

SEPTEMBER 2021

North One Hotel Development and Apartments

ENVIRONMENTAL RISK ASSESSMENT



CONTROL AND REVISION HISTORY**Revisions**

Version	Document	Author	Reviewer/Approver	Date Reviewed
Version 1.0	Risk Assessment	Sharon Arena – BPL	John Hamilton - Urbanscope	15/09/2021



Completed by: **BPL Environmental**

ABN: 88 119 156 884

Tel: 0419 934 461

Address : 5/7 Albany Highway, Armadale
Western Australia 6122

For further information on this report please contact:

Ms Sharon Arena – BPL Environmental

Tel: 0419 934 461

Email: sharon@bplenvironmental.com.au

Disclaimer

In the preparation of this document, BPL Environmental (BPL) has relied on data, plans and other information provided by KTT Investment Pty Ltd and its Agents. Except as otherwise stated in the Report, BPL has not verified the accuracy or completeness of the information. BPL will not be liable in relation to incorrect conclusions or recommendations should any data or information, be incorrect, misrepresented or otherwise not fully disclosed to BPL. Within the limitations imposed by the commission, the assessment of the site and preparation of the report have been undertaken in accordance with generally accepted practices using a degree of care ordinarily exercised by professional resource and environmental consultants. No other warranty, expressed or implied, is made.

CONTENTS

1	INTRODUCTION	1
2	METHODOLOGY.....	1
2.1	Approach and Methodology	1
2.2	Environmental Context	2
2.3	Risk Identification, Analysis and Evaluation.....	2
3	RISK ASSESSMENT	5
3.1	Inherent Risk Assessment	5
3.2	Responses to Inherent Risk Levels.....	5
3.3	Development of Impact Mitigation Measures	6
3.4	Residual Risk Assessment.....	6
3.5	Level of Certainty.....	6
3.6	Residual Impact Assessment	7
4	ENVIRONMENTAL RISK ASSESSMENT	7
5	OUTCOMES.....	16

LIST OF TABLES

Table 2-1: Key Environmental Factors.....	2
Table 2-2: Consequence Categories Adopted in Risk Assessment.....	3
Table 2-3: Likelihood Categories Adopted in Risk Assessment.....	3
Table 2-4: Consequence Categories Adopted in Risk Assessment adapted for each Factor with Site specific interpretation.....	4
Table 2-5: Risk Matrix Adopted in Risk Assessment.....	5
Table 3-1: Risk Level and Mitigation Response Matrix.....	5
Table 3-2: Level of certainty categories used to evaluate reliability of risk assessment	7
Table 4-1: North One Hotel and Apartments Environmental Risk Register	8

LIST OF FIGURES

Figure 1: Risk and Environmental Impact Assessment Process	1
--	---

LIST OF ABBREVIATIONS AND TERMS

Abbreviation	Meaning
AAPA	Aboriginal Areas Protection Authority
ALARP	As Low as Reasonably Practicable
ASS	Acid Sulphate Soils
BPL	BPL Environmental
CEMP	Construction Environmental Management Plan
COPC	Contaminants of Particular Concern
EMP	Environmental Management Plan
EP Act	<i>Environment Protection Act 2019</i>
ESCP	Erosion and Sediment Control Plan
ha	Hectare
km	Kilometre
KTT	KTT Investment Pty Ltd
MSDS	Material Safety Data Sheet
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Authority
Proponent	KTT Investment Pty Ltd
The Project / Development	North One Hotel and Apartment Development
The Site	25 Gilruth Avenue, The Gardens, Darwin, NT

1 INTRODUCTION

KTT Investments Pty Ltd (the **Proponent**) intends to develop the North One Hotel and Apartments (the **Development**) - a high-quality multi-story hotel/villa, apartment complex with public bar and markets, situated at 25 Gilruth Avenue, The Gardens, Northern Territory (the **site**). Consistent with the *Environmental Protection Act 2019 (EP Act)* and *Environmental Protection Regulations 2020*, the Proponent is referring this Project for assessment by the Northern Territory Environmental Protection Authority (**NT EPA**).

To inform the NT EPA Referral, an environmental risk assessment has been conducted for the Development. The methodology and outcomes of the risk assessment are presented below.

2 METHODOLOGY

2.1 APPROACH AND METHODOLOGY

The Risk Assessment for the North One Hotel and Apartment Development involves the identification, analysis and mitigation of potential environmental impacts of the Development through a whole-of-project risk assessment. The approach to risk assessment included:

- Establishment of context;
- Risk identification;
- Risk analysis;
- Risk evaluation;
- Risk treatment;
- Monitoring and review; and
- Communication and consultation.

This document describes the work that was undertaken to establish the context of risks and the process for risk identification, analysis, evaluation and treatment. The NT EPA Referral describes the monitoring and review procedures that will be adopted for each Environmental Factor relevant to the Development. The Proponent will establish a risk register with health, safety and environmental risks and will incorporate mitigation into the Environmental Management Plan (to be developed prior to commencement of operations). The risk assessment will be reviewed over the life of the project, including at all stages of the Development. The risk and environmental impact assessment process is illustrated in **Figure 1** and described in the sections below.

