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Final Report

Construction Environmental Management Plan (CEMP): Lee Point Master-planned Urban Development

Prepared for

Defence Housing Australia

ABN: 72 968 504 934

October 2025

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EPBC 2015/7591

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Document Control

Assessment	Construction Environmental Management Plan (CEMP)
Address	Lee Point Master-planned Urban Development
Project number	7793
Project manager	Originally: Dr Thomas Wright – Senior Ecologist. Currently: Dr Patrick Tomkins – Senior Ecologist (4 Elements Consulting).
Report reviewer	Previously: Aaron Organ – Principal Ecologist/Director. Currently: 4 Elements Consulting
Other EHP staff	Previously: Jordan Whitmore – Botanist. Currently: 4 Elements Consulting
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Report Version:	Comments:	Comments made by:	Reviewed by:	Date Submitted:
Original Submission	Original Submission	-	-	26/07/2018
Version 2 (4 Element Consulting)	Implement Variation of conditions to approval.	JM	TA	12/08/2025
Version 3 (4 Elements Consulting)	Include additional sections in line with DCCEEW EMP guidelines	JM	TA	29/09/2025

I, Peter Gurkin, being the duly authorised representative of Defence Housing Australia, hereby declare that the information contained within this Construction Environmental Management Plan is true, accurate, and complete to the best of my knowledge. In making this declaration, I am aware that section 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations (Cth) 2000. The offence is punishable on conviction by imprisonment, a fine, or both.

Signed:
Position: Director · · Developments
Date: 17/11/2025

Reference table linking the conditions of approval to relevant sections within this document.

Condition Number	Conditions Requirements	Plan Reference
1)	For the protection of EPBC Act listed species and the Environment, the approval holder must not clear more than 110 ha within the project area.	• Section 4.1, Biodiversity Management; Tabe 7 - Vegetation Clearing.
2)	To mitigate and manage impacts to EPBC Act listed species and the Environment, the approval holder must comply with and implement the Stormwater Management Plan - 2CRU, Stormwater Management Plan - Muirhead North and Water Quality Monitoring Plan.	• Section 5, Water Management Sub-plan; • Section 6, Erosion and Sediment Control Plan. • Appendix C – 2CRU Stage 1 – ESCP
2A)	To mitigate and manage impacts to Gouldian Finch in the project area and Migratory Shorebirds at the Sandy and Buffalo Creek roosts, the approval holder must submit to the department, for the Minister's approval, a revised version of the Construction Environmental Management Plan. The revised Construction Environmental Management Plan must include details of: a) measures to mitigate the impacts of clearing to Gouldian Finch, including but not limited to: i. pre-clearance surveys. ii. tree felling protocols; and iii. the oversight of all clearing by fauna spotter catcher(s). b) additional measures to those in the Construction Environmental Management Plan that avoid, mitigate and manage impacts of the action to Migratory Shorebirds. c) measures to plant native grass species where gamba grass is removed in conservation areas; and d) activities to monitor and ensure the efficacy and integrity of these measures, including trigger values and corrective actions that will be implemented if trigger values are realised. The approval holder must not undertake any clearing in the project area, other than Stage 1A in Attachment D1, Stage 1 and Stage 2 in Attachment D2 and clearing up to 20 meters from the perimeters of these stages (as required to facilitate construction), unless the Minister has approved the revised Construction Environmental Management Plan in writing. The approval holder may undertake clearing where required for the removal of contamination, noxious weeds (including gamba grass), and/or the creation and maintenance of fire breaks. The approval holder must implement the revised Construction Environmental Management Plan approved by the Minister.	• Section 4.1.2, Gouldian Finch; • Section 4.1.3, Migratory Shorebirds; • Section 4.1.5, Weed Management (Gamba Grass)
2B)	The approval holder may undertake clearing in the area identified in Attachment D2 as Casuarina Coastal Reserve and CCR for the purpose of rehabilitating existing erosion gullies and maintenance of existing bike tracks.	• Section 4, Table 7. Biodiversity management sub-plan – Vegetation Clearing

Condition Number	Conditions Requirements	Plan Reference
		• Section 5, Table 8 Water Management sub plan – management actions
3)	For the protection of the heritage values of the environment on the project area the approval holder must: a) retain the existing Konfrontasi Cruciform and Lee Point bunkers at their current location; and b) engage a heritage expert to develop and install signage and interpretation material for the Konfrontasi Cruciform and Lee Point bunkers which must be maintained until at least the expiry date of approval.	• Section 7, Heritage management sub plan.
4)	In the event of a discovery of a heritage place item (including an object) within the project area, the approval holder must: a) cease work within 20 meters of the discovery, fence and cover the area from further disturbance. b) seek advice from the relevant authority administering the NT Heritage Act; and a) c) document, salvage and store the discovery consistent with advice received in accordance with condition 4(b), prior to any recommencement of work within 20 meters of the discovery.	• Section 7, Heritage Management Sub-plan – Table 10, management actions (Stone scatters, Heritage finds).
5)	To minimise light pollution impacts to turtles, the approval holder must restrict artificial lighting on buildings above 15 meters in height in Stage 4, and any other lighting directly visible from the beach, by: a) only permitting lights of a long-wavelength (560 nanometers or longer) to which turtle hatchlings are not sensitive. b) ensuring lighting is directed in a downwards direction and faced away from the Casuarina Coastal Reserve; and, c) within 12 months from the commencement of Stage 4, at least once each year prior to turtle hatching season, conducting an audit of compliance with 5a) and 5b) and replace or correct any non-compliant light source.	• Section 4.1.4, Marine Turtles
6)	For the protection of the environment the approval holder must determine if PFASs are known or likely to be present on the project area using the procedures outlined in the National Environment Protection (Assessment of Site Contamination) Measure 1999, which must include a desktop historical review of past fire suppression practices. If PFASs are known to be or likely to be present, prior to commencement of clearing or other works which have the potential to disturb areas of known or potential PFAS contamination, the approval holder must submit a PFAS Management Plan for the written approval of the Minister. If PFASs are known to be or are likely to be present the approval holder must not commence the action until the PFAS Management Plan is approved by the Minister in writing. The PFAS Management Plan must: a) identify the extent and concentrations of possible contamination within the project area; b) identify possible exposure pathways and ecological receptors including from stored material; c) identify possible risks tailored to the identified concentrations, pathways and receptors; d) outline management strategies to be undertaken, as well as any remediation action plans or strategies, to manage any identified or potential risks and provide for ongoing monitoring; and e) commit to:	• Section 4, Table 7 – Vegetation clearing.

Condition Number	Conditions Requirements	Plan Reference
	i. any PFAS contaminated material (including but not limited to excavated soil or sediment, leachate from soil or sediment, water arising from de-watering of soil or sediment, concrete, tarmac, appliances, pumps, pipes, hoses, fittings) will be handled in accordance with current best practice and disposed of in an approved receiving facility such that the PFAS content is unlikely to enter/spread into the environment; and ii. any PFAS contaminated material with a PFOS, PFHxS or PFOA content above 50 milligrams per kilogram or litre (mg/kg or L) will be stored or disposed of in an approved receiving facility such that there will be no release of its PFAS content into the environment.	
7)	To offset the loss of Black-footed Tree-rat habitat from 2CRU, the approval holder must provide the following to the department: a) written agreement between the approval holder and Northern Territory Government committing to transfer of the title for the Black-footed Tree-rat offset area to the Northern Territory Government by the approval holder. The Black-footed Tree-rat offset area must contain at least 21.5 ha of Black-footed Tree-rat habitat. b) documentation demonstrating that the Northern Territory Government is satisfied with the management funding agreed to be provided by the approval holder for the management and monitoring required by Northern Territory Government of the Black-footed Tree-rat offset area. c) the offset attributes and shapefile for the Black-footed Tree-rat offset area required by condition	Not applicable to CEMP.
7A)	Unless otherwise agreed to in writing by the Minister, the approval holder must not continue the action at 2CRU for more than 36 months from the date of commencement of the action unless the approval holder has provided the requirements of condition 7(a-c) to the department.	Not applicable to CEMP.
8)	To offset the loss of 10 ha of Black-footed Tree-rat habitat from Muirhead North, within 12 months of commencement of the action at Muirhead North the approval holder must submit a Black-footed Tree-rat Offset Plan to the department for the Minister's approval. The approval holder must not undertake the action at Muirhead North for more than 24 months from the date of commencement of the action unless the Minister has approved the Black-footed Tree-rat Offset Plan in writing, and the provisions of condition 2A and 8B have been met. The cessation of the action does not include the trunk sewer main as defined in Attachment D1 or the construction of dwellings on Stage 1A. a) The Black-footed Tree-rat Offset Plan must provide a framework for how the clearance of Black-footed Tree-rat habitat will be offset, and must: i. include a review of relevant approved conservation advices, recovery plans and threat abatement plans. ii. identify threats to Black-footed Tree-rat, and potential recovery actions and research opportunities; and	Not applicable to CEMP.

Condition Number	Conditions Requirements	Plan Reference
	iii. specify a process for developing Black-footed Tree-rat Offset Projects, and a staged process for submitting proposed Black-footed Tree-rat Offset Projects and milestones for completion of Black-footed Tree-rat Offset Projects to the department for approval by the Minister. b) Black-footed Tree-rat Offset Projects submitted to the department for approval in accordance with Condition 8.a) iii) must: i. specify the location and nature of Black-footed Tree-rat Offset Projects activities. ii. include project goal/s, budget and a detailed Black-footed Tree-rat Offset Project description, including timeframes for the elements of the Black-footed Tree-rat Offset Project, and reporting and publishing of the Black-footed Tree-rat Offset Project results. iii. demonstrate how the Black-footed Tree-rat Offset Project is consistent with the Black-footed Tree-rat Offset Plan. iv. describe advice obtained to develop the Black-footed Tree-rat Offset Project; v. explain how the Black-footed Tree-rat Offset Project complies with the principles of the EPBC Act Environmental Offsets Policy and, if relevant, provide details of how the Black-footed Tree-rat Offset Project meets the criteria for research and educational programs identified in Appendix A of the EPBC Act Environmental Offsets Policy. vi. identify and manage risks associated with implementing the Black-footed Tree-rat Offsets Project. The approval holder must not implement any Black-footed Tree-rat Offset Project until it has been approved in writing by the Minister. Each approved Black-footed Tree-rat Offset Project must be implemented. The approval holder must expend an amount equivalent to at least $78,750 (excluding GST) on implementation of the Black-footed Tree-rat Offset Projects approved in accordance with Condition 8a) and 8b).	
8A)	The approval holder must not clear more than 94.64 ha of Gouldian Finch breeding habitat and 62.05 ha of Gouldian Finch foraging habitat within the project area. All clearing of Gouldian Finch breeding habitat and Gouldian Finch foraging habitat within the project area must be offset in accordance with the requirements of conditions 8B and 8C.	Section 4.1.2,
8B)	To compensate for the loss of Gouldian Finch breeding habitat and Gouldian Finch foraging habitat within the project area, the approval holder must submit to the department a Gouldian Finch Strategy and Offset Plan (GFSOP) for the Minister's approval. The approval holder must implement the GFSOP approved by the Minister. The approval holder must not undertake any clearing in the project area, other than Stage 1A in Attachment D1, Stage 1 and Stage 2 in Attachment D2, and clearing extending no more than 20 meters from the perimeters of these stages (as required to facilitate construction), unless the Minister has approved the GFSOP. The approval holder may undertake clearing where required for the removal of contamination, noxious weeds (including gamba grass), and/or the creation or maintenance of fire breaks.	Not applicable to CEMP.
8C)	The GFSOP must be prepared by a suitably qualified independent expert, and must:	Not applicable to CEMP.

Condition Number	Conditions Requirements	Plan Reference
	a) be consistent with the department's published Environmental Management Plan Guidelines; b) include an ecological survey of Gouldian Finch breeding habitat and Gouldian Finch foraging habitat within the project area, conducted by a suitably qualified independent expert; c) specify the actual area of Gouldian Finch breeding habitat and Gouldian Finch foraging habitat that will be cleared; d) for any areas of Gouldian Finch breeding habitat and/or Gouldian Finch foraging habitat to be retained within the project area: i. identify and assess the likelihood and consequence of potential project-related impacts that may lead to the functional loss of retained areas; ii. include details of measures that will be implemented to avoid, mitigate, monitor and manage risks for the approval period; iii. include details of activities to monitor the achievement of performance targets and completion criteria; iv. specify timebound actions that will be implemented in the event performance targets and/or completion criteria are not achieved; v. include details of contingency responses, including triggers, corrective actions and reporting requirements that will be implemented if retained areas are functionally lost. e) identify suitable environmental offsets to provide compensation for the actual area of Gouldian Finch breeding habitat and Gouldian Finch foraging habitat that has been or will be cleared; f) specify outcomes for Gouldian Finch habitat quality that will be attained for each offset; g) specify timebound and measurable completion criteria that will be achieved and maintained; h) specify timebound and measurable performance targets that will be achieved and maintained; i) include details of measures that will be implemented to achieve and maintain performance targets and completion criteria; j) include details of reporting requirements, including triggers for different reporting types.	
8D)	The approval holder must legally secure the environmental offset(s) for Gouldian Finch identified in the GFSOP approved by the Minister, within 48 months of the Minister approving the GFSOP.	Not applicable to CEMP.
8E)	The approval holder must not transfer the ownership or long-term management responsibility of the area marked as 'conservation' in Muirhead North as shown in Attachment D1 to another entity unless the proposed transfer has been approved by the Minister in writing. Note: The proposed arrangement must serve to protect that part of the project area in perpetuity from any impact on EPBC Act listed species or the environment.	Not applicable to CEMP.
9)	Within 30 days of commencement of the action, the approval holder must advise the Department of the actual date of commencement.	• Section 3.3.3, Reporting
10)	The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans, and make them available	• Section 3.3, Monitoring, auditing and reporting

Condition Number	Conditions Requirements	Plan Reference
	upon request to the department. Such records may be subject to audit by the department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the department's website. The results of audits may also be publicised through the general media.	
10A	The approval holder must prepare a compliance report for each 12-month period following the date of commencement. Each compliance report must include: a) accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents; b) one or more shapefile showing all clearing of any EPBC Act listed species, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared; a) a schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.	• Section 3.3, Monitoring, auditing and reporting
10B)	Each compliance report must be consistent with the department's Annual Compliance Report Guidelines (2014), or any subsequent official version, and include: a) accurate and complete details of compliance and any non-compliance with the conditions and the plans, and any incidents; b) one or more shapefile showing all clearing of any EPBC Act listed species, and/or their habitat, undertaken within the 12-month period; b) c) a schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.	• Section 3.3, Monitoring, auditing and reporting
10C)	The approval holder must: a) publish each compliance report on the website within 60 business days following the end of the 12-month period for which that compliance report is required; b) notify the department electronically, within 5 business days of the date of publication that a compliance report has been published on the website; c) provide the weblink for the compliance report in the notification to the department; d) keep all published compliance reports required by these conditions on the website until the expiry date of this approval; e) exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public; f) if sensitive ecological data is excluded or redacted, submit the full compliance report to the department within 5 business days of its publication on the website and notify the department in writing of what exclusions and redactions have been made.	• Section 3.3, Monitoring, auditing and reporting
11)	Upon the direction of the Minister, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor and	• Section 3.3.3, Reporting; • Section 3.3.4, Adaptive Management

Condition Number	Conditions Requirements	Plan Reference
	audit criteria must be approved by the Minister prior to the commencement of the audit. The audit report must address the criteria to the satisfaction of the Minister.	
12)	The approval holder may choose to revise a management plan specified in condition 2, 8, 8B, and/or 8C without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. If the approval holder makes this choice it must notify the department in writing that the plan has been revised and provide the department, at least four weeks before implementing the revised plan, with: a) an electronic copy of the revised plan; b) an explanation of the differences between the revised plan and the approved plan; c) the reasons the approval holder considers that the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact.	• Section 3.3.4, Adaptive Management
12A)	The approval holder may revoke its choice under condition 12 at any time by notice to the department. If the approval holder revokes the choice to implement a revised plan, without approval under section 143A of the EPBC Act, the plan approved by the Minister must be implemented.	Not applicable to CEMP.
12B)	If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the revised plan would be likely to have a new or increased impact, then: a) Condition 12 does not apply, or ceases to apply, in relation to the revised plan; and b) The approval holder must implement the plan approved by the Minister. To avoid any doubt, this condition does not affect any operation of conditions 12 and 12A in the period before the day the notice is given. At the time of giving the notice the Minister may also notify that for a specified period of time, that condition 11 does not apply for one or more specified plans required under the approval.	Not applicable to CEMP.
12C)	Conditions 12, 12A and 12B are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised plan to the Minister for approval.	Not applicable to CEMP.
13)	Unless otherwise agreed to in writing by the Minister, the approval holder must publish all plans referred to in these conditions of approval on their website. Each plan must be published on the website within one (1) month of being approved by the Minister or being submitted under condition 12 and must remain published for the life of the approval.	Not applicable to CEMP.
14)	If, at any time after five (5) years from the date of this approval, the approval holder has not substantially commenced the action, then the approval holder must not substantially commence the action without the written agreement of the Minister.	Not applicable to CEMP.

