environment and Heritage considers that the draft EIS and the Supplement, and the commitments and safeguards they contain, are adequate to inform any future use of the Darwin City Waterfront. This outcome is dependent on the proponent implementing the environmental commitments identified in the EIS, together with recommended measures for environmental management presented in this Assessment Report.

The contents of this Assessment Report form the basis of advice to the NT Minister for the Environment and Heritage regarding the environmental issues associated with the Darwin City Waterfront.

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:-

- **identified in the Darwin City Waterfront Environmental Impact Statement (the Draft EIS and the Supplement constitute the EIS) as clarified by the proponent; and**
- **recommended in this Assessment Report (No. 43).**

All safeguards and mitigation measures outlined in the EIS are considered to be commitments by the proponent and are summarised in Appendix 2 of this report.

Recommendation 2

In the event that the Department of Infrastructure, Planning and Environment does not remain the proponent for the proposal, all commitments and safeguards identified in this Assessment Report (Recommendation 1) will be taken to be the responsibility of the developer.

Recommendation 3

The Master Plan is to be lodged with the Minister for the Environment and Heritage for consideration under the *Environmental Assessment Act 1982*.

Recommendation 4

The proponent is to discuss options for Development Applications and staging for the final Master Plan with the Office of Environment and Heritage and the Lands and Planning Group of the Department of Infrastructure, Planning and Environment.

3.2. Cultural Environment

Aboriginal Cultural Heritage

Sites of Aboriginal Cultural Value

The contemporary Aboriginal community of Darwin has indicated specific cultural links with the Kitchener Bay coastline, in particular, the Stokes Hill area. Two areas of Aboriginal cultural value were identified in Appendix J of the Draft EIS - *Darwin City Wharf Redevelopment Preliminary Aboriginal Heritage Assessment*. A recorded sacred site in the vicinity of Lameroo Beach lies just outside of the project area. The registered sacred site 5073-93, centred on Stokes Hill, will inform decisions on future land use and activities on Stokes Hill. This includes the fate of oil storage tanks T13 and T14 in the cutting on Stokes Hill, and widening of the lower end of McMinn between Bennett St and Kitchener Drive. The Aboriginal Areas Protection Authority (AAPA) certificate for this area stipulates that no works may be undertaken within the restricted work area without formal approval of the senior Aboriginal site custodians. In addition, there is potential for development activities adjacent to these sites to impact upon their cultural values.

The proponent has given a commitment to consult with the relevant Aboriginal community groups regarding the future land uses in the Stokes Hill area (*Refer to **Recommendation 16***) and that the cultural significance of the Darwin City Waterfront site, particularly Stokes Hill, will be acknowledged.

Archaeological deposits

The preliminary Aboriginal heritage assessment concludes that due to the degree of disturbance of the site, intact archaeological deposits are not expected to be encountered. In responding to the Draft EIS, the Office of Environment and Heritage concurred that this is most likely correct, but noted that little field work was carried out to eliminate the possibility of other sites which may produce evidence of Aboriginal occupation. It is recommended that this be confirmed by carrying out an initial inspection and assessment of sites that may contain intact archaeological elements, before any site works proceed. The results of this initial assessment would identify any need further archaeological field investigation.

The proponent has committed that conduct of heritage field inspections for this purpose will be included in the Construction Environmental Management Plan (*Refer to **Recommendation 1***).

Interpretation of Aboriginal Cultural Heritage

Despite the low predicted Aboriginal archaeological sensitivity of the Darwin City Waterfront, the Aboriginal cultural and environmental values remain. Section 5.6.1 of the Draft EIS describes traditional use of the Darwin City Waterfront by the Larrakia Aboriginal people. Appendix J also identifies contemporary use of the escarpment base by Aboriginal people. The Draft EIS recommends that development of the escarpment base be avoided, and that the indirect impacts of the proposal be discussed with the local Aboriginal community. These recommendations are endorsed.

In its response to the Draft EIS, the AAPA cautioned that any interpretative material of the cultural significance to Aboriginal people should be developed in consultation with the relevant Aboriginal community groups. The proponent has committed that ongoing local Aboriginal community consultation will be undertaken, to ensure concerns about the area and development are addressed (*Refer to Recommendation 16*).

European Cultural Heritage

The primary potential impact on the historical heritage of the project site and nearby areas is the damage to or loss of significant sites and structures during the redevelopment. Conversely, the redevelopment provides opportunities for interpretation of major heritage themes across the project area.

Adverse impacts can go beyond damage or loss of significant sites and structures. An adverse impact can also be created by loss of context or setting, including loss of views to or from a significant place, eg Government House, which was deliberately sited in the 1870's on a promontory overlooking Darwin Harbour, and is a prominent landmark when viewed from the wharf and harbour. Development within the Darwin City Waterfront redevelopment site has the potential to have a significant adverse impact on these values.

Appendix M - *DCWR Visual Impact Assessment - Technical Assessment for the Draft EIS* assumes that all built structures will not exceed the height of the main escarpment, but the Concept Plan is less clear, and envisages that buildings in the central area of the site, between Fort Hill and Stokes Hill, will generally not exceed the height of the escarpment, and provides for maintenance of view corridors to allow visual connection from the CBD to the waterfront. The proponent has confirmed that the intent is to ensure all development within the central area of the Darwin City Waterfront generally remains below the height of the escarpment, however this same restriction is not to apply to across the site, to allow the visual diversity of the redevelopment.

Appendix M identifies as a potential impact visual incongruity and intrusion into the landscape of the civic, parliamentary and heritage precinct on the northern (CBD) side of the Esplanade. This should also apply to the western side of the Esplanade, including Government House. Appendix M recommends that height controls for all structures should be applied such that they do not exceed view lines from near ground level in this precinct, with the exception of strategically placed visual "indicator" structures. This Assessment Report strongly supports this approach.

Recommendation 5

The proponent is to ensure that the Master Plan incorporates the preservation of view lines:-

- a) from the escarpment, and**
- b) from and to existing heritage places on the escarpment, including Government House.**

The proponent shall consult with the Office of Environment and Heritage with respect to the preservation of the visual amenity of heritage sites adjacent to the Darwin City Waterfront.

Developers preparing Master Plan proposals are obliged to ensure that the proposals reflect, enhance and utilise the heritage features in and near the site. The Supplement states that the *Call for Detailed Proposals* for the Master Plan noted the variety and significance of heritage features within the site. In particular, potential developers must ensure that their proposals “reflect the cultural heritage and history of this unique site”. The proponent has committed that the Master Plan “will integrate a plan for the interpretation of cultural and historic sites at key locations across the site”.

Comments on the Draft EIS indicated that the theme of early European settlement is particularly important. The Darwin City Waterfront includes the site of the first permanent European settlement in the Northern Territory, Goyder’s Camp. It is considered important that the site of Goyder’s Camp retains the ‘sense of space’ that the area would have had when first occupied. The Supplement states that Goyder’s Camp and the early European settlement was given particular emphasis in the advice given to potential developers.

Recommendation 6

The site of Goyder’s Camp will be retained as an open space feature that retains a ‘sense of space’ and provides public recognition of the importance of the site and the events associated with it.

The Draft EIS alludes to major heritage themes across the site linking individual elements. Because much of the physical evidence of the history of the site is lost or fragmented, in some cases the only way to appreciate the history of the site is through interpretation. Respondents to the Draft EIS considered it important that a full range of historical themes be covered.

Recommendation 7

The Master Plan will demonstrate how interpretation of the range of historical themes relevant to the Darwin City Waterfront will be incorporated into the redevelopment.

These themes include:-

- the natural history of the area;
- Aboriginal occupation before European arrival;
- discovery and first settlement by Europeans;
- contact between Europeans and Aboriginal people;
- maritime history including wrecks;
- the coming of the overland telegraph line;
- the Chinese in Darwin;
- the gold rush era;
- the coming of the railway;
- Darwin as a strategic outpost - oil storage, World War Two, the 1942 bombing, Harbour defence and the boom net;
- aviation history (the flying boats);
- Cyclone Tracy; and
- industrial use of the site, including the power station and the Iron Ore Wharf.

