Referral of proposed action

Project title: Cox Peninsula Remediation Project.

1 Summary of proposed action

1.1 Short description

The proposed action relates to planned remediation works to Sections 32, 34 and 41 of the Cox Peninsula, Northern Territory (NT) located on the western side of Darwin Harbour, 130 kilometres by road and 10 kilometres by ferry from Darwin (hereafter collectively referred to as the 'site') (refer to Appendix A, Figure 1 for site location).

Sections 32, 34, and 41 on Cox Peninsula have been used by the Commonwealth for over 70 years. Sections 32 and 34 were extensively used by Radio Australia as receiver and communications facilities from the 1960s until the late 1990s. Over this same time period, Section 41 has been in use by the Australian Maritime Safety Authority (AMSA) and its predecessors in hosting the Charles Point Lighthouse as well as a remote World War II radar installation (Radar 105 Precinct). These past uses have resulted in a number of areas of relatively discrete points of contamination across the 4,808 hectares that comprise this landholding.

Based on extensive investigations undertaken at the site the predominant contamination issues relating to past Commonwealth operations that have impacted a small portion of the overall site area include:

- Asbestos and other contaminants in tip sites and general rubbish areas located on Sections 32 and 34 (refer to Appendix A, Figures 2 and 3 for location of the tip sites)
- Concrete footings associated with former transmission and receiving antenna at the site that represent an aesthetic issue for future landuse (refer to Appendix A, Figures 5 and 6)
- Deteriorated asbestos materials in underground services (refer to Appendix A, Figures 4 and 7)
- Polychlorinated biphenyls (PCB) materials in underground services and in one of the tip site areas (Tip Site 2, Section 34 – refer to Appendix A, Figure 3)
- Hazardous materials (such as asbestos containing material (ACM), lead paint and synthetic mineral fibre (SMF) in the fabric of buildings on the site
- High concentrations of pesticides beneath building slabs and in one of the tip site areas (Tip Site 2, Section 34 – refer to Appendix A, Figure 3)

These areas on the Commonwealth's land holdings at the Cox Peninsula pose a significant risk to human health through potential exposure to ACM and other contaminants such as pesticides, heavy metals and PCBs. Responsibility for the remediation of contamination on Commonwealth land resides with the Australian Government under the polluter pays principle, detailed in the National Environment Protection Council Act 1994 (NEPC Act). The Commonwealth also has obligations under the Work, Health and Safety Act 2011 (WHS Act) to ensure people who access the site can do so without risk to their health.

The location of the proposed remedial works (proposed action) are in areas of the site that have in large part been previously cleared as part of the historic operation of the radio transmission facilities and associated antenna. In addition, they are located away from identified areas of environmental and heritage significance. As a result, the physical works that would result in the proposed action fall into the following categories of potential impact as a subset of the overall footprint of the site:

- Direct impact: 69.33 hectares or 1.4%
- Only potential/partial impact 7.42 ha or 0.2%
- No potential impact on 4,731.23 ha or 98.4%

These discrete areas of the site need to be fully remediated by the Commonwealth to comply with its obligations under the NEPC Act and WHS Act. In summary, remediation and waste management activities on site will include:

- Screening and treating the hazardous materials and contaminated soils and placing them in a geoengineered 'Containment Cell' – a subsurface purpose-built structure designed to act as a long-term physical and impermeable barrier. The Containment Cell prevents the hazardous materials and contaminated soils from impacting the surrounding land and groundwater

- Pre-treatment of contaminated soils that may include immobilisation of leachable contaminants (such as metals) and thermal treatment to remove PCB and pesticide contamination, such that material placed in the Containment Cell would meet strict contaminant acceptance criteria. The criteria agreed with the appointed Contaminated Site Auditor (Paul Steinwede of AECOM (Site Auditor)), an independent third party who will oversee and sign-off that the remedial works have been undertaken to agreed standards and best practice. The Site Auditor is accredited by the NT Environment Protection Authority (NT EPA) and NSW Environment Protection Authority
- Remove and recycle material where contamination of this material does not prohibit it.

1.2 Latitude and longitude

Table 1.1 – Summary of Tip Site Coordinates

Site Area	Location Point	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
Section 32	**Centre of site**	-12	-28	-24.370	130	44	7.628
	Area B	-12	-28	-12.863	130	44	36.049
	Area E-1	-12	-28	-33.869	130	44	20.483
	Area E-2	-12	-28	-17.572	130	44	25.134
	Area E-3	-12	-28	-15.206	130	44	26.943
	Wagait Shire Tip	-12	-28	-36.818	130	44	22.245
	ACMA Compound	-12	-28	-33.868	130	44	44.049
Section 34	**Centre of site**	-12	-24	-49.104	130	37	8.064
	Tip Site 1/1A	-12	-24	-24.777	130	38	20.352
	Tip Site 2 and 3	-12	-24	-57.645	130	37	54.111
	Main Compound	-12	-24	-42.370	130	37	36.47
Section 41	**Centre of site**	-12	-23	-21.544	130	37	51.681

1.3 Locality and property description

Cox Peninsula is a 4,808 hectare landholding of the Commonwealth's Department of Finance. The site is 10km away from Darwin by ferry and 130km by road (refer to Appendix A, Figure 1 for site location). Cox Peninsula consists of tropical savannah and is generally well vegetated.

This referral relates to specific sites on Cox Peninsula, namely Sections 32, 34 and 41. These sites are described briefly below.

Section 32

Section 32 is located in the eastern portion of Cox Peninsula, has an area of approximately 1,664 ha and is bisected, in a north-south direction, by Cox Peninsula Road (refer to attached Appendix A, Figure 1). An area to the east of Cox Peninsula Road of 175 ha has been cleared and used initially by Radio Australia as a receiver station (1969 – 1975). Since the 1990s two compounds within the original cleared area have been used by the Australian Communications and Media Authority (ACMA) as a monitoring facility and also as a High Frequency Direction Finding (HFDF) facility.

The area contains bushland and a mangrove coastline, however the site has been modified from its natural condition and contains:

- Old informal tips sites where rubbish including contaminants such as asbestos have been placed (refer to attached Appendix A, Figure 2);
- A community landfill facility (Wagait Shire landfill) due to close in October 2015, with a footprint of approximately 800 m^2 (refer to Appendix A, Figure 2);
- The remnants of communication (antenna) arrays, the footprint of which are shown in Appendix A, Figures 2, 4, 5 and 6. These antenna arrays include:
  - Disused concrete footings to secure guy wires and antenna bases
  - Disused above ground cabinets and equipment; and
  - Underground pits and cables.
- Large areas of intact and modified natural habitat, with open Eucalyptus forest largely defining the vegetation around the proposed disturbance site.

Section 34

This section is located on the western side of Cox Peninsula at the western end of Charles Point Road. In the 1960s, an area of approximately 221 ha in the centre of the site was cleared and transmitters constructed along with associated infrastructure (refer to attached Appendix A, Figure 3). The site has been used by different entities for radio transmission purposes until mid-2010. This site is modified from its natural condition and contains:

- At least seven informal landfill / tip sites;
- The remnants of a disused antenna field, camp and compound shown in Appendix A, Figures 3 and 7 including:
  - Disused above ground cabinets and equipment;
  - Existing buildings and building slabs; and
  - Underground pits and cables.
- A large area (approximately 3,090 ha) of intact native vegetation, largely composed of Eucalyptus forest and grassland, with a variety of coastal associations fringing the site.

Section 41

This section located on the northern extent of Cox Peninsula (refer to Appendix A, Figure 3). Current areas of disturbance are limited to areas previously utilised for maritime navigation purposes . The site is modified from its natural condition and contains:

- An operational Australian Maritime Safety Agency (AMSA) navigation aid (Charles Point Lighthouse),
- A small automated meteorological weather station operated by the Bureau of Meteorology (BoM),
- A helipad (used by AMSA when visiting the site to undertake inspections and maintenance of the lighthouse) and a number of floor slabs of former buildings.
- Largely cleared area, maintained for operational purposes.

1.4 Size of the development footprint or work area (hectares)

The table below should be viewed in conjunction with the attached plans (refer to Appendix A, Figures 10, 11 and 12). The table and attached plans highlight the areas that will:

- Definitely be disturbed as part of the remediation of the site;
- Potentially be disturbed as part of the remediation of the site; and
- Will not be disturbed during the remediation activities.

Table 1.2 – area to be disturbed

	S32 Area (ha)	% of total S32 Area	S34 Area (ha)	% of total S34 area	S41 Area (ha)	% of total S41 area	Total Ha	Total (as % Total Site Area)
Will be impacted	22	1.3%	48	1.5%	0.13	13.2%	69.33	1.4%
Potential/Partial disturbance	3	0.2%	4	0.1%	0.64	66.9%	7.42	0.2%
No disturbance	1639	98.5%	3091	98.4%	0.19	19.9%	4731.23	98.4%
Total Area	**1664**	-	**3143**	-	**0.96**	-	**4807.98**	-

1.5 Street address of the site

Cox Peninsula and Charles Point Roads, Cox Peninsula, NT

1.6 Lot description

Commonwealth land.

1.7 Local Government Area and Council contact (if known)

Wagait Shire.

1.8 Time frame

Work is expected to commence in late 2015 and be completed by the end of 2018. Work will be undertaken primarily during the dry season (April to December) in any given year. The proposed timeline for the project is provided in Appendix C.

1.9	**Alternatives to proposed action**	X	No – significant risk to human health and the environment through potential exposure to ACM and other contaminants such as pesticides, heavy metals and PCBs mean that remediation and management of these materials is required. Australia is a signatory to the Stockholm Convention on Persistent Organic Pollutants, 2001 and identifies PCB and Organochlorine Pesticides (OCPs) as Persistent Organic Pollutants (POPs). These pollutants are managed at a Federal level through the "The National Strategy for the Management of Scheduled Wastes", published by the Australian and New Zealand Environment Conservation Council (ANZECC) and endorsed in 1993. As part of the strategy the ANZECC prepared the following Waste Management Plans: • Polychlorinated Biphenyls Management Plan, 2003; and • Organochlorine Pesticides Waste Management Plan, 1999 Management requirements contained within these plans include the requirement to treat PCB and OCP wastes on-site when the concentration c PCBs and OCP exceed a concentration of 50mg/kg.
			Yes, you must also complete section 2.2
1.10	**Alternative time frames etc**	X	No – Project programming has considered the impact of the wet and dry season in the NT and potential influence this may have on timing of the works due to site trafficability and construction and infill of the proposed Containment Cell on-site (refer to Appendix C).
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.11	**State assessment**	X	No – Stakeholder consultation and follow up e-mail dated 27 March 2015 from Lisa Bradley, Manger Environmental Assessments, NT EPA, indicated that Resolution of any issues identified under the Environment Protection and Biodiversity Conservation Act 1999 will satisfy NT EPA requirements. Assessment under the NT Environmental Assessment Act would not be required. The NT Government support the proposed project (refer to Appendix F).
			Yes, you must also complete Section 2.5
1.12	**Component of larger action**	X	No
			Yes, you must also complete Section 2.7
1.13	**Related actions/proposals**	X	No
			Yes, provide details:
1.14	**Australian Government funding**		
		X	Parliamentary approval (June 2015) has been provided for the Cox Peninsula

			Remediation Project. The estimated cost of the project is $31.8 million, over four years. Approved funding is $16.0 million in financial year 2015-16, $12.0 million in financial year 2016-17 and $3.5 million in financial year 2017-18. The works will be concluded by November 2018 with the allocation of funding dependent on the approvals and the expected commencement date of the project. The Public Works Committee considered the cost estimates for the project have been adequately assessed by Finance and were satisfied that the proposed expenditure is cost effective.
1.15	**Great Barrier Reef Marine Park**	X	No
			Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

After completing a stakeholder consultation process and undertaking a detailed multi-criteria analysis, the preferred remediation option (on-site containment of the waste and hazardous materials), meets the needs of the key stakeholder groups whilst addressing concerns voiced by the Traditional Owners during extensive consultation. The purpose of the containment cell is to encapsulate waste material identified at the site while doing so in a manner that minimises the impact upon the environment and protects human health under current and future land use scenarios.

The preferred remedial option demonstrates industry best practice for remediation projects in limiting the disposal of wastes by effectively managing materials on-site. Containment cells have been widely used across Australia in sensitive environments including residential precincts. Well known examples of safe waste and contaminant encapsulation include the Homebush Olympic Precinct in Sydney and the Pasminco site in Newcastle. The Greenhills Beach residential development in Sydney provides an example of a containment cell being constructed in close proximity to Ramsar wetlands and within a sensitive residential setting.

Following extensive soil and groundwater investigation over a number of stages the location and extent of identified soil contamination and hazardous materials were identified, and their contaminant levels and volumes quantified.

Appendix B, Table 1 provides further detail on the waste materials and type.

Based on consideration of the location of the materials and contaminant concentrations, the Section 34 compound has been identified as the preferred location for the containment cell. There are a number of reasons why this location has been selected. These include:

- Proximity to the most significant tip sites (Tip Site 1/1A, Tip Site 2 and Tip Site 3) and other sources of waste (Section 34 compound). This reduces not only transport distances, but risks associated with the movement of soils impacted by hazardous materials (particularly fibrous asbestos)
- The Containment Cell is located within an area that has previously been disturbed. As such, the need for extensive native vegetation clearance will be avoided
- The presence of the existing roadway provides good access to the containment cell during construction, placement of the waste materials and capping of the cell
- The Section 34 compound has been identified as an area that may be zoned in the future for commercial/industrial use. This future use of this area would not be constrained by the presence of the containment cell.
- The Section 34 compound represents the preferred location for a transfer station for the sorting and pre-treatment of material at the site prior to either off-site disposal or placement in the containment cell. As such, the location of the containment cell nearby makes practical sense.
- The observed soil profile and groundwater levels at the nominated location are considered suitable for the construction of a containment cell. Similarly, the area is also mostly level.

In addition to the above reasons for the preferred location of the containment cell, assessment of its suitability has been undertaken against the NT EPA *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory,* January 2013 (otherwise known as the NT EPA Solid Waste Guidelines). The NT EPA Solid Waste Guidelines have been referred to when identifying preferred locations for the containment cell. In addition, they also provide cell design and construction principles and reference other recognised Best Practice guidelines such as the Environment Protection Authority Victoria, *Best Practice Environmental Management, Siting, design, operation and rehabilitation of landfills*, August 2015. In designing and siting the containment cell these documents have been referenced as they outline the current Australian best practice with regard to containment cell siting, design, construction and post closure monitoring and management.

In siting the containment cell, specific assessment of the following site conditions have been made as required by the NT EPA Solid Waste Guidelines, as listed:

- Permeability
- Geotechnical stability
- Seismic risk

- Deformation of insitu materials
- Potential impact upon surficial water bodies
- Location in comparison to regional water table

The proposed location of the containment cell is assessed to conform to each of the NT EPA guideline requirements listed previously.

Based on the consistent, flat topography and subsurface geological profile encountered across the footprint of the proposed containment cell location, it is considered suitable for this purpose, as per the proposed design outlined in Appendix G – Remediation Contract Specification (the containment cell tender design itself contained in Appendix E of that document).

The functional design for the containment cell has been undertaken with reference to the NT EPA Solid Waste Guidelines.