Contents

1 Introduction

The purpose of this Construction Environmental Management Plan (CEMP) is to provide a framework for the management of environmental risks identified through the environmental impact assessment process for the Lee Point Master-planned Urban Development. This CEMP was a condition of assessment under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), providing measures to mitigate the environmental risks identified during the EPBC Act assessment process. Unlike the CEMP developed under NT Government legislation, which addresses different regulatory requirements, this CEMP is intended to meet Commonwealth requirements under the EPBC Act.

The project was assessed and approved under the EPBC Act on the 17th of March 2019 (EPBC 2015/7591), with a variations to the EPBC Act approval for the project issued on the 13th of June 2023 and on the 27th of July 2025. The varied conditions require the previously approved CEMP to be revised to include the requirements listed in Condition 2A of the varied EPBC Act approval. This document has been prepared to address those requirements and includes a comprehensive management plan to mitigate the impacts of the construction phase on EPBC matters.

This CEMP focuses primarily on the construction phase of the development. However, it also includes commitments that will mitigate long-term impacts to EPBC Act listed species. The management actions contained within this CEMP represent the minimum environmental commitments that Defence Housing Australia (DHA) and its contractors will undertake to meet the requirements of the EPBC Act conditions of approval.

It is important to note that the Northern Territory Development Permits (condition three of DP18/0409, conditions six & seven of DP19/0050) requires a CEMPs to be approved by the NT Government, which address a broader range of site-based environmental and amenity issues. While this EPBC-specific CEMP may touch on some of those areas, the NT Government CEMP include additional detail not required under the EPBC Act approval. This is explained further in the structure section below.

The principal contractor will comply with the provisions of this CEMP relevant to the civil construction of each project stage, with the management actions in this document to be applied where applicable.

1.1 Structure

This Construction Environmental Management Plan (CEMP) focuses on managing key environmental issues related to biodiversity and water quality that were identified during the EPBC Act assessment and variation processes. This CEMP includes specific management sub-plans to ensure the protection of EPBC listed threatened species and important ecosystems known to occur within and around the site during the construction phase.

Several standalone and sub management plans have been developed and approved to address the impacts to protected matters that were identified during the EPBC Act assessment and variation process. These plans include the management of migratory shorebirds, marine turtles, Gouldian finches, and Black-footed Tree-rats, all of which are found within and around the project extent.

Each sub-plan within this document articulates management objectives and performance criteria and outlines the management measures to be applied to avoid and minimise environmental impacts

during the relevant phases of the project. Monitoring and reporting requirements, corrective actions and key responsibilities are also explained.

In addition to matters relating to the project's EPBC approval, a range of environmental, cultural, and amenity matters subject to additional regulation are addressed under Northern Territory Government approval frameworks. As part of the NT Development Permit conditions, separate detailed sub-management plans have been prepared to address construction-phase matters that fall within the jurisdiction of the NT planning system. These sub-plans include:

- Cultural Heritage,
- Air Quality,
- Health and Safety, and
- Noise and Vibration Management.

These sub-management plans directly relate to specific principal and contractor construction actions. While there is some thematic overlap with the EPBC-related measures in this CEMP, the NT sub-plans provide additional detail and address broader local regulatory requirements that are not within the scope of the EPBC Act approval.

Additionally, stand-alone management plans have been prepared and approved for Stormwater Management and Water Quality Monitoring. These are additional requirements of the EPBC Act conditions of approval. While this CEMP references those matters where relevant, the stand-alone plans remain the primary source of detailed management and mitigation measures. A comprehensive list of standalone management plans can be found in section 10.2.

2 Project Overview

The Lee Point Master-planned Urban Development has been developed in accordance with the Lee Point Area Plan and Planning Principle's as described in DHA's application to amend the NT Planning Scheme (PA2014/0922). It will accommodate approximately 720 ground-level dwellings, thirty rural residential lots, and between 300 and 350 apartments.

The Lee Point Area Plan identifies a tourism and mixed-use centre situated along a Main Street precinct in 2CRU running from Lee Point Road through the site in a north-westerly direction where it will terminate at a coastal esplanade. The area will provide most of the medium density residences in 3-6 storey apartments. The coastal esplanade runs perpendicular to the Main Street precinct and parallel to the Casuarina Coastal Reserve. It will be an important area of public open space and provide bicycle and walking paths and other recreation facilities, as included in the Project Landscape Masterplan. There will also be a small area of open space in the north of the site, which specifically includes the preservation of bunkers as part of local military history. Another military history site on the eastern side of Lee Point Road recognising the Konfrontasi period in the 1960's will also be preserved and integrated into a larger parkland recreational area.

The Main Street precinct will provide a mixture of commercial, retail and community services. There are also four tourist sites to be established along the Main Street that will be transferred to the NT Government and will provide for hotel and apartment accommodation in buildings between 2-12 stories.

A Community Hub will be located in Muirhead North, and will include a primary school, child-care facility, and sports facilities.. Immediately adjacent to the Community Hub will be an active recreation reserve including provision for sports (e.g. AFL/cricket infrastructure) and a Community Centre, both of which will be under the ownership and control of the City of Darwin.

In addition to the 50 m wide buffer between the residential development adjacent to the Casuarina Coast Reserve interface on the western boundary in 2CRU, other areas of public open space will include the preservation of 22 ha of Monsoon Vine-thicket and Eucalypt Woodland on the western side of 2CRU to conserve habitat for the endangered Black-footed Tree-rat and expand the existing Casuarina Coastal Reserve. A further 1.6 ha within Muirhead North supporting sensitive Monsoon Rainforest vegetation will also be protected as part of a 11.3 ha conservation area on the eastern edge of Muirhead North. A series of parks and playground areas will be set-aside across the project site, including a treatment train of bioretention basins to manage stormwater egress.

The current staging plan for the project proposes an eight staged development, outlined in Figures 1a & 1b.

Figure 1.a Map of proposed development at 2CRU.

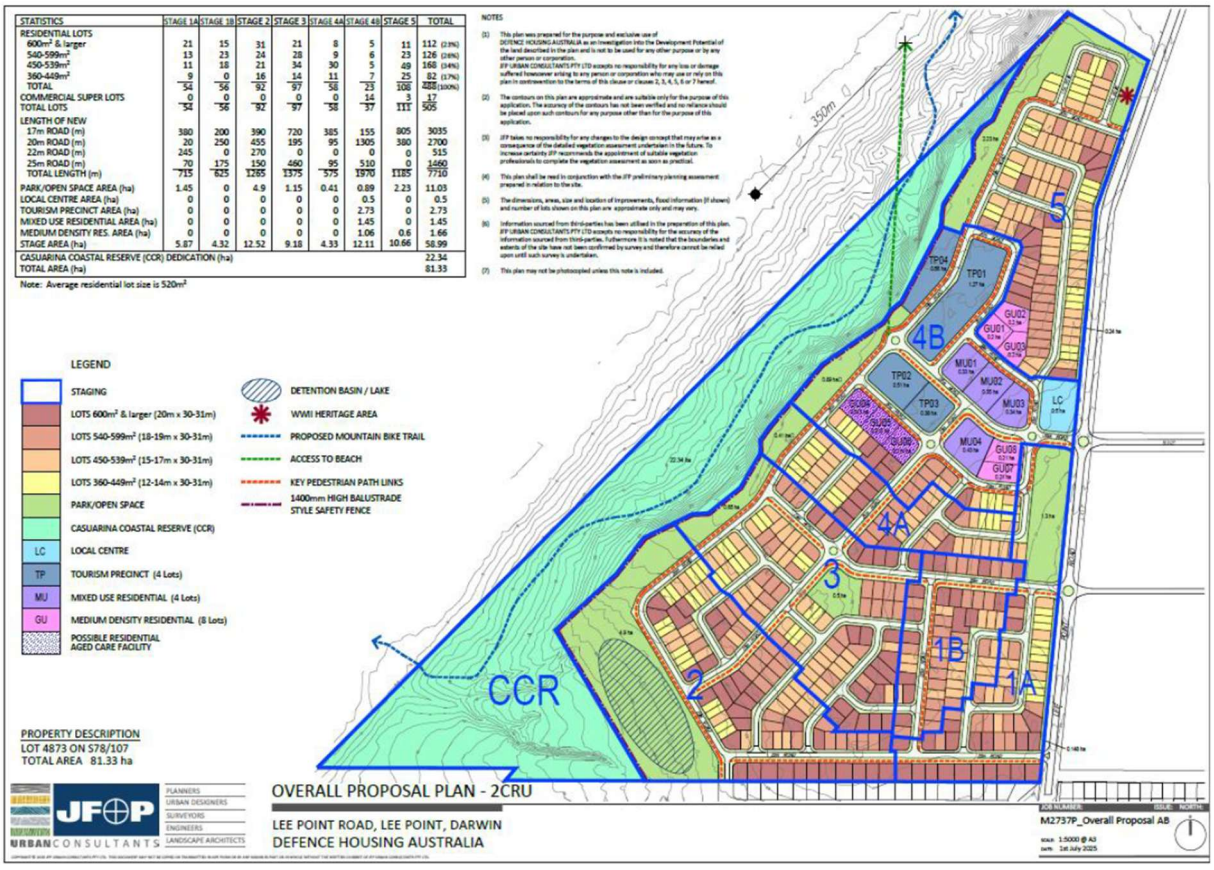
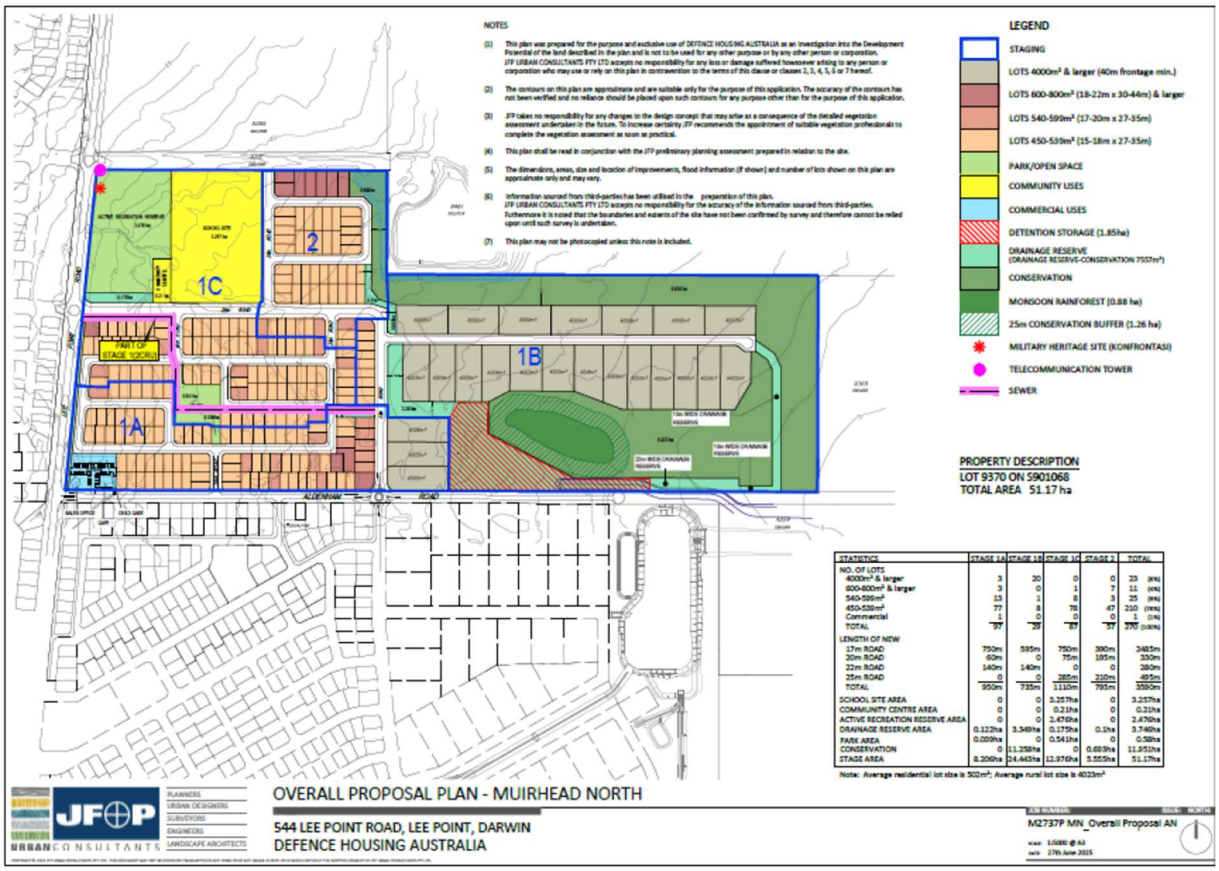


Figure 1.b Map of proposed development at Muirhead North.



2.1.1 *Construction*

Stage 1A (MHN) of the project commenced in September 2021 with the final stage of the project (Stage 5 2CRU) expected to be completed by 2033.

The construction footprint will involve the loss of approximately 110 ha of native and introduced vegetation. A 22 ha area of Monsoon Vine-thicket and Low Eucalypt Woodland along the western boundary of 2CRU will be retained as a conservation reserve. A 1.6 ha patch of native vegetation in Muirhead North containing a 0.9 ha patch of the sensitive Monsoon Rainforest vegetation community will also be protected. The eastern end of Muirhead North includes 11.3 ha of Conservation Land as designated by the NT EPA, as well as the recently adopted Gouldian Finch 50 m buffer along the northern and western boundaries adjoining the dam on the neighbouring property.

2.1.2 *Operations*

Operational aspects of the project relevant to this CEMP include the performance of detention and bioretention basins and the potential for increased visitation to Casuarina Beach. All other ongoing maintenance activities after construction is completed (such as management of public open space, roads, and utilities), and the construction of individual dwellings are not subject to the EPBC approval and therefore fall outside the scope of this CEMP. These activities are instead regulated under Northern Territory planning and development legislation, with requirements managed through development permits issued by the Development Consent Authority, Northern Territory EPA (NTEPA) and the Department of Lands, Planning and Environment (DLPE).

3 Environmental Management Framework

This CEMP provides overarching environmental management guidance for the project, implemented through the procedures and management strategies detailed below. It establishes a framework of management plans and procedures to address key areas of environmental risk and incorporates conditions of approval, commitments, and legal and other requirements. Non-conformance with actions or requirements under this CEMP and its sub-management plans are addressed through the corrective actions and reporting requirements specified within each plan. Such non-conformances are not considered breaches of EPBC conditions or NT approvals unless explicitly stated as such.

3.1 Roles and Responsibilities for Environmental Management

Table 1 below provides information on the roles and responsibilities of the project's stakeholders in implementing this CEMP. DHA will be ultimately responsible for compliance with this CEMP and will oversee the performance of the head contractor and sub-contractors in implementing the actions of this CEMP. The relevant environmental regulators are not statutorily required to undertake site audits but can do at any time.

Table 1. Roles and responsibilities

Organisation	Roles and responsibilities
Defence Housing Australia	Ensures principal contractors are complying with the CEMP, including implementing actions, observing, and reporting. Site inspections and management of compliance on a regular basis. Respond to any complaints from the public. Approves corrective actions and notification of regulatory authorities when there is a non-conformance, if necessary.
Principal Contractor	Implementation of all actions where applicable in the CEMP, including management actions and reporting. Ensuring all subcontractors comply with applicable CEMP requirements. Management of sub-contractors on a discretionary and strategic basis. Environmental inductions. Complaints management. Notifies DHA of any non-compliance with CEMP.
Superintendent	Ensuring all contractors, subcontractors, and consultants comply with applicable CEMP requirements.
Department of Climate Change, Energy, the Environment and Water (Commonwealth)	Environmental regulator – undertake audits of project site if required and assess compliance with CEMP in accordance with Commonwealth approvals. Review annual monitoring reports.
Environment Protection Authority (Northern Territory) Department of Lands, Planning and Environment.	Environmental regulator – undertake audits of project site if required.

Organisation	Roles and responsibilities
	Review and approve the NTDCA CEMP compliance and implementation.

3.2 Emergency Contacts

Table 2 Details key emergency contacts responsible for managing environmental incidents associated with the project. These personnel or entities hold the authority to stop and direct works to ensure an effective response. The following table provides their contact details of entities present for all stages of the development. Contact details for principal contractors and superintendents will be included in the stage-specific CEMPs once those contracts are awarded.