3.3. Infrastructure

Road Network, Traffic and Transport

Each of the individual land uses and activities associated with components of the redevelopment will generate demands for traffic movements into and out of the site, as well as within the site. Traffic volumes will be concentrated at the major road access points at McMinn St and to a lesser extent at Frances Bay Drive and at the intersections of these roads with Tiger Brennan Drive. Several respondents to the Draft EIS queried the traffic assessments presented, and highlighted potential traffic issues regarding the capacity of the road network to service the redevelopment.

The traffic assessment undertaken for the EIS considered the Concept Plan for the redevelopment. The *Call for Detailed Proposals* for the Master Plan requires the eventual developer to undertake a detailed assessment of traffic and transport issues, including

- travel demand;
- traffic characteristics;
- impact of specific events on traffic demand;
- impacts of on-site traffic with public transport options (including links to the CBD and feeder bus options);
- public transport to and from the site (including public buses/taxis/potential sea transport);
- assessment of public transport interfaces with components of the redevelopment;
- potential for off-site transfer to parking facilities;
- pedestrian connections;
- options for meeting parking demands;
- linkages and integration of pedestrian/cyclist and public transport facilities; and
- internal road network and linkages to external network.

The Draft EIS recommends analysis and advocacy of the use of public transport in the redevelopment, especially in relation to minimisation of air emissions, and these recommendations are endorsed.

The proponent has undertaken to review previous CBD traffic/transportation studies once the developer traffic assessment has been completed, to establish the external impacts of the proposals (*Refer to Recommendation 15*). The proponent has further undertaken to consult with Darwin City Council and relevant NT Government agencies to ensure transport planning is coordinated.

The Draft EIS proposes a number of short to long term road network strategies. Responsibility for the roads in and adjacent to the Darwin City Waterfront belong variously to the Department of Infrastructure, Planning and Environment (with different roads administered by different Divisions within the Department) and Darwin City Council. Considerable consultation will be required to ensure that planning and construction of any changes to the road network, and arrangements for road maintenance, meet the needs of the redevelopment and other road users in the vicinity of the CBD.

Recommendation 8

The proponent is to establish liaison between Darwin City Council, the relevant groups within the Department of Infrastructure, Planning and Environment, and the preferred developer, to ensure that traffic and transport issues associated with the redevelopment, including the provision and promotion of public transport, are addressed in a coordinated and timely manner.

Associated headworks

The Draft EIS states that the Northern Territory Government will provide associated infrastructure to the Darwin City Waterfront site boundary in support of the redevelopment. Associated headworks that are proposed include

- roads, including vehicular, pedestrian and bicycle access;
- water supply, sewerage and drainage; and
- electricity.

Respondents to the Draft EIS indicated the need for forward planning and consultation to ensure that the capacity is available to supply the associated headworks committed by the Northern Territory Government.

The Supplement states that the developer must define all head works required for the redevelopment, including the necessary staging of those headworks for the various construction phases. During development of the Master Plan, the developer is required to conform to the “Guide to Infrastructure Requirements”, a detailed document attached to the *Call for Detailed Proposals*.

3.4. Noise Management

Noise sensitive premises proposed as part of the redevelopment include residential developments and serviced apartments, and hotels and other possible short term accommodation. Adjacent land uses constitute several sources of noise which may impact upon such premises. In later phases of the redevelopment, noise sensitive premises within the development may be impacted by construction noise as well as operational noise.

The redevelopment is situated in close proximity to existing medium rise residential premises, and to tourist and recreational facilities. Noise sensitive premises adjacent to the Darwin City Waterfront include Government House, adjacent business premises, including wharf eateries and the Deckchair Cinema, and nearby residential premises. A number of residential developments along The Esplanade face the Darwin City Waterfront. There is potential for impact on these premises from construction activities over the development phase of the project, and for ongoing impact of venue noise from the proposed Darwin Convention and Entertainment Centre (DCEC).

Noise from Working Wharves

Stokes Hill and Fort Hill Wharves currently provide berths for naval ships, cruise liners and commercial and other vessels and Stokes Hill Wharf supports a range of tourism and commercial activities. A key desired outcome of the Darwin City Waterfront redevelopment is to maintain Stokes Hill and Fort Hill Wharves as working marine facilities. A large proportion of the wharves’ current commercial activities (servicing of small vessels, cruise liners and Navy vessels, and restaurants) will continue into the operational life of the project. In addition, there is potential for the Iron Ore Wharf to remain operational for some time into the future. Additional intermittent noise can be expected to arise from future activities supporting cruise ship visits at Fort Hill Wharf.

Services for marine vessels carried out during night-time periods is the primary concern for noise impacting on proposed residential accommodation within the site. The proponent has undertaken that noise impacts associated with servicing of navy and cruise ships at the wharves will be minimised through effective planning and layout design, when the Master Plan is finalised. Opportunities exist for baseline noise monitoring and modelling to inform this design, when several vessels are berthed at the same time during Navy exercises. The proponent has committed to additional noise monitoring during Navy exercises in August 2004 (*Refer to Recommendation 15*).

Traffic Noise

Road traffic to and from the proposed residential facilities, typically throughout morning and evening periods, will introduce increased traffic volumes within the redevelopment, with the potential for noise impact on these residential premises. In addition, events held within the DCEC are expected to dramatically increase road traffic volumes before and after each event, with the final volume dependent on parking and public transport arrangements identified in the final Master Plan. There is potential for significant impact on noise sensitive premises associated with traffic movements to and from DCEC events.

Road trains carrying fuel oil are used from time to time to supply vessels berthed at Fort Hill Wharf or the Iron Ore Wharf on a needs basis. With the advent of cruise ships wishing to refuel at Fort Hill Wharf, these road train movements may increase.

Independent of the Darwin City Waterfront redevelopment, the Northern Territory Government has undertaken to provide an area of approximately 7500 m² of land in close proximity to Fort Hill Wharf for use by the military for assembly when required of cargoes including supplies and equipment. This secure staging area near Fort Hill Wharf will require the movement of heavy machinery through the DCW site, such as low loaders carrying armoured vehicles, and trucks carrying personnel, equipment and supplies.

While traffic volumes have been considered in terms of continued access to the area, no assessment appears to have been made of the noise impact of such movements on the noise sensitive premises located within the redevelopment site along the access routes. However the proponent has committed to undertake traffic counts during periods of naval ship resupply. The proponent has also stated that the Master Plan will contain effective planning and layout design to mitigate noise impacts (*Refer to **Recommendation 1***).

Construction Noise

The number and frequency of heavy and light road vehicles passing existing residential and commercial premises is likely to increase during construction. The Supplement lists a number of measures to be implemented to mitigate noise from these increased vehicle movements, and it is considered that this issue has been adequately addressed. In regard to noise from construction equipment, the Supplement details a number of noise suppression measures which the proponent proposes to implement.

The proponent has committed to prepare Noise Management Plans for all construction phases of the redevelopment (*Refer to **Recommendation 1***).

Operational Noise

Darwin Convention and Entertainment Centre

The Darwin Convention and Entertainment Centre is proposed to cater for both indoor and outdoor events, with a maximum anticipated internal capacity of approximately 1500 people. Noise generated by this facility is expected to comprise the following:

- entertainment noise, including the break out from the internal space and external noise from outdoor events; and
- mechanical and electrical noise from air conditioning plant noise, refrigeration systems and ventilation systems.

Entertainment events are most likely to occur in the evening, when reduced background noise levels are expected, and tolerance of adjoining premises to noise is also low.

Noise from events at DCEC, and from increased ongoing and event based road traffic resulting from the redevelopment has the potential to impact on the on-site and off-site noise sensitive premises identified above. The proponent has committed to prepare a Noise Management Plan for the operational phase of the redevelopment (*Refer to **Recommendation 1***).

Mechanical and Electrical Systems

Due to Darwin's warm and humid climate, the redevelopment can be expected to include active air-conditioning plants, ventilation systems and refrigeration units. Many of these are likely to operate continuously, creating a potential noise impact on noise sensitive premises nearby. It is recommended that the proponent consult with the Office of Environment and Heritage regarding appropriate noise guidelines to assist with the construction, design and layout of the development, ensuring that acceptable noise impacts do not occur.