The following measures have been factored into the design and future monitoring of the containment cell, as well as the soil and groundwater in its vicinity:

- Use of geotextiles and bentonite clays to create an impermeable cell liner and cover layers to restrict water infiltration and migration of contaminants to the surrounding soil and groundwater environment
- Siting of the containment cell in the cleared area on Section 34, an area that is highly modified from the original environment
- A large proportion of the waste placed in the containment cell will be asbestos, which is an inert waste that is not susceptible to leaching
- Strict leachability acceptance criteria for waste that will be placed in the containment cell such that any material that exceeds this criteria will be treated to immobilise the contaminants prior to disposal
- Groundwater monitoring around the perimeter of the containment cell to assess and monitor against leakage and trigger contingency actions should contaminants be detected in the immediate vicinity. The groundwater monitoring would be incorporated into a Site Environmental Management Plan.

The cell will be excavated to a maximum depth of 8 metres below ground level (mbgl). This represents a depth 2m above the estimated maximum seasonal groundwater level. The containment cell will be lined with an impermeable geosynthetic clay liner (GCL), typically comprising a layer of bentonite bonded between layers of woven and non-woven geotextiles. Following hydration, the bentonite swells forming an impermeable barrier preventing leachate generated by the encapsulated material from interacting with the underlying groundwater. Similarly, the encapsulated material will be capped with a GCL to minimise surface water ingress in to the containment cell, thereby reducing rates of leachate generation. Drawings in Appendix G provide an illustration of the proposed containment cell footprint and cross section.

Since it may not be possible to eliminate surface water ingress and leachate generation entirely, the containment cell will incorporate a leachate collection system. A leachate extraction system will be installed along with a sump to allow leachate to be pumped to a temporary containment tank. The temporary leachate collection tank will need to be emptied by tanker on a periodic basis and disposed off-site to a licenced facility. Both the tanker used to transport the leachate and the facility receiving the leachate removed from the containment cell will be appropriately licensed to transport and receive such wastes. The requirements for leachate removal, transport and off-site management will be clearly stipulated in a Site Environmental Management Plan that will be approved by the Site Auditor (refer to section 4 of this document for further details).

While the biodegradable component of the waste material is relatively low, there is potential for limited landfill gas generation within the waste mass over time. However, this will be below levels considered safe for human health and the environment. As such, the cell will incorporate provisions for venting of accumulated gas including a gas collection layer. The gas collection layer will be located immediately below the impermeable GCL capping layer and will comprise a layer of coarse granular material used to promote lateral movement of gas. The waste will be placed such that the highest point is located towards the centre of the cell. Drawings provided in Appendix G provide an illustration of the proposed concept design for the containment cell.

In order to promote surface water runoff from the cell it will be contoured such that centre of the cell is a high point (as described above) with surface water channelled towards the edges. While the hardstand will minimise infiltration rates, some water may permeate through over time. In order to prevent this water from accumulating on top of the impermeable GCL capping layer, a drainage layer will be placed immediately on top of this liner to promote lateral movement of surface water towards the edges of the cell. The drainage layer will comprise coarse granular material overlain by a non-woven geotextile (to prevent the drainage medium from becoming clogged up with silt over time).

A detailed Remediation Action Plan (RAP) has been developed, which along with the master works program provides a blueprint for the preferred remediation plan.

Non-contaminated recyclable material will be separated and transported for off-site recycling. The following Figure 2.1 and Figure 2.2 summarise this process.

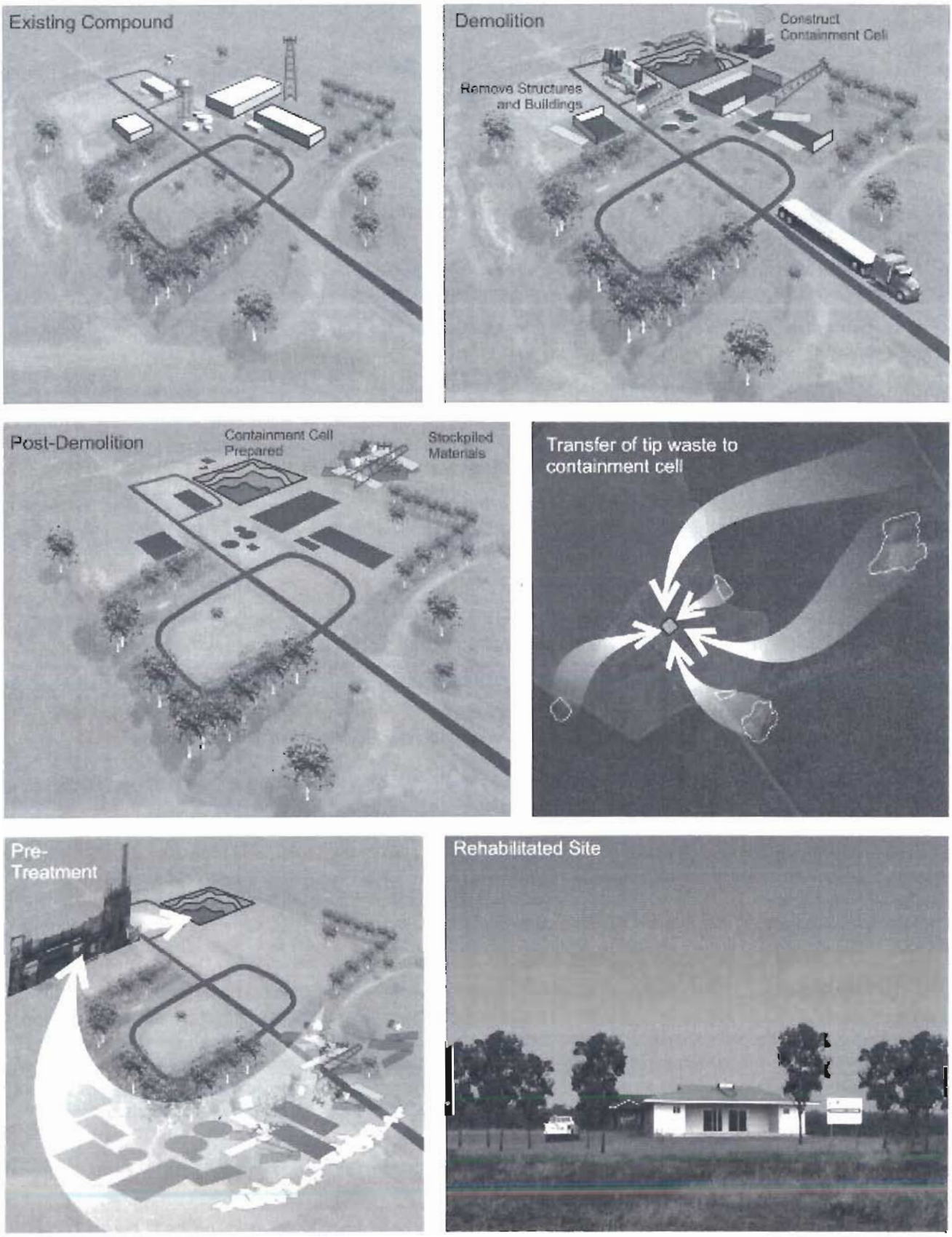

Figure 2.1 : Section 34 and 41 remediation process

Figure 2.2 : Section 32 remediation process

2.2 Alternatives to taking the proposed action

A multi-criteria framework was developed to evaluate the options against criteria relevant to the project, its relevant stakeholders, and other potential constraints and opportunities applicable to the site. The primary objectives of the Multi Criteria Analysis (MCA) process were to:

- Identify and agree upon appropriate evaluation criteria and weightings to be applied

- Undertake an assessment of potential options against the criteria identified in order to determine preferred options
- Assess technical feasibility, acceptability and the ability to appropriately eliminate or mitigate risks and liabilities

Each of the remedial options were evaluated against criteria and assigned a score between -2 and 2 according to the options suitability for meeting the criteria's requirements. The critical screening criteria used are summarised in Table 2.1 below, along with an explanation of the ranking system used summarised in Table 2.2.

Table 2.1 – Summary of Critical Screening Criteria

Critical Screening Criteria	Question
Technical Feasibility	Can the option feasibly be adopted and implemented for the Cox Peninsula site?
Fit for Purpose	Does the option allow resolution of the Kenbi Land Claim?
Risks / Liabilities	Does the option address potential health and safety risks and liabilities arising from contamination or waste materials present at the site?
Acceptability	Would the option be acceptable to the public and all stakeholders, taking into account all potential areas of concern such as legislative, environmental and community issues?

Table 2.2 – Ranking System

Scoring System	
2	Option effective for meeting criteria requirements and addresses other key issues concurrently
1	Option effective for meeting criteria requirements
0	Option suitable for meeting criteria requirements
-1	Option could meet criteria requirements, but would have adverse impacts and/or consequences
-2	Option does not meet criteria requirements

Over 20 remediation options were assessed and categorised according to three distinct strategies:

- Treatment of chemical contaminants
- On-site containment of contaminated and waste materials
- Off-site disposal of contaminated and waste materials.

During the evaluation different combinations of remedial options were considered against the evaluation criteria and took into account the following:

- The majority of material requiring remediation and management at the Cox Peninsula comprises materials that cannot be effectively managed using chemical treatment techniques alone. Potential remediation and management options for the site will require methods for managing and/or disposing of hazardous and waste materials and redundant infrastructure, in addition to any techniques selected for the treatment of chemical contaminants. Observations and investigations at the site indicate the quantity of hazardous materials (primarily ACM), waste material at existing tip sites and waste areas, and redundant infrastructure requiring removal; comprise a significant proportion of the materials requiring management. By comparison, the volume of soils with contaminant concentrations at levels that require treatment to meet land use criteria or to permit off-site disposal is approximately 10% of the total estimated volume. Given these conditions, the evaluation of potential remediation and management options through the MCA process focused on those strategies that effectively manage the hazardous and waste materials and redundant infrastructure present at the site, whilst potential options for the treatment of chemically contaminated soils was subject to a separate evaluation process.
- Based on the data collected as part of the site contamination investigations, contaminant concentrations present in some areas of the site are considered to present significant risk to human health and require remediation in order to meet land use or waste disposal criteria. As these materials require treatment regardless of the strategy chosen (e.g. on-site management or off-site disposal), treatment of contaminated soils has been considered a 'pre-disposal' task common to each remediation or management option being considered. In other words, the treatment of contaminated soils are considered a common requirement for all of the remediation options that were evaluated.
- The primary chemical contaminants of concern identified from site observations and investigations relate to historical infrastructure and activities at Cox Peninsula, including PCBs, pesticides and heavy metals. Site observations and investigation data indicate that concentrations of PCBs, pesticides and lead in soils in limited areas would require treatment in order to meet land use or disposal criteria. Available technologies to treat soils contaminated with PCBs, pesticides and heavy metals were identified and assessed against preliminary screening criteria in the initial stages of

the remediation and management options assessment. Based on the preliminary screening assessment, the treatment techniques considered suitable for contaminated soils at the Cox Peninsula site include ex-situ physical or chemical and thermal treatment techniques.

The options considered are outlined in the following Table 2.3.

Table 2.3 – Remedial Options Considered

Option No.	Description
1	Placement of all materials within engineered containment cells designed to limit contaminant and material migration at multiple selected locations across the site
2	Placement of all materials within a single engineered containment cell designed to limit contaminant and material migration at a designated location on site
3	Transport of all materials to the Wagait Shire community landfill. Upgrade of the current facility to meet NT EPA guidelines and obtain license to accept ACM and ACM-contaminated waste.
4	Placement of all materials in a designated burial location (not an engineered containment cell). Burial of all materials and capping with validated site won material (minimum 0.5 m thick). Implementation of management controls for area (e.g. management plan, security, and signage).
5	Placement of all materials in a designated surface waste area. Implementation of management controls for area (e.g. management plan, security, signage) to limit access and exposure pathways
6	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of remaining materials (including hazardous materials such as ACMs) within engineered containment cells at multiple selected locations across the site
7	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of remaining materials (including hazardous materials such as ACMs) within a single engineered containment cell at a designated location on site
8	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of all materials beneath hard stand to limit potential exposure pathways. Materials to be buried beneath new hard stand to be constructed at the current Section 34 compound.
9	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of all materials beneath designated road to limit potential exposure pathways. Materials to be buried beneath new or existing road, with various options available for ownership and management of the road (e.g. Commonwealth, future land owners, NT government).
10	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and transport of remaining materials (including hazardous materials such as ACMs) to the Wagait Shire community landfill. Upgrade of the current facility to meet NT EPA guidelines and obtain license to accept ACM and ACM-contaminated waste.
11	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of remaining materials in a designated burial location (not an engineered containment cell). Burial of all materials and capping with validated site won material (minimum 0.5 m thick). Implementation of management controls for area (e.g. management plan, security, and signage).
12	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, transport of hazardous materials (ACMs and ACM-contaminated wastes) off-site to licensed facility, and placement of remaining materials in a designated location as a surface tip site. Installation of perimeter fencing and signage to restrict access by the public, and implementation of management plan.
13	Transport of all materials off-site to the Shoal Bay Waste Management facility, licensed to accept ACMs and ACM-contaminated waste.
14	Screening, sorting and separation of all materials, transport of recyclable materials for recycling, and disposal of remaining materials off-site to the Shoal Bay Waste Management facility licensed to accept ACMs and ACM-contaminated waste.
15	Transport of all materials off-site to a new landfill / waste facility to be constructed as part of remediation works. An Integrated Waste Management Facility would be constructed and operated at a location to be determined in accordance NT EPA guidelines and licensed to accept ACMs and ACM-contaminated waste. Facility would have capacity to accept waste from other local and regional sources.
16	Transport of all materials off-site and placement in one or more engineered containment cells designed to limit contaminant and material migration in designated off-site location(s). Implementation of management controls for area (e.g. management plan, security, signage)
17	Screening, sorting and separation of all materials, transport of recyclable materials for recycling, and placement of remaining materials in one or more engineered containment cells designed to limit contaminant and material migration in designated off-site location(s). Implementation of management controls for area (e.g. management plan, security, and signage).
18	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of remaining materials off-site beneath hard stand to limit potential exposure pathways. Materials, including ACMs and ACM-contaminated material of suitable geotechnical properties, to be buried and contained beneath Cox Peninsula Road and/or Mandorah Road

19	Transport of all materials off-site and disposal in abandoned quarry or mine site in local area. Designated site still to be determined.
20	Screening, sorting and separation of all materials, transport of recyclable materials off-site for recycling, and disposal of remaining materials off-site in abandoned quarry or mine site in local area. Designated site to be determined.

Based on the MCA undertaken Appendix H outlines the options considered and ranked.

The results of the MCA process were used to identify preferred remediation and management strategies for the site. Options with weighted scores greater than three were considered preferred options that suitably address the MCA evaluation criteria and were worthy of further evaluation and detailed costing. These preferred options identified through the MCA evaluation, together with their weighted scores, are summarised in Table 2.4.

