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API Management Pty Ltd
25 May 2011

Anketell Port Proposal

Level 2 Flora and Vegetation Assessment

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Level 2 Flora and Vegetation Assessment

Prepared for

API Management Pty Ltd

Prepared by

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Executive Summary

Australian Premium Iron Management Pty Ltd (API) is developing the West Pilbara Iron Ore Project (WPIOP) based on channel iron deposits (CID) at Mt Stuart and Red Hill, south of Pannawonica. At the feasibility stage, up to three potential port locations and therefore corresponding rail alignments were under investigation for the haulage and export of ore produced from the mine sites. Since 2008, AECOM have been undertaking flora and vegetation assessments of the various project sites and combinations of site for the project, to assist API with the environmental approvals process.

This report presents the findings of the botanical component of environmental studies for the proposed Port Development Area at Anketell Point and on Dixon Island and the Port Access Rail Realignment Area.

The field component of the various phases of the Level 2 flora and vegetation assessment was conducted by AECOM in May and July 2009, May 2010 and March and April 2011. It specifically deals with flora and vegetation communities, vegetation condition and potential floristic environmental constraints within the project areas.

The poor rainfall during early 2010 contributed to poor survey conditions within the original Port Development Area. The wet season in 2010 did not provide sufficient rains to classify the weeks that followed as a "good season" from a floristic point of view (AECOM, 2010). For this reason the 2011 phase 2 flora and vegetation assessment was carried out to meet EPA Guidance requirements for comprehensive survey criteria.

The phase 2 flora and vegetation assessment was carried out in March and April 2011, following the wet season during the optimum flowering period. Rainfall figures obtained from the Bureau of Meteorology indicate that December 2010, January and February 2011 all received higher than average rainfall (Figure 4). This would have provided sufficient rains to classify the weeks that follow as a good season from a floristic point of view.

No species listed as DRF (T or X) under the *Wildlife Conservation Act, 1950* or as Threatened under the *EBPC Act, 1999* were recorded within the project area. Similarly no species listed as Priority Flora by the DEC were recorded.

Additionally, no TECs were identified from field collected data within the original Port Development Area during the 2009, 2010 or 2011 flora and vegetation assessments. Similarly no TECs were identified to occur within the Port Access Rail Realignment area during 2011.

In summary, the factors of environmental significance (constraints) with regards to flora and vegetation associated with the project area include:

- One species collected, *Isotoma* aff. *pusilla* (AP 10-01) is most likely to be a new taxon and it is recommended that this species be recollected with the aim of collecting mature seeds to assist in further identification;
- A Declared Plant (pest weed); **Prosopis pallida*, listed by DAFWA has been recorded in the project area;
- Two communities, Thg and AThg2, are considered to be locally significant due to supporting populations of Priority Flora;
- A total of 15 vegetation communities, inclusive of vegetation community Hf, are considered to be regionally significant within the Chichester IBRA region, due to limited representation; and
- One community, Hf, is regionally significant due to being equivalent to the Priority 3 Horseflat Land System of the Roebourne Plain PEC.

In response to the factors of significance recorded for the project area, the following measures are recommended to minimise impacts on these factors:

- Limit clearing and placement of infrastructure to avoid areas of vegetation or vegetation supporting significant species (or with the potential to support significant species);
- Utilise areas of vegetation determined to be in poorer condition for clearing and construction; and
- Consider an appropriate revegetation program that may contribute to offsets for unavoidable impacts that could be implemented in cleared areas not required for infrastructure and in degraded areas also not utilised for the development.

1.0 Introduction

1.1 Background

AECOM Australia Pty Ltd (AECOM) was commissioned by API to conduct an additional Phase 2 flora and vegetation assessment of the Anketell Point and Dixon Island Proposed Port Development Area, during April 2011. Numerous flora and vegetation assessments have been conducted between 2009 and 2011 at the port development site, and since 2008 for the rail corridor, associated with the development of API's West Pilbara Iron Ore Project (WPIOP).

This survey consisted of three components:

- Phase 2, Level 2 Flora and Vegetation assessment of the original Port Development Area
- Phase 1, Level 2 Flora and Vegetation assessment of the Port Access Rail Realignment Area; and
- Targeted Priority Flora Surveys.

This report presents the findings of the three flora and vegetation assessment components conducted during 2011 for the Anketell Point and Dixon Island Port Development Area (herein referred to as 'Port Development Area').

For the purposes of this report, the collective project areas of the original Port Development Area and the Port Access Rail Realignment area are herein referred to as "the project area." The areas that were surveyed, for example the original Port Development Area, Northern Terminus of Rail Corridor and Port Access Rail Realignment Areas are individually herein referred to as "survey areas".

1.2 Location

The Port Development Area is situated within the Shire of Roebourne, approximately 15 km directly east of Karratha and 1,5557 km north of Perth (Shire of Roebourne, 2011).

The western most edge of the Port Development Area is approximately 1km west of Cleaverville Road and continues in an east north easterly direction for approximately 14 km (**Figure 1**). It spans the coast to Anketell Point and out to Dixon Island.

The Port Access Rail Realignment Area is a section of proposed realignment of the original rail corridor linking iron ore resources and the proposed port location. The area of realignment that was assessed is directly adjacent to the western edge of the original rail alignment as presented within API's Mine and Rail PER (API, 2010) and continues in a southerly direction towards North West Coastal Highway (**Figure 1**).

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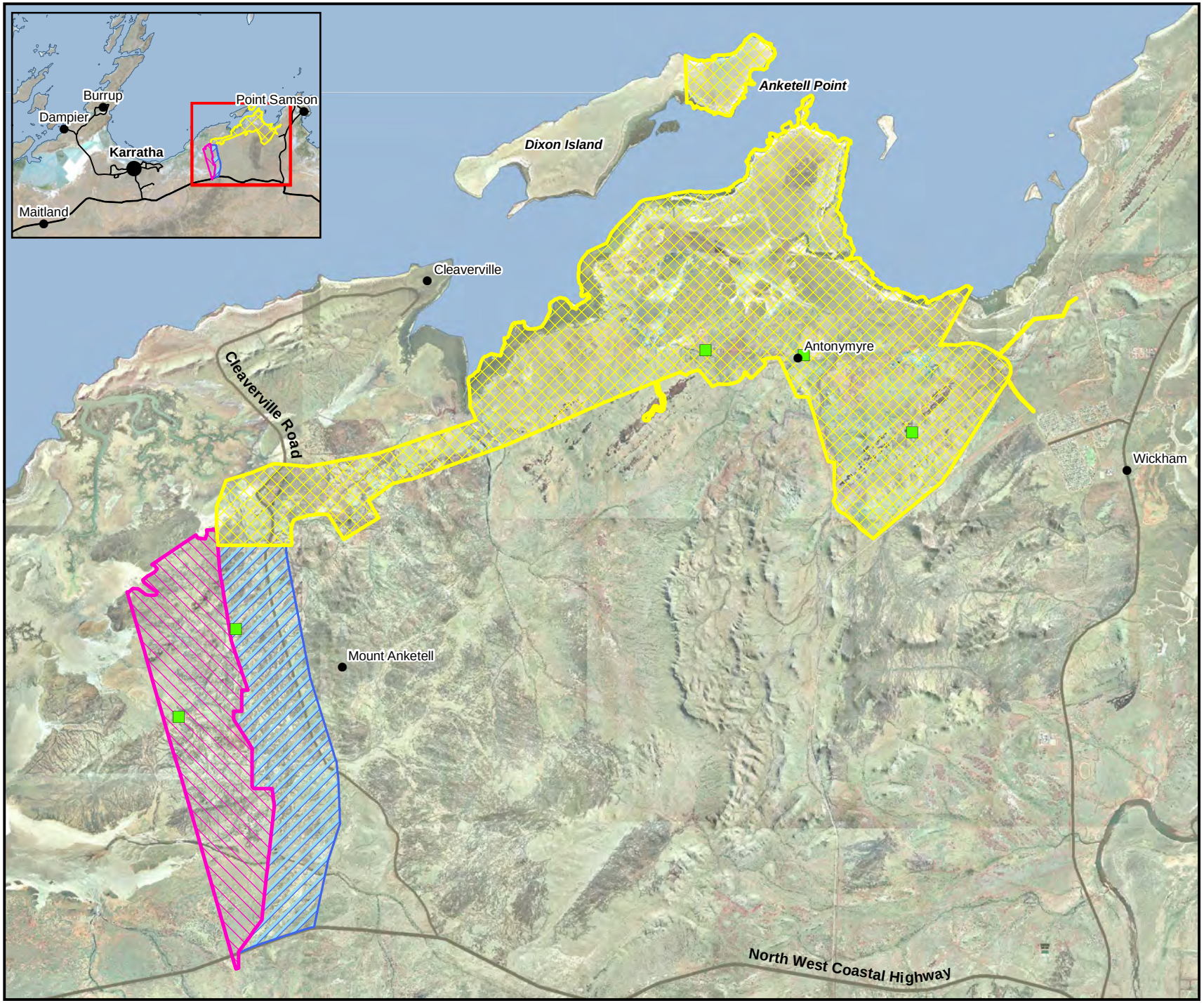

Anketell Point and Dixon Island Port Project Area

Survey Area Locations

Figure 1

0 1 2 3

Kilometres

1:90,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Priority Flora Targeted Search Locations
- Original Port Survey Area
- Port Access Rail Re-alignment Survey Area
- Northern Terminus of Rail Corridor

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1.3 Physical Environment

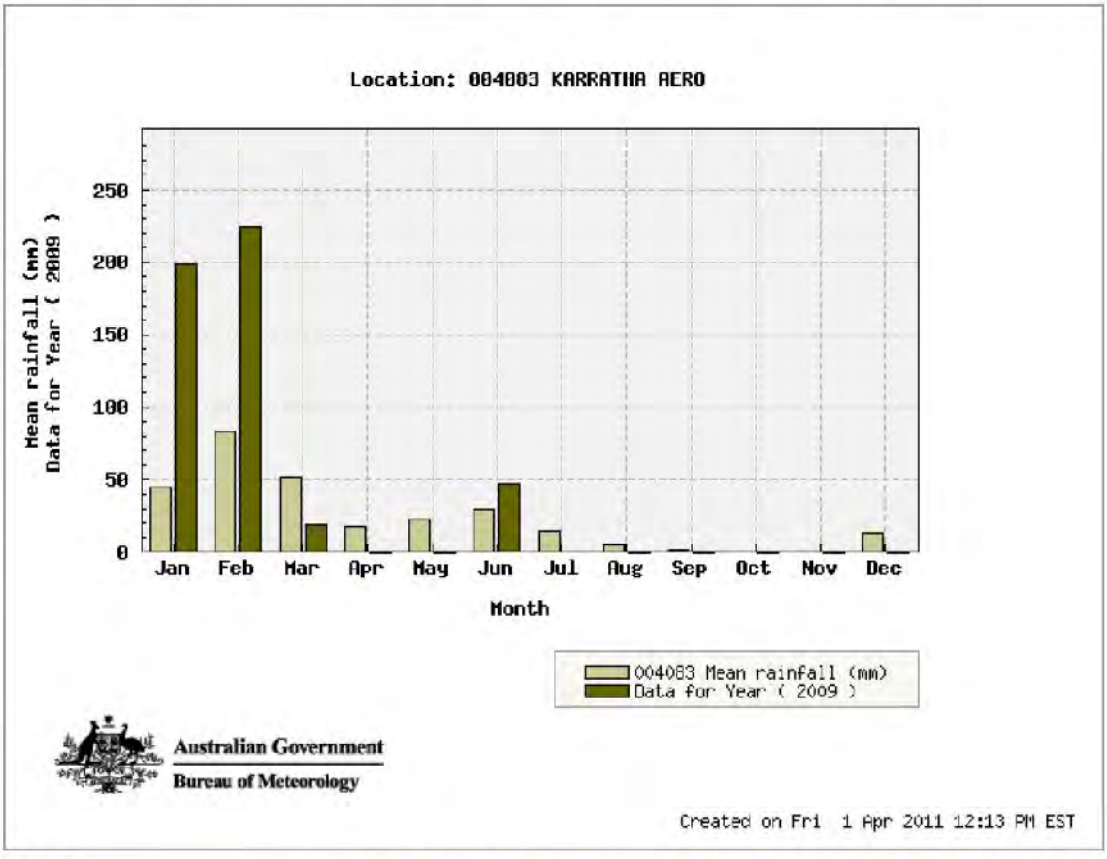
1.3.1 Climate

Karratha is located in the cyclone belt of Western Australia and during the cyclone season the region receives its annual rainfall (Karratha Visitors Centre, 2009). The region experiences both tropical and semi desert climates, with temperatures ranging from 15ºC to 45ºC.

Karratha experiences an average annual rainfall of 279 mm per annum, with the lowest average rainfall of 53 mm per annum and the highest average rainfall of 855 mm per annum (Bureau of Meteorology, 2011). Rainfall data for 2009, 2010 and 2011 to date is presented below Figure 2, Figure 3 and Figure 4. During January, February and June 2009, higher than average rainfall was experienced for the region. There was no rainfall recorded from August to December. Below average rainfall was recorded in January 2010 and no rainfall was recorded for February, March and April 2010(Bureau of Meteorology, 2011). According to recorded averages, Karratha receives a large proportion of annual rainfall during these months, making 2010 a comparatively dry season. Rainfall for December 2010 and January and February 2011 were all above average (Bureau of Meteorology, 2011).

KARRATHA AERO
Mean rainfall (mm)

Site details
Site name: KARRATHA AERO | Site number: 004083 | Commenced: 1971
Latitude: 20.71 °S | Longitude: 116.77 °E | Elevation: 7 m | Operational status: Still Open



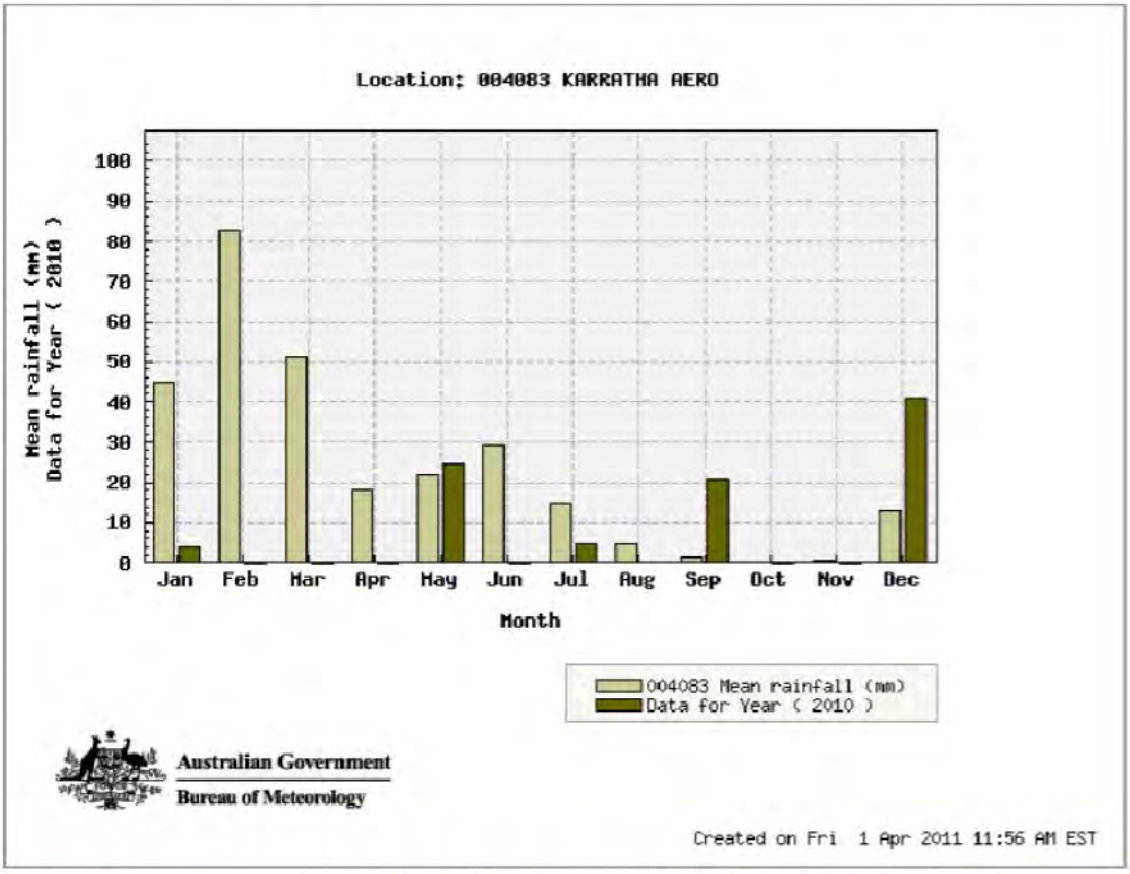
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1972 to 2011	44.9	82.6	51.1	18.3	22.2	29.5	14.8	4.9	1.5	0.3	0.6	13.0	287.6	37
Statistics	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Years**
Rainfall (mm) for year 2009	*198.8*	*224.4*	*19.4*	*0.0*	*0.0*	*46.6*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*489.4*	1

Figure 2 Karratha Average Rainfall and 2009 Rainfall Data (Bureau of Meteorology, 2011a)

KARRATHA AERO
Mean rainfall (mm)

Site details

Site name: KARRATHA AERO **Site number:** 004083 **Commenced:** 1971
Latitude: 20.71 °S **Longitude:** 116.77 °E **Elevation:** 7 m **Operational status:** Still Open

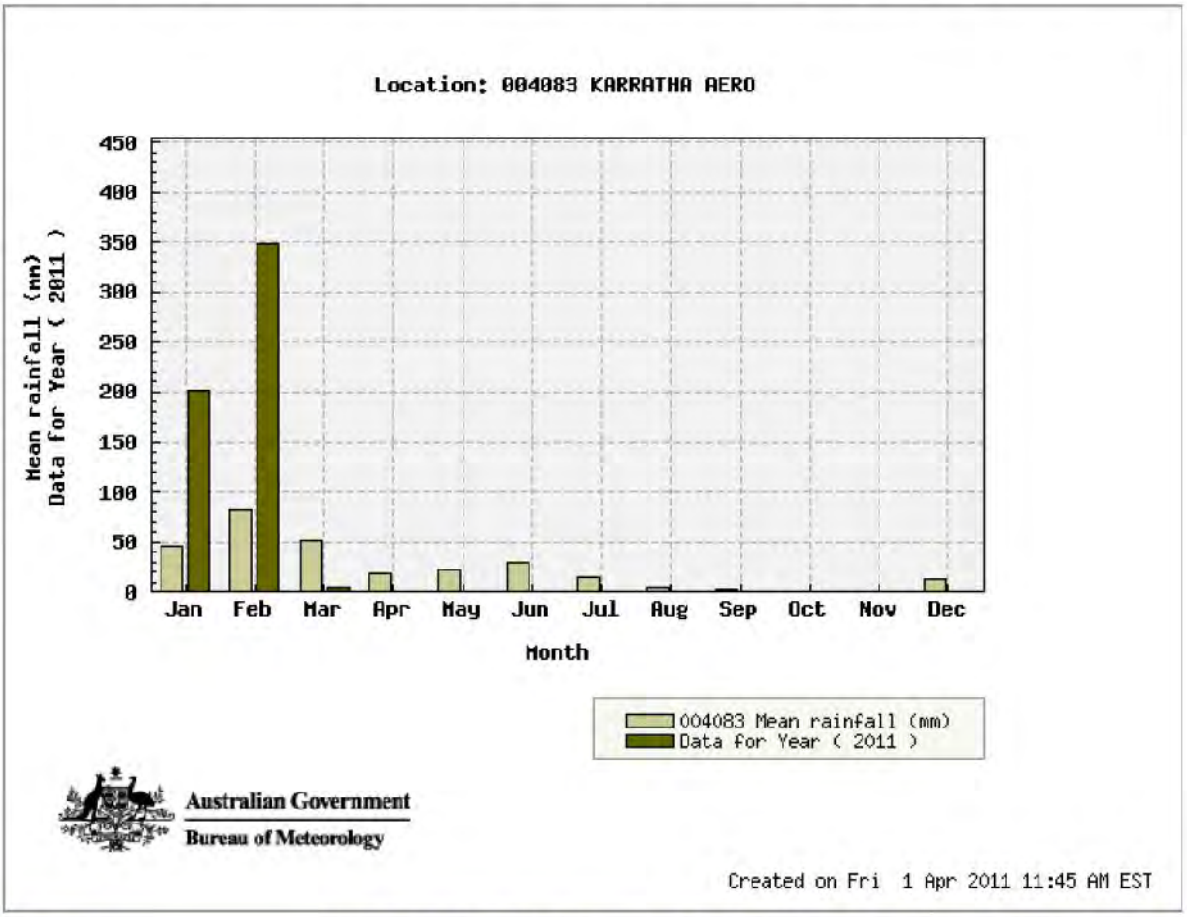


Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1972 to 2011	44.9	82.6	51.1	18.3	22.2	29.5	14.8	4.9	1.5	0.3	0.6	13.0	287.6	37
Statistics	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Years**
Rainfall (mm) for year 2010	3.8	0.0	0.0	0.0	24.6	0.0	5.0	0.2	20.8	0.0	0.0	41.0	95.4	1

Figure 3 Karratha Average Rainfall and 2010 Rainfall Data (Bureau of Meteorology, 2011b)

KARRATHA AERO
Mean rainfall (mm)

Site details
Site name: KARRATHA AERO **Site number:** 004083 **Commenced:** 1971
Latitude: 20.71 °S **Longitude:** 116.77 °E **Elevation:** 7 m **Operational status:** Still Open



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1972 to 2011	44.9	82.6	51.1	18.3	22.2	29.5	14.8	4.9	1.5	0.3	0.6	13.0	287.6	37
Statistics	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Years**
Rainfall (mm) for year 2011	201.2	346.8	3.2											0

Figure 4 Karratha Average Rainfall and 2010 Rainfall Data (Bureau of Meteorology, 2011c)

1.3.2 Soils

The Pilbara Region exhibits complex mosaics of soils and geology. The proposed development area traverses a mosaic of differing soil types including, friable loamy soils, brown self mulching cracking clays and shallow coherent porous loamy soils (CSIRO, 1967).

1.3.3 Land System Units

1.3.3.1 Original Port Development Area

The original Port Development Area lies within a region for which the Land Systems have been mapped as part of the rangeland assessment programme (Van Vreeswyk *et al*. 2004). Dixon Island has not been mapped as part of this programme. Six Land System Units are traversed by the original Port Development Area (**Figure 5**) and these are described as follows:

Boolgeeda Stony lower slopes and plains found below hill systems, supporting hard and soft spinifex grasslands and mulga shrublands. Predominantly deposition surfaces of very gently inclined stony slopes and plains becoming almost level further downslope.

Cheerawarra Sandy coastal plains and saline clay plains supporting soft and hard spinifex grasslands and minor tussock grasslands. Depositional surfaces of gently undulating, sandy surfaced coastal plains and level plains with saline clay soils and bare saline scalds with wind hummocks.

Littoral Bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches. Depositional surfaces of saline coastal flat, and estuarine and littoral surfaces with extensive bare saline tidal flats subject to infrequent tidal inundation, slightly higher samphire flats and alluvial plains, mangrove seaward fringes with dense branching patterns of shallow tidal creeks, minor coastal dunes, limestone ridges, sandy plains and beaches.

Rocklea Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex and occasionally soft spinifex grasslands. Consists of hills, ridges and plateaux remnants on basalt with steep stony slopes, restricted lower slopes, stony interfluves and minor gilgai plains.

Ruth Hills and ridges of volcanic and other rocks supporting hard spinifex and occasionally soft spinifex grasslands. They consist of erosional surfaces of rounded hills and ridges with restricted lower slopes and stony interfluves with moderately to widely spaced drainage patterns.

Uaroo Broad sandy plains supporting shrubby hard and soft spinifex grasslands. Depositional surfaces; level sandy plains up to 10km or more in extent with little organised drainage. It consists of pebbly surfaced plains and plains with calcrete at shallow depth. It is broad, mostly unchannelled, tracts receiving more concentrated sheet flow, minor low stony hills and rises. Relief is mostly less than 10m but isolated hills up to 30m.

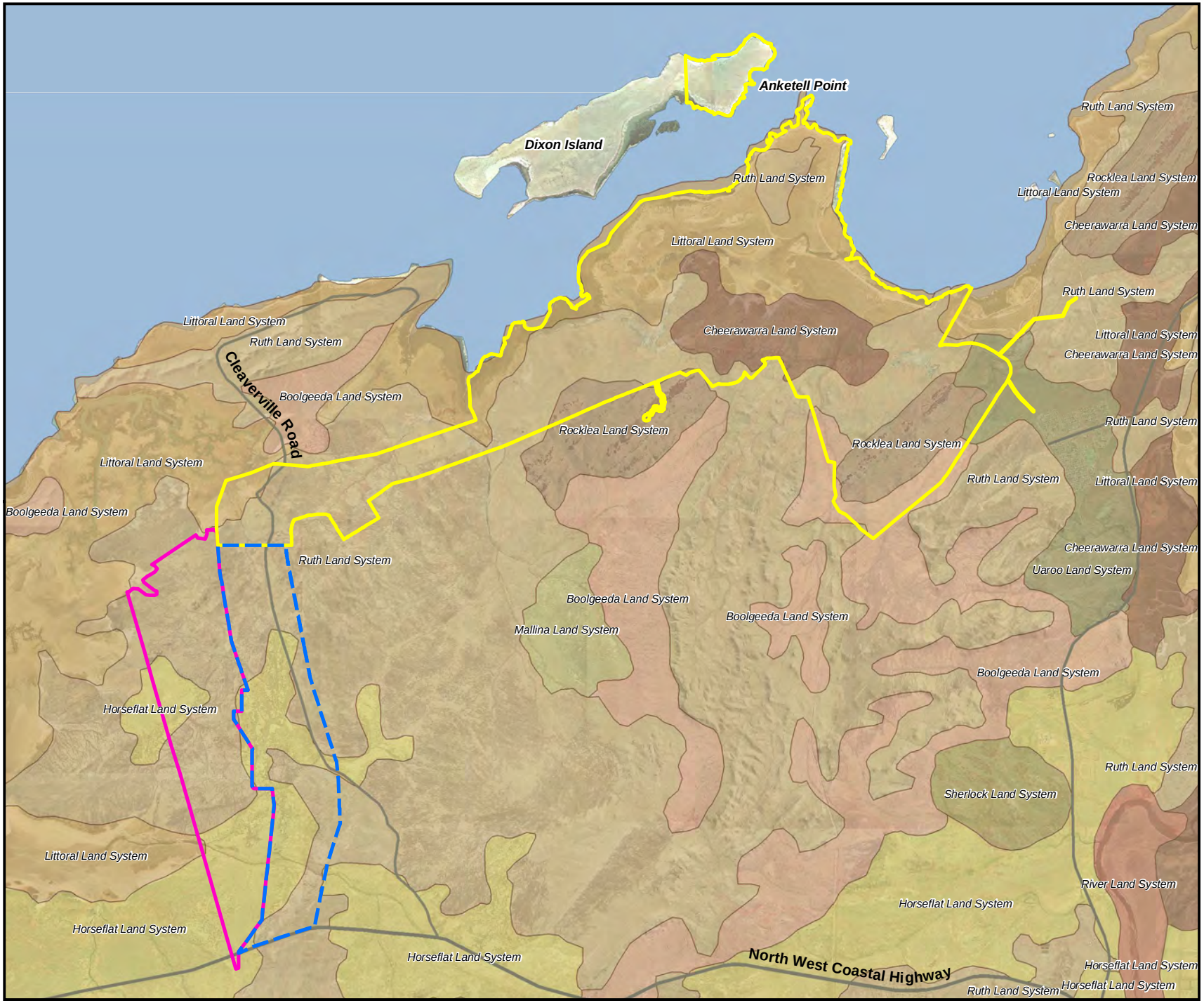
1.3.3.2 Port Access Rail Realignment Area

Three Land System Units are traversed by the Port Access Rail Realignment Area (**Figure 5**) and area described as follows:

Horseflat Gilgaied clay plains supporting tussock grasslands and minor grassy snakewood shrublands. They consist are depositional surfaces of clay plains, stony plains, narrow linear drainage depressions and dissected slopes marginal to the River land system; mostly internally drained.

Littoral Bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches. Depositional surfaces of saline coastal flat, and estuarine and littoral surfaces with extensive bare saline tidal flats subject to infrequent tidal inundation, slightly higher samphire flats and alluvial plains, mangrove seaward fringes with dense branching patterns of shallow tidal creeks, minor coastal dunes, limestone ridges, sandy plains and beaches.

Ruth Hills and ridges of volcanic and other rocks supporting hard spinifex and occasionally soft spinifex grasslands. They consist of erosional surfaces of rounded hills and ridges with restricted lower slopes and stony interfluves with moderately to widely spaced drainage patterns.



Anketell Point and Dixon Island Port Project Area

Land Systems

Figure 5

0 1 2 3

Kilometres

1:90,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Original Port Survey Area
- Port Access Rail Re-alignment Survey Area
- Northern Terminus of Rail Corridor

Land Systems

- Boolgeeda Land System
- Cheerawarra Land System
- Horseflat Land System
- Littoral Land System
- Mallina Land System
- River Land System
- Rocklea Land System
- Ruth Land System
- Sherlock Land System
- Uaroo Land System

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1.4 Biological Context

1.4.1 IBRA Regions

There are 85 recognised Interim Biogeographical Regionalisation Areas (IBRA) Regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (Environment Australia, 2000). Both the Port Development Area and the Port Access Rail Realignment Area lie within the Pilbara Biogeographic Region of IBRA (Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC), 2011).

The Pilbara IBRA Region is comprised of four Biogeographical subregions; Chichester, Fortescue Plains, Hamersley and Roebourne Subregions. The project areas occur within two of these subregions; the Chichester and Roebourne Subregions with the majority occurring within the Chichester Subregion (**Figure 6**).

The Chichester subregion comprises the northern section of the Pilbara Craton consisting of undulating Archaean granite and basalt plains including areas of basaltic ranges (Kendrick and McKenzie, 2001). The plains support a shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, while *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick and McKenzie, 2001).

Kendrick and Stanley (2001) have broadly described the Roebourne subregion as; Quaternary alluvial and older colluvial coastal and sub-coastal plains with a grass savannah of mixed bunch and hummock grasses and a dwarf shrub steppe of *Acacia stellaticeps* or *Acacia pyrifolia* and *Acacia inaequilatera*. Uplands are dominated by *Triodia* Hummock Grasslands and the ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* Woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas.

1.4.2 Flora and Vegetation

The project area is situated within the Fortescue Botanical District of the Pilbara region, which broadly consists of tree and shrub steppe communities with *Eucalyptus* trees, *Acacia* shrubs, *Triodia pungens* and *Triodia wiseana* (Beard, 1990).

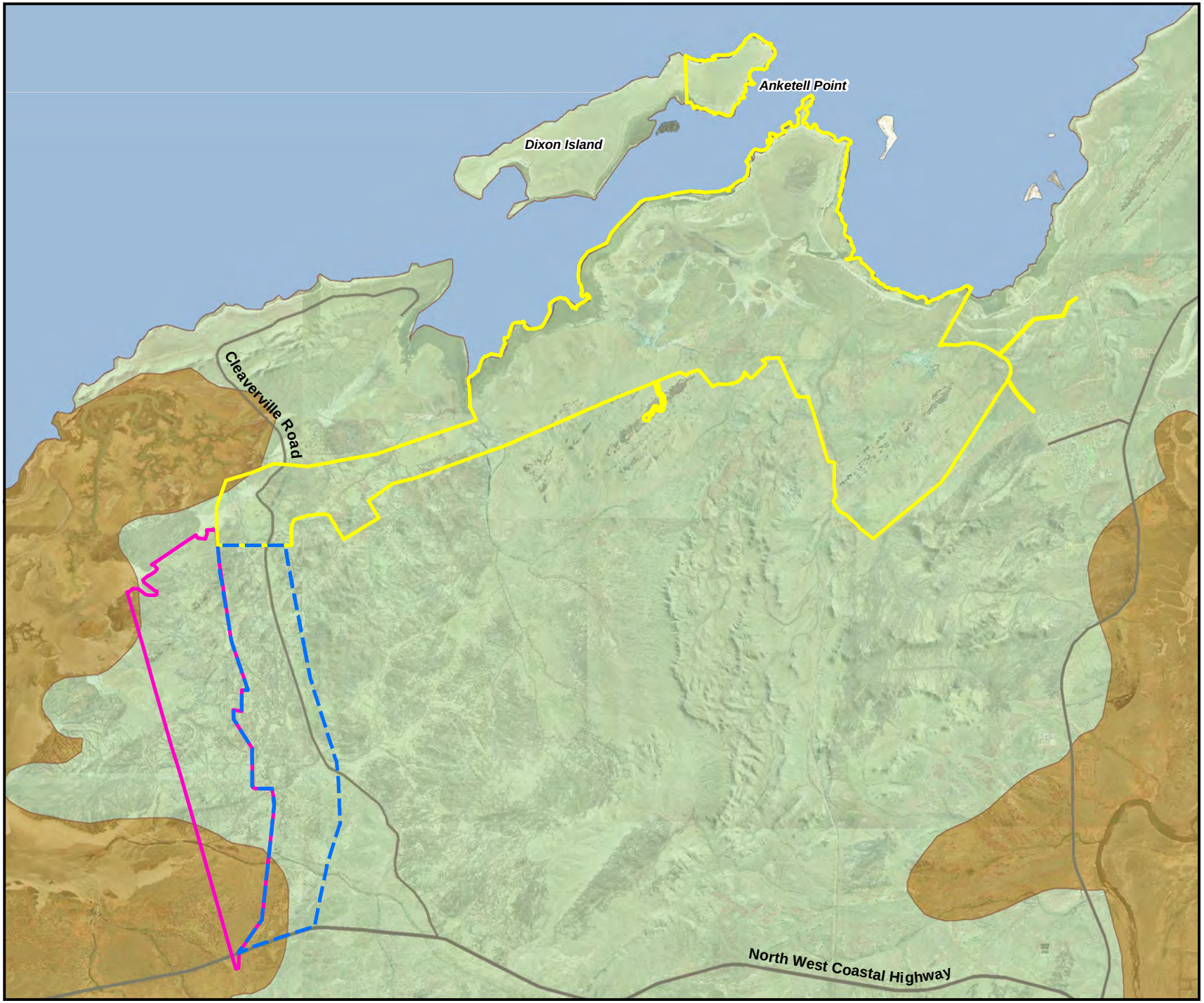
Beard's (1975) 1:1,000,000 vegetation series mapping for the Pilbara Region identifies three broad terrestrial vegetation types within the original Port Development Area and three within the Port Access Rail Realignment Area. They are described in **Table 1a** and **Table 1b.**

Table 1a Beard's (1975) Terrestrial Vegetation Types within the original Port Development Area

Vegetation Code No.	Beard Code	Category
629	xGc/t_3Hi	Mosaic: Short bunch grassland - savannah / grass plain (Pilbara) / Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana*
157	T_3Hi	Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana*
43	Mangrove	Low forest; mangroves (Kimberley) or thicket; mangroves (Pilbara)

Table 1b Beard's (1975) Terrestrial Vegetation Types within the Port Access Rail Realignment Area

Vegetation Code No.	Beard Code	Category
589	xGc/t_1Hi	Mosaic: Short bunch grassland - savannah / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex
157	T_3Hi	Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana*
127	fl	bare areas: mudflats



Anketell Point and Dixon Island Port Project Area

IBRA Regions

Figure 6

0 1 2 3

Kilometres

1:90,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Original Port Survey Area
- Port Access Rail Re-alignment Survey Area
- Northern Terminus of Rail Corridor

IBRA Regions

- Chichester
- Roebourne

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1.4.3 Vegetation Clearing, Extent and Status

Where clearing of native vegetation is proposed to occur, purely from a biodiversity perspective and not taking into account any other land degradation issues present, there are now several key criteria being applied with regards to clearing licenses. The criteria, as outlined in the WA EPA Position Statement No. 2, *Environmental Protection of Native Vegetation in Western Australia: Clearing of native vegetation, with particular reference to the agricultural area* (EPA, 2000) are used to help reverse the long-term decline in the quality and extent of Australia's native vegetation cover. The criteria are as follows:

- The "threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type
- A level of 10% of the original extent is regarded as being a level representing "endangered"
- Clearing which would put the threat level into the class below should be avoided; and
- From a biodiversity perspective, stream reserves should generally be in the order of at least 200m wide.

The status of remaining vegetation can be delineated into five different classes:

- *Presumed extinct*: Probably no longer present in the bioregion
- **Endangered*: <10% of pre-European extent remains
- **Vulnerable*: 10-30% of pre-European extent exists
- **Depleted*: >30% and up to 50% of pre-European extent exists; and
- *Least concern*: >50% pre-European extent exists and subject to little or no degradation over a majority of this area.

* or a combination of depletion, loss of quality, current threats and rarity gives a comparable status.

1.5 Biological Factors of Environmental Significance

1.5.1 Declared Rare, Priority or Threatened Species

The Department of Environment and Conservation (DEC) assigns conservation codes to endemic plant species that are geographically restricted to few known populations or threatened by local processes. Allocating conservation codes to plant species assists in protecting populations and conserving species from potential threats (DEC, 2011a and 2011b). During April 2011, DEC revised the conservation codes for Western Australian Flora.

Under the *Wildlife Conservation Act 1950,* the Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection. Schedules 1 and 2 deal with those that are threatened and those that are presumed extinct respectively (DEC, 2011a).

It is an offence to "take" or damage Rare Flora without Ministerial approval. Section 23F of the *Wildlife Conservation Act, 1950* defines "to take" as " to gather, pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means."

Species designated as Priority Flora are species that have not yet been adequately surveyed and are in urgent need of further survey (Priority One to Three), are rare but not threatened (Priority Four) or conservation dependent species (Priority Five). **Table 2** presents the updated definitions of Conservation Codes for Western Australian Flora under the *Wildlife Conservation Act, 1950*, as extracted from DEC, 2011b.

Table 2 Definition of Rare and Priority Flora Species (Department of Environment and Conservation, 2011b)

Conservation Code	Category
X	**Presumed Extinct Flora (Declared Rare Flora - Extinct)** Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such Schedule 2 under the Wildlife Conservation Act 1950).
T	**Threatened Flora – (Declared Rare Flora – Extant)** Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such (Schedule 1 under the Wildlife Conservation Act 1950).
P1	**Priority One – Poorly Known Species** Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
P2	**Priority Two – Poorly Known Species** Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
P3	**Priority Three – Poorly Known Species** Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
P4	**Priority Four – Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
P5	**Priority Five: Conservation Dependent species** Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Any species listed in State and Commonwealth legislation as being of conservation significance is said to be a significant species (EPA QLD, 2002) and incorporates species that are endangered, vulnerable and rare or covered by international conventions. Species at risk of extinction are recognised at a Commonwealth level and are categorised according to the EPBC Act, summarised in **Table 3**. Significance is not limited to species covered by State and Commonwealth legislation and also includes species of local significance and species showing significant range extensions or at the edge of their known range.

Table 3 Categories of Threatened Flora Species (*Environment Protection and Biodiversity Conservation Act, 1999*)

Conservation Code	Category
Ex	**Extinct** Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild** Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	**Critically Endangered** Taxa which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	**Endangered** Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable** Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent** Taxa which at a particular time if, at that time, the species is the focus of a specific conservation programme, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

1.5.2 Threatened and Priority Ecological Communities

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat, which are subject to processes that threaten to destroy or significantly modify the assemblage across its range (DEC, 2001).

Vegetation communities in Western Australia are described as 'TECs' if they have been defined by the DEC's Species and Community Branch and found to be Presumed Destroyed (PD), Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). For definitions of TEC categories and criteria refer to English and Blyth (1997). The DEC maintains a database of state listed TECs which is available for online searches via their website (www.dec.wa.gov.au).

The categories and the criteria for defining TECs have been described by English and Blyth (1997). A publicly available database, listing TECs within Western Australia, is maintained by DEC and available via their website (www.dec.wa.gov.au).

There is currently no legislation covering the conservation of TECs in WA, however some are protected under the Commonwealth EPBC Act. The TECs on the Commonwealth register are also listed on the Department of Environment, Water, Heritage and the Arts (DEWHA) website. For those State TECs not listed on the Commonwealth register, land clearing legislation under the Environmental Protection (EP) Act, 1986 also provides protection from clearing. The Environmental Protection Authority's (EPA's) position on TECs states that proposals resulting in the direct loss of TECs are likely to be formally assessed.

Additional to TECs, potential TECs that do not currently meet survey criteria or that are not adequately defined, are rare but not threatened, have been recently removed from the TEC list or require regular monitoring are considered to be Priority Ecological Communities (PECs) (DEC, 2011c) and DEC require them to be taken into consideration during environmental impact assessments.

1.5.3 Local, Regional and National Significant Communities

Vegetation communities are referred to as Locally Significant where they:

- Support populations of Priority Flora species
- Extend the geographic range of particular taxa from previously recorded locations
- Are restricted to only one or a few locations
- Occur as small isolated communities; or
- Exhibit unusually high structural and species diversity (Dr. E.M. Mattiske, pers. comm.).

Vegetation communities are referred to as Regionally Significant where they:

- Are limited to specific landform types
- Are uncommon or restricted plant community types within the regional context; or
- Support populations of Declared Rare Flora (Dr. E.M. Mattiske, pers. comm.).

Vegetation communities are referred to as Nationally Significant where they:

- Support populations of Threatened (EPBC listed) species; or
- Support populations of Threatened Ecological Communities (TECs) listed with national (EPBC) significance (Dr. E.M. Mattiske, pers. comm.).

Guidance Statement 51 (EPA, 2004) also states that “vegetation may be significant for a range of reasons, other than a statutory listing as a Threatened Ecological Community or because the extent is below threshold level”. According to Guidance Statement 51, other significant vegetation may include communities that have:

- Scarcity
- Unusual species
- Novel combination of species
- A role as a refuge
- A role as a key habitat for threatened species or large populations representing a significant proportion of the local to regional total population of a species;
- Being representative of the range of a unit (particularly, a good local and/or regional example of a unit in “prime” habitat, at the extremes of a range, recently discovered range extensions, or isolated outliers of the main range)
- A restricted distribution.

1.5.4 Significant Species

Guidance Statement 51 (EPA, 2004) states that “species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than as Declared Rare Flora or Priority Flora”. According to Guidance Statement 51 (EPA, 2004), other significant flora may include taxa that:

- Have a keystone role in a particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species
- Have a relic status
- Have anomalous features that indicate a potential new discovery
- Are representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- Show the presence of restricted subspecies, varieties or naturally occurring hybrids

- Have local endemism / a restricted distribution; or
- Are poorly reserved.

1.6 Flora (Variants and Complexes)

Taxonomist, Malcolm Trudgen identified differences in the key characteristics of a number of collected flora specimens from the project area. In order to determine the significance of the collections, they have been split into different forms and further taxonomic work will be required in future (**Table 4**).

Table 4 Variants and Complexes from Collected Taxa

Species	Variant and/or Complexes	Malcolm Trudgen Comments
Triodia wiseana	*Triodia wiseana* (fine form)	One of several forms of *Triodia wiseana*. This one seems to be common, possibly restricted to the western Pilbara but may be in the central Pilbara as well
Polycarpaea longiflora	*Polycarpaea longiflora* (red form) *Polycarpaea longiflora* (white form)	There are several colour forms of *Polycarpaea longiflora*, which may have taxonomic significance. Studies are needed to resolve this problem
Acacia elachantha	*Acacia elachantha* (golden hairy variant)	This is an informal variant recognised by the WA Herbarium, but not catalogued on Florabase
Senna artemisioides subsp. *oligophylla*	*Senna artemisioides* subsp. aff. *oligophylla* (thinly sericeous)	A well known variant of *Senna oligophylla* with a distinct apressed sericeous tomentum
Indigofera monophylla	*Indigofera monophylla* (Cape Preston form) *Indigofera monophylla* (Burrup form) *Indigofera monophylla* (grey leaflet form)	*Indigofera monophylla* is a species complex, these are different forms, varying in characters such as tomentum and calyx
Euphorbia tannensis subsp. *eremophila*	*Euphorbia tannensis* subsp. *eremophila* (Burrup form)	A variant with some different characters
Gossypium australe	*Gossypium australe* (Whim Creek form) *Gossypium australe* (Burrup Peninsula form)	Two forms with different leaf tomentum
Sida pilbarensis	*Sida pilbarensis* (Ferrugineous form)	This is a form of recognised on determinavit slips by Robin Barker, who works on *Sida*. It is widespread and common in the Pilbara Bioregion
Scaevola spinescens	Scaevola spinescens (broad leaf form) Scaevola spinescens (narrow form)	*Scaevola spinescens* is a species complex. These forms require further study but appear to be separate taxa

2.0 Scope and Objectives

The flora and vegetation assessment consisted of three separate components. The scope, specific objectives and tasks relating to each assessment component are described below.

2.1 Phase 2, Level 2 Flora and Vegetation Assessment of the Original Port Development Area

The objectives of the second phase assessment of the original Port Development area were to:

- Conduct a second phase (Phase 2) Level 2 flora and vegetation assessment in accordance with EPA Guidance Statement 51 and as requested by DEC (Submission 3.25 on the Anketell Port Public Environmental Review (API, 2010))
- Rescore a representative selection of the quadrats established during the first phase assessment; and
- Interpret and report on survey results, including a summary of the consequences of these results on environmental approvals.

2.2 Level 2 Flora and Vegetation of the Port Access Rail Realignment Area

The objectives of the first phase, Level 2 Assessment of the Port Access Rail Realignment Area were to:

- Review available reports and information for flora and vegetation of the Anketell Point area
- Conduct a 'Level 2' Flora and Vegetation assessment in accordance with EPA Guidance Statement 51
- Accurately map and delineate Vegetation Communities and Vegetation Condition
- Record the vascular flora represented within the various vegetation communities, from quadrats, releves and opportunistic recordings; and
- Interpret and report on survey results, including a summary of the consequences of these results on environmental approvals.

2.3 Targeted Priority Flora Surveys

The objectives of the targeted Priority Flora surveys were to:

- Determine the presence or absence of DRF, Priority or Significant Flora Species within specifically targeted areas
- Clarify habitat suitability for DRF, Priority or Significant Flora Species within vegetation types of the project area
- Provide management recommendations where necessary; and
- Interpret and report on survey results, including a summary of the consequences of these results on environmental approvals.

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3.0 Methodology

As discussed previously, the three assessment components that were the subject of the study were:

- Phase 2, Level 2 Flora and Vegetation assessment of the original Port Development Area
- Phase 1, Level 2 Flora and Vegetation assessment of the Port Access Rail Realignment Area; and
- Targeted Priority Flora Surveys.

The phase 1 and 2 Level 2 Flora and Vegetation assessments were carried out in accordance with EPA Guidance Statement No. 51, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004) for Level 2 Surveys, specifically addressing:

- desktop studies
- a reconnaissance field survey, including:
    - verification of desktop studies
    - delineation and characterisation of flora and vegetation units; and
    - identification of potential impacts.
- A detailed flora and vegetation field survey, including:
    - verification of vegetation mapping and vegetation units; and
    - a comprehensive and quantitative assessment of individual vegetation units.

The specific methodologies used to undertake these studies are described in more detail in the following sections.

3.1 Desktop Assessment

A search of DEC's Declared Rare and Priority Flora database was undertaken prior to the field assessment to identify flora of conservation significance that could potentially occur within the project area.

The search co-ordinates used were; 20° 23' - 20° 58' S and 116° 43' - 117° 20' E. The following databases were interrogated:

- DEC Threatened Flora Database
- Western Australian Herbarium records
- DEC Declared Rare Flora and Priority Flora List; and
- DEC Threatened Ecological Communities (TEC) and Priority Ecological Community (PEC) database.

As part of the desktop assessment and field preparations, results of previous assessments conducted at the site and in the vicinity by AECOM were considered. This involved consideration of the complexity and the spatial and temporal distribution of the vegetation communities, as well as the location of previously established quadrats, areas of better quality vegetation and habitats suitable for supporting flora of conservation significance. This information contributed to determining the approach for the field assessment and where to focus efforts for specific data collection and verification of previous results.

3.2 Field Assessment

As the assessment was conducted as three components, detailed methodologies for the field assessment for each component are described below.

3.2.1 Phase 2 Level 2 Flora and Vegetation assessment of the original Port Development Area

Numerous flora and vegetation assessments have been carried out within the Anketell Point Port Development Area prior to the 2011 surveys, between May 2009 and May 2010 (AECOM, 2010). The full list of participants is presented in **Section 8.0**.

Between the dates of 21 – 23 March 2011 and 5 – 7 April 2011, the Phase 2 Level 2 Flora and Vegetation assessment was conducted to verify the results of the vegetation community and condition mapping carried out previously and to capture additional flora species that may not have been observed during the phase 1 assessment. This involved rescoring vegetation monitoring quadrats that were established and initially surveyed during phase 1 assessments in previous years.