Recommendation 9

The Master Plan is to be accompanied by:-

- a) a draft Noise Management Plan that demonstrates how the Proponent will achieve the objective of limiting the impact of noise from all aspects and stages of the development to acceptable levels; and**
- b) a draft Noise Management System that contains the organisation structure, responsibilities, practices, procedures, processes and resources required for implementing the Noise Management Plan.**

3.5. Port Security Arrangements

Australia's compliance with the International Maritime Organisation (IMO) International Ship and Port Facility Security (ISPS) Code from 1 July 2004 will mean that in future public access to port facilities that require heightened security measures, (eg surrounding Navy and cruise ships), will be severely restricted. The *Maritime Transport Security Act* (MTSA) 2003 implements the ISPS Code, which aims to address the global threat to maritime security, within Australia. New security requirements will apply to virtually all ships visiting Darwin. Potential permanent restrictions on public access to wharf areas are likely to occur, as well as additional temporary restrictions around berthed vessels.

While the MTSA does not apply to Defence vessels, Navy's Force Protection security measures adopted when in port are complementary and may include the placing and enforcing of a security zone around all vessels berthing at Fort Hill Wharf and the Iron Ore Wharf. Such a security zone could place possible restrictions on private vessels entering Kitchener Bay.

Recommendation 10

Security zones associated with berthing of cruise ships and Navy ships are to be modelled and this information used in designing site layout when finalising the Master Plan.

The Darwin Port Corporation has prepared the *Port Security Plan for the Darwin Wharves* to ensure that security arrangements for the port meet international standards. The continued implementation of the new security standards and measures will require cooperation and coordination between the Darwin Port Corporation and port users. The recent formation of a security working group will contribute to complementary measures being adopted by all users.

Port security issues, including public access to wharves, security zones around visiting ships, and the management of vessels entering Kitchener Bay would best be addressed through the continued operation of a working group including Darwin Port Corporation, Defence, and all stakeholders in the Darwin City waterfront redevelopment. (*Refer to **Recommendation 16.***)

3.6. Hazards Associated with Fuel Storage and Transfer

Storage - Naval Fuel Installation

The potential components of the redevelopment described in the Draft EIS include medium-high density residential development on the former Stokes Hill power station site. This is in close proximity to the Naval Fuel Installation (NFI). The Supplement states that a minimum safety distance of 50m around bulk fuel storage is required to comply with Australian and international standards. (IS9077 - International Safety Guide for Oil Tankers and Terminals [ISGOTT], requires a 30m safety distance.) The proponent has committed that the layout of the redevelopment on the former Stokes Hill power station site will be designed with this in mind, and the results of a current Defence review of the hazard assessment of the NFI will be incorporated into the Master Plan assessment process. (*Refer to **Recommendation 1.***)

Bulk Fuel Off-loading

Fort Hill Wharf and the Iron Ore Wharf support bulk fuel off-loading facilities with pipelines from these wharves to fuel storage tanks at the NFI on Stokes Hill, and to commercial fuel storage temporarily located at Stuart Park. While commercial bulk fuel off-loading at Iron Ore Wharf is scheduled to cease, Defence currently receives an average of four bulk fuel deliveries by sea tanker each year at the Iron Ore Wharf.

Results of risk assessment indicate that, in conjunction with improvements to the facilities, a minimum safety buffer of 300m would be required around fuel discharge to avoid injury to personnel in the area in the unlikely event of fire, fuel spill and ignition of fuel on the water. Information provided by the proponent shows that the implementation of the 300m safety template around the Iron Ore Wharf would exclude permanent occupation of a considerable part of the Fort Hill area. Although the Fort Hill area is expected to be developed later in the project (after 2008), the proposed components of the project include medium to high density residential buildings near Fort Hill. The proponent has indicated, in additional information provided to the Office of Environment and Heritage, that they expect all bulk fuel off-loading at the Iron Ore Wharf to cease before redevelopment of the Fort Hill area occurs.

Recommendation 11

The proponent will ensure:-

- a) that the results of hazard modelling related to fuel off-loading are incorporated in the Master Plan;**
- b) that no permanent occupation of areas within the hazard zone is permitted while fuel discharge operations remain at the Iron Ore Wharf; and**
- c) that adequate arrangements are in place for preventing access by the public into the safety zone when fuel discharge operations are in progress.**

Refuelling Operations

The refuelling of naval and commercial ships currently occurs at both the Fort Hill and Iron Ore Wharves. The Australian Defence Standard (DEF-AUST-5695) requires a safety buffer of 50m when refuelling operations are in progress at the wharves. Information provided by the proponent shows that this buffer is entirely outside the redevelopment site. As a result, potential hazards from refuelling operations to users and the environment of the Darwin City Waterfront relate to fuel transfer via pipelines or road tankers traversing the site.

The Draft EIS and Supplement envisage that above ground fuel lines will remain from the NFI to the wharves for bunkering of naval vessels with heavy fuel oils. The heavy fuel oils are considered to be a low fire hazard due to relatively low susceptibility to ignite, however it is combustible and will burn producing smoke, fumes and oxides of carbon should ignition occur as a result of a major incident.

Additionally, releases and spills of hydrocarbon product to either the on-shore or marine environment could occur as a result of connection hoses, couplings, valve points or through small pressure leaks or by overfilling of fuel tanks. The proponent has committed to further risk assessment in this regard. (*Refer to **Recommendation 1***)

It is acknowledged that negotiations continue between the Northern Territory Government and Defence on refuelling options for naval vessels berthed at Fort Hill and Iron Ore Wharves.

3.7. Potential Impact of Odour and Air Emissions from Adjacent Land Use

Naval Fuel Installation

The Naval Fuel Installation is a potential localised source of hydrocarbon odours and some hazardous air pollutants. The preliminary assessment undertaken for the Draft EIS suggests that areas around the Naval Fuel Installation may be classed as a Stage 1 site under the National Environment Protection [Air Toxics] Measure (NEPM); i.e. an area with elevated levels of one or more of the five priority air toxics, benzene, toluene, xylenes, benzo- α -pyrene and formaldehyde. The proponent has committed to undertake modelling of release and dispersion of fugitive emissions from the Naval Fuel Installation to inform the Master Plan in regard to appropriate development in adjacent areas. (*Refer to **Recommendation 15***).

As air quality guidelines currently do not exist for the Northern Territory, the proponent has committed that appropriate local air quality guidelines, will be formulated as part of this modelling process.

Refuelling Operations at Fort Hill Wharf and the Iron Ore Wharf

Refuelling of Navy vessels at the Iron Ore Wharf and Fort Hill Wharf are currently expected to continue for the foreseeable future (*Darwin City Waterfront team, pers. comm., August 2004*). In addition, cruise ship operators have indicated a desire to refuel in Darwin at the cruise ship facility proposed for Fort Hill Wharf. Air emissions of similar quality to those experienced at the NFI could be expected to accompany refuelling operations, perhaps in greater quantities. The proponent has committed to undertake similar dispersion modelling for refuelling activities (*Refer to **Recommendation 15***), and the results of this modelling should inform the Master Plan in regard to allowable activities in these areas.

3.8. Potential Impacts on the Marine Environment

Possible components of the Concept Plan for the redevelopment that have the potential to impact upon the marine environment include:

- construction of a revetment structure along the coast, or sea wall offshore;
- construction of a marina or jetties in Kitchener Bay including dredging of marine mud;
- leisure craft moorings and associated marina-oriented commercial and public transport facilities;
- land reclamation in Kitchener Bay which may require dredging of marine mud; and
- minor reclamation and/or a jetty adjoining the western side of Fort Hill.

At this time it is not clear which of these components will be included in the preferred Master Plan.

Potential Impact of Marine Structures

Seawalls, a marina and lock systems could have a number of impacts on the groundwater regime at the site, but these have not been confirmed either qualitatively or quantitatively. Several submissions to the Draft EIS expressed concerns relating to the potential for, and effects of, groundwater contaminants entering the receiving environment in the event that a revetment, off shore seawall and/or marina was to be constructed.

The Draft EIS predicts that an impoundment may reduce the head difference across the site, thus affecting the rate of groundwater discharge. Impoundment may also result in a significant reduction in water level variation limiting the existing tidal flushing effect on any groundwater contamination entering Kitchener Bay. The draft EIS also contends that impoundment may cause the groundwater to rise at the site particularly during recharge from the escarpment during the wet season. This could result in significant amounts of contaminated groundwater discharging through the ground surface at the site.