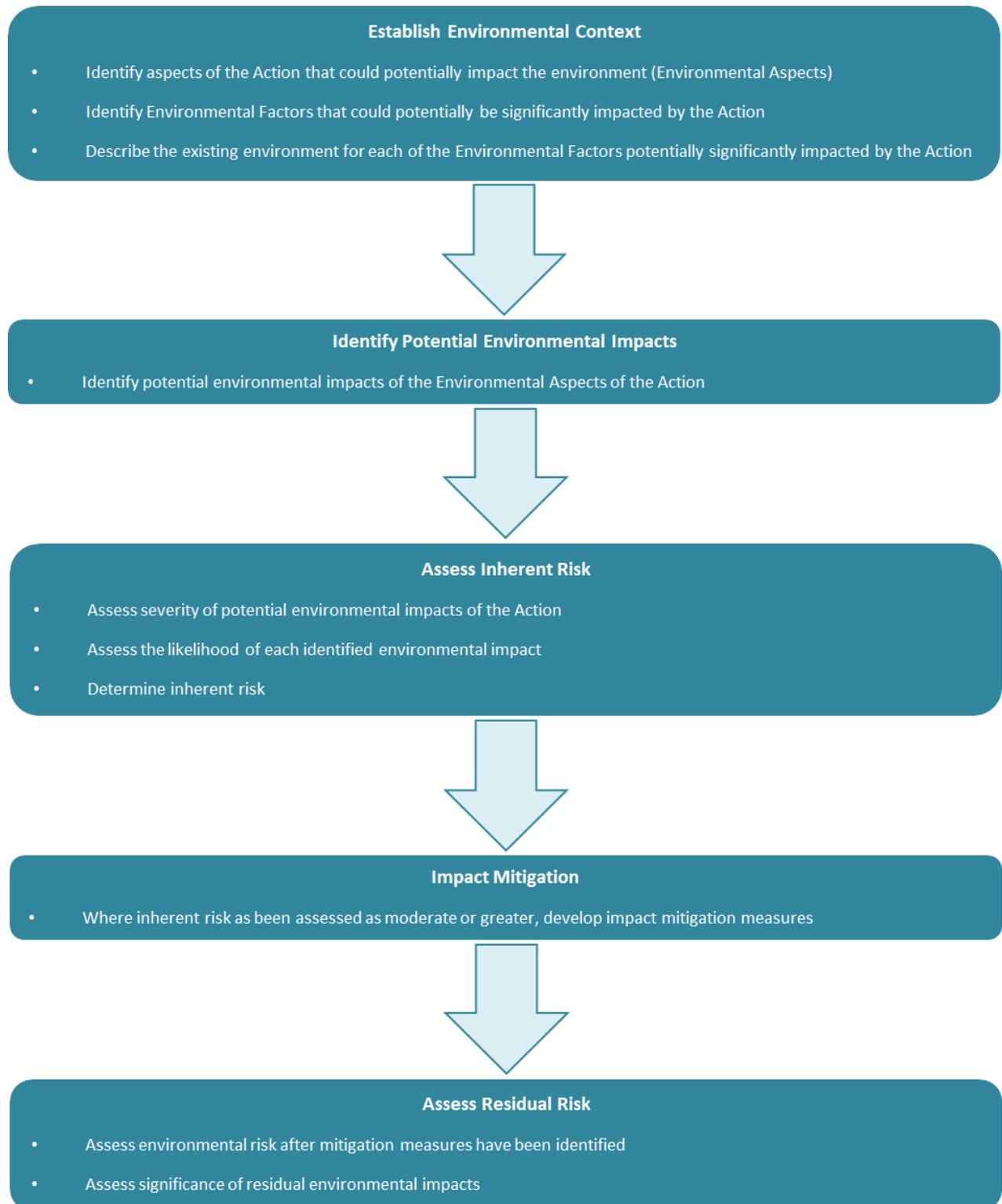


Figure 1: Risk and Environmental Impact Assessment Process

2.2 ENVIRONMENTAL CONTEXT

Environmental risks of the Development are determined by the environmental setting and the Development features. The NT EPA classifies 14 environmental factors (NT EPA, 2021) to guide the structure of the referral in the NT. The potential impacts of a proposal are assessed against the NT EPA's objectives for each factor to determine whether the impacts of the proposal are likely to be significant. **Table 2-1** indicates the key Environmental Factors applicable to the North One Development and the corresponding NT EPA objectives.

Table 2-1: Key Environmental Factors

Theme	Environmental Factor	NT EPA Objective	Referral Section
Land	Terrestrial Environmental Quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	7.1
Water	Hydrological Processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are maintained.	7.2
	Inland Water Environmental Quality	Protect the quality of groundwater and surface water so that environmental values including health, land uses, and the welfare and the amenity of the people are maintained.	7.3
People	Community and Economy	Enhance communities and the economy for the welfare, amenity, and benefit of current and future generations of Territorians.	7.4
	Culture and Heritage	Protect sacred sites, culture, and heritage.	7.5
	Human Health	Protect the health of the Northern Territory population.	7.6

2.3 RISK IDENTIFICATION, ANALYSIS AND EVALUATION

The risk that potential Project impacts will result in one or more NT EPA objectives for an Environmental Factor being compromised was assessed in accordance with qualitative risk management principles described in *ISO 31000:2018 Risk Management – Principles and Guidelines* (International Standards Organisation, 2018).

Risk is a function of the likelihood of an impact occurring and the consequence of that impact on Environmental Factor objectives. The consequence and likelihood categories adopted are listed in **Table 2-2** and **Table 2-3**, respectively. The consequence assessment was informed both by the outcomes of the impact severity analysis described in the previous section, and the importance/ sensitivity of environmental values. A site and Factor specific interpretation of the consequences are listed in **Table 2-4**. Likelihood and consequence ratings were combined to derive an overall risk rating using the matrix shown in **Table 2-5**.