A collective total of 22 vegetation quadrats that were previously established as part of the study of the Port Development Area (AECOM, 2010) were rescored as part of the phase 2 assessment. The 22 quadrats consisted of 18 established during 2009 field assessments and four established during the 2010 field assessment. Rescored quadrats were selected to represent each of the vegetation types present in the original Port Development Area (with a small number of the small and isolated communities exception to this). A minimum of one quadrat per community or two to three quadrats for each of the dominant communities of the area were rescored. There were no new quadrats established and surveyed within the original Port Development Area during the 2011 assessment.

Each quadrat was established in a north-south orientation. At the north western corner of each quadrat, GPS locations and quadrat reference photos were taken. A thorough site walkover was conducted surrounding each quadrat, to record additional (opportunistic) species occurring within the vegetation community that may not have been recorded within the quadrat.

The described method complies with the EPA's guidelines for flora and vegetation assessments as outlined in EPA Guidance Statement No. 51 (EPA, 2004). Standardised data collection sheets were used to ensure consistent data records for the following features at each quadrat:

- location
- flora species
- dominance of each species
- average height of each species
- projected foliage cover of each species
- soil type and colour
- topography; and
- vegetation condition.

Species that were unable to be identified in the field were collected to be further identified by AECOM botanists and experienced botanist Cate Tauss at the WA Herbarium. Plant specimens were identified using a combination of the use of taxonomic keys, comparison with pressed specimens housed at the West Australian Herbarium and Ms Tauss's personal, extensive knowledge of and experience with the Pilbara flora. Nomenclature of follows protocols of the West Australian Herbarium.

Aerial imagery provided by API was used in the field to delineate vegetation community boundaries within the project areas. A Panasonic Toughbook ® loaded with the aerial imagery was utilised in conjunction with a GPS unit and the mobile mapping capabilities and the ability to plot real time locations assisted with site navigation and tracking throughout the project area. This also ensured that field assessments were within the defined alignments and that vegetation community and condition mapping was recorded accurately.

Vegetation condition is determined in relation to the (perceived) ability of the bushland to maintain itself (Keighery, 1994). This is commonly interpreted primarily on the ratio of visible introduced species to native species however disturbance (e.g. grazing, erosion), degree of alteration to community and habitat structure, site ecology and other factors are also considered.

In order to map vegetation condition of the project area, the condition was determined at a range of detailed recording sites including at quadrats and in between as necessary, where condition changed. The categories of vegetation condition used were consistent with a combination of methods developed by Keighery (1994) and the Braun-Blanquet Scale (Mueller-Dombois and Ellenberg, 1974), as summarised in **Table 5**. Given that effective measures of bushland condition are a measure of both the amount of change in community structure and the proportion of weeds present, a quantitative measure is considered to add value to interpretations and results. That is, the described method incorporates the Keighery (1994) (descriptive and qualitative) and the Braun-Blanquet Scale (Mueller-Dombois and Ellenberg, 1974) (quantitative) methods.

Table 5 Bushland Condition Ratings (adapted from Keighery, 1994 and the Braun-Blanquet Scale of Cover Abundance (from Mueller-Dombois and Ellenberg, 1974)

Descriptor	Explanation
Pristine	Pristine or nearly so, no obvious signs of disturbance. *0% weed cover*
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. *1 – 5% weed cover*
Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing. *5 – 25% weed cover*
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing. *25 – 50% weed cover*
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing. *50 – 75% weed cover*
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as "parkland cleared" with the flora comprising weed or crop species with isolated native trees or shrubs. *75 – 100% weed cover*

A search of the Department of Agriculture and Food Western Australia (DAFWA) website for Declared Plants was conducted to determine if any of the recorded species are listed as Declared Plants pursuant to the *Agriculture and Related Resources Protection Act, 1976* (DAFWA, 2011).

3.2.2 Level 2 Flora and Vegetation of the Port Access Rail Realignment Survey Area

The methods used to undertake the first phase Level 2 Flora and Vegetation Assessment of the corridor of the realigned section of rail were similar to those described in **Section 3.2.1** for the Level 2 assessment of the Port Development Area, that was conducted as a second phase Level 2 assessment. The key difference in the two assessments was that the rail realignment area included initial vegetation community and condition mapping, whereas the phase 2 assessment of the Port Development Area involved a revision and verification of existing mapping and rescoring of a selection of existing quadrats.

The Port Access Rail Realignment area was traversed by vehicle, foot and helicopter (where appropriate), to verify desktop mapping that had been carried out prior to field mobilisation, and to further define and spatially map vegetation communities and condition within the area. Where distinct changes in floristic composition and structure were noted, detailed information was recorded using quadrats.

No permanent quadrats were established in the Port Access Rail Realignment survey area, as the vegetation communities in the general project area (in adjacent rail corridor and the Port Development Area) have been previously well defined and sampled from quadrats. Despite no permanent quadrats being established, a complete vegetation description and species list was recorded for each location that incorporated newly collected data and data from previous assessments of the area, including from quadrats.

In order to ground truth the vegetation communities present within the extent of the realignment corridor, all of the area was sighted and mapped by botanists from either vehicle, helicopter or on foot. Where it was necessary to confirm vegetation assemblages, or where verification of flora species present was carried out, a thorough walk over of the site was carried out. A total of twenty five locations were assessed via thorough walk over, recording the flora species and their abundance and determining an equivalent vegetation community, based on the combination of species, soil types and landforms present. The perceived condition of the vegetation at each of these sites was also recorded. This information was also rationalised with aerial imagery, which assisted in spatial mapping boundaries of communities and condition.

3.2.3 Targeted Priority Flora Assessments

Based on information collated from previous flora and vegetation assessments conducted by AECOM between 2009 and 2010, it was determined that a selection of the vegetation types may provide suitable habitat for Priority Flora species. The relevant species are:

- *Acacia glaucocaesia* (P3)
- *Eragrostis lanicaulis* (P3)
- *Terminalia supranitifolia* (P3); and
- *Helichrysum oligochaetum* (P1).

Some habitats were determined to potentially support two or more of these species. As part of the desktop preparations for the field assessment, a number of areas within suitable habitats were selected for targeted Priority Flora surveys. A total of five areas from within the assessment boundary were searched in the field in fine detail for the relevant Priority Flora (**Figure 7**).

The survey methodology involved experienced botanists walking parallel in rows and conducting sweeps or "gridding". Sweeps were orientated north-south or east-west and orientated using a combination of magnetic compass and the Panasonic Toughbook ™ coupled with a GPS unit. At each target area, transects of approximately 5 to 30 metres apart (depending on the density of the vegetation and therefore visibility) were gridded and a total search area of approximately 100 m x 100 m was included for each search areas.

Where Priority Flora or species suspected to possibly be Priority Flora were encountered, the location and number of each was recorded using a handheld GPS. Specimens were collected for verification by taxonomic identification.

4.0 Survey Limitations

The majority of the Level 2 floristic assessment or the collective project areas was conducted during May 2009, with some areas assessed and reassessed in June and July 2009 and May 2010 and March to April 2011. The timing of the majority of the initial baseline survey (post wet May 2009) was verified by DEC Pilbara specialist Stephen Van Leeuwen to have been carried out at an optimal time during exceptional conditions following a good wet season. The wet season that preceded this assessment was also a notably good wet season with high and prolonged rainfall that resulted in an ideal post-wet season, floristically.

It was intended that the field assessment conducted in May 2010 would represent the second phase of the Level 2 assessment for the Port Development Area. However the poor rainfall during the 2010 Pilbara wet season resulted in a poor flowering season and many of the species within the project area were observed to be in poor condition, withered, not in flower or altogether absent. For this reason another detailed sampling effort has now been undertaken during March and April 2011.

Additional areas were added to the scope following the completion of initial field assessments, including a narrow edge of the transport corridor to the port area, to encompass slightly greater areas than previously assessed. A combination of desktop extrapolation of existing ground truthed data and some additional ground truthing during the May 2010 site visit was used to determine the vegetation communities, condition and floral composition of these areas. Six additional quadrats were also established and assessed in May 2010, four of these six additional quadrats were re-surveyed during the phase two assessment in April 2011.

Vegetation communities have been delineated within the project area based on species composition and structure not necessarily taking Land System Units into consideration. The spatial extent of some vegetation communities may span numerous Land System Units. Discussions with various DEC personnel has concluded that Land System Mapping is based on underlying soil and landform characteristics and whilst this usually has a direct relationship with supported vegetation, ground truthing is considered the most accurate and fine scale assessment and characterisation of vegetation distribution.

Targeted searches for selected Priority Flora species were carried out in the original Port Development Area and in the Port Access Rail Realignment project areas. Due to the large area, it was not possible to cover the entire site at a fine level of detail. Search sites were instead selected as representative of vegetation communities where potential habitat for priority species may occur. These targeted search areas were a separate component to the 22 quadrats and 25 vegetation description sites which have been established in the project area and searched in detail.

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5.0 Results

5.1 Previous Assessments

Flora and vegetation assessments have previously been undertaken between 2007 and 2010, within the entire proposed Anketell Point and Dixon Island Port Development Area and associated infrastructure (**Table 6**). Surveys within the proposed Port Development Area have previously been undertaken by:

- Mattiske Consulting Pty Ltd (2007) *Flora and Vegetation Survey of Cape Lambert Project Area.* The area surveyed for Cape Lambert Iron Ore encompasses API's Anketell Point and Dixon Island Port Development Area
- AECOM Australia Pty Ltd (2008) *Port Development Options and Environmental Constraints Analysis. Pilbara Port Options*
- AECOM Australia Pty Ltd (2010) *Anketell Point and Dixon Island Proposed Port Development Area. Level 2 Flora and Vegetation Assessment;* and
- Astron Environmental Services (2010) *West Pilbara Iron Ore Project Proposed Anketell Point Port Area Vegetation Survey Data Analysis*.

Table 6 Summary of Terrestrial flora and vegetation assessments conducted within the Anketell Point and Dixon Island Port Development Area

Survey	Summary of Results
Mattiske Consulting Pty Ltd(2007) Flora and Vegetation Survey of Cape Lambert Project Area	- A total of 228 plant taxa were recorded from 204 sites - 6 introduced flora species, none are listed as Declared Plants - No Declared Rare or Priority Flora - No Threatened Ecological Communities were recorded, however two communities with similarities to two Priority Ecological Communities were identified - Based on surveys conducted by AECOM during 2009, liaison with Jill Pryde and Stephen van Leeuwen from DEC, as well as an analysis of Mattiske's previous assessment it has been determined that Mattiske's inferred PECs (i.e. Roebourne Plains Gilgai Grassland and Roebourne Chenopod Association) do not exist in the project area (AECOM, 2010)
AECOM Australia Pty Ltd (2008) Port Development Options and Environmental Constraints Analysis. Pilbara Port Options	- Interrogation of DEC database identified potential for 13 Priority Flora species to occur within the project area - No known TECs, however two communities identified to be at risk have the potential to occur
AECOM Australia Pty Ltd (2010) Anketell Point and Dixon Island Proposed Port Development Area. Level 2 Flora and Vegetation Assessment;	- No DRF was recorded, however one Priority Flora species (*Acacia glaucocaesia* P3) have been recorded - No TECS and two PECs identified through DEC database search as occurring within close proximity to the project area - One Declared plant (**Prosopis pallida*) was recorded - Two communities considered to be locally significant due to supporting populations of Priority Flora species identified - One community(Hf) is considered to be regionally significant due to being equivalent to the Priority 3 *Horseflat System of the Roebourne Plain* Priority Ecological Community (PEC)
Astron Environmental Services (2010) West Pilbara Iron Ore Project Proposed Anketell Point Port Area Vegetation Survey Data Analysis	- 12 significant groups of quadrats that represent vegetation communities were identified - 3 vegetation community outliers identified however these do not represent unusual communities

5.2 Flora

5.2.1 Desktop Assessment

A search of the DEC Threatened and Priority Flora database identified 21 Priority Flora species that have previously been recorded in the vicinity of the project area, or that have the potential to occur within close proximity (**Table 7**). The dataset results include three Priority One, two Priority Two, 14 Priority Three and two Priority Four species. No species of Declared Rare Flora (DRF) resulted from the database search. Known locations of Priority Flora identified through the DEC database search and other flora of significance known to occur within the vicinity of the Port Development Area are spatially presented in **Figure 7**.

Table 7 Threatened and Priority Flora identified to potentially occur within the Anketell Point and Dixon Island Area (DEC, 2009)

Species	Conservation Code	Species Description	Preferred Habitat	Likelihood of Occurring in Project Area
Helichrysum oligochaetum	P1	Erect annual, herb to 0.25m tall. Flowers yellow August - November	Red clay, Alluvial plains	*Likely* to occur
Ipomoea sp. A Kimberly Flora (L.J. Penn 84)	P1	Creeping or twining perennial, herb. Flowers (pink) in June.	Shallow soils on sandstone.	*Unlikely* to occur (Typically a Kimberley species)
Nicotiana heterantha	P1	Decumbent, short lived annual or perennial, herb to 0.5m high, forming low spreading colonies. Flowers (white/cream) in March-June/September.	Black clay. Seasonally wet flats.	Unlikely to occur
Gomphrena pusilla	P2	Slender branching annual, herb, to 0.2 m tall. Flowers white, March – June.	Fine beach sand, behind foredune on limestone	*Unlikely* to occur (Typically a Kimberley species)
Nymphoides beaglensis	P2	Aquatic annual, herb. Flowers (white, pink, purple) in March – June.	Shallow freshwater. Edges of permanent waterholes or in seasonally inundated claypans and depressions.	*Unlikely* to occur (Typically a Kimberley species)
Acacia glaucocaesia	P3	Dense, glabrous shrub or tree, 1.8–6 m tall Flowers yellow, July – September.	Red loam, sandy loam, clay. Floodplains	*Likely* to occur
Atriplex lindleyi subsp. *conduplicata*	P3	Monoecious, short lived or perennial herb to 0.2m height.	Crabhole plains	*May* occur
Eragrostis lanicaulis	P3	Knotty or bulbous rhizomatous, perennial, grass like or herb, 0.45 – 0.5m high. Flowers March- May/August – October	Red sandy clay. Flats	*Likely* occur
Eriachne sp. Dampiera Peninsula (KF Kenneally 5946)	P3	Slender, leafy usually ascending annual, grass like or herb to 0.52m in height. Flowers between March - April.	Shallow soils over rock, red sand, sandy clays. Ridges and sand dunes	*Unlikely* to occur (Typically a Kimberley species)

Species	Conservation Code	Species Description	Preferred Habitat	Likelihood of Occurring in Project Area
Eriochloa fatmensis	P3	Tufted perennial, grass-like or herb, 0.2 – 1m tall.. Flowers in April	Regularly flooded areas, river banks	*Unlikely* to occur
Geijera salicifolia	P3	Tree 1.5 – 6m in height. Flowers white September	Skeletal soils, stony soils. Rocks, gorges	*May* occur
Gymnanthera cunninghamii	P3	Erect shrub to 1–2 m tall Flowers cream, yellow, green, January – December.	Hummock Grassland, Sandy soils	*May* occur
Polymeria distigma	P3	Prostrate trailing herb. Flowers (pink) in April – July.	Sandy soils.	*May* occur
Schoenus punctatus	P3	Shortly rhizomatous, tufted perennial, grass-like or herb (sedge) ca 0.6m tall. Flowers brown, August	Water courses	*Unlikely* to occur
Stackhousia clementii	P3	Dense broom-like perennial, herb to 0.45m high. Flowers are green, yellow and brown.	Skeletal soils. Sandstone hills.	*May* occur
Stylidium costulatum	P3	Erect, tufted annual herb to 0.1-0.2m high. Flowers (yellow, orange, red) in April-August.	Sandy or clayey soils. Creeks or seasonally wet areas.	*Unlikely* to occur (Typically a Kimberley species)
Tephrosia bidwillii	P3	Shrub 0.3-0.9m high. Flowers (orange) in May/August.	Sandy margin of creeks in basalt hills,	*May* occur
Terminalia supranitifolia	P3	Spreading, tangled shrub or tree, 1.5–3 m high. Flowers green, yellow, May – July/December.	Sand. Among basalt rocks.	*Likely* to occur
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	P3	Tussocky perennial, grass-like or herb, 0.9–1.8 m high. Flower. August.	Red clay. Clay pan, grass plain.	*May* occur
Pittosporum moluccanum	P4	Tree, 2-6m high. Flowers (white) in February – August.	White sand. Sand dunes.	*Unlikely* to occur (Typically a Kimberley species)
Rhynchosia bungarensis	P4	Compact, prostrate shrub, to 0.5 m high. Fl. yellow.	Pebbly, shingly coarse sand amongst boulders.	*Unlikely* to occur

5.2.2 Field Assessment

5.2.2.1 Original Port Development Area

During 2010 a total of 207 flora species from 97 genera and 41 families were recorded within the original Port Survey Area. The total includes 204 (98%) native species and 3 (2%) introduced (weed) species. The full list of vascular flora species recorded and the representative communities and quadrats in which they occur are presented in **Appendix A** and **Appendix B**. Qualitative data recorded from individual quadrats is presented in **Appendix C**.

During the 2010 field assessment, families with the highest representation were Poaceae (Grass Family – 38 taxa; 37 native, 1 introduced), Papilionaceae (Pea Family – 28 taxa) and Malvaceae (Hibiscus Family – 17 taxa). One flora species recorded (*Frankenia pauciflora* var. *pauciflora*) was found to be occurring outside its previously recorded range of distribution as documented by the West Australian Herbarium (DEC, 2011a). According to the West Australian Herbarium, this species is endemic to the Geraldton Sandplains, Coolgardie, Murchison and Swan Coastal Plain IBRA Regions.

As anticipated the number of species recorded within the original Port Development area has increased as a result of the additional assessment. The main objective of conducting the additional phase 2 assessment is to capture additional species that may not have been observed at the time of the initial assessments.

A collective total of 262 vascular flora species were recorded from within the original Port Development Area, from 38 families and 106 genera. The total includes 258 (98.47%) native species and four (1.53%) introduced (weed) species. Families with the highest representation were Poaceae (Grass Family – 47 taxa; 46 native, 1 introduced), Fabaceae (Legume or Pea Family – 28 taxa) and Malvaceae (Hibiscus Family – 38 taxa).The full list of vascular flora species recorded and the representative communities and quadrats in which they occur are presented in **Appendix A** and **Appendix B**. Qualitative data recorded from individual quadrats is presented in **Appendix C**.

5.2.2.2 Port Rail Access Realignment Area

A total of 172 vascular flora species were recorded from within the Port Access Rail Realignment Area, from 34 families and 91 genera. The total includes 166 (96.517%) native species and six (3.48%) introduced (weed) species. Families with the highest representation were Poaceae (Grass Family – 37 taxa; 36 native, 1 introduced), and Fabaceae (Legume or Pea Family – 34 taxa; 33native, 1 introduced)

The full list of vascular flora species recorded and the representative communities and quadrats in which they occur are presented in **Appendix A** and **Appendix B**. Qualitative data recorded from individual quadrats is presented in **Appendix C**.

5.2.3 Declared Rare, Priority and other Significant Flora

5.2.3.1 Original Port Development Area

No species listed as DRF (T or X) under the *Wildlife Conservation Act, 1950* or as Threatened under the EBPC Act were recorded within the project area.

Four populations of *Acacia glaucocaesia* (P3) have been recorded by DEC along Cleaverville Road, 4 km north of the North West Coastal Highway. These populations were collected and reported by Bruce Maslin in October 2004. The locations of all four populations were revisited by AECOM during 2009, however only two of these populations were confirmed on the ground (**Figure 7, Table 8**). These areas were not reassessed as part of the 2011 assessment.

When ground truthing to confirm the location of the DEC recorded populations, AECOM recorded a single main population of *Acacia glaucocaesia* (P3), comprising five sub-populations and a total of more than 67 individual plants in the vicinity of the project area between 501668 to 501677mE and 7708273 to 7708300mN (**Figure 7, Table 8**). This single population recorded by AECOM encompasses the two DEC records confirmed through ground thruthing.

Table 8 *Acacia glaucocaesia* (P3) populations recorded in the vicinity of the original Port Development Area (AECOM, 2009)

Easting (mE)	Northing (mN)	Number of Plants	DEC/AECOM Recorded	Confirmed During 2009
501677	7708300	1	DEC	Yes
501677	7708298	1	DEC	Yes
501689	7708464	1	DEC	No
501825	7708443	1	DEC	No
501677	7708273	25+	AECOM	Yes
501668	7708273	20+	AECOM	Yes
501723	7708267	5	AECOM	Yes

One flora species recorded during 2010 (*Frankenia pauciflora* var. *pauciflora*) was found to be occurring outside its previously recorded range of distribution as documented by the West Australian Herbarium (DEC, 2011a). According to the West Australian Herbarium, this species is endemic to the Geraldton Sandplains, Coolgardie, Murchison and Swan Coastal Plain IBRA Regions.

5.2.3.2 Targeted Priority Flora Assessment

Based on information collated from previous flora and vegetation assessments conducted within the Port Development Area it was determined that there are four Priority Flora species that may have the potential to occur within the project area (AECOM, 2010). The species with the potential to occur, based on their preferred habitat requirements and current known occurrence and distribution are; *Helichrysum oligochaetum* (P1)*, Acacia glaucocaesia* (P3)*, Eragrostis lanicaulis* (P3) and *Terminalia supranitifolia* (P3) and are summarised in **Table 9**.

Table 9 Priority species and potential habitat identified in desktop assessments as having the potential to occur in the project areas

Species	Potential Habitats
Acacia glaucocaesia (P3)	Thg, AThg1, AThg2, ATg, AxT, MAC, MAT, MATE
Helichrysum oligochaetum (P1)	Amg, DCAT1, DCAT2, ATg, AThg1, AThg2, AxE, AxT, Lit, MAC, MATE, MAT, Hf
Eragrostis lanicaulis (P3)	Thg, Thg(c), Sam1, Sam2, ATg, Hf, AxT, MAC
Terminalia supranitifolia (P3)	Thg, ATg, GT, AThg1, AThg2, MAT, Amg, DCAT1, DCAT2

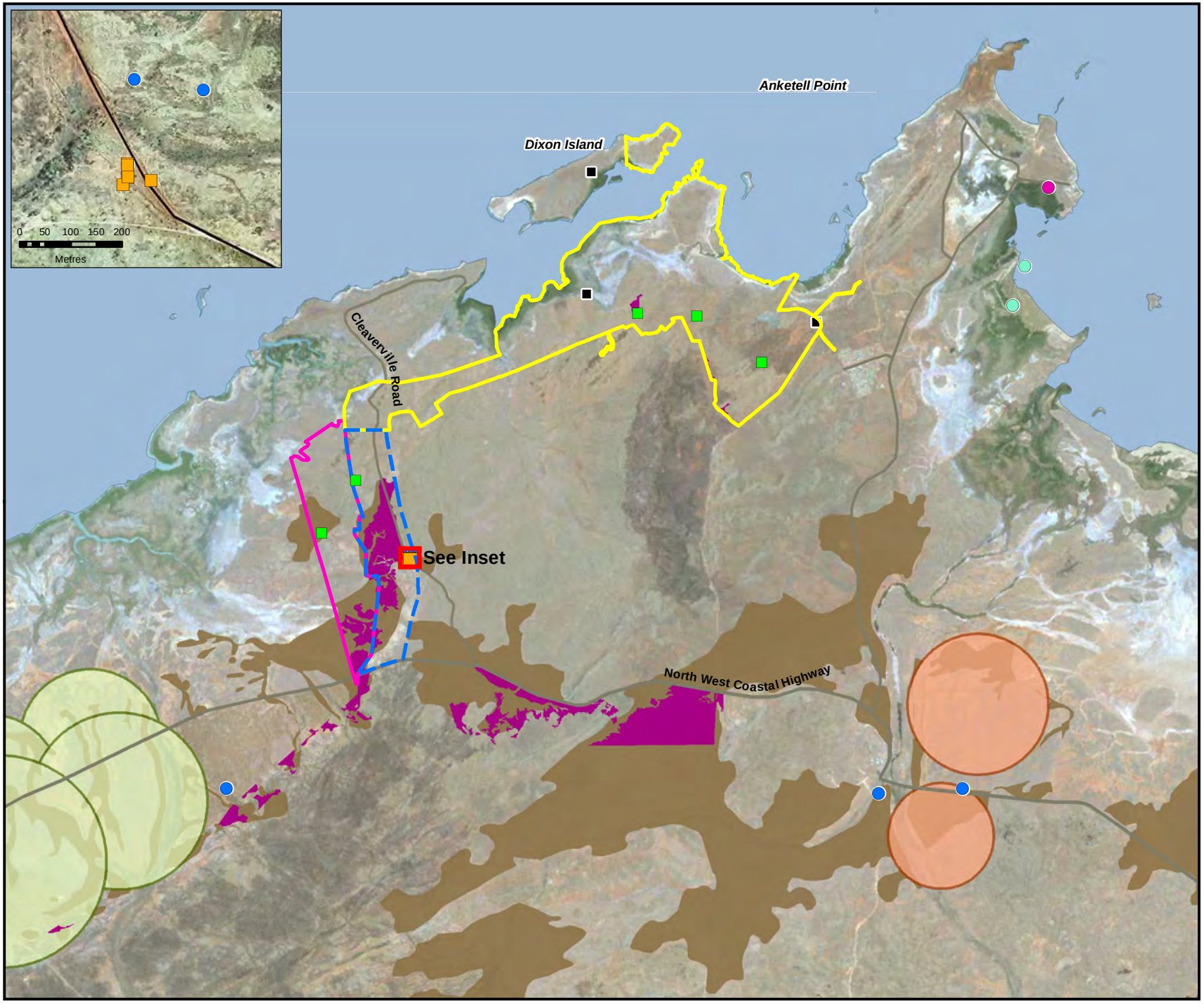
Five areas within the communities listed above were specifically targeted and searched in detail for Priority Flora. This consisted of three search areas within the original Port Development Area, one with the Port Rail Assess Realignment area and one within the northern terminus of the rail corridor, adjacent to the realignment (**Figure 7).** The vegetation communities within in which the five targeted Priority Flora surveys were conducted are broadly described as follows:

- MAT – Mixed Shrubland of *Acacia* spp. over a Mid Dense Hummock Grassland of *Triodia* spp. on orange brown sandy soil with rocky nodules suitable habitat for *Acacia glaucocaesia, Helichrysum oligochaetum* and *Terminalia supranitifolia*)
- Thg – Mid Dense to Closed Hummock Grasslands of *Triodia* spp. on hillslopes, ridgetops and stony plains (suitable habitat for *Acacia glaucocaesia, Eragrostis lanicaulis* and *Terminalia supranitifolia*)
- ATg – Shrubland of *Acacia* spp. over an Open Shrubland of *Corchorus* spp. *Stemodia grossa* and *Sida* aff. *echinocarpa* (MET 15, 350) over a Hummock Grassland of *Triodia epactia* (Form A) over a Very Open Tussock Grassland of **Cenchrus ciliaris* on orange sandy clay drainage lines suitable habitat for *Acacia glaucocaesia, Helichrysum oligochaetum, Eragrostis lanicaulis* and *Terminalia supranitifolia*); and
- AxE – Shrubland to Low Open Shrubland of *Acacia xiphophylla* over a Grassland of *Dichanthium sericeum* subsp. *humilius, Chrysopogon fallax, Eriachne* spp., *Eragrostis* spp. and *Xerochloa* spp. over a Hummock Grassland of *Triodia wiseana* (fine form) on rocky clay loam suitable habitat for *Helichrysum oligochaetum*).

No species listed as DRF (T or X) under the *Wildlife Conservation Act, 1950* or as Threatened under the *EBPC Act, 1999* were recorded within the project area. Similarly no species listed as Priority Flora by the DEC were recorded.

5.2.3.3 Port Access Rail Realignment Area

No species listed as DRF or Priority Flora were recorded within the Port Access Rail Realignment area. However one species has been identified to potentially be of conservation significance. *Isotoma* aff. *pusilla* (AP 10-01) is likely to be a new taxon. The specimen collected has many characteristic of *Isotoma petraea* but the leaves are not petiolate the occurrence of this species would be a significant range extension. Additionally, this specimen could also be closely related to *Isotoma pusilla*, however, there are characteristic that do not match this species also. No other taxonomically described species seems to match the collected specimen.



Anketell Point and Dixon Island Port Project Area

DEC Priority Flora, Range Extension & PECs

Figure 7

0 1 2 3 4 5

Kilometres

1:150,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

LEGEND

- Priority Flora Targeted Search Location
- Original Port Survey Area
- Port Access Rail Re-alignment Survey Area
- Northern Terminus of Rail Corridor
- AECOM confirmed *Acacia glaucocaesia* populations (P3)

Range Extension

- *Frankenia pauciflora* var. *pauciflora*

DEC Priority Flora Search Results

- *Acacia glaucocaesia* (P3)
- *Eragrostis lanicaulis* (P3)
- *Helichrysum oligochaetum* (P1)
- AECOM Horseflat Vegetation Community equivalent to Horseflat Landsystem of the Roebourne Plain (P3 PEC)

Priority Ecological Communities

- Stony Chenopod association of the Roebourne Plains area (Priority 1 PEC)
- Roebourne Plains Gilgai Grasslands (Priority 1 PEC)
- Horseflat Landsystem of the Roebourne Plain (Priority 3 PEC)

AECOM

5.2.4 Introduced Species

For the purposes of this report, only introduced species recorded within the original Port Development Area and Port Access Rail Realignment Area are included. Species recorded within the Anketell Point Transport Corridor area have been excluded.

Some of the most significant weeds for the Pilbara region are:

- Mesquite (**Prosopis* species)
- Ruby Dock (*Acetosa vesicaria)
- Buffel grass (*Cenchrus ciliaris)
- Redtop Natal Grass (**Melinis repens*)
- Parkinsonia (*Parkinsonia aculeata)
- Kapok bush(**Aerva javanica*); and
- Mexican poppy (*Argemone ochroleuca).
- Ward's weed (**Carrichtera annua*);and
- Mediterranean turnip (**Brassica tournefortii*).

Close attention was given to the presence of any of the aforementioned species during survey efforts. In total, seven introduced species were recorded, four of which occur within the original Port Development Area and six occur within the Port Access Rail Realignment area (**Table 10)**.

Of the six introduced species recorded, one species (**Prosopis pallida*) is listed as a Declared Plant by DAFWA, pursuant to the *Agriculture and Related Resources Protection Act, 1976* (DAFWA, 2010).

Table 10 Interim Summary of Vegetation Communities and Quadrats recording Introduced and Declared Plant Species (2010 and 2011)

Species	Species Description	Vegetation Community (original Port Development Area)	Vegetation Community (Port Access Rail Realignment Area)	original Port Development Area Quadrat Number	Port Access Realignment Area Quadrat Number
**Aerva javanica* (Kapok bush)	Kapok bush is a perennial herb, up to 1.6m high, densely covered in short, branched hairs, giving it a greyish appearance. It was introduced to Australia to assist with the re-vegetation of degraded rangelands. It's now widespread in many types of vegetation from Carnarvon to the Kimberley, although it prefers calcareous soils. It flowers and fruits for most of the year. It is native to northern Africa to south west Asia.	Thg, Thg(c), ATg, AThg1, CHT, CST, DEAT1, Lit, MAC and MAT.	AGThg and AThg2	APQ64, APQ65, APQ66, APQ80, APQ81, APQ87, APQ94, APQ95 and APQ100.	APQ121, APQ122
**Cenchrus ciliaris* (Buffel grass)	Buffel grass is tufted, often tussocking perennial to 1m tall. The inflorescence is cylindrical, with purplish flowers produced for much of the year. It's widely planted in pastoral regions as a pasture grass and has become a widespread weed of roadsides, creeklines, river edges and most vegetation types from Shark Bay to the Pilbara and adjacent desert. It continues to spread in the north and south, both naturally and through deliberate establishment. It's native to Africa and India.	Thg, Thg(c), AThg1, MAT, DCAT1, DCAT2, Sam1, Lit, MAC, ATg, CST and GT	AThg1, AThg2,DEAT1, DCAT1, FACE, Hf, AxE, Thg, ATg, AGThg, MAT, Sam1,AxSH, CAThg1	APQ62, APQ63, APQ64, APQ65, APQ66, APQ67, APQ68, APQ81, APQ87, APQ89, APQ90, APQ91, APQ92, APQ93, APQ94, APQ95, APQ96, APQ97, APQ100, APQ102, APQ103, APQ104 and APQ105	APQ106, APQ108, APQ109,APQ110, APQ111, APQ112, APQ113, APQ114, APQ115, APQ116, APQ117, APQ118, APQ121, APQ125, APQ126, APQ128, APQ129, APQ130
**Flaveria trinervia* (Speedy Weed)	This weed was formerly known as *Flaveria australasica* ssp. *gilgai* (P3), however it is considered to be a synonym of *Flaveria trinervia*. Both the morphological and molecular evidence overwhelmingly support the merging of these two entities. *Flaveria trinervia* is found in southern USA, Mexico, Central America, Caribbean, northern parts of South America, central Africa, Middle East and India. It is thought that Flaveria trinervia originated in southern Mexico (Mckown *et al.*, 2005)	NA	AThg2	NA	APQ122

Species	Species Description	Vegetation Community (original Port Development Area)	Vegetation Community (Port Access Rail Realignment Area)	original Port Development Area Quadrat Number	Port Access Realignment Area Quadrat Number
**Malvastrum americanum* (Spiked Malvastrum)	Spiked Malvastrum is an erect, hairy perennial up to 1.3m tall. It's native to America and has yellow to orange flowers in a dense terminal spike. It is inedible to herbivores and is therefore a weed of river and creek margins, wasteland and many arid zone habitats, from the Nullarbor to the Pilbara and Kimberley.	NA	DEAT1 and AxE	NA	APQ108 and APQ112
**Portulaca oleracea* (Pigweed)	Pigweed is a prostrate, succulent annual. Under water stress the whole plant becomes reddish. The shiny leaves are spoon shaped and have yellow flowers in their axils. Pigweed grows and flowers in summer and is a common widespread weed of horticulture, paddocks and gardens. It is considered a native in most of the State but is probably introduced to the south-west.	Hf, Thg, AThg2, MAT and DCAT2	AThg2, AxE, Thg and MAT	APQ69, APQ87, APQ92, APQ96 and APQ98	APQ106, APQ112, APQ114, APQ116 and APQ117
**Prosopis pallida* (Algaroba) – Declared Plant	Algaroba is a fast growing thorny shrubs or tree 4 to 10m high, originating from South America. Algaroba has a widespread distribution throughout the State from Derby to Carnarvon. All *Prosopis* species are Declared Plants in WA (Hussey *et al*., 2007)	NA	MAT	NA	APQ117
**Stylosanthes hamata* (Verana stylo)	Verana stylo is a softly hairy sprawling perennial to 30cm, native to central and South America, It is naturalised throughout the Kimberley and near Port Hedland and Karratha; and is known to also occur in the Northern Territory and Queensland.	GT	NA	APQ63	NA

The *Agriculture and Related Resources Protection Act, 1976,* lists weed species (93 species within Western Australia) as Declared Plants or significant pest weeds. Under the Act, these species are subject to restrictions on movement or sale and landholders are obliged to carry out control measures to prevent their spread. Weeds effectively colonise areas where the soil has been disturbed and where there has been clearing and can then rapidly invade surrounding natural sites. *DAFWA* recommended control measures are detailed in **Appendix D.**

5.3 Vegetation

A total of 28 separate vegetation communities were described and mapped during the 2011 flora and vegetation assessment. The vegetation communities within the combined project areas are presented spatially in **Figures 8.1 to 8.54**.

5.3.1 Vegetation Communities

A total of 22 vegetation communities were recorded within the original Port Development Area, consisting of three Grasslands, ten Shrublands, one Mangal community, two Samphire communities, three Drainage and Creekline communities and three 'other' classifications of mapped areas. Within the Port Access Rail Realignment Area there were a total of 17 vegetation communities recorded. This consisted of two Grasslands, 10 Shrublands, one Samphire community and four Drainage and Creekline communities. There were three new communities described and mapped within the Port Access Rail Realignment survey area during field assessments in 2011. The full list of study sites/quadrats for each vegetation community is presented in **Appendix B** and vegetation communities are described in **Table 11**.

NB: * denotes introduced or non endemic species (weeds).

Table 11 Vegetation Communities occurring within the original Port Development Area and the Port Rail Realignment Area

Habitat	Vegetation Community Code	Vegetation Community Description	Survey Area
Grassland	Hf	Horseflats of *Eragrostis* spp., *Eriachne* spp. and *Dichanthium* spp. on stony red crackling clayey loam. This community is represented by quadrats APQ98 and APQ103 within the original Port Development Area and APQ111 within the Port Access Rail Realignment Area.	PDA, PARRA
	Thg	Mid Dense to Closed Hummock Grasslands of *Triodia* spp. on hillslopes, ridgetops and stony plains. This community is represented by quadrats APQ82, APQ87, APQ88, APQ89, APQ90 and APQ97 within the original Port Development Area and quadrats APQ114 and APQ120 within the Port Access Rail Realignment Area.	PDA, PARRA
	Thg(c)	Mid to Dense Hummock Grassland of *Triodia pungens* over an Open Tussock Grassland of **Cenchrus ciliaris* and *Eragrostis* aff. *eriopoda* (WAS site 963) on pale orange sandy clay. This community is represented by quadrat APQ66 within the original Port Development Area. There are no quadrats within the Port Access Rail Realignment Area that represent this community.	PDA

Habitat	Vegetation Community Code	Vegetation Community Description	Survey Area
Shrubland	AGThg	Mixed Open Shrubland of *Acacia tumida, Acacia ancistrocarpa, Acacia bivenosa, Acacia coriac*ea subsp. *pendens, Grevillea pyramidalis* and *Ficus aculeata* var. *indecora* over a Hummock Grassland of *Triodia wiseana* with scattered patches of *Gomphrena cunninghamii* and *Cleome viscosa* in rocky crevices on rocky orange loam. This community is represented by quadrat APQ121 within the Port Access Rail Realignment Area.	PARRA
	ATg	Shrubland of *Acacia inaequilatera, Acacia tumida* var. *pilbarensis* with occasional *Acacia coriacea* subsp. *coriacea*, *Acacia coriacea* subsp. *pendens* and *Acacia bivenosa* over an Open Shrubland of *Corchorus* aff. *parviflorus*, *Corchorus* aff. *walcottii* (K.J. Atkins 570), *Stemodia grossa* and *Sida* aff. *echinocarpa* (MET 15, 350) over a Hummock Grassland of *Triodia epactia* (Form A) over a Very Open Tussock Grassland of **Cenchrus ciliaris* on orange sandy clay drainage lines. This community is represented by quadrats APQ93 and APQ94 within the original Port Development Area and quadrat APQ115 within the Port Access Rail Realignment Area.	PARRA
	AThg1	Tall Shrubland to Open Shrubland dominated by *Acacia pyrifolia* var. *pyrifolia*, *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia synchronicia* over a Mid Dense Hummock Grassland dominated by *Triodia wiseana* (fine form) on rocky sandy flats, hill slopes and ridgetops. This community is represented by quadrats APQ91 and APQ100 within the original Port Development Area and quadrats APQ107, APQ113 and APQ127 within the Port Access Rail Realignment Area.	PARRA
	AThg2	Open Shrubland to Low Open Shrubland of *Acacia pyrifolia* var. *pyrifolia* with scattered *Corchorus* aff. *parviflorus* over a Mid Dense Hummock Grassland of *Triodia wiseana* (fine form) on rocky hill slopes. This community is represented by quadrat APQ69 within the original Port Development Area and quadrats APQ106 and APQ122 within the Port Access Rail Realignment Area.	PARRA
	AxE	Shrubland to Low Open Shrubland of *Acacia xiphophylla, Acacia tumida* and *Acacia tenuissima* over a Grassland of *Triodia wiseana* (fine form), *Eragrostis* spp., *Eriachne* spp., *Chrysopogon fallax*, *Iseilema dolichotrichum* and *Xerochloa* spp. on rocky clay loam. This community is represented by quadrat APQ116, and APQ123 within the Northern Terminus of Rail Corridor and quadrat s APQ112 and APQ125 within the Port Access Rail Realignment Area.	PARRA
	AxSH	Open Shrubland of *Acacia xiphophylla, Acacia tumida* and *Acacia bivenosa* over an Open Shrubland of *Senna notabilis* over a Grassland of *Aristida contorta, Eragrostis xerophila*, with patches of *Chrysopogon fallax* and *Triodia wiseana* over a Herbland of *Gomphrena cunninghamii* and *Ptilotus exaltatus* on orange clay. This community is represented by quadrat APQ129 within the Port Access Rail Realignment Area.	PARRA
	AxT	Tall Shrubland to Open Shrubland of *Acacia xiphophylla* over Hummock Grasslands dominated by *Triodia wiseana* (fine form) and *Triodia angusta* on red rocky clay loam. This community is represented by APQ02, APQ11, APQ22, APQ47, APQ53 and APQ75 within the proposed Anketell Point Transport Corridor. There are no quadrats within the Port Development Area or the Port Access Rail Realignment Area which represent this community.	PARRA

Habitat	Vegetation Community Code	Vegetation Community Description	Survey Area
Shrubland (cont.)	CST	Scattered *Spinifex longifolius* over **Aerva javanica* on pale brown sands on shoreline. This community is represented by quadrat APQ65 within the original Port Development Area.	PDA
	FACE	Scattered trees of *Dolichandrone heterophylla* over a Very Open Shrubland of *Acacia coriacea* subsp. *pendens, Acacia inaequilatera, Acacia pyrifolia* and *Acacia bivenosa* over a Tussock Grassland of *Eriachne* sp. and **Cenchrus ciliaris* with changing dominance between *Triodia wiseana* over a Herbland of *Gomphrena cunninghamii* red rocky clay loam. This community is represented by APQ110 within the Port Access Rail Realignment Area.	PARRA
	GT	Tall Shrubland of *Grevillea pyramidalis* subsp. *leucadendron* over a Tussock Grassland of **Cenchrus ciliaris* with scattered *Triodia wiseana* (fine form) on rocky mid to upper slope sand. This community is represented by quadrat APQ63 within the original Port Development Area.	PDA
	Lit	Tall Open Scrub to Tall Shrubland of *Acacia coriacea* subsp. *coriacea* and *Acacia sabulosa* with scattered *Santalum lanceolatum* and *Senna artemisioides* subsp. *oligophylla x helmsii* over a Tussock Grassland of **Cenchrus ciliaris* on shorelines. This community is represented by quadrats APQ64, APQ81 and APQ105 within the original Port Development Area.	PDA
	MAC	Tall Open Scrub to Low Open Shrubland dominated by *Acacia sabulosa*, *Acacia bivenosa, Acacia stellaticeps* and *Acacia ampliceps* with occasional *Acacia pyrifolia* ssp. *pyrifolia* over a Closed Tussock Grassland of **Cenchrus ciliaris* with occasional Triodia wiseana on sandy clay. This community is represented by quadrat APQ95 and APQ104 within the original Port Development Area.	PDA
	MATE	Tall Shrubland of *Acacia xiphophylla, Acacia bivenosa* and *Acacia synchronicia* over a Mid Dense Hummock Grassland of *Triodia wiseana* (fine form), *Eriachne* spp. and *Aristida* spp. on red sandy loam. This community is represented by quadrats APQ01, APQ08 and APQ30 which are present within the proposed Anketell Point Transport Corridor. This community is also represented by quadrat APQ124 within the Port Access Rail Realignment Area. There are no quadrats within the original Port Development Area which represent this community.	PDA, PARRA
	MAT	Mixed Shrubland of *Acacia* spp. mainly dominated by *Acacia ancistrocarpa, Acacia bivenosa* and *Acacia pyrifolia* var. *pyrifolia* over a Mid Dense Hummock Grassland of *Triodia wiseana* (fine form), *Triodia angusta*, *Triodia* aff. *epactia*, *Triodia epactia* (Form A) on orange brown sandy soil with rocky nodules. This community is represented by quadrats APQ62, APQ92 and APQ101 within the original Port Development Area and quadrats APQ117 and APQ126 within the Port Access Rail Realignment Area.	PDA, PARRA,
Mangal	MF	Mangroves of *Avicennia marina* subsp. *marina* on brown tidal clay. This community is represented by quadrat APQ61 within the original Port Development Area.	PDA
Samphire	Sam1	Low Shrubland dominated by *Tecticornia halocnemoides* subsp. *tenuis* with scattered *Trianthema turgidifolia* and *Tecticornia pruinosa* on brown clayey loam. This community is represented by quadrat APQ67 within the original Port Development Area and quadrat APQ128 within the Port Access Rail Realignment Area.	PDA, PARRA

Habitat	Vegetation Community Code	Vegetation Community Description	Survey Area
	Sam2	Low Open Heath dominated by *Hemichroa diandra, Tecticornia halocnemoides* subsp. *tenuis* and *Tecticornia indica* subsp. *bidens* with scattered *Avicennia marina* subsp. *marina* on edges of tidal mudflats. This community is represented by quadrat APQ79 within the original Port Development Area.	PDA
Drainage Lines, Creeklines and Minor Flow Lines	Amg	Tall Shrubland of *Acacia inaequilatera* with occasional *Corymbia hamersleyana* over a Grassland dominated by *Triodia wiseana, Triodia epactia* and *Chrysopogon fallax* in association with drainage lines. This community is represented by APQ55, APQ41 (Vegetation description only) which are present within the proposed Anketell Point Transport Corridor. This community is represented by quadrat APQ102 within the original Port Development Area and quadrat APQ119 within the Port Access Rail Realignment Area.	PDA, PARRA
	CAThg1	Tall Open Scrub of *Acacia ancistrocarpa* over a Hummock Grassland of *Triodia wiseana* on red brown clay. This community is represented by quadrats APQ130 within the Port Access Rail Realignment Survey Area.	PARRA
	DCAT1	Woodland of *Corymbia hamersleyana* over a Tall Shrubland mainly dominated by *Acacia bivenosa*, *Acacia tumida* var. *pilbarensis* and *Acacia ancistrocarpa* with occasional *Grevillea pyramidalis* subsp. *leucadendron* over a Mid Dense Hummock Grassland of *Triodia wiseana* (fine form) and *Triodia angusta* on red rocky soils in association with drainage lines. This community is represented by quadrat APQ68 within the original Port Development Area and quadrat APQ109 and APQ118 within the Port Access Rail Realignment.	PDA, PARRA
	DCAT2	Low Open Woodland of *Corymbia hammersleyana* over a Tall Shrubland of *Acacia pyrifolia* var. *pyrifolia*, *Acacia bivenosa* and *Grevillea pyramidalis* subsp. *leucadendron* over a Mid Dense Hummock Grassland of *Triodia wiseana* (fine form) over a Tussock Grassland dominated by *Chrysopogon fallax* and **Cenchrus ciliaris* in minor drainage lines. This community is represented by quadrat APQ96 within the original Port Development Area.	PDA
	DEAT1	Open Woodland of *Eucalyptus victrix* with scattered *Corymbia hamersleyana* over a Shrubland mainly dominated by *Acacia bivenosa, Acacia trachycarpa* and *Acacia sclerosperma* subsp. *sclerosperma* over a Hummock Grassland of *Triodia wiseana* (fine form), *Triodia epactia* and *Triodia angusta* over a Tussock Grassland of **Cenchrus ciliaris* in rocky drainage lines. This community is represented by quadrat APQ108 within the Port Access Rail Realignment Area.	PARRA
Other	Bare and/or Cleared	Cleared areas void of any native and non-native species.	PDA
	Tidal Mud Flats	Tidal Mud Flats (Low-lying muddy flats that are inundated at high tide and exposed at low tide).	PDA
	Beach	Sand on shorelines.	PDA

5.3.2 Vegetation Condition

The condition of the vegetation within the original Port Development Area ranges from 'Completely Degraded' to 'Very Good – Excellent'. The majority of vegetation within this area is in 'Good' condition. The vegetation condition within the Port Access Rail Realignment Area was received to be in better condition and ranges from 'Degraded – Good' to 'Very Good – Excellent', with the majority of the vegetation being in 'Very Good' condition. The proportion varying vegetation condition is presented in **Table 12.**

Table 12 Proportions of varying Vegetation Condition within the Project Area

Condition Rating	original Port Development Area (ha)	% of original Port Development Area	Port Access Rail Realignment Area (ha)	% of Port Access Rail Realignment area
Completely Degraded	29.22	0.88	0	0
Completely Degraded – Degraded	0.35	0.01	0	0
Degraded	193.85	5.84	0	0
Degraded – Good	242.33	7.31	5.23	0.62
Good	1306.55	39.39	36.73	4.37
Good – Very Good	1168.33	35.22	276.93	32.98
Very Good	355.71	10.72	503.54	59.97
Very Good – Excellent	20.40	0.62	17.25	2.05
TOTAL	**3316.75**	**100**	**839.67**	**100**

Vegetation condition for both project areas has been mapped spatially and is presented in **Figures 8.1 – 8.44**.