Appendix E– *Hydrogeology – Technical Assessment for the Draft EIS* concludes that the groundwater behaviour beneath the site is not well known. Further investigations will be required to better understand the groundwater beneath the site and allow modelling of potential impacts associated with marine structures. This information would then inform the design of appropriate and effective engineering solutions. The Supplement indicates that hydrogeological assessment of the site is ongoing as part of the Contaminated Site Assessment, and the proponent has committed to further hydrogeological investigation should coastal and/or off-shore structures be contemplated. (*Refer to Recommendation 15*)

Two respondents also noted the potential for a seawall to change sediment flows. The proponent has committed to undertake hydrodynamic modelling of Kitchener Bay, and that engineering design will address coastal sediment transport should a seawall or marina be constructed (*Refer to Recommendation 15*).

Operations involving Dredging and Reclamation in Kitchener Bay

The EIS documents a number of contaminants associated with industrial use of the adjacent land in the surface layer (0 – 0.5m) of sediments in Kitchener Bay. Polycyclic aromatic hydrocarbons (PAH) concentrations were elevated at the western and eastern end of the bay, but were found not to be bioavailable. Elevated levels of metals were discovered in the central and western parts of Kitchener Bay.

It is highly likely that dredging activities and possibly some reclamation of the tidal mudflats will be undertaken within Kitchener Bay. The EIS indicates that disturbance of some surface sediments through dredging, particularly in the western and central portions of the bay, could result in the mobilisation of lead and zinc in the water column. Once mobilised, there is concern that these metals could be ingested by biota and incorporated into the food chain. The presence of these contaminants has the potential to limit the options for removal or disturbance of these sediments.

Ocean disposal of contaminated dredge spoil from Kitchener Bay is one of the options being considered by the proponent in consultation with the Darwin Harbour Dredging Technical Advisory Committee (TAC). Although the TAC has indicated that sub-tidal disposal might be acceptable, details concerning the nature of dredging for the redevelopment and the quantity and composition of material that might require disposal have not yet been determined. The proponent has committed to further characterisation of Kitchener Bay sediments, if dredging works were to be undertaken at these locations (*Refer to Recommendation 15*).

In response to an EIS submission advocating monitoring of heavy metals during dredging to enable implementation of remedial action, the proponent has contended that remedial action during and following dredging would be impractical and recommends that an ecological risk assessment, including ecotoxicological assessments, be undertaken to define appropriate dredging and spoil disposal options, in line with the National Ocean Disposal Guidelines for Dredged Material. This is strongly supported (*Refer to Recommendation 15*). The proponent has also committed to refining the hydrodynamic modelling for Kitchener Bay (*Refer to Recommendation 15*) to assess the potential impacts arising from dredging.

The proponent has committed to develop a Dredging Management Plan, in consultation with the Darwin Harbour Dredging Technical Advisory Committee (TAC) if dredging of Kitchener Bay is required as part of the redevelopment. (*Refer to Recommendation 1*.) Both the ecological risk assessment and more detailed hydrodynamic modelling will help to inform the Dredging Management Plan, which will be submitted to the Office of Environment and Heritage for licensing under the *Water Act* prior to the commencement of any works.

Mud-Waving

The EIS has not considered the effects of mud waving associated with reclamation activities. The displacement of soft marine muds from under the load of imported fill could lead to substantial disturbance or even turnover of intertidal muds resulting in the exposure and consequent suspension of contaminated sediments. This phenomenon must be considered during the detailed engineering and design phase as part of the final Master Plan, and included in the Construction Environmental Management Plan.

Recommendation 12

If off shore reclamation is to be undertaken as part of the redevelopment, strategies for the prevention or management of mud-waving are to be included in the Construction Environmental Management Plan.

Potential Off-shore Development adjacent to the western side of Fort Hill

The Draft EIS contains several references to minor reclamation and/or marine structures such as a jetty adjoining the western side of Fort Hill Wharf as a possible component of the Concept Plan for the redevelopment. This area is external to the Redevelopment site boundary. The sediments here are considered moderately to highly contaminated, and the associated biota would be subject to a moderate to high risk of toxic impacts (Warren 2001). The impacts of potential works in this area have not been discussed. It is unclear whether new wharf structures and reclamation will occur on the western side of Fort Hill. Given the contaminant levels in the substrates, works in the intertidal and subtidal zones within the vicinity of the Iron Ore Wharf will require special and more detailed consideration.

Recommendation 13

Any future development related to the Darwin City Waterfront, outside the redevelopment area, is to be referred to the Minister for the Environment and Heritage for assessment in accordance with the *Environmental Assessment Act*.

3.9. Acid Sulfate Soils/Potential Acid Sulfate Soils

Acid Sulfate and Potential Acid Sulfate Soils

The Draft EIS identifies potential acid sulfate soils (PASS) at locations corresponding with areas where fill material was historically placed over marine/mangrove sediments. This applies to most of the site area except for Fort Hill and Stokes Hill proper, and a strip of land at the foot of the escarpment. Depths at which PASS might be found beneath the fill material vary according to typical bathymetrical/topographical principles; approximately 4 metres beneath the fill closest to the escarpment and ranging from 4 to 12 metres beneath the fill closest to Kitchener Bay. There is some potential for these underlying muds to be disturbed if excavation or dewatering activities for the development are required.

The EIS has adequately considered the potential impacts of disturbing and/or exposing PASS. One respondent to the Draft EIS expressed concern that the quantity of acid sulfate soils (ASS) material present was not defined and an appropriate on-shore disposal site was not discussed. The Supplement has increased the resolution of information with regards to ASS material in the site. It is understood that the extent to which the PASS could be disturbed during the development will not be unequivocally definable until such time as the detailed Master Plan is finalised. It will be essential to further quantify the potential for PASS disturbance associated with construction activities and to provide appropriate management measures to prevent/minimise acid generation resulting from these activities, including disposal options if material is to be removed from the site.

Both the Draft EIS and Supplement refer to the requirement for an Acid Sulfate Soil Management Plan (ASSMP) and the proponent has committed to providing an ASSMP to the Office of Environment and Heritage for approval prior to the commencement of any works. Additionally, the Supplement provides guidelines, based on Western Australian acid sulfate soils guidelines, that may be used to prepare the management plan.

Acid Sulfate and Potential Acid Sulfate Sediments in Kitchener Bay

According to the EIS, no ASS or PASS were identified within the top 1m of the Kitchener Bay marine sediments. The underlying muds have not yet been investigated. Although it is likely that deeper sediments to contain PASS, the document assumes that the risk of acid sulfate generation from this source is low.

Given that these sediments are likely to be disturbed during construction of some components of the site either through dredging or reclamation (mud-waving), it is considered essential that these be further investigated to determine the extent of PASS and ASS. This will allow determination of any remedial measures that may need to be implemented and also provide a better understanding of the disposal requirements for these sediments.

Recommendation 14

The sediments of Kitchener Bay shall be further characterised with regard to acid sulfate potential at depths to which sediment disturbance is likely.

3.10. Waste Management

Submissions in response to the Draft EIS requested more detail on arrangements for the disposal of waste, including contaminated and sulfidic material, during the remediation, construction and operation phases of the Darwin City Waterfront redevelopment. The Power and Water Corporation highlighted the need for consideration of management of liquid waste from commercial activities at the wharves and from ships berthing at the wharves, including transport of these wastes across the Darwin City Waterfront site.

The proponent has agreed that waste streams will be characterised and disposal options will be described by the preferred developer, and that risk assessments for waste management will be undertaken, during finalisation of the Master Plan.

The proponent has further committed to including descriptions of estimated volumes of different waste types in the Remediation Action Plan and Construction Environmental Management Plan and that a Waste Management and Minimisation Plan will be included in the Construction Environmental Management Plan. (*Refer to **Recommendation 1***)

As discussed in Section 1.3, remediation of existing soil contamination, including identification of suitable sites for disposal, is to be undertaken in accordance with a Remediation Action Plan being developed in line with the National Environment Protection [Assessment of Site Contamination] Measure 1999 (NEPM), and external to this environmental assessment process. Should off-site disposal of contaminants be required as part of the remediation process, this would fall under the provisions of the *Waste Management and Pollution Control Act*.