Table 2. Emergency Contacts

Organisation	Phone Number	Email
DHA Project Manager	139 342	Developments@dha.gov.au
NTEPA Emergency Response	1800 064 567	pollution@nt.cgov.au
DCCEEW EPBC Referrals	1800 423 135	epbc.referrals@dcceew.gov.au

3.3 Training and Awareness

The principal contractor will be responsible for site environmental inductions. Prior to commencing work, all staff including any contractors/sub-contractors must complete a site induction informing them of the type and location of sensitive environmental areas and potential threats. The induction will include, as a minimum:

- Location of Casuarina Coastal Reserve, Sandy Creek, and Buffalo Creek.
- Description of the Black-footed Tree-rat, where the species could potentially occur, and measures to prevent construction workers having impacts on this species.
- Description of the Gouldian Finch, where the species could potentially occur, and measures to prevent construction workers having impacts on this species.
- Description of migratory shorebird habitat, including the importance of minimising disturbance to their roosts, and measures to prevent construction workers having impacts on this species.
- Military and Indigenous heritage considerations and protocols to follow in the event of a heritage artefact discovery
- Location of the area of Monsoon Vine-thicket and Monsoon Rainforest to be retained, and other areas of native vegetation to be retained in public open space.
- Location of adjoining residents and land-users and their exposure to the project. Sensitivities and protocols to follow in the event of organised demonstrations.
- Description of erosion, weed spread, habitat removal, human disturbance, dust and noise impacts and the effect that this can have on environmental values.

3.4 Monitoring, auditing, and reporting

In accordance with the approval conditions, DHA will prepare an annual compliance report for each 12-month period. The reports will detail all instances of compliance and non-compliance with approval conditions and associated plans, report any incidents, and will include shapefiles showing any clearing of protected matters or their habitat. A schedule of all relevant plans and an explanation of how each is being implemented will be included in each report. The reports will follow the Department's Annual Compliance Report Guidelines (2014) and will be published on DHA's website within sixty business days of the relevant reporting period. DCCEEW will be notified within five business days of publication of each report.

3.4.1 Monitoring responsibility

Observations will be made to assess compliance with the CEMP and determine whether any potential impacts to EPBC matters are conformable with approved thresholds via a monthly checklist (Appendix A) conducted by the superintendent. This monthly inspection checklist is a tool for ensuring compliance with the CEMP and EPBC approval conditions throughout all phases of active construction. It verifies that pre-clearing safeguards are in place to avoid and mitigate environmental impacts, and that post-clearing activities have not resulted in unintended harm.

The checklist covers key environmental aspects, including biodiversity management (such as weed control, fauna spotter-catcher attendance, and fencing of vegetation to be retained), water quality monitoring (including Sandy Creek and bioretention basin inspections), and heritage protection measures. It also records observations of potential risks such as contamination spills, groundwater interactions, or unauthorised disturbance of heritage sites to highlight corrective actions and provide a record of identified concerns prior to incidents arising.

There will be ongoing supervision of the site by an environmental representative of the principal contractor who is aware of the contents of the CEMP. The DHA may also sub-contract aspects of compliance including specific tasks such as water quality monitoring and migratory shorebird monitoring undertaken by contractors on behalf of DHA.

3.4.2 Compliance inspections.

DHA will undertake random compliance inspections periodically throughout the project, and during or after any major corrective actions or remediation works. DHA will also supervise the principal contractor to ensure the Incident and Complaint Register is being maintained, the training and site environmental inductions are conducted, and the inspections are being undertaken as scheduled. The principal-contractor will review sub-contractors on a periodic basis to check general environmental performance and compliance with relevant sub-plans of the CEMPs.

Environmental regulators may undertake audits during the construction phase.

An independent environmental compliance review will be undertaken periodically to review compliance with the CEMPs, whether the CEMPs are mitigating environmental impacts as intended, and whether any changes to the CEMPs or its implementation are required.

3.4.3 Reporting

An EPBC annual compliance report will be prepared in accordance with the conditions of the variation notice and submitted to DCCEEW, with a copy provided to the NT EPA throughout the construction phase of the project. The report will include:

- List of actions from the CEMP that have been implemented including photographic evidence.
- Details of any non-compliance.
- Results of water quality and migratory shorebird monitoring.
- List of complaints received from adjoining residents.
- Any unexpected impacts to the environment that was not adequately accounted for.
- Any corrective actions implemented (see Section 3.4.4 below).
- A shapefile showing all clearing of protected matters/habitat during the reporting period.
- A list of all management plans that relate to this approval and details on how each plan is being implemented.

3.4.4 Adaptive Management

Mitigation and avoidance measures have been developed as part of this CEMP that are intended to reduce the risk of the project impacting the environment. In the unlikely event that the monitoring shows that the impact has exceeded the performance indicator, the proposed management actions will be revised and alternative measures implemented. Any changes to environmental management will be proposed as part of the annual compliance report and will be developed by DHA in conjunction with the head contractor, and in consultation with discipline experts from Government or the private sector as required. Changes to environmental management will only be proposed if the performance objectives outlined in the CEMP are exceeded within the twelve-month reporting period in accordance with the approval conditions.

Corrective actions relating to the management of sub-elements within this plan, including those linked to triggers and threshold values, are provided within their respective sections (e.g. biodiversity, water quality, erosion and sediment control). Each management sub-plan outlines the relevant corrective actions to be implemented if monitoring results or performance indicators exceed defined thresholds.

Any approved changes to environmental management will be incorporated into a revised CEMP and submitted for DCCEEW for review and approval.

3.4.5 Environmental risk identification and assessment

A Qualitative Risk Assessment Methodology Will be applied to all environmental risks associated with construction prior to commencement of tasks/construction elements. This framework provides a structured approach to identifying and evaluating risks in accordance with AS ISO 31000:2018 Risk Management Guidelines.

Table 3. Risk Evaluation criteria and rating matrix

Step 1: Determine Likelihood: What is the possibility that the effect will occur?

	Criteria	Description
Almost certain	Expected in most circumstances.	The effect is a common result.
Likely	Will probably occur in most circumstances.	The effect is known to have occurred previously.
Possible	Might occur at some time.	The effect could occur
Unlikely	Could occur at some time.	The effect is not likely to occur
Rare	May occur only in exceptional circumstances.	The effect is practically impossible.

Step 2: Determine Consequence: What will be the expected effect?

Level of Effect:	Example of each level:
Insignificant/ Acceptable	No effect – or so minor that effect is acceptable.
Minor	First Aid treatment only. Insignificant environmental consequence.
Moderate	Serious injuries, medium business interruption, medium, reversable environmental impact.
Major	Extensive injuries/Death; significant business interruption, major loss of credibility, significant Environmental harm, prosecution.
Catastrophic	Multiple Permanent Total Disability injuries; multiple deaths. Business failure, substantial irreversible environmental harm, prosecution/imprisonment.

Step 3: Determine the risk score:

	Consequence				
Likelihood	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost certain	**3 High**	**3 High**	**4 Acute**	**4 Acute**	**4 Acute**
Likely	**2 Mod.**	**3 High**	**3 High**	**4 Acute**	**4 Acute**
Possible	**1 Low**	**2 Mod.**	**3 High**	**4 Acute**	**4 Acute**
Unlikely	**1 Low**	**1 Low**	**2 Mod.**	**3 High**	**4 Acute**
Rare	**1 Low**	**1 Low**	**2 Mod.**	**3 High**	**3 High**

Step 4: Assess Risk: (Note – Risk scores have no absolute value and should only be used for comparison and to engender discussion.)

Score	Action
4A: Acute	***DO NOT PROCEED*** Requires immediate attention. Introduce further high-level controls to lower the risk level. Re-assess before proceeding.
3H: High	*Review before commencing work.* Introduce new controls and/or maintain high-level controls to lower the risk level. Monitor frequently to ensure control measures are working.
2M: Mod.	*Maintain control measures.* Proceed with work. Monitor and review regularly, and if any equipment/people/materials/work processes or procedures change.
1L: Low	*Record and monitor.* Proceed with work. Review regularly, and if any equipment/people/materials/work processes or procedures change.

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Table 4. The following table identifies key construction activities, their potential environmental impacts, and the sections of this management plan where the required control and management actions are referenced. Future revisions approved by NT Government will replace Stantec CEMP V8 in this table of reference; all references to Stantec CEMP V8 are to be updated to the latest NT Government-approved CEMP version as they are developed and released.

Activity	Impact	Control Elements
Vehicles/ Plant operations	*Air Quality* *Public Nuisance* *Biodiversity*	• 4.1.1 Black Footed Tree Rat – Speed limits to prevent traffic strikes. • 6.2 Erosion and Sediment Control – Traffic management. • 8.2 Noise Management – machinery noise. • 9.2 Air Quality Management – dust from plant. • Appendix B – NT Government approved CEMP section 8 – Traffic Management.
Refuelling	*Land Contamination* *Water Contamination*	• 5.2 Water Quality Management– hydrocarbon and chemical spill prevention. • 6.2 Erosion and sediment control –contaminant immobilisation and containment.
Chemical Storage	*Land Contamination* *Water Contamination*	• 5.2 Water Quality Management – bunding, spill control. • 6.2 Erosion and Sediment Control – containment of hazardous materials. • 4.1.5 Weed Management – herbicide handling protocols. • Appendix B – NT Government approved CEMP section 5 – Site Control and Waste Management
Stockpiling	*Air Quality* *Water Contamination* *Land Degradation* *Biodiversity*	• 6.2 Erosion and Sediment Control – Sediment runoff controls. • 5.2 Water Quality Management – stormwater and sediment controls. • Appendix B – NT Government approved CEMP section 5 – Site Control and Waste Management

Activity	Impact	Control Elements
Vegetation Clearing	*Air Quality* *Water Contamination* *Land Degradation* *Heritage values* *Biodiversity*	• 4.1 Biodiversity management – controlled clearing approach. • 6.2 Erosion and Sediment Control – Stabilisation of exposed soils. • 7.1 Heritage Management – consultation and traditional owner attendance where appropriate. • 9.2 Air Quality Management – Dust suppression. • Appendix B – NT Government approved CEMP section 11 – Vegetation and Weed Management.
Earthworks	*Air Quality* *Land Contamination* *Water Contamination* *Heritage values* *Land Degradation* *Biodiversity*	• 4.1 Biodiversity management – controlled clearing approach. • 5.2 Water Management Actions – stormwater treatment, hydrocarbon control. • 6.2 Erosion and sediment control – staged clearing, sediment basins, erosion prevention. • 7.1 Heritage Management – Artifact discovery protocol. • 9.2 Air Quality Management – dust suppression. • Appendix B – NT Government approved CEMP section 9 – Air Quality and Dust Control.
Stencilling/Line/ Colour Work	*Water Contamination*	• 6.2 Erosion and sediment Control – prevention of paint/chemical runoff into stormwater. • Appendix B – NT Government approved CEMP section 13 Erosion and Sediment Control.
Concrete Work	*Water Contamination*	• 5.2 Water Quality Management – concrete washout management. • 6.2 Erosion and sediment control – containment of alkaline runoff.
Asphalt Works	*Water Contamination*	• 5.2 Water Quality Management – early hydrocarbon contamination identification. • 6.2 Erosion and sediment control – runoff management
Waste Management	*Air Quality* *Resource Recovery*	• 9.2 Air Quality Management – handling and disposal of asbestos-containing material. • Appendix B – NT Government approved CEMP section 5 – Site Control and Waste Management

Activity	Impact	Control Elements
Remediation	*Air Quality* *Land Contamination* *Water Contamination* *Biodiversity*	• 4.1.5 Weed Management Actions – progressive rehabilitation and re-seeding. • 5.2 Water Quality Management – rehabilitation of erosion gullies. • 6.2 Erosion and sediment control – stabilisation of exposed batters.

4 Biodiversity Management

4.1 Overview of environmental values and risks

The biodiversity values that occur within the project site, and potential impacts and risks to biodiversity associated with project activities, were assessed by DCCEEW based on information within the Environmental Impact Statement (EIS) – Lee Point Master-planned Urban Development (Version 7, October 2017). A brief summary of the risks to biodiversity values is provided below.

- Increased visitation to Casuarina Beach, which may cause disturbance to migratory shorebirds.
- Impacts to sensitive vegetation including Monsoon Vine-thicket and Monsoon Rainforest.
- Loss of native vegetation resulting in population fragmentation.
- Loss of habitat for the nationally significant Black-footed Tree-rat.
- Loss of habitat for the nationally significant Gouldian Finch.
- Disturbance to the Darwin Cycad.
- Disturbance to marine turtles from artificial lighting.
- Dispersal of weeds and pathogens during construction.
- Further degradation of Casuarina Coastal Reserve.
- Increased numbers of recreational fishers causing potential by-catch of threatened saw fish species.
- Risk of biting insects

4.1.1 Black-footed Tree-rat

The following mitigative strategies will be implemented to minimise impacts to the Black-footed Tree-rat:

- Pre-clearance habitat surveys will be conducted by a suitably qualified *Fauna Spotter Catcher* within One weeks of clearing. This will include tree hollow inspections to confirm presence/absence of Black-footed Tree-rats including using drones, pole cameras, or elevated work platforms. All hollows identified as potential Black-footed Tree-rat refugia/nest trees will be flagged.
- All vegetation clearing will be conducted under supervision of a suitably qualified Fauna Spotter Catcher with experience in Black-footed Tree-rat identification.
- Flagged trees will be gently tapped and left standing for a minimum of one night before they are cleared. They will be inspected by a Fauna Spotter Catcher before they are cleared to ensure no Black-footed Tree-rats are present. Any trees containing Black-footed Tree-rats cannot be cleared until they are vacated.
- All flagged trees will be felled using appropriate controlled felling techniques.

- A staged clearing approach will be implemented to allow Black-foot Tree-rats to self-relocate gradually as clearing progresses.
- Where possible, flagged hollows will be retained and moved off the alignment into adjacent bushland.
- Any captured Black-footed Tree-rats will be released after dusk into adjacent bushland.
- To reduce the likelihood of vehicle collision, speed limits on site will be set at or below 40km/hr. Adequate signage will also be installed.
- Clearing will not be permitted between 6pm and 7am.
- If a Black-footed Tree-rat is injured, it will be taken to a veterinarian for assessment and returned to the same location and released at dusk into adjacent bushland.
- If a juvenile Black-footed Tree-rat is separated from its parents, it will be taken to a licenced wildlife carer.

Clearing of Black-footed Tree-rat habitat will be offset according to the Black-footed Tree-rat Offset Plan.

4.1.2 Gouldian Finch

Condition 2A a) of the project's varied EPBC approval states that additional measures must be included in this CEMP to mitigate potential impacts of clearing on the Gouldian Finch. To comply with these conditions, the following mitigative measures will be implemented:

- Preclearance habitat surveys will be conducted by a suitably qualified *Fauna Spotter Catcher* within 2 weeks of clearing to identify potential Gouldian Finch breeding habitat and foraging habitat. Active nests, potential nest hollows, and high-quality foraging habitat will be flagged. All surveys will be conducted early morning or late afternoon when birds are most active.
- All vegetation clearing will be conducted under supervision of a suitably qualified Fauna Spotter Catcher with experience in Gouldian Finch identification.
- Trees flagged as active nests will not be cleared until chicks have fledged.
- Trees flagged as potential nest sites will be visually checked by a Fauna Spotter Catcher using a pole camera or from an elevated work platform prior to clearing to ensure absence of nesting birds.
- The *Fauna Spotter Catcher* will traverse flagged foraging habitat prior to clearing to flush any feeding finches.
- To reduce the likelihood of vehicle collision, speed limits on site will be set at or below 40km/hr. Adequate signage will also be installed.

Clearing of Gouldian Finch habitat will be offset according to the Gouldian Finch Strategy and Offset Plan.

4.1.3 Migratory shorebirds

The construction phase of the project will not impact migratory shorebird populations. No migratory shorebird roosting, foraging, or breeding habitat will be cleared as a result of the development. The

potential impacts to shorebirds identified during the EIS process relate to increased beach traffic and associated disturbance at key roosting sites, which will only occur once the development is completed. To mitigate these potential impacts, DHA has committed to the following:

- Beach access installed at least 350m north of the mouth of Sandy Creek to minimise beach traffic at key roosting sites.
- Installation of barrier fencing if permitted by local authorities to protect key roosting sites at Sandy Creek and Buffalo Creek.
- Creation of no dog zones at key roosting sites near the mouth of Sandy Creek. Collaboration with City of Darwin and NT Parks and Wildlife will be required to determine location and enforcement of no dog zones.
- Installation of interpretative signage along the boardwalk that provides beach access from the project site.
- Implementation of a shorebird monitoring program

Condition 2A b) of the project's varied EPBC approval conditions states that additional measures must be included in this CEMP to avoid, mitigate and manage impacts of the action on migratory shorebirds. To meet these approval conditions, DHA has committed to the following additional impact mitigation strategies:

- Implementation of a community education program. This will include:
    - ❖ Interpretative signage at beach access points along Casuarina beach informing the public of the importance of the area to listed migratory shorebirds, and the potential impacts of human disturbance to key roosting sites.
    - ❖ Migratory shorebird information packs distributed to new residents via provision on the DHA website on completion of construction.
    - ❖ Site workers provided with an induction/pre-start toolbox regarding the potential impacts to migratory shorebirds prior to the commencement of relevant construction stages (as per section 3.1 – Training and awareness).
- Installation of public bins along Casuarina beach if permitted by local authorities and landowner. Location of bins will be determined via collaboration with NT Parks and Wildlife.

