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**Northern Territory Government,
Department of Planning and
Infrastructure**

Darwin City Waterfront
Multi-storey Car Park Area
Environmental Audit Report

Kitchener Drive, Darwin

November 2008



Statement of Environmental Audit

This Statement provides a summary of the findings of an Environmental Audit of the site located on **Kitchener Drive, Darwin**, Northern Territory in accordance with Section 47d of the *Waste Management and Pollution Control Act (NT)*.

Note that this Statement of Environmental Audit has been compiled to meet the requirements of the development permit for the site and does not constitute a statutory Statement of Environmental Audit under the Victorian Environment Protection Act 1970.

Name of Auditor	Dr Peter Nadebaum of GHD Pty Ltd
Term of appointment of Auditor (under the Victorian Environment Protection Act 1970)	16 May 1990 to 29 November 2011
Date Audit requested	September 2003
Owners of the Site	Northern Territory Government under the Administration of Department of Planning and Infrastructure.
Person requesting a Certificate	Terry O'Neill of the Northern Territory Government Department of Planning and Infrastructure.
Municipality	Town of Darwin
Title Information	Part Lot 7578 Town of Darwin Volume 700 Folio 461 and Future Lot 7767 as defined on Drawing No. LTO 2008/091 (attached in Appendix A) to be subdivided out of Lot 7578 Town of Darwin Volume 700 Folio 461
Area of the Site	2640 m ²
Zoning	Central Business under the Northern Territory Planning Scheme

The audit has had regard to, amongst other things:

- ▶ The Waste Management and Pollution Control Act (NT),
- ▶ The National Environment Protection (Assessment of Site Contamination) Measure (NEPM 1999),
- ▶ Water Act (NT),
- ▶ Advice provided by the Northern Territory Environment Heritage & Arts Division, Department of Natural Resources Environment & the Arts (EHA/DNRETA), and
- ▶ Guidance provided by the Victorian Environment Protection Authority.

Summary of Findings

The Site is historically a marine area reclaimed through uncontrolled and controlled filling and was previously utilised for industrial purposes. Pollution control measures have been implemented to make the Site suitable for its intended purpose, subject to certain conditions and a Site Management Plan (Environment) and Groundwater Management Plan, both attached to the Site Audit Statement, and the following information is relevant:



- ▶ Underlying fill can include glass, concrete, metal and wood pieces in the fill material at some locations. Very little biodegradable material is present and the age of the fill makes it unlikely that methane and other gases would be generated at levels of concern or above concentrations that would occur naturally where marine sediments are present. The fill material may be judged to be aesthetically objectionable if it were to be uncovered and may also adversely affect the growth of plants; however, no unsealed open spaces or garden areas are proposed for the Site.
- ▶ Methane gas testing was undertaken in the air space of eight groundwater bores across the Stage 1 area, and seven soil gas probe locations adjacent the Multi-Storey Car Park. Methane was detected in two groundwater bores. However results were less than the adopted trigger value of 20% of the Lower Explosive Limit (LEL) of methane in air. Methane was not detected in the soil gas bores. It is concluded that methane does not pose an explosion or asphyxiation risk to the users of the Site.
- ▶ Sampling and analysis has not detected any significant concentrations of asbestos in the fill in the waterfront area; however, due to the nature of the fill such material (particularly pieces of asbestos cement sheet) may be present in some localised areas of the Site. If excavations take place in the future, the work will need to be managed in accordance with the Site Management Plan (Environment) and material disposed of off Site in accordance with regulatory requirements.
- ▶ Heavy metal contamination has not been measured at concentrations that would be expected to adversely impact the health of persons working at the Site. Some metals concentrations were detected at depth exceeding the ecological criteria, but given the clayey nature of the soils on site would be unlikely to impact ecosystems in any garden areas. While there are no gardens proposed for this site, if the site use were to change in the future the potential for isolated hotspots of metal contaminated soils may need to be considered.
- ▶ Hydrocarbon contamination can be present in the fill and natural soil and rock, particularly in the northern region of the Site. The contamination is generally several meters beneath the surface and in the vicinity of the groundwater, and can give rise to contamination of the groundwater. This contamination is odorous and may be judged to be objectionable particularly if exposed and may be hazardous to persons if they come into direct contact with the material. If excavated, it should be managed and disposed of off Site in accordance with regulatory requirements and the Site Management Plan (Environment).
- ▶ Groundwater at the Site is contaminated with petroleum hydrocarbons, and this may be evident by a thin film or sheen on the groundwater in some locations. This could have adverse impacts if it were to discharge into the lagoon. A drainage system is provided to avoid this occurring, and it is proposed that this system will remain in operation until monitoring shows that contamination has reduced to a level where the drainage system can safely cease operation. Groundwater should be managed in accordance with the Groundwater Management Plan.
- ▶ Consideration has been given as to whether further clean up should take place. It has been determined that clean up has been carried out to the extent practicable, and EHA/DNRETA has been consulted to confirm that it is in agreement with the determination. Natural biodegradation of residual hydrocarbon contamination will continue to occur and the sub-soil drain will continue to remove hydrocarbons from the Site. It can be expected that at some time in the future that controls such as the subsurface drain will no longer be required to operate. The assessor infers that this might occur within a decade; however, the audit concluded that there is considerable uncertainty in such an estimate.