3.11. Dewatering During Construction

The Draft EIS states that groundwater impacts are not expected. However, Appendix E, *Hydrogeology – Technical Assessment for the Draft EIS*, does not provide sufficient information to verify that conclusion. Groundwater contamination across the site has been shown to vary, and includes dissolved phase hydrocarbons and elevated levels of metals. Dewatering activities associated with foundation construction have the potential to impact on hydrogeology and associated contaminant transport, within the redevelopment site. Although groundwater flow beneath the site is believed to be slow, lowered groundwater levels associated with dewatering could cause groundwater contamination plumes to change direction, changing the distribution of contaminated groundwater.

Drawdown of groundwater due to dewatering also has implications for management in areas containing potentially acid sulfate soils (PASS). Should previously saturated soils be exposed to oxygen, the potential exists to cause reductions in groundwater pH, with resultant disposal restrictions on groundwater itself, and introducing the likelihood of dissolution and transport of metals in acidic groundwater.

If dewatering will be required either during construction or as part of the ongoing management of the site, this raises issues of appropriate disposal and licensing according to the *Water Act*. The draft Construction Environmental Management Plan (CEMP) provided in the Draft EIS states that dewatering during construction will be controlled by the Acid Sulfate Soil Management Plan (ASSMP), but does not appear to consider appropriate investigation and management of dewatering involving existing contaminated groundwater that may occur outside of areas where PASS have been identified.

In additional information provided to the Office of Environment and Heritage, the proponent has committed to undertake further groundwater flow and solute transport *modelling* (*Refer to **Recommendation 15***), as well as the development of an engineered program for the treatment, monitoring, and contingency management of dewatered groundwater. (*Refer to **Recommendation 1***)

3.12. Biting Insects

The Draft EIS concludes that the location of the Darwin City Waterfront redevelopment poses no special problems in regard to biting insects, due to the lack of mosquito or biting midge breeding habitat in or nearby to the site. Potential areas for mosquito breeding identified were topographical depressions and open stormwater drains. In addition to commitments in regard to management and maintenance of stormwater drainage structures, the Department of Health and Community Services requested that, as part of the redevelopment, open stormwater drains should be upgraded to underground stormwater systems where possible. The proponent has committed to undertake this, to re-contour any identified mosquito breeding depressions, and to design and contour the site so that no new depressions or poorly draining areas are capable of holding water for more than three days. This meets the *Guidelines for Preventing Biting Insect Problems for Urban Residential Developments or Subdivisions in the Top End of the Northern Territory*. The proponent has committed that management plans to address the issue of biting insects will be included in the Construction Environmental Management Plan and Operational Environmental Management Plan.

3.13. Master Plan

At the time of writing of the Draft EIS and the Supplement, a number of final components of the redevelopment were uncertain, and potential impacts could not be quantified. As a result of comments provided on the Draft EIS and review of the Supplement, the proponent has submitted to the Office of Environment and Heritage a revised list of further studies to be undertaken to support the final redevelopment plans. Similarly, the proponent undertook a number of commitments regarding the content of the Master Plan. To ensure the complete and rigorous environmental assessment of the proposed development, it is considered that a number of these studies and commitments should be completed before the final Master Plan is lodged for approval, and provided with the Master Plan as supporting information. The provision of this information at the time the Master Plan is lodged will minimise the likelihood for further formal environmental assessment of the redevelopment in accordance with the *Environmental Assessment Act*. A list of these studies and commitments is provided in Appendix 3.

Recommendation 15

The studies and commitments listed in Appendix 3 are to be completed before the final Master Plan is lodged for approval. Copies of the completed studies are to be lodged with the Master Plan as supporting information.

3.14. Integrated Environmental Management

Land Use Conflicts/Incompatibilities

Potential land use conflicts, for example, the existence of Sacred Site 5073-93, and potential synergies with adjacent land use (for example, shared oil spill response capability), have been identified in the EIS. The EIS has demonstrated that these conflicts can be resolved, and opportunities captured, if early and ongoing consultation is initiated between all affected parties.

Respondents to the EIS have indicated their wish to be consulted about future proposed works in order to allow them to plan their complementary works programs.

Significant issues of security, traffic and personal hazard arise from the desire to maintain working wharves adjacent to the Darwin City Waterfront. In addition, Darwin and its Port are seen as strategically important in Australia's defence capability and access to the Port (which by land can only be reached through the Darwin City Waterfront) has been guaranteed by a Deed of Licence signed by the Northern Territory Government and the Australian Government.

Any lack of integration and coordination between the final design and layout for the redevelopment and the ongoing use of the Darwin wharves by Defence and other users has the potential to create land use incompatibilities, including noise, health and safety, access and port security issues.

Given the close interaction of the Darwin City Waterfront with its neighbours, it is recommended that all management stakeholders, including Darwin City Council, the senior Aboriginal custodians of Sacred Site 5073-93, Defence, and Northern Territory Government agencies be consulted during finalisation of the Master Plan. (*Refer to **Recommendation 16.***)

Formal consultation mechanisms should be established with all neighbouring land users and relevant regulators and advisory bodies.

Recommendation 16:

The proponent is to implement a consultation program as soon as the preferred developer has been determined to allow an examination, review and input of the site's design and layout to allow the up front identification and resolution of any issues of potential impact between land uses. The consultation committee is to be made up of, but not limited to:-

- **The proponent;**
- **The preferred developer;**
- **Aboriginal Areas Protection Authority;**
- **relevant local Aboriginal Community Groups**
- **the Office of Environment and Heritage;**
- **Defence;**
- **Darwin Port Corporation;**
- **Department of Infrastructure, Planning and *Environment* (*Transport and Infrastructure and Lands and Planning Groups*); and**
- **Darwin City Council.**

Transfer of environmental responsibility, site constraints and environmental management commitments to eventual developers, land owners and land users

Given the industrial history of the site and resultant existing soil contamination, it is imperative that any future changes in land use are based on the constraints of the site, as identified in the Site Management Plan. The proponent has committed that these conditions, and any restrictions on land use within the site will be imposed on land titles and conditions on leases to ensure that they survive changes in land ownership, land tenure and proposed land use (*Refer to **Recommendation 17.***).

Environmental Management Plans

The *Call for Detailed Proposals* document details a range of requirements that the developers are required to incorporate in the final draft Master Plan. Section 3.1 of the Supplement addresses the incorporation of EIS Studies into the Master Plan, and obligations on the final developer.

The Draft EIS envisaged that a further series of environmental management documents will be prepared covering various phases of the project. The Remediation Action Plan (RAP) will outline remediation activities to be undertaken to ensure the site is suitable for the proposed end land uses, while the Site Management Plan (SMP) will define the actions required to manage any residual contamination possibly permitted to remain at certain parts of the site following remediation. A Construction Environmental Management Plan will cover measures to prevent or minimise potential environmental impacts from construction activities.

As the Master Plan is the overarching management document for the Darwin City Waterfront, it is appropriate that all aspects of environmental management are addressed in the Plan, with management responsibility for implementation of aspects of the management plans clearly delineated.

Discussions with the proponent suggest that the Master Plan can be considered to be the long term vision for the Darwin City Waterfront. Day to day management of the Darwin City Waterfront will also require an overarching plan of the whole site as it exists at any point in time.

As indicated in the Draft EIS and Supplement, there is considerable overlap between the various plans and due to the lifespan of the project there will also be varying responsibility for implementation of the various plans across a number of parties. To ensure that all environmental aspects of each component of the redevelopment are integrated into the overall management of the site and its surrounds over the life of the project, an Environmental Management System is recommended.

Recommendation 17

The Master Plan is to provide a draft Darwin City Waterfront Management Plan which:-

- **shall include commitments in EIS and recommendations made in this assessment report;**
- **shall be informed by the results of studies listed in Appendix 3;**
- **shall include the**
 - **Remediation Action Plan**
 - **Site Management Plan**
 - **Construction Environmental Management Plan**
 - **Operational Environmental Management Plan****(and their sub-plans);**
- **shall include details of appropriately qualified environmental personnel to be employed by the proponent, and training and induction to be given to the proponents' employees, contractors and agents;**
- **shall include arrangement for regular external audit by an environmental auditor with industry recognised accreditation; and**
- **shall include a mechanism for ongoing review by OEH.**

The requirement for preparation, implementation and review of the Darwin City Waterfront Management Plan shall be included as a condition of all leases or agreements issued by the proponent.