Table 2-2: Consequence Categories Adopted in Risk Assessment

Consequence or Severity of Impact	Description
Severe	<p>A Severe impact has two or more of the following characteristics:</p> <ul style="list-style-type: none"> • Widespread - Impact occurs at a NT, national, international or global scale; • High Intensity - Impact irreversibly compromises the integrity of environmental values; and/or • Permanent - environmental values will not recover on human time scales.
Major	<p>A Major impact has two or more of the following characteristics:</p> <ul style="list-style-type: none"> • Regional - Impact extends to the Greater Darwin region, and/or Beagle Gulf; • Moderate - Integrity of environmental values altered but impact can practicably be reversed; and/or • Long term – Impact that is measurable post-Project.
Moderate	<p>A Moderate impact has two or more of the following characteristics:</p> <ul style="list-style-type: none"> • Localised - Impact is confined to the Site and areas directly adjacent to the Development, such as other allotments and estuarine watercourses adjacent to the Site; • Low - Impact alters the quality, abundance or distribution of environmental values without compromising their integrity, and can be easily and cheaply reversed; and/or • Medium term - Impact that is felt up to completion of operations.
Minor	<p>A Minor impact has two or more of the following characteristics:</p> <ul style="list-style-type: none"> • Limited - Impact limited to the Site; • Very Low - Impact does not significantly alter the quality, distribution or abundance of environmental values; and/or • Short term - Impact that is felt up to completion of construction.
Insignificant	No noticeable/ measurable impact to values.

Table 2-3: Likelihood Categories Adopted in Risk Assessment

Likelihoodcategory	Description
Almost certain	The event/ impact will occur or is expected to occur. The impact occurs regularly in association with similarprojects and/ or in similar environments.
Likely	The impact will probably occur in most circumstances but there is some uncertainty about the likelihood. The impact has occurred on more than one occasion in association with similar projects and/ or in similar environments.
Possible	The impact could occur in some circumstances. The impact has occurred infrequently on similar projectsand/ or in similar environments.
Unlikely	The impact is not expected to occur. The impact occurs very infrequently on similar projects and/ or in similarenvironments.
Rare	The impact is very unlikely to occur. The impact has not occurred on similar projects and/ or in similarenvironments.

Table 2-4: Consequence Categories Adopted in Risk Assessment adapted for each Factor with Site specific interpretation

Consequence or Severity of Impacts	Score	Terrestrial Environmental Quality	Hydrological Processes	Inland Water Environmental Quality	Communities and Economy	Culture and Heritage	Human Health	Terrestrial Ecosystems	Atmospheric Processes
Severe	5	Soil disturbance, erosion or contamination that is measurably and permanently impacting environmental values that rely on good soil quality throughout the NT	Change in surface water flow volumes and/ or timing that permanently alters the ecological functioning and/ or amenity of Arafura Sea Change in ground water in a regional scale aquifer that permanently alters ecological health, beneficial uses and/ or amenity	Exceedance of baseline water quality that permanently alters the ecological functioning and/ or amenity of Little Mindil Creek	Permanent impact that is felt by the majority of the NT population	Unauthorised destruction of Aboriginal heritage item and/ or sites of world or national heritage significance	One or more fatalities More than one person injured with permanent disabilities	Extinction of terrestrial flora, vegetation or fauna	Measurable increase in global GHG concentrations
Major	4	Soil disturbance, erosion or contamination that compromises regional environmental values that rely on good soil quality, and would be costly and technically challenging to remediate	Reduction in surface water flow volumes, groundwater levels and/ or timing of flows/discharges that compromises regional ecological functioning, land use and/ or amenity post-Project Drawdown of groundwater in a regional scale aquifer that alters ecological health, beneficial uses and/ or amenity post-Project	Exceedance of baseline Little Mindil Creek water quality that continues for many years post-development	Impact that is felt by a majority of the regional population post-Project	Unauthorised damage/ desecration of Aboriginal heritage item and/ or sites of regional heritage significance such that integrity is lost	No fatalities One injury with permanent disability More than 10 injuries requiring hospitalisation	Regional scale impacts on terrestrial flora, vegetation or fauna that compromise post-Project biodiversity and/ or ecological integrity	Significant increase in NT GHG emissions, prohibiting meeting of the Net Zero emissions by 2050 target
Moderate	3	Medium term soil disturbance, erosion or contamination in the vicinity of the Site that alters soil characteristics but with no measurable impact to environmental values that rely on good soil quality, and can be remediated	Localised reduction in surface water flow volumes, and/ or timing of flows/ discharges with no impact on ecological health, beneficial uses and/ or amenity. Localised drawdown of ground water throughout operations that recovers rapidly post-Project	Localised exceedances of baseline water quality that occurs throughout operations but ceases within months of the Project concluding	Impact that is felt by a small number of people during the Project, ceasing within months of the Project concluding	Unauthorised activity but with no physical impact to a heritage item, or minor physical impact such that integrity is not lost	No fatalities No permanent disabilities 5-10 injuries requiring hospitalisation	Localised impact to flora, vegetation or fauna that alters the quality, abundance or distribution but with no measurable impact on biodiversity and/ or ecological integrity within months of the Project concluding	Moderate increase in NT GHG emissions
Minor	2	Short term soil disturbance, erosion or contamination in the vicinity of the Site that is reversible without significant remedial works	Reduction in surface water flow volumes, groundwater levels and/ or timing of flows/discharges at the Site with no impact on ecological health, beneficial uses and/ or amenity. Limited drawdown of ground water throughout operations that recovers post-construction.	Exceedances of baseline water quality at the Site ceasing within months of construction concluding	Impact felt by a small number of people at the Site during construction	Unauthorised activity but with no physical impact to a heritage item	No fatalities No permanent disabilities Less than 5 injuries requiring hospitalisation	Impacts on flora, vegetation or fauna that do not measurably alter environmental values outside of the Development site after construction concluding	Negligible increase in NT GHG emissions
Insignificant	1	No measurable soil disturbance, erosion or contamination	No measurable change to hydrology	No significant change to baseline water quality	No noticeable impact to stakeholder or community values	No impact to Aboriginal Sacred or other heritage sites	No fatalities No permanent disabilities No injuries requiring hospitalisation	No measurable impact on terrestrial flora, vegetation or fauna	No measurable GHG emissions