DHA will undertake ongoing monitoring of shorebird populations throughout the construction phase, as outlined in the Shorebird Monitoring Plan, which commenced in 2024 and will continue for a duration of 10 years. Data collected pre-construction and during construction (i.e., 2024-2025) will serve as a baseline to assess any potential changes in shorebird populations resulting from increased beach traffic following project completion.

Given the seasonal variability of shorebird populations in the area, a 50% decrease in abundance at the Sandy Creek and Lee Point roosts, relative to the pre-construction baseline values (2024–2025) for the same month of record, will constitute a trigger for the corrective actions outlined in Table 5. Any apparent decline will be confirmed across consecutive

monthly surveys to ensure the trend is consistent before a trigger is considered to have been exceeded.

Table 5. Quantitative Trigger thresholds and stepwise corrective action framework for the management of impacts to migratory shorebirds

Trigger Threshold	Corrective action	Person Responsible
0 – 50% reduction	• Continue monitoring program; no corrective action required beyond routine implementation of management measures.	• DHA • Principal Contractor
51 – 75% reduction	• Increase shorebird monitoring frequency to confirm decline in abundance. • Additional inductions for site workers. • Ensure interpretive signage is maintained and legible.	• DHA • Principal Contractor • Environmental Consultant
>75% Reduction	• Evaluate effectiveness of dog no-go zones along at key roosting sites. • Increase survey frequency to assess effectiveness of additional measures. • Public closure of shorebird roost sites subject to local authority and landowner consent.	• DHA • Principal Contractor • Superintendent • Environmental Consultant • Authority / applicable land owner

4.1.4 Marine Turtles

To minimise light pollution impacts to turtles at Casuarina Coastal Reserve, the approval holder must restrict artificial lighting on buildings above 15 m in height, and any other lighting directly visible from the beach, by:

- Only using lights of a long wavelength (560 nanometers or longer) to which turtle hatchlings are not sensitive shall be used.
- Ensuring lighting is directed in a downwards direction and faced away from the Casuarina Coastal Reserve and
- At least once each year prior to turtle hatching season, conducting an audit of compliance with the above two proposed management strategies, and replacing or correcting any non-compliant light source.

4.1.5 Weed Management

Weed management will be conducted in accordance with the approved Vegetation and Weed management plan (VWMP) (*2CRU And Muirhead Vegetation & Weed Management Plan*), or updated version current at the time and approved by the NT Government.

Gamba grass (*Andropogon gayanus*) will be progressively replaced with native grass species within conservation areas to maintain food resources for Gouldian Finches, which are known to forage on its seed. The initial removal and rehabilitation of affected areas will be staged over a minimum of three years following the construction of adjacent infrastructure. Treated areas will be rehabilitated with

directly seeded native perennial grasses such as *Chrysopogon fallax, Sorghum plumosum*, and *Heteropogon contortus*, with direct seeding being undertaken late in the dry season to maximise establishment success.

Herbicide application must be undertaken in suitable conditions. The type of herbicide shall be appropriate for the site and conditions and consider impacts on downstream aquatic systems and risk of overspray effecting desirable species. Directions outlined within the VWMP are to be followed, and all precautions strictly adhered to. When applying any herbicide use a brightly coloured marker dye in the solution to mark areas that have been treated. This will ensure adequate cover and reduce the risk of overspray to reduce residual herbicides impacting the health of rehabilitation measures. Ongoing biannual monitoring will assess native grass establishment, and further management conducted where necessary to suppress the re-establishment of Gamba grass.

Monitoring will occur concurrently with management activities on a biannual frequency. A 7.5% increase in Gamba grass cover, relative to the initial extent of management as delivered by the weed management contractor, will serve as the quantitative trigger for the corrective actions outlined in Table 6.

Table 6. Quantitative Trigger thresholds and stepwise corrective action framework for the monitoring and management of Gamba grass infestations.

Trigger Threshold	Corrective action	Person Responsible
0-7.5% Increase cover	• Continue routine monitoring and management. No additional corrective action required.	• Principal Contractor • Vegetation management contractor
7.6-10% increase in cover	• Increased weed control effort in affected areas. • Prioritise eradication of newly identified infestations and containment of existing infestations. • Review treatment methods to confirm suitability. • Prevent further weed incursion/spread by ensuring new vehicles/plant on site are utilising washdown bays.	• DHA • Principal Contractor • Vegetation management contractor
>10% increase in cover	• Increase Weed surveillance frequency and scope to comprehensively assess extent of gamba grass spread. • Deploy additional eradication measures in line with the approved WVMP to compliment increased spraying regime.	• DHA • Principal Contractor • Superintendent • Vegetation management contractor

Table 7. Biodiversity management sub-plan – management actions summary

Objective	Management Actions	Monitoring	Performance Indicators
Weed Management			
Reduce the extent of weeds in the project site and minimise risk of spread into the Casuarina Coastal Reserve and other areas.	• Implementation of the NT Government approved Vegetation and weed management plan. • Employ a staged approach to removing Gamba Grass within conservation areas as per section 4.1.5. • Spray any residual weeds after clearing/excavation in unconstructed areas. • Use native species in landscaping, with City of Darwin approval. • Only use fill that is unlikely to contain weed propagules. • Wash-down bays for any plant or equipment working in infested areas that will be leaving site. • A minimum of 21.5-ha area of Monsoon Vine-thicket and Low Eucalypt Woodland along the western boundary of 2CRU will be retained as a conservation reserve. A 50 m buffer around the dam at Muirhead North will also be retained to protect Gouldian Finch habitat. Where Gamba Grass management activities (i.e. spraying/removal) are undertaken within proposed conservation areas/areas of retained native vegetation, replace with native perennial grasses known to be foraged by Gouldian finches (such as *Heteropogon spp*, *Sarga spp.*, *Schizachyrium spp.* & *Triodia spp.*)	Annual audit by principal contractor in conjunction with appointed weed contractor and ecologist.	No increase in cover or type of environmental weeds on site or in adjoining areas of Casuarina Coastal Reserve
Vegetation Clearing			
Vegetation clearing is limited to the least amount of vegetation loss required for the project.	• Prior to commencing works, fence-off the relevant stage inclusive of the EPBC variation buffer of 20 metres to prevent clearing from crossing the stage boundary.	Ongoing site monitoring and audit by head contractor	Area of native vegetation loss is no greater than what has been approved.

Objective	Management Actions	Monitoring	Performance Indicators
	• Where native vegetation will be retained within a stage (i.e. Monsoon Vine Thicket, Low Eucalypt Woodland, Rainforest, 50 m buffer, Conservation Areas, and Parks) fence off and ensure training protocols are followed to prevent impact. • No more than 110ha of native vegetation is to be cleared within the project area; including excavation, clearing and grubbing of a 5.8 ha area is required to facilitate stormwater management works, slope stabilisation and rehabilitation of eroded gullies and establishment of new and improvement of existing bike trail and pedestrian network, including beach access within the Casuarina Coastal Reserve. The works within the Casuarina Coastal Reserve will be in accordance with the NT Government and Parks and Wildlife approved Casuarina Coastal Reserve design plans included as Appendix D, or otherwise as required / approved by NT Government / Parks and Wildlife. o Additional Clearing for the removal of contamination from asbestos and PFOA/PFAS will be necessary under condition 6, a) of this approval if/when identified. o Additional clearing to create firebreaks in line with NTFRS requirements will be undertaken when necessary to ensure compliance with the Bushfires management act (2016). • No more than 94.64 ha of Gouldian Finch breeding habitat and 62.05 ha of Gouldian Finch foraging habitat is to be cleared within the project area. All clearing of Gouldian Finch breeding habitat and Gouldian Finch foraging habitat within the project area must be offset in accordance with the Gouldian Finch Offset Plan. Details of definitions of Gouldian Finch foraging and breeding habitat within the project scope are detailed within the EIS. • Use native species in landscaping plans and revegetation of disturbed areas if practical and with City of Darwin approval.		

Objective	Management Actions	Monitoring	Performance Indicators
	• No machinery, equipment, or laydown areas to be located within areas of native vegetation to be retained. • Prior to development of each stage, Darwin Cycads within the applicable stage are to be salvaged and relocated to area of public open space or reinstated on other properties in Darwin area.		
Native fauna			
No direct loss of native fauna	• Suitably qualified Fauna Spotter Catcher/s on site during habitat and vegetation clearing. Any captured animals to be released in nearest area of viable habitat. • Record the species, location, health, number of animals and date of capture, and details of where animals released. • *Fauna Spotter Catchers* must be suitably qualified. The project's EPBC Act approval conditions defines this as: "a person who has demonstrable identification and handling skills, and behaviour knowledge (including nesting requirements) for EPBC Act listed species that have the potential to occur, are likely to occur, or are known to occur, in the area being impacted by the relevant clearing." • Personnel to be trained as part of the site induction in how to identify threatened fauna (including Black-footed Tree-rat and Gouldian Finch), and that a stop works procedure will be enacted if any species are found during works to allow the *Fauna Spotter Catcher* to safely relocate the animal if in attendance.	*Fauna Spotter Catcher* Pre and Post clearance reports.	No injury, harm, or death of native fauna.
Black-footed Tree-rat			
Mitigate potential impacts to the Black-footed Tree-rat as a result of construction activities	• Preclearance habitat surveys by a suitably qualified Fauna Spotter Catcher	Principal contractor including environmental sub-	No injury, harm, or death to Black-footed Tree rats during clearing operations.

Objective	Management Actions	Monitoring	Performance Indicators
	• All vegetation clearing conducted under supervision of a Fauna Spotter Catcher with experience in Black-footed Tree-rat identification. • Adherence to tree-clearing protocol outlined in Section 4.1.1 above. • Any captured Black-footed Tree-rats will be released after dusk into adjacent bushland. • To reduce the likelihood of vehicle collision, speed limits on site will be set at or below 40km/hr. Adequate signage will also be installed. • CEMP checklist	contractor ensure compliance prior to removal of habitat.	
Gouldian Finch			
Mitigate potential impacts to the Gouldian Finch as a result of construction activities	• Preclearance habitat surveys by a suitably qualified Fauna Spotter Catcher • All vegetation clearing conducted under supervision of a Fauna Spotter Catcher with experience in Gouldian Finch identification. • Adherence to tree-clearing protocol outlined in Section 4.1.1 above. • Any captured Gouldian Finch will be released after dusk into adjacent bushland. • To reduce the likelihood of vehicle collision, speed limits on site will be set at or below 40km/hr. Adequate signage will also be installed. • CEMP checklist	Principal contractor including environmental sub-contractor ensure compliance prior to removal of habitat.	No injury, harm, or death mortality of Gouldian finch through clearing operations
Migratory Shorebirds			

Objective	Management Actions	Monitoring	Performance Indicators
Retain value of Casuarina Beach and mouth of Sandy Creek as migratory shorebird habitat.	• Beach access installed at least 350m north of the mouth of Sandy Creek • Installation of barrier fencing, subject to local authority and landowner consents. • Creation of no dog zones at key roosting sites • Installation of interpretative signage • Implementation of a shorebird monitoring program • Implementation of a community education program • Installation of public bins, subject to local authority and landowner consents • Implementation of litter collection program, subject to local authority consent. • CEMP checklist	Migratory shorebird monitoring will be conducted in accordance with the approved Migratory Shorebird Monitoring Plan	No detectable change in population of migratory shorebirds at Casuarina Beach that can be attributed to project. This will be determined by comparing population data post-project completion to baseline data collected in 2024-2025.
Water			
No impact on biological diversity in Sandy Creek.	• Implement the EPBC Act conditioned Stormwater Management Plans to manage the flow of stormwater exiting the site, and treat stormwater for sediment, pollutants, hydrocarbons, and heavy metals to limit Impact on aquatic flora and fauna as a result of altered water quality or quantity. • Rehabilitate erosion gullies in the south-west corner of the site in accordance with remediation plans subject to approval by NTPWS. • Implement site specific Erosion and Sediment Control Plan.	Water Quality Monitoring Plan	Water quality to remain within limits of defined Water Quality Objectives (WQOs) which will be determined prior to construction commencing based on

Objective	Management Actions	Monitoring	Performance Indicators
			combination of pre-construction monitoring data and ANZECC Guidelines.
Biting Insects			
No connectivity between Casuarina Coastal Reserve and 2CRU for biting insects.	• A 50-metre open wind buffer to be established along the western perimeter of 2CRU. The tree canopy coverage will need to be reduced to maximum 10%.	Principal contractor in consultation with NT Department of Health (Medical Entomology) and in accord with NT DCA DA Conditions.	Dimensions of buffer along western perimeter of 2CRU comply with Biting Insect Management Plan.
Threatened Sawfish			
No impact of increased recreational fishing in Sandy Creek and Buffalo Creek on Dwarf Sawfish and Green Sawfish	• Install signage at local popular fishing spots along Sandy Creek and Buffalo Creek informing public about threatened status of sawfish found in the creeks, identification guides, catch and release methods and contact details of NT Government, subject to authorisation from NTPWS.	Liaison between DHA and NT Government about reported threatened sawfish catches from Sandy Creek and Buffalo Creek.	No increased mortality rates of threatened sawfish due to increased fishing pressure along Sandy Creek and Buffalo Creek.

5 Water Management Sub-plan

5.1 Environmental values and risks

The hydrological values of the project site and adjoining areas that could potentially be impacted by the project include:

- Water quality of Sandy Creek, and potentially downstream receptors such as Casuarina Beach and Beagle Gulf.
- Groundwater supporting a 0.9 ha patch of Monsoon Vine-thicket along the eastern end of Muirhead North. The patch also receives sheet flows from the eastern and northern parts of 2 CRU via culverts beneath Lee Point Road.

Stormwater management also needs to consider the potential for breeding habitat for mosquitos. It is unlikely that that project will have an impact on the quality of Buffalo Creek, as Buffalo Creek is highly degraded and considered the most polluted waterway entering Darwin Harbour.

5.2 Management actions

A description of the management actions to mitigate impacts to hydrological values is provided below in **Table 8**. These actions are derived from the Stormwater Management Plans for 2CRU and Muirhead North. The management actions contained within stage specific NT Government ESCPs (Appendix B). will also contribute to achieving the objectives of the Water Management sub-plan.

Table 8. Water Management Sub-plan – management actions

Objective	Management Actions	Monitoring	Performance Indicators
Sandy Creek and Buffalo Creek			

Health and condition of three locations receiving discharge and down-stream receptors is maintained or improved if possible.	• As detailed in the Stormwater Management Plans, the following management actions will be undertaken as part of a treatment train of bioretention and detention basins, and vegetated swales:
	  ○ Maintain the existing flowrates of run-off from the project site.
	  ○ Remove 80% of Total Suspended Solids (TSS), 30% of Total Nitrogen (TN), 35% of Total Phosphorous (TP) and 93% of Gross Pollutants (GP).
	• The following commitments are addressed in the Erosion and Sediment Control Plan that is outlined in section 6.
	• Erosion gullies in south-west corner of site will be filled and revegetated in a staged manner, starting at the head of the gullies and working down the face of the escarpment. Works will be agreed with NT Government and Parks and Wildlife. Improvement of erosion gullies will require the construction of an underground stormwater line and access track requiring all weather capability.
	  ○ Sediment traps located around the property in accordance with the relevant ESCP.
	  ○ Minimise works in the wet season where possible.
	  ○ Clearly defined access points and haul roads.
	  ○ Stockpiles to be located upstream of any sediment control and secured with cover or binding agent if necessary.
		Monitoring processes are outlined in the conditioned Water Quality Monitoring Plan.	Water quality does not exceed thresholds of Water Quality Objectives defined in Water Quality Monitoring Plan.

Objective	Management Actions	Monitoring	Performance Indicators
Groundwater			
Maintain the quantity and quality of groundwater	• Retain the 22-ha patch of Monsoon Rainforest and Low Eucalypt Woodland along the western boundary of the site. • Retain and monitor 0.9 ha patch of Monsoon Vine-thicket in Muirhead North (within a larger 1.6 ha patch of native vegetation). • Maintain the proposed area of permeable surfaces that would ensure recharge of groundwater. • Ensure all chemicals are stored and handled in accordance with the Materials Safety Data Sheet (MSDS). • Any chemical spill is treated immediately. • Excavate and remediate any potential contamination of groundwater. • Review Stormwater Management Plan if the 0.9 ha patch of or Monsoon Vine-thicket patch within Muirhead North deteriorates by more than 10% based on 'monitoring' or 'performance indicators'.	Reviewing health of potential Groundwater Dependent Ecosystems as defined in Section 7.3.2.10 of the EIS. Monitoring is to commence following the completion of construction of adjacent stages (Muirhead north, stage 1B), for a period of 10 years bi-annually: - Two transects running from top to bottom of the site where the slope is less than 25% grade. - At ten metre intervals along transect record percentage cover and live/dead cover for ground layer, shrub layer and overstorey layer. For Monsoon Rainforest-patch, monitor: - At five locations through patch establish photo-monitoring points. - Map the boundary of patch.	Less than 10% change in any monitored parameter based on baseline conditions or control site.