The Darwin City Waterfront Management Plan will be referred to relevant Northern Territory Government agencies for review prior to finalisation, after which it will become a public document.

The Darwin City Waterfront Management Plan shall form the basis for approvals and licences issued under relevant NT legislation.

4. CONCLUSIONS

The Office of Environment and Heritage considers that the environmental issues associated with the proposed Darwin City Waterfront redevelopment, as identified in the Concept Plan, have been fully identified and addressed, recognising that the proposed development for the site is yet to be finalised. Appropriate environmental management of these issues will be addressed through management actions detailed in the Pre-Remediation Environmental Management Plan, Remediation Action Plan, Site Management Plan, Construction Environmental Management Plan and Operational Environmental Management Plan.

The environmental impact of some options for the proposed development could not be adequately assessed at this time, and further environmental assessment may be required once details of the development have been finalised. When the Master Plan for the Darwin City Waterfront has been finalised, the development will be the subject of a Development Application under the *Planning Act*.

At this time the Master Plan will be forwarded to the Office of Environment and Heritage, and the Minister for the Environment and Heritage will determine if any further environmental assessment is required according to the *Environmental Assessment Act*. Public review of the Master Plan is allowed for during the assessment of the Development Application.

APPENDIX 1 - RESPONDENT MATRIX.

RESPONDENT	The Proposed Project	Status of the Proposed Project in the EIA process	Relevant Government Legislation and Policies	Timeline and Project Schedule of the Proposed Project	Objectives and Benefits of the Proposed Project	Benefits	Alternatives	Project Description	Proposed Land Uses	Associated Headworks	Field Surveys	Soils	Existing Soil Contamination	Hydrogeology	Acid Sulfate Soils	Air Quality	Noise	Biting Insects	Marine Biota	Existing Land Uses	Existing Environment	Groundwater Contamination	Stages of the Redevelopment
Department of Health and Community Services																							
Police Fire and Emergency Services																							
Aboriginal Area Protection Authority																							
Department of Infrastructure Planning and Environment																							
Museums and Art Gallereys of the Northern Territory																							
Power Water Corporation																							
Department of Business Industry and Resource Development																							
Department of Defence																							
The Environment Centre NT Inc																							
Darwin City Council																							
Office of Environment and Heritage																							
Darwin Film Society																							

RESPONDENT	Impacts on the Physical Environment	Hydrology and Surface Water Quality	Marine Environment	Vegetation and Weeds	Marine Ecology	Changes to the Existing Built Environment	Traffic, Roads and Public Transport Network	Impacts on Socio-economic Environment	Storage, Transfer and Offloading of Fuels	Defence Use of Wharves	Preliminary Hazard analysis	Vessel Collision/Grounding	Cyclones and Storm Surge	Terrorist Attacks	Site Contamination	Soil Remediation	Disposal of Contaminated Material	Construction Environmental Management Plan	Site Management Plan	Visual Characteristics and Values	Aboriginal Cultural Heritage	European Heritage	Legal Heritage Requirements
Department of Health and Community Services																							
Police Fire and Emergency Services																							
Aboriginal Area Protection Authority																							
Department of Infrastructure Planning and Environment																							
Museum's and Art Gallery's of the Northern Territory																							
Power Water Corporation																							
Department of Business Industry and Resource Development																							
Department of Defence																							
The Environment Centre NT Inc																							
Darwin City Council																							
Office of Environment and Heritage																							
Darwin Film Society																							

APPENDIX 2 - SUMMARY TABLE OF COMMITMENTS AND FUTURE STUDIES

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Environmental Management			3.14	
<p>A series of environmental management plans will be developed to control the remediation, construction and operational elements of the project, including:</p> <ul style="list-style-type: none"> • Construction Environmental Management Plan (CEMP) • Operational Environmental Management Plan (OEMP) • Remediation Action Plan (RAP) • Site Management Plan (SMP) <p>Issue specific environmental management plans (eg waste management plan) will be incorporated in the above plans.</p> <p>Management Plans will be circulated to government agencies for comment before finalisation.</p>		6.1		17
Aboriginal Cultural Heritage, Archaeology and Native Title			3.2	
All work will be done in accordance with obligations set out in the Heritage Conservation Act.		8.6.1		
The cultural significance of the project site, particularly Stokes Hill, will be acknowledged and past and present Aboriginal land use of the Wharf Area recognised by any future Development.	8.6.1			15
The contemporary value and use of areas by Aboriginal people will be acknowledged	8.6.1			15
Consultation will be undertaken with the relevant Aboriginal community groups, the proponent and the Office of Environment and Heritage, to determine possible future land uses for Stokes Hill.	8.6.1			15,16
Ongoing local Aboriginal community consultation will be undertaken, to ensure concerns about the area and development are addressed.		8.6.1		15, 16
Targeted archaeological investigations will be undertaken following confirmation of development Master Plan		8.6.1		
Field inspection and assessment of sites that may retain intact archaeological elements will be done before any site works proceed as required by and the Office of Environment and Heritage. These inspections will be undertaken of areas where works are planned as part of the Construction Environmental Management Plan (CEMP)		8.6.1		

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
If any archaeological place is found during the redevelopment, work will be ceased at that location and the Office of Environment and Heritage contacted so that assessment can be made as required under the <i>Heritage Conservation Act</i> .		8.6.1		
Acid Sulfate Soil Management			3.9	
An Acid Sulfate Soil Management Plan (ASSMP) will be prepared and approved prior construction. The ASSMP will outline storage, treatment, disposal, and dewatering management measures and procedures as well as proposed monitoring and contingency plans. The ASSMP will be incorporated into a Construction Environmental Management Plan.	8.2.6			17
The ASSMP will be reviewed and updated at regular intervals during the construction phase of the project.			3.14	
A formal validation report including all field and laboratory test data will be prepared upon completion of the excavation works/dewatering operations.				
Further investigations will be undertaken to support initial engineering design (if Final Master Plan involves deep excavation)		6.1		15
The sediments of Kitchener Bay shall be further characterised with regard to acid sulfate potential at depths top which sediment disturbance is likely.			3.9	14
Air Quality			3.7	
Measures will be implemented to minimise the potential for off-site dust emissions, which will include dust suppression measures. Regular checks of dust levels generated by works and remedial action will be taken whenever visible off-site emissions occur. Dust monitoring will be continued during major demolition and construction works. All dust management measures and monitoring procedures will be included in the Construction Environmental Management Plan.	8.5.3 6.3.8			17
Impacts arising from vehicle emissions will be mitigated through advocacy of public transport and traffic design/management principles incorporated into the final Development Master Plan.	8.5.3			15
An analysis of building design and operation, public transport, non-vehicular access and energy efficient technology will be included in the Master Plan in regards to emissions and efficiency.	8.5.3			15
If required by CLA Auditor, with regards to volatilisation of vapours into enclosed building spaces, a Quantitative Human Health Risk to determine potential risk to human health from exposure.		6.1		

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Dispersion modelling of fugitive emissions from NFI and refuelling activities.		6.1	3.7	15
Biting Insects			3.12	
Management procedures will be implemented during all construction phases of the redevelopment to minimise mosquito breeding habitat.				17
Design of the Master Plan will include provision for pest management.				15
Information about the timing of biting insects and personal protection measures will be provided to developers, potential residents, landholders and businesses in the project site (as part of the Operational Environmental Management Plan).				
Waste Management			3.10	
Waste management and disposal will be carried out in accordance with the <i>Waste Management and Pollution Control Act</i> .				
A waste management plan (WMP) will be prepared for both the construction and operational phases of the project and will be incorporated in the CEMP.				17
Hazardous material from the DCW site will be removed to an appropriate treatment or disposal facility.				
Wastewater Management				
Wastewater from marine vessels will be included in the sewer plan.				
Groundwater Remediation/ Management				
Groundwater will not be used for any purposes identified as posing a risk to public health or environment.		5.2.6		
Monitoring and contingency management will be undertaken, including treatment of dewatered groundwater during construction, before discharge. (This will be included in the RAP, SMP and CEMP)			3.11	
An engineered program will be provided with the Master Plan (and for inclusion in the CEMP) satisfying the provisions of the Waste Management and Pollution Control Act and the Water Act.			3.11	15
Ongoing groundwater monitoring		6.1		