Some tracks and gravel roads traverse the project area at various locations; however they have not been individually delineated as part of the vegetation condition mapping. Generally tracks and roads are in 'Completely Degraded' condition but have not been delineated due to the small areas they occupy in comparison to the entire project area.

5.3.3 Threatened and Priority Ecological Communities

5.3.3.1 Desktop Assessment

There are two vegetation communities currently listed as TECs for the Pilbara region. These are:

- *Themeda* grasslands on cracking clays (Hamersley Station, Pilbara). Grassland plains dominated by the perennial *Themeda* (kangaroo grass) and many annual herbs and grasses (*Themeda* Grasslands); and
- Ethel Gorge aquifer stygobiont community (Ethel Gorge).

It has been reported by Kendrick and McKenzie (2001) and also Kendrick and Stanley (2001) that there are no known TECs within the Chichester or the Roebourne Biogeographical Subregions. A search of the DEC TEC and PEC database was conducted for the Port Development Area at the time of the first phase Level 2 assessment in 2009. This database search area encompassed the Port Access Rail Realignment survey area and did not identify any known TECs within the entire survey area. However, the search did identify two Priority 1 Ecological Communities, namely; *Roebourne Plains Coastal Gilgai Grassland* (herein referred to as *Roebourne Plains Gilgai Grassland*) and *Stony Chenopod Association of the Roebourne Plains Area* (herein referred to as *Roebourne Chenopod Association*) in close proximity to the project area (**Figure 7**).

The locations of PECs are represented by point data with surrounding buffers, based on confirmed study plots assessed by DEC. Based on the database search results, the boundary of a buffer area of the Priority 1 Ecological Community, *Roebourne Plains Gilgai Grassland*, was identified to occur approximately 5km west from where the Port Access Rail Realignment area intersects with North West Coastal Highway. Additionally the boundary of a PEC buffer area for the occurrence of the Priority 1 Ecological Community, *Stony Chenopod association of the Roebourne Plains Area* was identified to occur approximately 8km south east from the east boundary of the original Port Development Area (**Figure 7**). None of these buffers occur within or adjacent to the Port Development Area or the Port Access Rail Realignment.

5.3.3.2 Field Assessment

No TECs were identified from field collected data within the original Port Development Area during the 2009, 2010 or 2011 flora and vegetation assessments. Similarly no TECs were identified to occur within the Port Access Rail Realignment area during 2011.

Consultation with DEC indicates that the *Roebourne Plains Gilgai Grassland* PEC differs from the surrounding clay flats of the Horseflat Land System Unit which are dominated by *Eragrostis xerophila* and other perennial tussock grass species (*Eragrostis* mostly) (Jill Pryde, April 2009, pers. comm.). The *Roebourne Plains Gilgai Grassland* was subject to a much more detailed assessment following results of the DEC Pilbara Biological Surveys, which set up survey sites on Roebourne Grasslands. This assisted in further defining the community and subsequently the *Roebourne Plains Coastal Grasslands with Gilgai micro-relief of deep cracking clays* (*Roebourne Plains Gilgai Grasslands*) was defined and nominated as a TEC to the WA Threatened Ecological Communities Scientific Committee in August 2008 (Jill Pryde, April 2009, pers. comm.).

The *Roebourne Plains Gilgai Grasslands* is described as coastal grassland with self mulching cracking clays that emerge on depositional surfaces. It occurs on microrelief of deep cracking clays, surrounded by clay plains/flats and sandy coastal alluvial plains. The gilgai depressions support ephemeral and perennial tussock grasslands dominated mainly by *Sorghum* species and *Eragrostis xerophila* along with other native species including *Astrebla pectinata, Eriachne benthamii, Chrysopogon fallax* and *Panicum decompositum*. Although the Horseflat Land System on which these grasslands occur is extensive, the *Roebourne Plains Gilgai Grasslands* are confined to only a small portion of the system that consists of heavy cracking clay soil. It occurs as disjunct occurrences of cracking clays on the Nickol/Maitland River floodplain in the vicinity of Karratha (Jill Pryde, Dec 2009, pers. comm.).

According to DEC, the Priority 1 PEC Roebourne Chenopod Association is dominated by chenopods growing in saline clay soil that has a dense surface strewn with pebbles and cobbles. This PEC appears to be uncommon with only one occurrence has located to date (AECOM, 2010; **Plate 1, Appendix B**) and differs from the other Roebourne Plains Grassland communities due to the predominance of Chenopod species on clay soils (Stephen van Leeuwen, June 2009, pers. comm.).

The PEC list for Western Australia was updated in December 2010 and there are now 29 known PECs within the Pilbara Region. This represents an increase of ten PECs since commencement of the assessment of the original Port Development Area. A new PEC of interest within the project area is the Priority 3 *Horseflat Land System of the Roebourne Plains*. This PEC represents the entire extent of the Horseflat Land System, not including the *Roebourne Plains Gilgai Grassland* and the *Roebourne Chenopod Association* that are classified as PECs of more significant importance (Priority 1) (AECOM, 2010).

The Horseflat Land System is dominated by *Eragrostis xerophila* and other perennial Tussock grass species (*Eriachne* sp., *Eragrostis* sp. and *Dichanthium* sp. on red clay loam), elements of which are present within the project areas. If not on cracking clay but with an abundance of annual *Sorghum* and uncommon *Astrebla* then a grassland is a typical *Horseflat Land System Roebourne Plain Grassland*. This PEC extends from Cape Preston to Balla Balla (Whim Creek). DEC's current spatial mapping of the extent of the *Horseflat Land System Roebourne Plain Grassland* PEC overlaps with the Port Access Rail Realignment and the Northern Terminus of the Rail Corridor (**Figure 7**).

During flora and vegetation assessments conducted in 2010 and 2011, AECOM identified a 'Horseflat 'Vegetation community to be equivalent to the Priority 3 PEC *Horseflat Landsystem of the Roebourne Plain*. This community occurs within the original Port Survey Area, the Port Access Rail Realignment and more extensively into the adjacent area referred to as Northern Terminus of the Rail Corridor (not part of the assessment area relevant to this report, but included to provide context of the vegetation of the region).

5.3.4 Other Communities of Conservation Significance

Reservation priorities have been given to the five vegetation communities previously mapped by Beard (1975) within the Chichester and Roebourne Biogeographic Subregion. The Reservation Priority Status relates to the proportion of each vegetation type that is currently protected in IUCN reserves or DEC protected lands. In general, if none of a particular community is currently protected in reserves, then it is given "High" Reservation Priority Status, whilst land currently protected in reserves may have a lower status of "Moderate". The Reservation Priority status for each of the Beard vegetation communities occurring within the project areas are provided in **Table 13**.

Although they are not categorised as TECs, communities are determined to be at risk where a number of threatening processes have been identified with the potential to destroy or significantly modify biological assemblages of the community. High Reservation Priority communities are often of limited extent and are subject to threatening processes such as grazing pressures, altered fire regimes and competition from weed species.

Vegetation communities not well represented in reserves are considered to be more at risk of being listed as a TEC. Therefore, clearing of such community types is likely to be considered of greater environmental impact than clearing of vegetation that is well represented in the reserve system.

Table 13 Community Reservation Priority Status for Beard Vegetation within the Chichester Subregions (Kendrick and Stanley, 2001 and Beeston *et al.*, 2002)

Vegetation Code	Beard Code	Community Description	Pre European Extent (Ha)	Current Vegetation Extent (Ha)	Remaining (%)	Area in Conservation Reserve (Ha)	Reservation Priority
629	xGc/t_3Hi	Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana*	59,308	59,308	100	0	High
157	T_3Hi	Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana*	501,139	500,420	100	0	Medium / Low
127	fl	bare areas: mudflats	765,734	745,336	97.34	0	High
43	Mangrove	Low forest; mangroves (Kimberley) or thicket; mangroves (Pilbara)	225,819	187,661	83.10	0	High

Table 14 Community Reservation Priority Status for Beard Vegetation within the Roebourne Subregions (Kendrick and Stanley, 2001 and Beeston *et al.*, 2002)

Vegetation Code	Beard Code	Community Description	Pre European Extent (Ha)	Current Vegetation Extent (Ha)	Remaining (%)	Area in Conservation Reserve (Ha)	Reservation Priority
589	xGc/t_1Hi	Mosaic: Short bunch grassland - savannah / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex	59,308	59,308	100	250.7	Medium
157	T_3Hi	Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana*	501,139	500,420	100	10.5	Medium
127	fl	bare areas: mudflats	765,734	745,336	97.34	30,345.4	Low

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6.0 Discussion

6.1 Flora

6.1.1.1 Original Port Development Area

During 2010 a total of 207 flora species from 97 genera and 41 families were recorded within the original Port Development area. The total includes 204 (98%) native species and 3 (2%) introduced (weed) species. Families with the highest representation were Poaceae (Grass Family – 38 taxa; 37 native, 1 introduced), Papilionaceae (Pea Family – 28 taxa) (family name has changed to Fabaceae since time of reporting in 2010) and Malvaceae (Hibiscus Family – 17 taxa).

As anticipated the number of species recorded within the original Port Development area has increased as a result of the additional assessment. The main objective of conducting the additional phase 2 assessment is to capture additional species that may not have been observed at the time of the initial assessments.

A collective total of 262 vascular flora species were recorded from within the original Port Development Area, from 38 families and 106 genera. The total includes 258 (98.47%) native species and four (1.53%) introduced (weed) species. Families with the highest representation were Poaceae (Grass Family – 47 taxa; 46 native, 1 introduced), Fabaceae (Pea Family – 28 taxa) and Malvaceae (Hibiscus Family – 38 taxa).The full list of vascular flora species recorded and the representative communities and quadrats in which they occur are presented in **Appendix A** and **Appendix B**. Qualitative data recorded from individual quadrats is presented in **Appendix C**.

One flora species recorded during 2010 (*Frankenia pauciflora* var. *pauciflora*) was found to be occurring outside its previously recorded range of distribution as documented by the West Australian Herbarium (DEC, 2011a). According to the West Australian Herbarium, this species is endemic to the Geraldton Sandplains, Coolgardie, Murchison and Swan Coastal Plain IBRA Regions. The taxonomy of this specimen is inconsistent and the genus is under current revision. The entity that the name has been applied to is common (Malcolm Trudgen, December 2009, pers. comm.) and therefore is unlikely to represent a significant range extension. This species and the community that supports it are not regarded as significant for the purposes of this assessment.

During 2011 a collective total of 22 vegetation quadrats that were previously established as part of the Port Development Area study (AECOM, 2010) were reassessed as part of the phase 2 flora and vegetation assessment.. Each vegetation community was quantitatively assessed by rescoring the flora and site data within the permanent 50 m x 50 m quadrats.

The poor rainfall during early 2010 contributed to poor survey conditions within the original Port Development Area. The wet season in 2010 did not provide sufficient rains to classify the weeks that followed as a “good season” from a floristic point of view (AECOM, 2010). For this reason the 2011 phase 2 flora and vegetation assessment was carried out to meet EPA Guidance requirements for comprehensive survey criteria.

The phase 2 flora and vegetation assessment was carried out in March and April 2011, following the wet season during the optimum flowering period. Rainfall figures obtained from the Bureau of Meteorology indicate that December 2010, January and February 2011 all received higher than average rainfall (Figure 4). This would have provided sufficient rains to classify the weeks that follow as a good season from a floristic point of view.

6.1.1.2 Port Rail Access Realignment Area

A total of 172 vascular flora species were recorded from within the Port Access Rail Realignment Area, from 34 families and 91 genera. The total includes 166 (96.517%) native species and six (3.48%) introduced (weed) species. Families with the highest representation were Poaceae (Grass Family – 37 taxa; 36 native, 1 introduced), and Fabaceae (Legume or Pea Family – 34 taxa; 33native, 1 introduced)

The full list of vascular flora species recorded and the representative communities and quadrats in which they occur are presented in **Appendix A** and **Appendix B**. Qualitative data recorded from individual quadrats is presented in **Appendix C**.

The 172 flora species were recorded from 17 community types. Based on the total area of the Port Access Rail Realignment of 839.67 ha, the species diversity for this area is considered to be low, equating to 0.20 species per hectare. The low species diversity can be attributed to the relatively homogenous nature of the survey area, particularly the southern portion of the area containing the Priority 3 PEC, *Horseflat Land System of the Roebourne Plain*.

6.1.2 Declared Rare, Priority and Other Significant Flora

Interrogation of the DEC database identified the potential for 21 Priority Flora species to potentially occur within the project areas (**Table 7**). This consisted of the following species:

- *Helichrysum oligochaetum* (P1)
- *Ipomoea* sp. A Kimberly Flora (J.L.Penn 84) (P1)
- *Nicotiana heterantha* (P1)
- *Gomphrena pusilla* (P2)
- *Nymphoides beaglensis* (P2)
- *Acacia glaucocaesia* (P3)
- *Atriplex lindleyi* subsp. *conduplicata* (P3)
- *Eragrostis lanicaulis* (P3)
- *Eriachne* sp. Dampiera Peninsula (KF Kenneally 5946) (P3)
- *Eriochloa fatmensis* (P3)
- *Geijera salicifolia* (P3)
- *Gymnanthera cunninghamii* (P3)
- *Polymeria distigma* (P3)
- *Schoenus punctatus* (P3)
- *Stackhousia clementii* (P3)
- *Stylidium costulatum* (P3)
- *Tephrosia bidwillii* (P3)
- *Terminalia supranitifolia* (P3)
- *Themeda* sp. Hamersley Station (M.E.Trudgen 11431) (P3)
- *Pittosporum moluccanum* (P4); and
- *Rhynchosia bungarensis* (P4).

Since initially reporting on the conservations significance of these species, three of the species have either undergone taxonomic review resulting in name changes or changes in conservation status and have been updated accordingly. These species are:

- *Eriachne semiciliata*, now known as *Eriachne* sp. Dampier Peninsula (KF Kenneally 5946) (P3)
- *Eriochloa decumbens*, now known as *Eriochloa fatmensis* (P3); and
- *Rhynchosia bungarensis* formerly P3 is now P4.

6.1.2.1 Original Port Development Area

No species listed as DRF (T or X) under the *Wildlife Conservation Act, 1950* or as Threatened under the *EBPC Act, 1999* were recorded within the project area. Desktop assessments conducted during 2010, have not identified the potential for any DRF (T or X) species to occur in either project area.

Spatial information obtained from DEC indicates that all previously known populations of Priority Flora occur a significant distance from the extent of the original Port Development Area. The closest known Priority Flora (*Acacia glaucocaesia*, P3), occurs approximately 3.5 km south of the original Port Development Area boundary along Cleaverville Road.

Four populations of *Acacia glaucocaesia* (P3) have been recorded by DEC along Cleaverville Road, 4 km north of the North West Coastal Highway. These populations were collected and reported by Bruce Maslin in October 2004. The locations of all four populations were revisited by AECOM during 2009, however only two of these populations were confirmed on the ground (**Figure 7, Table 8**). These areas were not reassessed as part of the 2011 assessment.

When ground truthing to confirm the location of the DEC recorded populations, AECOM recorded a single main population of *Acacia glaucocaesia* (P3), comprising of five sub-population. A total of more than 67 individual plants in the vicinity of the project area between 501668 to 501677mE and 7708273 to 7708300mN (**Figure 7, Table 8**) were recorded. This single population recorded by AECOM encompasses the two DEC records confirmed through ground thruthing.

These populations do not occur within the extent of the original Port Development Area or the Port Access Rail Realignment Area.

There were a number of flora specimens collected during 2010 which showed significant differences in their key characteristics. Therefore in order to determine the significance of the collections, Malcolm Trudgen (Taxonomic specialist for the Pilbara region) has spilt the specimens into different forms and further taxonomic work will be required in future to accurately describe these species and to determine their conservation significance (**Table 4**).

6.1.2.2 Targeted Priority Flora Assessment

Based on information collated from previous flora and vegetation assessments conducted within the original Port Development Area between 2009 and 2010, it was determined that only four Priority Flora species identified from the DEC database search may have the potential to occur within the project area (AECOM, 2010). The likelihood of these species occurring at the site was determined based on their preferred habitat requirements and current known occurrence and distribution. The species with the potential to occur within the project area are; *Helichrysum oligochaetum* (P1)*, Acacia glaucocaesia* (P3)*, Eragrostis lanicaulis* (P3) and *Terminalia supranitifolia* (P3).

Based on current known locations, distribution and the preferred habitat types, it was determined that *Ipomoea* sp. A Kimberley Flora (L.J.Penn 84) (P1), *Gomphrena pusilla* (P2), *Nymphoides beaglensis* (P2), *Eriachne* sp. Dampiera Penninsula (KF Kenneally 5946*)* (P3), *Stylidium costulatum* (P3) and *Pittosporum moluccanum* (P4) are not likely to occur within the project areas.

When conducting the Threatened Flora database search for the Anketell Point and Dixon Island Proposed Development areas, DEC staff used “Dampier” as a location. This search includes species from the Dampier Peninsula in the Kimberley IBRA region and thus includes species such as those mentioned above which are unlikely to occur within the Pilbara project area.

The potential habitat types for the four Priority Flora species is presented in **Table 9**. Five specific areas were targeted for Priority Flora within vegetation communities determined to be potential Priority flora habitat were assessed. These communities were;

- MAT, potential habitat for *Acacia glaucocaesia* (P3), *Helichrysum oligochaetum* (P1) and *Terminalia supranitifolia* (P3)
- Thg, potential habitat for *Acacia glaucocaesia* (P3), *Eragrostis lanicaulis* (P3) and *Terminalia supranitifolia* (P3)
- ATg, potential habitat for *Helichrysum oligochaetum* (P1), *Eragrostis lanicaulis* (P3) and *Terminalia supranitifolia* (P3); and
- AxE, potential habitat for *Acacia glaucocaesia* (P3), *Helichrysum oligochaetum* (P1) and *Eragrostis lanicaulis* (P3).

No species listed as Priority Flora by the DEC was recorded.

Acacia glaucocaesia (P3) is described as a dense, glabrous shrub or tree, 1.8 m to 6 m high (DEC 2011a). Based on the height of this species, if it was present within the project area, it would have been easily observed and recognisable during field assessments and the seasonal timing would not limit these observations.

Helichrysum oligochaetum (P1) is described as an erect, annual herb to 0.25 m in height with yellow flowers (DEC, 2011a). Being an annual herb which flowers between August and November, it was given specific attention during the targeted flora survey. Due to the nature of the gridding technique used for the assessment, if this species was present within the areas assessed, it would have been recorded, although was not observed.

Eragrostis lanicaulis (P3) is described as a knotty or bulbous rhizomatous, perennial grass to 0.5 m in height and flowers in March and May/August-October. The herb like form of this species may result in the species being inconspicuous at the time of survey and not observed. However, due to the nature of the gridding technique used for the assessment, if this species was present within the areas assessed it would have been recorded, although was not observed.

Terminalia supranitifolia (P3) is a perennial shrub of considerable size (2-3 m in height), which if present in the project area, would have been easily observed, although was not recorded.

6.1.2.3 Port Access Rail Realignment Area

No species of DRF, listed under the *Wildlife Conservation Act, 1950* or as Threatened under the EBPC 1999 were recorded within the Port Access Rail Realignment Area. Desktop assessments conducted during 2010, have not identified the potential for any DRF species to occur in either area.

Spatial information obtained from DEC indicates that all previously known populations of Priority Flora occur a significant distance from the extent of the Port Development Area.

One species collected, *Isotoma* aff. *Pusilla* (AP 10-01) is most likely to be a new taxon (Cate Tauss, pers comm*.,* 2011). The specimen collected could possibly be *Isotoma petraea* but the leaves are not petiolate as per *Isotoma petraea* and would result in quite a significant range extension. Additionally, this specimen could also be closely related to *Isotoma pusilla*. It is recommended that this species is recollected with mature so that it can be compared with specimens housed at the WA Herbarium (C. Tauss, pers comm*.,* 2011).

6.1.3 Introduced Species

To date, over 1,200 introduced (weed) species have been recognised to occur within Western Australia (EPA, 2007). Specifically within the Pilbara Bioregion a total of 86 weed species are known. Of these, 71% have been classified as Environmental (pest) Weeds (EPA, 2007). Environmental Weeds establish in natural ecosystems and adversely modify natural processes, resulting in the decline of the invaded community. Weeds threaten the survival of many flora because of their rapid growth and the ability to out-compete native plants for available nutrients, water, space and sunlight.

Only introduced species recorded within the original Port Development Area and Port Access Rail Realignment area are included in this report and weeds recorded within any portion of the Anketell Point Transport Corridor area have been excluded.

During field assessments, close attention was given to the presence of any of significant weed species of the Pilbara region. In total, interim data indicates that six introduced species were recorded, three of which occur within the original Port Development Area and six within the Port Access Rail Realignment area (**Table 10)**. Of the six introduced species recorded, one (**Prosopis pallida*) is listed as a Declared Plant by DAFWA, pursuant to the *Agriculture and Related Resources Protection Act, 1976* (DAFWA, 2010). Species listed as Declared under the Act, require specific control measures to reduce and control the spread of these species. Specific control measure pertaining to **Prosopis pallida* is presented in **Appendix D**.

A total of 26 quadrats from within the original Port Development Area and 19 quadrats from within the Port Access Rail Realignment area recorded weeds. The higher number of quadrats recording weeds species from within the original Port Development Area can be attributed to the higher level of disturbance, particularly the eastern portion which has numerous access tracks and an existing gravel pit. Roads and similar areas of disturbance increase the likelihood of the spread of weeds.

**Aerva javanica* (Kapok bush) was recorded in both survey areas and occurs throughout the region, particularly in sandy soils closer to the coast. It was recorded from nine quadrats within the original Port Development Area and two quadrats in the Port Access Rail Realignment area. This species is a perennial herb up to 1.6 m in height and is densely covered in short, branched hairs giving it a greyish appearance. This species is native to northern Africa and south west Asia and was introduced to Australia to assist with revegetation of degraded rangelands. It is now widespread in many types of vegetation from Carnarvon to the Kimberley.

*_Cenchrus ciliaris_ (Buffel grass) was the most frequently recorded weeds species for the project area and was recorded from a collective total of 41 quadrats. This comprised 23 quadrats from the original Port Development Area and 18 quadrats from the Port Access Rail Realignment area. The recorded high frequency of this species can be attributed to its habit, nature and preferred habitat, tending to aggressively spread along seasonal waterways and in low lying areas where moist conditions support its prolific growth. Buffel grass has been identified as a major threat to biodiversity in areas across Australia including the Rangelands of Western Australia (CRC Weed Management, 2008). This species is native to Africa and south western Asia. It grows on a range of soil types and is commonly found on stony and sandy soil (National Weed Strategy, 2009). Buffel grass has been identified as one of the worst environmental weeds in Australia, requiring a very high urgency of action. It is considered a critical invasive species because of its potential to displace native herbaceous species, affect the availability of food for native herbivores and alter fire regimes. This species was originally introduced for erosion control and pasture as it can withstand heavy grazing, however it has become an aggressive coloniser of mesic habitats (e.g. alluvial pans) in the arid zone (DEWHA, 2009b).

*_Portulaca oleracea_ (Pigweed) was recorded in five quadrats within each survey area. Pigweed is a prostrate, succulent annual. It grows and flowers in summer and is a common widespread weed of horticulture, paddocks and gardens.

*_Malvastrum americanum_ (Spiked Malvastrum) was only recorded from two quadrats within the Port Access Rail Realignment area. *_Malvastrum americanum_ is an erect, hairy perennial up to 1.5 m tall and is a weed of river and creek margins, wasteland and many arid zone habitats from the Kimberley to the Pilbara and Gascoyne regions.

*_Prosopis pallida_ (Algaroba) is a Declared Plant and was found to be supported by vegetation community MAT from one quadrat. Algaroba is a tree or shrub to 10 m in height and occurs on the coast, in sand, loam, wet soil (and saline soil), tidal flats, banks of watercourses, paddocks, wastelands and on bare areas (DEC, 2011a). This species is very salt tolerant, deep rooted and survives long periods of drought. Algaroba is known to infest an extensive area of Mardie station and is found in coastal areas on Peedamulla and Yarraloola stations (Van Vreeswyk et. al., 2004). It is an aggressive invader of the rangelands and forms dense thorny thickets which shade out more useful foraging plants (Van Vreeswyk. *et al.,* 2004). This species has also been declared a weed of National significance (National Weed Strategy, 2009).

*_Flaveria trinervia_, formerly known as Priority 3 species _Flaveria australasica_ subsp. _gilgai_, was recorded in one quadrat within the Port Access Rail Realignment area, within community AThg1. _Flaveria australasica_ subsp. _gilgai_ (P3) was removed from the DEC Priority List, recognised as a synonym of *_Flaveria trinervia_ in March 2010 (Melanie Smith, June 2010, pers. comm.). It is thought that *_Flaveria trinervia_ originated in southern Mexico.

6.2 Vegetation

Twenty two vegetation communities were recorded within the original Port Development Area, consisting of three Grasslands, ten Shrublands, one Mangal community, two Samphire communities, three Drainage and Creekline communities and three 'other' classifications of mapped areas. Additionally, within the Port Access Rail Realignment, there were a total of 17 vegetation communities recorded that consisted of two Grasslands, ten Shrublands, one Samphire community and four Drainage and Creekline communities. There were an additional three new communities described and mapped within this area, namely FACE, AxSH and AGThg (**Table 11**).

The vegetation communities were mapped based on species composition and soil type and did not primarily take into consideration the changes in Land System Units. For this reason a number of vegetation communities identified may traverse a number of differing Land Systems.

A range of factors, including isolation, supporting significant flora or fauna and the supporting landform type determines the significance of native vegetation communities. However, the most important factor in consideration of community significance is the degree of representation in the local and regional area. That is, vegetation communities are considered significant if they are poorly represented elsewhere.

Vegetation can be considered to be significant at either a local or regional level, depending on the representation in the local or regional context. Local and regional significance of the vegetation communities recorded for the project areas is discussed in the following sections.

6.2.1 Locally Significant Vegetation

Ordinarily, the local representation of vegetation is determined for the areas assessed (the project area). In order to determine vegetation representation for the areas reported in this report, part of the rail corridor, previously assessed in detail over multiple field sampling events, was incorporated into the area for local vegetation comparison. For the purposes of this report, this section is referred to as the Northern Terminus of the Rail Corridor. The collective project areas of the original Port Development Area, the Port Access Rail Realignment area and the Northern Terminus of the Rail Corridor are herein referred to as "the project area".

As discussed, determining vegetation representation on a local level involves assessing the proportionate extent of each recorded community within the study area. Based on this, it is considered that vegetation communities AGThg, ATg, AxSH, AxT,CAThg1, CST, DCAT2, DEAT1, FACE, GT, MAC, Sam1, Sam2 and Thg(c) are locally significant due to the limited in representation (by area) within the local area (**Table 15**). Representation of less than 1% of the total surveyed area has been considered to define limited representation in the local context. Areas referred to as; Bare, Cleared, Tidal Mud Flats and Beach have also not been included in this assessment as they are not actual vegetation assemblages.

Although vegetation communities AGThg, ATg, AxSH, AxT,CAThg1, CST, DCAT2, DEAT1, FACE, GT, MAC, Sam1, Sam2 and Thg(c) are considered to be locally significant due to their limited proportionate extent within the project area, further assessment of these communities indicates that of these, ATg, CST, GT, MAC, Sam1 and Thg(c) are also considered to be regionally significant as per the assessment discussed below. Since these communities have been determined to be under-represented in the wider region, they are considered to be of conservation significance. Community Hf is also of significance for reasons other than limited representation and further explanation regarding this community is presented in **Section 6.2.3**.

Table 15 Proportion of vegetation communities within Project Areas (i.e. original Port, Port Access Rail Realignment and Northern terminus of Rail Corridor)

Vegetation Community	original Port Development Area (ha)	% of original Port Development Area	% of total survey area	Port Access Rail Realignment Area (ha)	% of Port Access Rail Realignment	% of total survey area	Total Project Area (ha)	% Total Project Area
AGThg	0	0	0	14.76	1.76	0.3	14.76	0.3
Amg	36.86	1.11	0.75	56.46	6.72	1.14	93.32	1.89
ATg	22.35	0.67	0.45	12.37	1.47	0.25	39.95	0.81
AThg1	259.26	7.82	5.25	131.68	15.68	2.66	397.53	8.04
AThg2	113.35	3.42	2.29	61.15	7.28	1.24	341.63	6.91
AxE	0	0	0	50.59	6.02	1.02	100.05	2.02
AxSH	0	0	0	27.14	3.23	0.55	27.14	0.55
AxT	14.24	0.43	0.29	0.91	0.11	0.02	16.15	0.33
Bare	0	0	0	0	0	0	0	0
Beach	27.77	0.84	0.56	0	0	0	27.77	0.56
CAThg1	0	0	0	2.91	0.35	0.06	2.91	0.06
CHT	0	0	0	0	0	0	0	0
Cleared	30.3	0.91	0.61	0	0	0	30.3	0.61
CST	4.57	0.14	0.09	0	0	0	4.57	0.09
DCAT1	70.43	2.12	1.43	4.99	0.59	0.1	106.13	2.15
DCAT2	16.37	0.49	0.33	0	0	0	16.37	0.33
DEAT1	0	0	0	13.64	1.62	0.28	30.17	0.61
FACE	0	0	0	15.65	1.86	0.32	15.72	0.32
GT	25.98	0.78	0.53	0	0	0	25.98	0.53
Hf	14.77	0.45	0.3	91.87	10.94	1.86	333.27	6.75
Lit	231.39	6.98	4.68	0	0	0	231.39	4.68
MAC	35.42	1.07	0.72	0	0	0	35.42	0.72

Vegetation Community	original Port Development Area (ha)	% of original Port Development Area	% of total survey area	Port Access Rail Realignment Area (ha)	% of Port Access Rail Realignment	% of total survey area	Total Project Area (ha)	% Total Project Area
MAT	376.43	11.35	7.62	160.69	19.14	3.25	588.44	11.91
MATE	63.92	1.93	1.29	78.72	9.38	1.59	142.79	2.88
MF	259.54	7.83	5.25	0	0	0	259.54	5.25
Sam1	24.49	0.74	0.5	2.96	0.35	0.06	27.45	0.56
Sam2	0.49	0.01	0.01	0	0	0	0.49	0.01
Thg	1237.66	37.32	25.04	113.18	13.48	2.29	1581.9	32.01
Thg(c)	32.53	0.98	0.66	0	0	0	32.53	0.66
Tidal Mud Flat	418.63	12.62	8.47	0	0	0	418.63	8.47
TOTAL	**3316.75**	**100**	**67.11**	**839.67**	**100**	**16.99**	**4942.3**	**100**

Vegetation communities that support populations of Priority Flora are also considered to be of local significance. Two vegetation communities, Thg and AThg2, may be considered locally significant due to supporting populations of the Priority Three Flora species, *Acacia glaucocaesia*. Although *Acacia glaucocaesia* was not recorded within the original Port Development Area, it was recorded within communities Thg and AThg2 in the Northern Terminus Rail Corridor and therefore also has the potential to occur within the Port Access Rail Realignment area.

6.2.2 Regionally Significant Vegetation

The EPA's Position Statement No. 2 lays out a series of constraints which relate to biodiversity. One of them is to protect at least 30% of the original extent of vegetation complexes in unconstrained areas and 10% in constrained areas (i.e. urban zoned regions). All of the vegetation types identified as occurring within the Chichester and Roebourne Subregions meet the 30% target (**Table 13** and **Table 14**).

The project area is situated within two IBRA subregions, namely the Chichester and Roebourne Subregions with the majority of the project area within the Chichester Subregion (**Figure 6**). The project area lies within a region for which the Land Systems have been mapped as part of the Rangeland Assessment Programme (Van Vreeswyk, *et al*., 2004). Dixon Island has not been mapped as part of this programme. Seven Land Systems Units are traversed by the project area within the Chichester IBRA region and these are Boolgeeda, Cheerawarra, Horseflats, Littoral, Rocklea, Ruth and Uaroo. Three Land System Units are traverse by the project area within the Roebourne IBRA region and these are Horseflats, Littoral and Ruth. The proportions of each Land System within the Chichester and Roebourne IBRA regions are presented below in **Table 16** and **Table 17**.

Table 16 Proportion of Land System Units within the project area and the Chichester IBRA Region

Land System	ha of each land system in the whole of Chichester IBRA region	% within Chichester within Land Systems supported by the project area	ha of each land system of project area within Chichester IBRA region	% of each Land System within project area for Chichester IBRA region^	% of total project area#
Boolgeeda Land System	167650.4	5.7	135.8	0.1	2.7
Cheerawarra Land System	786.1	0.0	407.9	51.9	8.2
Horseflat Land System	27132.5	0.9	440.5	1.6	8.9
Littoral Land System	3217.3	0.1	1007.0	31.3	20.4
Rocklea Land System	2125325.7	72.0	315.9	0.0	6.4
Ruth Land System	137147.0	4.6	2178.6	1.6	44.1
Uaroo Land System	488730.4	16.6	76.1	0.0	1.5
TOTAL	**2949989.3**	**100.0**	**4561.8**	**86.5**	**92.3**

Table 17 Proportion of Land System Units within the project area and the Roebourne IBRA Region

Land System	ha of each land system in the whole of Roebourne IBRA region	% within Roebourne within Land System supported by the project area	ha of each land system of project area within Roebourne IBRA region	% of each Land System within project area for Roebourne IBRA region^	% of total project area#
Horseflat Land System	297358.7	54.893	181.950	0.061	3.681467522
Littoral Land System	212125.9	39.159	6.495	0.003	0.13140678
Ruth Land System	32223.8	5.949	35.351	0.110	0.7152644
TOTAL	**541708.4**	**100.000**	**223.795**	**0.174**	**4.528138703**

^Excludes consideration of landforms not representative within project area within the Chichester and Roebourne IBRA Region, therefore does not add up to 100%

Proportion of total project area does not add up to 100% as there is no Land System data for Dixon Island.

All of the Land System Units in the project area are well represented in the region, with the exception of the Cheerawarra and Littoral Units within the Chichester IBRA region (**Table 16**). Vegetation supported by the Cheerawarra and Littoral Units may therefore be considered regionally significant. The vegetation units mapped within the project area and supported by the Cheerawarra and Littoral Land System units of the Chichester IBRA region are presented below in **Table 18**. Vegetation communities Bare, Cleared, Tidal Mud Flats and Beach have not been included in this assessment as they are not native vegetation assemblages.

Table 18 Regionally significant Vegetation within the Chichester IBRA Region

Vegetation Community	Cheerawarra	Littoral
AThg1	✓	✓
AThg2		✓
ATg		✓
CST		✓
DCAT1	✓	✓
GT	✓	✓
Hf	✓	
Lit	✓	✓
MAC		✓
MAT	✓	✓
MATE	✓	
MF		✓
Sam1		✓
Thg	✓	✓
Thg(c)	✓	✓

In total there are 15 vegetation communities which occur within the Cheerawarra and Littoral Units within the Chichester IBRA region and based on regional representation, these units are considered to be regionally significant. These areas of vegetation represent significant proportions of the Cheerawarra project area. Although this may represent a significant impact on a localised regional scale, the Cheerawarra and Littoral Units are well represented on a broader scale in other IBRA regions within the Pilbara, and therefore, the vegetation units are also likely to be represented elsewhere in the region.

6.2.3 Threatened and Priority Ecological Communities

Kendrick and McKenzie (2001) and Kendrick and Stanley (2001) have stated that there are no known TECs within the Chichester or the Roebourne Biogeographical Subregions. A search of the DEC Threatened and Priority Ecological Communities database confirms this and did not identify any known TECs within the Port Development Area during 2009, 2010 or 2011 and the Port Access Rail Realignment area during 2011. However, the search did identify two Priority 1 Ecological Communities, namely; *Roebourne Plains Coastal Grassland* and *Stony Chenopod Association of the Roebourne Plain Area* as occurring in close proximity to the project area (**Figure 7**).

The PEC list for Western Australia was updated in December 2010 and there are now 29 known PECs within the Pilbara Region. This represents an increase of ten PECs since commencement of the assessment of the original Port Development Area in 2009. A combination of new information regarding specific boundaries and distributional extent for PECs in the Pilbara as well as species composition, soil types and position in the landscape, were used to determine which of the mapped and described communities within the project areas may be characterised or considered equivalent to the three PECs of interest, namely *Roebourne Plain Gilgai Grassland* (P1), *Roebourne Chenopod Association* (P1) or the *Horseflat Land System of the Roebourne Plain* (P3).

Roebourne Plain Gilgai Grassland (P1) and *Roebourne Chenopod Association* (P1) were not identified to occur within the project area.

The newly defined PEC within the project area is the Priority 3 *Horseflat Land System of the Roebourne Plains* and represents the entire extent of the Horseflat Land System, not including the *Roebourne Plains Gilgai Grassland* and the *Roebourne Chenopod Association* that are classified as PECs of more significant importance (Priority 1) (AECOM, 2010). The *Horseflat Land System of the Roebourne Plain* is widely distributed and extends beyond the boundaries of the project area.

AECOM has identified one of the vegetation communities for the project area to be equivalent to the Priority 3 PEC *Horseflat Land System of the Roebourne Plain.* This community defined by AECOM (Hf) occurs within the original Port Development Area and the Port Access rail Realignment area. Only a small proportion of this community was delineated within the original Port development area (14.77ha), however 91.87 ha was delineated within the Port Access Rail Realignment area (**Table 15**). Collectively, the total area of this vegetation type recorded in the project area is 106.64 ha and this equates to 2.56% of the project area.

The Horseflat Land System is dominated by *Eragrostis xerophila* and other perennial Tussock grass species (*Eriachne* sp., *Eragrostis* sp. and *Dichanthium* sp. on red clay loam), elements of which are present within the project areas. If not on cracking clay but with an abundance of annual *Sorghum* and uncommon *Astrebla* then a grassland is a typical *Horseflat Land System Roebourne Plain Grassland*. This PEC extends from Cape Preston to Balla Balla (Whim Creek).

There is currently no legislative protection for PECs, particularly in the Pilbara region; however, it is advisable that the DEC be consulted regarding the proposed impact to areas supporting the Hf vegetation community.

6.2.4 Other Communities of Significance

Reservation Priority status has been allocated to all five of the Beard (1975) vegetation communities present within the Chichester and Roebourne IBRA Region. Reservation Priorities are allocated to communities based on the known current extent of the community and the percentage of that community currently protected within conservation reserves in each subregion (**Table 13 and 14**). For example, Beard's Short bunch community (xGc/t3Hi) has a current extent of 59,308ha (Beeston *et. al*, 2002), and since there is currently none of this community protected within reserves, it has been given a High Priority Status.

6.2.5 Vegetation Condition

The condition of the vegetation within the original Port Development Area ranges from 'Completely Degraded' to 'Very Good – Excellent'. The majority of vegetation within this area is in 'Good' condition. The vegetation condition within the Port Access Rail Realignment area was found to be in better condition and ranges from 'Degraded – Good' to 'Very Good – Excellent', with the majority of the vegetation in 'Very Good' condition.

The limited number of weeds recorded and the relative remoteness of the realignment area is likely to contribute to the better condition. The vegetation and landforms traversed during the assessment have limited access, therefore reducing degradation by weed invasion caused by human activities and access track clearing. More degraded vegetation is evident around areas of disturbance such as the eastern section of the original Port Development Area where the existing Rio Tinto quarry and associated access tracks are located.

7.0 Conclusions and Recommendations

The significance of an impact is dependent on the conservation and reservation status of the vegetation communities and individual flora species that would be affected. It is also dependent on the intensity and duration of the impact.

No species listed as DRF (T or X) under the *Wildlife Conservation Act, 1950* or as Threatened under the *EBPC Act, 1999* were recorded within the project area. No DRF (T or X) were recorded within the Original Port Development Area or the Port Access Rail Realignment Area. Desktop assessments conducted during 2010, have not identified the potential for any DRF (T or X) species to occur in either area.

One species collected, namely *Isotoma* aff. *pusilla* (AP 10-01) is most likely to be a new taxon (Cate Tauss, *pers comm.,* 2011). It is recommended that this species is recollected with mature seeds in order for this specimen to be compared with specimens housed at the WA Herbarium.

Based on preferred habitat and soil types, along with previously recorded locations for the flora species resulting from the DEC database, it has been determined there is the potential for four species of conservation significance to occur within the project area. These species are; *Helichrysum oligochaetum* (P1), *Acacia glaucocaesia* (P3), *Eragrostis lanicaulis* (P3) and *Terminalia supranitifolia* (P3). However, only one of these species was recorded during field surveys, namely *Acacia glaucocaesia* (P3) within the Northern Terminus of the Rail Corridor (**Figure 7**).

Only six weed species were recorded in the project areas, however three of these are significant environmental weeds for the Pilbara region and one is listed as a Declared Plant under the *Agriculture and Related Resources Act, 1976*. The Declared Plant, **Prosopis pallida* (Algaroba) has been found to be supported by vegetation community MAT. Obligatory control measures, enforced by DAFWA apply to this species (**Appendix D**).

Overall the condition of the vegetation within the original Port Development Area is mostly 'Good'. The vegetation condition within the Port Access Rail Realignment area is in better condition and ranges is mostly in 'Very Good' condition. This can be attributed to the relative remoteness of the site and the limited clearing and disturbance.

The newly defined PEC within the project area is the Priority 3 *Horseflat Land System of the Roebourne Plains* and represents the entire extent of the Horseflat Land System, not including the *Roebourne Plains Gilgai Grassland* and the *Roebourne Chenopod Association* that are classified as PECs of more significant importance (Priority 1) (AECOM, 2010). AECOM has identified a vegetation community (Hf) to be equivalent to the Priority 3 PEC *Horseflat Land System of the Roebourne Plain.* This community occurs within the Original Port Development Area, the Port Access Rail Realignment area and the Anketell Point Transport Corridor.

There were six vegetation communities which were considered to be locally significant due to their limited proportionate extent within the project areas and comprise of ATg, CST, GT, MAC, Sam1 and Thg(c). Additionally, a further two communities, namely Thg and AThg2 may also be considered to be locally significant due to supporting populations of Priority Flora species. There were a total of 15 vegetation communities which are considered to be regionally significant within the Chichester IBRA region due to poor representation on a regional scale, although this scale is relatively localised. Further more detailed assessment of the regional representation of these vegetation types would more than likely determine these types to be well represented within other IBRA regions, as the Land System Units that support them are also more widely represented.

In summary, the factors of environmental significance (constraints) with regards to flora and vegetation associated with the project area include:

- One species collected, *Isotoma* aff. *Pusilla* (AP 10-01) is most likely to be a new taxon and it is recommended that this species be recollected with the aim of collecting mature seeds to assist in further identification
- A Declared Plant (pest weed); **Prosopis pallida*, listed by DAFWA has been recorded in the project area;
- Two communities, Thg and AThg2, are considered to be locally significant due to supporting populations of Priority Flora
- A total of 15 vegetation communities, inclusive of vegetation community Hf, are considered to be regionally significant within the Chichester IBRA region, due to limited representation; and
- One community, Hf, is regionally significant due to being equivalent to the Priority 3 Horseflat Land System of the Roebourne Plain PEC.

In response to the factors of significance recorded for the project area, the following measures are recommended to minimise impacts on these factors:

- Limit clearing and placement of infrastructure to avoid areas of vegetation or vegetation supporting significant species (or with the potential to support significant species);
- Utilise areas of vegetation determined to be in poorer condition for clearing and construction; and
- Consider an appropriate revegetation program that may contribute to offsets for unavoidable impacts that could be implemented in cleared areas not required for infrastructure and in degraded areas also not utilised for the development.