Table 2.4 – Preferred Remedial Options

Potential Options		Weighted Score
2	Placement of all materials within a single engineered containment cell designed to limit contaminant and material migration at a designated location on site	3.55
7	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of remaining materials (including hazardous materials such as ACMs) within a single engineered containment cell at a designated location on site	3.8
8	Screening, sorting and separation of all materials, transport recyclable materials off-site for recycling, and placement of all materials beneath hard stand to limit potential exposure pathways. Materials to be buried beneath new hard stand to be constructed at the current Section 34 compound.	3.55
13	Transport of all materials off-site to the Shoal Bay Waste Management facility, licensed to accept ACMs and ACM-contaminated waste.	3.3
14	Screening, sorting and separation of all materials, transport of recyclable materials for recycling, and disposal of remaining materials off-site to the Shoal Bay Waste Management facility licensed to accept ACMs and ACM-contaminated waste.	3.3

Closer analysis of preferred remedial options outlined in Table 2.4 reveals similar weighted scores for the various on-site containment options, with weighted scores ranging from 3.55 to 3.8. Such scores reflect the similar risks, liabilities, benefits and opportunities associated with these various on-site containment options. Due to such commonalities, two remediation options (on-site containment and off-site disposal) were ultimately identified as providing value for money while significantly addressing the public risk of exposure to asbestos and contamination. Both of these options were compared against the base case "do nothing" option. A robust technical feasibility assessment of the two remediation options was undertaken with the options then assessed against the agreed assessment criteria.

The preferred option identified recommended that contaminated material be disposed of in an engineered sealed containment cell within the existing industrial compound on Section 34 and for appropriate non-contaminated material to be recycled where suitable.

Alternatives such as removing contaminated material off site for treatment and disposal did meet many of the key evaluation criteria, however in comparing the on-site containment cell option through the MCA process it was considered a superior option based on:

- Fewer truck movements through the neighbouring communities and a significantly reduced carbon footprint
- Managing materials on site which provide greater opportunities for indigenous participation
- Demonstrating industry best practice for a remediation project in limiting the disposal of wastes by effectively managing materials on site, while ongoing environmental controls in the Section 34 compound will provide employment opportunities for indigenous groups
- Upgrade works at the Wagait Shire Tip, situated in S32, to improve waste management operations and reduce any potential impact on the adjacent wetland and Savannah areas
- Need for an administrative building in the Section 34 compound to support ongoing land management training and environmental monitoring activities
- Provision of ongoing land management opportunities for Traditional Owners.

2.3 Alternative locations, time frames or activities that form part of the referred action

No – as part of the development of the Detailed Business Case (SKM, 2013), over 20 remedial options were assessed, with two (on-site containment and off-site disposal) assessed in detail (refer to section 2.2).

The on-site containment option has been selected as it provides the least environmental impacts, can deliver a solution within the nominated project timeframe and has been agreed with stakeholders (the most significant of which are Traditional Owners) that would help finalise the long-standing Kenbi Land Claim. This solution has also been scrutinised through the Public Works Committee process that was completed as part of the funding approval for the project.

2.4 Context, planning framework and state/local government requirements

Through assessment and development of the proposed remedial strategy extensive stakeholder consultation has been undertaken (refer to Section 2.6). This has been integral in assessing and defining the remedial and management solutions and identifying the preferred option.

In designing the proposed remedial works and considering the proposed handback of the land to the Traditional Owners, consideration has been given to Northern Territory Government requirements. This includes the remediation measures proposed for managing the identified waste and contaminated soils. Of particular relevance is stakeholder consultation conducted with a number of NT Government departments including the NT EPA, Department of Lands, Planning and the Environment (DLPE) and the Aboriginal Areas Protection Authority (AAPA)

NT EPA – Meeting on 25 March 2015 and subsequent e-mail confirmation of advice received 27 March 2015

- Lisa Bradley, Manager Environmental Assessment – Provided confirmation the Commonwealth have full environmental assessment responsibility, and assessment under the NT Environmental Assessment Act, 1994 was not required (Appendix F). Resolution of any matters raised under the EPBC Act would satisfy any requirements
- Peter Vasel, Director Pollution Control and Ryan Wagner, Environmental Officer:
  - Confirmation of the Appointed Site Auditor under s68 of the Waste Management and Pollution Control Act, 1998 to review and verify the scope of the remediation works. The Site Auditor will also review and provide comment on the RAP, RCS, Post remediation Site Environmental Management Plans, proposed containment cell design and ultimately provide an environmental audit report. The report signs off on the remediation and validation undertaken, appropriate construction of the containment cell and waste materials it has received and suitability of the site for the nominated landuse for each area of the site (or sub areas depending on how the final staging of handback is decided).
  - Regular site inspections to view progress of the works during the course of the remediation
  - Provision of Audit reports to NT EPA for review and comment
  - Requirement for any ongoing environmental management or monitoring with a pollution abatement notice (PAN) that would be linked to the land title(s). That may include such things as ongoing maintenance of the containment cell capping or groundwater monitoring in this area of the site that acts as one of the control measures to guard against containment cell failure.
- Dr Emma Young, Director Waste and Resource Recovery:
  - Environmental Protection Approval to authorise construction of the containment cell for disposal of a Listed Waste (PCB, OCP and asbestos) will not be required
  - Onsite treatment and transport of Listed waste (PCBs, OCPs and asbestos) to be carried out by waste contractors licensed under the Waste Management and Pollution Control Act, 1998

Department of Lands, Planning and the Environment – Meeting 25 March and 24 April 2015, Letter dated 1 May 2015 (Appendix F)

The Department of Lands, Planning and the Environment noted that the proposed containment cell is sited over an aquifer that could be used for drinking water. However they acknowledged that technical specialists in the department note the geology of the area comprises Cretaceous aged sandstone at a depth of 20 metres below the ground surface. This aquifer is confined by a deepening sequence of weathered to poorly weathered mudstone. This means that there is a low recharge potential for the proposed containment cell which reduces the risk of impact from the containment cell in the event that it did fail. In addition to the risk controls inherent in the natural geology, the following risk mitigation measures are in place:

- Only treated and non-leachable material that meet leachability criteria agreed with the appointed Site Auditor will be placed in the containment cell
- The containment cell is designed to be covered with an impervious capping layer to reduce the potential for surface water infiltration
- At least ten groundwater wells on Section 34 will be located around the containment cell for the ongoing monitoring of the aquifer
- All leachate will be removed from the site (containment cell) and disposed of to a licensed facility

- Remediation will not be complete until there is independent Site Auditor sign-off
- Post construction monitoring will be undertaken as part of a site Environmental Management Plan (EMP) agreed with the appointed Site Auditor to monitor groundwater quality in the vicinity of the landfill and trigger contingency management actions to prevent impact to the underlying groundwater. The requirements and conformance associated with monitoring and management at the site outlined in the EMP would be administered through the issue of a Pollution Abatement Notice (PAN) by the NT EPA.

AAPA – Meeting 25 March

- Benedict Scambary, CEO AAPA:
  - Protection of sacred sites through sacred site avoidance surveys
  - Issuing of Authority Certificates for the remedial works based on scope of works and potential impacts (if any). Refer Appendix I for a copy of the AAPA Certificate issued in September 2015.

Planning Framework

The NT Planning Scheme is the local planning instrument that covers the area immediately surrounding the site. The Commonwealth currently own the land, therefore as such is not controlled by the Planning Scheme.

The Commonwealth Department of Finance has conducted an assessment of potential environmental impacts associated with the project activities and these matters are more fully discussed in Section 3 of this document. The assessment has also considered in some detail the requirements of relevant State and local government legislation. After these assessments it was considered that mandatory approvals required for the project were not triggered.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

Based on stakeholder consultation conducted with the NT EPA on the 25 March 2015 and subsequent e-mail confirmation dated the 27 March 2015 (Appendix F), the action is not subject to the Northern Territory or local assessment process. In defining the proposed remedial strategy the Department of Finance has referred to the legislative framework for environmental and heritage matters including the EPBC Act and National Environmental Protection Measures (Implementation) Act 1998.

2.6 Public consultation (including with Indigenous stakeholders)

Table 2.4 – Stakeholder consultation to-date

Date	Key Stakeholders	Outcomes
November 2013	EPA Northern Territory & NT Government & the Dept of Prime Minister and Cabinet	Discussed proposed remediation strategy and likely approval process. EPA confirmed suitability of proposed approach.
February 2014	Site Auditor	Detailed site inspection was completed with Paul Steinwede (AECOM), Department of Finance, Jacobs (site investigation and remediation planning consultants) and Nation Partners (technical advisors to the Department of Finance). The Site Auditor was comfortable with the proposed approach for remediating the site and level of investigation that had been completed to inform the options assessment and preferred strategy.
March 2014	Tony Eggington/ Melanie Reichmeier - Department of Business Northern Territory Government	Department of Business have lists of Indigenous businesses and can provide guidance on likely tenderers for specific work packages. They also support Indigenous businesses tendering for projects to improve their success rates. There have been good examples of Indigenous businesses sub-contracting to others to build up their performance and capacity as a way of learning the tender process.
April 2014	Industry Capability Network	Discussed lessons learned and effective strategies for developing and implementing KPIs that achieve high levels of Indigenous Participation.

Date	Key Stakeholders	Outcomes
April 2014	Kenbi Rangers/ Traditional Owners/ Belyuen Community	Gaining meaningful engagement with Indigenous stakeholders is a critical component of a major rehabilitation project in the Northern Territory. There are significant opportunities to build cultural awareness and make meaningful inroads to closing the gap. A key capacity building initiative was delivered to engage and inform people and encourage cooperation and collaboration. The work, health and safety program increased awareness around hazardous materials and will assist in maximising Indigenous participation in the broader remediation project.
July 2014	Kenbi Rangers/ Traditional Owners	Discussed proposed risk mitigation works that were initially focussed on the water tower demolition. Provided overview of project and continued engagement process with Traditional Owners.
September 2014	Kenbi Rangers/ Traditional Owners	Industry briefing for Risk Mitigation Works Contractors. Kenbi Rangers provided an overview of their capabilities and the services they could provide to the risk mitigation project. The tendering for risk mitigation works contractors developed a much greater understanding of the existing capacity in the local community and this led to several approaches for specialist services. The winning contractor (Thiess) achieved an Indigenous Participation rate of more than 30% during the risk mitigation works.
September – December 2014	Kenbi Rangers/ Traditional Owners	Cultural monitoring. As part of the risk mitigation works the Traditional Owners, through the Kenbi Ranger group, completed cultural support, sacred site protection, environmental monitoring, security, fire management and land management services. The direction and guidance provided by the Traditional Owners was instrumental in protecting environmental values.
September 2014	Kristy Edlund – Solicitor for the NT	Discussed risk mitigation program, cultural monitoring and engagement with Traditional Owners.
November 2014	Kenbi Rangers/ Traditional Owners	Meeting at Belyuen and inspection of Tip Sites 1/1A on Sec 34 with the Kenbi Rangers to discuss the scope of the trial revegetation program. Identified the best nursery for sourcing the plants for the pilot and discussed likely approaches.
December 2014	Kenbi Rangers/ Traditional Owners	Meeting at Belyuen with Steve Brown, Zoe Singh and Raylene Singh to the preferred methodology and timing. It was agreed that plants would be purchased in the first week of January and planting would occur in the second week of January if weather conditions were favourable. Works to upgrade the Belyuen Nursery were discussed to better understand what support would be required to propagate plants for future rehabilitation works (the referred action).
December 2014	Kenbi Rangers/ Traditional Owners	Working in collaboration with Thiess, the Traditional Owners have upgraded the Belyuen Nursery with facilities that will provide plants for the future remediation project.
January 2015	Kenbi Rangers/ Traditional Owners	Met with Kenbi Rangers to undertake rehabilitation planting activities. Discussion included training requirements and ambitions of Belyuen nursery development.
January 2015	Greening Australia	Met to discuss opportunities to collaborate and undertake training with the Kenbi Rangers, as well as opportunities for collaboration under recent grant applications and projects.
January 2015	Charles Darwin University	Met in Darwin to discuss opportunities to undertake horticultural training for the Kenbi Rangers. Discussed options under Certificate II in Horticulture and opportunity to refresh modules covered in Certificate II in Conservation and Land Management
January 2015	Indigenous Business Australia	Met to discuss opportunities for business planning and administration support for the nursery at Belyuen. Recommended further consideration of business preparation workshops held in Darwin CBD during 2015.

Date	Key Stakeholders	Outcomes
January 2015	Charles Darwin University	Discussion with Horticultural Department of CDU regarding recommended monitoring parameters to track revegetation success at the Tip Site 1/1A, Sec 34 Rehabilitation area.
January 2015	Kenbi Rangers/ Traditional Owners	Commencement of the trial revegetation works to assess various revegetation strategies. Traditional Owners have led the planting and monitoring works.
February 2015	Kenbi Rangers/ Traditional Owners	Department of Finance meetings to better understand Traditional Owner expectations and to discuss the broader remediation program and outcomes. Opportunity to map capacity building activities to longer term development and closing the gap targets.
March 2015	Tommy Lyon Group	Department of Finance meetings to better understand Traditional Owner expectations and to discuss the broader remediation program and outcomes. Opportunity to map capacity building activities to longer term development and closing the gap targets.
March 2015	Belyuen Community	Department of Finance meetings to better understand Traditional Owner expectations and to discuss the broader remediation program and outcomes. Opportunity to map capacity building activities to longer term development and closing the gap targets.
March 2015	Larrakia Group	Department of Finance meetings to better understand Traditional Owner expectations and to discuss the broader remediation program and outcomes. Opportunity to map capacity building activities to longer-term development and closing the gap targets.
March 2015	Northern Land Council (NLC) CEO	Department of Finance meetings to better understand NLC expectations and to discuss the broader remediation program and outcomes. Opportunity to map capacity building activities to longer development and closing the gap targets.
March 2015	NT EPA Lisa Bradley, Director Environmental Assessments and Fity Peehikuru, Environmental Officer	Meeting to brief the agency on the proposed works and discuss approvals / requirements in relation to the future works.
March 2015	NT Department of Lands, Planning and the Environment; Nerida Bradley, Director Strategic Risk Management	Meeting to discuss the proposed works including the intention to sub-divide Section 32. Mechanisms for carrying out this sub-division and implications were discussed. It should be noted that the overall program of remediation still applies to the site and the sub-division is purely to facilitate staged hand-back of the land as part of the Kenbi Land Claim.
March 2015	AAPA Benedict Scambary, CEO	Brief AAPA on the proposed works and stakeholder engagement activities with TOs to date. Discussed AAPA's requirements and agreed that the Department of Finance/Jacobs would submit an application for an AAPA Authority Certificate. This application was lodged in mid-2015 and the Certificate was issued in September 2015 (refer Appendix I)
March 2015	NT Department of Land Resource Management Alistair Shields, CEO; Steve Popple, Exec Director Water Resources	Discuss the proposed works, specifically any requirements in relation to the extraction/use of groundwater resources
April 2015	NT Department of Land Resource Management Steve Popple, Exec Director Water Resources	Following completion of the Public Works Committee Hearing, Jacobs discussed questions presented by the hearing panel with DoLRM.

2.7 A staged development or component of a larger project

No

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

Review of the World Heritage List indicated that there were no records relevant to the site.

Nature and extent of likely impact

None

3.1 (b) National Heritage Places

Description

Review of the National Heritage List indicated that there were no records relevant to the site.

Nature and extent of likely impact

None

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

A review of the relevant Protected Matters Search Tool (PMST) indicated that there were no records relevant to the site.

Nature and extent of likely impact

None

3.1 (d) Listed threatened species and ecological communities

Description

A review of the relevant Protected Matters Search Tool (PMST) indicated that no listed communities are relevant to the site. Twenty five Listed Threatened Species are considered to have relevance to the site, of which only eleven species are terrestrial. Of the terrestrial species, there are no flora species listed under the EPBC Act that are considered relevant to the area. Of the fauna, two of the five bird species are considered 'known' to occur, four of the terrestrial mammals are considered 'likely' to occur, and the single terrestrial reptile listed under the EPBC is also 'known' to occur.