Objective	Management Actions	Monitoring	Performance Indicators
		- Estimate canopy cover of overstorey species. - Identify all species presence and allocate a CAB rating. Reviewing will be completed by an independent ecologist. Reporting will be done annually and submitted to NT EPA and DCCEEW.	
Monsoon Rainforest Patch (Muirhead North)			
Maintain the flow of stormwater to Monsoon Rainforest Patch.	• The Stormwater Management Plan for Muirhead North contains measures to maintain the rate and volume of flow between the Muirhead North patch. • The Stormwater Management Plan includes measures designed to protect the Monsoon Vine Thicket within Muirhead North by ensuring appropriate drainage, preventing erosion, and maintaining soil moisture conditions required for its sustained viability.	Ongoing site management and reviewing by WQMP consultant during construction.	Pre-construction flow rates and volumes to Monsoon Rainforest patch are sustained.
Biting insects			
Retain amenity for users by preventing habitat for biting insect habitat from establishing.	• Treatment train to be developed as part of Stormwater Management Plans to comply with recommendations of the Biting Insect Report.	Resident complaints, site observations, liaison with entomologists	Compliance with Biting Insect Plan.
Acid-sulphate Soils			
Avoid exposing acid-sulphate soils during construction	• Test pits to be established throughout Stage 1B before construction commences for this Stage.	Test pits to be established prior to construction commencing in Stage 1B (MHN).	No acid-sulphate soils are detected. If encountered, an Acid-sulphate Soils

Objective	Management Actions	Monitoring	Performance Indicators
	• If acid-sulphate soils are encountered, an acid-sulphate soils management plan will be developed.		Management Plan will be developed by a suitable qualified expert.

Table

6 Erosion and Sediment Control Plan

6.1 Erosion and sediment control

Erosion and Sediment Control Plans (ESCPs) have been developed and approved by a Certified Professional in Erosion and Sediment Control (CPESC) (**Appendix C**) as a condition of both the EPBC assessment (EPBC 2015/7591) and the Northern Territory development permits (Condition precedent 6 of DP18/0409 and 7 of DP19/0050). ESCPs have been developed on a staged basis and are to be implemented as construction progresses.

The key objective of ESCPs is '*to take all reasonable and practicable measures to minimise short and long-term soil erosion and the adverse effects of sediment transport.*' (IECA Best Practice Erosion and Sediment Control (BPESC)). The intended outcomes of sediment and erosion control is to prevent or at least minimise environmental harm caused by the project. All erosion and sediment control measures must conform to the standards and specifications contained in:

- Development Permit DP18/0409
- The approved ESCP drawings
- The latest version of IECA Best Practice Erosion and Sediment Control guidelines.

Pre-existing eroded gullies in the south-west of 2CRU, formed from historical land use, are to be rehabilitated to address safety risks, reduce sedimentation into Sandy Creek, and control potential biting insect breeding sites. The works will involve vegetation clearing, excavation and landscaping across approximately 5.8 hectares within the CCR and aim to stabilise the area through the reinstatement of native vegetation, and naturalised discharge paths. The 5.8 ha includes the area of eroded gullies and a stormwater infrastructure corridor to manage flows and mitigate future erosion/environmental impact in the long term. The design and timing for these works are subject to approval by CPESC and NT Parks and Wildlife.

6.2 Management actions

If site conditions change significantly or there is a high risk of environmental harm due to sediment leaving the site, additional erosion and sediment control measures must be promptly implemented, and a revised NT Government ESCP must be submitted for approval. Any new or modified control measures must comply with BPESC until the amended ESCP is approved. A pre-wet season inspection with DLPE officers is required to confirm adequate controls, and contractors must keep sufficient materials on site for emergency repairs. The implementation of the ESCP will be regularly monitored, and additional measures may be required by the superintendent or the contractor to ensure compliance and environmental protection. The provided ESCP details serve as a guideline and may not include all necessary measures for approval compliance.

Table 9 summarises the recommended management actions for each season, including measures to minimise dust pollution during dry periods, reduce erosion and protect water quality during wet periods, and implement ongoing controls applicable throughout the project duration.

Table 9. Erosion and Sediment Control Plan - management actions

Objective	Management Actions	Monitoring	Performance Indicators
Dry season			
Control air quality through dust suppression.	• Ensure exposed soil surfaces are kept moist to supress dust. • Limit traffic movement on exposed soils. • Limit/minimise the extent of exposed soil at any given time where possible. • Stabilise exposed soils where works have completed with erosion treatments (such as soil binders, mulch, revegetation)	Ongoing site management and reviewing by principal contractor during construction. Record and respond to dust complaints from neighbouring residents or site personnel.	No increase in sedimentation. No significant complaints raised in relation to air quality. Complaints responded to in accordance with stage specific CEMP requirements (Appendix B, Section 4.3)
Wet season			
Reduce soil loss from runoff, erosion, and sedimentation	• Implement sediment control structures (kerb inlet traps, filter berms, Rock lined catch drains and sediment fences) as specified in the ESCP. • Divert surface runoff away from active excavations, manage discharge with filtration/isolation structures. • Implementation of Stormwater Management Plans.	Ongoing site management and reviewing by principal contractor during construction. WQMP for Sandy Creek.	. No significant impact to water quality within sandy creek.
Wet and dry season			

Objective	Management Actions			Monitoring	Performance Indicators
Implement all aspects of ESCPs prior to the progression to subsequent stages of construction.	• Control movement of traffic within the site, reduce speed limits to minimise dust generation. • No additional clearing or disturbance beyond the limit of works of a particular stage. • Maintenance and monitoring of the ESC measures are to be undertaken for the life of the project. • Stripped topsoil for re-use is to be stockpiled appropriately and protected from wind, runoff erosion, and weed infestation. • Revegetation / stabilisation works are to occur as early as practicable on cleared / disturbed areas. • Undertake inductions of staff to emphasise the importance of erosion and sediment control.	Ongoing site management and reviewing by head contractor during construction. Implementation of Stormwater Management Plans. WQMP for Sandy Creek. Dust complaints from adjoining residents, workers.	No significant impact to water quality within Sandy Creek. Bioretention and detention basins working to specification.		

7 Heritage Management Sub-plan

7.1 Environmental values and risks

The historic and cultural heritage values that occur within the project site, as well as potential impacts and risks to historic and cultural heritage values associated with project activities, are described in Chapter 7 of the EIS. The historic and cultural heritage values include:

- Military heritage s at the Lee Point Bunker and Konfrontasi Cruciform sites.
- Background scatter of Aboriginal stone artefacts.

The site does not support any items listed on the Commonwealth or Northern Territory cultural heritage lists.

It also does not support any Aboriginal Sacred Sites registered under the *Northern Territory Aboriginal Sacred Sites Act.*

Management actions

The management actions that support the Heritage Management Sub-plan are provided below in **10**.

See appendix B – Stantec CEMP V8 section 7 or most recently NT Government approved CEMP (note: stage specific CEMPs prepared per NT Government Development Permit Conditions Precedence requirements will change from time to time) for further construction specific management of cultural heritage aspects of the project.

Table 10. Heritage Management Sub-plan – management actions

Objective	Management Actions	Monitoring	Performance Indicators
Military heritage			
Preserve important heritage items that reflect the site's military history, where possible.	• Retain the Lee Point bunkers and Konfrontasi Cruciform. • Fence off these items during clearing (if required) • Work with local NT Heritage Branch to develop signage and interpretation material of Lee Point Bunkers and Konfrontasi Cruciform. • Site training and induction program (refer to Section 3.1, training, and awareness) • New resident information package distributed via the DHA website when these areas are made publicly available.	Document condition in monitoring checklist (Appendix A)	Residents have an understanding of the military history of the site. Condition is maintained to uphold aesthetic values
Stone scatters			
Destruction of stone scatters is in accordance with heritage regulations.	• Traditional Owners in attendance as required to undertake heritage monitoring during clearing works to detect any other Aboriginal artefacts not detected during original survey. • Apply for an approval under Section 72 of the NT *Heritage Act* before carrying out any works within a 20m area of stone scatters when identified. • Site training and induction program (refer to Section 3.1, training, and awareness)	Detail how the management of stone scatters is being handled within monitoring checklist (Appendix A)	Compliance with NT *Heritage Act*
Aboriginal sacred sites			

Objective	Management Actions	Monitoring	Performance Indicators
There are no listed sacred sites within the project site; however, there are sacred sites in close proximity along Casuarina Beach. An Authority Certificate has been obtained from the AAPA.	• Comply with conditions of AAPA Authority Certificate (C2018/060) • Site training and induction program (refer to Section3. 1, training and awareness)	Assess all new excavations for evidence of artifacts and document findings in monitoring checklist (Appendix A)	Compliance with NT *Aboriginal Sacred Sites Act.*

8 Noise Management Sub Plan

8.1 Environmental values and risks

Potential impacts and risks associated with project noise and vibration include adverse effects on human health, sleep disturbance, annoyance to residents. An exhaustive list of these risks are detailed in Chapter 9 of the EIS and are relevant to both operational and construction phases of the project. Further, a comprehensive strategy to manage construction impacts is detailed within Appendix B – Stantec CEMP CRU CEMPV8, Section 10, or updated NT Government approved CEMP as they become superseded. Where complaints are received from site workers or adjacent sensitive receptors, the principal contractor will initiate an investigation to determine their significance, assess whether they are reasonable or unavoidable, confirm if all reasonable and practical dust suppression measures have been implemented, and implement nominated corrective actions as described within the stage-specific Northern territory CEMP (Appendix B, Section 10.7).

8.2 Management actions

Management actions to minimise noise and vibration impacts are summarised in **Table 11**. These actions aim to maintain the health and amenity of workers and adjoining residents while preserving structural integrity of nearby assets under extreme circumstances.

Table 11. Noise Management Sub-plan – management actions

Objective	Management Actions	Monitoring	Performance Indicators
Operational noise			
Protect the health and wellbeing of workers and nearby residents.	Works are to comply with NTEPA Noise management framework guidelines (NMFG) and the contractors Noise Management Plan (NMP), where necessary control measures to be employed may include: • The fitting of effective exhaust silencers to all mobile plant. • Fit engine acoustic shielding on significant noise producing plant. • Use exhaust silencers on compressed air exhausts. • Review times of operation of plant.	Monitoring of complaints and worker health assessments.	No unreasonable deterioration in workers' or adjoining residents' health. No significant complaints received from residents.
Construction noise			
Protect the health and wellbeing of workers and nearby residents.	• Ensure contractor develops and implements Noise Management Plan (NMP) in accordance with NTEPA Noise Management Framework Guidelines. Contractors to comply with National Standard for Occupational Noise [NOHSC: 1007(2000)] to prevent occupational noise induced hearing loss.	Monitoring of complaints and worker health assessments.	No unreasonable deterioration in workers' or adjoining residents' health. No significant complaints received from residents.
Operational and Construction vibration			
Protect building structures and safeguard the health and wellbeing of workers and nearby residents.	• Operations to comply with section 2.2 *ANZECC guidelines – Technical basis for Building to Minimize Annoyance due to Blasting, Over Pressure and Ground Vibration (1990)* during construction.	Monitoring of complaints and worker health assessments.	No deterioration in workers' or adjoining residents' health. No significant complaints

			received from residents.

9 Air Quality Management Sub Plan

9.1 Environmental values and risks

Potential impacts to air quality associated with construction activities include dust generation during clearing, excavation, and haulage operations, as well as potential asbestos contamination risks during removal of legacy asbestos-containing infrastructure. An Odour Impact Assessment determined that the project site is located over one kilometre from the plume extent of the Leanyer Sanderson Wastewater Treatment Plant; however, community complaints indicate that odour intensity increases during plant maintenance or operational breakdowns. Additionally, residual asbestos-containing material (ACM) fragments may be present on the surface at 2CRU and Muirhead North, posing potential human health risks. A comprehensive strategy to manage the construction impacts can be found detailed within Appendix B – Stantec CEMP CRU CEMP V8 (or updated NT Government approved CEMP) section 9. Where complaints are received from site workers or adjacent sensitive receptors, the principal contractor will initiate an investigation to determine their significance whether reasonable, unavoidable, or if all reasonable and practical dust suppression measures have been implemented; and implement nominated corrective actions as described within the stage specific NT Government CEMP (appendix B, Section 9.6).

9.2 Management actions

Management actions for air quality are summarised in **Table 12.** These include measures to manage asbestos risks, control dust emissions, and address potential odour impacts to maintain air quality and protect environmental and human health.

Table 12. Air Quality Management Sub-plan – management actions

Objective	Management Actions	Monitoring	Performance Indicators
Avoid Disturbing friable asbestos	• Remove two 450 m parallel asbestos pipes in 2CRU using trained and certified removal contractors. • Contractors to investigate / test any samples suspected as being an asbestos containing material.	Certification from asbestos contractor / environmental auditor. Report any findings in monitoring checklist (Appendix A)	No impact on human health from asbestos removal activities.
Maintain respiratory health of workers and adjoining residents; no adverse impacts on vegetation	• Notify adjoining residents prior to significant dust producing works commencing. • Vegetation cleared in accordance with the approved land clearing plan. Periodically Water haul roads and exposed areas to suppress dust. • Ensure vehicles adhere to speed limits and remain on formed roads where possible. • Clearly mark traffic areas. • Stabilise long exposed areas through hydromulching, top dressing with gravel or mulch. • Rehabilitate disturbed areas as soon as practicable.	Complaints by adjoining residents Report any identified exposed area in monitoring checklist (Appendix A)	No decline in respiratory health of staff/adjoining residents, or decline in vegetation health, that can be attributed to the project.

10 Supporting Documents

The following documents support the actions proposed in this CEMP and can be found in the appendices of the CEMP. A list of guidelines that have been referenced in preparing this document are also provided.

10.1 Technical Studies and Reports

NT Department of Health 2016. Muirhead North and 2CRU Biting Insect Report. Final report prepared for Defence Housing Australia. Medical Entomology Centre for Disease Control, NT Department of Health, Darwin.

The Odour Unit Pty Ltd 2017. Odour Impact Assessment - field odour inspection of Leanyer-Sanderson WWTP, Darwin NT, Final Report prepared for Defence Housing Authority. The Odour Unity Pty Ltd, Perth, WA.

Lilleyman A 2017. Report on potential impacts from disturbance to migratory shorebirds in Darwin: Defence Housing Authority – Lee Point Master-planned Urban Development. Report prepared for EcOz Environmental Consultants, January 2017.

Cardno 2016a. Noise Impact Assessment. Darwin 2CRU Development. Final Report Prepared for Defence Housing Authority, December 2016.

Cardno 2016b. Noise Impact Assessment. Darwin Muirhead North Development. Final Report Prepared for Defence Housing Authority, December 2016.

10.2 Stand-alone Management Plans

Cardno 2017a. Stormwater Management Plan. 2CRU – Lee Point Road, Lee Point. Final Report Prepared for Defence Housing Authority, October 2017.

Cardno 2017b. Stormwater Management Plan. 2CRU – Lee Point Road, Lee Point. Final Report Prepared for Defence Housing Authority, October 2017.

Ecology and Heritage Partners Pty Ltd 2017. Lee Point Master-planned Urban Development – Water Quality Monitoring Plan. Draft report prepared for Defence Housing Australia, October 2017.

Ecology and Heritage Partners 2023. Shorebird Monitoring Plan: Lee Point Master-planned Urban Development, Darwin, Northern Territory. Report prepared for Defence Housing Australia, November 2023.

10.3 Guidelines

NT EPA 2017. Recommended Land Use Separation Distance Guidelines. Northern Territory Environment Protection Authority, Darwin, NT.

NT EPA 2015. Guidance for the Preparation of an Environmental Management Plan. Northern Territory Environment Protection Authority, Darwin, NT.

NT EPA 2013. Guidelines for the Preparation of a Social Economic Impact Assessment. Northern Territory Environment Protection Authority, Darwin, NT.

IECA 2016. Best Practice Erosion and Sediment Control Guidelines. International Erosion Control Association Australian Chapter, Picton, NSW.

Appendices

Appendix A – CEMP Inspection Checklist

This monthly checklist will be completed during construction by the superintendent and verifies that environmental management strategies are implemented and that no negative impacts have occurred during works. It will document compliance with CEMP commitments and approval conditions, and to support monitoring, reporting, and adaptive management throughout construction.