8.0 List of Participants

Table 19 List of Participants

Name	Title	Involvement
Kellie Honczar	Principal Ecologist	Project Manager Field Assessment Report Review and Authorisation
Gabriela Martinez	Senior Botanist	Field Assessment Data Collation Taxonomy Report Preparation
Lisa Chappell	Botanist	Data Collation Spatial Mapping Report Preparation
Vanessa Yeomans	Senior Botanist	Field Assessment Taxonomy
Alexandra Sleep	Ecologist	Field Assessment Data Collation Spatial Mapping Report Preparation
Kathryn Jones	GIS Analyst	Spatial Mapping Spatial Data Management Map Publishing

9.0 Acknowledgements

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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.1

0 100 200 300

Metres

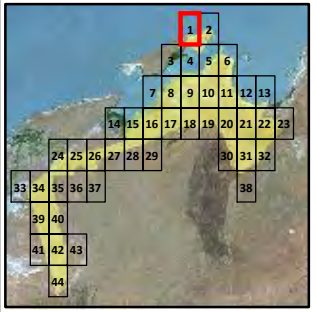
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD, CD-D, D, D-G, G, G-VG, VG, VG-E



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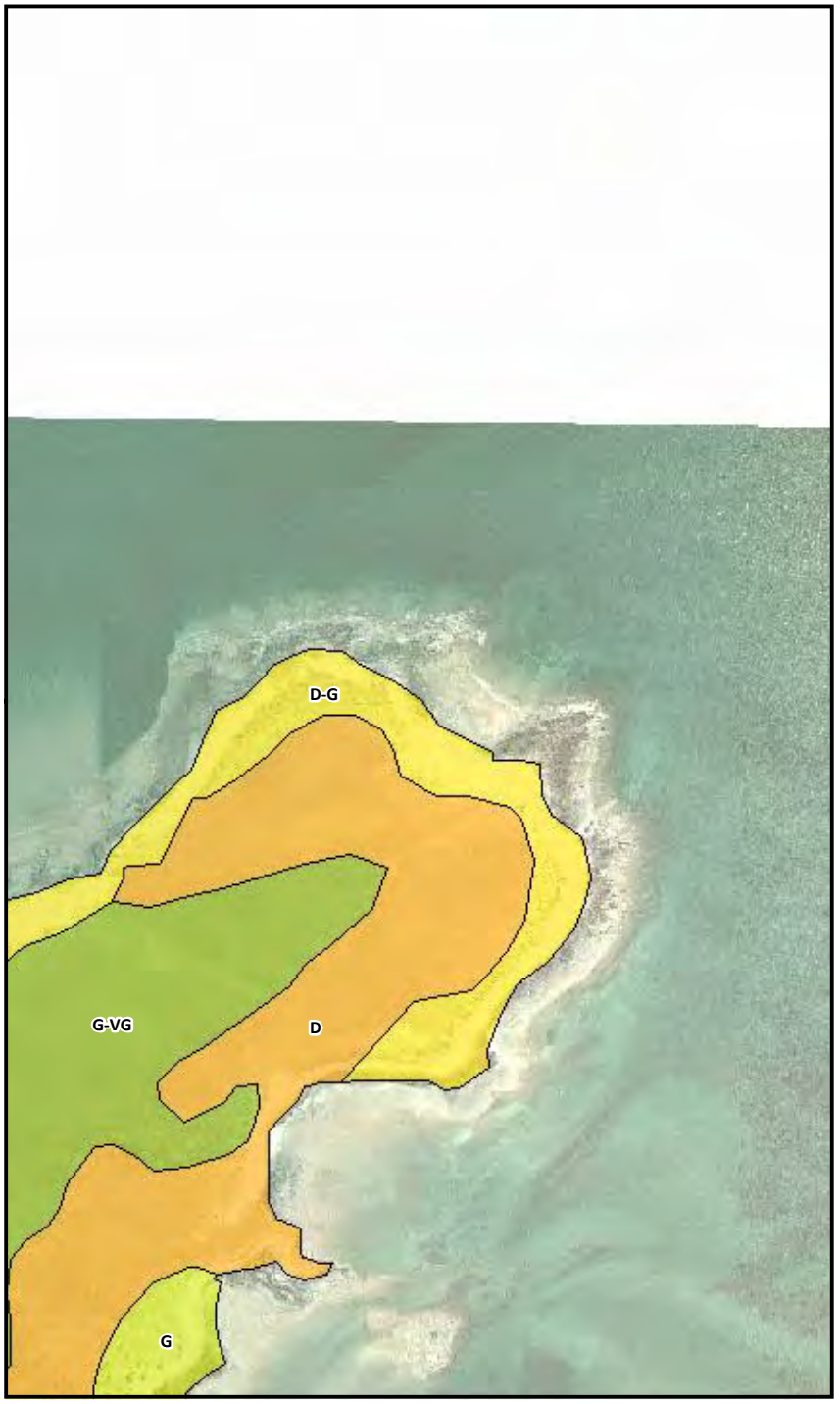


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.2

0 100 200 300

Metres

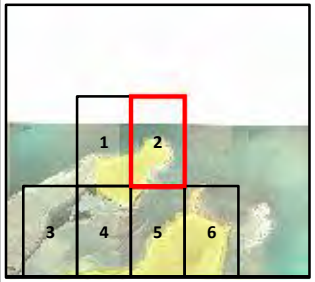
1:10,000 (A4)

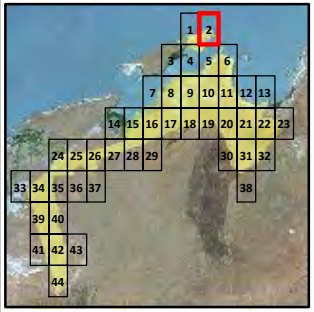
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.3

0 100 200 300

Metres

1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD

CD-D

D

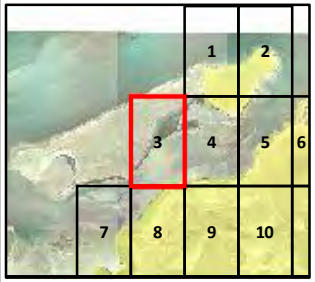
D-G

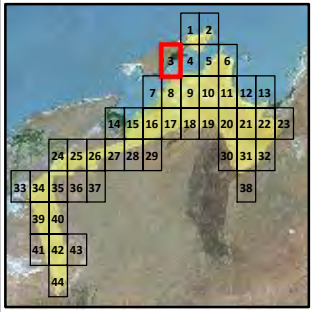
G

G-VG

VG

VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.4

0 100 200 300

Metres

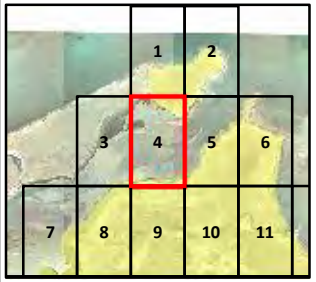
1:10,000 (A4)

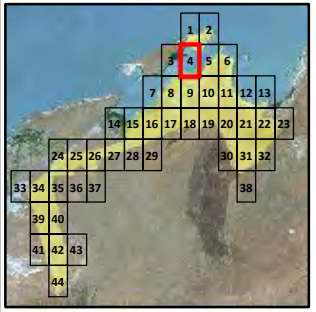
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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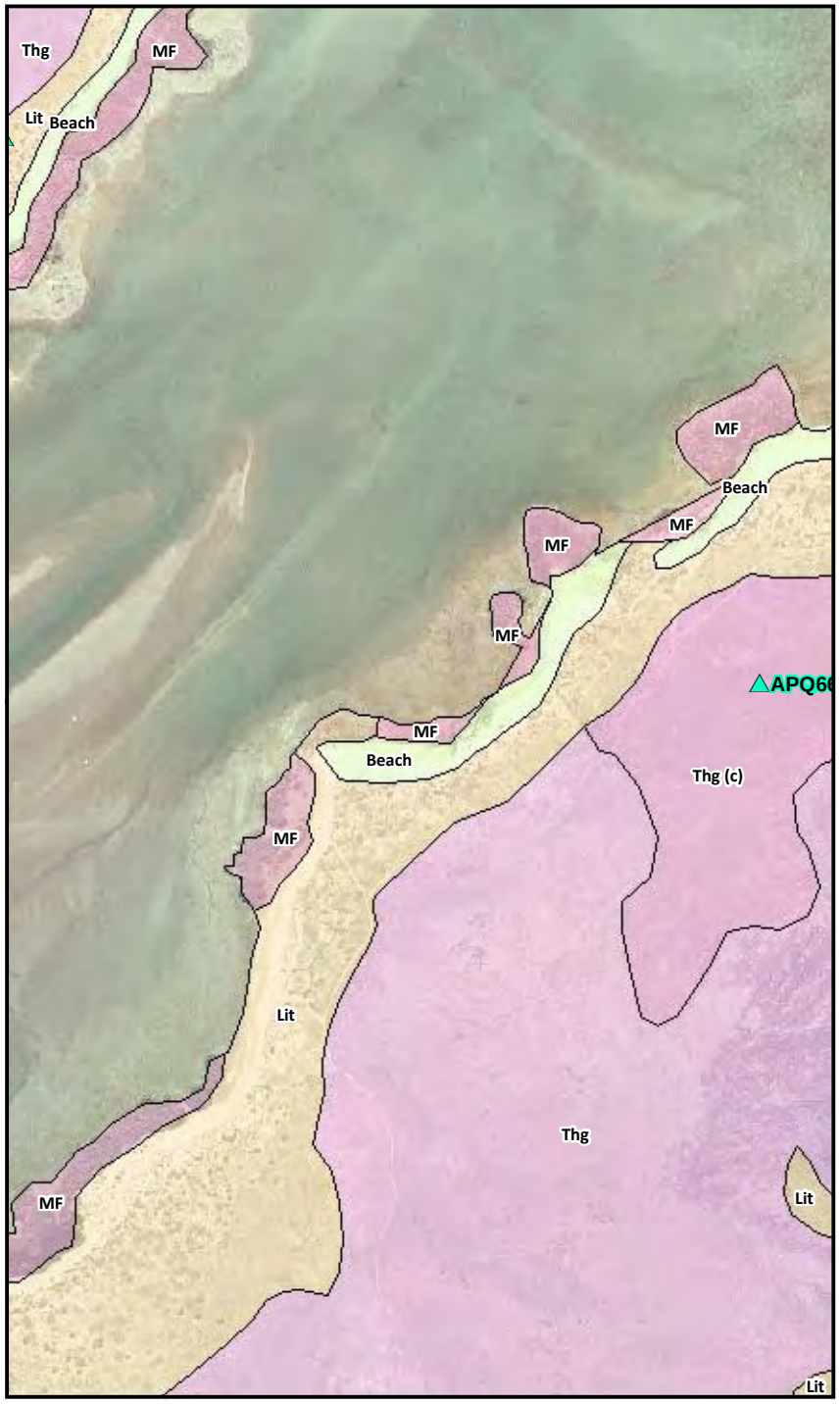
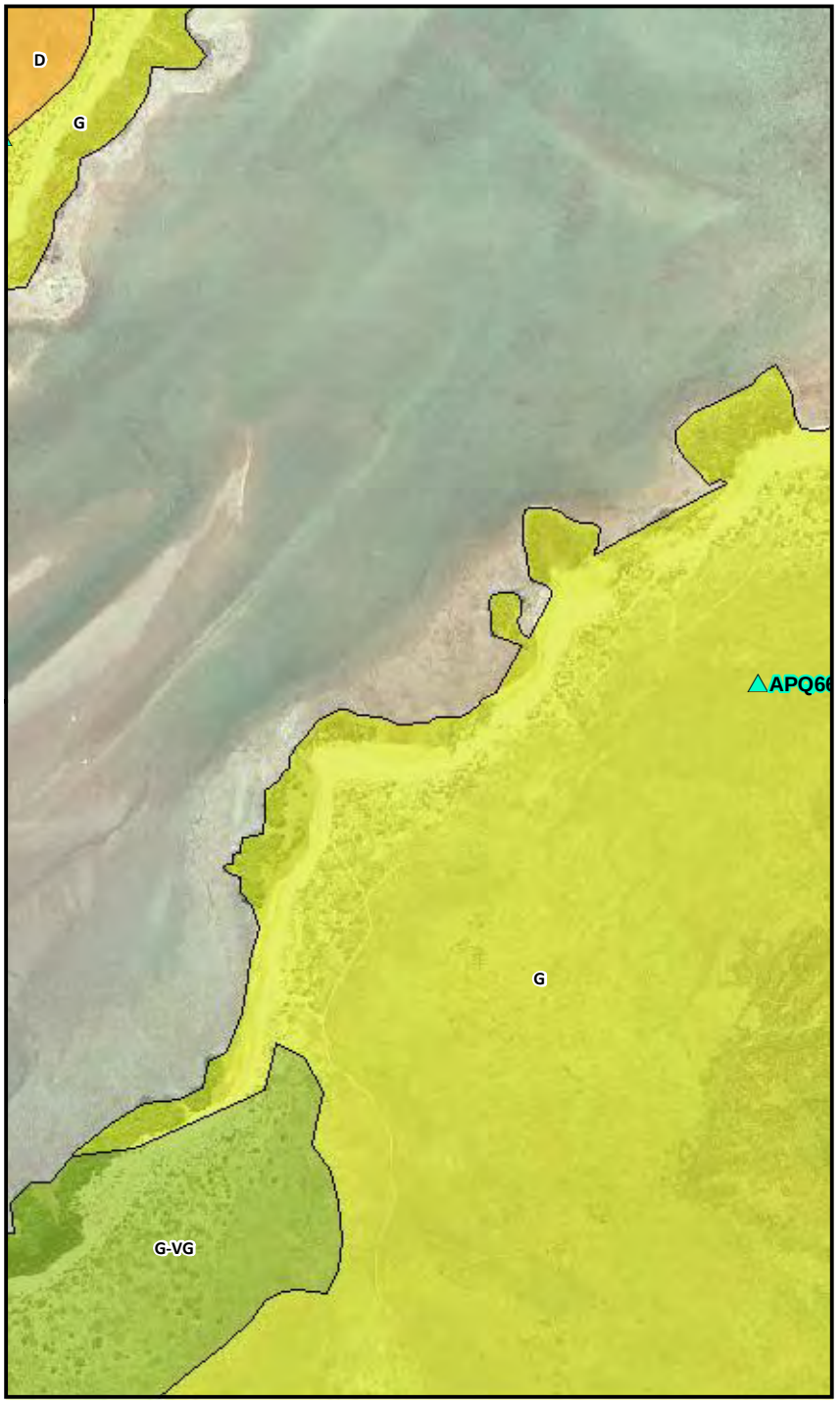




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.5

0 100 200 300

Metres

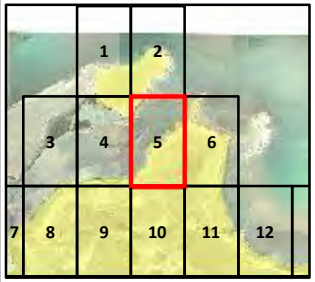
1:10,000 (A4)

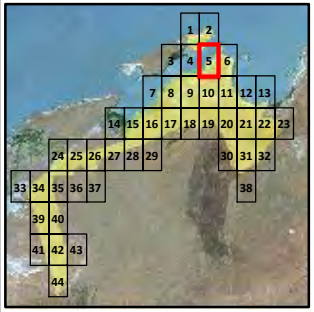
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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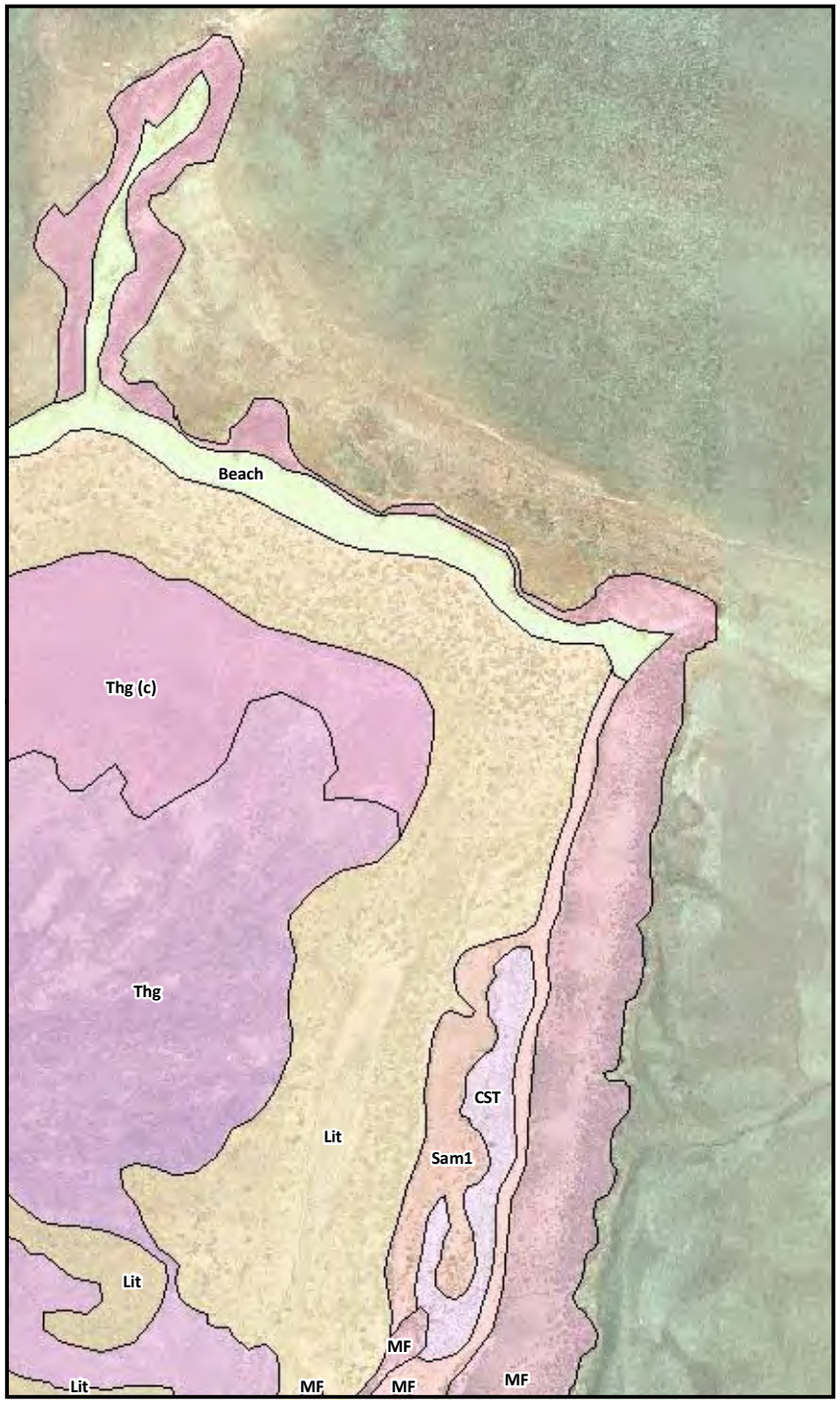
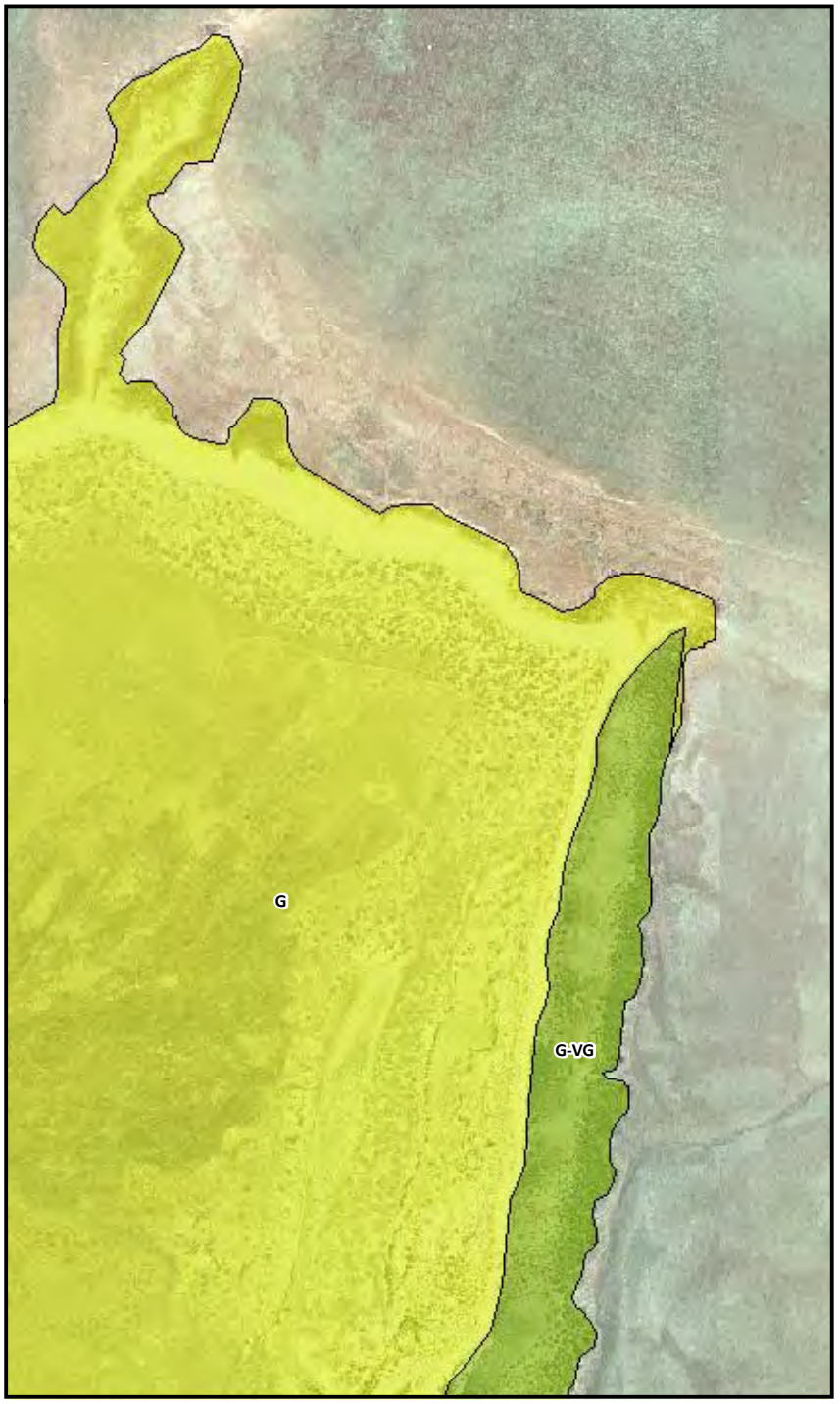




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.6

0 100 200 300

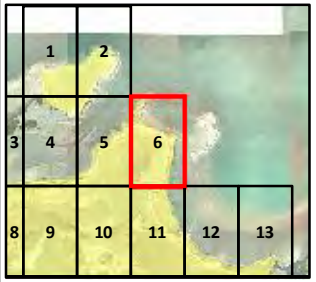
Metres

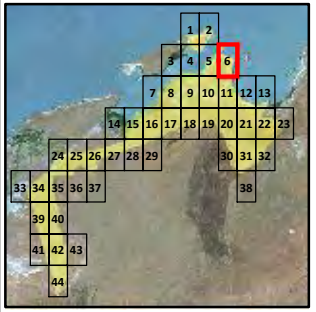
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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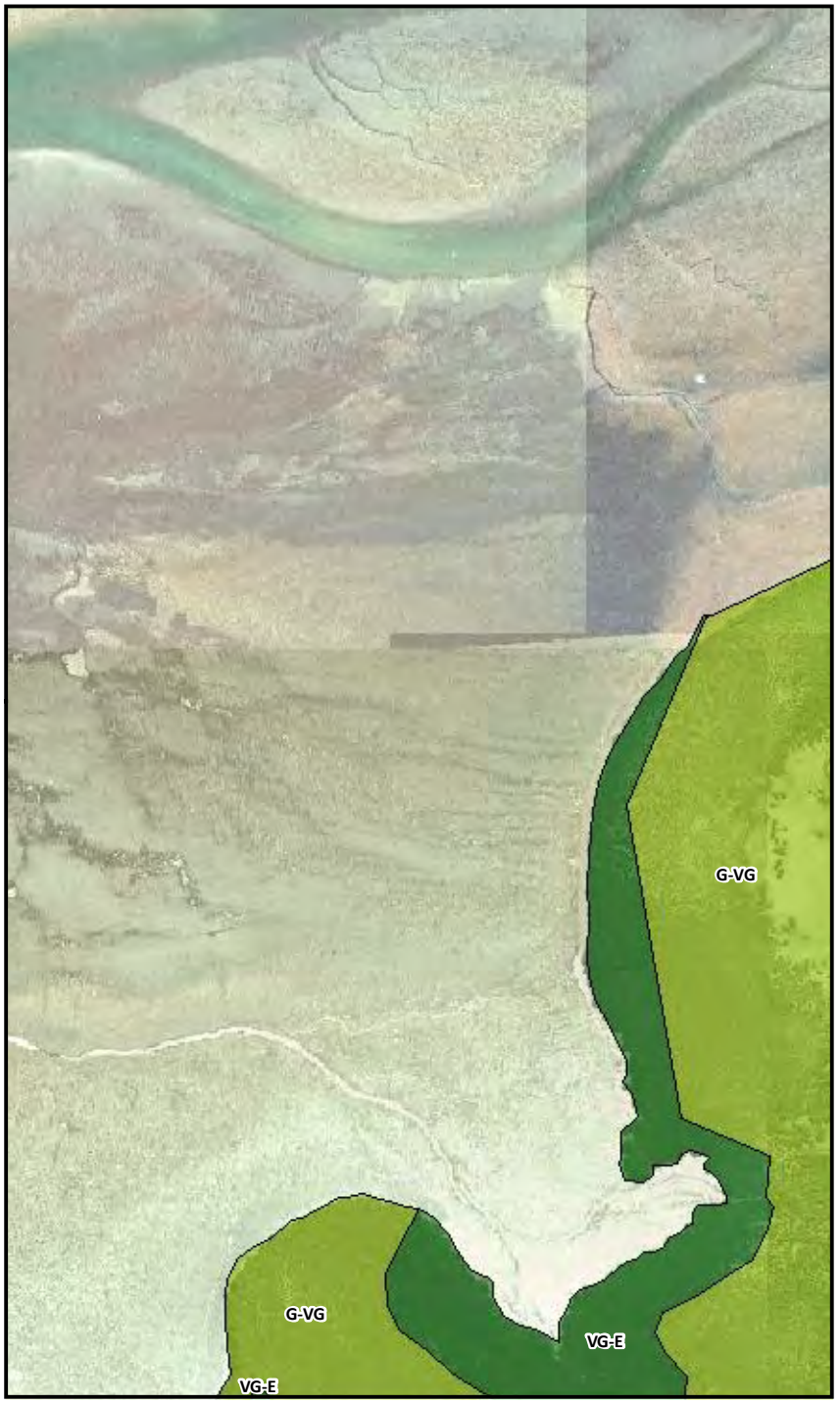


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.7

0 100 200 300

Metres

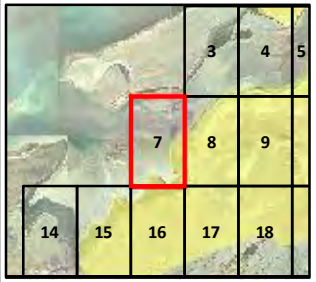
1:10,000 (A4)

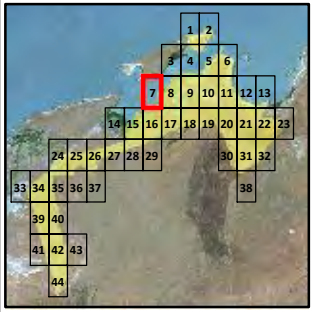
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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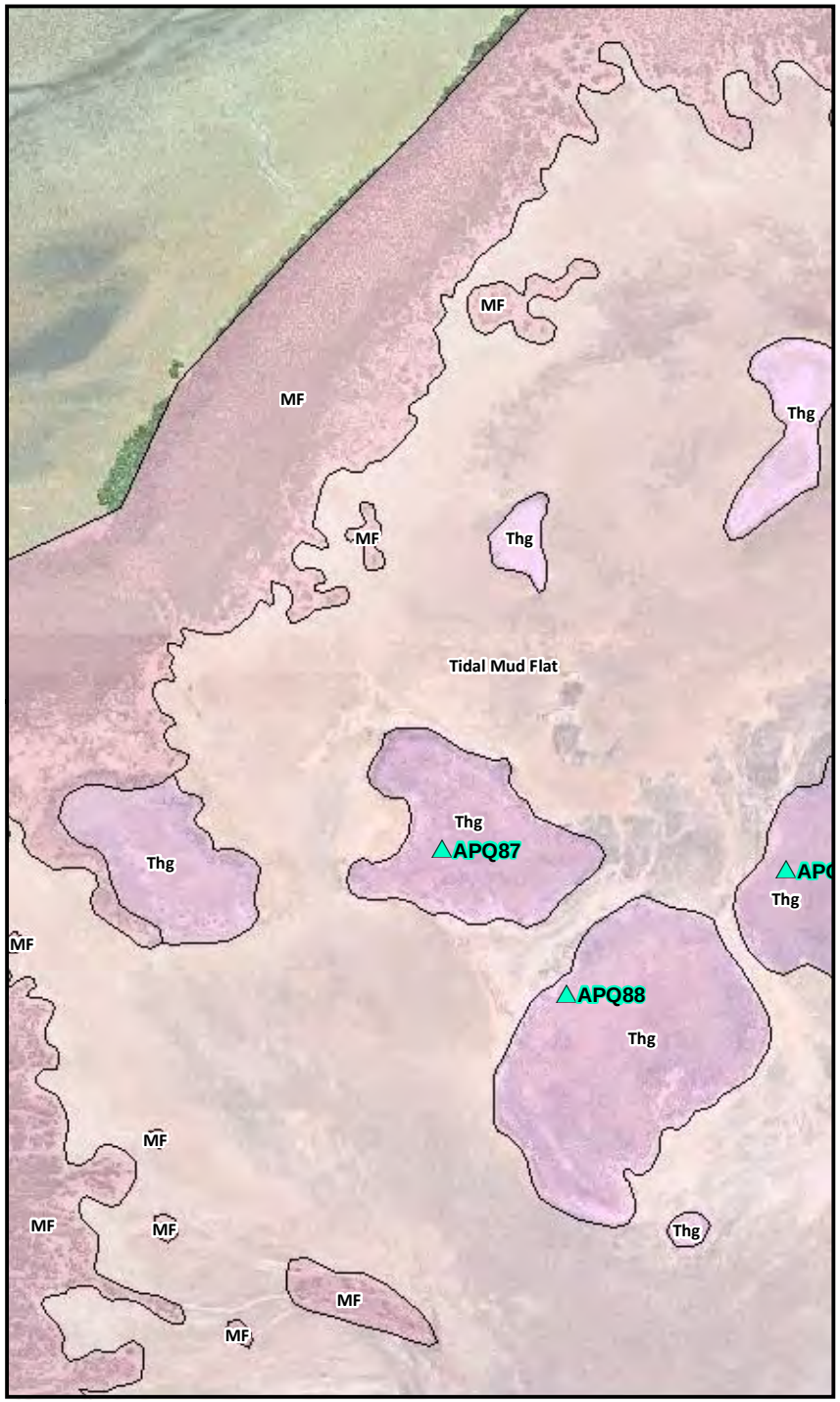
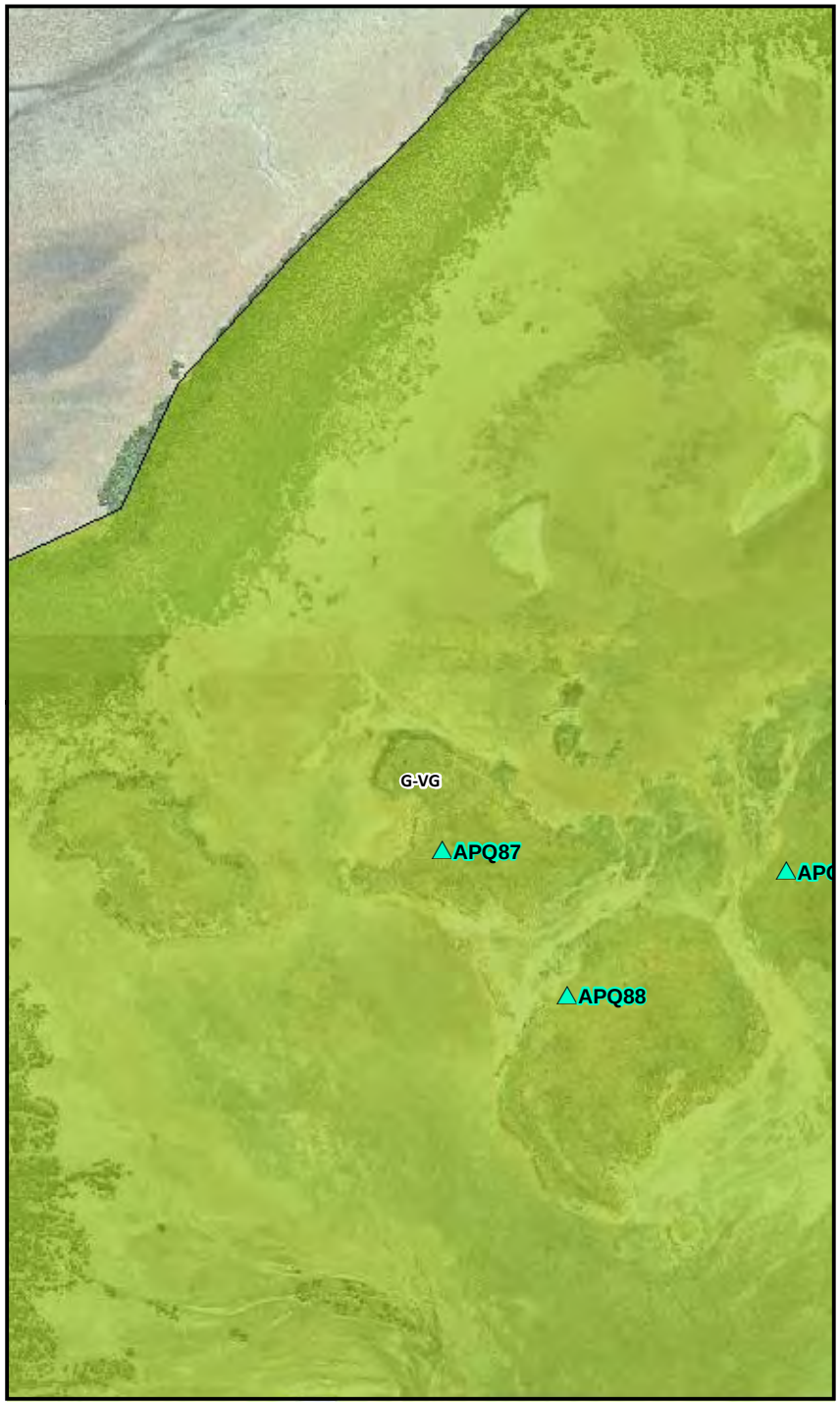




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.8

0 100 200 300

Metres

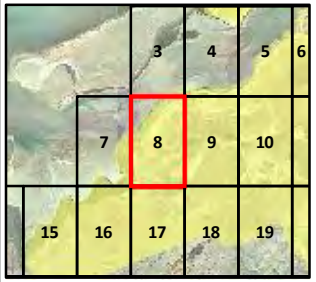
1:10,000 (A4)

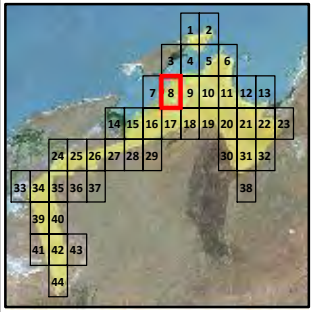
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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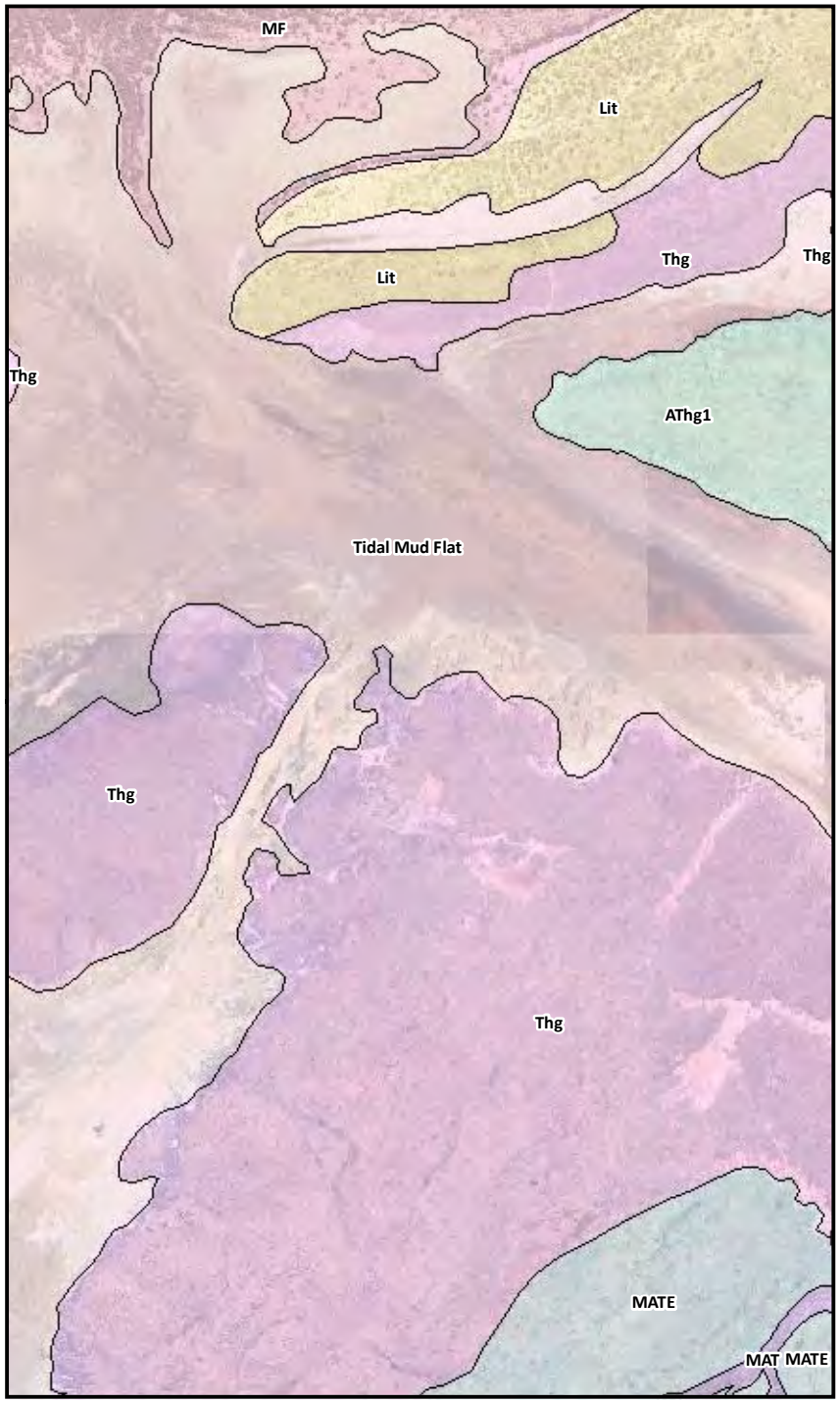
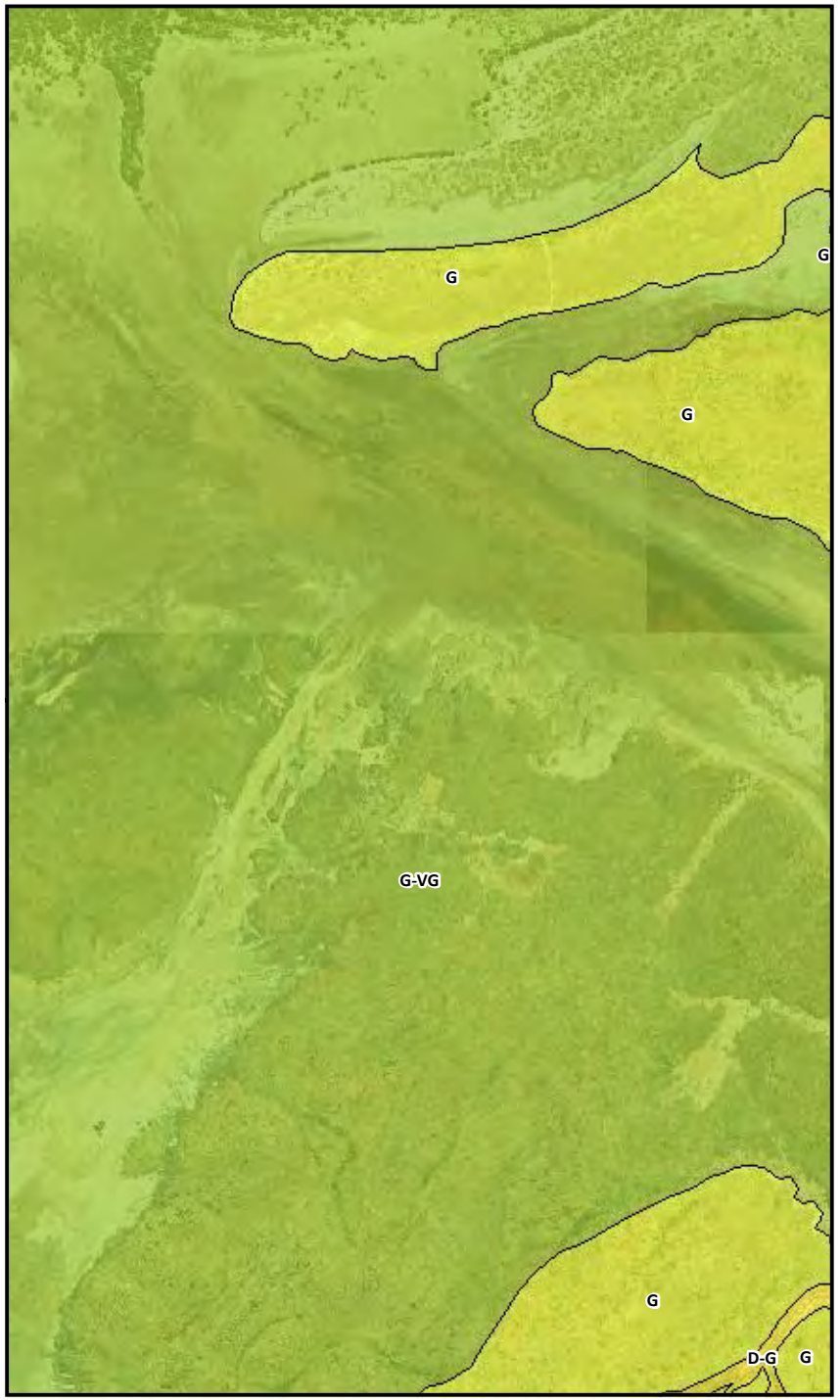




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.9

0 100 200 300

Metres

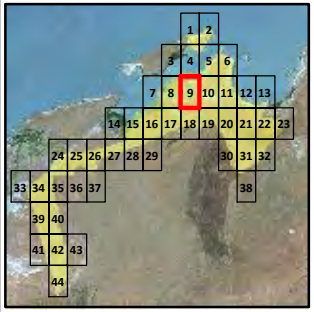
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E



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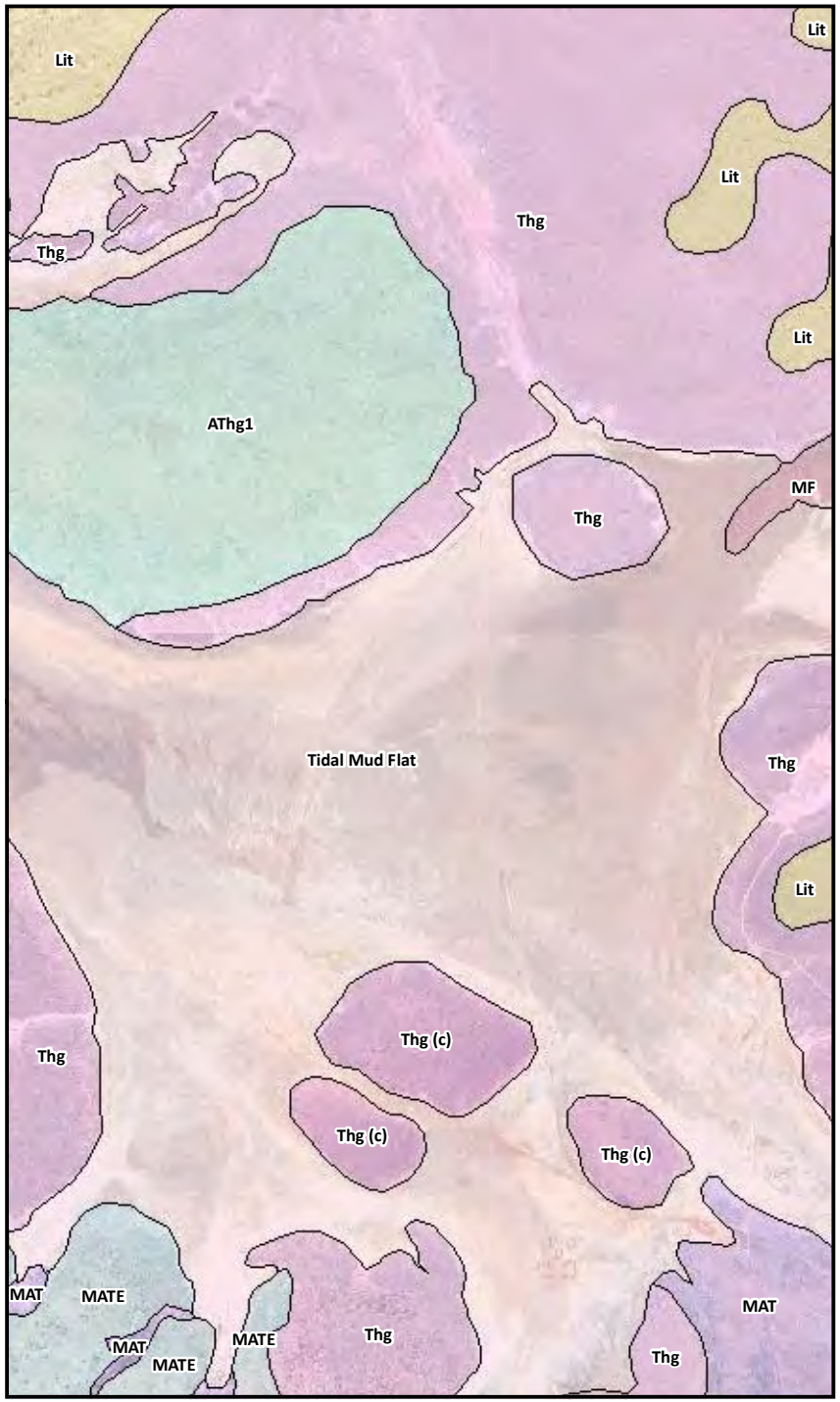
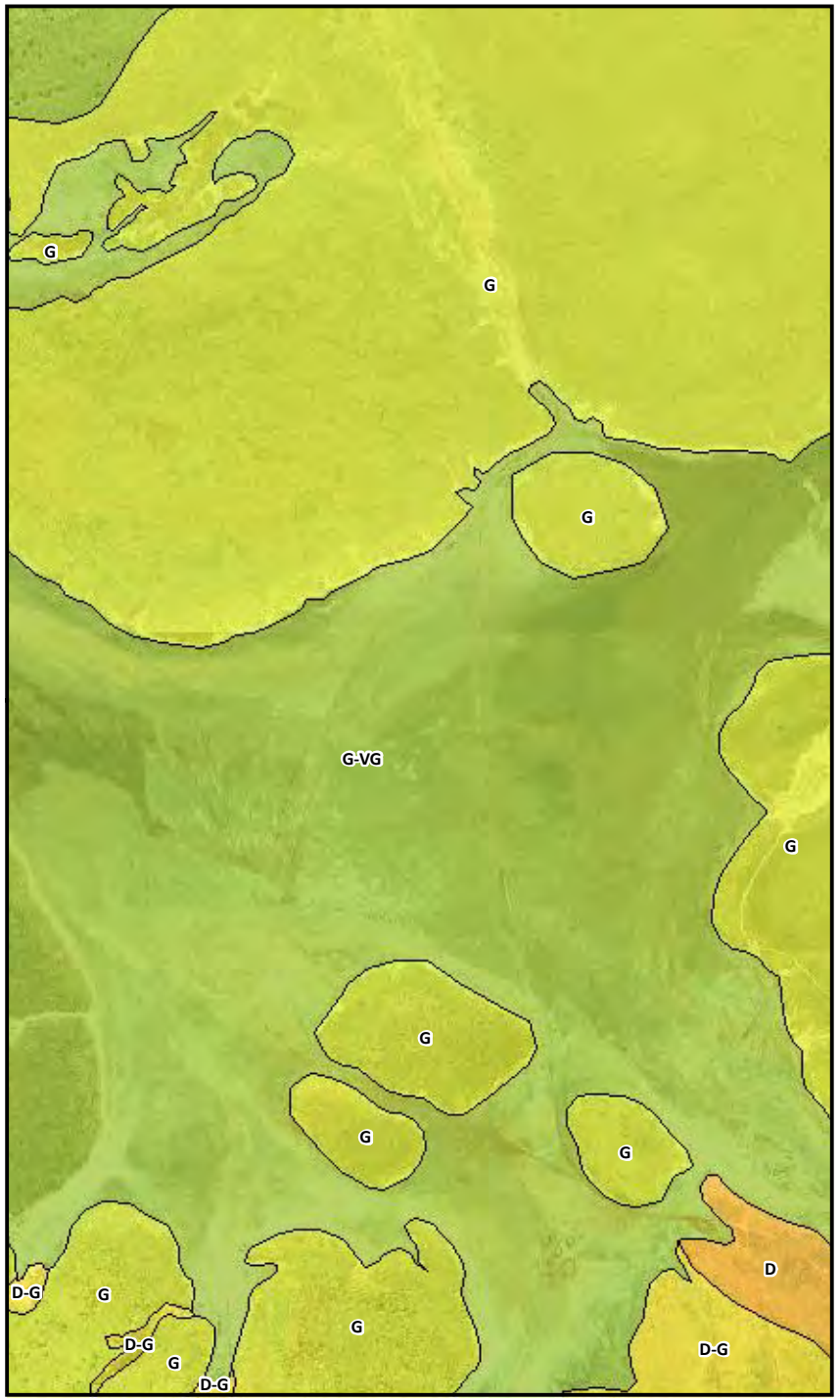




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.10

0 100 200 300

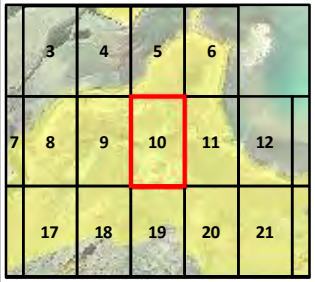
Metres

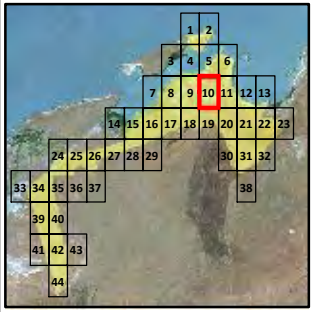
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition: CD, CD-D, D, D-G, G, G-VG, VG, VG-E