Table 2-5: Risk Matrix Adopted in Risk Assessment

			Consequence				
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Severe
Likelihood	5	Almost Certain	Medium	Medium	High	Very High	Very High
	4	Likely	Medium	Medium	High	Very High	Very High
	3	Possible	Low	Medium	Medium	High	Very High
	2	Unlikely	Low	Low	Medium	Medium	High
	1	Low	Low	Low	Low	Medium	High

3 RISK ASSESSMENT

3.1 INHERENT RISK ASSESSMENT

For each potential impact, an inherent risk rating was assigned by ranking the likelihood and consequence of the impact in the absence of any mitigation (*i.e.*, the worst-case scenario). The inherent risk rating considered the location and design of the Project, existing environmental conditions, impact sources and pathways, and the presence/ absence of important and/ or sensitive values and receptors.

3.2 RESPONSES TO INHERENT RISK LEVELS

Each inherent risk rating was evaluated with reference to the risk level and response matrix in Table 3-1 to determine the level of mitigation required. The higher the inherent risk level, the less tolerable/ acceptable the risk is likely to be to stakeholders and regulators, and the greater the requirement for impact mitigation.

Table 3-1: Risk Level and Mitigation Response Matrix

Risk level	Response
Very High	Risk is unacceptable. Specific action plans required to reduce risk to an acceptable level. Director/ CEO level management attention required.
High	Risk is generally unacceptable without action. Specific action plans required to reduce risk to ‘as low as is reasonably practicable’ (ALARP). Senior management attention required.
Medium	Risk is generally acceptable. Proactive action is required to reduce risk to ALARP. Requires routine monitoring and adaptive management in accordance with Environmental Management Plan. Line management attention required.
Low	Risk is acceptable. Management by routine policies and procedures.

3.3 DEVELOPMENT OF IMPACT MITIGATION MEASURES

Practicable impact mitigation measures were developed for impacts with Very High, High, or Medium risk levels. Mitigation measures were developed with the objective of reducing all risks to a level that is considered ALARP. This is defined as the level at which the resources involved in reducing the risk further would be grossly disproportionate to the benefit gained.

3.4 RESIDUAL RISK ASSESSMENT

Practicable mitigation measures were developed for the risk/pathway of each environmental impact with Very High, High, or Medium risk levels. Impacts with a Low level of inherent risk were still considered for additional mitigation where routine controls would further contribute to risk minimisation. Each of these risks/pathways was reassessed assuming implementation of proposed mitigation measures to determine a residual risk rating. The residual risk rating of each potential environmental impact represents the level of environmental risk associated with the Project.

3.5 LEVEL OF CERTAINTY

For each potential impact, any information gaps/ uncertainties that could reduce reliability of the risk assessment, or certainty about the effectiveness of proposed controls, were identified. Each risk rating was assigned a level of certainty using the categories in **Table 3-2**.

Table 3-2: Level of certainty categories used to evaluate reliability of risk assessment

Level of Certainty	Description
High	Risk rating is based on testing, modelling or experiments. Baseline information is complete and an appropriate level of analysis has been undertaken. Proposed mitigation measures were recommended by technical specialists and are well developed with demonstrated efficacy. Minimal further work is required to adequately understand risk.
Medium	Risk rating is based on similar conditions being observed previously on a similar project and/ or in a similar environment. Baseline information has some gaps that are considered minor, and further work is unlikely to significantly alter the risk rating. While the efficacy of proposed mitigation measures has been demonstrated, some further work is required to provide details of implementation prior to commencement of the Project.
Low	Risk rating is based on professional opinion. Limitations in baseline information require that some assumptions are made, which introduces a level of uncertainty. Effectiveness of proposed controls and/ or the likelihood of implementation cannot be reliably assessed at this point in time. A substantial amount of further work is required to adequately manage risk prior to commencement of the Project.

3.6 RESIDUAL IMPACT ASSESSMENT

For each environmental factor, residual risk ratings assigned through the risk assessment process were used as the basis for assessing the significance of residual impacts. Impacts with a low residual risk rating, with a moderate to high level of certainty, are likely to have limited to no effect on the NT EPA's Environmental Objectives. Impacts assigned a residual impact rating of medium or higher are more likely to have an effect on the NT EPA's Environmental Objectives, either because the mitigation measures require further work to demonstrate their efficacy, or because it is not practicable to avoid some level of impact.

The outcomes of the impact and risk assessment processes are documented in the North One Hotel and Apartments Environmental Risk Register, appearing as **Table 4-1**.