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
If required by the CLA Auditor, groundwater modelling may include solute transport for additional infrastructure options of: <ul style="list-style-type: none"> Hydrocarbon discharge into marine environment VOC discharge into marine environment 		6.1		
If required by the CLA Auditor, bioremediation, groundwater treatment options for groundwater.		6.1		
A detailed dewatering plan will be prepared and implemented to ensure that the impact of dewatering activities is minimised. This will be included in the CEMP.	8.3.1		3.11	17
Surface water Management				
Development drainage infrastructure will safely accommodate runoff from heavy rainfall events to DCC requirements.			3.3	
Surface water management plan will be developed and incorporated into both CEMP and OEMP. Measures for management of hydrology will be incorporated into relevant management plans (RAP, CEMP, OEMP)				17
All stormwater flows from the escarpment will be collected and disposed of as part of the development draining infrastructure.				
The RAP will address issues of hydrocarbon contamination entering stormwater and mitigation measures to address acidic leachates on stormwater infrastructure.				
Heritage Conservation			3.2	
Mitigation measures will be implemented to retain and protect listed heritage sites. Where possible retained heritage features will be utilised in the Redevelopment. Any removal or destruction of heritage sites will be fully documented before any works are undertaken.	8.6.2			5, 6, 7
The site of Goyder's Camp will be retained as an open space feature that retains a 'sense of space' and provides public recognition of the importance of the site and the events associated with it.				6
The Master Plan will demonstrate how interpretation of the range of historical themes relevant to the Darwin City Waterfront will be incorporated into the redevelopment.				7

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
<p>These themes include:-</p> <ul style="list-style-type: none"> the natural history of the area; Aboriginal occupation before European arrival; discovery and first settlement by Europeans; contact between Europeans and Aboriginal people; maritime history including wrecks; the coming of the overland telegraph line; the Chinese in Darwin; the gold rush era; the coming of the railway; Darwin as a strategic outpost - oil storage, World War Two, the 1942 bombing, Harbour defence and the boom net; aviation history (the flying boats); Cyclone Tracy; and industrial use of the site, including the power station and the Iron Ore Wharf. 				
Noise Management			3.4	
<p>The Master Plan will contain effective planning and layout design to mitigate noise impacts.</p> <p>Operational and construction noise will be controlled through a Noise Management Plan to be incorporated into the CEMP and OEMP.</p> <p>The Office of Environment and Heritage will be consulted to determine appropriate noise guidelines to assist with construction, design and layout.</p>	8.5.4		3.14	9, 15
Permanent entertainment facilities at redeveloped site will comply with the special concessions standards required by NT Government regulators. Management of noise from external events will form an integral part of the Noise Management Plan.	8.5.4			
Expanded noise survey of Navy vessels at berth at Darwin Wharves		6.1		15

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
<p>The Master Plan is to be accompanied by:-</p> <ul style="list-style-type: none"> a) a draft Noise Management Plan that demonstrates how the Proponent will achieve the objective of limiting the impact of noise from all aspects and stages of the development to acceptable levels; and b) a draft Noise Management System that contains the organisation structure, responsibilities, practices, procedures, processes and resources required for implementing the Noise Management Plan. 			3.4	9
Traffic Management			3.3	
Traffic assessment will be considered in the development of the Master Plan design. Detailed traffic/ transport assessment of the Master Plan.		6.3.7 6.1		8, 15
All haulage roads will be maintained during construction and returned to their pre-development visual condition or compensation will be paid to relevant Authority.		6.3.7		
All traffic and transport requirements for existing and future users of the Darwin City Waterfront site and Darwin Wharves will be met.		6.3.7		
Additional traffic assessment will be undertaken during periods of naval ship resupply, and where possible, when multiple ships are berthed.		5.4.3		
If works affect the sacred site, formal approval will be sought from senior Aboriginal Custodians of the site.		8.5.6	3.2, 3.14	16
The developer will provide all transport infrastructure within the redevelopment site at their cost to previously agreed NTG/DCC standards.		8.5.6		
Site layout and Design				
Escarpment will be maintained as a buffer of vegetation and backdrop to site.	4.3			
In general, unless deemed appropriate, building heights on the central section of the site will be restricted to no greater than RL 25m.	4.3		3.2	5
Construction of the Smith St pedestrian connection between the CBD and the project site will be undertaken with minimal clearing of escarpment vegetation and with measures in place to minimise the risk introduction of weeds	6.4.5			

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Adjacent land uses			3.4, 3.5, 3.7, 3.14	
Government will consult with Defence to resolve issues regarding adjacent wharf activity and refuelling infrastructure.		6.7.6		15, 16
Consultation and collaboration with Defence will be undertaken to ensure that strategic capabilities and current flexibility will not be reduced.				15, 16
Darwin Wharves will be maintained as a working maritime facility		8.7		15
Vegetation Management				
Wherever possible, trees listed on the Register of Significant Trees in and near the project site will be retained for aesthetic or historical value.	8.4.1			
A weed management plan will be developed to assist in prevention of further introductions and long-term control of weeds.	8.4.1		3.14	17
Marine Structures			3.8	
Engineering design of seawall/marina will address coastal sediment transport, undertake hydrodynamic modelling and involve consultation with relevant bodies.		6.3 6.1		15
Hydrogeological assessments will be used to review any marina/seawall.		6.2.4		15
Combined groundwater flow and solute transport modelling and potential Ecological Risk Assessment (ERA) to evaluate ecological toxicity risk at receptor resulting from new construction.		6.1		15
Fauna				
Existing habitat will be protected through the installation of temporary fencing of vegetation at the base of escarpment prior to any road works.	8.4.2			

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Dredging and Reclamation Management			3.8	
A Dredging Management Plan will be developed in consultation with the Darwin Harbour Dredging Technical Advisory Committee and OEH.		7.2.4		17
Sediment sampling will be carried out to define the aerial extent of elevated metals within the sediments of the site. If dredging is required within the defined contaminated areas an Ecological Risk Assessment (ERA) will be undertaken. A dredging management plan will be developed which will include monitoring and control strategy based on the outcome of the ERA.	8.2.5			15
Once the Master Plan is finalised, further sediment analysis and elutriate testing (and ecotoxicology testing for the western end of Kitchener Bay) may be required.		6.1		
Hydrodynamic modelling of Kitchener Bay will be undertaken.		6.1		15
If off shore reclamation is to be undertaken as part of the redevelopment, strategies for the prevention or management of mud-waving are to be included in the Construction Environmental Management Plan.			3.8	12
Any future development related to the Darwin City Waterfront, outside the redevelopment area, is to be referred to the Minister for the Environment and Heritage for assessment in accordance with the <i>Environmental Assessment Act</i> .			3.8	13
Sustainability				
The Master Plan will include opportunities to achieve best practice in environmentally sustainable development in a tropical environment. An environmental management strategy will be provided which demonstrates how sustainable outcomes will be achieved.		4.1		15
Hazard Analysis and Contingency Planning			3.6	
Hazard analysis and contingency plans for the storage, transfer and offloading of fuels and other hazardous materials will be developed compatible with the Darwin Harbour Oil Spill Contingency Plan.	7.2.3			11
The International Safety Guide for Oil tankers and Terminals (ISGOTT) and Australian Defence Standard (DEF-AUST-5695) for maintaining safety distances around hazardous facilities will be addressed in the Master Plan.		6.7.6		
Operational plans covering awareness and response to the detection of unexploded ordnance (UXO), will be implemented in the CEMP				

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Possible further risk assessment for:- <ul style="list-style-type: none"> Product spills and releases to the marine environment. Product spills and releases from pipeline rupture. 		6.1		
Contingency plans for fire and explosion scenario will be developed as part of the Construction and Operational EMP's.				
The proponent will ensure:- a) that the results of hazard modelling related to fuel off-loading are incorporated in the Master Plan; b) that no permanent occupation of areas within the hazard zone is permitted while fuel discharge operations remain from the Iron Ore Wharf; and that adequate arrangements are in place for preventing access by the public into the safety zone when fuel discharge operations are in progress.			3.6	11
Security			3.5	
Requirements of new port security legislation will be met through a cooperative approach between the key user groups.		7.2.10		16
Security zones associated with berthing of cruise ships and Navy ships is to be modelled and this information used in designing site layout when finalising the Master Plan.				10
Soils				
An Erosion and Sedimentation Control Plan (ESCP) will be prepared and included in the CEMP.			3.14	17
Contaminated site assessment and remediation will occur in accordance with the NEPM (Assessment of Site Contamination) and as outlined in the RAP. The RAP will be validated by the VICEPA CLA to ensure proposed remediation action is consistent with proposed redevelopment. Remediation and any site management conditions will comply with the requirements of the CLA. The conditions of the VICEPA CLA "Statement of Environmental Audit" will be included in the finalised Master Plan. Engineering controls and management actions required to protect human health and the environment will be included through the development of the Site Management Plan (SMP).			1.3	17
Only clean spoil will be imported to the site as fill material.				