- ▶ Potential Acid Sulphate Soil (PASS), which occurs naturally in coastal areas, was identified at the Site during friction pile augering in the natural marine sediments underlying the fill. Any works undertaken that may aerate or otherwise disturb these soils (such as via excavation or dewatering) must be undertaken in accordance with an Acid Sulphate Soil (ASS) management plan prepared by a qualified and experienced professional as specified in the Site Management Plan (Environment).
- ▶ There is potential for unexploded ordnance to be present, and for this to pose a risk if detonation should occur. This is outside the scope of the audit, and the risk associated with UXO is managed through other means.

The Site Management Plan (Environment) provides information on the requirements for management of materials that may be encountered if sub-surface works are carried out at the Site. The Groundwater Management Plan provides information on the requirements for ongoing monitoring of groundwater in the Stage 1 area, which includes the Site.

The audit considers only contamination of the soil and groundwater by potentially hazardous substances, and does not consider or advise on the geotechnical conditions, the requirements for management of UXO or other aspects of the suitability of the land for development.

Suitability of the Site

On the basis of the work undertaken, the auditor is of the opinion that the Site is suitable for the intended purpose, that being;

A Multi-Storey Car Park with no exposed soil, in accordance with the site development plan (attached to the Statement of Environmental Audit as Attachment A) and used subject to the following conditions:

1. All future development and maintenance works at the Site involving excavation, and disposal of soil and fill shall be carried out in accordance with the Site Management Plan (Environment) attached to this summary.
2. Buildings shall be designed to prevent oily water from entering any occupied sub-surface structures, where there is a likelihood of oily water being present.
3. Buildings and structures shall be built to withstand acidic conditions potentially associated with Acid Sulphate Soil and Potential Acid Sulphate Soil.
4. Groundwater at the Site shall be managed in accordance with the Groundwater Management Plan attached to this summary to avoid contaminated groundwater discharging to the lagoon, and any sub-surface spaces such as lift overruns.
5. Groundwater at the Site shall not be used for any beneficial purpose other than environmental monitoring and for site remediation.

The reader should note that the SMP and GMP are subject to review and will be updated as appropriate. The reader should contact the Darwin Waterfront Corporation to obtain the current version of these documents.



This statement should be read in conjunction with the full audit report "*Northern Territory Government, Department of Planning and Infrastructure, Darwin City Waterfront, Multi-Storey Car Park Area, Environmental Audit Report, Kitchener Drive, November 2008*".

DATED: 12 November 2008

SIGNED: A handwritten signature in black ink, appearing to read 'Peter Nadebaum'.

PETER NADEBAUM

Environmental Auditor (Appointed Pursuant to the Victorian *Environmental Protection Act 1970* and recognised in the Northern Territory under section 68 of the *Waste Management and Pollution Control Act Northern Territory*).

Statement Attachments:

- Statement Attachment A: Site Development Plan
- Statement Attachment B: Site Management Plan (Environment) – Current version as at 5/11/2008
- Statement Attachment C: Groundwater Management Plan – Current version as at 30/07/2008