4 ENVIRONMENTAL RISK ASSESSMENT

Table 4-1 presents the environmental risk assessment undertaken for the North One Development. It includes a description of the environmental and social risks associated with various project activities. The consequence and likelihood of each risk is provided in accordance with the rating system provided in **Table 2-2** and **Table 2-3** respectively, and an overall risk rating is provided in accordance with the matrix presented **Table 2-5**. Risk ratings are provided for the activity both with and without mitigation allowing the effect of the mitigation measures to be understood. **Table 4-1** also describes the mitigation measures that will be applied to the project and a level of certainty in relation to how effective the mitigation measures will be in reducing the risk rating.

Table 4-1: North One Hotel and Apartments Environmental Risk Register

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
Environmental Factor: Terrestrial Environmental Quality											
Contamination (metals, petroleum, polychlorinated biphenyls etc) from historical fly-tipping and waste disposal	Inhalation of contaminants of particular concern (COPC) derived vapours Dermal contact between site users and areas of gross contamination Lateral migration of surface water/runoff Vertical infiltration of COPC's from the surface water to groundwater Lateral migration of COPC's via groundwater	Adverse health impacts to site users (including workers engaged in site clearance and construction work). Pollution of Little Mindil Creek and beach area with adverse impacts to soil quality, flora and fauna Adverse health impacts to recreational users and consumers of fish/shellfish from creek and beach area	3	2	Medium	Complete a Land Suitability Assessment prior to commencement of construction. Undertake appropriate remediation of the site, determined in consultation with the appropriate Regulatory Authority. Develop a Contaminated Site Management Plan required, to facilitate clean-up of the site and ensure further contamination of the adjacent environment is avoided during the remedial works Removal of fly-tipped waste from the site using accredited waste specialists.	1	2	Low	High	Construction
Asbestos contamination from historical waste disposal and fly-tipping, particularly associated with World War II and Cyclone Tracy	Presence of friable asbestos, fibrous asbestos, or asbestos fines that may become airborne	Inhalation of asbestos fibres by site users (including workers engaged in site clearance and construction works).	3	3	Medium	Inspection of disturbed area and fly-tipped waste for the presence of asbestos. Removal, transport and disposal of asbestos using licensed specialists, as required. Develop a Contaminated Sites Management Plan if required, which includes asbestos contamination, to facilitate clean-up of the site and ensure further contamination of the adjacent environment is avoided during the remedial works	1	3	Low	High	Construction
Disturbance of Acid Sulfate Soils (ASS) or Potentially Acid Sulfate Soils through site excavation and soil erosion during Project construction phase	Acidification of soils, surface water and groundwater Leaching of toxic metals due to acid drainage that contaminates soil, surface water and groundwater	Adverse changes to the quality of soil and water Degradation of ecological receptors (soil/flora/fauna) of the creek and beach area Loss of habitat ecosystem complexity and biodiversity Invasion and dominance of creek ecosystem and waterways by acid-tolerant water plants and plankton species Reduction of soil stability and fertility Acidification of surface waterbodies increasing mosquito breeding, which may increase the prevalence of mosquito-borne diseases such as Ross River virus Loss of visual amenity due to rust-coloured stains from iron precipitates at the soil surface Long term infrastructure damage through acidic water corroding metallic and concrete structures	4	3	High	Implement the ASS Management Plan (Appendix 8 of Referral) including the following: <ul style="list-style-type: none"> Undertake a geotechnical assessment prior to construction, to identify areas of occurrence of ASS. Disturbance of ASS to be avoided where possible, including constructing infrastructure above natural ground level wherever possible. Excavated ASS to be treated during construction in accordance with requirements of the ASS Management Plan to prevent acidic fluids leaching into surface water or groundwater. Implementation of the Erosion and Sediment Control Plan (ESCP) and management procedure in the Construction Environmental Management Plan (CEMP) (Appendix 7 of Referral) to avoid erosion	2	3	Medium	High	Construction

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
Contamination of hazardous substances such as petrol, oil and lubricants used in construction phase	<p>Dermal contact between site users and areas of gross contamination</p> <p>Lateral migration of COPC's via surfacewater runoff</p> <p>Vertical infiltration of COPC's from the surface water to groundwater</p> <p>Lateral migration of COPC's via groundwater</p>	<p>Adverse health impacts to site users (including workers engaged in site clearance and construction work).</p> <p>Pollution of Little Mindil Creek and beach area with adverse impacts to flora and fauna</p> <p>Adverse health impacts to recreational users and consumers of fish/shellfish from creek and beach area</p>	3	1	Low	<p>Implement measures in the CEMP including the following:</p> <ul style="list-style-type: none"> Storage hazardous materials in accordance with Australian Standard AS1940:2017 - <i>The Storage and Handling of Flammable and Combustible Liquids</i>. Train personnel in implementing safe work practices to minimise risks and impacts of spillage of fuels, chemicals, and other contaminants. Train personnel in incident reporting and emergency management procedures and encourage the reporting of issues and near misses. Record and report all POL, chemical and hazardous substance spills. Ensure personnel have access to spill kits that contain an absorbent material, clearly marked oily waste disposal drum and a shovel. In the event of a chemical or hazardous substance spill, containment measures should be enacted, and Material Safety Data Sheet (MSDS) requirements complied with. MSDSs are to be located with storage areas, as well as centrally located and readily available to staff for use in case of an emergency. MSDSs must be current. All contaminated soil and absorbent in the oily/chemical waste disposal drum should be disposed of by a licenced waste contractor. Keep site free from build-up of waste materials by directing regular clean ups. Avoid storing large volumes of materials on site. Ensure herbicides used for weed control are registered and are only applied by appropriately trained personnel. 	2	1	Low	High	Construction (Use of herbicide will continue into Operations)
Environmental Factor: Hydrological Processes											
Site earthworks and addition of Hotel infrastructure	Alteration of surface hydrology (flow paths, volume and velocity)	<p>Increased volume of surface water runoff</p> <p>Scour from runoff velocity within Little Mindil Creek and beach</p> <p>Site flooding or inundation from storm surge</p>	3	3	Medium	<p>Avoid direct alteration to Little Mindil Creek</p> <p>Implement the ESCP during both the construction and operational phase of the Development</p> <p>Install measures, as appropriate, to mitigate velocity impacts at the point of discharge from the site</p> <p>Incorporate impervious areas into the Hotel design to reduce stormwater flow</p> <p>Design landscaping to facilitate on-site infiltration of stormwater runoff</p> <p>Design private open space for dwellings within the complex to have at least half of the area permeable to allow stormwater infiltration and lessen stormwater runoff from the site</p> <p>Incorporation of biophilic architecture into the design to reduce stormwater runoff from roof-spaces</p> <p>Incorporate stormwater management into an operational Environmental Management Plan (EMP), to be developed prior to commencement of operations.</p> <p>Fill the site to RL 5.80 m AHD to ensure key infrastructure is situated outside of the storm surge inundation level.</p>	1	3	Low	High	Construction and Operations