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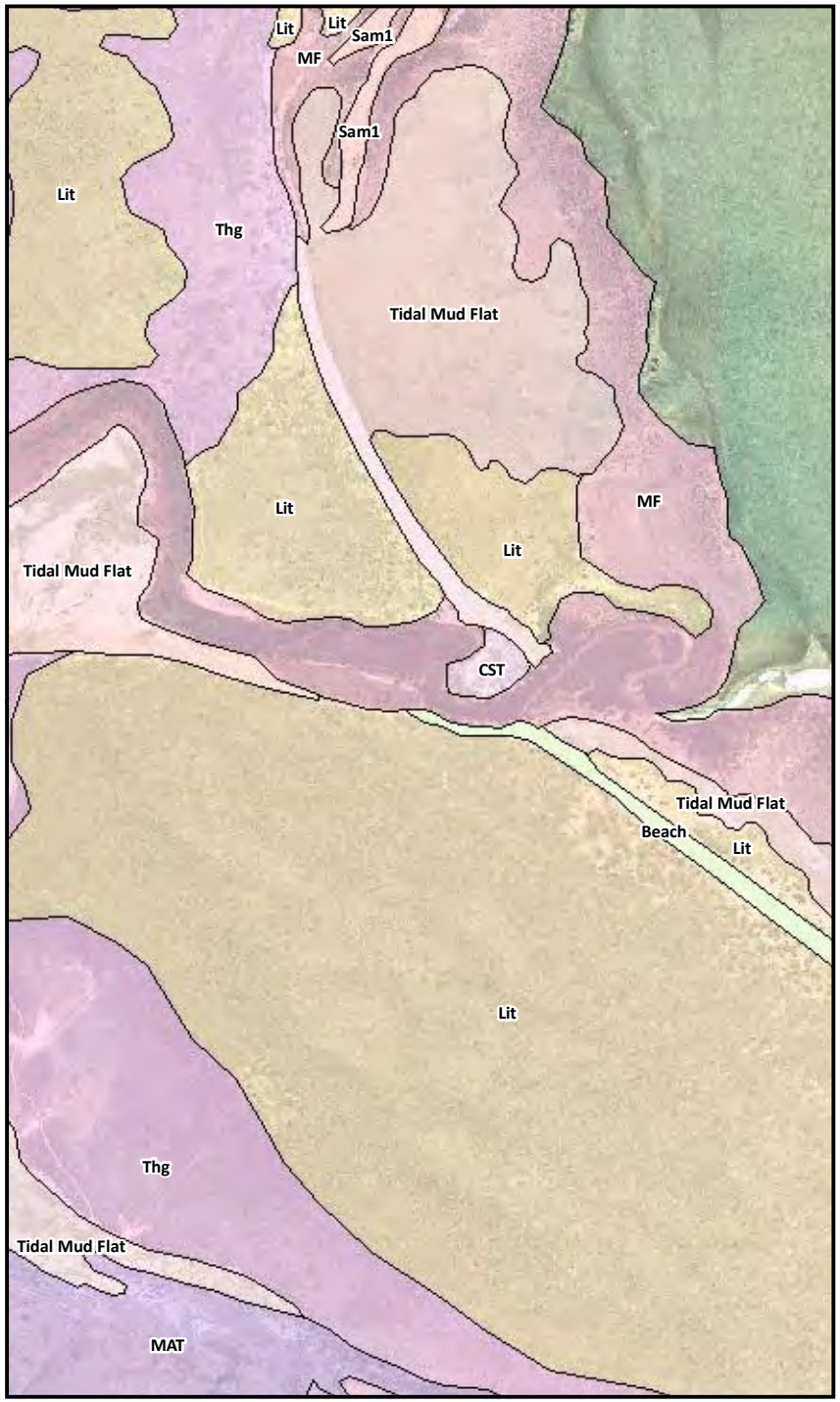
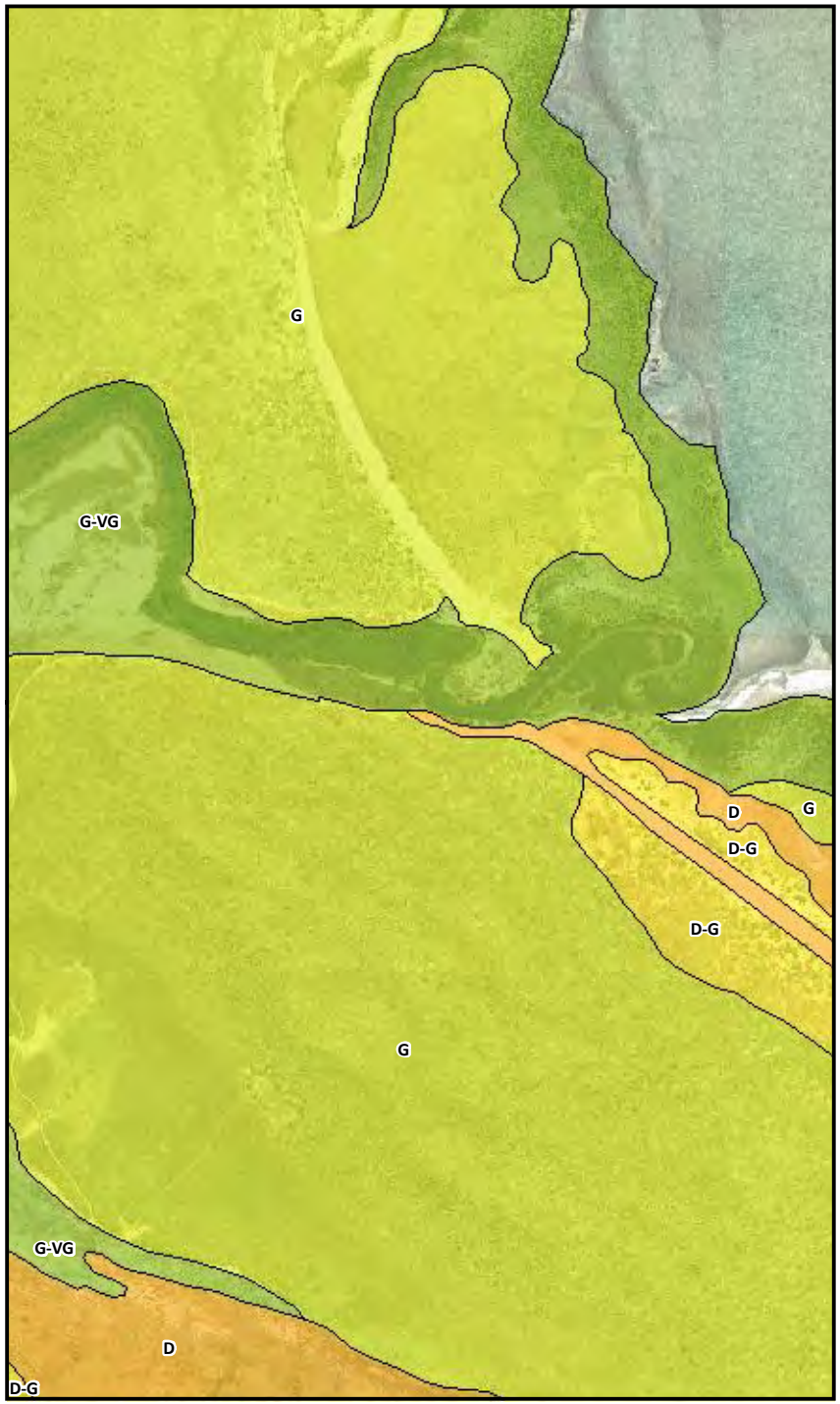




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.11

0 100 200 300

Metres

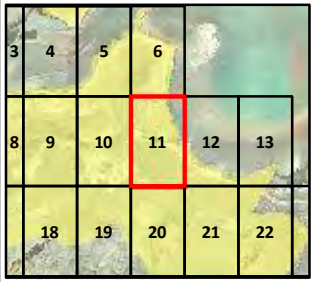
1:10,000 (A4)

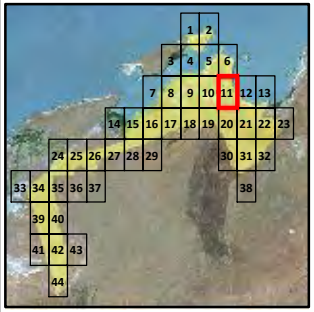
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.12

0 100 200 300

Metres

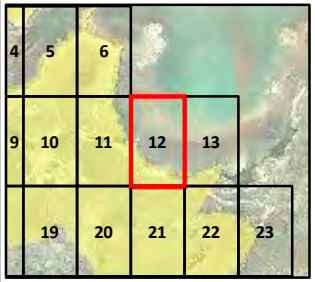
1:10,000 (A4)

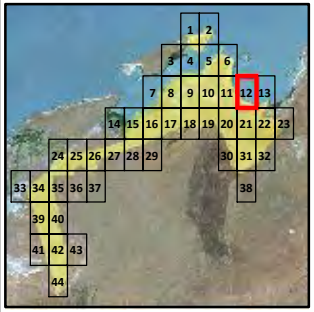
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
VG
VG-E
G-VG





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.13

0 100 200 300

Metres

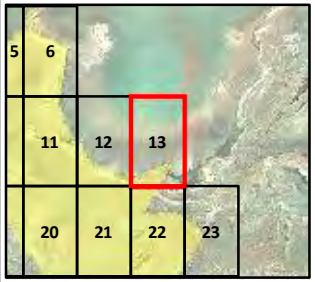
1:10,000 (A4)

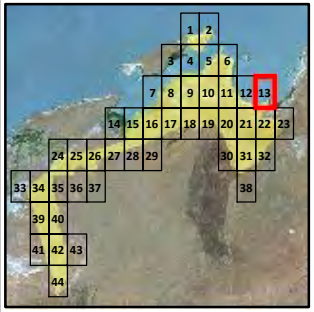
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

D
D-G
G
G-VG
VG
VG-E
CD
CD-D





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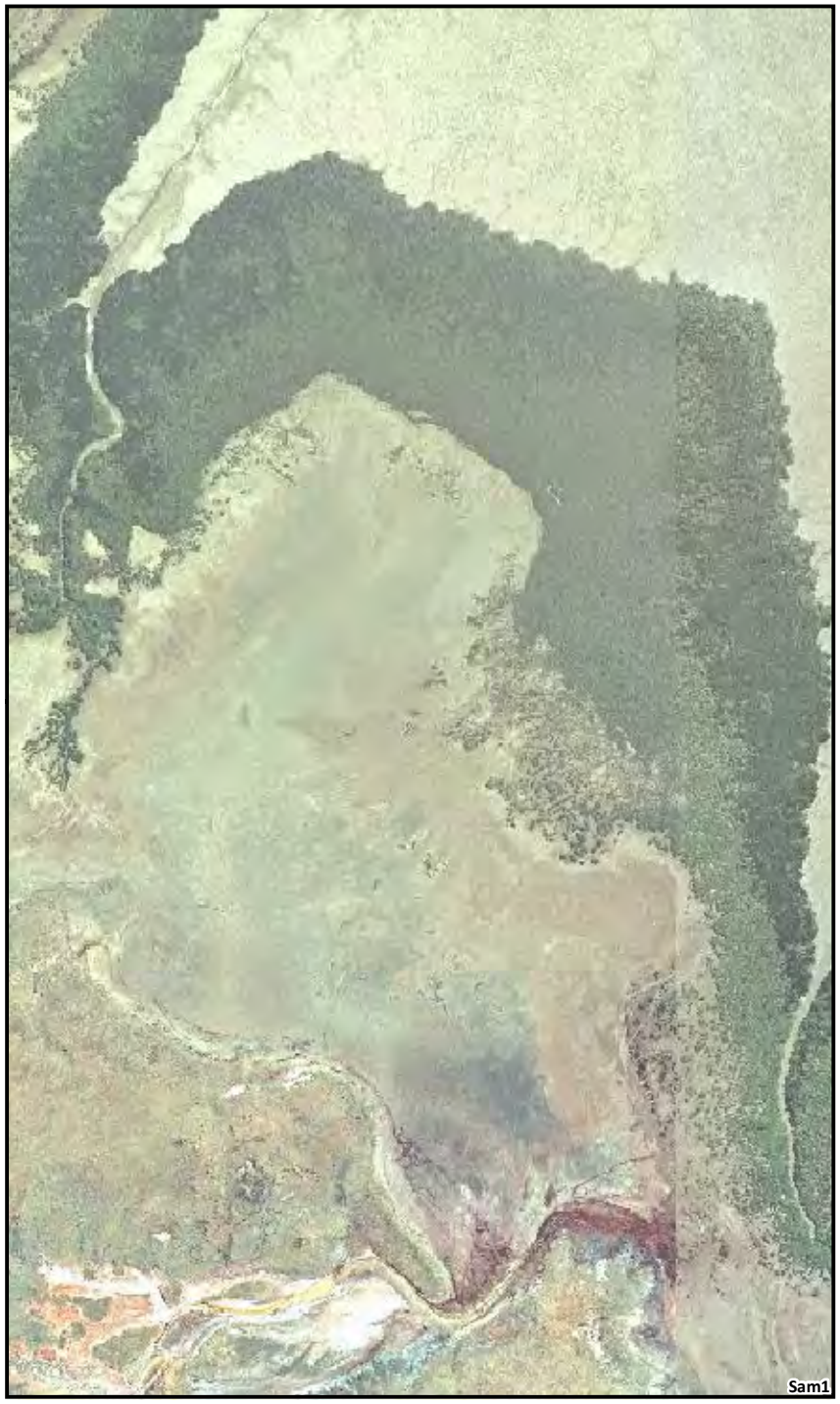


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.14

0 100 200 300

Metres

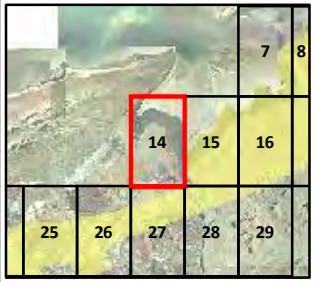
1:10,000 (A4)

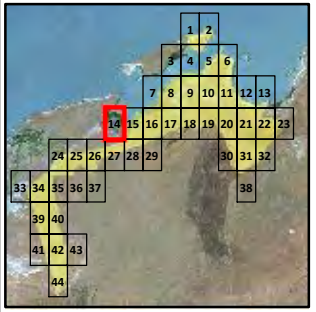
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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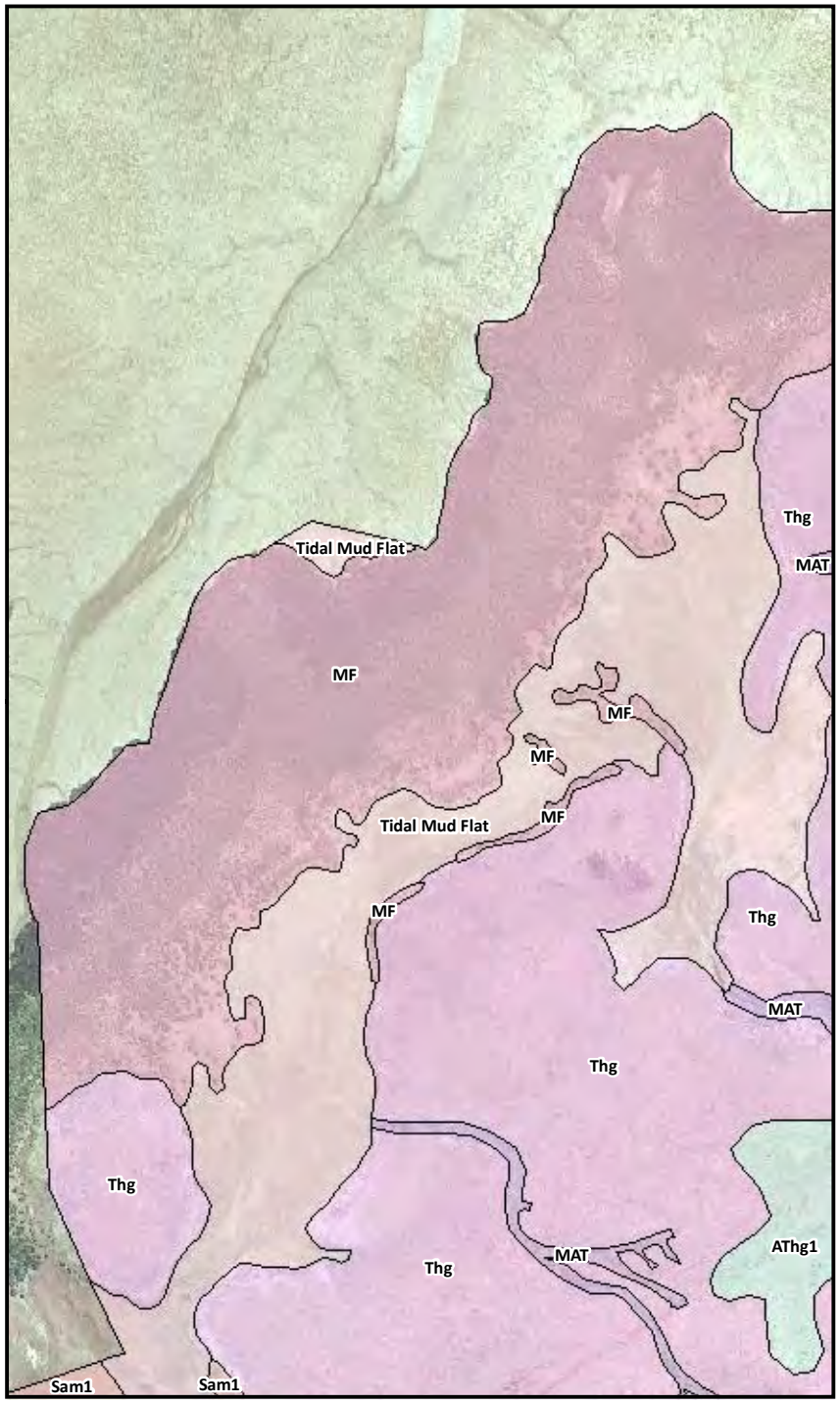
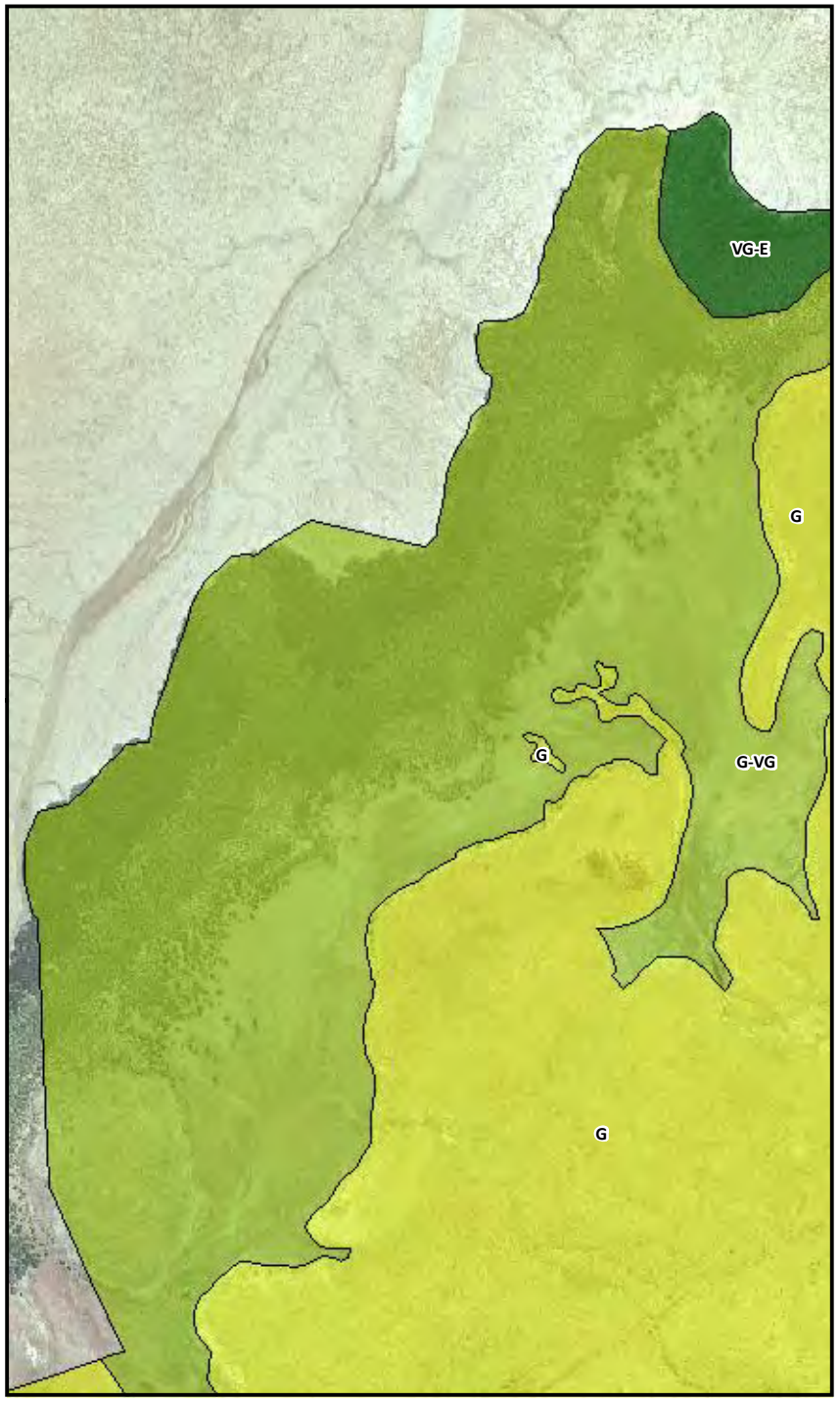




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.15

0 100 200 300

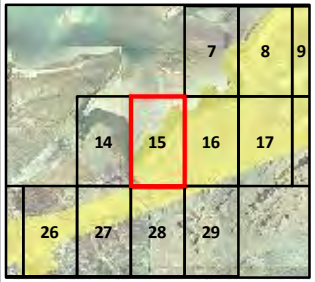
Metres

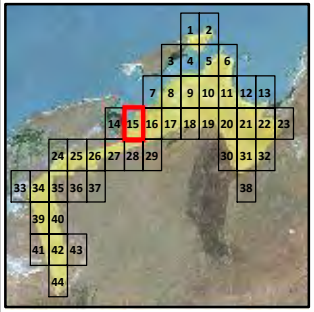
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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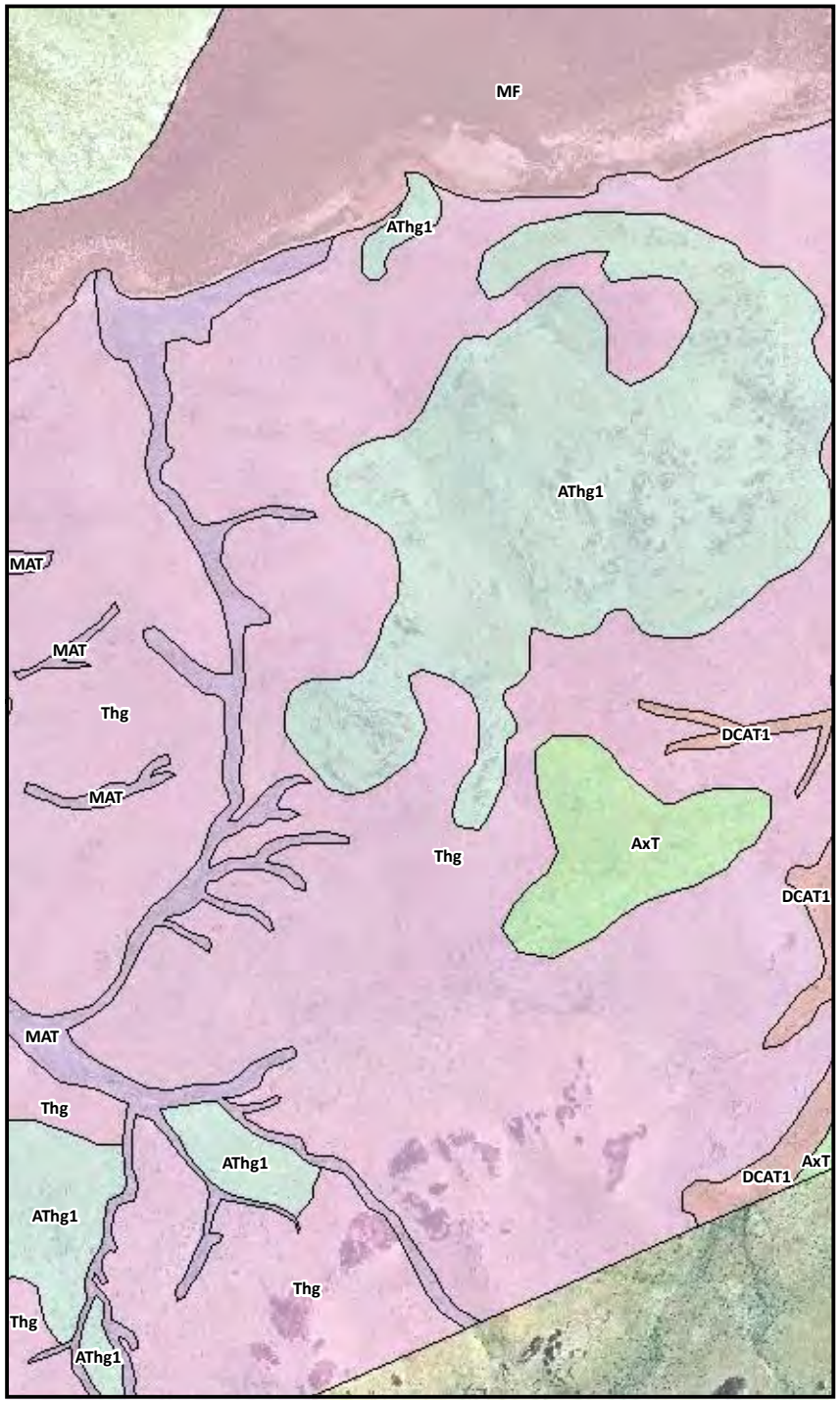
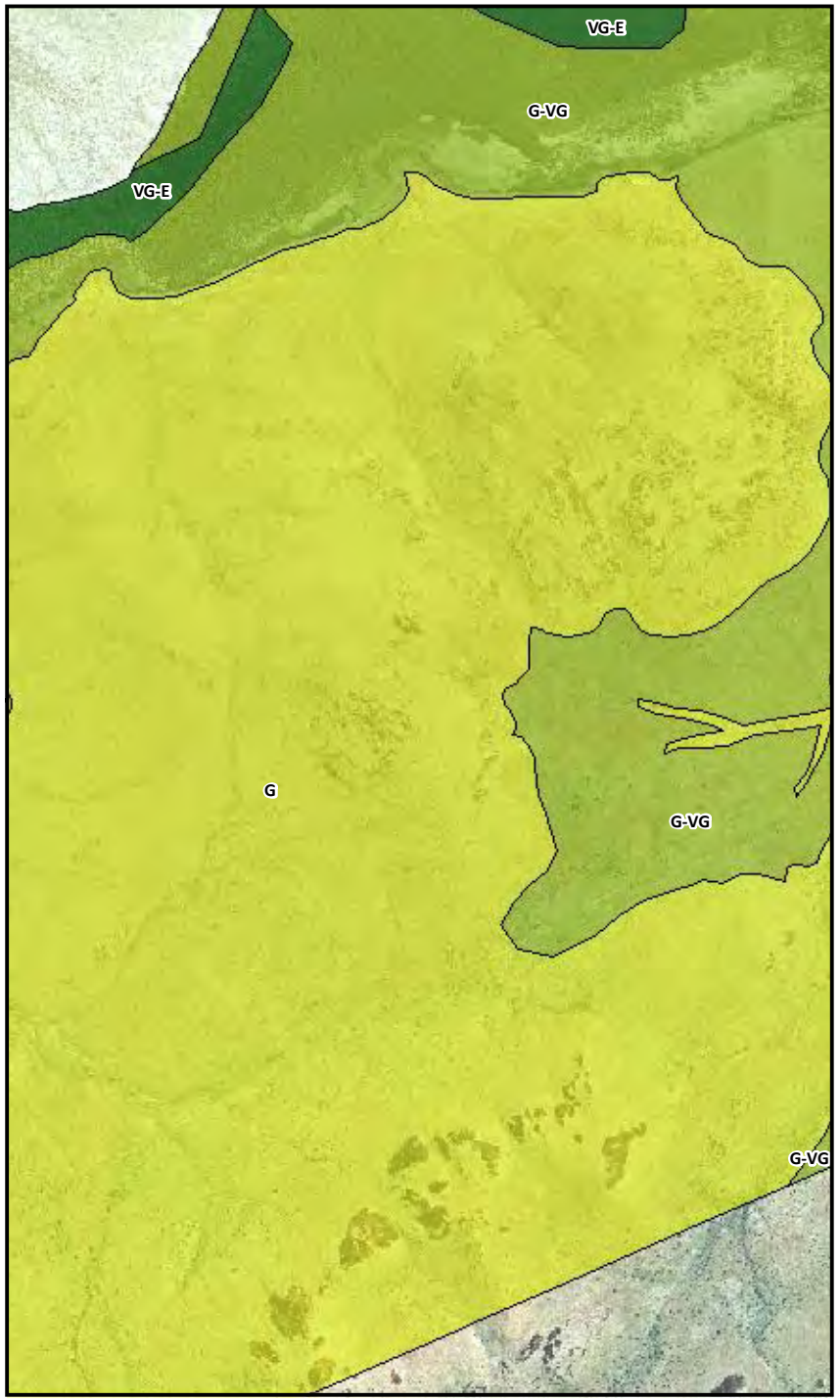




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.16

0 100 200 300

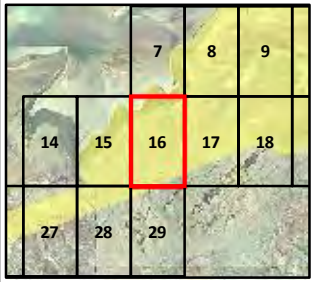
Metres

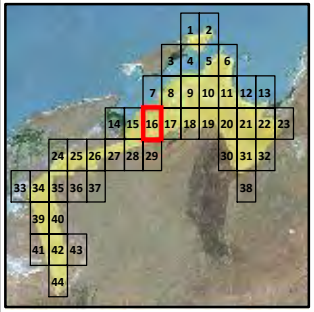
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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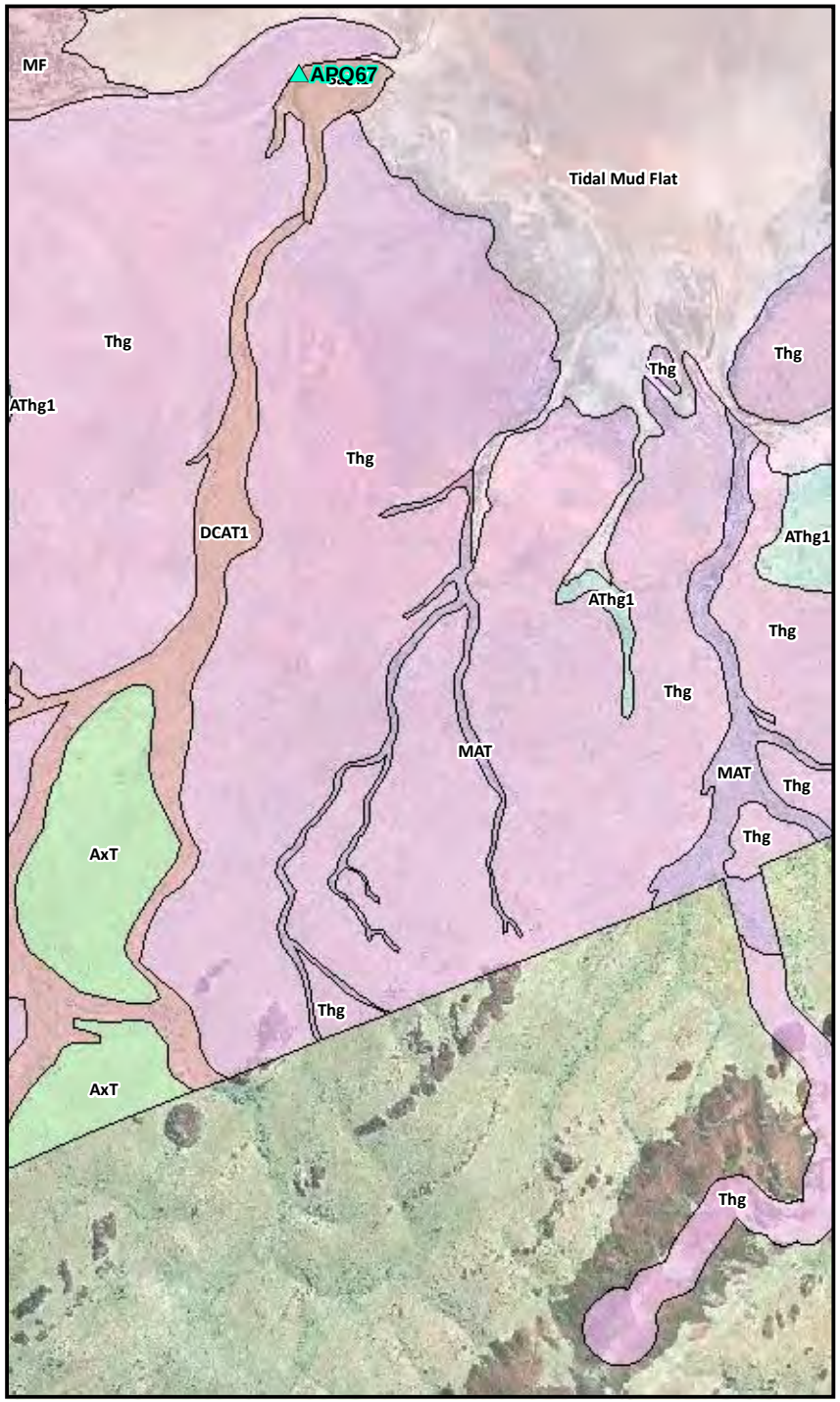
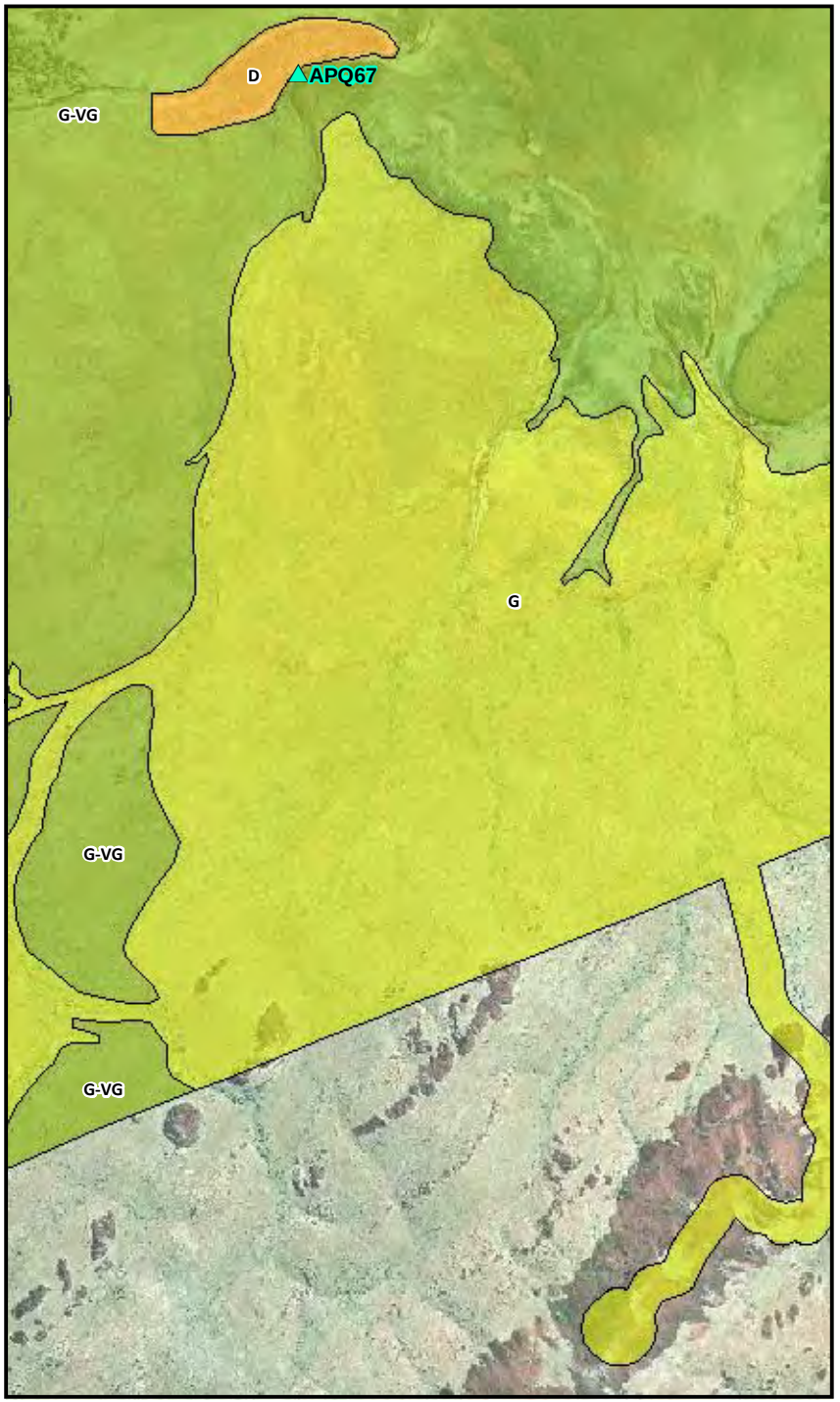




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.17

0 100 200 300

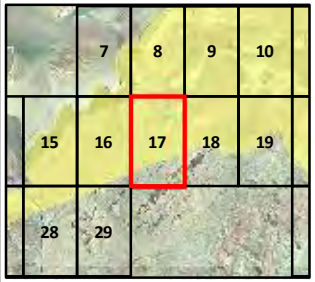
Metres

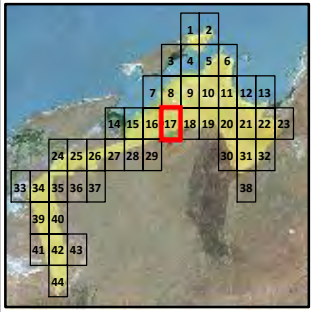
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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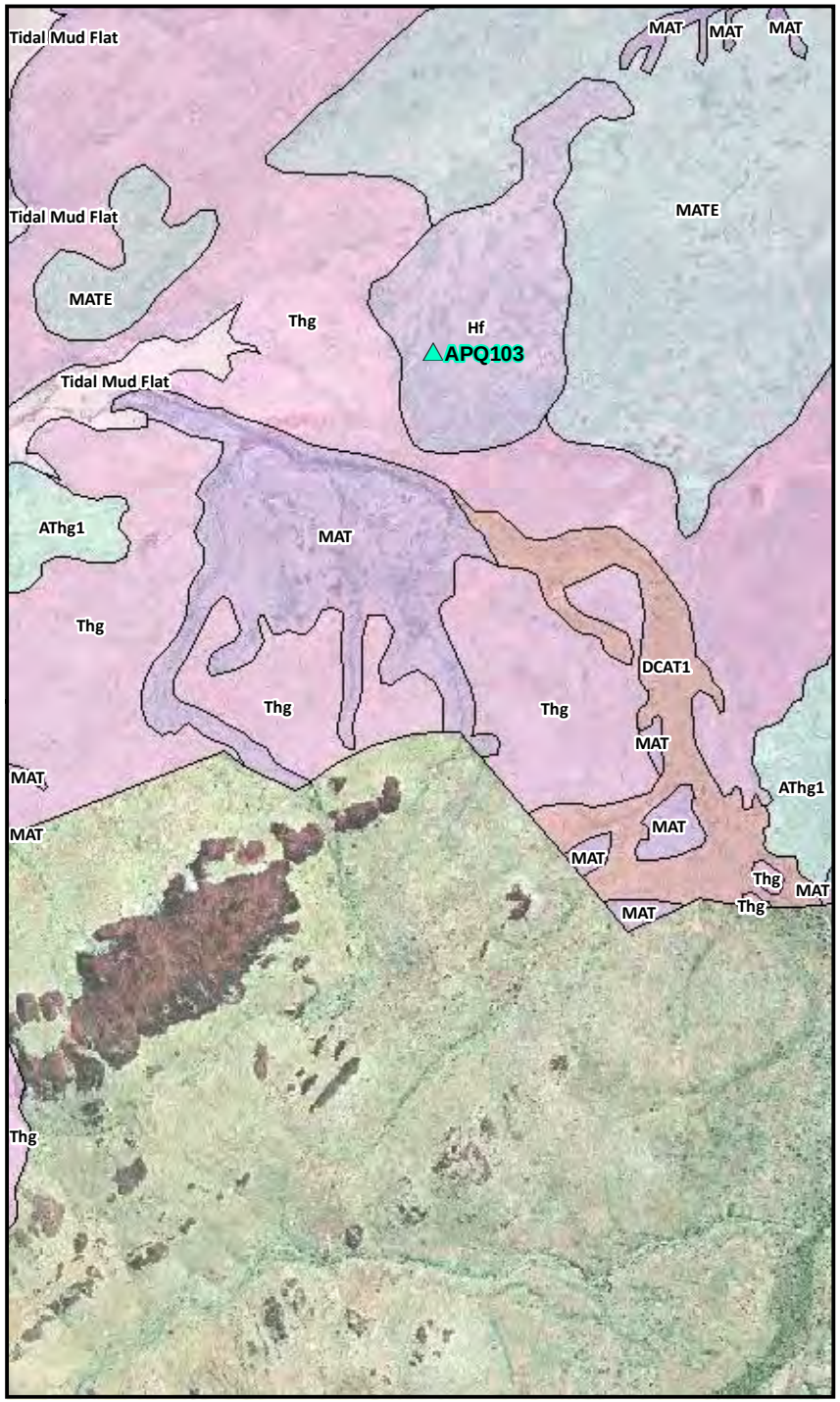
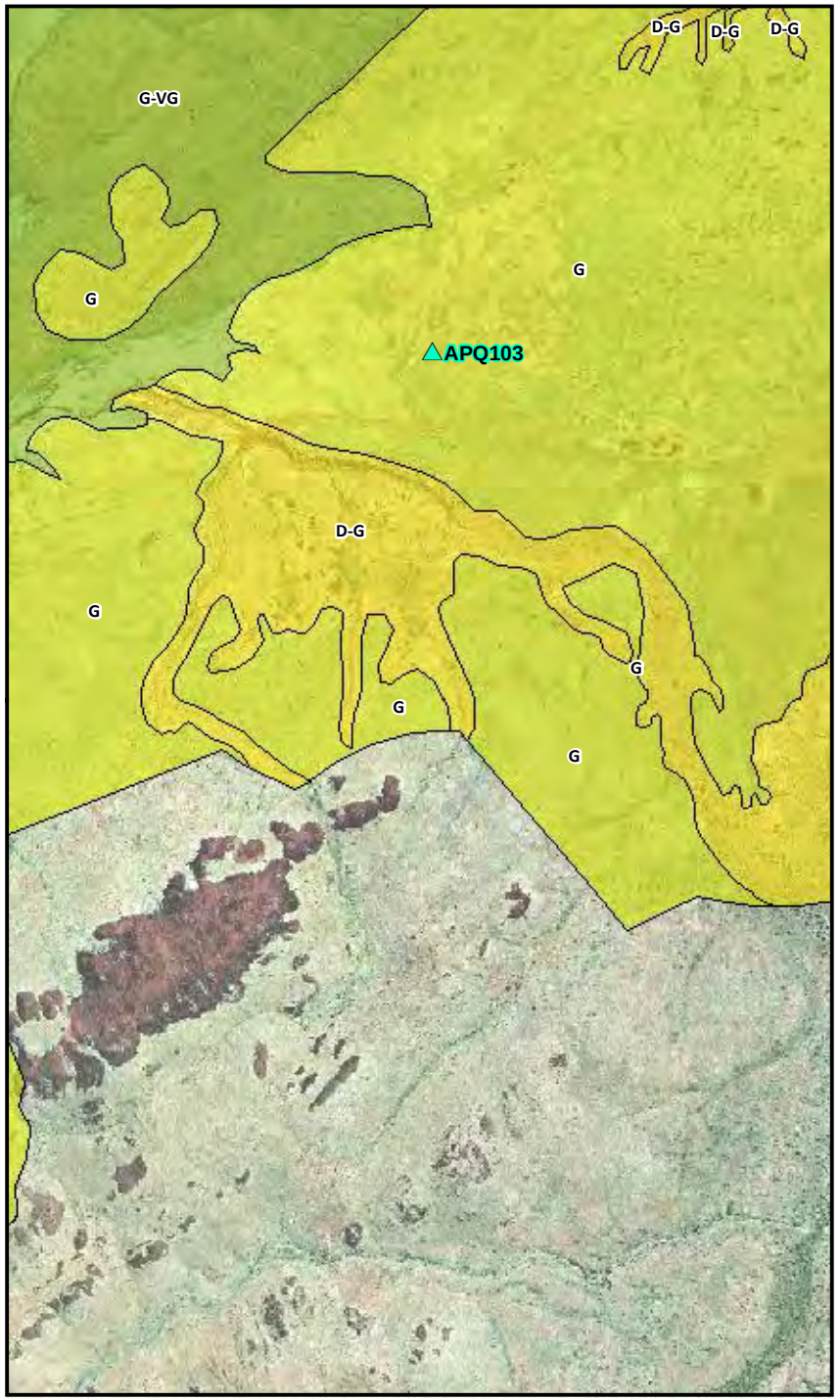




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.18

0 100 200 300

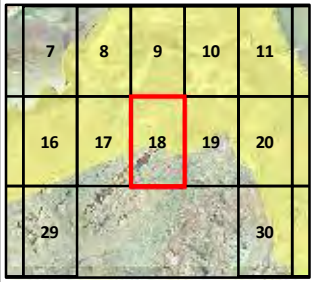
Metres

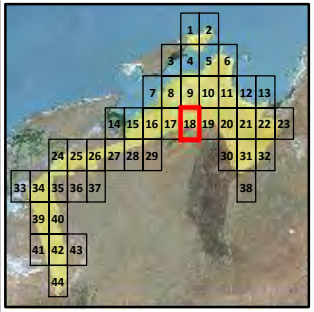
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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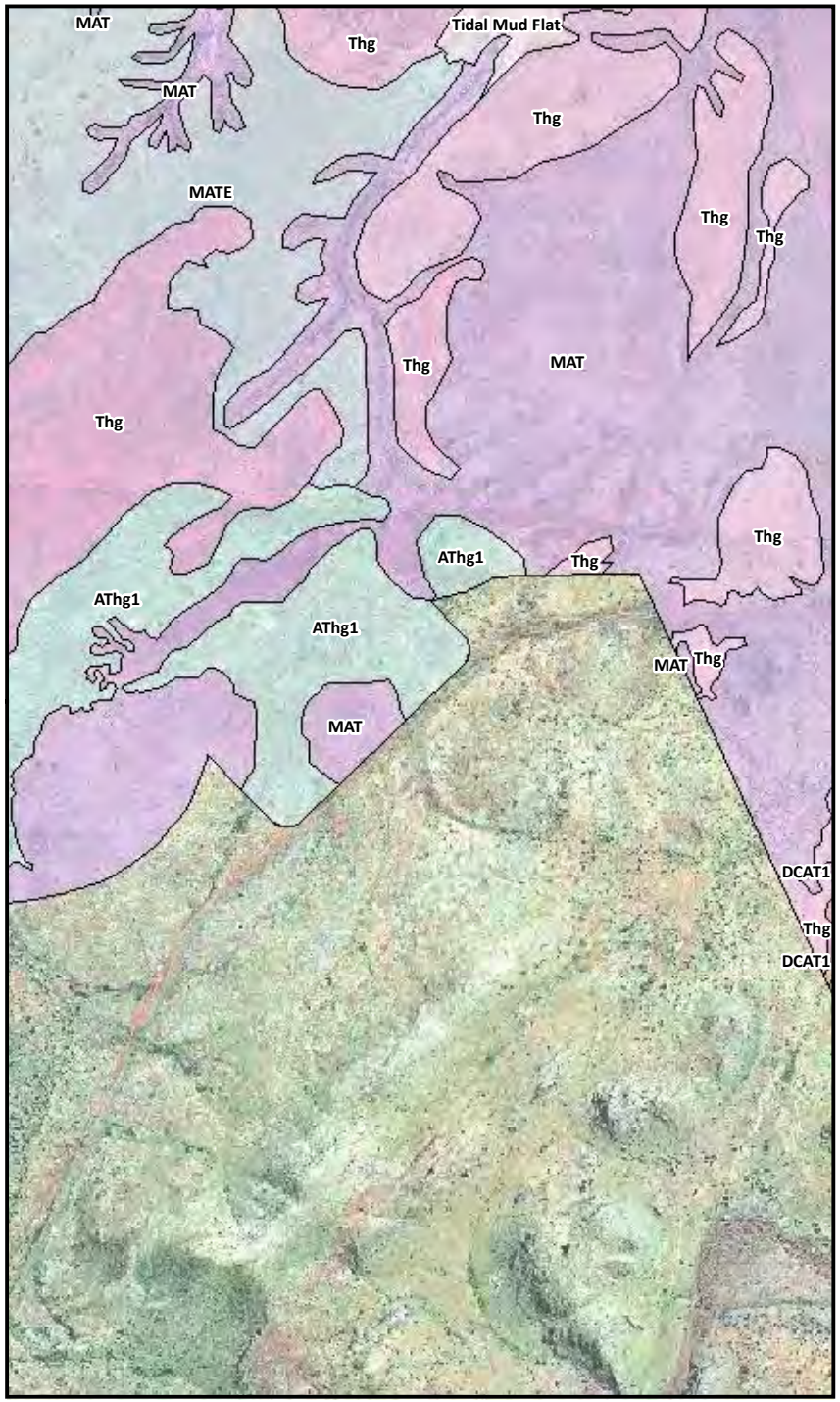
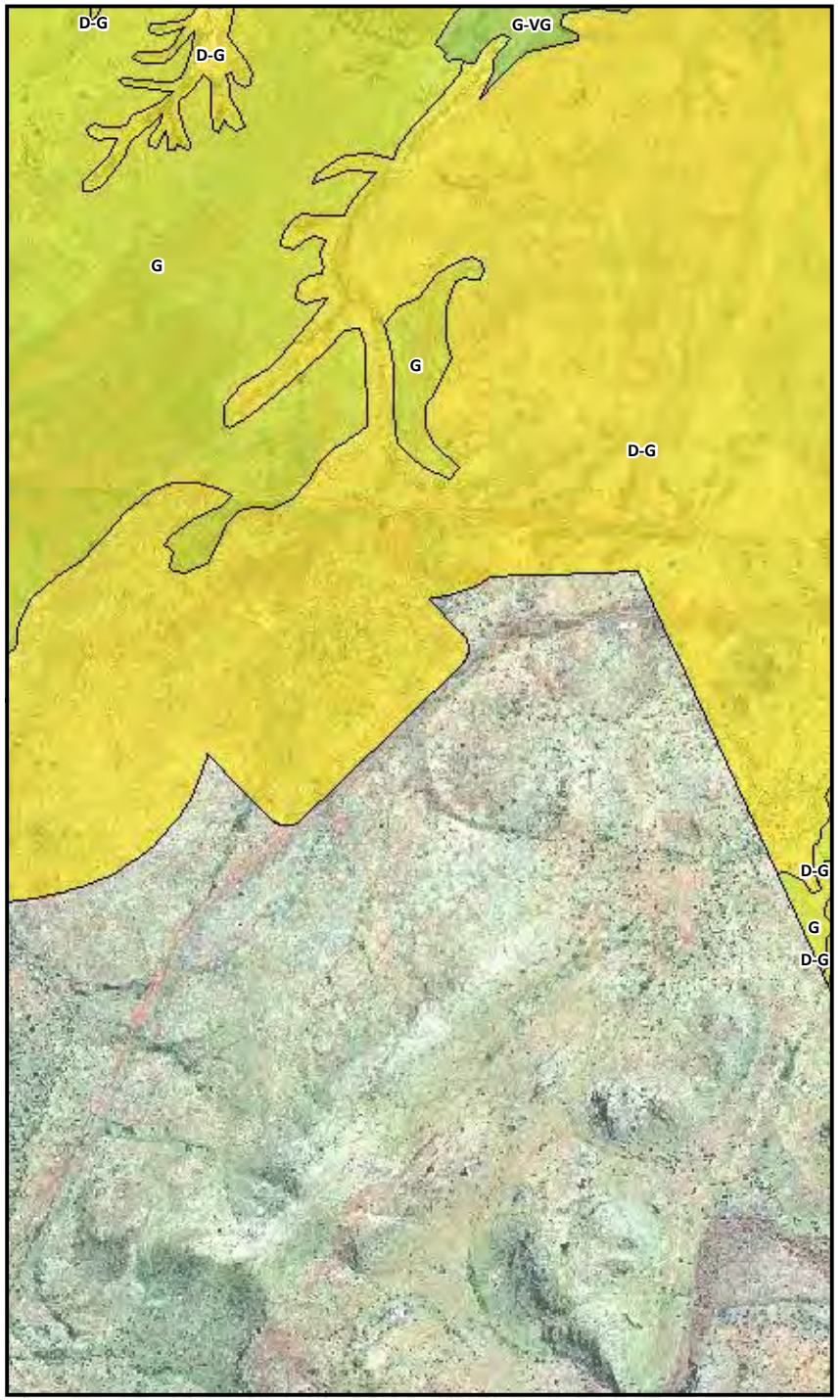