The following studies have been undertaken to verify the information obtained from the PMST (all of which are presented in Appendix D):

- ERM, 2010. Section 34 Cox Peninsula Flora and Fauna Assessment - for a detailed assessment of threatened species on site refer to Section 4.4
- ERM, 2011. Section 32 Cox Peninsula NT Flora and Fauna Assessment. for a detailed assessment of threatened species on site – for a detailed assessment of threatened species identified on site refer to Section 4.4
- VDM Consulting, 2012. Environmental Risks and Gap Analysis, Stage 1: Initial Business Case, Cox Peninsula Contamination Remediation Project.
- Jacobs (2015) Memo Re. Cycad Assessment and Mapping, July 2015

Nature and extent of likely impact

The reports on the study areas demonstrate that impacts on EPBC listed species would be unlikely. This is largely due to the discrete nature of the specific remediation works (removing localised assets and contamination) and the habitat context, given the infrastructure being removed is generally located in disturbed and modified areas. The attached maps (Appendix A Figures 10,11 and 12) outline the areas that will be and are likely to be subject to disturbance associated with remediation work. However, it should be noted that remediation works will only affect areas which are already highly disturbed.

Section 32

The ERM (2011) Section 32 report and subsequent studies undertaken by Jacobs in 2014 and 2015 (Jacobs, 2015c) found that no EPBC listed flora species were found in the study area. However, Armstrong's Cycad (*Cycas armstrongii*) (cycads), listed under the Territory Parks and Wildlife Conservation (TPWC) Act, was a dominant feature of the Eucalypt forest mid storey. While regarded as 'locally abundant', likely due to the site not being grazed, care is being applied to the management of the local cycad population to ensure adverse impacts are minimised. All cycads occurring in close proximity to existing infrastructure have been mapped (see Appendix D) and it is anticipated that most individuals will be avoidable during site remediation works. A Cycad Management Plan has been prepared to manage translocation programs for individuals that cannot be avoided.

A Cycad Translocation Plan has been prepared for implementation during the works with the relocation to be undertaken by a suitably qualified and licensed party (Kenbi Rangers).

The area around the radio broadcasting facility which will be disturbed during remediation works is of low habitat value (Appendix A, Figure 10 illustrates the extent of disturbance anticipated during the remedial works).

Section 34 and 41

The ERM (2010) Section 34 report, which also considers Section 41, notes that no flora species listed under the EPBC Act were recorded in the study area. The map on page 20 of the ERM (2010) report and Appendix A, Figures 11 and 12 illustrate the extent of disturbance anticipated during the remedial works. These Figures also demonstrate that the proposed action will predominately occur in the cleared areas of the site. The disturbed area of Section 34 was maintained free of vegetation until approximately 5 years ago. Significant natural regeneration has taken place across such areas, including the colonisation by cycads. Those present are immature, less than 5 years old and sparsely distributed across the disturbed area, in lower densities to that observed in the surrounding intact vegetated areas. Similarly to Section 32 above, a Cycad Management Plan has been prepared to manage translocation programs for individuals that cannot be avoided as part of the work.

3.1 (e) Listed migratory species

Description

Two (2) Listed Migratory Species are indicated as potentially relevant to the sites. The Fork-tailed Swift, considered 'likely' to occur and the Little Tern, considered as 'may' occur, are listed for the site.

The specific habitat associated with the areas of proposed remediation is not considered relevant to either of these species.

Refer to Section 4.4, ERM (2010) *Section 34 Cox Peninsula Flora and Fauna Assessment*, for a detailed assessment of threatened species on site.

Refer to Section 4.4, ERM (2011) *Section 32 Cox Peninsula NT Flora and Fauna Assessment*, for a detailed assessment of threatened species on site.

Nature and extent of likely impact

The reports on the study areas demonstrate that there will be no impacts on migratory species. The attached maps (Appendix A, Figures 10 - 12) outline the areas that will be and are likely to be subject to disturbance associated with the proposed remediation work. However, it should be noted that remediation works will only affect areas which are already highly disturbed.

Section 32

The ERM (2011) Section 32 and VDM (2012) reports note that no threatened EPBC species where found during the survey. The ERM (2011) report notes that the Beach Stone-curlew (*Esacus magnirostris*), Spotted Nightjar (*Eurostopodus argus*) and Southern Boobook (*Ninox novaeseelandae*) each of which are listed migratory species, were observed during spotlighting in surrounding, intact areas. The report notes that Estuarine crocodiles (*Crocodyylus porosus*) are likely to exist in the intertidal area.

The map on page 33 of the ERM (2011) Section 32 report and the figures illustrating the anticipated areas of disturbance presented in Appendix A, Figures 2 and 10 demonstrate that the remediation works will avoid the large wetland and melaleuca swampland, the termitaria seasonal floodplain and the coastal dune areas. These areas are considered to provide habitat to migratory species relevant to the site.

Section 34 and 41

The ERM (2010) Section 34 report (which includes consideration of Section 41) and VDM (2012) study notes that 13 bird species listed as migratory and 21 listed as marine under the EPBC Act were identified within the study area. None of the species identified were listed as threatened under the EPBC Act or the TPWC Act.

Figure 4.4 in the ERM (2010) report and the figures illustrating the anticipated areas of disturbance presented in Appendix A, Figures 3, 11 and 12 demonstrate that the remediation works will largely avoid the migratory and marine shorebird habitat as well as the migratory terrestrial avifauna habitats identified at the site.

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

N/A

Nature and extent of likely impact

None

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

The action is on Commonwealth land

Nature and extent of likely impact

None

3.1 (h) The Great Barrier Reef Marine Park

Description

The site is not located in the Great Barrier Reef Marine Park.

Nature and extent of likely impact

None

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

Information relating to the geology of the site (either published or observed during investigation of the site) indicates that there are no coal measures at or in the vicinity of the site (Jacobs 2015, 2015a, 2015b).

Nature and extent of likely impact

None

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**		No
		X	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

The action is to be undertaken by the Department of Finance.

Refer Section 3.2 (d) for description of nature and extent of potential impacts.

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**		No
		X	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

Sections 32, 34 and 41 on Cox Peninsula comprise Commonwealth land that is managed by the Department of Finance. As the referred action is being undertaken by a Commonwealth agency (Department of Finance), section 26 (3) (f) of the EPBC Act excludes Commonwealth land as a controlling provision. However, section 28 of the EPBC Act provides for the protection of the environment from significant impacts caused by the actions of Commonwealth agencies.

The EPBC Act Policy Statement 1.2 Significant Impact Guidelines for actions on, or impacting upon Commonwealth land and actions by Commonwealth agencies has been followed in order to address the likely impacts on the environment of the proposed action.

The potential impacts associated with the action relate to potential impacts on flora and fauna, potential impacts to the historical values of the existing structures and the clearing of native vegetation. Table 3.1 below provides the outcome of the self assessment process undertaken in accordance with the EPBC Act Policy Statement 1.2 Significant Impact Guidelines for actions on, or impacting upon Commonwealth land and actions by Commonwealth agencies.

Table 3.1 Impact Self Assessment

Potential Impact	Likelihood of Impact
Landscapes and Soils	No. The construction of the proposed ACM and contaminated soil containment cell in the vicinity of the former Section 34 compound is in an already cleared and highly disturbed area. The footprint of the containment cell is estimated to be 6,490 m^2, while a total volume of 45,000 m^3 of natural soils will be excavated. Excess material associated with this excavation will be used to backfill tip sites and other remediated areas where necessary and the final containment cell finished level with the existing surface.
Coastal Landscapes and Processes	No. The proposed action is situated on land and has no impact on coastal processes or tidal patterns. Works will be undertaken during the dry season thereby minimising the potential for sedimentation or erosion.
Impacts on ocean forms, ocean processes and ocean life	No. With the exception of Section 41 where some small-scale soil excavation will be undertaken to a depth of approximately 300 mm, the proposed action will be undertaken a significant distance inland, with the main activities undertaken in the former Section 34 Compound (located 2 – 3 kilometres inland from the coastline). The action would not alter water circulation patterns through the modification of existing landforms or result in the release of oil, fuel or other toxic substances into the marine environment (works will be undertaken away from surface water bodies)
Impacts on water resources	Unlikely. Groundwater abstracted for use during the remedial activities for use as dust suppressant and during thermal treatment of the soils, will be obtained from the underlying sandstone aquifer. The abstraction is considered unlikely to measurably reduce the quantity, quality or availability of surface or ground water or alter drainage patterns. A groundwater well construction and abstraction licence will be obtained through the NT Department of Lands (refer to Section 4) as required prior to abstraction, therefore the rate and volume of groundwater abstracted will be agreed under the licence, such that it does not impact surface and groundwater.
Pollutants, chemicals and toxic Substances	Unlikely. Exhaust emissions and greenhouse gases would be produced from the construction and operation of the soil treatment plant; however, these would be temporary in nature and would not result in a substantial impact to the local / regional air quality. Storage areas for dangerous goods used throughout the remediation works (i.e. fuels, chemicals etc.) would be designed in accordance with the relevant Australian Standards. A number of safeguards would be implemented to prevent leaks and spills in addition to contingency measures should a spill / leak occur (refer to Section 4.0). Disturbance of potentially contaminated soils (containing metals, PCB and pesticides and concentrations in excess of criteria outlined in the National Environment Protection (Assessment of Site Contamination) Measure as amended 2013 (NEPM 2013) guidelines for public open space and ecological screening levels and hazardous material (ACM) will occur as a result of the works. Mitigation measures have been recommended to avoid (or minimise) potential impacts relating to contamination and ACM (refer to Section 4.0) and these would be incorporated into the Construction Environmental Management Plan which would be reviewed and signed off by the project manager / contract administrator for the remedial works (Jacobs).

Potential Impact	Likelihood of Impact
Plants	
Medium or large-scale vegetation clearance	**No.** The remediation project does not involve medium or large-scale native vegetation clearing. Some very minor clearing may be required as detailed below.
Clearance of any vegetation containing a listed threatened species which is likely to result in a long-term decline in a population or which threatens the viability of the species.	**No.** There are no EPBC listed flora in the area. A single threatened species (cycads) listed under the Northern Territories TPWC Act was recognised as 'locally abundant' given the lack of threatening processes (specifically grazing) that have affected the species over its natural range. Given the 'local abundance' and the management approach minimising impacts to individuals in close proximity to areas where infrastructure is proposed for removal, it is considered that no long term decline to the local population or the viability of the species will result from the action.
Introduce potentially invasive species	**Unlikely.** Safeguards will be implemented to minimise the spread of introduced terrestrial and flora species proximate to the project area, including vehicle cleaning, targeted weed control and other preventative measures (refer to Section 4.0). The implementation of these safeguards would minimise the likelihood of introducing additional invasive species.
Substantially stunt growth of native species through the use of chemicals or undertake any controlled burning in sensitive areas	**No.** These activities are not required for the project
Animals	
Cause a long-term decrease in, or threaten the viability of, a native animal population/s, through death, injury or other harm to individuals.	**Unlikely.** Previous fauna assessment (ERM, 2010, ERM, 2011, VDM, 2012) completed for Section 32, 34 and 41 identified a number of protected species at the site. However, the primary habitats of these species are generally confined to the undisturbed areas, rather than the disturbed areas that are the subject of the remediation works. The location of the works away from identified habitats is considered to mitigate against potential impact to native animal populations. While the wider site retains important habitat for migratory species (including the large wetland areas at Section 32 and the coastal areas of Section 34), these areas are not subject to works associated with this proposal.
Displace or substantially limit the movement or dispersal of native animal populations.	**No.** The footprint of the proposed remedial works comprises 1.4 % of the overall site area and is outside undisturbed primary habitat that would be used for movement or dispersal of native animal populations.
Substantially reduce or fragment available habitat for native species.	**No.** The proposed remedial works will be situated in areas of the site that are already disturbed and/or cleared and would not substantially reduce or fragment available habitat for native species. Mitigation, including the establishment of no-go zones in areas other than designated work areas for contractors undertaking the work are provided in Section 4.0 to ensure that available habitat for native species is not substantially reduced or fragmented in the medium to long term.
Substantially reduce or fragment available habitat for listed threatened species which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species.	**No.** The remediation works would not likely substantially reduce or fragment available habitat for listed threatened species which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species. The primary habitats of these species are generally confined to the undisturbed areas of the site (rather than the disturbed areas that are the subject of the remediation works), therefore will not reduce or fragment available habitat.

Potential Impact	Likelihood of Impact
Introduce potentially invasive species which will substantially reduce habitat or resources for native species.	**Unlikely.** Safeguards would be implemented to minimise the spread of introduced terrestrial and marine fauna species proximate to the project area, including vehicle cleaning, targeted weed control and other preventative measures (refer to Section 4.0). The implementation of these safeguards would minimise the introduction of invasive species. It is noted that Cane Toads (*Rhinella marina*) has already established itself across the area.
People and Communities	
Negatively affect people and communities	**No.** The remedial works proposed in Sections 32 are located between 4 and 10 kilometres from the Belyuen community and around 20km from Section 34 and 41. The Wagait Beach community is at least 4km from Section 32 and 12km from Section 34 and 41. The main processing of contaminated soil and hazardous materials is proposed in the former Section 34 compound (refer Appendix A, Figure 3). One of the reasons the on-site remedial solution was selected was due to significant reduction in transport and potential effects this may have on local and other communities that may be on the route to the off-site management facility. With on-site management, focusing activities in the former Section 34 compound vehicle movements are at least 12km from the nearest residence in the Belyuen and Wagait Beach communities . Impacts from vehicle movement will also be further managed through restricted work hours outlined in the RCS (Jacobs, 2015f).
Heritage	
Indigenous Heritage	**Unlikely.** The remediation project is unlikely to impact Indigenous heritage sites provided the mitigation measures identified in Section 4.0 are implemented. These include limiting excavations and vehicle movements to the existing services easements and implementing a 'No Go' area in proximity of identified Indigenous heritage sites.
Historic Heritage	**Unlikely.** The remediation project is unlikely to impact historic heritage sites provided the mitigation measures identified in Section 4.0 are implemented. These include limiting excavations and vehicle movements to the existing services easements and implementing a 'No Go' area in proximity of identified historic heritage sites.

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Other important features of the environment

3.3 (a) Flora and fauna

Large seasonal fresh water wetland areas occur in the western portion of Section 32 and provide important migratory bird habitat. These areas are remote from the location of proposed works and will not be affected by the proposal.

Refer to Section 3.3 for further details as well as the following reports presented in Appendix D:

- ERM (2011) *Section 32 Cox Peninsula NT Flora and Fauna Assessment,* for a detailed assessment of the flora and fauna species on site.
- ERM (2010) *Section 34 Cox Peninsula Flora and Fauna Assessment,* for a detailed assessment of the flora and fauna species on site.

3.3 (b) Hydrology, including water flows

Surface Water

Surface water at the site generally drains to either the low lying areas towards the coast or the seasonal wetlands to the west of the main cleared area at the Site.

Section 32

West of Cox Peninsula Road seasonal wetlands form during the wet season although these appear to recede and then dry out over the course of the dry season. These wetlands occupy approximately half of the western part of the Site at their maximum extent.

Elsewhere, floodways are evident in various locations including along and across cleared dirt roads, although no permanent surface water features are present on the Site. These floodways accommodate surface water flows during high rainfall periods (particularly during the wet season) but are otherwise dry.