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
Environmental Factor: Inland Water Environmental Quality											
Disturbance of ASS through site excavation and soil erosion during the construction phase	Acidification of soils, surface water and groundwater Leaching of toxic metals due to acid drainage that contaminates soil, surface water and groundwater	Adverse changes to the quality of surface water (particularly in Little Mindil Creek) and ground water	4	3	High	Implement the ASS Management Plan, including the following: <ul style="list-style-type: none"> Undertake a geotechnical assessment prior to construction, to identify areas of occurrence of ASS. Disturbance of ASS to be avoided where possible, including constructing infrastructure above natural ground level wherever possible. Excavated ASS to be treated during construction in accordance with requirements of the ASS Management Plan to prevent acidic fluids leaching into surface water or groundwater. Implementation of the ESCP and management procedure in the CEMP to avoid erosion	2	3	Medium	High	Construction
Leaks and spills of chemicals fuel during construction and operational activities	Contamination of surface and groundwater from spills and leaks	Altered chemical properties and quality of surface water and groundwater	3	1	Low	Implement mitigation measures identified in the CEMP; including: <ul style="list-style-type: none"> Record and report all chemical and hazardous substance spills. Ensure personnel have access to spill kits that contain an absorbent material, clearly marked oily waste disposal drum and shovel. All contaminated soil and absorbent in the oily waste disposal drum should be disposed of at a designated oil waste disposal site approved by Darwin authorities. In the event of a chemical or hazardous substance spill ensure all requirements of the MSDS's are complied with. MSDSs are to be located within storage areas as well as centrally located and readily available to staff for use in case of emergency. MSDSs are to remain current. Any spillage of wastes, contaminants or other materials shall be cleaned up as quickly as practicable using procedures that prevent contaminants or material being transferred to the stormwater drainage system. The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken. Chemical storage and handling areas shall be bunded in accordance with AS1940:2017 and have drainage lines separate from the stormwater drainage, to reduce the likelihood of chemical contamination of stormwater.	2	1	Low	High	
Site construction works, including clearing of vegetation (predominantly lawn cover) and earthworks for site preparation exposing underlying soil	Wind or stormwater transporting sediment through surface water runoff	Increased sediment loads and reduction of quality of surface water within Little Mindil Creek and/or Little Mindil Beach	3	2	Medium	Implementation of the ESCP and the CEMP Ensure stockpiles of bulk material are located well clear of any waterway or drainage system. The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken. Install erosion and sediment controls in accordance with the ESCP. Incorporate erosion and sediment control into the EMP, prior to commencement of operations. An inspection schedule should be included in the EMP for stormwater control infrastructure.	2	2	Low	High	Construction
Incorrect waste disposal from construction and operational phases of the Development	Litter entering Little Mindil Creek	Reduction in visual amenity Reduced water quality	3	2	Medium	Implement the Waste Management Plan (Appendix 13 of Referral), including consideration of the waste management hierarchy to minimise waste generation from the Development.	2	2	Low	High	Construction and Operations

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
						Undertake regular inspections of Little Mindil Creek for excessive litter and remove rubbish from the creek, as required.					
Environmental Factor: Community and Economy											
Construction of North One Development on existing recreational area	Loss of the site as community public open space	Reduction in recreational value of grassed area by current recreational users	4	3	High	<p>Continue open and collaborative relationships with key stakeholders.</p> <p>Implement the Stakeholder Engagement Plan (Appendix 3 of Referral) throughout the construction and operational phase to ensure the Development remains current with social issues and expectations</p> <p>The Planning Scheme Amendment to rezone the Little Mindil Creek Reserve as Zone Public Space has ensured public access is maintained</p> <p>Ensure the Development does not encroach on publicly- accessible open space.</p> <p>Explore partnership options to upgrade and enhance the adjacent Nurses Walk.</p> <p>Incorporation of public areas, including the Market area, within the design of the Development.</p>	3	3	Medium	Medium	Construction and Operations
Construction of Development on existing recreational area that is highly integrated into the surrounding pedestrian network, with footpaths providing access to the site from Gilruth Avenue to Mindil Beach foreshore	Restrictions on public access to the Mindil Beach foreshore	Reduction in recreational value of Little Mindil Beach foreshore by current recreational users	2	3	Medium	<p>Maintain pedestrian pathways to ensure access to the Little Mindil Beach foreshore.</p> <p>Continue open and collaborative relationships with key stakeholders.</p> <p>Implement the Stakeholder Engagement Plan throughout the construction and operational phase to ensure the Development remains current with social issues and expectations</p>	1	3	Low	Medium	Construction and Operations
Noise amenity	Noise and vibration generation from construction activities or operation of the Hotel complex	Reduced amenity due to noise generation from construction activities for nearby residents	3	2	Medium	<p>No direct line of site between major plant items and the nearest sensitive receptors</p> <p>Implement acoustic treatments if the overall sound power level of mechanical plant exceeds 80 dBA for each building</p> <p>Ensure acoustic testing is undertaken to confirm compliance for mechanical plant prior to completion of construction.</p> <p>Establish speed limits within the site to reduce traffic noise impacts.</p> <p>Construct trafficable surface with a low-squeal compound.</p> <p>Investigate acoustic upgrades for Ground Level Food and Beverage Bar to reduce break-out noise from amplified music.</p> <p>Investigate options for acoustic upgrades to the facades of the Hotel Building ad patron limits to reduce Level 1 Poolside Bar noise emissions.</p> <p>Adhere to Responsible Serving of Alcohol principles to reduce likelihood of patrons causing noise and participating in anti-social behaviour.</p>	2	2	Low	High	Construction and Operations