Statement Attachment A: Audit Site Development Plan

Site Development Plan



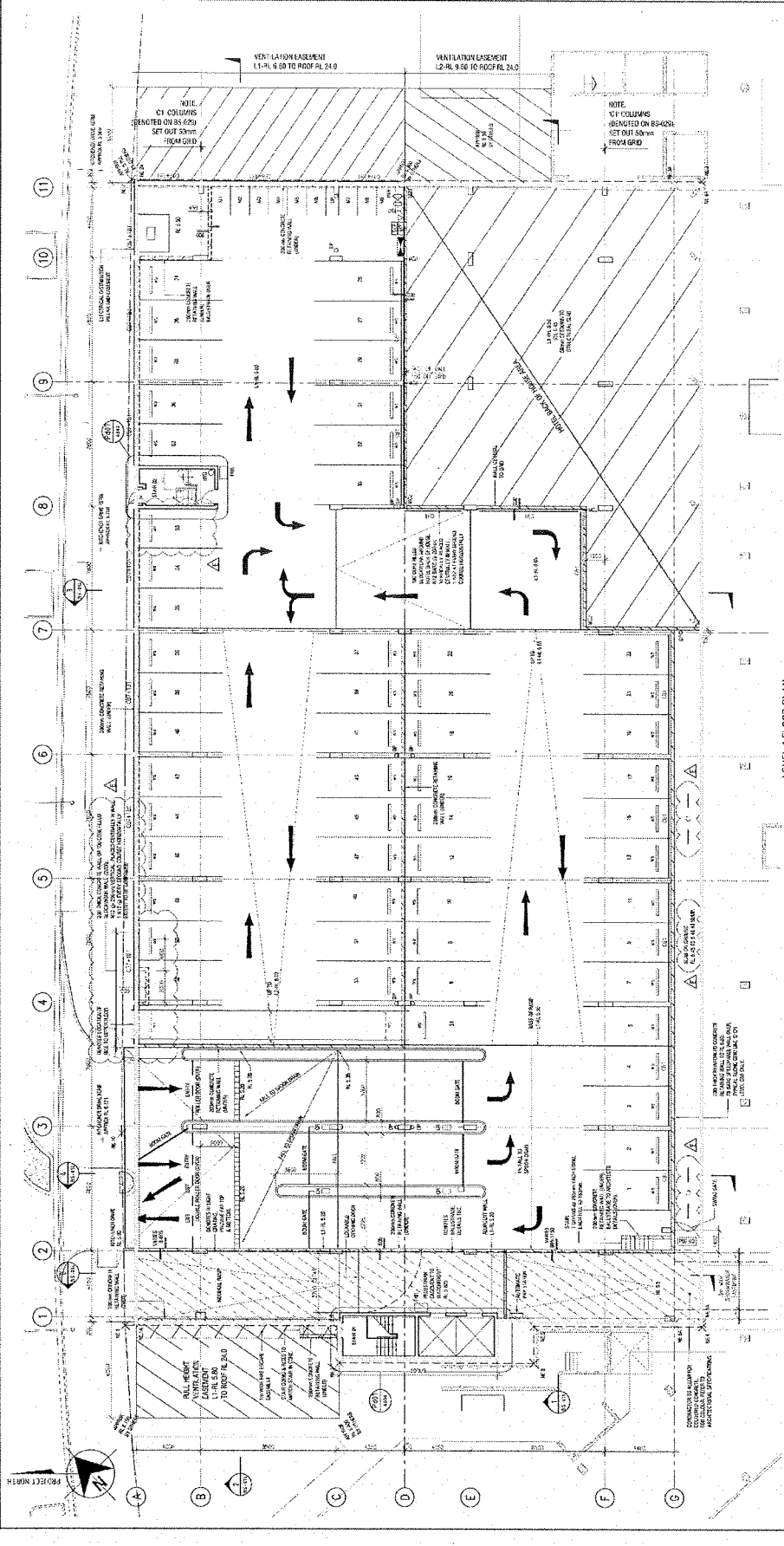
Audit Site Boundary

LEGEND

Symbol	Description
[Symbol]	...

26469-001	26469-001
B1	B1
BS-010	BS-010

CONSTRUCTION



LEVEL 1 FLOOR PLAN

COMPARTMENT NO.	SPACES	MAXIMUM VEHICLE SPACES	TOTAL CAPACITY
LEVEL 1	53	7	60
LEVEL 2	79	8	87
LEVEL 3	95	4	99
LEVEL 4	65	1	66
LEVEL 5 (HOTEL)	34	0	34
LEVEL 6 (HOTEL)	21	0	21
TOTAL HOTEL	33	0	33
TOTAL	125	2	127

NUMERICS DO NOT APPLY FOR SPACES UNDER FOOTING, PAVING, OR CURB.

BOUNDARY LOCATION COORDINATES

Point	Northing	Easting
NE 1	852 378	2114 631
NE 2	711 515	2114 171
NE 3	257 751	2115 827
NE 4	872 182	2113 817
NE 5	685 185	2112 729
NE 6	854 282	2112 435
NE 7	657 373	2113 625
NE 8	651 732	2114 041
NE 9	651 592	2115 973

CONCRETE EXTENT COORDINATES

Point	Northing	Easting
NE 1A	853 225	2113 555
NE 2A	712 515	2114 215
NE 3A	258 751	2115 865
NE 4A	708 574	2115 865
NE 5A	711 524	2115 290
NE 6A	872 348	2114 043
NE 7A	672 348	2115 523

HINDMARSH WATERFRONT MULTI-STORY CARPARK

57 WYNDHAM STREET
 ADELAIDE SA 5000

Cornell Wagner
 CONSULTING ENGINEERS
 55 SOUTH ADELAIDE STREET
 ADELAIDE SA 5000
 T 81 322 2222 F 81 322 2223
 www.cornellwagner.com.au

Site Plan, Attachment Site Development Plan
 Data source: Cornell Wagner, Car Park Plan. Created by: A. C. L. C. L.
 GHDA cannot accept liability for any errors, omissions or delays, for any particular purpose,
 GHDA cannot accept liability for any errors, omissions or delays, for any particular purpose,
 result of the product being inaccurate, incomplete or unavailable in any way and for any reason.



Statement Attachment B: Site Management Plan (Environment) – Current version as at 5/11/2008

(Current at the time of issue of the Statement of Environmental Audit. Contact the Darwin Waterfront Corporation to obtain the current version of this document)

**SITE MANAGEMENT
PLAN
(ENVIRONMENT)**

SMP - Darwin Waterfront Precinct

Prepared for

Darwin Waterfront Office

GPO Box 4000
Darwin NT 0801

5 Nov 08

42213719

URS

Project Manager:


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Warren Pump
Senior Principal

Date: 5 Nov 08
Reference: Rev G
Status: Issued