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.19

0 100 200 300

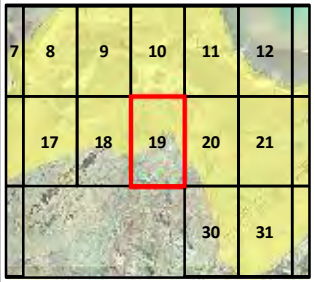
Metres

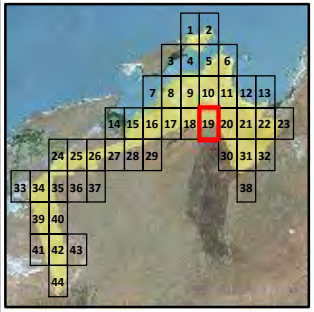
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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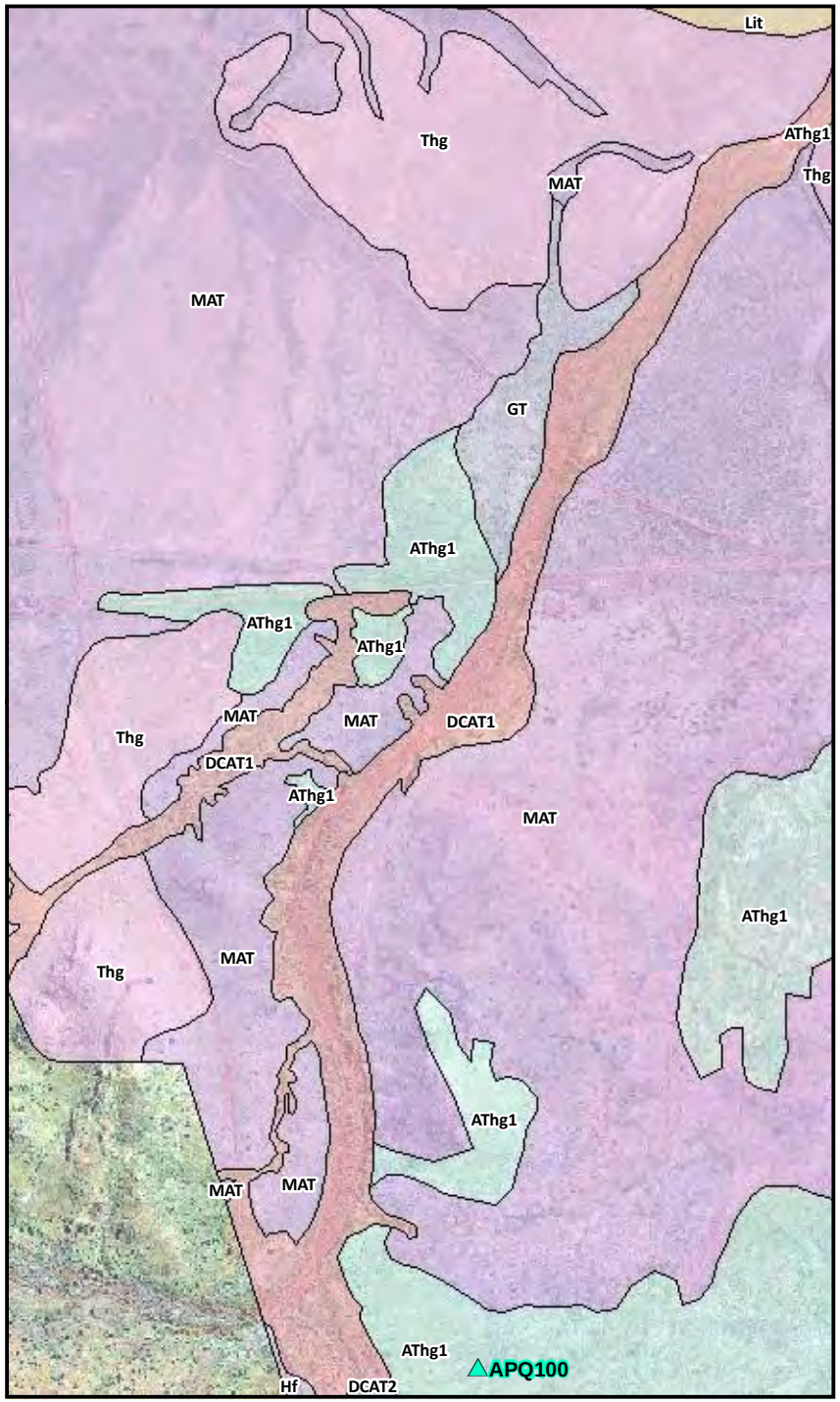
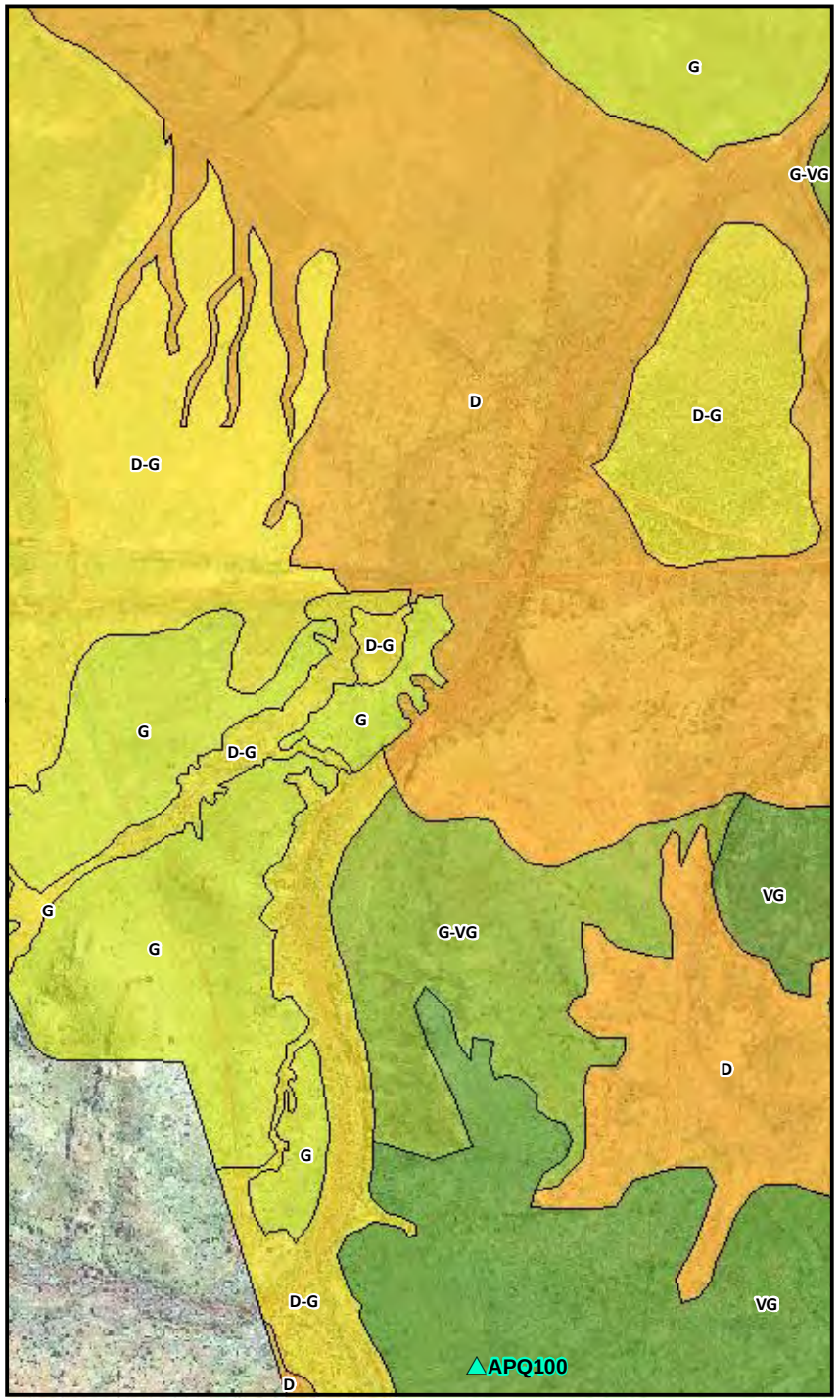




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.20

0 100 200 300

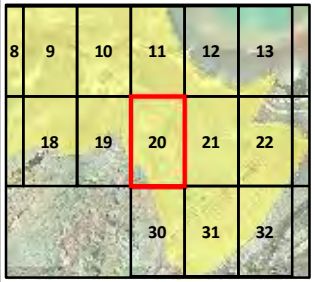
Metres

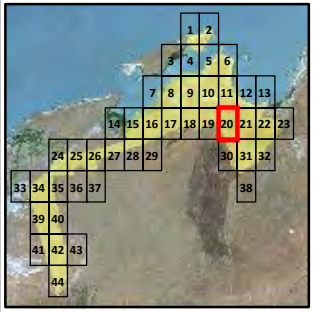
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition: CD, CD-D, D, D-G, G, G-VG, VG, VG-E





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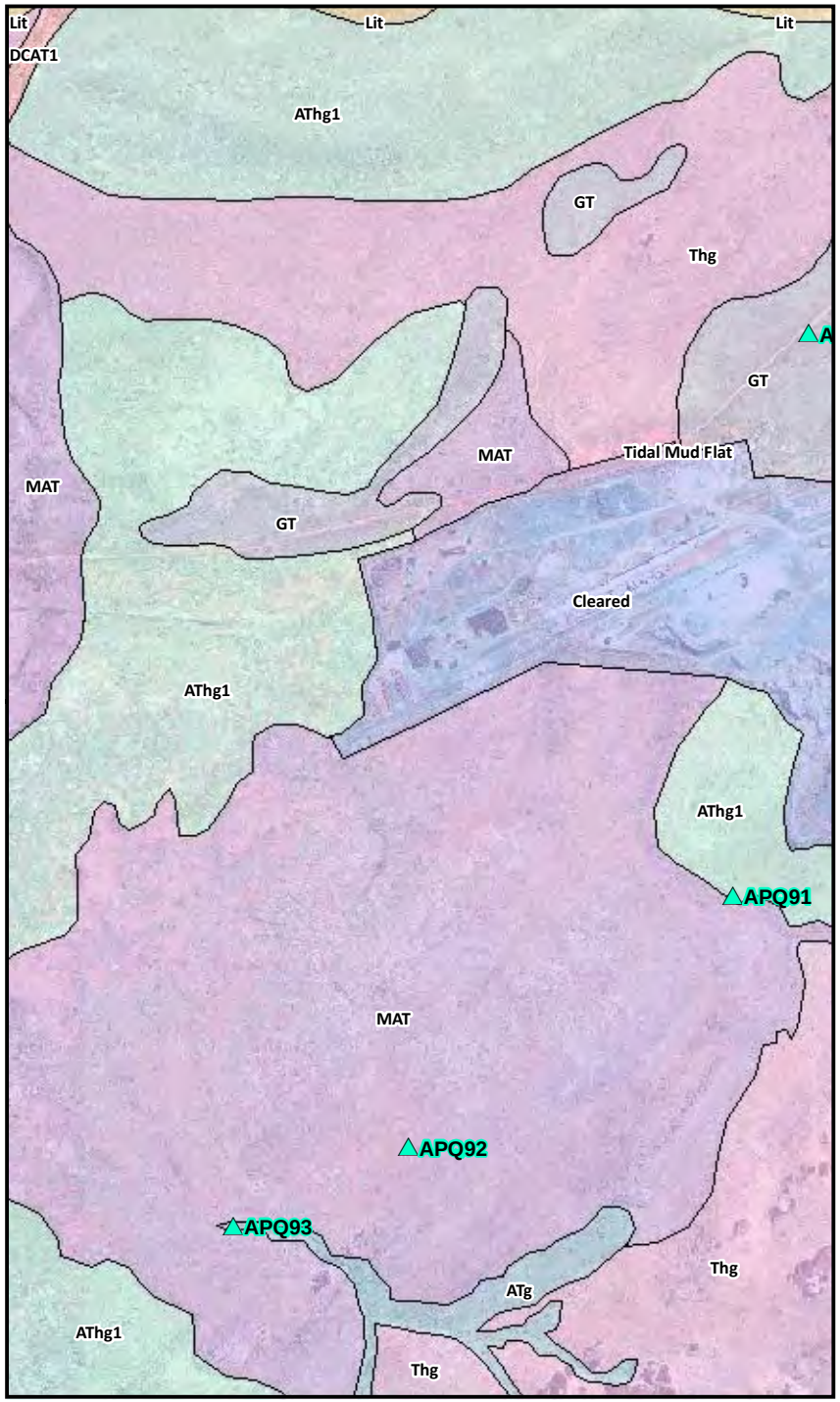
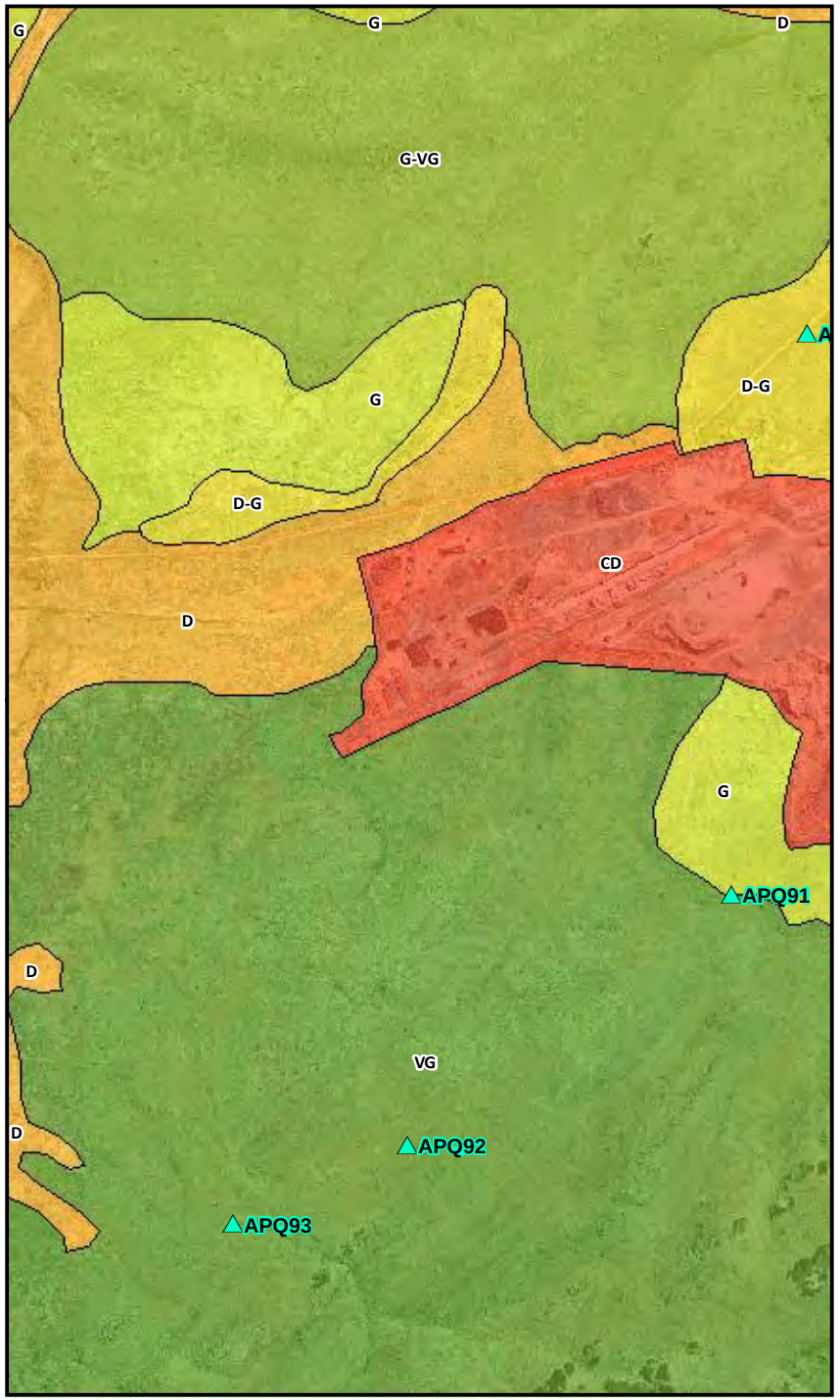




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.21

0 100 200 300

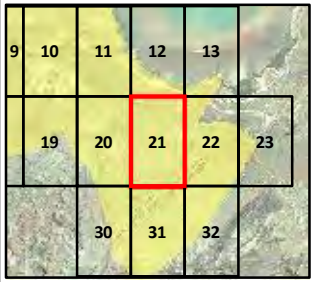
Metres

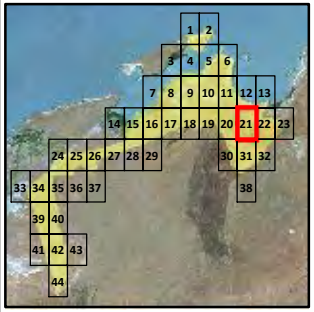
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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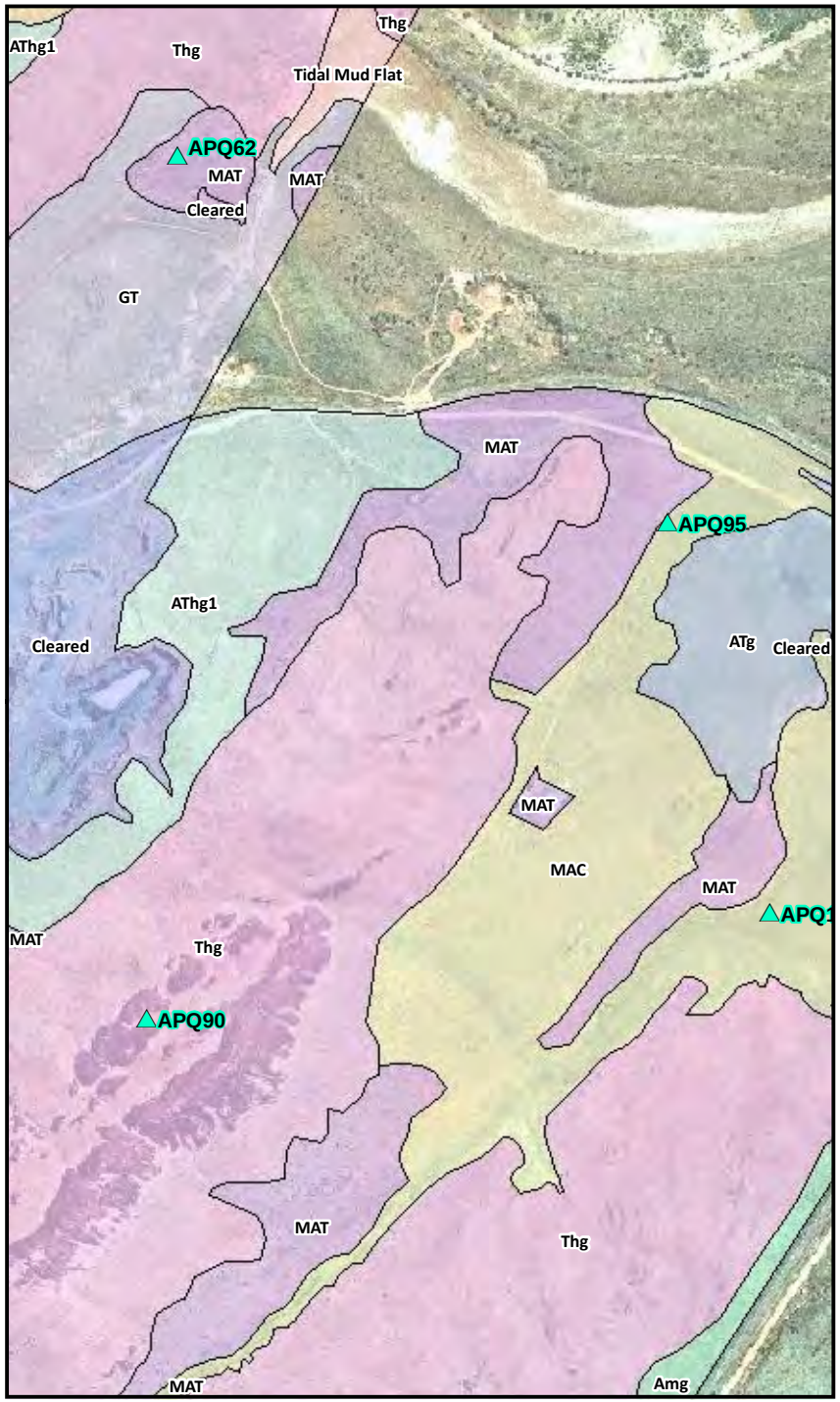
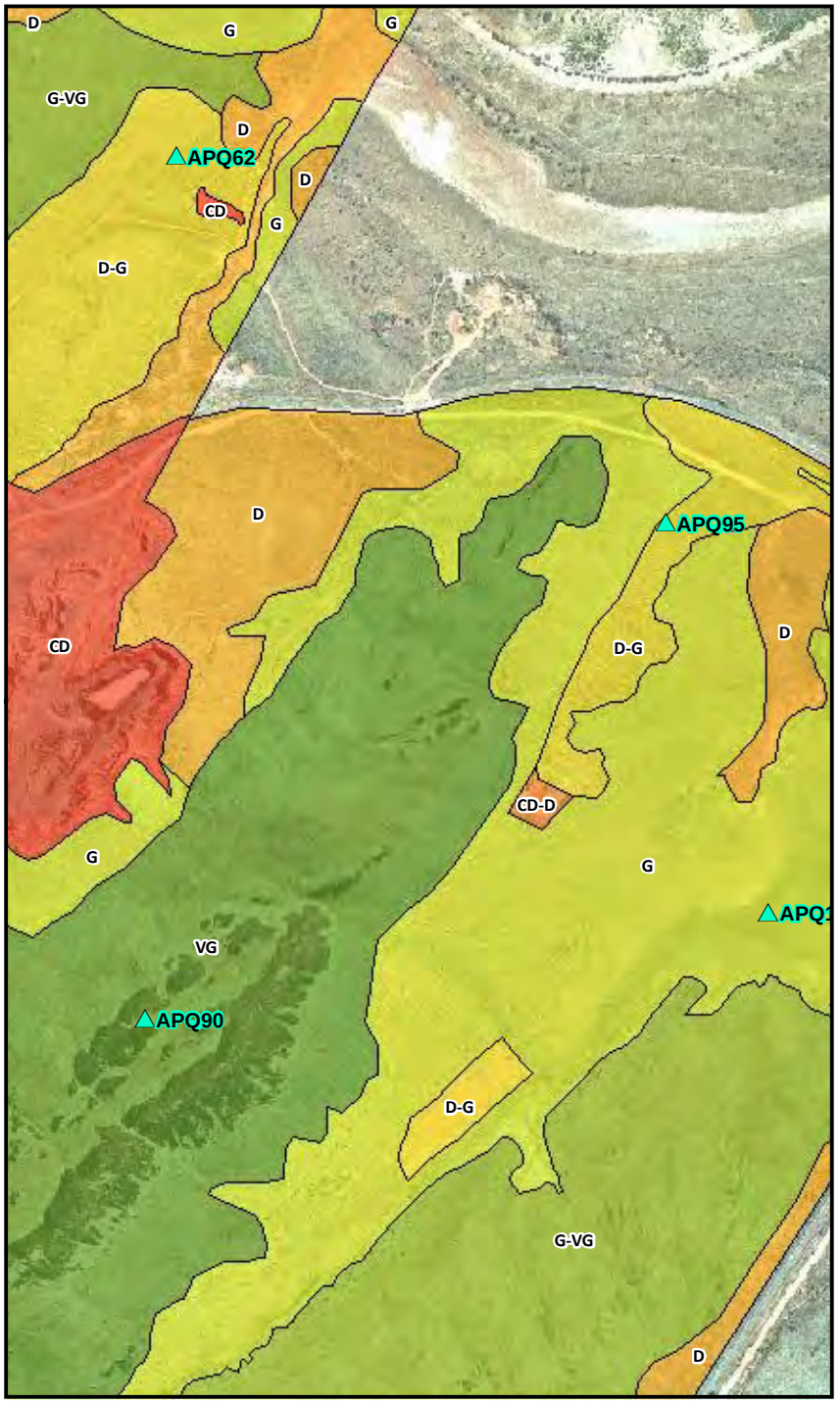




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.22

0 100 200 300

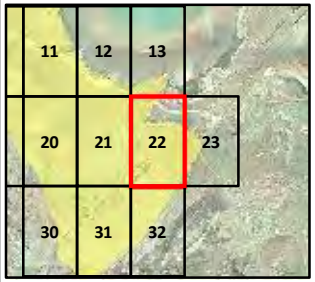
Metres

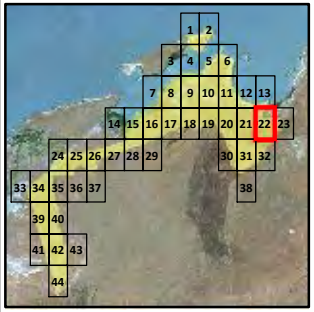
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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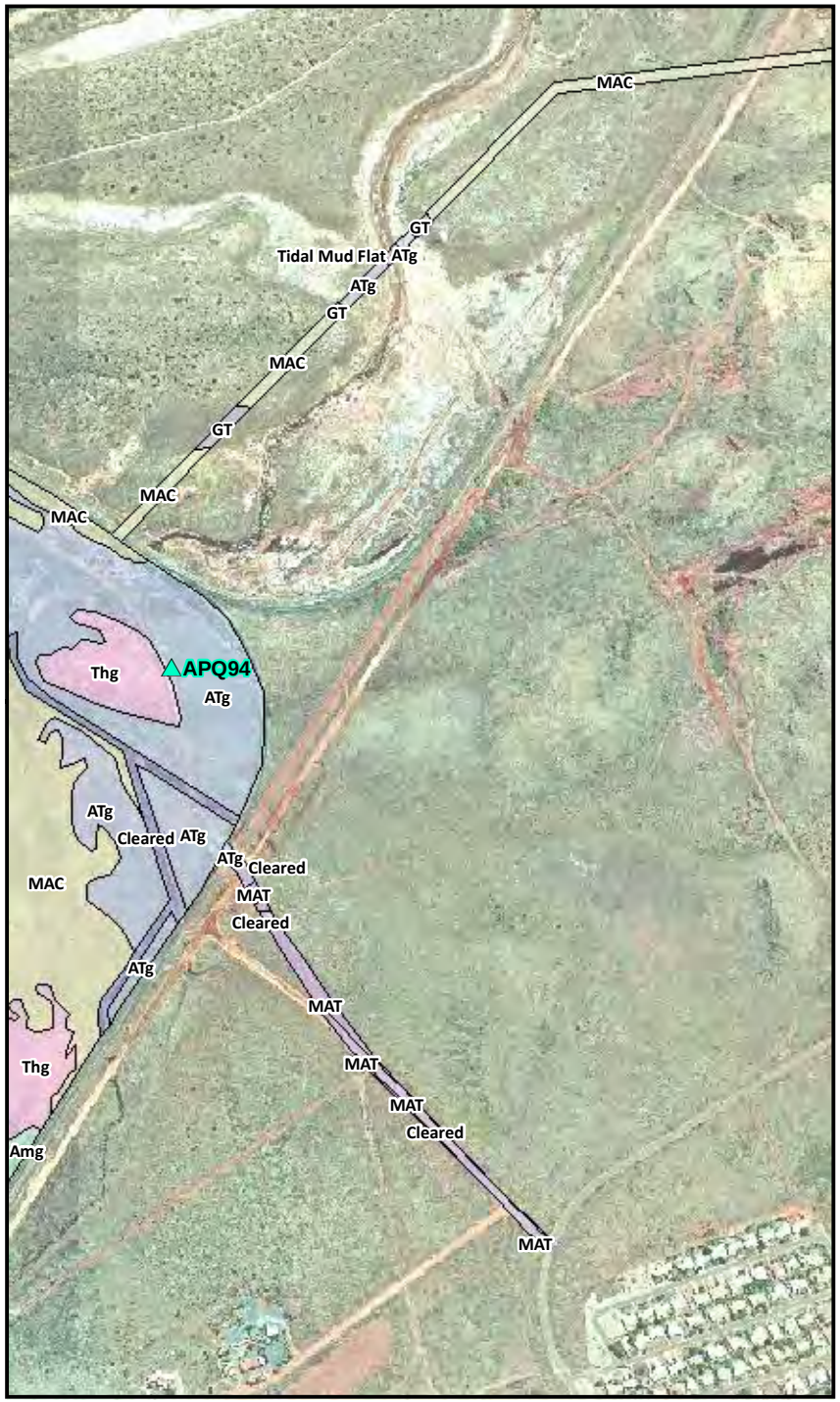
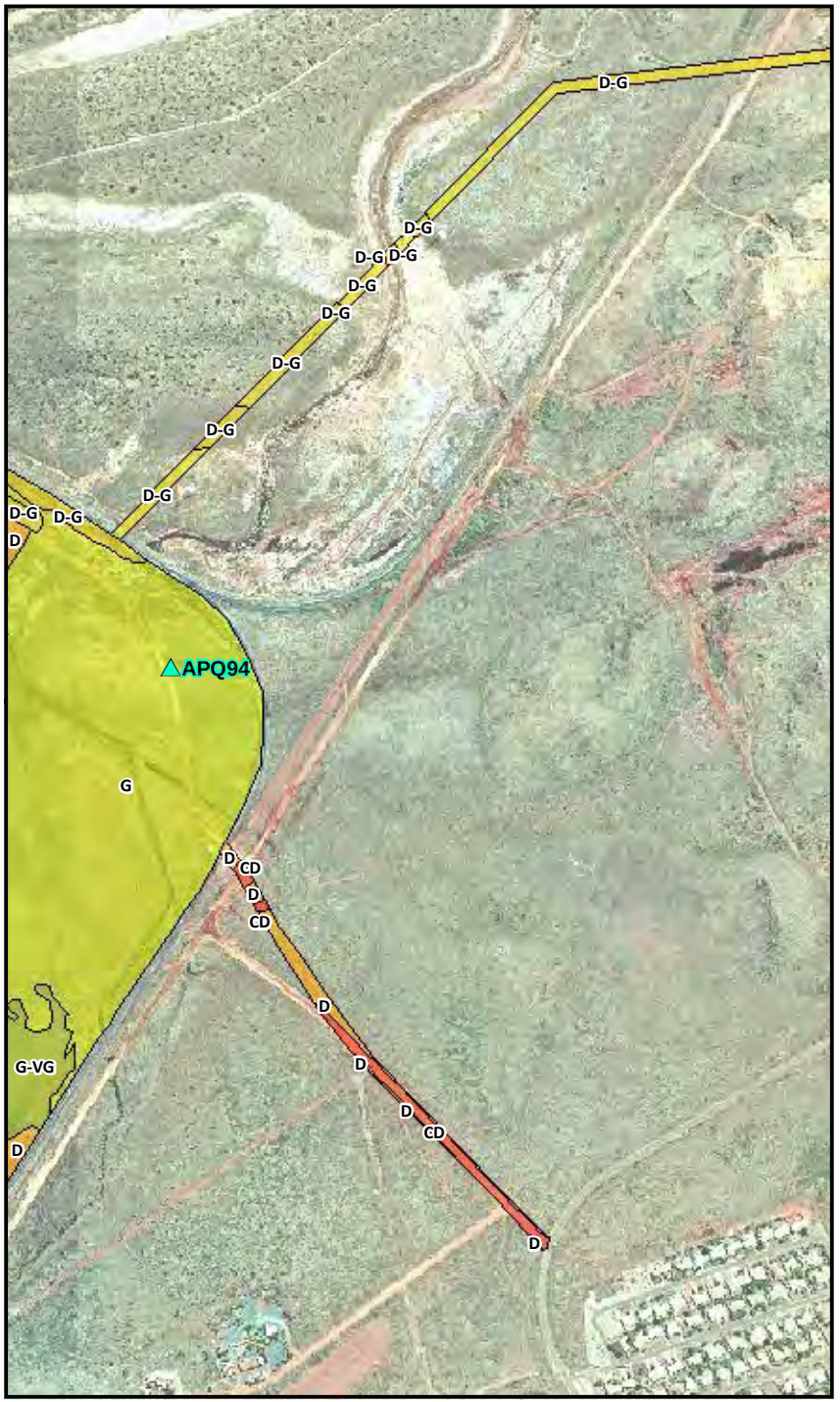




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.23

0 100 200 300

Metres

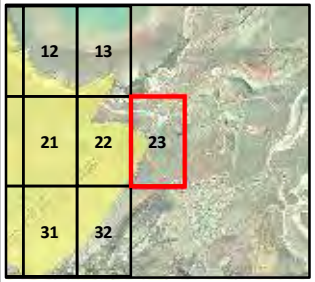
1:10,000 (A4)

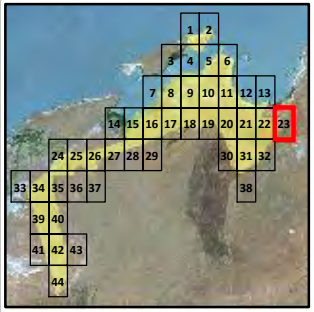
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

D
D-G
G
CD
CD-D
VG
VG-E
G-VG





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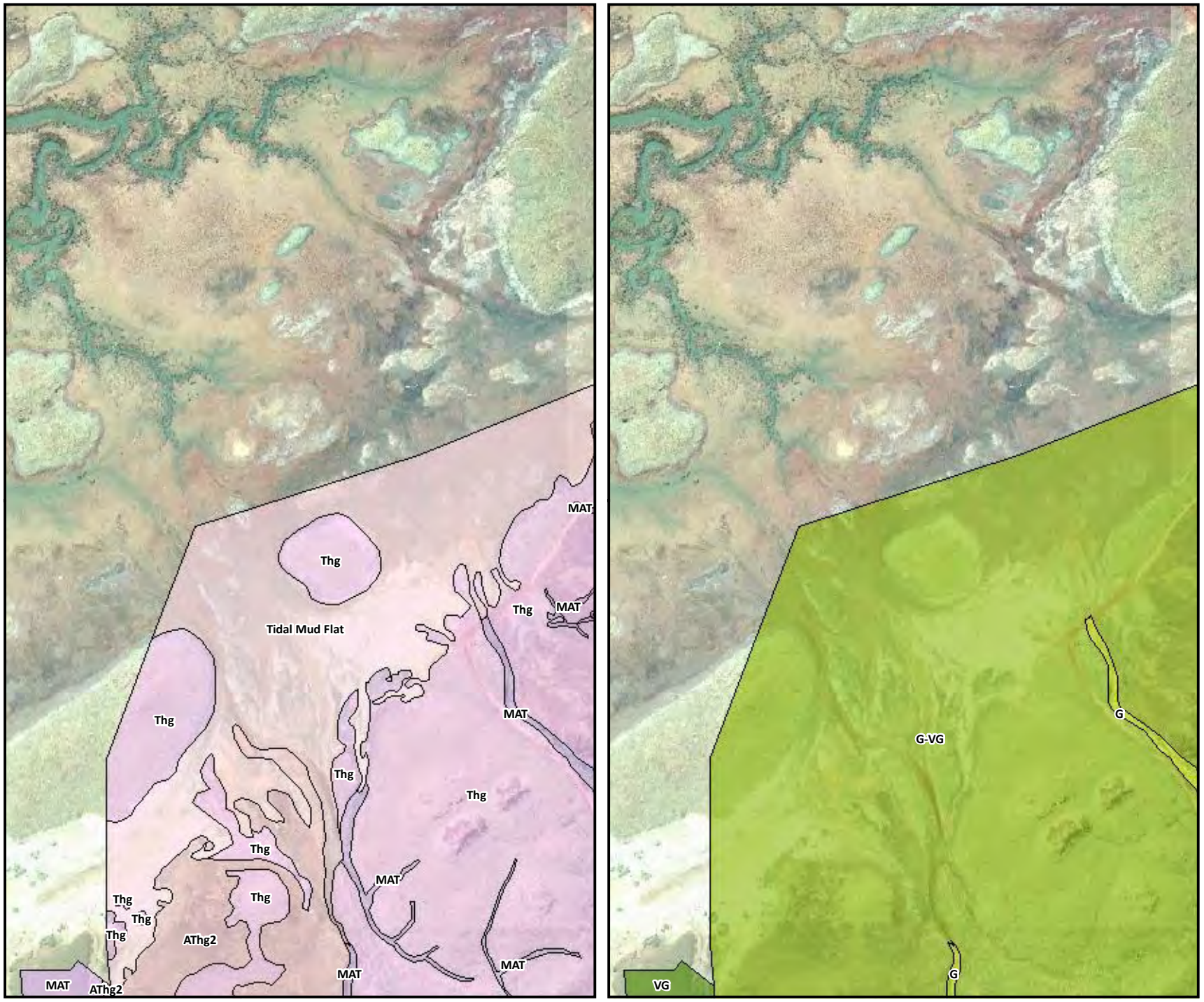


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.24

0 100 200 300

Metres

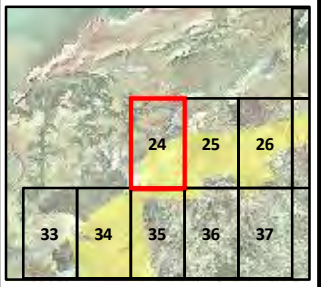
1:10,000 (A4)

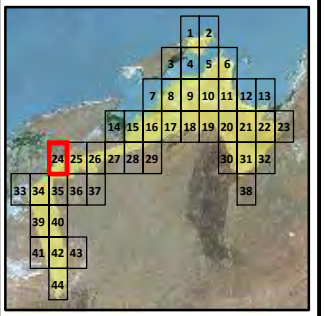
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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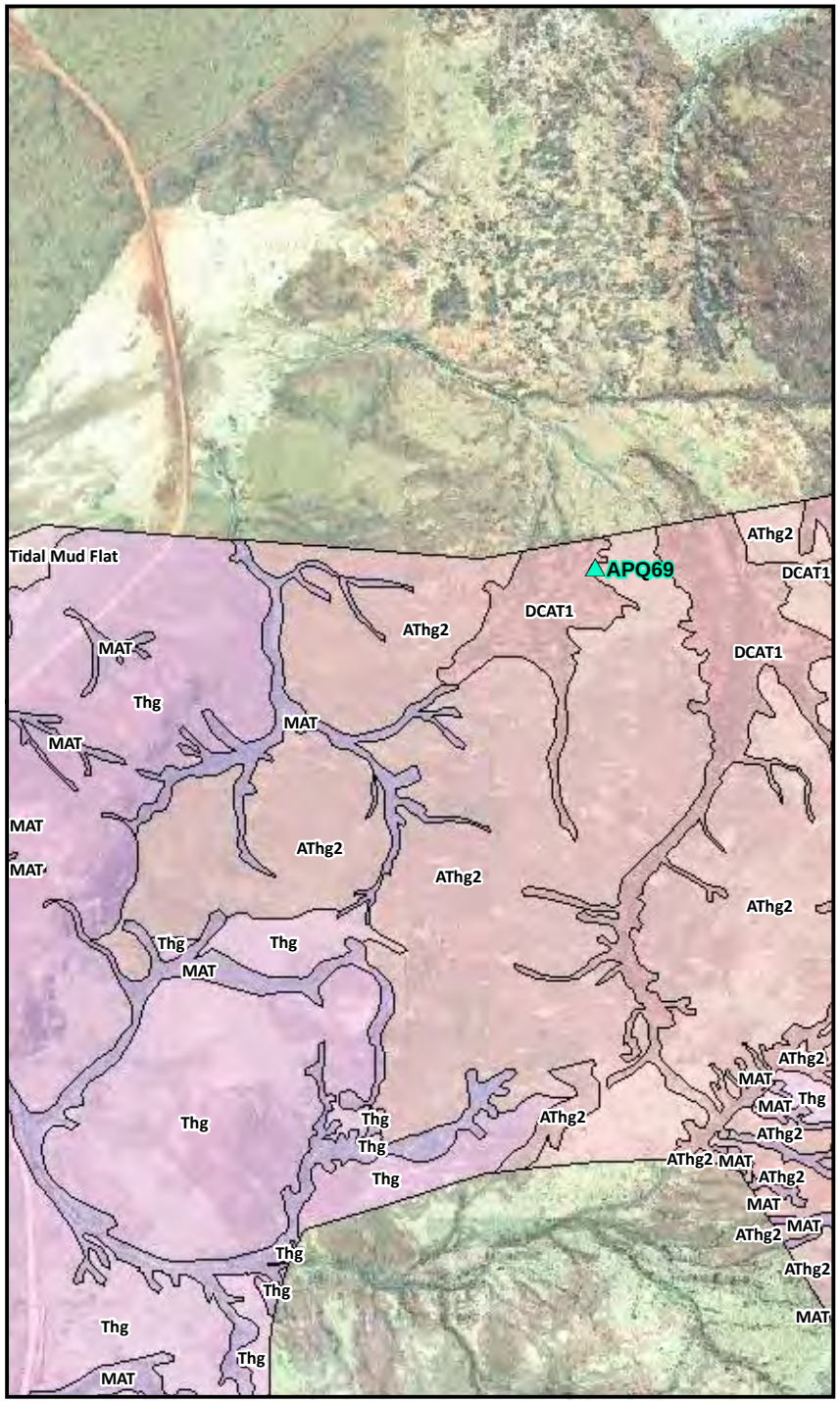
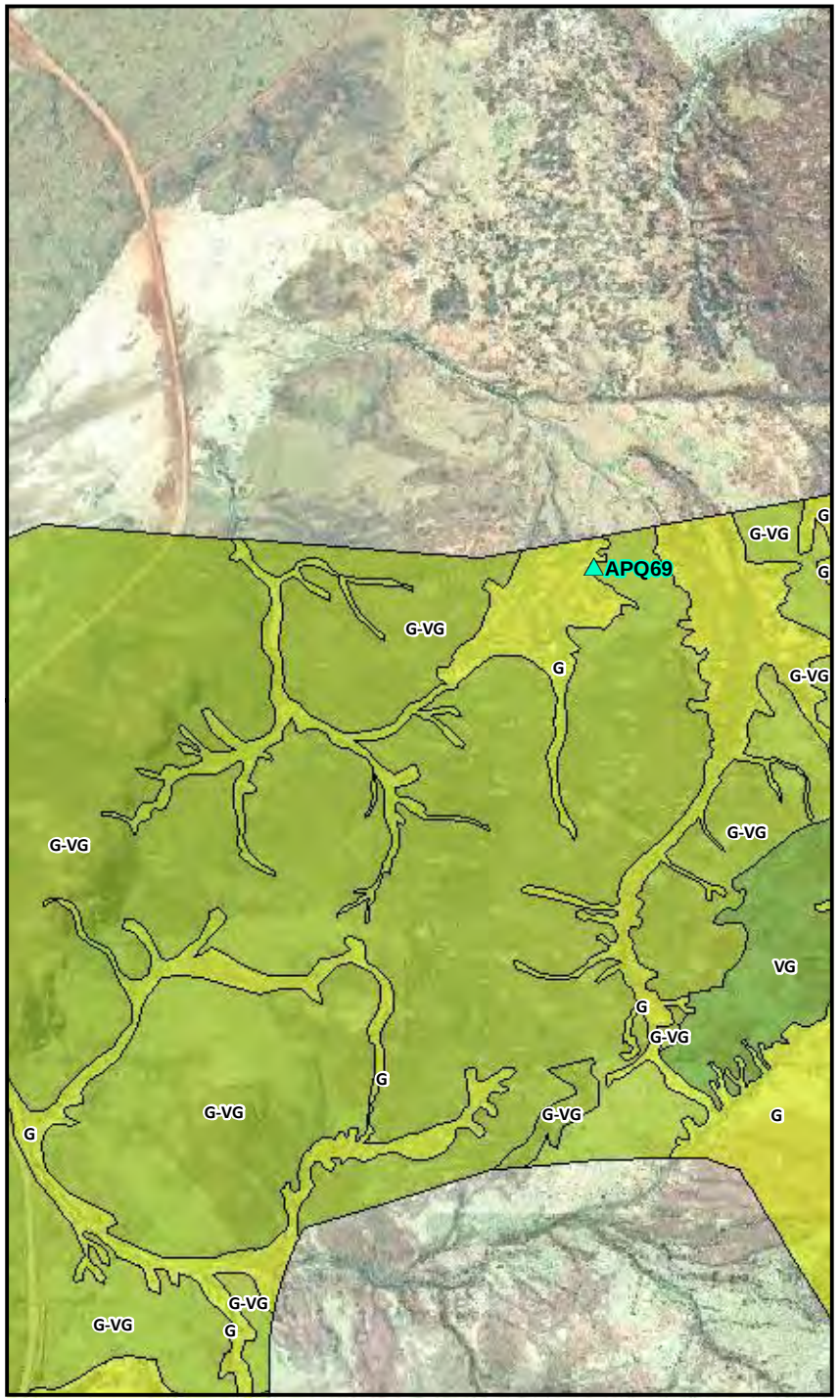




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.25

0 100 200 300

Metres

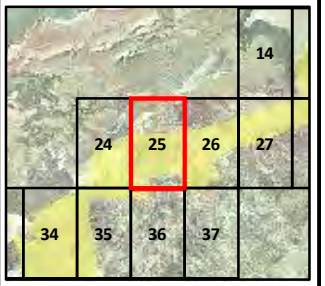
1:10,000 (A4)

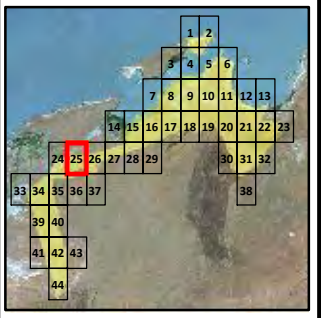
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