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
						Establish protocols for live music events, including notification procedures, noise monitoring (if appropriate) and complaint processes. Incorporate noise impacts into the EMP, to be completed prior to the commencement of operations.					
Construction of multi-storey Hotel	Visual amenity impacts of built environment	Reduction in visual amenity due to loss of views for some neighbouring residents and businesses	4	3	High	Maintain the maximum limit on building height to 6 levels. Siting of the taller buildings away from the sensitive receptors to the south of the Development site. Preserve and enhance the vegetation within Little Mindil Creek and the southern escarpment. Inclusion of biophilic rooftop design into the Development to enhance the visual amenity of the Development. Ensure building and landscape designs incorporate sympathetic vegetation and design choices to integrate with the surrounding environmental values and provide adequate screening of non-aesthetic infrastructure.	3	3	Medium	High	Operations
Construction and operation activities	Increased traffic due to increased construction and operational workforce	Traffic delays, congestion, and increased road safety risk for vehicle operators and pedestrians in the vicinity of the Development	1	1	Low	No mitigation measures have been identified for traffic movements, as the impacts were deemed negligible to the public road network	1	1	Low	High	Construction and Operations
Environmental Factor: Culture and Heritage											
Construction activities such as earthworks	Disturbance or destruction of culturally significant sites	Larrakia people unable to maintain cultural and spiritual connections and potentially ceremony and passing-on of knowledge at the site	3	4	High	Instigate an archaeological monitoring program for any ground disturbance work in recognition of the possibility that prehistoric burials may still exist at the site A Larrakia representative to be present on site to monitor excavation work Obtain an Aboriginal Areas Protection Authority (AAPA) Certificate prior to commencement of construction	2	3	Medium	Medium	Construction and Operations
Construction of built environment	Restricted access to Sacred Site and Little Mindil Beach for cultural purposes	Larrakia people unable to maintain cultural and spiritual connections and potentially ceremony and passing-on of knowledge at the site	2	3	Medium	Establish a process of stakeholder engagement and participatory planning with the Larrakia people Engage with the relevant indigenous stakeholders to ensure traditional activities in nearby areas are understood and not impacted The Planning Scheme Amendment to rezone the Little Mindil Creek Reserve as Zone Public Space has ensured access to the Registered Sacred Site is maintained Ensure the Development does not encroach on publicly- accessible open space Maintain pedestrian pathways to ensure access to the Little Mindil Beach foreshore	1	3	Low	Medium	Construction and Operations
Construction of multi-storey Hotel	Visual amenity impacts of built environment	Reduction of scenic values of Myilly Point Heritage Precinct due to loss of views due to construction of multi-storey Hotel	4	3	High	Maintain the maximum limit on building height to 6 levels. Siting of the taller buildings away from the sensitive receptors to the south of the Development site.	3	3	Medium	High	Operations

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
						<p>Preserve and enhance the vegetation within Little Mindil Creek and the southern escarpment.</p> <p>Inclusion of biophilic rooftop design into the Development to enhance the visual amenity of the Development.</p> <p>Ensure building and landscape designs incorporate sympathetic vegetation and design choices to integrate with the surrounding environmental values and provide adequate screening of non-aesthetic infrastructure.</p>					
Environmental Factor: Human Health											
Construction and Operational Activities	<p>Exposure to environmental elements of employees, contractors or Hotel guests</p> <p>Animal interactions</p> <p>Exposure to biting insects</p>	Hotel guests and employees suffering from adverse health impacts	1	1	Low	<p><u>Exposure to environmental elements</u></p> <p>Hotel personnel will be trained in the risks associated with climate exposure, the signs and symptoms of over-exposure to heat and its effects (e.g. dehydration) and what to do in case of an emergency.</p> <p>Hotel guests will be informed of the risks and mitigation strategies to avoid or minimise effects to human health.</p> <p>First-aid facilities will be equipped to provide at least an initial response to incidents of this type.</p> <p>Develop and implement a Cyclone Response Plan.</p> <p>Ensure buildings are designed and constructed in accordance with relevant building codes, with particular emphasis on cyclone ratings.</p> <p><u>Animal interactions</u></p> <p>Awareness for Hotel guests on risks of animal interaction and avoidance measures to be implemented.</p> <p>First-aid facilities will be equipped to provide at least an initial response to incidents of this type, with Hotel personnel trained in first response procedures.</p> <p><u>Biting Insects</u></p> <p>Implement the Biting Insects Management Plan (Appendix 21 of Referral)</p>	1	1	Low	High	Operations
Environmental Factor: Terrestrial Ecosystems											
Construction and operational activities.	<p>Unauthorised clearing of Sensitive and Significant vegetation</p> <p>Human disturbance of fauna due to additional personnel on site during construction and operation of the Development</p> <p>Vehicle strike of fauna</p> <p>Increase in the presence, diversity and abundance of introduced fauna due to generation of putrescible</p>	Degradation of sensitive and Significant Vegetation and potential impact to Threatened Fauna utilising habitats within this vegetation.	2	2	Low	<p><u>Unauthorised Vegetation Clearing</u></p> <p>Physically define disturbance footprint prior to commencement of construction activities, to ensure unauthorised clearing does not occur.</p> <p>Incorporate detail on the importance of Sensitive and Significant Vegetation within site induction and awareness training.</p> <p><u>Human Disturbance</u></p> <p>Awareness for Hotel guests on the environmental values of the surrounding area, including the importance of reducing human disturbance wherever possible on significant vegetation or fauna species.</p> <p><u>Vehicle Strike</u></p>	1	2	Low	High	Construction and Operations