Monthly Environmental Inspection Checklist				
Date:				
Inspected by / company:				
Environmental Element	Yes	N/A	No	Comments/Photos
Pre-Clearing Commitments				
Biodiversity				
Stage specific weed management completed (dates, locations, contractor).				
Wash-down bays available and in use.				
Are all areas of native vegetation to be retained within the area of civil works or immediately adjoining, fenced off prior to works commencing.				
Fauna Spotter Catcher present prior to any vegetation removal.				
Contractor training and inductions completed for biodiversity and weed hygiene requirements.				
Water				
All ESCP measures required prior to clearing are installed to satisfaction of the CPESC				
Heritage				
Confirmation of no planned works impacting known military heritage sites.				
Site has been checked for any visible Indigenous heritage artefacts prior to disturbance.				
Contractor training and inductions completed for cultural heritage requirements.				
Post-clearing commitments				
Biodiversity				
Evidence of increased weed spread or potential introduction of weed seed to site.				

Any disturbance in areas of native vegetation to be retained attributable to project activities (vehicles, machinery, equipment).				
Number and location of Darwin Cycads salvaged and relocated.				
Status of revegetation measures checked.				
Water				
Water quality monitoring of Sandy Creek completed.				
Bioretention and detention basins inspected and working to specification.				
No interactions with groundwater during clearance work or excavations.				
No contamination spills that may have polluted groundwater.				
Any pooling of water observed suitable for biting insect breeding.				
Heritage				
No damage or destruction of military heritage sites to be conserved.				
Any Indigenous/heritage artefacts discovered during works.				
Notification protocols followed for any heritage finds in accordance with EPBC Act approval requirements.				
General				
Twice-yearly vegetation monitoring of Monsoon Rainforest and Monsoon Vine Thicket completed or scheduled.				
Migratory shorebird monitoring completed for this month.				
Any complaints received from adjoining landowners or residents.				
Further comments, including communication with referral or regulatory authorities about potential breaches of the CEMP.				
Name				
Signed:				

Appendix B – Stantec CEMP V8) Later versions will be required by and approved by NT Government. Subsequent revisions are to replace Stantec CEMP V8 within this EPBC CEMP and references within the EPBC CEMP to Stantec CEMP V8 should be replaced with the latest NT Government approved CEMP version.

Stantec

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN – CIVIL CONSTRUCTION
'2CRU' Subdivision
Lot 4873, Town of Nightcliff

20 September 2024

Prepared for:
Defence Housing Australia

Prepared by:
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1	15/02/2022	Internal review	DMB	
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3	4/04/2022	Final	DMB	AGO
4	13/06/2022	Amend allowable working hours	DMB	AGO
5	28/06/2023	Update Contractor's contact details and Section 7	DMB	AGO
6	26/04/2024	Update contact details in Table 4-3	DMB	AGO
7	10/05/2024	Updates to Section 4.6, Section 13	DMB	AGO
8	20/09/2024	Various updates to align with the overall project CMP and current project status	DMB	AGO

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Tables

Figures

1 Introduction

In February 2016, Stantec Australia Pty Ltd (Stantec, formerly Cardno (NT) Pty Ltd) was engaged by Defence Housing Australia (DHA) to carry out the detailed engineering design and documentation of the 2CRU subdivision and associated external works at Lee Point in Darwin, Northern Territory.

This document serves as the Construction Environmental Management Plan (CEMP) for the civil construction works for the subdivision. This CEMP relates to the current stage(s) of the 2CRU subdivision, which forms part of the overall Lee Point Development. The CEMP will be updated during the life of the project to reflect any changes in scope, stage-specific considerations, legislative requirements and site contact details.

1.1 Background

The 2CRU project is situated on an 81-hectare parcel of land located approximately 17km by road north-east of the Darwin CBD. The site is bordered to the west and north by Casuarina Coastal Reserve, to the south by Lyons and Royal Darwin Hospital and to the east by Lee Point Road.

The site is a former Department of Defence (Defence) radar installation that was operated by the 2 Control and Reporting Unit (2CRU). It is partly vegetated, with areas of historical clearing and several unformed tracks. A 22-hectare conservation parcel will be preserved on the western side of the development and dedicated to the Casuarina Coastal Reserve. A further 11.3 hectares will be set aside for parks and public open space.

A military heritage site (the 'Bunkers') is located within Lot 4873 parcel near the northern boundary. The heritage site has been identified on the master plan.

The project was referred and assessed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* and by the Northern Territory Environment Protection Authority (NTEPA) and the preparation of an Environmental Impact Statement (EIS) was requested on 18 January 2016. A draft EIS was prepared in response to Australian Government and NTEPA Terms of Reference, and underwent a 12-week public exhibition period between 18 November 2017 and 1 February 2018. A Supplement to the draft EIS was requested on 8 February 2018 and submitted on 3 August 2018. Updated maps were provided to the NT EPA on 16 October 2018. The EIS assessment was concluded with issue of Assessment Report 88 by NTEPA on 30 October 2018. Development Permit DP18/0409 was issued on 30 November 2018.

The development consists of 5 stages with an expected total yield of up to 513 lots. Currently, 488 standard urban lots, 8 Medium Density lots, 4 Mixed Use lots, 4 Tourism lots and commercial lots are planned.

The site location and proposed staging plan are depicted in Figures 1-1 and 1-2 below.

Figure 1-1 Location plan

Figure 1-2 Proposed staging

1.2 Contractual Obligations

This CEMP addresses the requirements for the environmental management of civil construction activities from the commencement of works on site until final completion. During this phase, the civil contractor is responsible for ensuring that the provisions and requirements of this CEMP are met.

The CEMP will be updated during the course of the project to reflect any changes in scope, stage-specific considerations, legislative requirements and site contact details.

Condition Precedent 3 of the Development Permit DP18/0409 requires the preparation of this CEMP to include provision for environmental controls for construction works. The CEMP is to be adopted and its recommendations are to be implemented prior to and during the civil construction works to the satisfaction of the Development Consent Authority.

The CEMP includes details of requirements for waste management, traffic management, haulage routes, stormwater drainage, erosion and sediment control, management of dust, noise and vibration impacts, communication and complaints protocols. This is in line with and to meet the requirements of the Development Permit condition.

2 Legislative Requirements, Standards and Guidelines

2.1 Standards, Guidelines and Policies

Standards, guidelines, and policies relevant to the project include:

- Noise Guidelines for Development Sites in the Northern Territory, NTEPA (2014);
- Noise Management Framework Guideline, NTEPA (2018);
- Erosion and Sediment Control Guidelines, DEPWS;
- Best Practice Erosion and Sediment Control, IECA;
- Lee Point Master-planned Urban Development – Water Quality Monitoring Plan, Ecology & Heritage Partners (2017);
- Workplace Exposure Standards for Airborne Contaminants, Safe Work Australia;
- Subdivision and Development Guidelines, Darwin City Council, including any departures from the guidelines agreed with City of Darwin;
- Waste Management and Pollution Control Act (1998);
- Heritage Act (2011);
- Bushfires Management Act (2016);
- Weeds Management Act (2001), and the Northern Territory Weed Management Handbook (2018);
- Workplace Health and Safety Regulations; and
- Northern Territory Planning Scheme.

2.2 Legislative Requirements

Table 2-1 Environmental Legislation Relevant to the Project

Legislation	Legislation Requirement	Project Relevance
Commonwealth Act: Aboriginal and Torres Strait Islander Heritage Protection Act 1984	The purpose of this Act is the preservation and protection from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition.	A Person who discovers anything that he or she has reasonable grounds to suspect to be Aboriginal remains shall report his or her discovery to the Minister, giving particulars of the remains and of their location (Section 20). Any discovery of Aboriginal and Torres Strait Islander remains must be reported immediately to AAPA.
Commonwealth: Environmental Protection and Biodiversity Act 1999 (EPBC)	The EPBC Act requires that proposed actions to be taken which are likely to have significant impact on matters of national environmental significance (NES) shall be referred to the Minister for a decision if it will be subject to a rigorous assessment and approval process. The EPBC Act also applies to actions that are likely to have a significant impact on the environment of Commonwealth Land and to actions taken by the Commonwealth that will have a significant impact on the environment anywhere.	Environmental Impact Statement (EIS) submitted in response to terms of reference provided by NTEPA, including mitigation of impacts to water quality, air quality, noise, biodiversity and heritage
NT Act: Soil Conservation and Land Utilization Act 1969	Makes provisions for the prevention of soil erosion and for the conservation and reclamation of soil.	Erosion and sedimentation measures will be required during construction of the development.

NT Act: Dangerous Goods Act 1998	This act provides definition and regulatory requirement for handling, transporting and storage of dangerous goods as defined by the Act.	A license may be required for the storage, transport and handling of fuels, chemicals or other dangerous goods during construction.
NT Act: Water Act 1992	An Act to provide for the investigation, allocation, use, control, protection, management and administration of water resources, and for related purposes.	Erosion and sediment control and water quality treatment infrastructure will be required to treat the stormwater discharge prior to release to the waterways.
NT Act: Planning Act 1999	The objectives of this Act are to plan for, and provide a framework of controls for, the orderly use and development of land in the NT.	Development Permit DP18/0409 issued by Development Consent Authority on 30November 2018 to use and develop the land for the purpose of a subdivision to create 513 lots.
NT Act: Waste Management and Pollution Control Act 1998	The objectives of this Act are to protect the environment by preventing, reducing or avoiding pollution; effective waste management and encouraging sustainable development.	Construction works must ensure that waste is safely and effectively managed without detrimental impact to the environment. Pollution levels arising from the development must be managed to prevent nuisance or harm to the surrounding community or environment.
NT Act: Territory Parks and Wildlife Conservation Act 1976	The act makes provision for conservation, management and relocation of wildlife in the NT. A permit is required to take or interfere with Wildlife.	A permit is required to take or interfere with Wildlife.
NT Act: Northern Territory Aboriginal Sacred Sites Act 1989	Aims to build enhanced relations between Aboriginal and other citizens with regard to effective land use within a regime of sacred site protection, for the benefit of all Territorians. All Aboriginal sacred sites are protected under the Act.	Compliance with Aboriginal Areas Protection Authority (AAPA) Authority Certificates C2018/060. Clearing and disturbing culturally significant trees within nominated areas of cultural significance shall be avoided. Immediately stop work in the event that items of possible significance are identified

Any changes to the legislation, standards, policies and guidelines during the staged development will need to be reviewed and its impact on the development shall be distributed to the project team.

3 Project Scope and Risk Assessment

3.1 Construction Activities

The proposed development of 2CRU will include the following construction activities:

- Land clearing progressively for staged construction. No land clearing shall extend beyond the limits of the clearing plan for the respective stage it relates to;
- Cut and fill earthworks;
- Road pavement construction;
- Road surfacing;
- Concrete works including driveways, footpaths and kerb and gutters;
- Construction of open drains;
- Construction of detention basins and outfall drain;
- Construction of stormwater pits and pipes;
- Construction of protection works including gabions, grouted stone pitching and rock weirs;
- Services trenching;
- Construction of water reticulation and service connections;
- Construction of sewer reticulation and service connections;
- Construction of electrical reticulation and service connections;
- Construction of street lighting;
- Construction of telecommunication (NBN) reticulation and service connections;
- Landscaping works including topsoiling and grassing; and
- Implementation of Erosion and Sediment Control measures pre, during and post-construction.

3.2 Risk Assessment

A risk assessment was undertaken to assess potential health, safety and environmental risks that may arise during the construction process. Refer to Tables 3-1 to 3-5 below.

Table 3-1 Risk Matrix

	CONSEQUENCE SEVERITY				
LIKELIHOOD OR FREQUENCY	1 INSIGNIFICANT	2 MINOR	3 MODERATE	4 MAJOR	5 CATASTROPHIC
A – ALMOST CERTAIN	MODERATE 11	HIGH 16	EXTREME 20	EXTREME 23	EXTREME 25
B – LIKELY	MODERATE 7	HIGH 13	HIGH 17	EXTREME 21	EXTREME 24
C – POSSIBLE	MODERATE 5	MODERATE 8	HIGH 14	HIGH 18	EXTREME 22
D – UNLIKELY	LOW 2	LOW 4	MODERATE 9	HIGH 15	HIGH 19
E - RARE	LOW 1	LOW 3	MODERATE 6	MODERATE 10	MODERATE 12

Table 3-2 Risk Category Table

Risk Category	
E = EXTREME RISK	Immediate action required to implement better controls. Activity must not start. If started, activity must immediately be stopped. Superintendent's approval is required for work to commence or recommence.
H = HIGH RISK	Seek manager approval for work to commence or continue. More suitable controls to be investigated.
M = MODERATE RISK	Work to proceed once risk is reduced as low as reasonably practicable and controls are implemented
L = LOW RISK	Work to proceed while monitoring and managing risk

Table 3-3 Qualitative Measures of Impact – Consequence

Level	Impact	Example of Consequence
1	INSIGNIFICANT	No injuries; No environmental impact
2	MINOR	First aid; Environmental release immediately contained
3	MODERATE	Medical treatment; Environmental release not immediately contained with no detrimental effects
4	MAJOR	Lost time injury/illness; Environmental release not immediately contained with toxic effects
5	CATASTROPHIC	Fatality; Release to the environment with long term/permanent toxic effects

Table 3-4 Qualitative Measures of Likelihood

Level	Measure	Description	Guide
A	ALMOST CERTAIN	The event is expected to occur in most circumstances	Once or several times a day
B	LIKELY	Will probably occur in most circumstances	Once per week
C	POSSIBLE	Might occur at some time	Once per month
D	UNLIKELY	Could occur at some time	Once per year
E	RARE	May occur only in exceptional circumstances	May occur once per ten years

Table 3-5 Health Safety & Environment Risk Assessment Summary

Item	Job Step	Hazard	Consequences	Risk Rating	Control Method	Residual Risk Rating
1	Construction	Other Vehicles, Speed, Animals	Vehicle Crash	High 14	> Follow site traffic rules at all times > Only drive roadworthy and registered vehicles > Only licensed drivers to drive vehicles for which they are approved > Drive to conditions > Wear a seatbelt > Do not drive while fatigued > Be aware that wildlife may be on the road especially at dusk and dawn	Low 4
2	Construction	Workers/ Pedestrian	Persons hit by vehicle	High 19	> Drive at the recommended site speed and slow down around workers > Continuously scan the road/surroundings for pedestrian movements > Use appropriate communications	Moderate 12
3	Construction	Endangered Flora and Fauna	Loss of endangered Flora and Fauna	High 17	> Consult with Superintendent and DEPWS where applicable	Moderate 12
4	Construction	Noise	Hearing Loss, impact on community amenity	Extreme 21	> Ensure noise level generated during construction is within safe acceptable level > Adhere to 'Noise Guidelines for Development Sites in The Northern Territory'	High 17
5	Construction	Uneven / Unstable / Loose Surfaces	Vehicle rollover, vehicle bogged, vehicle crash	Moderate 10	> Do not drive in unfamiliar terrain, unless site condition is known > Maintain appropriate safe distance from batter edges and water > Use spotter when reversing in inspection site or if near mobile/fixed plant > If undertaking inspection in water, ensure depth is checked and monitored	Low 3
6	Construction	Weather conditions (limited visibility)	Vehicle Crash Hitting a person or object.	High 15	> Delay inspection if weather conditions do not allow for safe driving (fog, rainy) > Drive to conditions and slow down or stop if visibility is poor.	Moderate 10
7	Construction	Drugs and Alcohol	Vehicle Crash Hitting a person or object.	Extreme 23	> Do not drive or attend site under the influence of Drugs or Alcohol.	Moderate 10
8	Construction	Reversing	Hitting a person or object.	High 18	> Keep reversing to a minimum. > Use mirrors and perform head checks > If you cannot see, get out and look.	Moderate 10
9	Construction	Parking	Hitting a person or object	High 18	> Vehicle must be parked in designated areas. > Do not stop or park in an area that will obstruct clearways, walkways, pedestrian crossings, etc.	Moderate 10

Item	Job Step	Hazard	Consequences	Risk Rating	Control Method	Residual Risk Rating
10	Construction	Using handheld devices (Mobile Phones, GPS)	Hit by mobile plant Hit by falling object	High 19	> Driver is not to use any handheld devices (e.g. mobile phone, cameras), while driving.	Moderate 10
11	Construction	Waterways	Pollution to waterways	Extreme 24	> Implement erosion and sediment control measures > Test water quality periodically > Ensure stormwater treatment train is functioning efficiently > Inspect and maintain sediment basin regularly	Moderate 10
12	Construction	Uneven, unstable and slippery surfaces:	Slips, trips and falls causing abrasions, strains and lacerations.	High 18	> Visually inspect surroundings and identify hazards, report and ensure these are removed or controlled. > Extreme care should be taken when walking along embankments adjacent to water, steep batters and other slippery/unstable surfaces. > Maintain a 2m distance from steep drops, rock walls or pit walls.	Moderate 10
13	Construction	New electrical installations	Electrocution	Extreme 22	> Be aware of any new electrical installations and always treat electrical wiring as live and do not touch until cleared as safe to work on. > Report any exposed wiring that is not capped or taped.	Moderate 12
14	Construction	Confined Spaces	Lack of oxygen / atmospheric contaminants Flammable atmosphere Engulfment Entrapment	High 19	> Undertake Confined Spaces Awareness training. > Do not enter a confined space without consultation with your supervisor or without qualified training and accreditation.	Low 1 (no entry) Moderate 12 (entry)
15	Construction	Mobile Plant (Excavating machinery, light vehicles, cranes, drill rigs)	Person being hit by mobile plant	High 19	> Wear high visibility vests or shirts > Do not walk along carriageway unless it is safe to do so > Where appropriate, use someone as spotter to scan surroundings for any moving vehicles > Where available use pedestrian crossing > Obtain permission from the operator to enter a plant designated area > Always approach plant from the front, always gain eye contact with the driver before moving into the hazard zone > Inspection must not be carried out within 3 meters of mobile plant/plants, or within 5m of suspended loads. Be aware of reversing mobile plant, listen for reversing alarm > Walk in designated "safe zones"	Moderate 12