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Substructures of buildings will be engineered to suit varying subsurface conditions based on geotechnical assessment.				
General				
The developer is required to conform to the 'Guide to Infrastructure Requirements' in the <i>Call for Detailed Proposals</i> .		8.5.2		
If the final Master Plan differs significantly from the Concept Plan, additional assessment will be undertaken in accordance with the requirements of the <i>Environmental Assessment Act</i> .		1.4.3	3.1	
Where there is residual site contamination, future changes to more sensitive land uses will be controlled through limitations placed on land titles and conditions on leases.		6.2.2	3.14	
Consultation			3.14	
<p>The proponent is to convene a consultation program as soon as the preferred development has been determined to allow an examination, review and input of the site's design and layout to allow the up-front identification and resolution of any issues of potential impact between land uses. The consultation committee is to be made up of, but not limited to:-</p> <ul style="list-style-type: none"> • The proponent; • The preferred developer; • Aboriginal Areas Protection Authority; • relevant local Aboriginal Community Groups • the Office of Environment and Heritage; • Defence; • Darwin Port Corporation; • Department of Infrastructure, Planning and Environment (Transport and Infrastructure and Lands and Planning Groups); and • Darwin City Council. 				16

Commitment/ Safeguard	Section Reference			Recommendation from Assessment Report 43
	EIS	Supplement	Assessment Report 43	
Integrated Environmental Management			3.14	
<p>The Master Plan is to provide a draft Darwin City Waterfront Management Plan which:-</p> <ul style="list-style-type: none"> • shall include commitments in EIS and recommendations made in this assessment report; • shall be informed by the results of studies listed in Appendix 3; • shall include the <ul style="list-style-type: none"> • Remediation Action Plan • Site Management Plan • Construction Environmental Management Plan • Operational Environmental Management Plan (and their sub-plans); • shall include details of appropriately qualified environmental personnel to be employed by the proponent, and training and induction to be given to the proponents' employees, contractors and agents; • shall include arrangement for regular external audit by an environmental auditor with industry recognised accreditation; and • shall include a mechanism for ongoing review by OEH. <p>The requirement for preparation, implementation and review of the Darwin City Waterfront Management Plan shall be included as a condition of all leases or agreements issued by the proponent.</p> <p>The Darwin City Waterfront Management Plan will be referred to relevant Northern Territory Government agencies for review prior to finalisation, after which it will become a public document.</p> <p>The Darwin City Waterfront Management Plan shall form the basis for approvals and licences issued under relevant NT legislation.</p>				17

APPENDIX 3 - STUDIES AND COMMITMENTS TO BE UNDERTAKEN BY THE PROPONENT TO SUPPORT THE MASTER PLAN

Issue	Proposed Study
Potential and Acid Sulfate Soils (PASS/ASS)	Further investigations to support initial engineering design (if Final Master Plan involves deep excavation)
Noise from Navy Vessels	Expanded noise survey of Navy vessels at berth at Darwin Wharves
Air Quality	Dispersion modelling of fugitive emissions from NFI and refuelling activities
Traffic	Detailed traffic/transport assessment of the Master Plan
Potential Impacts of Marine Structures	Hydrodynamic modelling
Structures for marine structures or building foundations/footings impacting groundwater discharge and/or mixing	Combined groundwater flow and solute transport modelling and potential Ecological Risk Assessment to evaluate ecological toxicity risk at receptor resulting from new construction
Risk Assessment (Hazard Analysis)	Possible further risk assessment for: <ul style="list-style-type: none"> - Product spills and releases to the marine environment - Product spills and releases from pipeline rupture

Issue	Commitment
Aboriginal Cultural Heritage, Archaeology and Native Title	The Cultural significance of the project site, particularly Stokes Hill, will be acknowledged and past and present Aboriginal land use of the Wharf Area recognised by any future Development.
	The contemporary value and use of areas by Aboriginal people will be acknowledged by any future development.
	Consultation will be undertaken with the relevant Aboriginal community groups, the proponent and the Office of Environment and Heritage, to determine possible future land uses for Stokes Hill.
	Ongoing local Aboriginal community consultation will be undertaken, to ensure concerns about the area and development are addressed.
Air Quality	Impacts arising from vehicle emissions will be mitigated through advocacy of public transport and traffic design/management principles incorporated into the final Development Master Plan.
	An analysis of building design and operation, public transport, non-vehicular access and energy efficient technology will be included in the Master Plan in regards to emissions and efficiency.
Groundwater Remediation/ Management	An engineered program will be provided with the Master Plan (and for inclusion in the CEMP) satisfying the provisions of the Waste Management and Pollution Control Act and the Water Act.
Heritage Conservation	Mitigation measures will be implemented to retain and protect listed heritage sites. Where possible retained heritage features will be utilised in the Redevelopment. Any removal or destruction of heritage sites will be fully documented before any works are undertaken.
	The site of Goyder's Camp will be retained as an open space feature that retains a 'sense of space' and provides public recognition of the importance of the site and the events associated with it.

Issue	Commitment
Noise Management	The Master Plan will contain effective planning and layout design to mitigate noise impacts.
	The Office of Environment and Heritage will be consulted to determine appropriate noise guidelines to assist with construction, design and layout.
Traffic Management	Traffic assessment will be considered in the development of the Master Plan design.
Adjacent Land Uses	Government will consult with Defence to resolve issues regarding adjacent wharf activity and refuelling infrastructure.
	Consultation and collaboration with Defence will be undertaken to ensure that strategic capabilities and current flexibility will not be reduced.
	Darwin Wharves will be maintained as a working maritime facility
Marine Structures	Engineering design of seawall/marina will address coastal sediment transport, undertake hydrodynamic modelling and involve consultation with relevant bodies.
	Hydrogeological assessments will be used to review any marina/seawall.
	Hydrodynamic modelling of Kitchener Bay will be undertaken.
Sustainability	The Master Plan will include opportunities to achieve best practice in environmentally sustainable development in a tropical environment. An environmental management strategy will be provided which demonstrates how sustainable outcomes will be achieved.
Biting Insects	Design of the Master Plan will include provision for pest management.
Hazard Analysis and Contingency Planning	International (the International Safety Guide for Oil tankers and Terminals ISGOTT) and Australian Defence Standard (DEF-AUST-5695 Standards for maintaining safety distances around hazardous facilities will be addressed in the Master Plan.
Security	security zones associated with berthing of cruise ships and Navy ships is to be modelled and this information used in designing site layout when finalising the Master Plan.
Consultation	The proponent is to establish liaison between Darwin City Council, the relevant groups within the Department of Infrastructure, Planning and Environment, and the preferred developer, to ensure that traffic and transport issues associated with the redevelopment, including the provision and promotion of public transport, are addressed in a coordinated and timely manner.
	<p>The proponent is to convene a consultation program as soon as the preferred development has been determined to allow an examination, review and input of the site's design and layout to allow the up-front identification and resolution of any issues of potential impact between land uses. The consultation committee is to be made up of, but not limited to:-</p> <ul style="list-style-type: none"> • The proponent; • The preferred developer; • Aboriginal Areas Protection Authority; • relevant local Aboriginal Community Groups • the Office of Environment and Heritage; • Defence; • Darwin Port Corporation; • Department of Infrastructure, Planning and Environment (Transport and Infrastructure and Lands and Planning Groups); and • Darwin City Council