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
	waste Marine debris causing entanglement and ingestion by marine fauna					Implement vehicle speed limits within the Hotel complex, to reduce risks of fauna strike. Record fauna impacts from vehicle strike in the Incident Management System <u>Introduced Species</u> Ensure any vehicles or equipment are free of weeds prior to commencement of work on the site. During both construction and operations, implement a weed control program to manage infestations. Regular maintenance of landscaped areas to ensure planted species do not become invasive and impact the ecology of the adjacent Sensitive and Significant Vegetation <u>Marine Debris</u> Implement the Waste Management Plan to reduce waste generation and inappropriate disposal Awareness for Hotel guests on the environmental values of the surrounding area and the importance of appropriate waste disposal, to ensure marine debris impacting on terrestrial ecosystems and the adjacent aquatic environment.					
Environmental Factor: Atmospheric Processes											
Construction and operational activities that use significant volumes fossil fuels to generate power	GHG emissions from direct and indirect sources of the Development	Contribution of GHGs to global climate change	2	2	Low	<u>Project Wide</u> Implementation of a comprehensive commissioning and tuning program following construction to ensure building systems are operating efficiently and as designed. Investigation of inclusion of solar PV on the level 6 roof (or elsewhere depending on design development). The system capacity will depend on the extent of the green roof across the development and available space for solar. All-electric services and equipment – designing and operating the Hotelfacility with all electric services and equipment (i.e. no fossil fuels combusted onsite) allows for purchase of renewable energy to supply electricity. Adopt a commitment to certify or benchmark the project against a third-party ratings scheme such as Green Star or NABERS for Hotels. <u>Heating Ventilation and Air Conditioning</u> Installation ceiling fans in hotel rooms and other spaces throughout the Hotel to reduce reliance on air conditioning systems. Ceiling fans also improve occupant comfort by promoting air flow. Smart controls on air conditioning systems to allow for remote control of systems, temperature limiting and automatic shutdown depending on occupancy. Optimisation of passive measures at the detailed design stage such as natural	1	2	Low	High	

Environmental Aspect	Risk Pathways	Impacts	L	C	Risk Rating	Risk Treatment/Management/Mitigation Strategy	L	C	Residual Risk Rating	Certainty	Phase
						ventilation strategies, natural cooling, thermal mass, improved insulation, window orientation and shading strategy Implementing equipment with natural refrigerants with low global warming potential and/or the use of refrigerant leak detection systems <u>Equipment</u> Specification and procurement of efficient equipment. For example, procure TVs / computers within one energy rating star of best available per the Australian government's energy rating system. <u>Lighting</u> Installation of efficient LED lighting throughout the development Smart lighting systems such as PE sensors, timers and remote-control capability <u>Lifts</u> Place stairs in prominent locations throughout the Hotel complex to promote use and reduce reliance on lifts. Automatic controls for lighting and air-conditioning within lift car. <u>Cooking</u> Consider switching to all electric cooking appliances to eliminate combustion of fossil fuels onsite and allow for purchase of renewable energy					

5 OUTCOMES

The risk assessment broadly determines that the majority of residual impacts resulting from the Development pose a low risk to all of the NT EPA's environmental objectives and no residual impacts rate higher than a medium risk rating. In this sense the development of the North One Hotel and Apartment complex does not pose any unacceptable risks to the environmental factors outlined by the NT EPA.

The four residual impacts that are rated as medium risk are associated with the following:

- Contamination of surface water (including Little Mindil Creek) and degradation of associated ecological receptors due to liberation of ASS.
- Disturbance or destruction of culturally significant sites due the possibility that burial sites (additional to the Registered Sacred Site) may still exist at the site
- Reduction of scenic values of Myilly Point Heritage Precinct due to loss of views across due to construction of Hotel
- Loss of the site as community public open space due to development of the Hotel causes a reduction in recreational value of grassed area by some current recreational users

The risk assessment process has determined that the Development will not have any significant impacts on the environmental factors as described by the NT EPA (2020). Whilst the risk assessment broadly determines that all the residual impacts resulting from the Development pose either a low or medium risk to the NT EPA's environmental objectives, a suite of management plans appended to the Referral and CEMP seek to further mitigate and manage the risks presented in this assessment.