Surface water in Section 32 generally drains to either the low lying areas to the west of Cox Peninsula Road, or east towards the mangroves and Darwin Harbour.

Refer to Appendix A, Figure 2 for the location of surface water features.

Section 34

Seasonal wetlands form to the west of the main cleared area during the wet season although these appear to recede and then dry out over the course of the dry season. These wetlands occupy only a small part of the Site at their maximum extent.

Elsewhere, floodways are evident in various locations including along and across cleared dirt roads. These floodways accommodate surface water flows during high rainfall periods (particularly during the wet season) but are otherwise dry. The south-western extent of the Site is demarcated by the Corrawara Creek.

Refer to Appendix A, Figure 3 for the location of surface water features.

Section 41

There are no permanent or seasonal surface water features located at Section 41. Surface water resulting from heavy periods of rain during the wet season is likely to drain towards the northern and eastern edge of the Site, and the marine environment beyond, rather than form surface water features within the Site boundaries.

Groundwater

The 1:2,000,000 Groundwater of the Northern Territory map (Tickell, 2013) indicates that Cox Peninsula is underlain by a fractured and weathered rock aquifer with a typical yield of 0.5 to 2.5 litres per second (L/sec), although this may be as high as 5L/sec in places. It is likely that groundwater flow will be towards the edge of the peninsula in the absence of any notable features on the Site that would suggest otherwise.

Verma (1982) documents a hydrogeological investigation undertaken on Cox Peninsula between August 1979 and September 1982. The following provides a summary:

- Shallow aquifers are widely distributed on the Cox Peninsula, except in the central and western parts, occurring at the unconformity between the Lower Proterozoic and Lower Cainozoic sediments. They have depths of between 10m and 46m and relatively low yields (0.5 to 1.5 L/sec). Seasonal fluctuations in water level in the shallow aquifers range from 3.4m to 6.4m.
- A deeper aquifer (apparently associated with a fault system) was intersected at a depth of 58m and had a higher yield (5 L/sec). This comprises a confined aquifer and water level rose by 55.7m when the aquifer was struck.
- Groundwater recharge is likely to be low as most of the area is waterlogged (even during the dry season).
- Groundwater discharge is mostly via seepages (along the periphery of the peninsula), evapotranspiration and groundwater underflow

Section 32

Groundwater levels were recorded during both the dry and wet seasons, with relatively consistent levels across Section 32 and evidence of only a slight gradient. Groundwater appears to be tending in a general easterly direction towards Darwin Harbour. To illustrate the limited extent of the reported gradient, one of the westernmost wells (MW09) during the dry season reported a groundwater level of 13.62 mAHD during the first monitoring round whereas MW07, which is located around 600m to the east, reported a groundwater level of 11.95 mAHD, a difference of only 1.67 m.

Significant seasonal fluctuations in groundwater levels were observed between the dry and wet seasons, with groundwater encountered from 1 to 13.1 mAHD and 15.5 to 17.7 mAHD respectively.

Refer to Appendix A, Figure 8 for the location of groundwater wells and contours.

Section 34

Three rounds of groundwater monitoring and sampling was conducted for the 25 groundwater monitoring wells drilled and installed by Jacobs throughout Section 34 (Jacobs, 2015). The sampling round also included four wells installed prior to the SSI program; these were three open-topped dome-shaped wells (Well 1, Well 2 and Well 3) located within the Charles Point Lighthouse Precinct and one groundwater well (Bore 2) located south of the Section 34 compound.

Groundwater level measurements were taken at each sampling location using an interface meter. The groundwater at Section 34 was gauged on two occasions in the dry season, namely July and September 2013, with groundwater encountered at depths of between 8.0 mbgl and 13.7 mbgl. There were significant seasonal fluctuations in comparison to wet season water levels with depths between 15.5 to 17.7 mAHD measured in February 2014.

The Section 34 compound forms a slight topographical high point and groundwater flow in the area follows this. Groundwater gradients are very shallow in the vicinity of the compound and generally flow towards the coast in the north and the west.

Refer to Appendix A, Figure 9 for location of groundwater wells and contours.

Section 41

Depth to water measurements within the groundwater wells were recorded at each sampling location using an interface meter. Section 41 is in close proximity to Section 34, the data for which indicated that groundwater levels are relatively consistent across the site with only a slight gradient evident. Shallow groundwater flow beneath Section 34 appears to be trending in a general north-westerly direction, towards the coast. It is therefore considered likely that the hydraulic gradient at Section 41 is similarly trending towards the coast.

Groundwater at Section 41 was gauged on two occasions in the dry season, namely July and September 2013, with groundwater encountered at between 12.2 mbgl (GW10) and 13.6 mbgl (GW09). Gauging was repeated prior to the beginning of wet season groundwater sampling on 17 February 2014 and demonstrated significant seasonal differences in water level with groundwater encountered at 12.23 mbgl (GW10) and 11.54 mbgl (GW09).

Refer to Appendix A, Figure 9 for location of groundwater wells and contours.

3.3 (c) Soil and Vegetation characteristics

The proposed action will have a positive benefit to soil quality through the remediation of contaminants. Vegetation disturbance will occur in previously disturbed areas and a permit to remove and translocate (rather than destroy) cycads will be obtained (if required). Works will be undertaken around cycads as far as possible to minimise the need for relocation.

Following completion of remediation works, a program of rehabilitation and weed management will be implemented to promote the re-establishment of native species. This strategy will be informed by the ongoing revegetation trials being carried out by the Kenbi Rangers.

3.3 (d) Outstanding natural features

None

3.3 (e) Remnant native vegetation

Refer to Section 3.1 and 3.3.

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

No action will be taken in a marine area.

3.3 (g) Current state of the environment

Section 32 contains bushland and a mangrove coastline, however the site has been modified from its natural condition and contains old informal tips sites, the Wagait Shire community landfill facility (due to close in October 2015) and the remnants of a large communications array (refer to Appendix A, Figure 2) in small portions of the site (which are subject to this proposal). The areas in which the remedial works occur appear to have been levelled during the original construction, clearing the original vegetation community and (in some areas) the top soil.

Section 34 contains an area of approximately 221 ha that was cleared in the 1960s. This site is modified from its natural condition and contains at least seven informal landfill / tip sites and the remnants of a disused antenna field, camp and compound (refer to Appendix A, Figure 3).

The majority of Section 41 is maintained and vegetation cleared to facilitate the lighthouse operation. Current areas of disturbance are limited to areas of previous utilisation around the lighthouse. Beyond these cleared areas tropical savannah in areas exist that are not actively managed

A Contractors Environmental Management Plan (CEMP) will be completed prior to commencement of remediation activities in order to mitigate potential impacts to the environment arising from the works.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

A number of heritage studies have been undertaken at the Cox Peninsula Site. The following reports can be found in Appendix E

- ERM 2011a Section 32, Cox Peninsula NT Heritage Assessment. Report for Department of Finance and Deregulation, and United Group, Environmental Resources Management Australia, Barton, ACT.
- ERM 2010b Sections 34 and 41, Cox Peninsula, NT: Heritage Assessment. Prepared for United Group Service Limited, Environmental Resources Management Australia, Sydney.
- ERM 2010a Section 34 Cox Peninsula: Heritage Management Plan. Prepared for Department of Finance and Deregulation and United Group Process Solutions, Environmental Resources Management Australia, Canberra.
- Jacobs 2014 Cox Peninsula Historic Heritage Impact Assessment. Report to the Department of Finance. Melbourne.
- Jacobs 2015e Cox Peninsula Remediation Project, Historic Heritage Impact Assessment: Addendum A Test Excavation and Updated Impact Assessment, July 2015.
- Jacobs 2015d Cox Peninsula Remediation Project. Cox Peninsula Indigenous Heritage Impact Assessment, July 2015.

A previous heritage assessment of Cox Peninsula has identified two key precincts with historic heritage values – 105 Radar Camp (Section 34) and Charles Point Lighthouse Precinct (Section 41 and 34). There are no historic heritage values identified within Section 32.

The 105 Radar Camp comprises a series of archaeological features including concrete slabs, posts, a well, weapons pits, and service pipes. There are also surface archaeological artefacts related to the use of the site by the Australian Army. The Camp has heritage values related to its historical significance, rarity, potential to yield information, and its social significance.

The Charles Point Lighthouse Group is listed on:

- Register of the National Estate (Place ID 25)
- Commonwealth Heritage List (as an 'indicative place' Place ID 105371)

The Charles Point Lighthouse Precinct comprises the Charles Point Lighthouse, foundations of former lighthouse buildings and residences, wells, and archaeological artefacts (surface and sub-surface) related to the occupation by the lighthouse keepers. The Lighthouse Precinct has heritage values related to its historical significance, rarity, potential to yield information, aesthetic significance, creative/technical achievement, and social significance. Archaeological test excavations in the Lighthouse Precinct have identified low potential for substantial sub-surface historical archaeological deposits. A concentrated surface artefact scatter comprising historical artefacts is present surrounding the concrete foundation of a storehouse (now a helipad).

In the vicinity of the boundary of the Charles Point Lighthouse Precinct and the Radar Camp Precinct there is an artefact scatter comprising historical archaeological artefacts related to the occupation of the Lighthouse, the occupation of the Radar Camp and the use of the area by Aboriginal people. This artefact scatter contributes to both the significance of the Lighthouse Precinct and the Radar Camp Precinct, as well as to Indigenous heritage values (see Section 3.3(i) below).

For further details see Appendix E Jacobs (2014) Cox Peninsula Historic Heritage Impact Assessment as well as the more recent Addendum report (Jacobs 2015).

3.3 (i) Indigenous heritage values

Section 32

Previous heritage assessment of Section 32 identified three Aboriginal Precincts (Merribimam, Martbirl and Majill Precincts) which contain items with significant heritage values. These Precincts comprise landscapes, Dreaming Places and archaeological sites. The three Precincts variously meet five of the Commonwealth Heritage List (CHL) criteria although have not as yet been nominated to the CHL (ERM, 2011a). In addition, all of Section 32 has been assessed as meeting two of the CHL criterion based on intangible travelling Dreaming (which extends across the whole of the Cox Peninsula).

When the four precincts were considered together, they are considered to meet six of the nine CHL criteria. These are:

a) The places has significant heritage value because of the place's importance in the course, or pattern, of Australia's natural or cultural history

b) the place has significant heritage value because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history

c) the place has significant heritage value because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history

d) the place has significant heritage value because of the place's importance in demonstrating the principal characteristics of:

- a class of Australia's natural or cultural places; or
- a class of Australia's natural or cultural environments

g) the place has significant heritage value because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

i) the place has significant heritage value because of the place's importance as part of Indigenous tradition

The three Precincts - landscapes, Dreaming Places and archaeological site precincts are shown on Appendix A, Figure 10. It is noted that the location of these precincts does not intersect the proposed remediation works areas.

Section 34 and 41

A previous heritage assessment by ERM (2010b) identified four Aboriginal Precincts within Section 34, one of which also encompasses Section 41 (Point Charles Precinct). These four Precincts (Point Charles, Gilruth Point, Tapa Bay and Corrawarra Creek Precincts) comprise landscapes, Dreaming Places and archaeological sites. The four Precincts variously meet six of the CHL criterion although have not as yet been nominated to the CHL (ERM, 2011a). In addition, all of Section 34 and Section 41 has been assessed as meeting two of the CHL criterion based on intangible travelling Dreaming (which extends across the whole of the Cox Peninsula).

The precincts are shown on Appendix A, Figure 11.

3.3 (j) Other important or unique values of the environment

None

3.3 (k) Tenure of the action area (eg freehold, leasehold)

Commonwealth Land managed by the Department of Finance

3.3 (l) Existing land/marine uses of area

Vacant and fenced. Area used for lighthouse and radio infrastructure (used and disused)

3.3 (m) Any proposed land/marine uses of area

The proposed action aims to remediate the site such that it is suitable for public open space as defined in the NEPM.

4 Measures to avoid or reduce impacts

Overview – Management and Mitigation

Measures to avoid and reduce impacts associated the proposed remedial works are implemented through two overarching meachanisms, these being:

- Environmental and Heritage - Management Plans – These plans outline measures, protocols, responsibilities and reporting requirements to ensure that potential impacts to significant environmental and heritage features are agreed and in place before any works commence on-site
- Project Management, Reporting and Approvals – Clear roles and responsibilities have been allocated so that works are appropriately monitored and verified and various mitigation measures outlined and agreed in a range of plans developed to manage risk are appropriately implemented throughout the delivery of the works

The first part of this section aims to provide the reader with an overview of the above points, while more detail relating to specific responsibilities associated with identified potential impacts and how they may be managed with specific management plans is outlined in the later part of this section.

Project Management, Reporting and Approvals Structure

Finance propose to deliver the proposed remedial and management works (proposed action) in accordance with a Remediation Contract Specification (RCS) (refer to Appendix G) prepared for the Department of Finance by Jacobs who have been engaged as the Project Manager Contract Administrator (PMCA).

The selection of a remediation works contractor (RWC) to undertake the works in accordance with the RCS is to be undertaken through a select tender via the pre-qualified Defence Environment and Heritage Panel, Category F1, Contamination Remediation Works Panel. This panel has been selected on the basis that the panel members are pre-qualified in this field and have demonstrated capability and management systems to undertake remedial and management works to appropriate standards.

Once a RWC has been selected they will undertake works in accordance with the requirements of the RCS under the supervision of the PMCA, acting on behalf of the Principal (Department of Finance). In addition to Finance, the PMCA and the RWC, the following Figure 4.1 outlines the broader project structure, while Table 4.1 provides details of the roles and responsibilities of the various project stakeholders.

Key roles that relate to oversight and management of the remediation works and means by which avoidance of associated environmental impacts are implemented and verified are outlined in the following points:

- PMCA: Responsible for all tasks outlined in the RCS, daily site presence to monitor the activities of the RWC. The PMCA would approve the Environmental Management Plan (EMP) produced at the commencement of the works by the RWC, which includes implementation of environmental controls and mitigations measures
- RWC: Undertake work in accordance with the RCS and as agreed and approved by the PMCA, this includes implementation of environmental management and mitigation measures outlined and agreed in the EMP prepared and approved by the RWC at the inception of the project, prior to any works commencing on-site (refer to next section for outline of EMP content). The EMP would incorporate the requirements and control measures outlined in the Construction Environment and Heritage Management Plan (CEHMP) prepared by the PMCA (Jacobs 2015g).
- Site Auditor: Perform the role of a contaminated site auditor in accordance with NT legislation, liaising with and auditing the work of the RWC and Environmental Consultant, review and comment on the appropriateness of the EMP. Prepare statutory audit reports at the conclusion of the remediation and validation works. It should be noted that during the course of the project the Site Auditor assesses compliance of the works with relevant legislation and guidance

Environment and Heritage - Management Plans

The following provides a summary of plans prepared to mitigate against environmental and heritage impacts that could arise from the proposed remedial works:

- A CEHMP has been prepared for the works by the Contract Administrator (Jacobs 2015g) and is provided in Appendix J). The purpose of the CEHMP is to:
  - Summarise the current status of the Site in relation to environmental and heritage values
  - Identify potential environmental and heritage impacts of construction activities

- Define environmental and heritage management objectives
- Identify management actions required to achieve the nominated environmental and heritage objectives
- Define monitoring and reporting requirements
- Define environmental and heritage management responsibilities.