Item	Job Step	Hazard	Consequences	Risk Rating	Control Method	Residual Risk Rating
					> Persons working on public roads are to be trained in accordance with AS1742. > Maintain appropriate communications and use spotters where required.	
16	Construction	Situational awareness	Getting lost and not maintaining concentration leading to an incident and personal injury.	Extreme 22	> Do not proceed onto a site unless you are either inducted onto that site by a suitably trained person, OR, you are escorted at all times by an authorised person.	Moderate 12
17	Construction	Overhead / Under-ground Power Lines	Electrocution	High 19	> Check for any low overhead power lines at site and check with site foreman. > Do not work near overhead power lines if they are sagging and it is windy and/or rainy. > Ensure appropriate clearance from overhead power lines (suggested 8 metre distance from high voltage) > Do not excavate until area has been cleared of existing services.	Moderate 12
18	Construction	Falling objects	Person being hit by falling objects	High 19	> Be aware of surroundings and always scan above and around for hazards. > PPE – Hardhat. > Maintain safe distance from suspended loads.	Moderate 12
19	Construction	Dust/fumes	Inhalation, respiratory affects, eye affects, loss of community amenity	Moderate 9	> Avoid prolonged exposure to dust/fumes by keeping reasonable distance from sources of fumes if possible > Wear protective respiratory mask and safety glasses where appropriate > Ensure appropriate dust control measures are implemented.	Moderate 6
20	Construction	Uncapped or exposed reinforce-ment bars or untidy workplace	Cuts, Abrasions, Impaling	High 18	> All exposed reinforcement bars to be capped > Workplace to be kept clear of debris and trip hazards.	Moderate 5
21	Construction	Using handheld devices	Person being hit by mobile plant	High 19	> Do not use mobile phone or camera in the vicinity of moving vehicles. > Make phone calls in your vehicle if it is nearby, behind a barrier or in a designated safe zone.	Moderate 12

4 Implementation and Communications

4.1 Project Team Resources

The following personnel will be required to implement the CEMP:

- Construction Project Manager
- Construction HSE Manager
- Construction Site Foreman
- Construction Labourers; and
- Subcontractors.

4.2 Communication Processes

Communication processes for the project will be organised in accordance with Table 4-1 below.

Table 4-1 Communication Process

Subject	Responsibility	Action	Frequency
CEMP approval	Project Manager	Submit to approval agency	Minimum 7 days prior to works commencing. Live document updated as required
CEMP distribution	Project Manager	Distribute for implementation	Prior to commencement of site inductions
Liaison with City of Darwin, DEPWS	Project Manager	Notify CoD and DEPWS of project start date, contact details	Prior to start of work
Notify local residences of project start, contact details and any anticipated possible nuisance or service disturbances	HSE/Project Manager	Deliver information pamphlet	Minimum 7 days prior to works commencing and as required during construction.
Community Complaints	Project Manager	Record complaints and actions taken to resolve. Notify DHA, CoD and DEPWS within 24 hours where applicable	As required
Injured Wildlife	HSE Officer	Record in wildlife register	As required
Discovery of protected or threatened flora and fauna	HSE Officer	Advise DEPWS	As required
Environmental observations	HSE Officer	Record in environmental register	Weekly and after major storm event
Pollution	HSE Officer / Project Manager	Record in environmental register and report incident to the relevant agency	As soon as practicable after incident
After hours works	Project Manager	Deliver information pamphlet	After approval given by CoD and at least 5 days prior to work commencing
Archaeological, heritage and Aboriginal remains	Project Manager	Inform AAPA or DEPWS as appropriate	Same day
Audit	Environmental Auditor	Provide report	Every 12 months
Management Review	Project Manager and Environmental Officer	Provide minute of meetings	Every 12 months

4.3 Complaints Management

The following steps will be taken during construction to address complaints:

- List the project contact details for complaints on DHA's project website and the Contractor's website;
- Install sign boards at the site access point or on the fence bordering the community, containing contact person position, phone number and email address; and
- Contractor to maintain a register of any complaints made. Actions taken to resolve the complaint should be made available to DHA, City of Darwin and DEPWS (as appropriate) as soon as practicable after a complaint has been made.

4.4 Contractor's Site Management Plan

An Integrated Project Management Plan (IPMP) shall be developed by the Contractor to incorporate the requirements of this CEMP with the Contractor's proposed construction methodology. The IPMP shall also address any additional requirements contained within the approvals to undertake the works, obtained by the Principal.

Where required, traffic management for the site access and construction activities shall be addressed within a Traffic Management Plan (TMP) and submitted to the authority for approval.

The Contractor should address the following details in their IPMP:

- Work Hours
- Plant and Equipment
- Timing and Scheduling
- Site Facilities
- Storage, handling and transporting dangerous goods
- Environmental training
- Waste Management
- Incident Management
- Site Induction
- Staff training
- Pre-start toolbox session
- Training Records; and
- Environmental risk control measures.

4.5 Work Hours

Construction activities including delivery of materials and supplies are restricted to the times set out in Table 4-2 below or as stated in the Contract. The working hours in Table 4-2 in accordance with NTEPA's Noise Management Framework Guideline.

Table 4-2 Work Hours

Day	Time	Restriction
Monday to Saturday	7AM to 7PM	Allowed
Sunday and Public Holidays	9AM to 6PM	Allowed
After Hours		Permit required

4.6 Project Contacts

The following personnel and organisations can be contacted regarding the management of the site during construction. The Project Contracts list will be updated during the life of the project as required.

Table 4-3 Project Contacts

Organisation	Position	Name	Number
DHA	Senior Development Manager	Chris Grimm	(03) 9947 8111
Stantec	Principal Civil Engineer	David Bramley	(08) 8942 8200
City of Darwin	Customer Service	Customer Service	(08) 8930 0300
City of Darwin	Customer Service	Emergency After Hours	1800 099 557
Stantec	Superintendent's Representative	David Bramley	(08) 8942 8200
Stantec	Civil Engineer	Chris Kessaris	(08) 8942 8200
Civil Contractor (TBA)[1]	Project Manager	TBA[1]	TBA[1]
Civil Contractor (TBA)[1]	Environmental Officer	TBA[1]	TBA[1]
Civil Contractor (TBA)[1]	Site Foreman	TBA[1]	TBA[1]
Ambulance/Fire/ Police	Emergency		000
Police	NT Police (Darwin)		131 444
Hospital	Royal Darwin Hospital		(08) 8922 8888
Poison	Poisons Information		131 126
Cyclone	Tropical Cyclone Information		1300 659 211
Wildcare NT	Injured Animal Organisation		(08) 8988 6121 0408 885 341
Aboriginal Areas Protection Authority	AAPA	General Enquiries	(08) 8999 4365
Department of Environment, Parks and Water Security	Bushfires, Environment, Flora & Fauna, Weed Management, Water Resources, Rangelands	General Enquiries	(08) 8999 5511

[1] Contact details to be updated upon award of civil construction contract

5 Site Control and Waste Management

5.1 Policy

To maintain construction compounds and the site in a neat and tidy state without build-up of litter and waste, and to provide a safe facility for the storage of construction equipment and materials.

5.2 Performance Objectives

To maintain construction compounds in a neat and tidy state without build-up of litter and waste, and to provide a safe facility for the storage of construction equipment and materials. The site shall be maintained in a safe and tidy condition. Waste materials generated on site shall be stored in safe temporary storage prior to final disposal. All relevant NTEPA guidelines and Council by-laws shall be complied with.

5.3 Control Measures

As part of the IPMP, the Contractor shall establish a Litter and Waste Control Plan to manage the collection, storage and removal of all litter and waste on the site.

Litter and waste, including pre-existing materials, construction waste, human waste, used oils and any other surplus materials, shall not be disposed of on site. Material shall not be burnt or buried on site. All such materials shall be collected as they are accumulated, using appropriate methods to enable their future removal from the site. All such materials shall be stored on site in approved secure, confined area(s).

Specific areas shall be set aside for the storage of construction materials. If required on site, a safe storage location for fuels and oils shall be provided in accordance with AS 1940 "The Storage and Handling of Combustible Liquids". This area shall be bunded in compliance with the standard.

5.4 Monitoring

The Contractor shall construct, maintain and record details of work areas, fencing, storage locations and access roads. Weekly inspections of the site by the Contractor are required to verify locations and storage of litter and waste on the site.

5.5 Reporting

Records of removal of oils, litter and waste shall be maintained by the Contractor.

5.6 Corrective Action

Non-conformance with the Litter and Waste Control Plan shall be recorded by the Contractor and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the contractor.

The Contractor shall implement the corrective action, as required, within the agreed time frame noted in the CAR.

The Contractor shall advise the Superintendent upon completion of the corrective action.

6 Community Amenity

6.1 Policy

Appropriate measures are to be taken to control the impact of construction activities on the local community.

6.2 Performance Objectives

Disruption to the residential amenity of the local area shall be minimised where practicable. If a complaint is received, the cause of the complaint shall be investigated. In so far as it is practicable and the responsibility of the contractor to do so, the cause of the complaint shall be mitigated.

6.3 Control Measures

As part of the IPMP, the Contractor shall establish an induction program, to the satisfaction of the Superintendent, to inform all site workers prior to their commencement on the site of the environmental protection requirements and practices to be adhered to while working on site.

6.4 Monitoring

The Contractor shall maintain records of induction training, and all communications with residents.

6.5 Reporting

The Contractor shall submit quarterly reports to the Superintendent. These reports shall include records of communications with local residents and full details of any issues and actions taken.

6.6 Community Complaints

Complaints shall be managed in accordance with the procedures outlined in Section 4.3 of this document.

6.7 Corrective Action

Non-conformance shall be documented, by the Contractor, and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the Contractor. The Contractor shall implement the corrective action, as required within the agreed time frame noted in the CAR. The Contractor shall advise the Superintendent upon completion of the corrective action.

7 Heritage

The Developer has obtained an AAPA Authority Certificate (C2018/060) under the Northern Territory Aboriginal Sacred Sites Act. All works shall comply with the AAPA Authority Certificate and accompanying letter.

Lot 4873 contains a site of military historical significance. The Developer acknowledges the military history of the site and has committed to preserving important heritage items where possible. The explosives store referred to as 'the Bunkers' will be retained and incorporated into the development within a park or open space. 'The Bunkers' are located near Lee Point Road, opposite Club Tropical Resort.

The Contractor shall take appropriate measures to protect 'the Bunkers' from disturbance or damage, such as the erection of temporary fencing.

In the event of a discovery of a heritage item (including an object or place) within the project area, the Contractor must:

a) cease work within 20 metres of the discovery and fence the area from further disturbance;

b) seek advice from the relevant authority administering the *NT Heritage Act* and/or *Aboriginal Sacred Sites Act*; and

c) document, salvage, and store the discovery consistent with advice received in accordance with condition (b).

Figure 7-1 'The Bunkers' location plan

Source: Metromap

Figure 7-2 'The Bunkers'

8 Traffic Management and Haulage Routes

8.1 Traffic Management Plan

The Contractor shall prepare a project-specific Traffic Management Plan (TMP), and site-specific Traffic Guidance Schemes (TGSs) of a complex and noncomplex nature per activity if necessary for the scheduled works.

The TMP shall be designed by a Northern Territory accredited Traffic Management Plan Designer.

The Contractor shall submit the Traffic Management Plan (TMP), with the Traffic Guidance Schemes to the road authority.

The Contractor shall implement the TMP using personnel with the required accreditations and in accordance with the specification.

The Traffic Management for this contract may be subject to audit.

8.2 Haulage Routes

Fill materials won from within the site will be transported via site temporary access roads. These will be subject to internal controls by the Contractor and in locations approved by the Superintendent prior to use.

Materials brought to site will be subject to NT Government road rules with regards to load limits and speed controls. Routes for the transportation of materials shall be confined to permitted arterial routes and shall only access the site via nominated site access roads for transportation, namely Stuart Highway, Vanderlin Drive, McMillans Road, Bagot Road and Lee Point Road.

The Contractor shall comply with all road authority requirements for the transportation and securing of plant and materials.

9 Air Quality and Dust Control

9.1 Policy

The Contractor shall implement management measures to minimise the impact of construction activity on air quality.

9.2 Performance Objectives

The effective implementation of management measures to minimise the impact of construction activity on air quality. If an air quality complaint is received, the Contractor shall investigate the complaint. Where required, action shall be taken to mitigate the impact on air quality, including but not limited to ongoing action that will be required to manage dust emissions from the site.

Table 9-1 Management Actions

Objective	Management Actions	Monitoring	Performance Indicators
Maintain the respiratory health of workers and adjoining residents, and no adverse impacts on vegetation	• Notify adjoining residents prior to works commencing • Vegetation cleared in accordance with the approved land clearing plan • Watering of haul roads, and exposed areas • Vehicles to obey speed limits and stick to formed road • Trafficable areas clearly marked • Stabilise exposed areas • Rehabilitate as soon as possible	Complaints by adjoining residents	No decline in respiratory health of staff/adjoining residents, or decline in vegetation health, that can be attributed to the project

9.3 Control Measures

9.3.1 General

To manage air quality control on the site, the Contractor shall establish as part of the IPMP an Air Quality Management Plan to the satisfaction of the Superintendent and prior to commencing work. The following specific issues shall be addressed.

9.3.2 Fumes

All equipment shall be efficient, operated in accordance with established operating procedures and maintained to minimise exhaust emissions. Engines shall not be left idling needlessly.

All vehicles and plant shall be properly maintained, to ensure that emission levels are less than the limits defined by relevant guidelines produced by the Department of Infrastructure, Transport, Regional Development and Communications, Office of Road Safety, and the Australian Design Rules:

- ADR30 Diesel Engine Exhaust Smoke Emissions
- ADR36 Exhaust Emission Control for Heavy Duty Vehicles
- ADR37 Emission Control for Light Vehicles
- ADR70 Exhaust Emission Control for Diesel Engine Vehicles.

9.3.3 Odours

All materials (e.g. paints) which generate fumes or odours shall be properly stored and used with efficient equipment and in accordance with established procedures.

9.3.4 Earthworks

Earthworks shall be managed to minimise dust generation. Specific control measures include:

- Completion of vegetation clearing in accordance with the approved land clearing plan for the current stage;
- Implementation of control measures for disturbed ground in accordance with the Erosion and Sediment Control Plan;
- Early stabilisation of cut or filled areas and slope works; and
- Watering of all exposed areas, including haul routes.

9.3.5 Dust

Dust control measures shall be implemented for all processes that generate dust. Oil must not be used for the suppression of dust.

Haul roads and exposed earthworks shall be watered regularly to mitigate dust generation and checked throughout the works.

9.3.6 Deliveries

Deliveries shall be managed to control dust. Specific control measures include:

- Covering of loads entering and leaving the site;
- Cleaning of vehicles and plant; and
- Removal of soil from wheels of vehicles leaving the site. This includes the requirement for installation of a vibration grid, if required by the Erosion and Sediment Control Plan.

9.3.7 Stockpiles

Stockpiles shall be managed to control dust. Specific control measures include:

- Minimisation and stabilisation of stockpile areas. Stabilisation shall be undertaken by ensuring that angles of repose are not exceeded and, if necessary, by the placement of supporting structures to retain the stockpile within a designated area. If required, the surface of the stockpile shall be covered with either mulched vegetative matter, or an artificial cover, suitably weighted to prevent movement;
- Maintenance of stockpiles within designated areas and prevention of spread of stockpile material into adjacent areas;
- Creation of the minimum necessary stockpiles and removal of all stockpiles upon completion of works on site; and
- Provision of measures required by the Erosion and Sediment Control Plan.

9.4 Monitoring

Daily inspection of the types, locations, and details of control measures in place within the site is to be undertaken by the Contractor. Monthly recording by the Contractor of the effectiveness of the control measures is required.

The Contractor shall maintain daily records of meteorological conditions including rainfall, wind speed and direction. The Contractor shall record all air quality complaints received and details of all control measures implemented.

9.5 Reporting

The Contractor shall submit monthly reports to the Superintendent on the observation activities, control measures and corrective actions undertaken.