D D-G G G-VG VG VG-E CD CD-D





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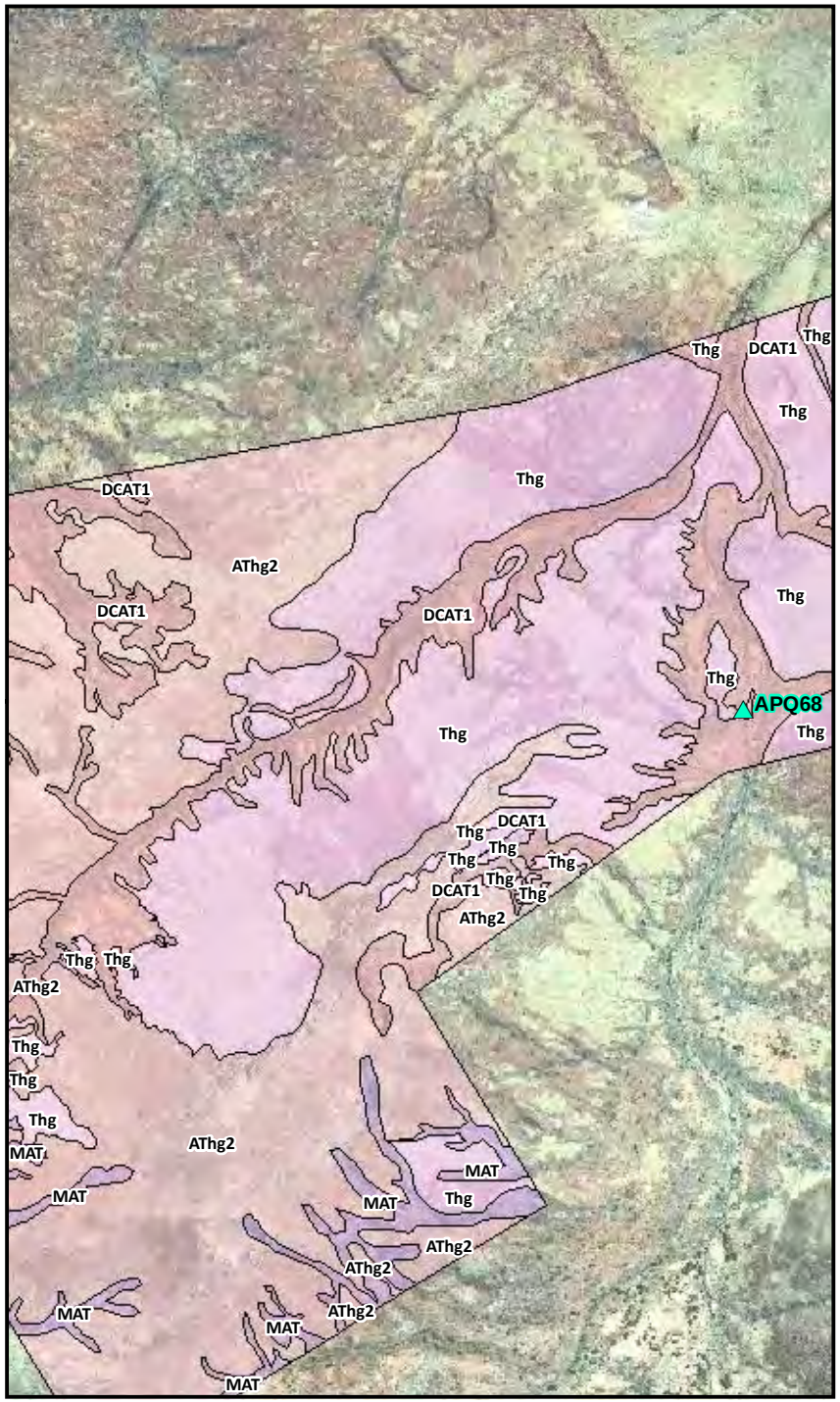
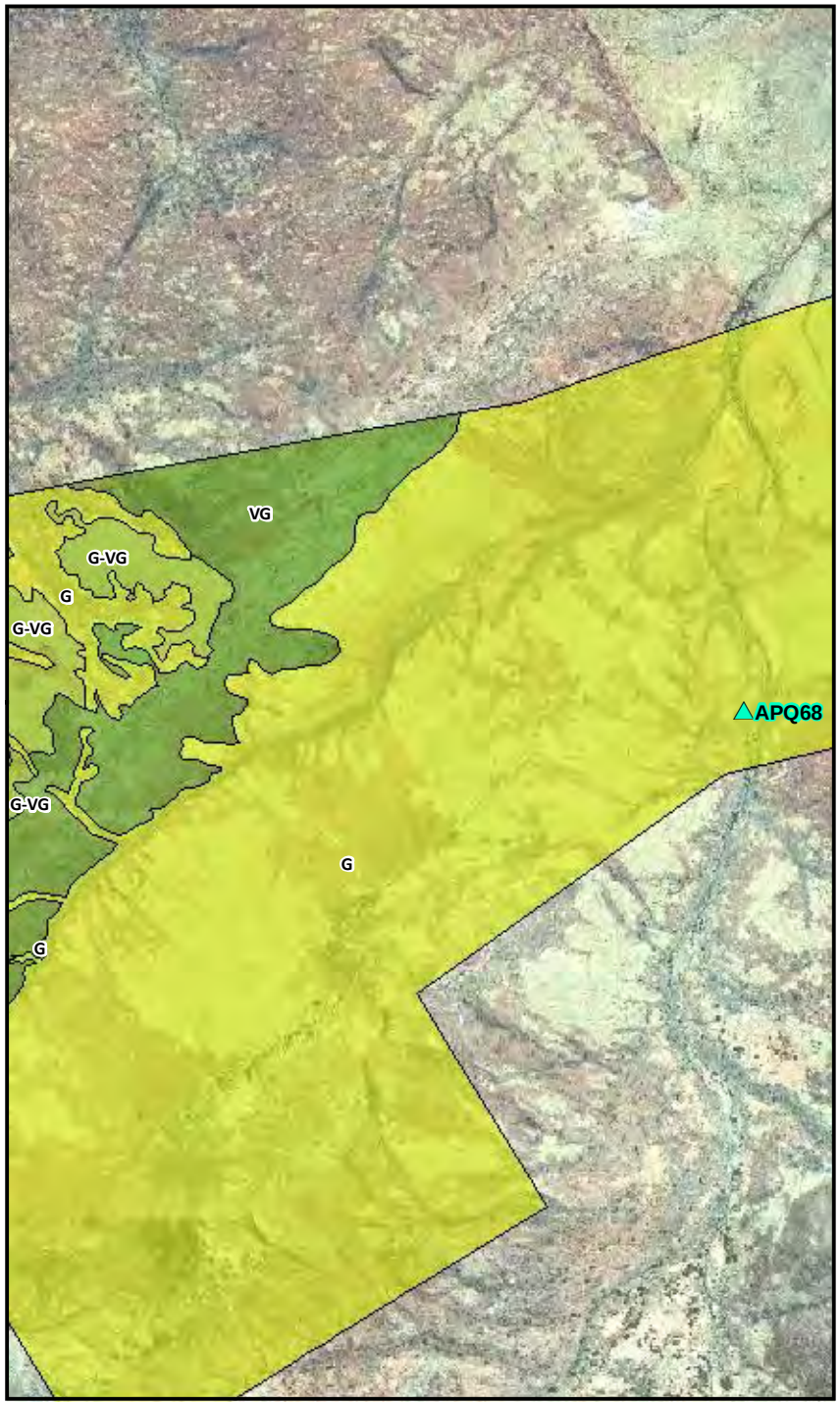




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.26

0 100 200 300

Metres

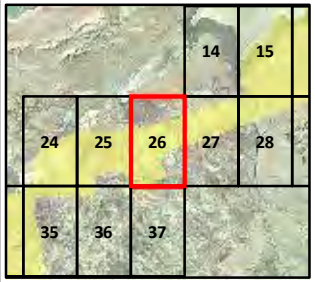
1:10,000 (A4)

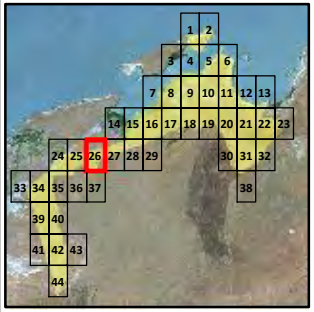
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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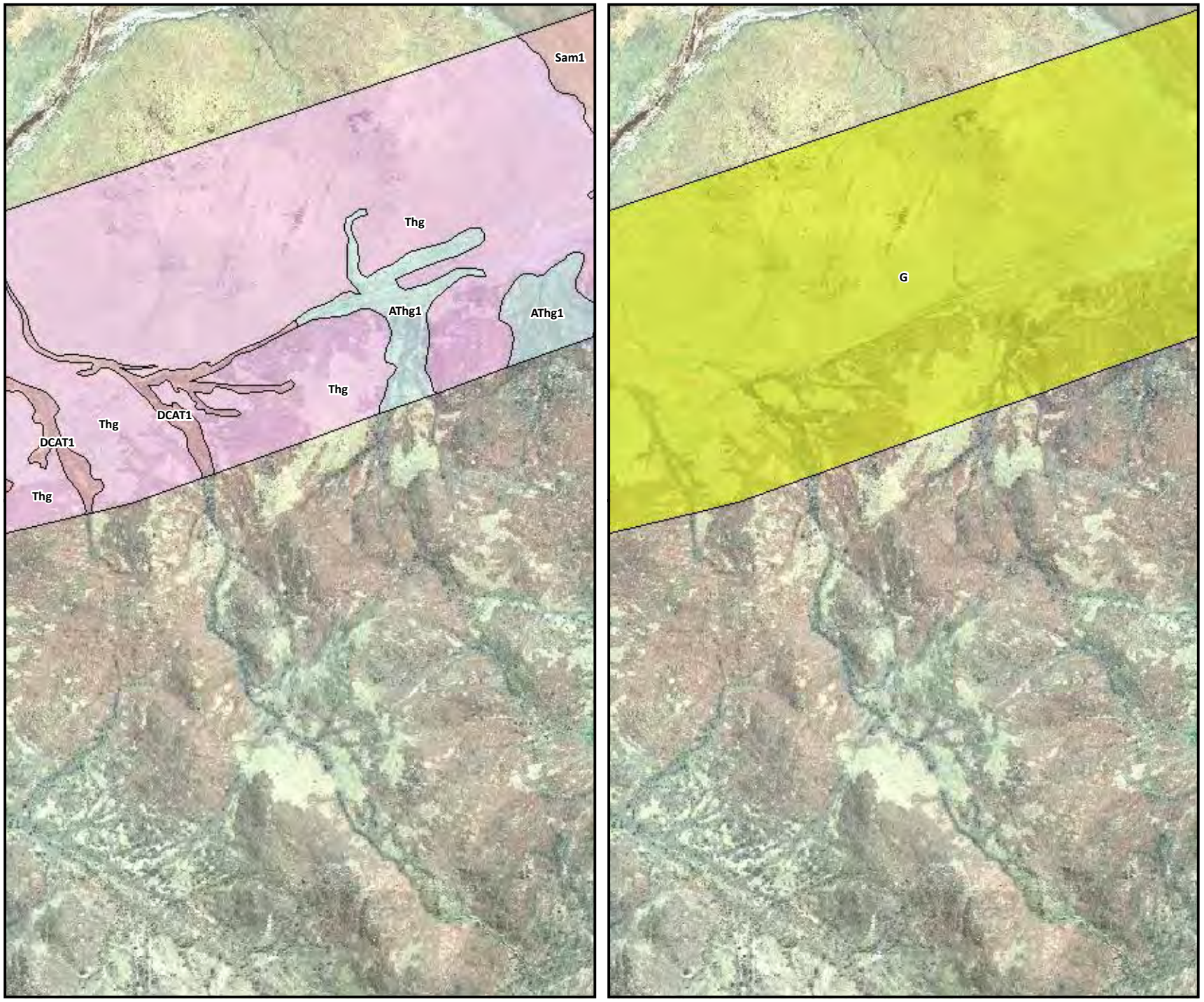


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.27

0 100 200 300

Metres

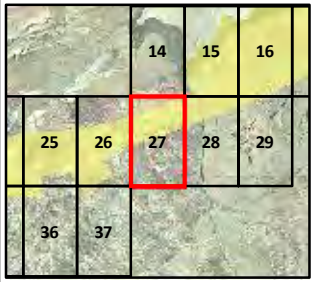
1:10,000 (A4)

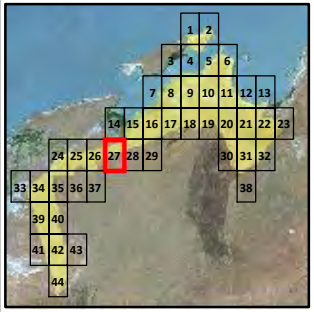
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.28

0 100 200 300

Metres

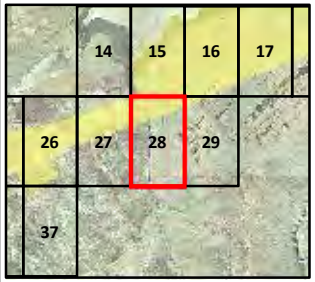
1:10,000 (A4)

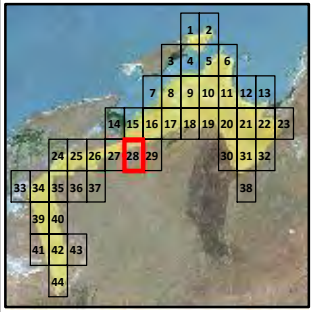
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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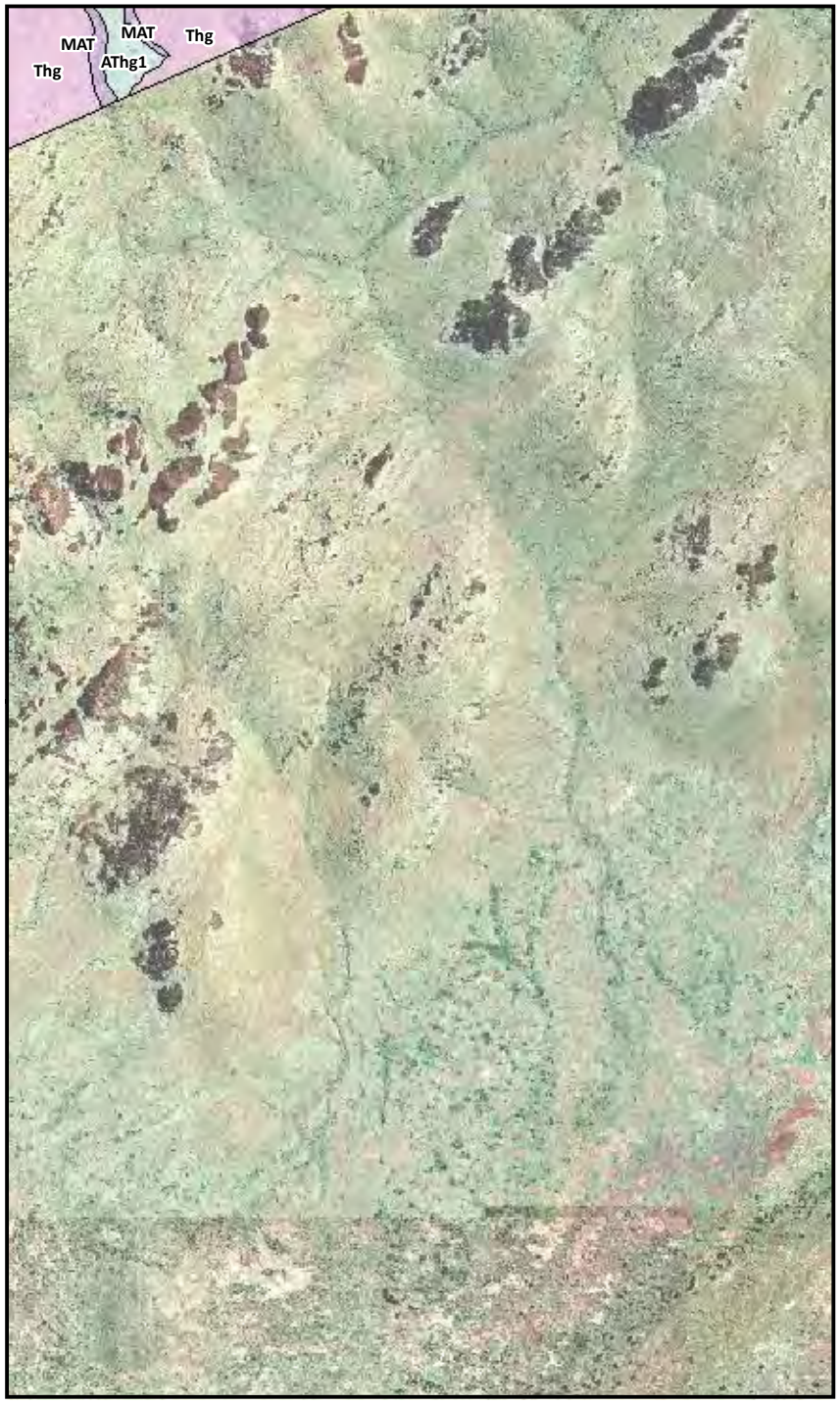


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.29

0 100 200 300

Metres

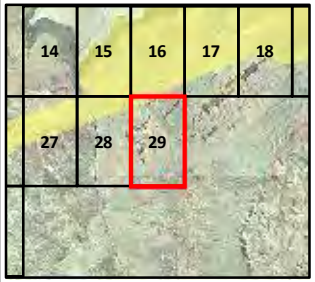
1:10,000 (A4)

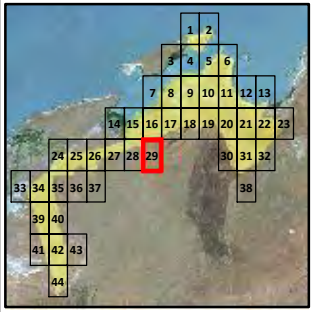
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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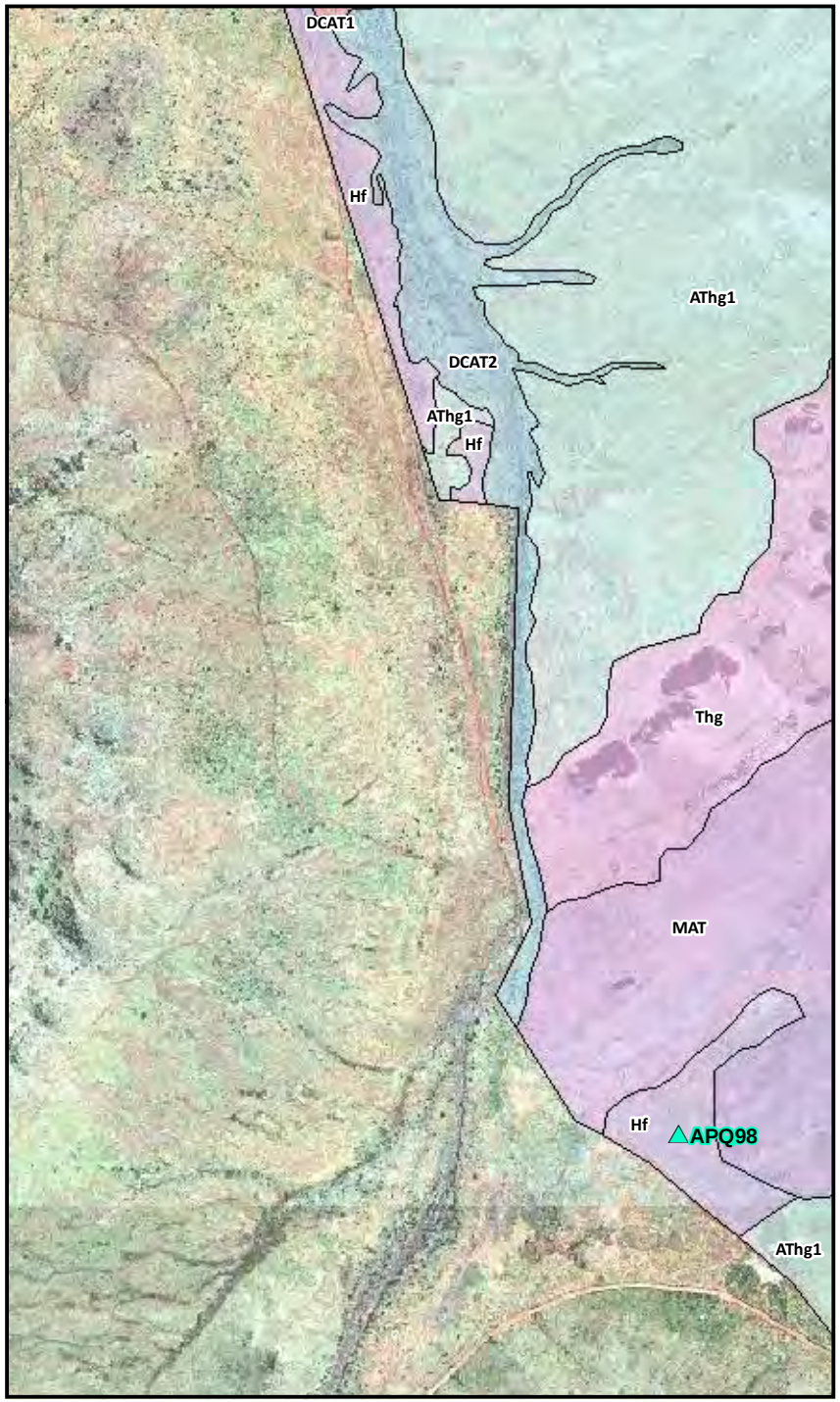
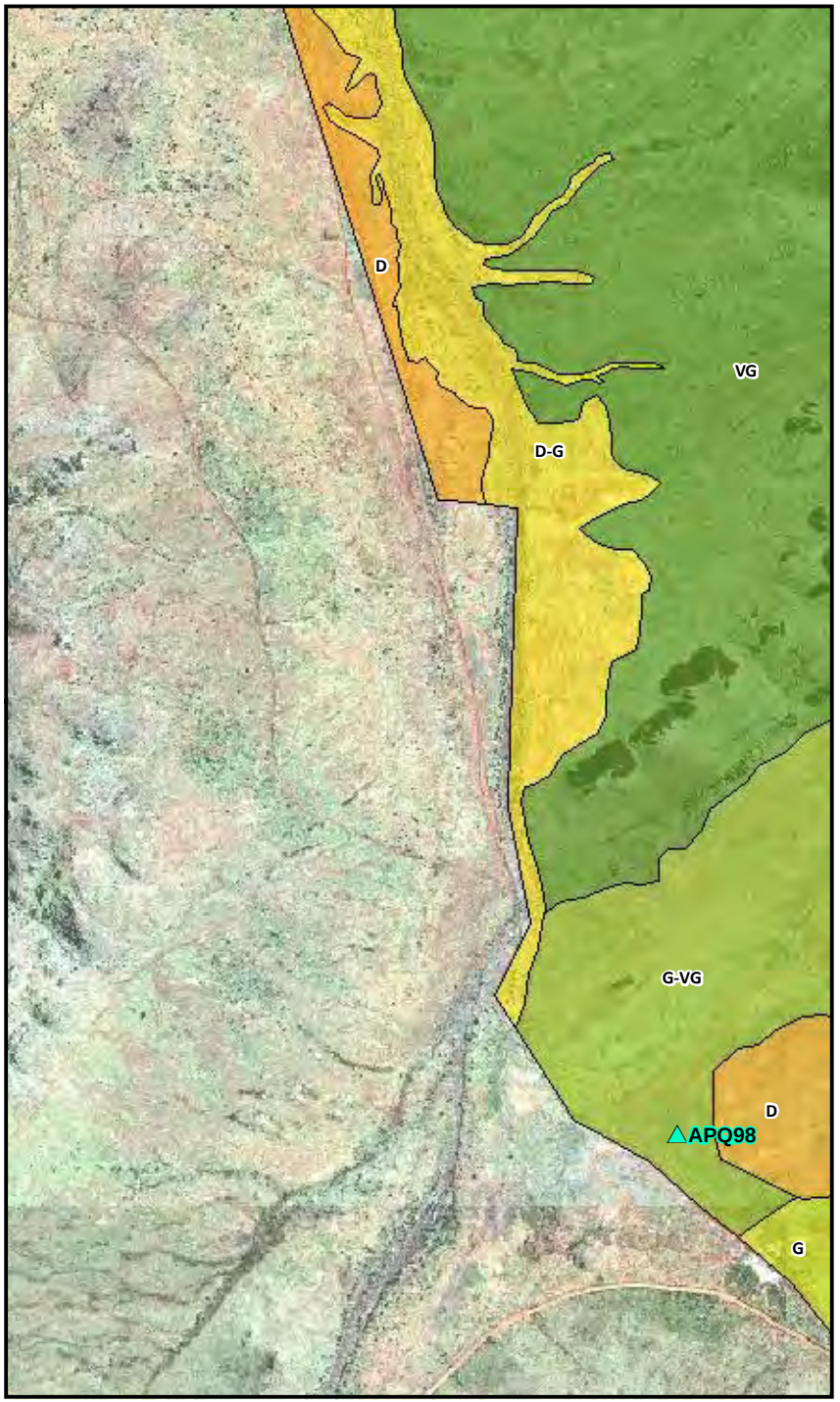




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.30

0 100 200 300

Metres

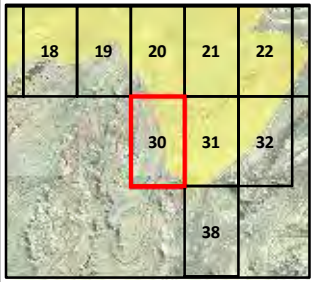
1:10,000 (A4)

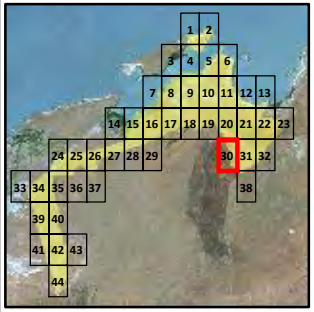
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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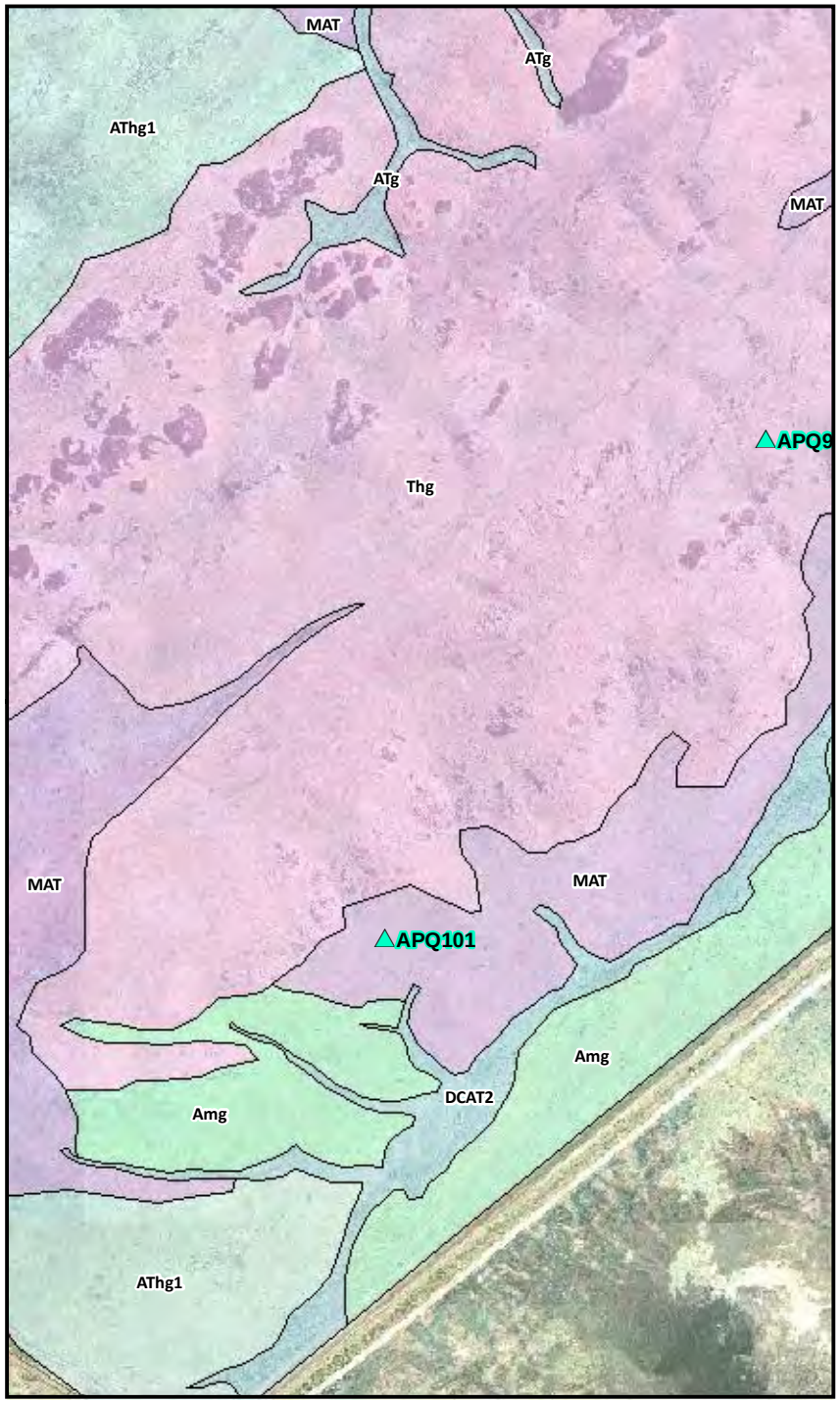
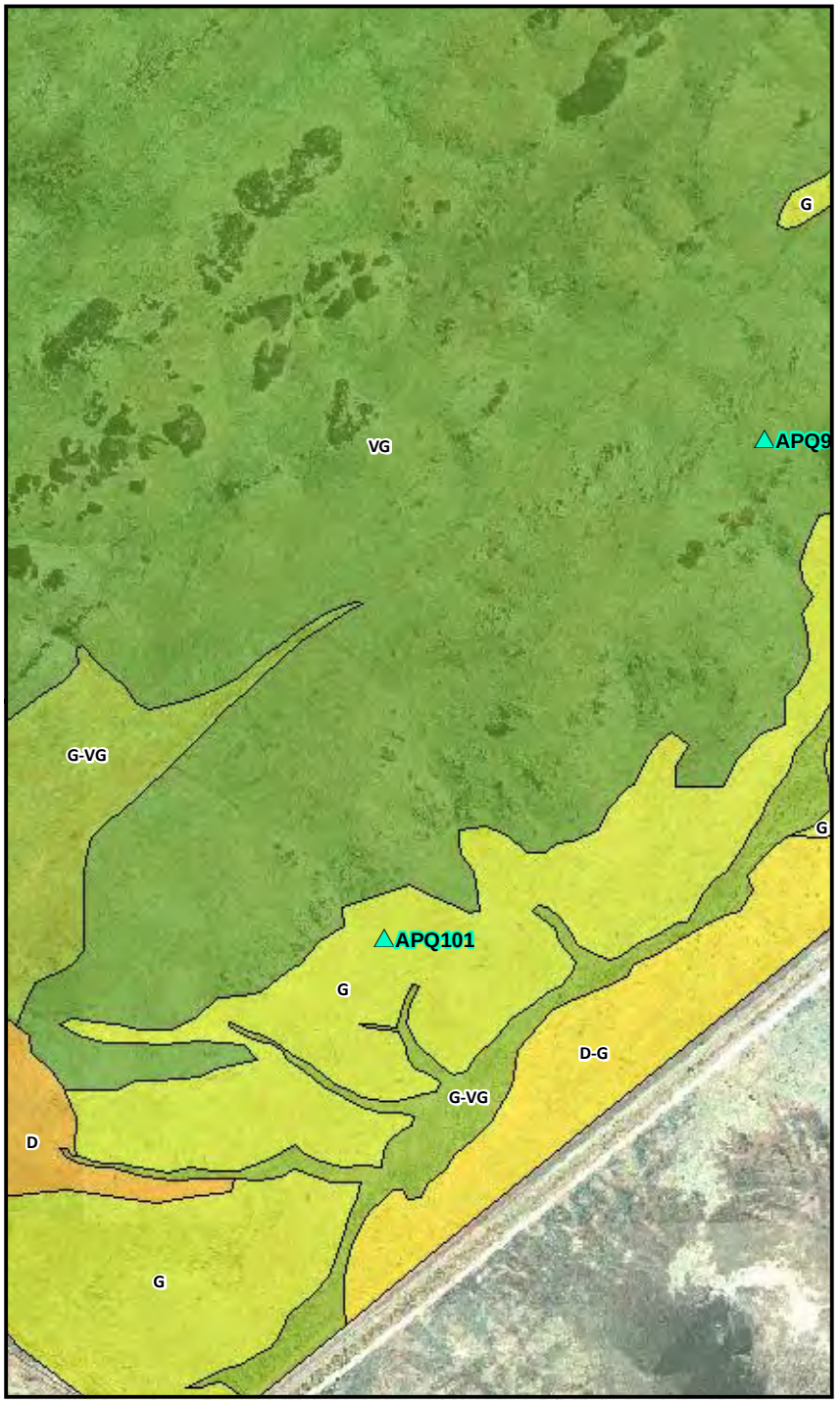




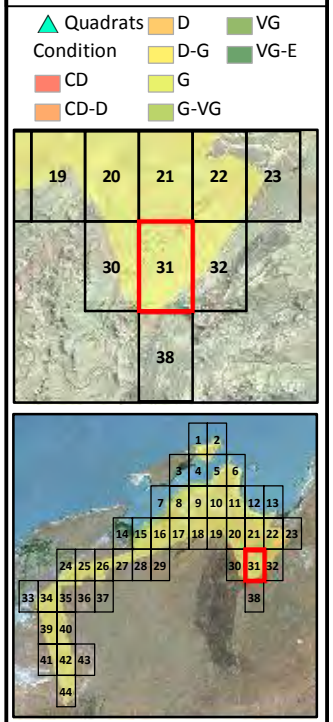
Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.31

1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50



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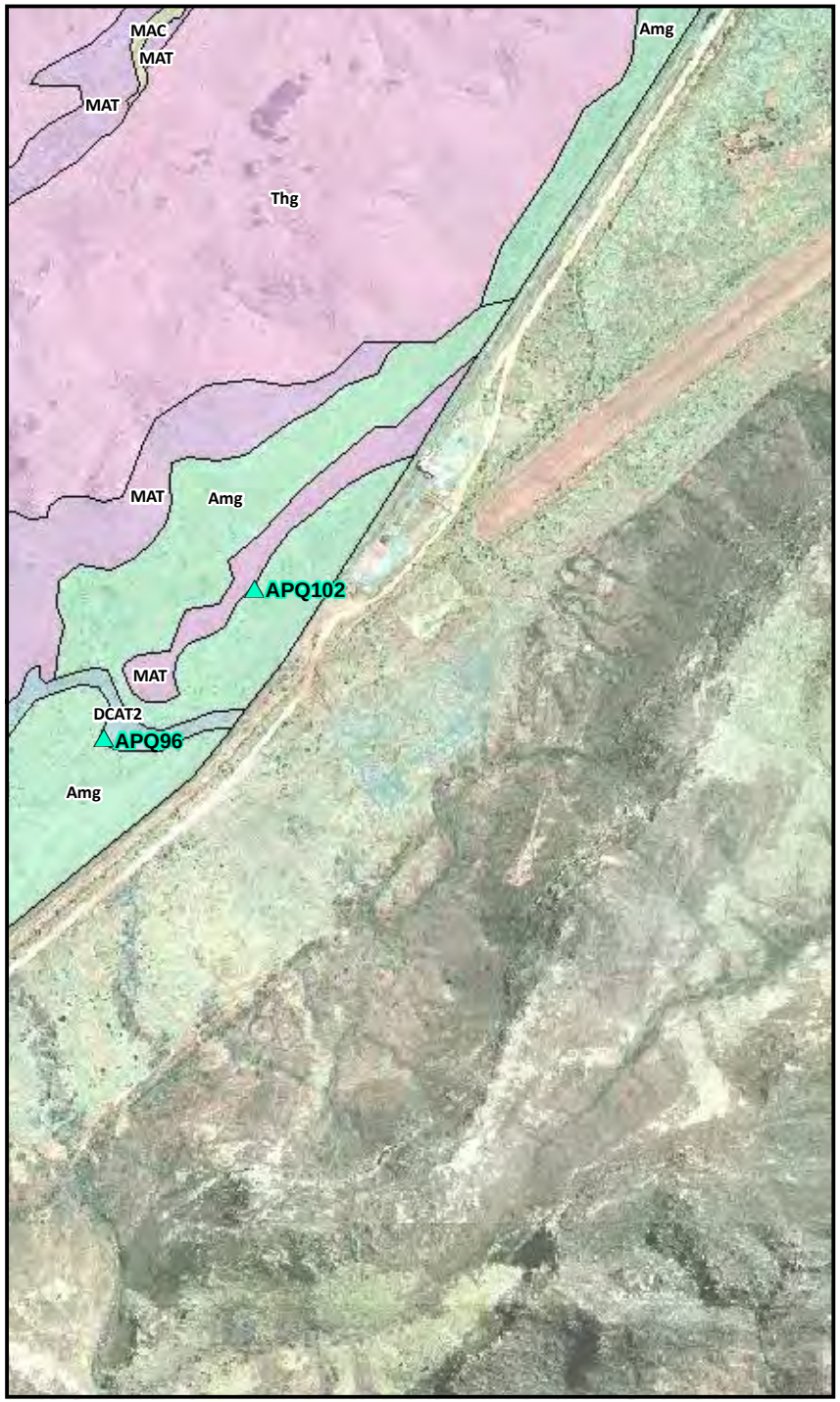
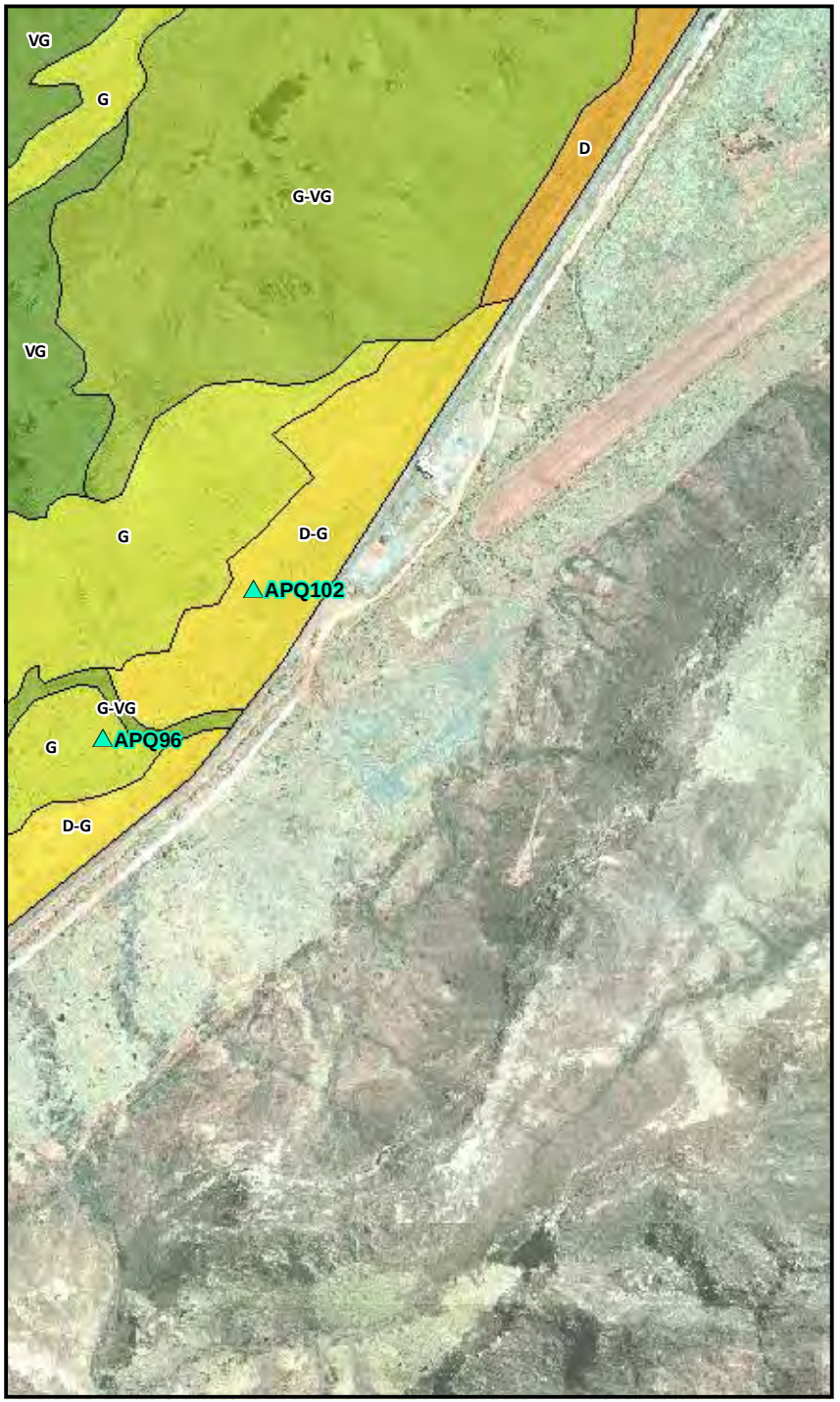




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.32

0 100 200 300

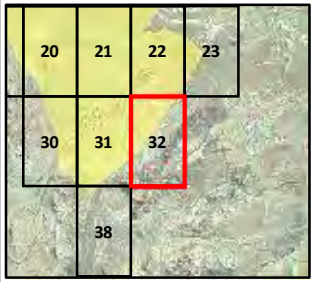
Metres

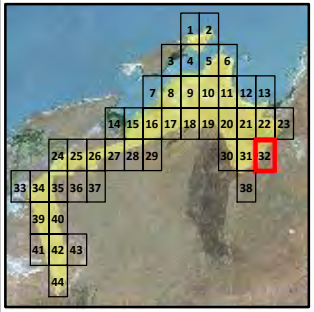
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.33

0 100 200 300

Metres

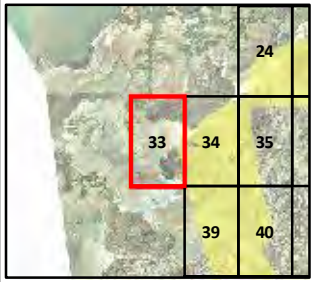
1:10,000 (A4)

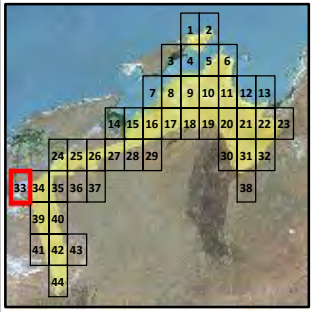
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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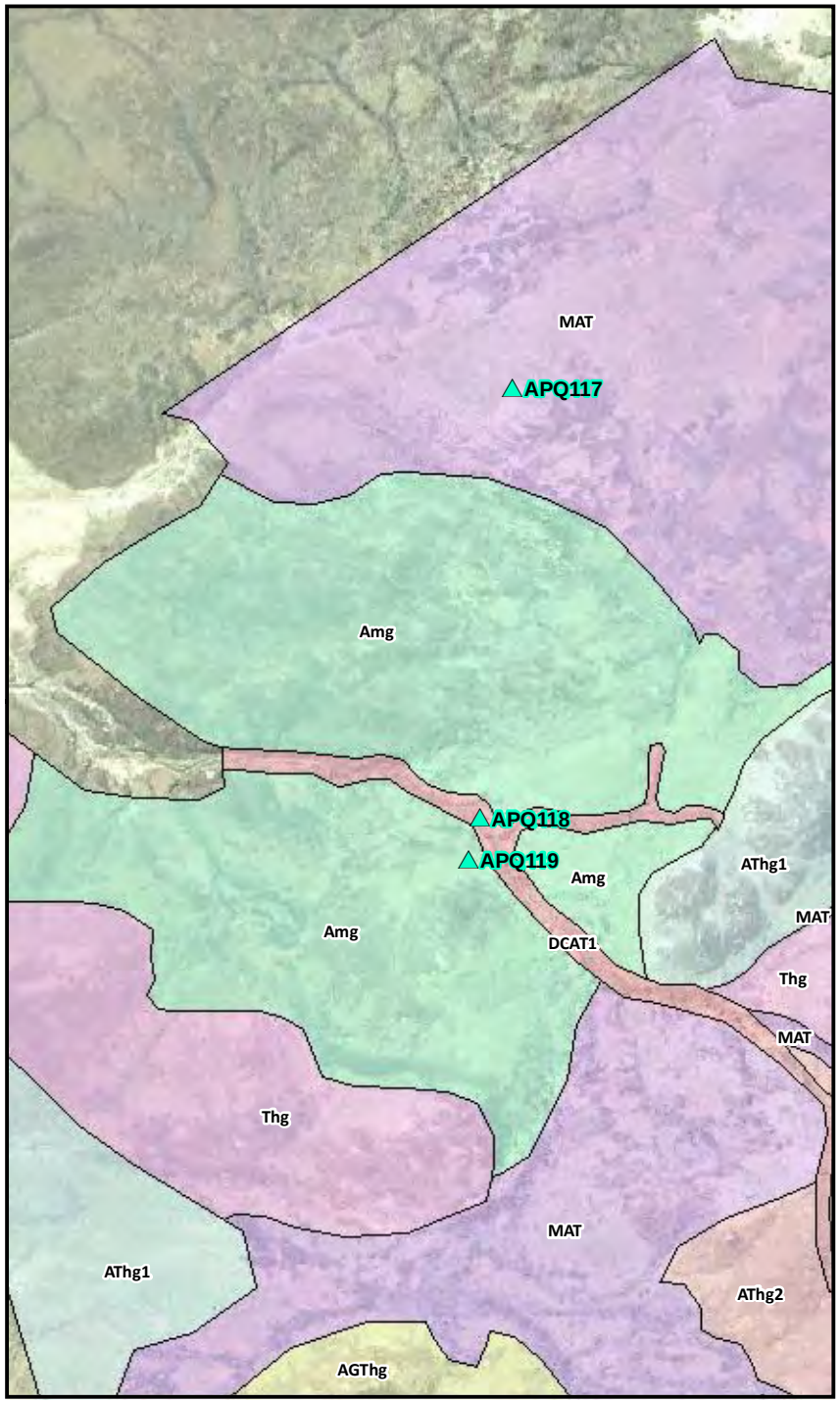
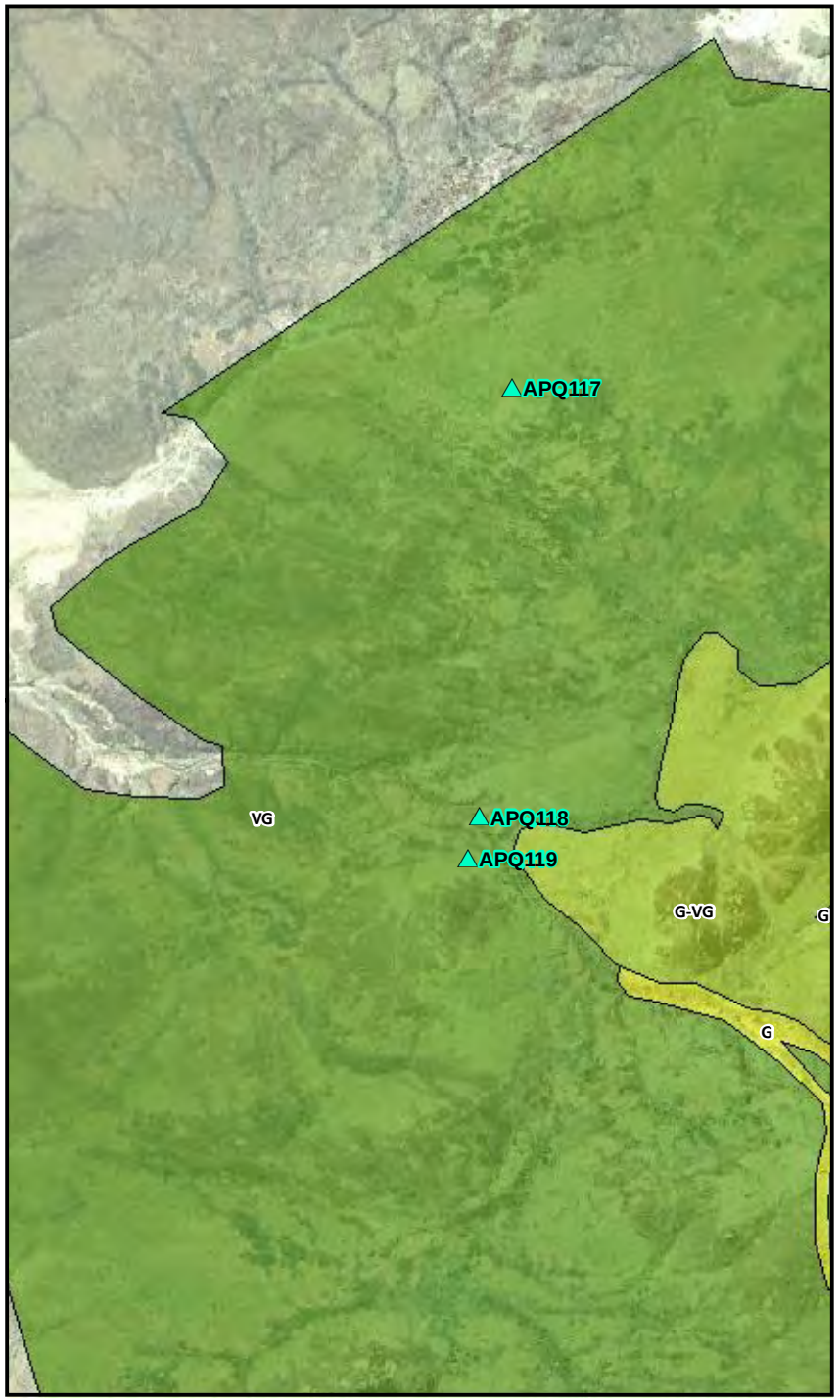