- An EMP will be prepared and implemented by the RWC. This document will identify:
  - the relevant controls that will be implemented by the RWC in meeting the management requirements identified in the CEHMP. The EMP will be reviewed and approved by the Site Auditor and PMCA prior to works commencing on-site.
  - Include protective works to be undertaken and means of spoil / contaminant containment. This will include dust and run off control, tracked debris control (mud etc. from vehicles; etc.), vehicle washing etc
- Noise and Vibration Management Plan that sets out requirements to:
  - Fit all construction equipment with noise suppressors, acoustic linings or shields. All tools and silencers shall be kept in good condition at all times
  - Comply with the recommendations set out in Appendix E of Australian Standard AS2436-1981, Guide to Noise Control on Construction, Maintenance and Demolition Sites, and all Statutory Authority Regulations and Guidelines concerning noise and nuisance arising from the contract being carried out
  - Development of a noise and vibration management plan for the works
  - Take all reasonable precautions, including the programming of the demolition, to minimise disruption to the public and Site visitors associated with noise and vibration impacts.
- Materials Tracking and Reporting Plan (MTRP) will include:
  - Methodology for undertaking an assessment of risks, in relation to handling of waste materials, including:
  - Surface waste and fly tipped waste.
  - Contaminated solids or liquids.
  - Details on treatment, handling and waste classification methodologies (excavation method statement), including:
    - Methodology for handling waste materials (identification of holding areas, loading / unloading zones, transport mechanism and route, and associated health & safety requirements).
    - Methodology for disposal of soil, water or other waste in strict accordance with all current legislation. All materials disposed off-site by the Contractor shall be disposed at an appropriately licensed waste disposal facility, with adherence to duty of care regulations at all times, utilising adequate descriptions of material, waste transfer notes and special waste consignment notes where applicable.
    - Details of any temporary water or soil treatment plants required shall be provided in full to the PMCA for approval prior to commencement of treatment processes. The Contractor shall provide a detailed methodology and reference to disposal standards.
    - Identification of appropriately qualified, responsible persons for ensuring compliance and verification with the procedures contained within the MTRP.
- Work Plan: In addition to the above at least two weeks prior to commencement of works on-site, the RWC must provide a Work Plan for review and approval by the PMCA. The Work Plan will include the proposed works methodology and order of works including items relevant to protection of the environment:
  - Form, condition and details of the structures, Site and surrounding area
  - Form, location and removal methods for contaminated or hazardous materials
  - Form, location and removal methods of materials for re-use or recycling
  - Form, location and removal methods of salvage items
  - Type and location of adjoining or surrounding premises which may be adversely affected by noise, vibration, dust or removal of structure (if any)
  - Identification and location of all services above and below ground, including those required for the RWC's own use.
  - Type and location of features of significance (Sacred Sites and heritage structures) (in accordance with the CEHMP (Jacobs, 2015g) presented in Appendix J)

- Sequence and method of demolition, infrastructure and services removed
- Arrangements for control of Site transport and traffic, the route between Sections 32 and 34 (Traffic Management Plan) and off-site facilities that may be nominated to receive waste or recycled material (i.e. Shoal Bay Landfill)
- Evidence of appropriate licensing and agreement from off-site facilities to receive particular categories of waste or recycled materials
- Arrangements for authority requirements, including permits
- Waste Management and on-site treatment methods proposed for mixed or Listed Waste, soil segregation and stockpile management
- Hazardous materials and removal process
- Proposed programme of work
- Sequence and method of documentation approval
- Construction of footings and other temporary works
- Materials Tracking and Reporting Plan
- This should include site logistics – specifically – order and flow of the works demonstrating how the works will be carried out within the site confines and nominated processing area in Section 34
- The RWC shall provide the programme for the works in a form of a network diagram produced in Microsoft Project format as a result of a critical path analysis taking into account wet season constraints. It shall show the level of detail appropriate to each stage of the works and all activities and restraints, each of which shall be given a short title. All events shall be numbered and annotated with earliest and latest event dates. In addition to this the Contractor shall provide resource histograms indicating the Contractor's squad resource levels at all times throughout the duration of the Contract.

- Site Environmental Management Plan: At the conclusion of the remedial works the Site Auditor will complete a Site Audit Report that will review and summarise that appropriate remediation and validation of identified contamination has been undertaken to minimise risk to human health and the environment and allow for the proposed landuse. Where the risks associated with contamination have been addressed to allow this, but ongoing management is required the Site Auditor will include a Site Environmental Management Plan with the Site Audit Report.

  In the case of this site, the residual management measures are likely to include the following requirements:

  - Ongoing groundwater monitoring around the containment cell as one line of management against cell failure
  - Monitoring and maintenance of the containment cell cap and cover to ensure its integrity is maintained
  - Leachate collection and disposal to a licensed off-site facility

  The Site Management Plan would also be implemented and linked to the site by the NT EPA through the issue of a pollution abatement notice (PAN) that links it to the land title.

Figure 4.1 Overview of Project Delivery Team

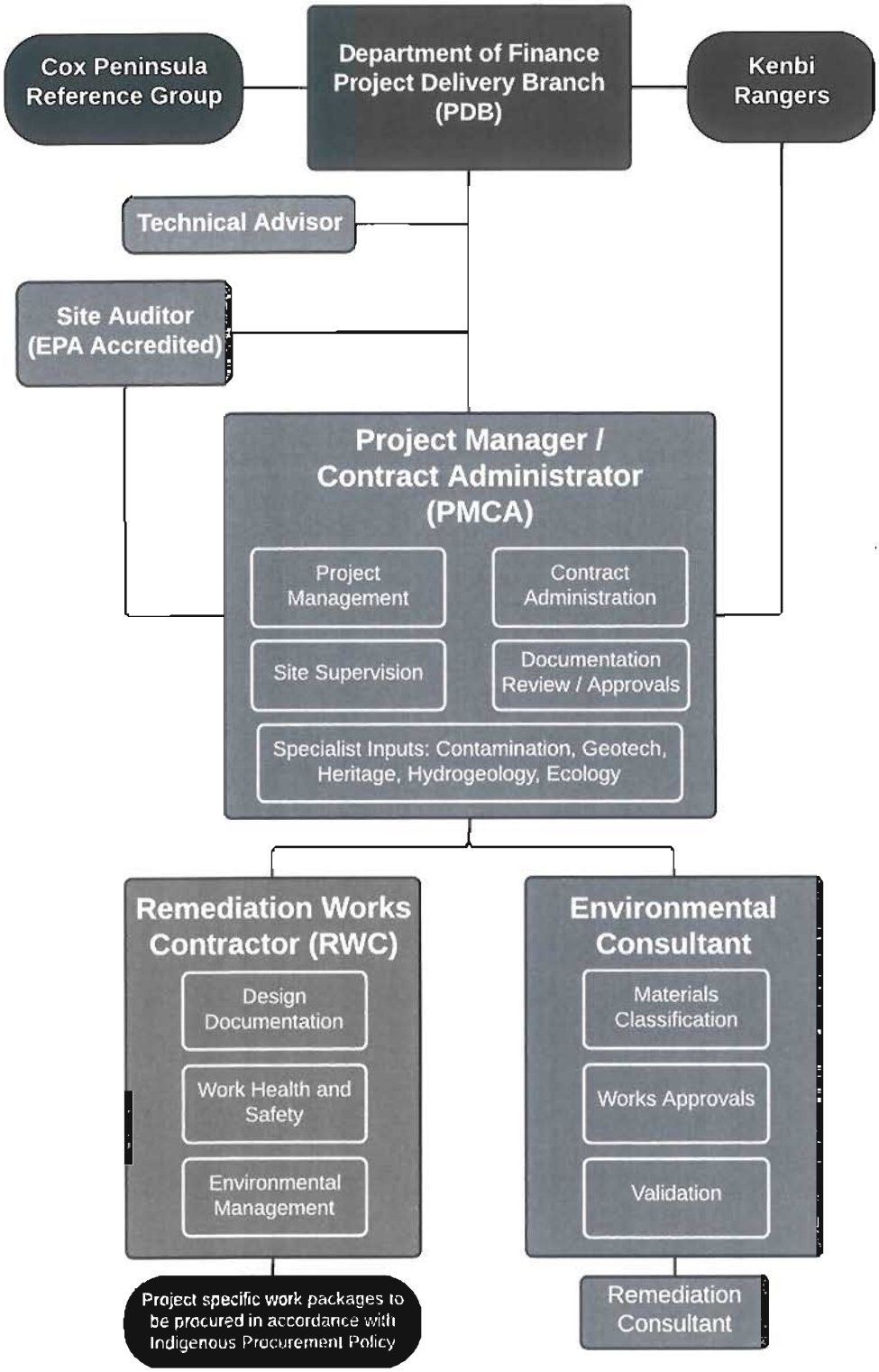

Table 4.1 Project Delivery Roles and Responsibilities

Role	Responsibilities	Accountabilities and Interactions
Principal Department of Finance - Project Delivery Branch (PDB)	• Overall leadership, management and delivery of the project • Responsible for ensuring the overall goals and objectives for the project are achieved • Ensure the project is implemented and executed in accordance with Commonwealth and Finance objectives, standards and procedures • Lead and implement stakeholder engagement program • Relaying decisions and expectations of stakeholders to the project delivery team • Lead and organise Cox Peninsula Reference Group • Ensure the project is delivered in accordance with the Commonwealth Indigenous Opportunities Policy • Reporting to Finance Project Sponsor, Steering Committee, and Commonwealth Public Works Committee • Liaison with relevant Commonwealth and Territory government agencies and departments • Project funding and approval of all project expenditure • Procurement and oversight of project delivery team • Procurement and oversight of Kenbi Rangers to undertake cultural monitoring throughout project	**Accountable to:** • Finance Project Steering Committee • Finance Project Sponsor (First Assistant Secretary, Property and Construction Division) • Commonwealth Public Works Committee **Interacts with:** • Technical Advisor • Environmental Site Auditor • PMCA • RWC • Environmental Consultant • Kenbi Rangers • Stakeholders
Technical Advisor Nation Partners	• Prepare the risk management framework for the project and facilitate quarterly risk review workshops • Directly support Finance in implementing the stakeholder communications plan • Directly support Finance in implementing the Indigenous Participation Plan for the Project and provide leadership to assist in achieving the Indigenous participation targets • Undertake a quarterly review of Indigenous participation targets and make recommendations for opportunities to achieve greater levels of engagement with Traditional Owners • On behalf of the Principal, review of technical reports prepared by the PMCA • Provide independent technical advice through review of remediation works and technical documentation prepared by the Environmental Consultant • Prepares Reports as required by the Principal • Attends PCGs as required	**Accountable to:** • Principal **Interacts with:** • PMCA • Environmental Site Auditor (as required by the Principal) • Stakeholders **No direct communication with:** • Environmental Site Auditor • Environmental Consultant • Remediation Consultant • RWC

Role	Responsibilities	Accountabilities and Interactions

Environmental Site Auditor
 	
AECOM
	• Perform the role of Environmental Site Auditor for the project in accordance with Northern Territory legislation
	• Liaise with and audit the work of the RWC and Environmental Consultant
	• Periodically inspect the site, remediation and validation works, and the RWC's and Environmental Consultant's activities
	• Review site investigations, assessments, remediation, validation and monitoring results obtained prior to and throughout the project
	• Undertake detailed reviews of key deliverables, including (but not limited to):
	  ▪ Site Investigation Reports
	  ▪ Remediation Action Plans (RAPs)
	  ▪ RCS
	  ▪ Project Plans
	  ▪ Remediation Design Documentation
	  ▪ Remediation Validation Reports
	  ▪ Site Environmental Management Plans
	• Prepare statutory site audit reports at the conclusion of the remediation and validation works; and
	• Perform tasks as specified in the RCS as being the responsibility of the Environmental Site Auditor.
		Accountable to:
		• Principal
		
		Interacts with:
		• PMCA
		• Environmental Consultant
		• RWC
		
		No direct communication with:
		• Technical Advisor
		• Remediation Consultant
		• Other parties
		
		All communication directly through PMCA and the Principal

Project Manager (PM) and Contract Administrator (CA) Jacobs Group (Australia) Pty Ltd	• On behalf of the Principal, act as overall Project Manager for the project • On behalf of the Principal, act as Contract Administrator for the RWC and Kenbi Rangers' Contracts • Perform all tasks as specified in the RCS as being the responsibility of the PMCA • Review, advise and report on all project activities and site personnel • Review and approval of Project Plans and Remediation Design Documentation • Review, inspect and document activities in accordance with Project Plans • Monitor the safety and environmental performance of the RWC, ensuring the works are being undertaken in accordance with relevant Project Plans • Coordinate work health and safety (WHS) audits throughout the project • Advise and approve activities undertaken by the RWC • Advise and approve activities undertaken by the Environmental Consultant • Implement the remediation works program in accordance with the Commonwealth Indigenous Procurement Policy by identifying opportunities for Indigenous employment to assist in the delivery of the project • Implement and maintain appropriate quality assurance and quality control standards, including Request for Information (RFI) registers, Variation Registers, etc • Coordinate fortnightly Project Control Group (PCG) meetings	**Accountable to:** • Principal **Interacts with:** • Technical Advisor • Environmental Site Auditor • Environmental Consultant • RWC • Remediation Consultant • Other site parties **Directs:** • RWC • Environmental Consultant • Remediation Consultant • Kenbi Rangers

Role	Responsibilities	Accountabilities and Interactions
	• Preparation and submission of weekly and monthly progress reports to the Principal • Preparation of closure reports following completion of each phase of the project for submission to the Principal • Participate in risk management workshops, ensure project risks are appropriately communicated to the RWC, Environmental Consultant and Remediation Consultant, and are mitigated in site activities • Coordinate specialist technical inputs as required, such as contamination, geotechnical, heritage, hydrogeology and ecology • Participate in stakeholder communication, engagement and management activities • Review, approve and collate all deliverables from the RWC and Environmental Consultant • Administration of project contracts for the RWC and Remediation Consultant • Assess and approve all RWC's and Kenbi Ranger's payment claims • Review, assess and approve all variation claims and extensions of time • Review and audit site activities against the RWC's works program • Issue Remediation Completion Notice at the conclusion of each project stage • Ensuring compliance with the Indigenous Participation Plan • Review the RWC quarterly Indigenous Participation Plan reports and provide to Finance • Review and approve the RWC final Indigenous Participation Plan in accordance with the requirements of the Commonwealth's Indigenous Procurement Policy (IPP) • Provide a six monthly report to the Principal in accordance with the IPP to ensure that Finance meets its reporting responsibilities • Undertake all activities that would normally be associated with a property management role during the project	No direct communication with: • None
Environmental Consultant Jacobs Group (Australia) Pty Ltd	• Review and document all remediation activities • Implementation of remediation validation program • Perform all tasks as specified in the RCS as being the responsibility of the Environmental Consultant • Review and comment on relevant Project Plans and Remediation Design Documentation • Supervise and instruct the Remediation Consultant • Undertake materials classification in accordance with RCS • Review and audit the materials tracking process • Undertake environmental monitoring requirements as specified in the RCS • Monitor the environmental performance of the RWC and remediation activities • Review, assess and interpret all data and information provided by the Remediation Consultant • Advise the PMCA on materials classification and approvals for tasks and activities to be undertaken by the RWC • Preparation of all reports and deliverables required by the Environmental Site Auditor, including site investigations	**Accountable to:** • Principal • PMCA **Interacts with:** • Environmental Site Auditor • RWC • Remediation Consultant • Other site parties **Directs:** • Remediation Consultant