9.6 Corrective Action

Non-conformance shall be documented, by the Contractor, and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the Contractor. The Contractor

shall implement the corrective action, as required within the agreed time frame noted in the CAR. The Contractor shall advise the Superintendent upon completion of the corrective action.

10 Noise and Vibration Impacts

10.1 Policy

To control noise generated by construction activities and to minimise the impact of construction noise on the amenity of the local community; and to protect workers from occupational noise-induced hearing loss.

10.2 Performance Objectives

To comply with the Northern Territory Waste Management and Pollution Control Act, Council By-Laws, and Northern Territory Environmental Protection Authority documents "Noise Guidelines for Development Sites in the Northern Territory" and "Noise Management Framework Guideline."

10.3 Noise Management Framework Guideline

https://ntepa.nt.gov.au/__data/assets/pdf_file/0004/566356/noise_management_framework_guideline.pdf

The Noise Management Framework Guideline (NMFG) provides the recommended assigned construction noise levels at residences and other effected land uses at normal working times and outside normal working times (for working times refer to Section 4.5 of this CEMP).

The recommended assigned construction noise level at residences $L_{Aeq\,(15\,min)}$ provided in the NMFQ are noise levels relative to the Rating Background Level (RBL). The RBL is the underlying background noise level.

The recommended level $L_{Aeq\,(15\,min)}$ for residences is:

- RBL +10 dB during normal working times; and
- RBL +5 dB outside normal working times.

The Contractor shall implement all feasible and reasonable work practices to meet the noise affected level.

The Contractor shall inform all potentially impacted residents of the nature of works to be carried out and expected duration, as well as contact details in accordance with the NMFG.

10.4 Control Measures

As part of the IPMP, the Contractor shall develop and submit to NTEPA a Noise Management Plan (NMP) for minimising construction noise levels within adjacent residential areas from noise-generating mobile and stationary plant, equipment, and processes. The NMP shall be in accordance with the NMFG.

The NMFG provides guidance on operational practices to minimise noise impacts.

Control measures may include:

- The fitting of effective exhaust silencers to all mobile plant;
- The fitting of engine acoustic shielding;
- Using exhaust silencers on compressed air exhausts; and
- Review of times of operation of plant.

Lighting devices shall be used instead of whistles, bells, and buzzers to control site operations. Audible alarms shall only be used for safety warnings.

All vehicles entering, leaving, or used within the site shall be operated and maintained in a manner which ensures that the resulting noise levels are within the prescribed limits.

In the event that the adjusted noise level for a single source or activity exceeds the maximum permitted noise level by more than 10 dB(A), consideration shall be given to restricting the times during which the activity can occur.

The Contractor shall also comply with:

- National Standard for Occupational Noise [NOHSC: 1007(2000)] to prevent occupational noise induced hearing loss.

> ANZECC guidelines – Technical basis for Building to Minimize Annoyance due to Blasting, Over Pressure and Ground Vibration (1990).

10.5 Monitoring

The Contractor shall perform weekly observations of all noise producing sources (including inspection of new items of plant before they commence work on the site).

If complaints about noise are received, the Contractor shall investigate the complaint and implement appropriate mitigation measures if required. In the event of a dispute, an independent party such as the Superintendent may undertake an assessment of noise levels on site.

The Contractor shall keep a written record of all complaints, the investigations undertaken and mitigation measures implemented.

10.6 Reporting

The Contractor shall provide monthly reports to the Superintendent on noise and vibration impacts, control measures and corrective actions taken.

10.7 Corrective Action

Non-conformance shall be documented by the Contractor and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the Contractor. The Contractor shall implement the corrective action as required within the agreed time frame noted in the CAR. The Contractor shall advise the Superintendent upon completion of the corrective action.

11 Vegetation and Weed Management

11.1 Policy

To ensure that completed work areas are stabilised in a manner which minimises future adverse environmental impacts and to manage weed species within the project area.

11.2 Performance Objectives

To create conditions and implement measures which ensure the prompt establishment of vegetation or mulching within all areas disturbed during the works.

11.3 Control Measures

The clearing perimeter shall be fenced prior to vegetation removal in accordance with the approved land clearing plan for the current stage.

No clearing shall be undertaken without the approval of the Superintendent.

No clearing shall be undertaken within the identified conservation area.

All cleared vegetation shall be disposed of by mulching on site.

Establish controls as shown in the Erosion and Sediment Control Plan (ESCP).

Stockpiled, weed infested vegetation shall not be mulched for re-use on site, nor disposed of at a green waste recycling facility, as these practices facilitate the re-establishment and spread of weed species.

Fertiliser application rates shall be closely monitored to ensure that excess fertiliser is not washed off by stormwater runoff and discharged to downstream water bodies. Controlled-release fertilisers shall be used wherever possible.

11.4 Monitoring

Observations of landscaping works shall be undertaken by the Contractor at regular intervals to assess the health and vigour of plantings. Any unhealthy plantings shall be treated or replaced. These observations shall also note the establishment of any weed species.

The frequency of observations may be progressively reduced as the plantings become established.

11.5 Reporting

Monthly reporting is to be provided by the Contractor to the Superintendent covering observation activities and control measures implemented.

11.6 Corrective Action

Non-conformance shall be documented by the Contractor and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the Contractor. Copies of CARs shall be provided to the Superintendent upon request. The Contractor shall implement the corrective action as required within the agreed time frame noted on the CAR. The Contractor shall advise the Superintendent upon completion of the corrective action.

12 Stormwater Management and Water Quality

12.1 Policy

To minimise the impact of construction activity on the water quality of downstream water bodies external to the site.

12.2 Performance Objectives

To avoid detrimental impact on the water quality and the aquatic environment of downstream water bodies as a result of the discharge of contaminated stormwater runoff from the site.

12.3 Control Measures

12.3.1 Stormwater Quality Management Plan

The contractor's IPMP shall address the implementation of the erosion and sediment control plan and measures to mitigate impacts to water quality.

12.3.2 Storage of Construction Materials

Construction materials stored on site shall be placed in suitably prepared locations to limit the potential for suspended solids to be transported from the site. Existing runoff paths shall be diverted around these storage locations and bunds shall be provided to retain material.

If storage is required on site, a safe storage location for fuels and oils shall be provided in accordance with AS 1940 "The Storage and Handling of Combustible Liquids". This storage area shall be bunded in compliance with the standard. Any fuel and oil spills shall be attended to immediately to limit the potential for off-site impacts.

12.3.3 Temporary Control Measures

The Contractor shall provide temporary control measures, as required, during the course of the work to prevent soil erosion, scour, sediment transport and deposition.

During the construction period, all reasonable and practicable measures must be implemented to control flow velocities in such a manner that mitigates soil erosion along drainage paths and at the entrance and exit of all drains and drainage pipes during all storms up to the relevant design storm discharge.

To the maximum degree reasonable and practicable, all water discharged during the construction phase must discharge onto stable land, in a non-erosive manner, and at a legal point of discharge.

The measures detailed in the Erosion and Sediment Control Plan (ESCP) shall be implemented and maintained. Refer to Section 13 of this CEMP and the ESCP drawings.

12.3.4 Permanent Control Measures

Permanent control measures shall be provided as soon as possible after completion of work in each construction area. Permanent measures to be adopted for this project include the adoption of Water Sensitive Urban Design (WSUD) principles where feasible and accepted by City of Darwin and stabilisation of disturbed areas.

Permanent stormwater treatment features include:

- Stormwater Quality Improvement Devices, such as Gross Pollutant Traps (GPTs); and
- Grassed lined grains, to assist with velocity reduction and encourage pollutant settlement and retention.

12.3.5 Outlet Structures

Outlet structures are provided at the end of stormwater outlets to dissipate energy from discharged run off and to limit scour potential of flows. Construct as detailed on the drawings. Where detailed, rock shall be hard angular rock placed over geofabric. For temporary rock protection works, proposed depth and diameter of rock is to be advised and based on the velocity of the drainage outlet discharge.

12.4 Monitoring

The Contractor shall monitor the aforementioned measures to ensure that the construction activities are not resulting in any worsening of the pre-development quality of stormwater being discharged from the site.

12.5 Reporting

Monthly reports shall be provided by Contractor to the Superintendent on the observations made and control measures implemented during construction, including all corrective action taken to maintain the control measures. All relevant reports and records shall be retained by the Contractor.

12.6 Corrective Action

Non-conformance shall be documented by the Contractor and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the Contractor. The Contractor shall implement the corrective action as required within the agreed time frame noted in the CAR. The Contractor shall advise the Superintendent upon completion of the corrective action.

13 Erosion and Sediment Control

13.1 Policy

The Contractor is to implement controls to minimise the impact of soil erosion, dust, and transport of sediment within or from the construction site.

13.2 Performance Objectives

Soil erosion, dust, and the transport of sediment within or from the construction site shall be mitigated by the implementation, monitoring and maintenance of controls in accordance with the approved Erosion and Sediment Control Plan.

13.3 General

Erosion and Sediment Control Plans (ESCP) have been prepared as part of the design and construction drawings and approved by a Certified Professional in Erosion and Sediment Control (CPESC), in accordance with the conditions of Development Permit DP18/0409 and International Erosion Control Association (IECA) best practice.

13.4 Erosion and Sediment Control Plan (ESCP)

13.4.1 Implementation and Monitoring

The approved ESCP details the methods that shall be used to control dust and erosion on the site, and to prevent discharge of sediment-contaminated runoff to receiving waters.

The Contractor shall adopt the ESCP program for the implementation, monitoring, and maintenance of the approved ESCP measures and the process for amending control measures, if necessary. Any proposed amendments to the approved ESCP shall be submitted by the Contractor to the CPESC and Superintendent for approval prior to implementation. Additional and/or alternative ESC measures must be implemented if site inspections, site observations and maintenance program, or the regulatory authority, identifies that unacceptable off-site sedimentation is occurring as a result of the work activities.

All erosion and sediment control measures must conform to the standards and specifications contained in:

- Development Permit DP18/0409
- The approved ESCP drawings
- The latest version of IECA Best Practice Erosion and Sediment Control guidelines, where standards and specifications are not detailed in the drawings.

13.4.2 Approved ESCP

An ESCP will be prepared and approved for each stage of construction. The contractor shall implement and monitor the control measures detailed in the ESCP. Refer to the approved ESCP for further information.

13.4.3 International Erosion Control Association

The International Erosion Control Association – Best Practice Erosion and Sediment Control guidelines provide additional technical support, standard drawings, specification information and management methods.

13.5 Reporting

Monthly reports shall be submitted by the Contractor to the Superintendent outlining all maintenance activities and corrective actions. All environmentally relevant incidents must be reported as soon as practicable.

13.6 Corrective Action

Non-conformance shall be documented by the Contractor and a corrective action request (CAR) issued. All CAR's shall be included in the Non-Conformance Register maintained by the Contractor. The Contractor shall implement the corrective action as required within the agreed timeframe noted in the CAR. The Contractor shall advise the Superintendent upon completion of the corrective action.

Contact

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Appendix C – 2CRU Stage 1 – ESCP (subject to stage specific changes)

byrne.

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TECHNICAL MEMO

To	Defence Housing Australia (DHA) – Attn: Chris Grimm
Cc	-
Subject	Lee Point – 2CRU Stage 1 – ESCP Review and Site Audit
From	Byrne Consultants – Paul Brandis (CPESC ID 9681)
Byrne Reference	NT23022-TM001 Rev A
Date	27-May-2024

1 Introduction

Byrne Consultants (Byrne) has been engaged by Defence Housing Australia (DHA) to undertake an audit of the Erosion and Sediment Control Plan (ESCP) for Lee Point – 2CRU Stage 1 (the Subdivision), located on Lot 4873 Town of Nightcliff (the Development Site).

An ESCP was prepared and certified by Carlo de Byl (CPESC no. 7619) for Stage 1 of the Subdivision, which was approved by the Department of Environment, Parks and Water Security on 2 June 2022. This is referred to as Drawings DC1603-2CRU-01-ES01 to DC1603-2CRU-01-ES11 Revision A (the Approved ESCP).

Byrne has undertaken a review of the Approved ESCP and provides comments/clarifications herein.

Byrne has also undertaken a Site visit on 9-May-2024, following clearing of the Stage 1 area, to confirm the scope of immediate controls required and whether it necessitates a variation from the Approved ESCP.

2 Background

2.1 Status of Works

The Stage 1 area of works was cleared and grubbed at the end of April 2024, with felled vegetation pushed up into multiple windrows along the contours. Topsoil has not been stripped and remains in place. Further works are on hold, with earthworks activities expected to commence late June / early July 2024.

2.2 Erosion Risk

As we are now in the Dry Season (May to September), there is a 'Very Low' erosion risk associated with rainfall, and a 'Moderate' erosion risk associated with wind. The immediate focus should therefore be on managing dust and trafficking of sediments. Notwithstanding, some perimeter controls should be installed where practicable to mitigate the risk of runoff-producing rainfall events.

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3 ESCP Review

Review comments are provided in the form of markups on the Approved ESCP in Attachment 1.

The Approved ESCP is considered to generally comply with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines; and it has been certified by a Certified Professional in Erosion Control (CPESC no. 7619).

Due to project delays, references to the Development Permit and construction period / dates need review.

It's noted that this is a 'Dry Season' ESCP only and assumes works will be completed by October. With delays in start time, it is anticipated that works will extend into the Wet Season (October to April). Therefore, a 'Wet Season' ESCP will need to be prepared and implemented prior to 30 September 2024. This will likely require the permanent detention basin being repurposed as a 'sediment basin' until the Subdivision is completed, and contributing catchments are stable. There may be some value in retaining the sediment basin until such time that the build-out phase is complete.

Other key issues which need to be addressed are summarised below:

- Phase 3 plans indicate 'vegetation to be retained' but this is not shown on any other plans.
- Clean water Diversion Drain (DD-EX1) is nominated with a 0m flat base (i.e. vee-drain profile) – a flat base should be provided to minimise erosion risk.
- Clean water Diversion Drain (DD-EX2) is shown to discharge into a 'no-go zone' via a level spreader. There is insufficient topographic data to confirm where this water will go; however, site assessment indicates there is a risk this water will return and concentrate along the proposed mulch berm.
- Clean water Diversion Drain (DD-EX3) passes through the middle of the compound area; however, clean and dirty water will need to be separated. Site falls may dictate that the proposed drain is not practicable, as pushing water up hill. Alternative clean-water passage may need to be considered.
- Clean water Diversion Drain (DD-EX3) is shown to discharge into a temporary culvert; however, the note calls up for a level-spreader. This should be clarified, and a size should be provided for the Temporary Culvert.
- The construction access track is not detailed. It's expected that this should be stabilised (e.g. rock mulch or similar).
- The site entry/exit point is provided at the road reserve interface; however, it would be more practicable to provide this upon entry to the compound and at the interface with ground disturbance areas. If there is risk of sediment trafficking onto the construction access, sediment-laden runoff into adjacent no-go zones would need to be captured.
- The application of mulch berms throughout the Phase 1 works is unlikely to be practicable for earthworks operations.
- Details for controlled spillway outlets through berms etc need to be reviewed to ensure that rock is extended across full width of spillway and up spillway wings to prevent erosion from overtopping flows.

4 Site Visit

Byrne undertook a site visit on 9-May-2024.

Generally, the controls nominated in the Approved ESCP had not been implemented. However, a water truck was observed to be implementing dust suppression; and the presence of multiple vegetated windows would be assisting to act as windbreaks to minimise wind erosion.

Key observations are shown in Table 4.1.

Table 4.1 – Site Visit Photos

Image	Description
	General status of clearing and grubbing across the site – view from southern end of site looking towards Lee Point Road. A ridge is present, indicating a small catchment drains to the south-eastern corner of the Site. The remainder of the site drains to a low point to the north.
	View towards low point/valley in the Site to the north, where the primary drainage outlet will be located discharging to culverts beneath Lee Point Road. The vegetated 'No-Go Zone' shown on the LHS is falling back towards the natural valley, which will present some challenges for clean water diversion.

	Windrow(s) of felled vegetation shown in foreground and background of picture, acting as wind breaks.
	Note: Existing edge break and erosion/scour within table drain along Lee Point Road.

5 Proposed Action

The following actions are proposed for the immediate works (i.e. Clearing Phase):

- Continue with dust suppression program.
    - Consider application of polymer (Vital Bon-Matt Stonewall, or similar) in lieu of active watering if site is to be retained in its current state and un-trafficked for longer than 30 days. This may prove more economical than paying for a water cart.
- Install downslope perimeter controls as per approved ESCP, including mulch filter berms and catch drains with rock check dams to rock filter dam settling pond areas.
    - Alternatively, use site topsoil to form catch drains and containment berms by cut-to-push. Install rock check dams as per Approved ESCP, or line drains/berms with geotextile or polymer. The latter may be more effective if drain depths are kept shallow.
- Install clean water diversion drains as per Approved ESCP, once requirements are clarified with ESCP designer as outlined in Section 3.

Attachments

1. Approved ESCP Drawings with Byrne Comments

Appendix D – Casuarina Coastal Reserve Design Plans