Role	Responsibilities	Accountabilities and Interactions
	reports, RAPs, validation reports, and site environmental management plans	**No direct communication with:** • Technical Advisor
Remediation Consultant TBC	• Observe and document all remediation works as directed by PMCA and Environmental Consultant • Undertake materials classification and validation sampling as directed by Environmental Consultant • Collect, document and collate all data, observations, reports and relevant information to comprehensively document the remediation works undertaken as directed by the Environmental Consultant • Provide factual reports to the Environmental Consultant documenting the waste classification and validation data	**Accountable to:** • PMCA • Environmental Consultant **Interacts with:** • RWC **No direct communication with:** • Principal • Technical Advisor • Environmental Site Auditor All communication directly through Environmental Consultant. Does not instruct or direct RWC.
Remediation Works Contractor (RWC) TBC	• Implementation and execution of all remediation works and activities in accordance with the RCS and under the direction of the PMCA • Preparation of all Project Plans specified in the RCS • Preparation of Remediation Design Documentation as specified in the RCS • Preparation of project works program • Obtain all necessary approvals to undertake the remediation works program • Site establishment including provision of access and security measures to restrict access to trespassers and the general public • Undertake and implement site induction and training procedures for all site workers and visitors • Coordinate, engage and manage all sub-contractors necessary to complete the works program • Implement the remediation works program in accordance with the Commonwealth Indigenous Procurement Policy by identifying and providing opportunities for Indigenous participation to assist in the delivery of the project • Undertake remediation works program in accordance with best practice and applicable legislation, guidelines and standards, and in accordance with project-specific WHS and environmental management plans • Attendance and provision of project updates at fortnightly PCG meetings	**Accountable to:** • Principal • PMCA **Interacts with:** • Environmental Consultant • Remediation Consultant **Directs:** • Other site parties (sub-contractors) **No direct communication with:** • Environmental Site Auditor • Technical Advisor

Role	Responsibilities	Accountabilities and Interactions
	• Implementation, maintenance and management of all WHS and environmental protection controls and measures required and as instructed by the PMCA • Collect, document and collate all data, observations, reports and relevant information to comprehensively document the remediation works as instructed by the PMCA • Provision of as-built survey drawings for each aspect of the works packages • Preparation and provision of reports, technical specifications, operation manuals, and all other necessary documentation required as instructed by the PMCA • Prepare and maintain an Indigenous Participation Plan in accordance with the IPP • Provide the PMCA with quarterly Indigenous Participation Plan reports • Prepare a final Indigenous Participation Plan in accordance with the requirements of the Commonwealth's Indigenous Procurement Policy (IPP) at the end of the project • Prepare all other reports as required by the PMCA under the IPP to ensure that the Commonwealth meets its reporting requirements	
Site Asset Manager Five D	• Continued day to day management of the site, exclusive of remediation works areas • Continued day to day management of the site following completion of remediation works and prior to transfer to Northern Territory government	**Accountable to:** • Principal **Interacts with / Directs:** • None

The following table outlines the key mitigation measures proposed to be used by the project to avoid, minimise or mitigate impacts on the identified environmental values of the site.

These mitigation measures will be incorporated into the project Environmental Management Plan and will be overseen by the project manager/contract administrator on site.

Table 4.2 Issue and Mitigation

Issue	Mitigation	Documentation/Implementation
Impact on Water Resources		
Abstraction of groundwater during the course of the remedial project.	Obtain groundwater abstraction licence from NT Department of Land Resource Management. This will regulate the volume of water that can be abstracted such that it does not measurably reduce the quality, quantity or availability of groundwater.	RCS requires RWC to obtain necessary groundwater abstraction licence at inception of the project. The licence is the tool by which abstraction is controlled and impacts managed.
Pollutants, chemicals and toxic substances		
Pre-treatment, treatment and disposal of contaminated materials (including consideration of exhaust and fugitive emissions from the operation of the soil treatment plant).	Waste identified as requiring pre-treatment are identified in the RCS prepared for the site and signed off by the Site Auditor. These will need treatment prior to agreement of their final disposal location with the PMCA and the Site Auditor. Pesticides (primarily aldrin and dieldrin) and PCBs returned in samples obtained from Tip Site 2 (refer Appendix A, Figure 3) and beneath various building slabs (pesticides only) of Section 34 and 32. Based on the concentration of these contaminants (above 50 mg/kg), they are classified as Listed Waste and require treatment to reduce the contaminant concentrations below site acceptance criteria associated with: • The on-site containment facility – Waste should meet site acceptance criteria agreed with the Site Auditor prior to commencement of the works • Off-site to a facility licenced to receive such wastes – Wastes should meet relevant acceptance criteria associated with the licenced facility. Other waste may require treatment to fix the contaminant within the soil matrix (chemical fixation or solidification) such as metals contaminated soils, prior to disposal either on-site in the containment cell (subject to agreement with the Site Auditor) or off-site to a facility licenced to receive such wastes. The Contractor is responsible for the design of the excavation and costing treatment then disposal and/or re-use of the treated materials. The Contractor is to nominate and provide detail of the proposed method(s) of soil treatment as part of the Work Plan for approval by the PMCA. Post treatment, the Contractor is required to nominate the proposed management/disposal method and gain approval from the PMCA before doing so. The treatment plant will be designed such that emissions discharged to the environment will be continuously monitored throughout the treatment process in order to ensure compliance with the air emissions standards nominated for the works (refer to the RCS, Appendix G4).	RCS, Section 13.3 (refer to Appendix G) requires the RWC to obtain necessary permits from the NT Government (NT EPA) prior to commencing on-site treatment. Final remedial methodology will be defined by the RWC and approved by the PMCA and Site Auditor, but could include thermal treatment of pesticide and PCB contaminated soils. The nominated remedial technology and performance parameters (including potential emissions and associated demonstration of licence compliance) will be detailed and provided to the PMCA and Site Auditor for approval as part of the Work Plan produced by the successful RWC at the inception of the project, prior to on-site works commencing.

Issue	Mitigation	Documentation/Implementation
Exhaust emissions from the operation plant and machinery.	Plant and machinery to be regularly maintained such that they operate efficiently without excess emissions beyond those anticipated in equipment specifications.	Requirement has been included in the RCS (refer to Appendix G). The following documents will need to be prepared at the inception of the project and signed off by the PMCA and Site Auditor prior to any works commencing on-site: • EMP • CEHMP • Work Plan
Disturbance of potentially contaminated soils	RWC is will adhere to the following requirements outlined in the RCS when handling and transporting contaminated soils and hazardous materials: • Before any material leaves the site, the Contractor shall satisfy the PMCA that the disposal operation would not breach the current legislation and regulations. In addition the Contractor shall ensure that the disposal operation is carried out in accordance with the requirements of the appropriate local authorities and NT EPA. • Loading of vehicles shall be performed in an organised manner so as to prevent the spread of contaminants. All vehicles are to be sheeted and clean prior to leaving site or moving internally within the site. The RWC shall take all reasonable and applicable measures to prevent the escape of material during transportation. • Reduce dust by periodically spraying works (including but not limited to demolition, recycling, sorting and stockpile relocation) with an appropriate wetting agent. Keep public roadways and footpaths clear of mud and debris. • Implement the requirements of the CEHMP, Work Plan, MTRP and EMP – refer to introduction to Section 4 of this document.	Requirement has been included in the RCS (Appendix G). The following documents will need to be prepared at the inception of the project and signed off by the PMCA and Site Auditor prior to any works commencing on-site: • EMP • CEHMP • Work Plan • MTRP
Plants		
Clearance of any vegetation containing a listed threatened species which is likely to result in a long-term decline in a population or which threatens the viability of the species.	Minimal vegetation clearance is required to provide site access to machinery required in the site clean-up. The open nature of vegetation means the majority of assets to be removed are readily accessible. Vegetation protection requirements will be included in the EMP, with the specific requirement that no woody vegetation with a diameter at breast height (DBH) of 10 cm would be touched, and any cycads that cannot be avoided are included in the translocation program.	Project EMP required from the RWC at the start of the project for approval by the PMCA.
Introducing potentially invasive species	Requirement for vehicle hygiene (wash down) prior to entering the site (noting water would be obtained from an on-site bore)	Project EMP required from the RWC at the start of the project for approval by the PMCA.

Issue	Mitigation	Documentation/Implementation
Animals		
Cause a long-term decrease in, or threaten the viability of, a native animal population/s, through death, injury or other harm to individuals.	With the avoidance of vegetation, any relevant habitat will also be avoided. Infrastructure being removed does not provide significant habitat resources.	Avoidance
Introduce potentially invasive species which will substantially reduce habitat or resources for native species.	Requirement for vehicle hygiene (wash down) prior to entering the site.	Project EMP required from the RWC at the start of the project for approval by the PMCA.
Heritage		
Indigenous Heritage	**Section 32** There is some potential for works to occur in close proximity of the Majili Precinct. These works will predominantly comprise revegetation and weed management activities rather than any significant earthworks that would require extensive ground disturbance. In order to mitigate potential impacts to Majili Precinct the following measures have already been undertaken (refer to Cox Peninsula Indigenous Heritage Impact Assessment (Jacobs 2015d) presented in Appendix E): • Systematic archaeological survey within the remediation works areas to identify any previously unidentified Aboriginal heritage values by heritage professionals in conjunction with Traditional Owners (refer to Appendix E - Heritage Management Plan). • Inspection of previously identified Aboriginal heritage values located within or near the remediation works areas for the purpose of accurately mapping the extent of these values and conducting an impact assessment • Recording and basic analysis of any Aboriginal heritage values identified within the remediation works areas • In consultation with the Traditional Owners an exclusion zone has been identified west of Majili Precinct. No contractors are to proceed east of this zone (refer to Appendix A, Figure 13). A temporary fence will be placed across the access track at this point. Kenbi Rangers (Traditional Owners) will undertake the revegetation and weed management west of and within Majili Precinct • Consultation with Traditional Owners to determine whether the works will impact on any intangible (travelling Dreaming) sites in Section 32. The following measures will be undertaken **prior** to remediation activities being undertaken: • Preparation of an Aboriginal Heritage Impact Assessment report that details the results of the archaeological survey , Aboriginal consultation, impact assessment and mitigation measures for all	EMP that incorporates requirements of the CEHMP from the RWC at the start of the project for approval by the PMCA. The EMP would implement the identified mitigation measures outlined in the CEHMP (refer Appendix J).

Issue	Mitigation	Documentation/Implementation
	Aboriginal heritage values with potential to be impacted by the works (refer Appendix E) • Incorporation of the mitigation measures for Aboriginal heritage values into a CEHMP (presented in Appendix J) • The establishment of an exclusion zone along the access track to Majili Precinct with all staff precluded from entry to this areas unless authorised to do so by the Traditional Owners The following measures will be undertaken during remediation activities: • Participation of the Traditional Owners in the works to as full an extent as practicable. This will include cultural monitoring of works and revegetation and weed control activities to ensure indigenous heritage values are protected. **Section 34 and Section 41** Works will occur within the Point Charles and Gilruth Point Precincts. These works will predominantly comprise rubbish removal and excavation of contaminated sediments (Section 41- Point Charles Precinct only). Point Charles Precinct In order to mitigate potential impacts to this Precinct the following investigation and consultation has already been undertaken: • Systematic archaeological survey within the remediation works areas to identify any previously unrecorded Aboriginal heritage values by heritage professionals in conjunction with Traditional Owners (refer to Appendix E - Heritage Management Plan). • Inspection of previously identified Aboriginal heritage values located within or near the remediation works areas for the purpose of accurately mapping the extent of these values and conducting an impact assessment • Recording and basic analysis of any Aboriginal heritage values identified within the remediation works areas • In consultation with the Traditional Owners identify any exclusion zones (refer to Appendix A, Figure 14) which are appropriate for the mitigation of impact to those values • Consultation with Traditional Owners to determine the location and nature of Dreaming Site 67 and confirm any activities which might be restricted from this area (approximately on the cliffline north of the lighthouse) • Consultation with Traditional Owners to determine whether the works will impact on any intangible (travelling Dreaming) sites in Section 34 and 41. The following measures will be undertaken **prior** to remediation activities being undertaken: • Preparation of an Aboriginal Heritage Impact Assessment report that details the results of the	

Issue	Mitigation	Documentation/Implementation
	archaeological survey , Aboriginal consultation, impact assessment and mitigation measures for all Aboriginal heritage values with potential to be impacted by the works • Incorporation of the mitigation measures for Aboriginal heritage values into the CEHMP • The establishment of an exclusion zone west of Point Charles Lighthouse to mitigate impact to a scarred site, the Canarium Tree. A temporary barrier will be constructed along the treeline west of the lighthouse to ensure no entry by contractors. • A temporary barrier will be constructed along the treeline east of the lighthouse to mitigate any impacts to the Red Apple Tree (Aboriginal shelter) and an unconfirmed burial site (component of Dreaming Site 67). The following measures will be undertaken **during** remediation activities: • A number of historical Aboriginal scatters comprising flaked glass, shell and a small amount of other historical materials have been identified in the vicinity of the boundaries of the Charles Point Lighthouse Precinct and the 105 Radar Camp Precinct (see historic heritage mitigation) and within Point Charles Aboriginal Precinct. Remediation activities will be restricted to the collection by hand of asbestos material only. This will be undertaken under the supervision of an appropriately qualified archaeologist • Participation of the Traditional Owners in the works to as full an extent as practicable. This will include cultural monitoring of all works in these Sections including verification of the exclusion zone fencing to ensure indigenous heritage values are protected. <u>Gilruth Point Precinct</u> Works in this area will comprise removal of surface rubbish (predominantly modern) as a consequence impacts to Aboriginal cultural heritage values are unlikely. In order to mitigate potential impacts to this Precinct the following measures have already been undertaken: • Systematic archaeological survey within the remediation works areas to identify any previously unrecorded Aboriginal heritage values by heritage professionals in conjunction with Traditional Owners (refer to Appendix E - Heritage Management Plan). • Inspection of previously identified Aboriginal heritage values located within or near the remediation works areas for the purpose of accurately mapping the extent of these values and conducting an impact assessment • Recording and basic analysis of any Aboriginal heritage values identified within the remediation works areas • In consultation with the Traditional Owners identify any exclusion zones which are appropriate for the mitigation of impact to those values • Consultation with Traditional Owners to determine whether the works will impact on Dreaming sites	

Issue	Mitigation	Documentation/Implementation
	and confirm any activities which might be restricted from this area The following measures will be undertaken **prior** to remediation activities being undertaken: • Preparation of an Aboriginal Heritage Impact Assessment report that details the results of the archaeological survey , Aboriginal consultation, impact assessment and mitigation measures for all Aboriginal heritage values with potential to be impacted by the works • Incorporation of the mitigation measures for Aboriginal heritage values into the CEHMP The following measures will be undertaken **during** remediation activities: • Participation of the Traditional Owners in the works to as full an extent as practicable. This will include cultural monitoring of works and revegetation and weed control activities to ensure indigenous heritage values are protected. General measures • Remediation Works CEHMP for Section 32 that will be implemented as part of the works. • Aboriginal Precincts and exclusion zones will be identified on project maps. • If at any time during remediation works, Aboriginal cultural heritage sites or places are found work would cease, a protocol for managing such finds would be implemented. This protocol would be detailed in the CEHMP. • In the event that remediation works reveal possible human skeletal material (remains) all works would cease, and a protocol for managing human skeletal remains would be implemented. This protocol would be detailed in the CEHMP. Cultural Heritage Awareness training would be provided to contractors as part of the site induction	
Historic Heritage	**Section 34 and Section 41** Charles Point Lighthouse Precinct In order to mitigate the potential impacts on historic heritage values at the Charles Point Lighthouse Precinct, the following measures have already been undertaken: • Systematic foot survey within the remediation area to identify surface artefacts or areas of archaeological potential • Test excavation of areas identified from pedestrian survey using manual excavation techniques • Test excavation used to identify/confirm archaeological potential to inform further mitigation measures in order to minimise impacts on the heritage significance of the site • Cataloguing and basic analysis of historical artefacts recovered during test excavation	EMP that incorporates requirements of the CEHMP from the RWC at the start of the project for approval by the PMCA. The EMP would implement the identified mitigation measures outlined in the CEHMP (refer Appendix J).

Issue	Mitigation	Documentation/Implementation
	• Preparation of an excavation report (as an addendum to the Historic Heritage Impact Assessment (Jacobs 2014)) including required approach for further management (Jacobs 2015e). The following measures will be undertaken **prior to** remediation activities being undertaken: • For the concentrated artefact scatter surrounding the concrete storehouse foundation, a systematic collection of surface artefacts will be undertaken by appropriately qualified historical archaeologists. The artefacts collected will be subject to cataloguing and basic analysis. A report will be prepared outlining the activity and the results of the collection. The following measures will be undertaken **during** remediation activities: • During excavation of contaminated sediment, an appropriately qualified historical archaeologist will monitor activities. Work would cease to allow historical archaeologist to investigate and record any sub-surface features or artefacts revealed during excavation. Temporary barrier/safety fencing would be erected around the in situ archaeological features (foundations, wells) prior to remediation activities commencing, and removed following completion of activities. Excavation close to the in situ archaeological features (foundations, wells) would also be monitored by the historical archaeologist. • Appropriate methods of removal of sediment within 2 m of the base of the Lighthouse tower would be used to ensure there is no damage to the fabric of the Lighthouse tower. Consultation with AMSA would be undertaken to determine an appropriate method. The method would be in accordance with the heritage management policies in the Charles Point Lighthouse HMP (Marquis-Kyle, in preparation). • During surface removal of debris/rubbish, an appropriately qualified historical archaeologist will monitor activities to ensure that historical archaeological artefacts are not inadvertently removed. • Heavy machinery, equipment or vehicles would not be driven into the Lighthouse Precinct unless on existing tracks, and would not be driven onto or into the in situ archaeological features (foundations and wells) <u>105 Radar Camp Precinct</u> • In order to mitigate the potential impacts on historic heritage values at the 105 Radar Camp Precinct, the following measures would be undertaken: During surface removal of debris/rubbish, an appropriately qualified historical archaeologist will monitor activities to ensure that historical archaeological artefacts are not inadvertently removed. Works would cease to allow the historical archaeologist to investigate and record any subsurface features or artefacts revealed. • Heavy machinery, equipment or vehicles would not be driven into the Radar Camp Precinct unless on existing tracks. <u>Historical/Aboriginal Artefact Scatter (Precinct Boundaries)</u> • Within the identified boundary of the historical/Aboriginal artefact scatter, in the vicinity of the boundaries of the Charles Point Lighthouse Precinct and the 105 Radar Camp Precinct, remediation	

Issue	Mitigation	Documentation/Implementation
	activities will be restricted to the collection by hand of asbestos material only. This will be undertaken under the supervision of an appropriately qualified archaeologist. General measures • Preparation of a CEHMP for the site that will be implemented as part of the works (refer Appendix J). • In situ heritage features, precincts and zones will be identified on project maps. • If at any time during remediation works, historic heritage materials, features and/or deposits are found work would cease, a protocol for managing such finds would be implemented. This protocol would be detailed in the CEHMP. • In the event that remediation works reveal possible human skeletal material (remains) all works would cease, and a protocol for managing human skeletal remains would be implemented. This protocol would be detailed in the CEHMP. • Heritage awareness training would be provided to contractors as part of the site induction and daily startup meeting would be held by the historical archaeologist when the above remediation works are undertaken	

5 Conclusion on the likelihood of significant impacts

5.1 Do you THINK your proposed action is a controlled action?

X	No, complete section 5.2
	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

In our view the action is not a controlled action for the following reasons:

- The footprint of the proposed remedial works and potential areas of direct or potential/partial impact represent 1.4% and 0.2% of the total site area respectively (as shown in Appendix A, Figures 10, 11 and 12). Movement of plant and machinery (i.e. trucks, excavators) will be largely confined to established roadways and tracks, existing tip sites and/or areas previously cleared of vegetation.
- Through application of the reduced works footprint , **avoidance** of significant flora and fauna, heritage features and areas of cultural sensitivity is the primary means by which potential impact associated with the proposed remedial works would be managed. As a risk (impact) control measure this is considered a highly effective primary means of managing potential impacts from the proposed remedial works.
- Multiple specialist studies have confirmed that no impacts will occur to significant flora and fauna and heritage features and areas of cultural sensitivity. The proposed remedial option of a specifically constructed on-site containment cell and it's associated footprint is in an already cleared area of Section 34. Studies undertaken include:
  - Desktop and site walkover studies to assess the seasonal variability in species present (i.e. use of the site by migratory species) (ERM 2010, ERM 2011, VDM Consulting 2012, Jacobs 2015c) – studies identified that use of the site by migratory species occurred in habitat outside the footprint of proposed remedial works.
  - Site walkover to identify and map the distribution of significant flora and fauna relative to proposed remedial works (Jacobs 2015c). The studies identified that there is substantial suitable alternative habitat around the project area and that species potentially impacted by the project will relocate to for the duration of the construction works. In addition, the impacts within the footprint of the proposed remedial works will be managed, be temporary in nature and will not result in irreversible impacts to the species.
  - Desktop studies, key stakeholder consultation (including, but not limited to the Traditional Owners, Kenbi Rangers, AAPA) and site investigation to better define and understand the location and extent of culturally sensitive areas (Jacobs 2015d)
  - Desktop studies and systematic archaeological survey to better define the location and extend of heritage features and associated artefacts (Jacobs 2014 and 2015e)
- In conducting the various flora and fauna studies it was identified that impacts associated with the proposed remedial works were generally avoided. However, of the 270 individual Cycads within the proposed footprint of the proposed remedial works, it may not be possible to avoid impacts to 20 (due to the proximity of the individual Cycad to former antennae concrete footings). To mitigate impacts and manage them such that they would not result in irreversible damage, a Cycad Translocation Plan has been outlined (Jacobs, 2015c) and included preparation of a map identifying the location of Cycads that required management and translocation methodology to be used. The Kenbi Rangers have been identified and engaged as the party to undertake translocation works. The Kenbi Rangers have a licence to translocate Cycads listed under the Territory Parks and Wildlife Conservation Act
- In relation to identified areas of significant Indigenous and Historic Heritage, the following management measures were identified to prevent impacts during the works:

  Overarching Management Measures

  - Preparation of a CEHMP and EMP for the site that will be prepared and implemented by the RWC as part of the works
  - Oversight of the works by Finance, PMCA and Site Auditor will ensure that management measures outlined in the CEHMP and EMP are adhered to
  - In-situ heritage features, precincts and zones have been identified on project maps to be used by the RWC

- If at any time during remediation works, historic heritage materials, features and/or deposits are found work would cease, a protocol for managing such finds would be implemented. This protocol would be detailed in the CEHMP
- In the event that remediation works reveal possible human skeletal material (remains) all works would cease, and a protocol for managing human skeletal remains would be implemented. This protocol would be detailed in the CEHMP
- Heritage awareness training would be provided to contractors as part of the site induction and daily startup meeting would be held by the historical archaeologist when the above remediation works are undertaken.

Specific Management Measures

- Work undertaken to identify indigenous heritage identified the potential for two areas of impact within the footprint of the proposed remedial works (Majili Precinct in Section 32 and the Gilruth Point Precinct and Charles Point Precinct in Sections 34 and 41 respectively). To prevent impacts associated with the works a CEHMP would set out clear management measures. These include the identification and mapping of Aboriginal Precincts and exclusion zones on project maps. These maps would be provided to personnel undertaking works in these areas of the site to help them avoid areas of identified significance during the works. In addition, a process of Cultural Monitoring by Traditional Owners would be undertaken during remedial works.
- The investigation undertaken to-date to understand the nature and extent of historic heritage features identified in the vicinity of the Charles Point Lighthouse and 105 Radar Precincts were used to identify management measures detailed in the CEHMP to prevent impacts. These included use of low impact excavation measures, restricting access of heavy plant, equipment or vehicles to existing tracks and monitoring of works by an appropriately qualified archaeologist to prevent inadvertent removal of artefacts

- The proposed remediation works will avoid the large wetland and melaleuca swampland, the termitaria seasonal floodplain and the coastal dune areas.
- The heritage impact of the preferred remediation scenario has been communicated, endorsed and managed by the Traditional Owners through an extensive stakeholder engagement process.
- The project has been approved by the Public Works Committee and joint statement by Prime Minister and Cabinet and the Northern Land Council (Parliament of Australia, 2015).

5.3 Proposed action IS a controlled action

N/A

Matters likely to be impacted

	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

6 Environmental record of the responsible party

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** Finance have submitted and gained decisions on a number of potential actions which are summarised on the Department of Environment Referrals list page. The following Table provides a summary of previous EPBC referrals submitted by the Department of Finance that specifically relate to management of and remediation of contamination:	X	

Reference Number	Site and Date of Referral	Project Description	Referral Decision
2005 / 2075	Fort Scratchley, Newcastle Peninsula, NSW	Removal and management of hazardous materials from buildings and remediation of contaminants identified in the soils.	Not a Controlled Action
2005 / 1985	Snapper Island, Parramatta, NSW	Remediation of heavy metals contaminated soil. Capping and Containment of contaminated soil	Not a Controlled Action
2004 / 1836	Macquarie Lighthouse, Old South Head Road, Vaucluse, NSW	Remediation of lead contamination around the lighthouse and ancillary buildings. Treatment (as required) and off-site disposal to licenced landfill.	Not a Controlled Action

6.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		X
6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework**		X
6.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)** Refer to previous response to Question 6.1.	X	

7 Information sources and attachments

(For the information provided above)

7.1 References

- ERM, 2010. Section 34 Cox Peninsula Flora and Fauna Assessment
- ERM, 2011. Section 32 Cox Peninsula NT Flora and Fauna Assessment
- Sinclair Knight Merz (SKM) now Jacobs Group (Australia) Pty Ltd (Jacobs), 2013. Detailed Business Case, Contamination, Remediation and Waste Management Planning Project, Jacobs November 2013.
- ERM 2011a Section 32, Cox Peninsula NT Heritage Assessment. Report for Department of Finance and Deregulation, and United Group, Environmental Resources Management Australia, Barton, ACT.
- ERM 2010a Section 34 Cox Peninsula: Heritage Management Plan. Prepared for Department of Finance and Deregulation and United Group Process Solutions, Environmental Resources Management Australia, Canberra.
- ERM 2010b Sections 34 and 41, Cox Peninsula, NT: Heritage Assessment. Prepared for United Group Service Limited, Environmental Resources Management Australia, Sydney.
- Jacobs 2014 Cox Peninsula Historic Heritage Impact Assessment. Report to the Department of Finance. Melbourne.
- Jacobs, 2015. Supplementary Site Investigation - Section 32, Cox Peninsula, May 2015.
- Jacobs, 2015a. Supplementary Site Investigation - Section 34, Cox Peninsula, May 2015.
- Jacobs, 2015b. Supplementary Site Investigation - Section 41, Cox Peninsula, May 2015.
- Jacobs, 2015c. Memo Re. Cycad Assessment and Mapping, July 2015.
- Jacobs, 2015d. Cox Peninsula Remediation Project. Cox Peninsula Indigenous Heritage Impact Assessment, July 2015.
- Jacobs, 2015e. Cox Peninsula Remediation Project, Cox Peninsula Historic Heritage Impact Assessment: Addendum A – Test Excavation and Update Impact Assessment, July 2015.
- Jacobs, 2015f. Cox Peninsula Remediation Project, RCS. August 2015
- Jacobs, 2015g. Cox Peninsula Construction Heritage and Environment Management Plan. September 2015
- Parliament of Australia, 2015. URL: http://www.aph.gov.au/Parliamentary_Business/Committees/Joint/Public_Works/Cox_Peninsua/Report_4. Accessed 17 August 2015.
- Tickell S.J., 2013. Groundwater of the Northern Territory, 1:2,000,000 scale. Department of Natural Resources, Environment and the Arts, Northern Territory.
- Yin Foo D., 2004. Cox Peninsula Water Supply Investigation: Stage 2 – 2003/2004. DIPE Report No. 9/2004D.
- Verma N.M., 1982. Cox Peninsula Hydrogeology. Report 8/1982 Water Division.
- VDM Consulting, 2012. Environmental Risks and Gap Analysis, Stage 1: Initial Business Case, Cox Peninsula Contamination Remediation Project.

7.2 Reliability and date of information

Documents outlined in Section 7.1 outline the relevant studies and information that has been referred to in preparing this referral. Specific references are made to these documents in the body of the text as it relates to specific statements made to support the referral.

7.3 Attachments

The following documents are attached to this referral:

Appendix A – Figures

Appendix B - Tables

Appendix C – Project Timeline

Appendix D – Flora and Fauna Studies

Appendix E – Heritage Studies

Appendix F – NT Government Correspondence

Appendix G – Remediation Contract Specification (including Containment Cell Tender Design – Appendix E)

Appendix H – Remediation Options Assessment Screening

Appendix I – AAPA Certificate

Appendix J – Construction Environment and Heritage Management Plan

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Appendix A – Figure 1
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Attachment A – Figures 2 - 12
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	✓	Appendix F – NT Government Correspondence
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)	✓	Appendix F – NT Government Correspondence
	copies of any flora and fauna investigations and surveys (section 3)	✓	Appendix D – Flora and Fauna Studies
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	Appendix E – Heritage Studies
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

8 Contacts, signatures and declarations

Project title: **Cox Peninsula Remediation Project**

8.1

1. Name and Title:	Adrian Kirk
2. Organisation	Department of Finance
3. EPBC Referral Number	
4: ACN / ABN	61 970 632 495
5. Postal address	Department of Finance, Treasury Building, 8 Parkes Place West, PARKES ACT 2600
6. Telephone:	+61 2 6215 2222
7. Email:	Adrian.kirk@finance.gov.au
8. Name of designated proponent (if not the same person at item 1 above and if applicable).	
9. ACN/ABN of designated proponent (if not the same person named at item 1 above):	

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

- ☐ an individual; OR
- ☐ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR
- ☐ not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial

- ☐ not applicable.

fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:	
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence. I agree to be the proponent for this action. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.
Signature	Date 14 10 15

8.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	William Rodger
Title	Environmental Scientist
Organisation	Jacobs Group (Australia) Pty Ltd
ACN / ABN (if applicable)	37 001 024 095
Postal address	Level 11, 452 Flinders Street, Melbourne VIC 3067
Telephone	03 8668 3421
Email	William.rodger@jacobs.com
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	Date

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)