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.34

0 100 200 300

Metres

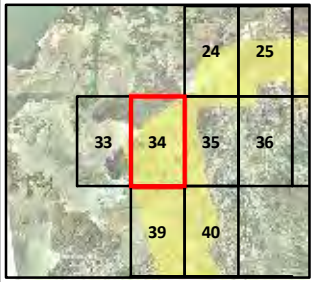
1:10,000 (A4)

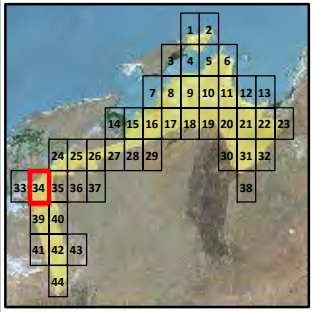
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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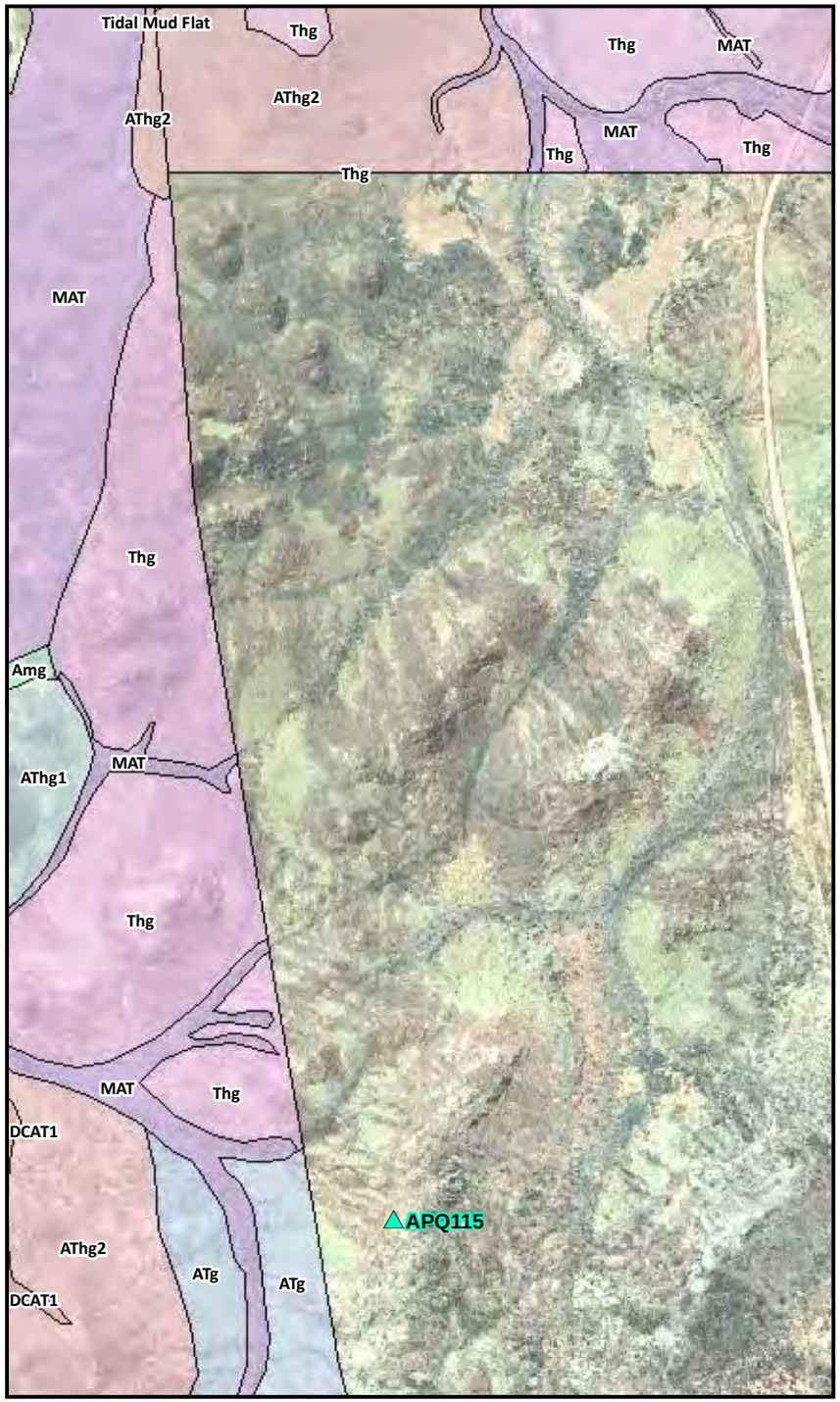
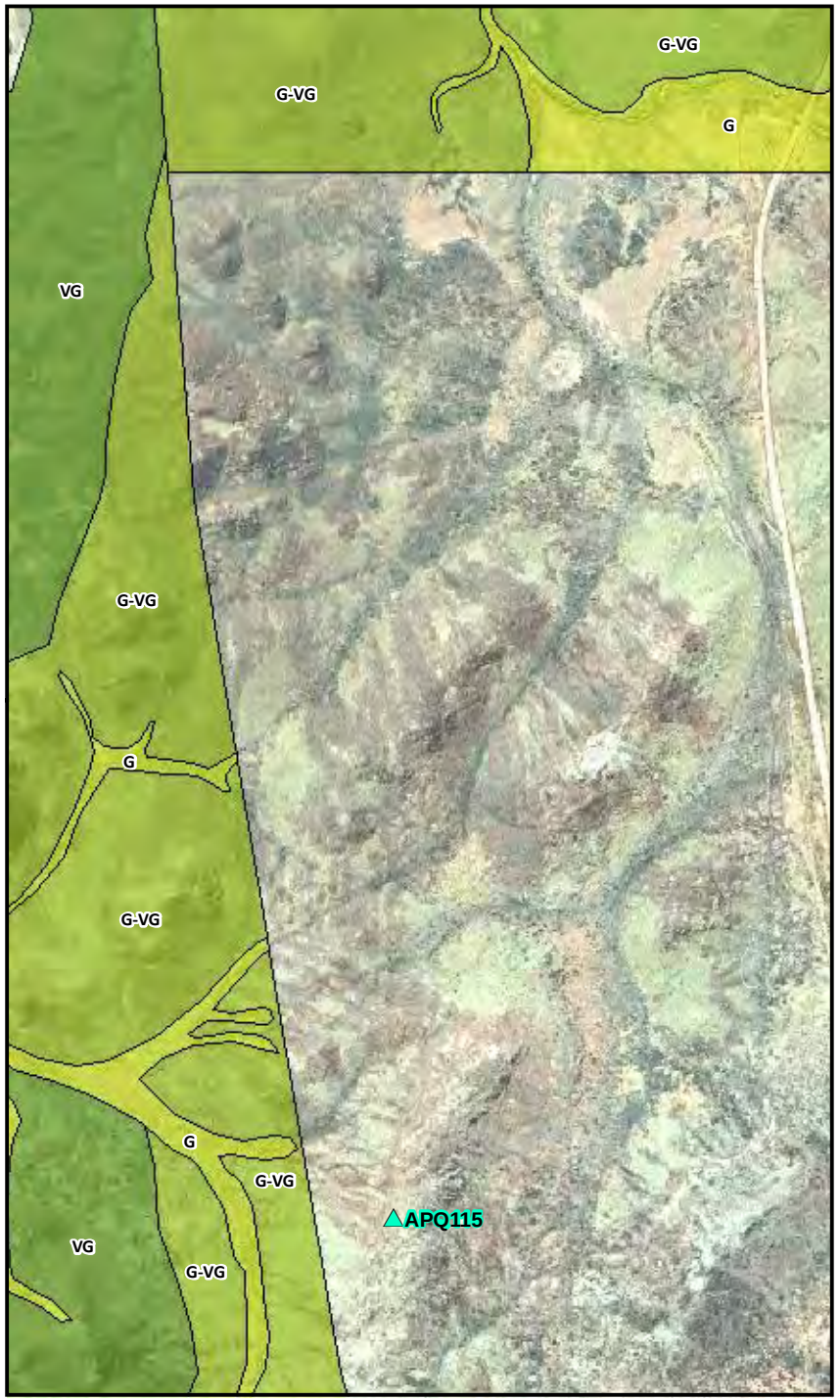




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.35

0 100 200 300

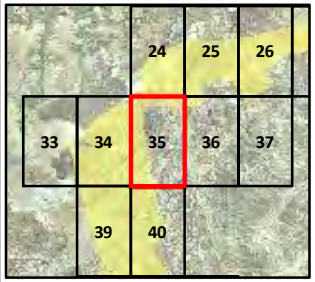
Metres

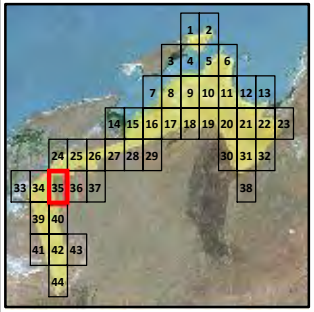
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.36

0 100 200 300

Metres

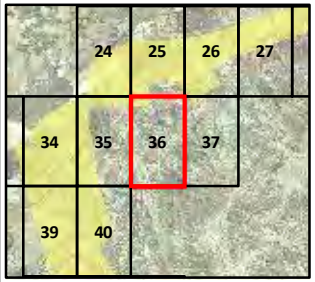
1:10,000 (A4)

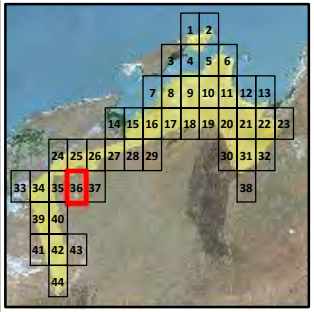
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.37

0 100 200 300

Metres

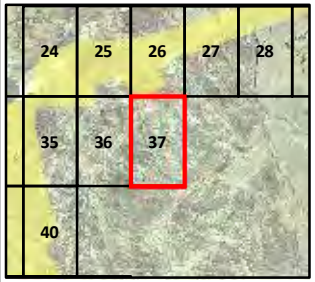
1:10,000 (A4)

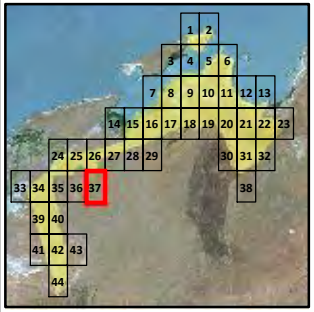
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.38

0 100 200 300

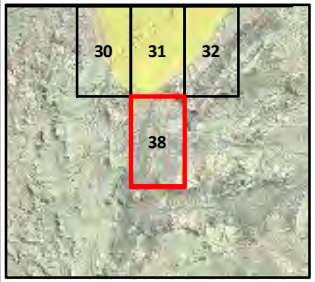
Metres

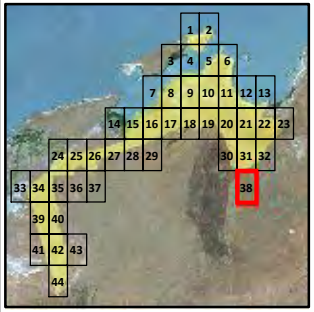
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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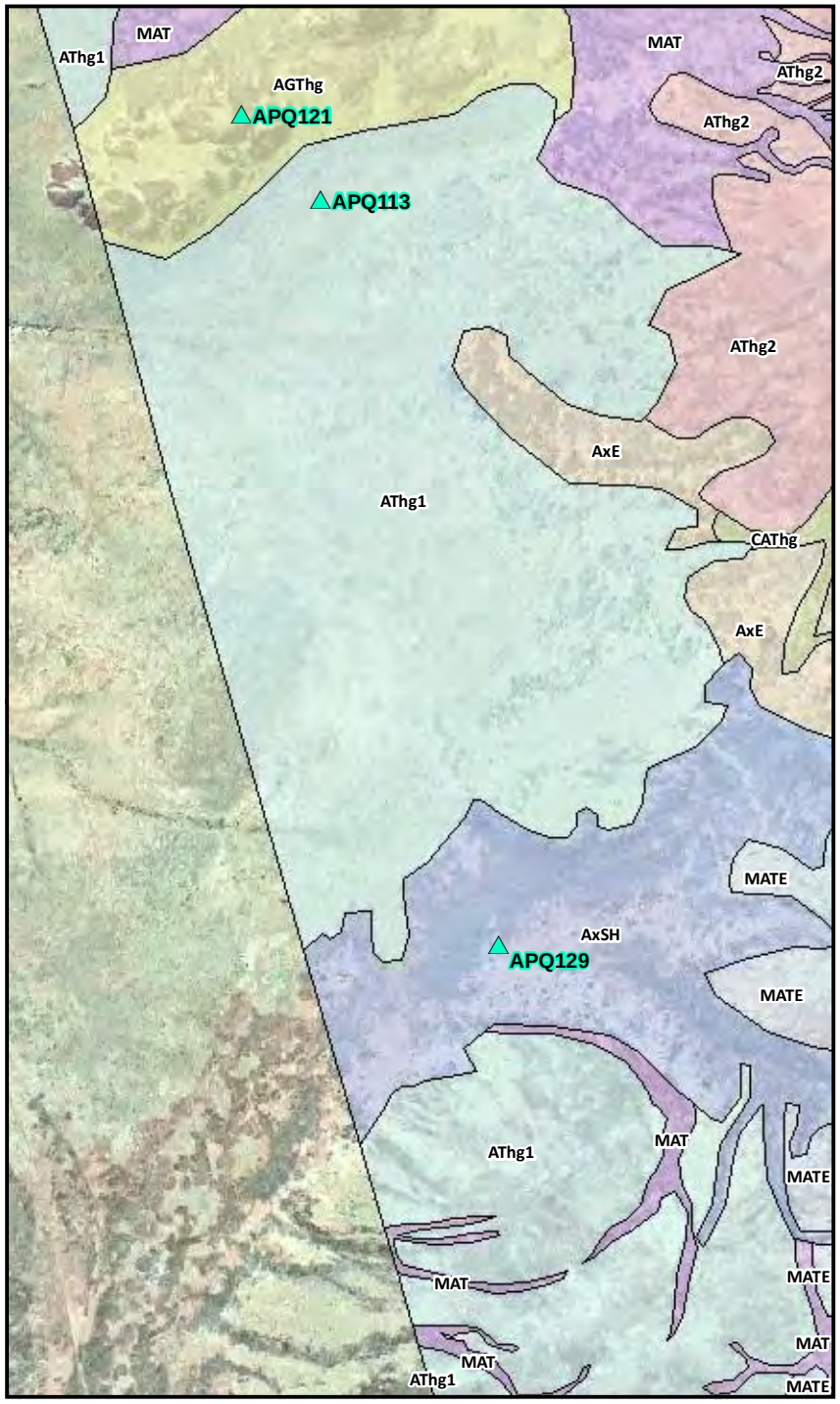
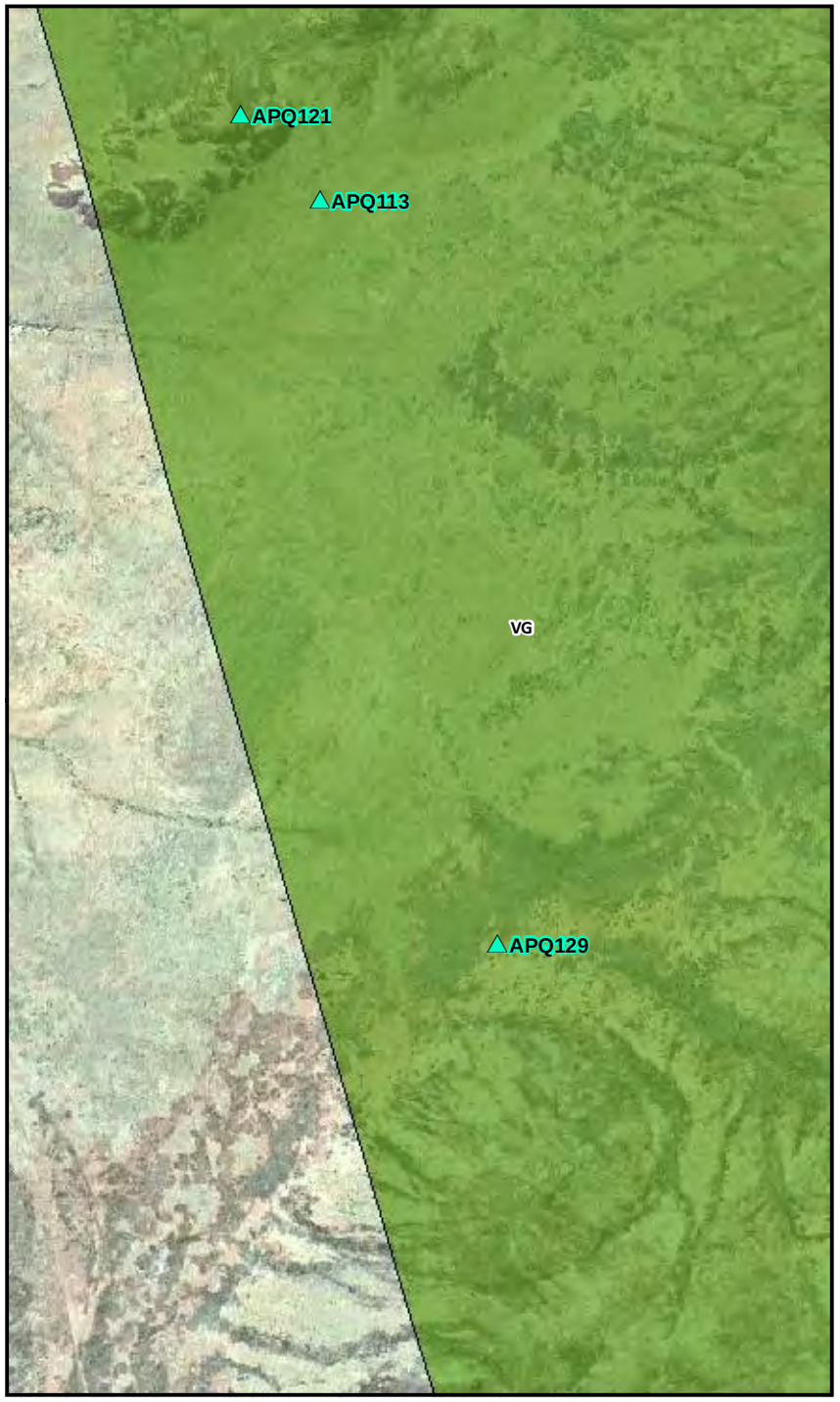




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.39

0 100 200 300

Metres

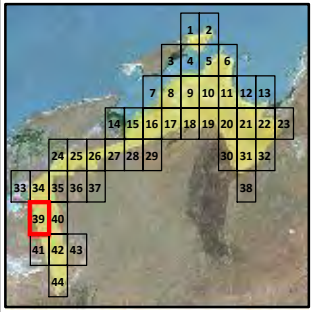
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E



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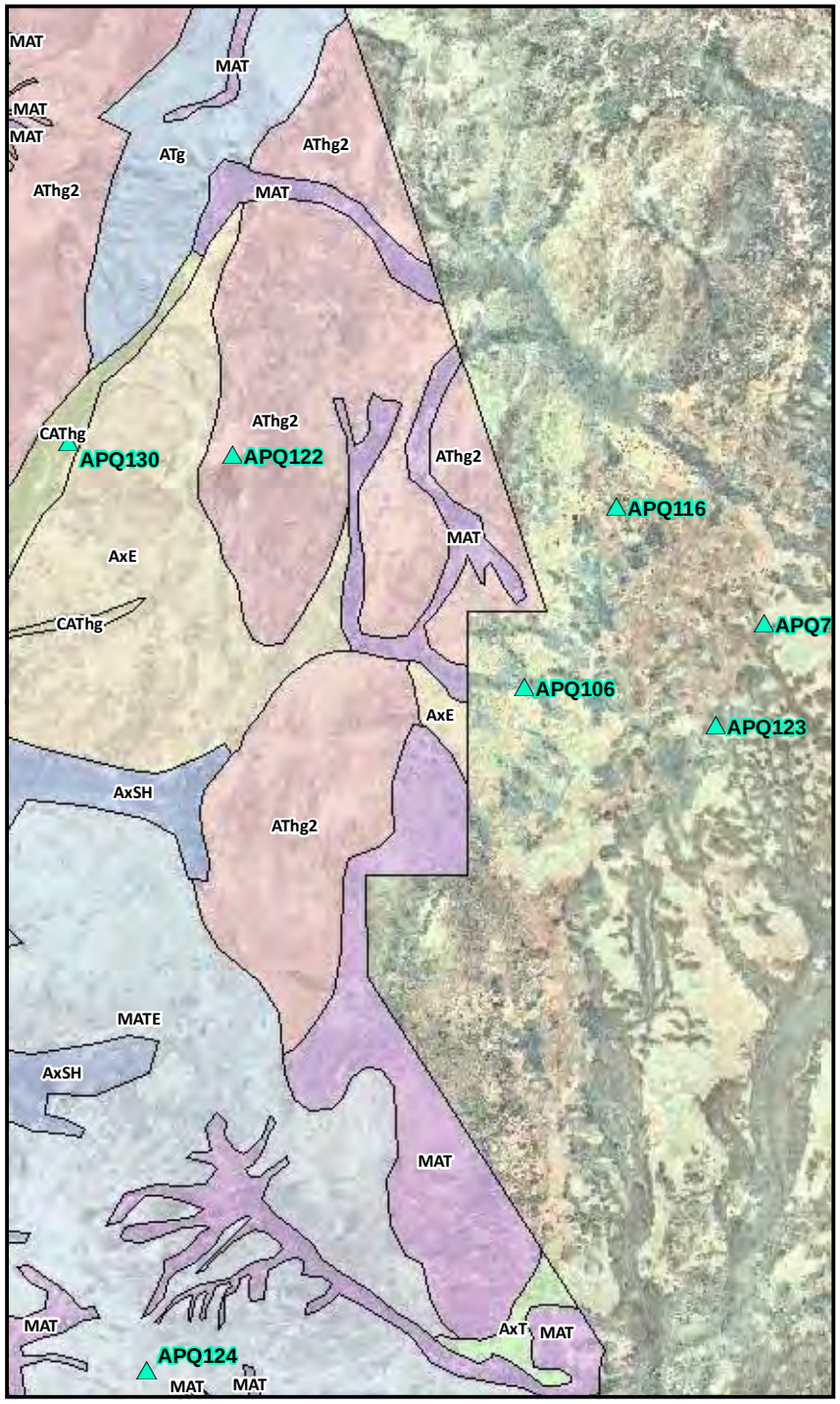
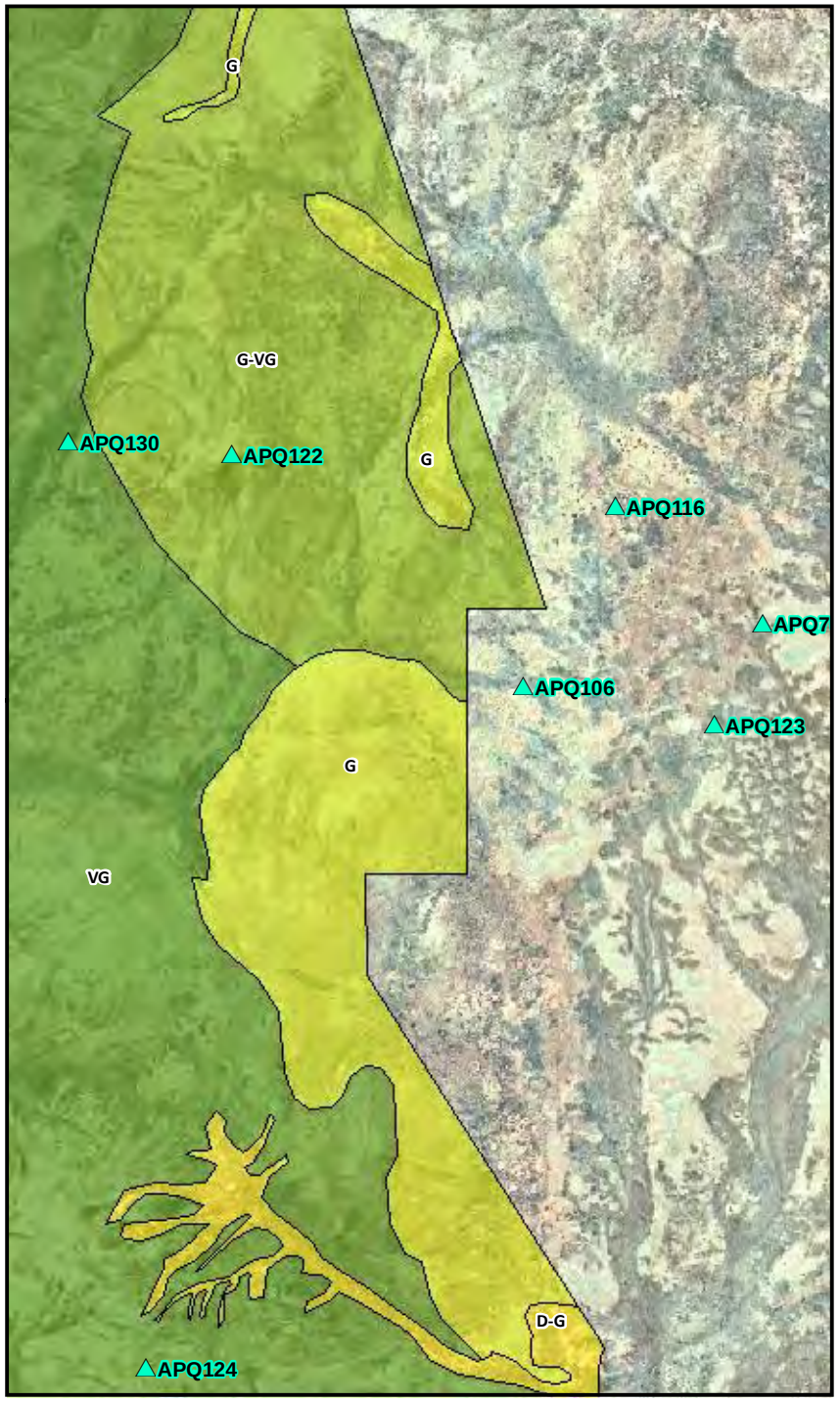




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.40

0 100 200 300

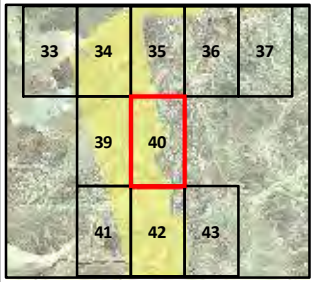
Metres

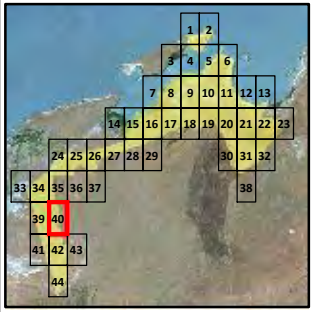
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition: CD, CD-D, D, D-G, G, G-VG, VG, VG-E





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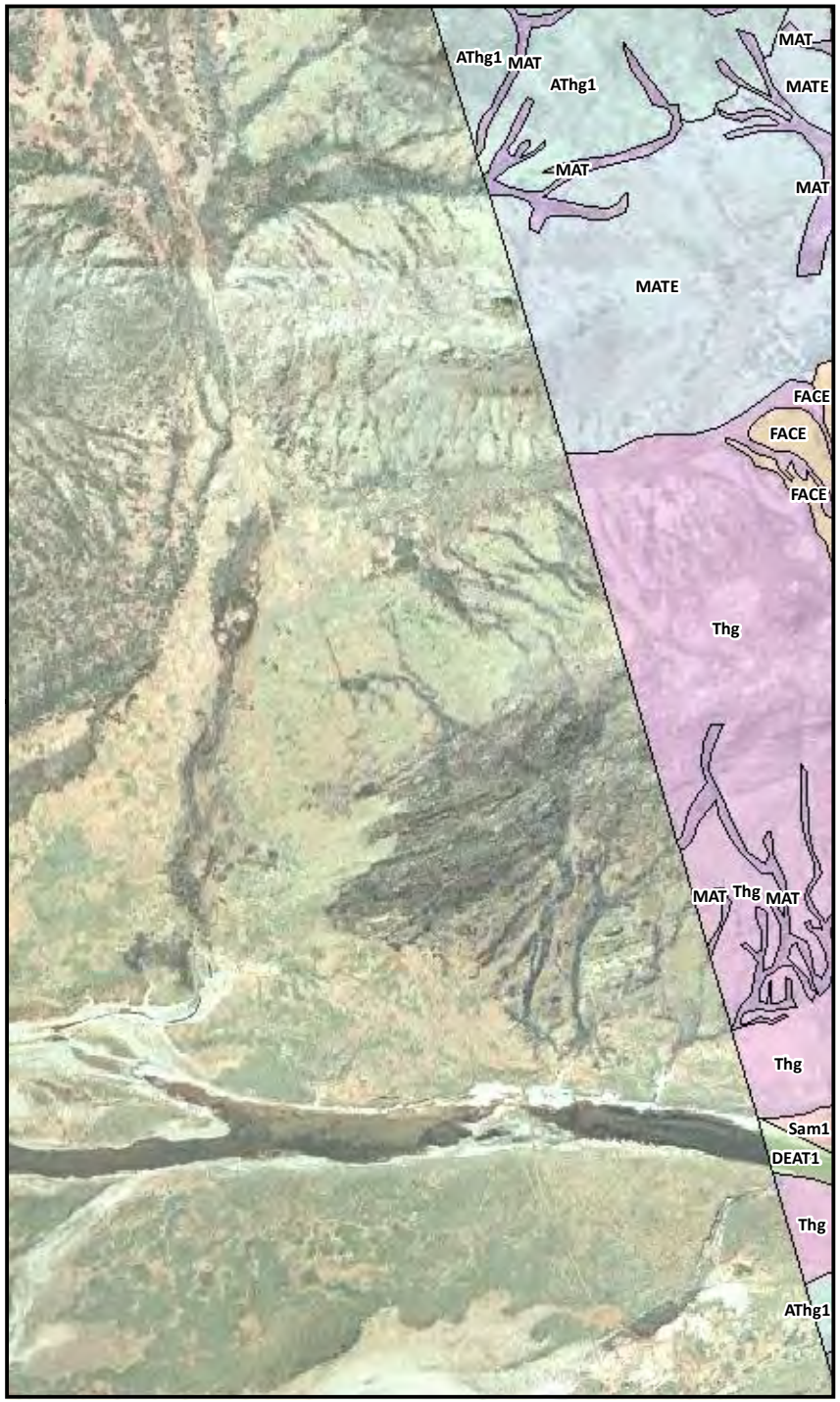
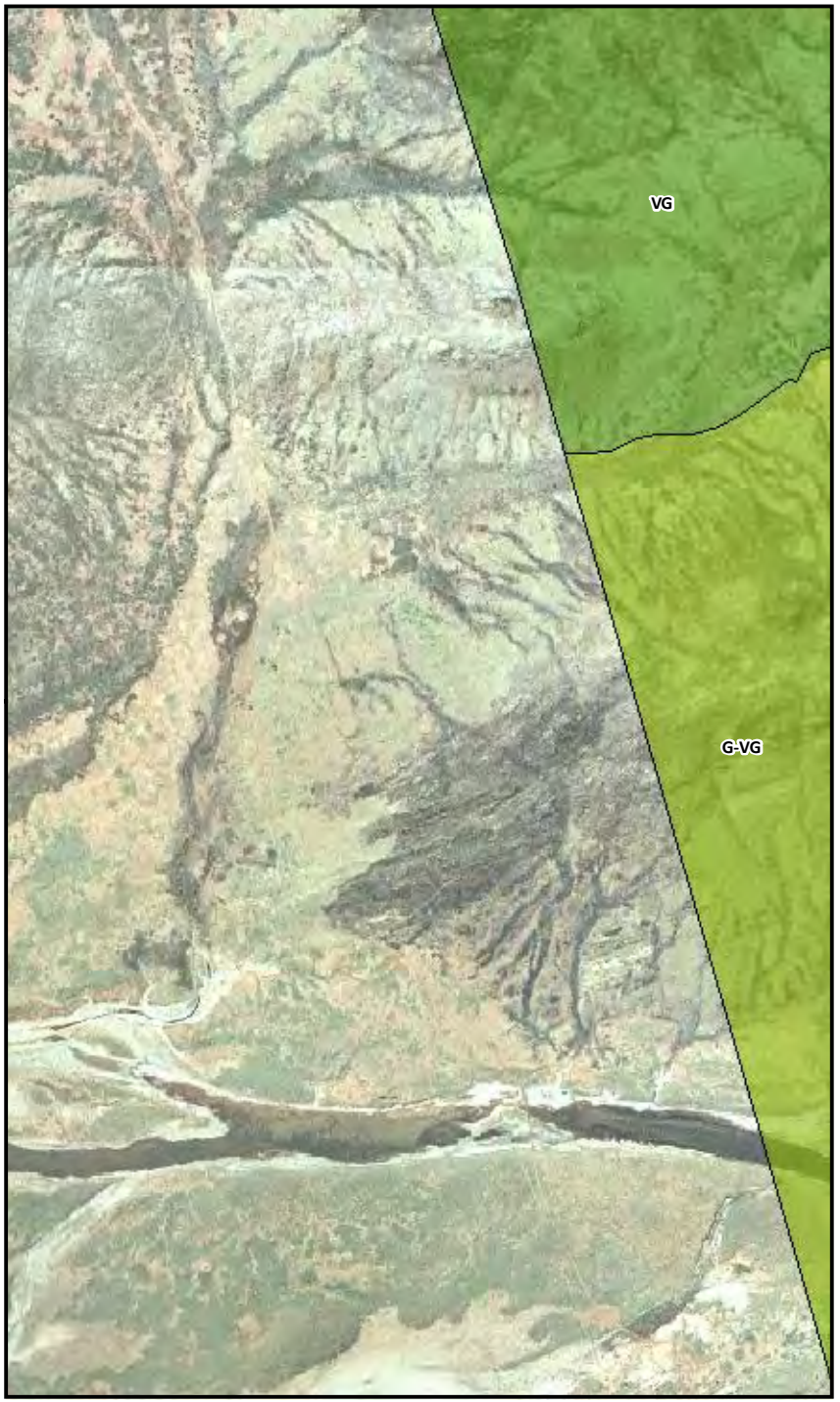




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.41

0 100 200 300

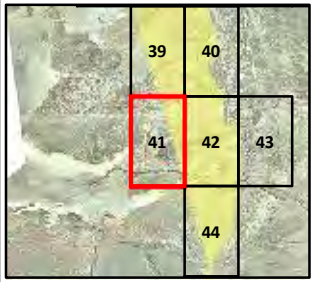
Metres

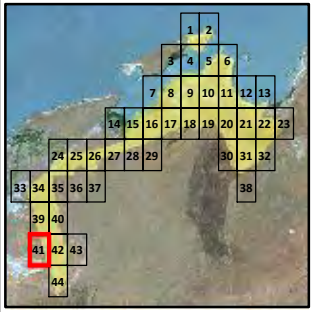
1:10,000 (A4)

Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E





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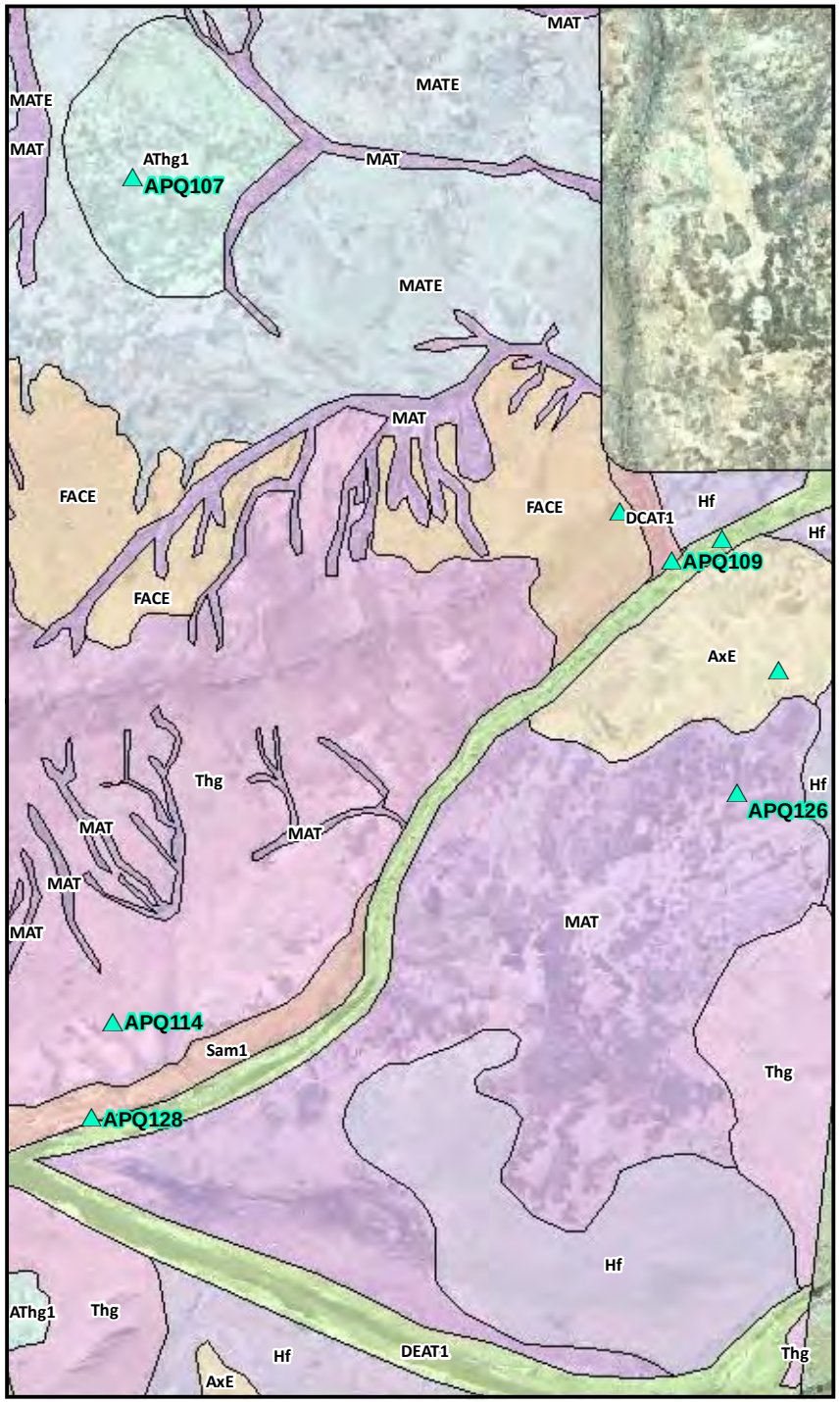
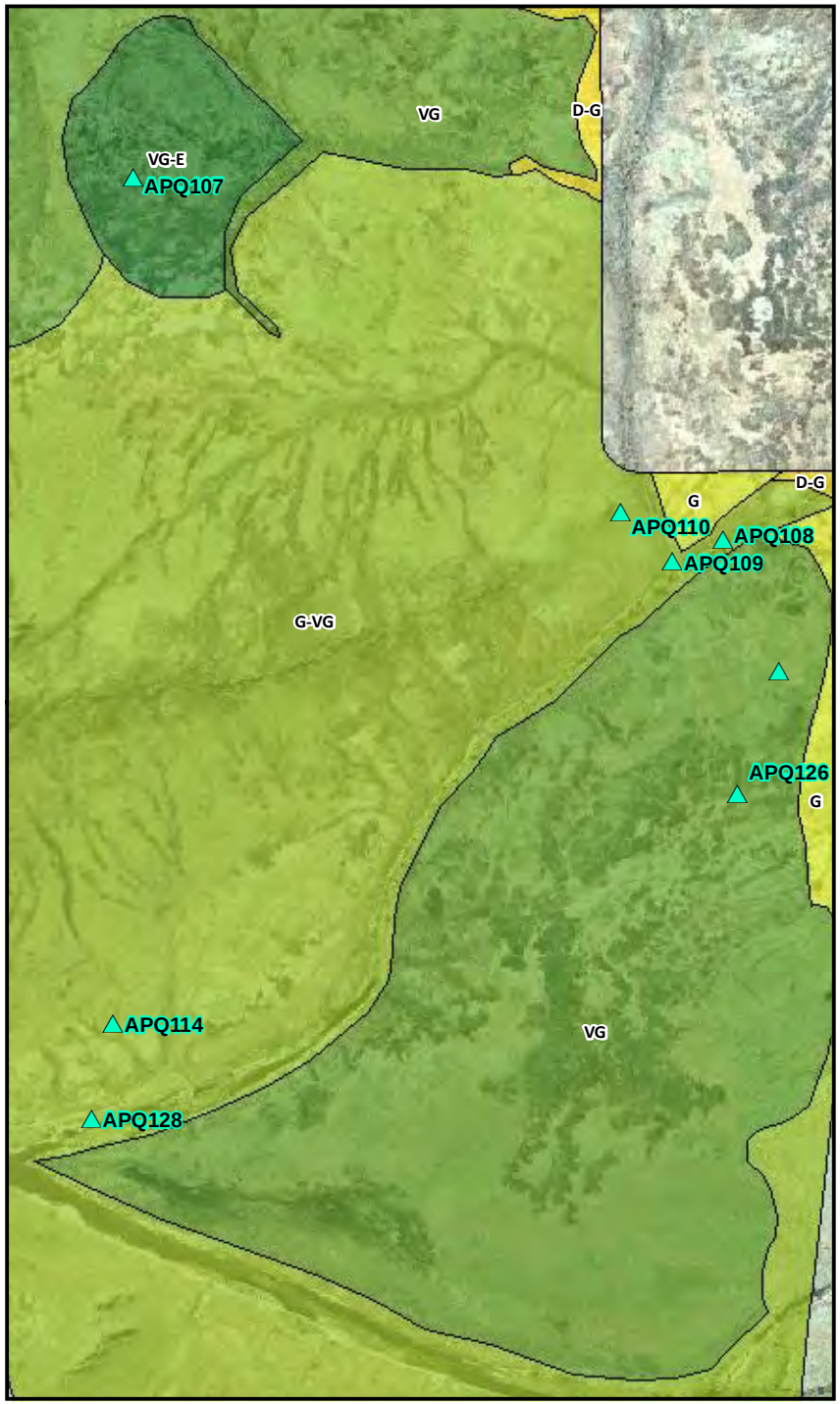
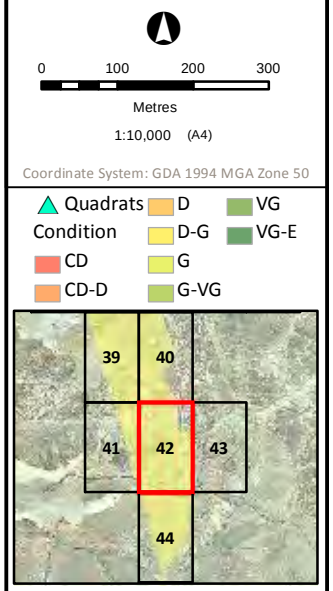




Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

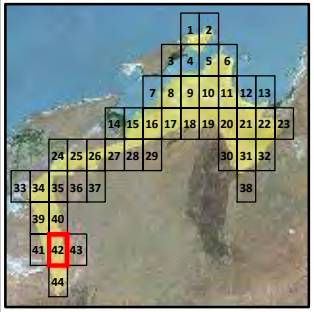
Figure 8.42



Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition
- CD
- CD-D
- D
- D-G
- G
- G-VG
- VG
- VG-E



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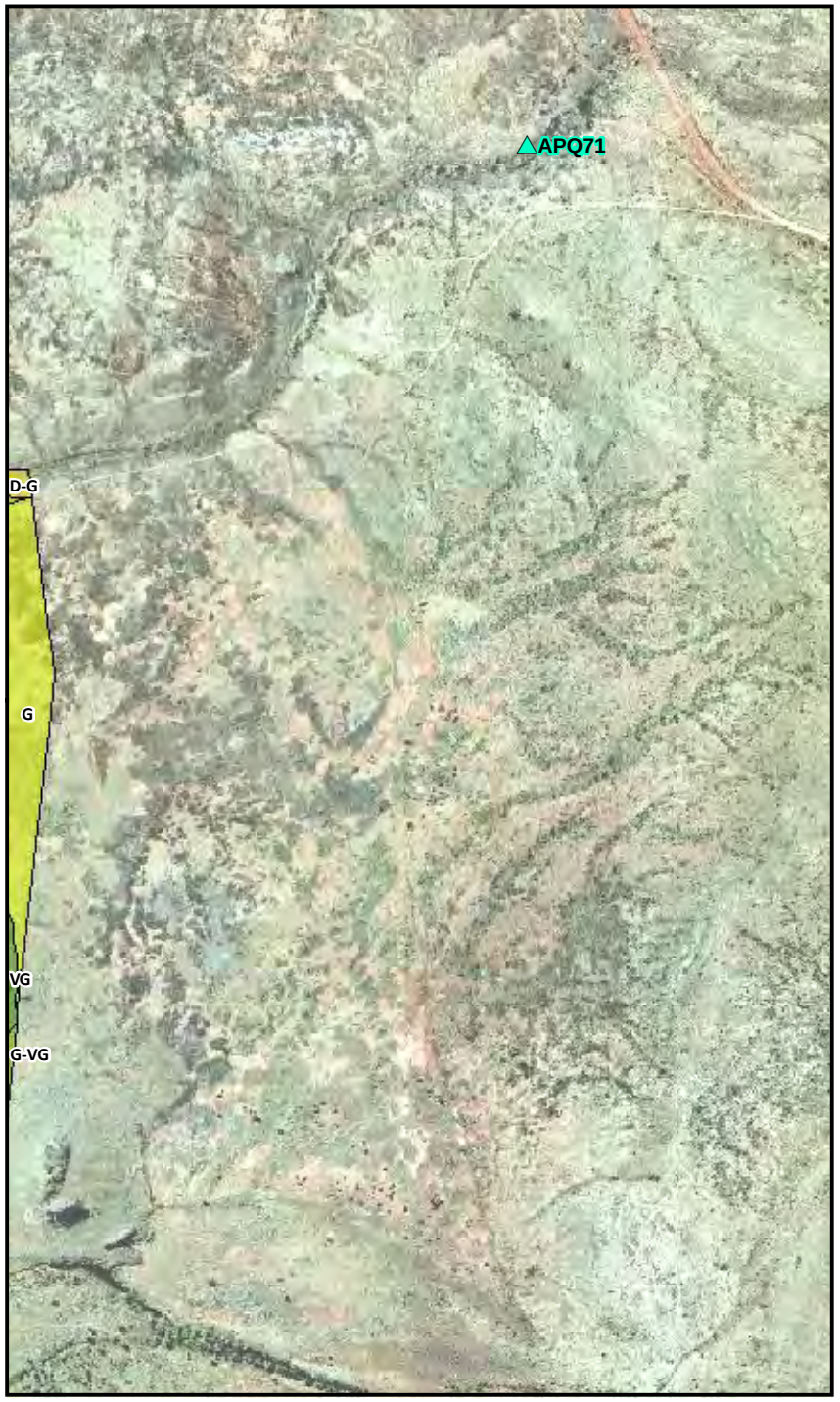


Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.43

0 100 200 300

Metres

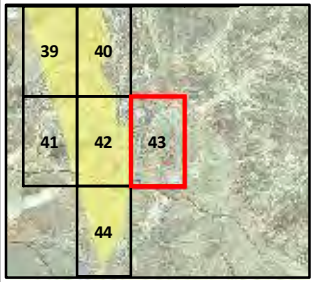
1:10,000 (A4)

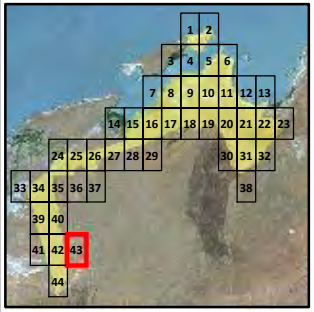
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





AECOM

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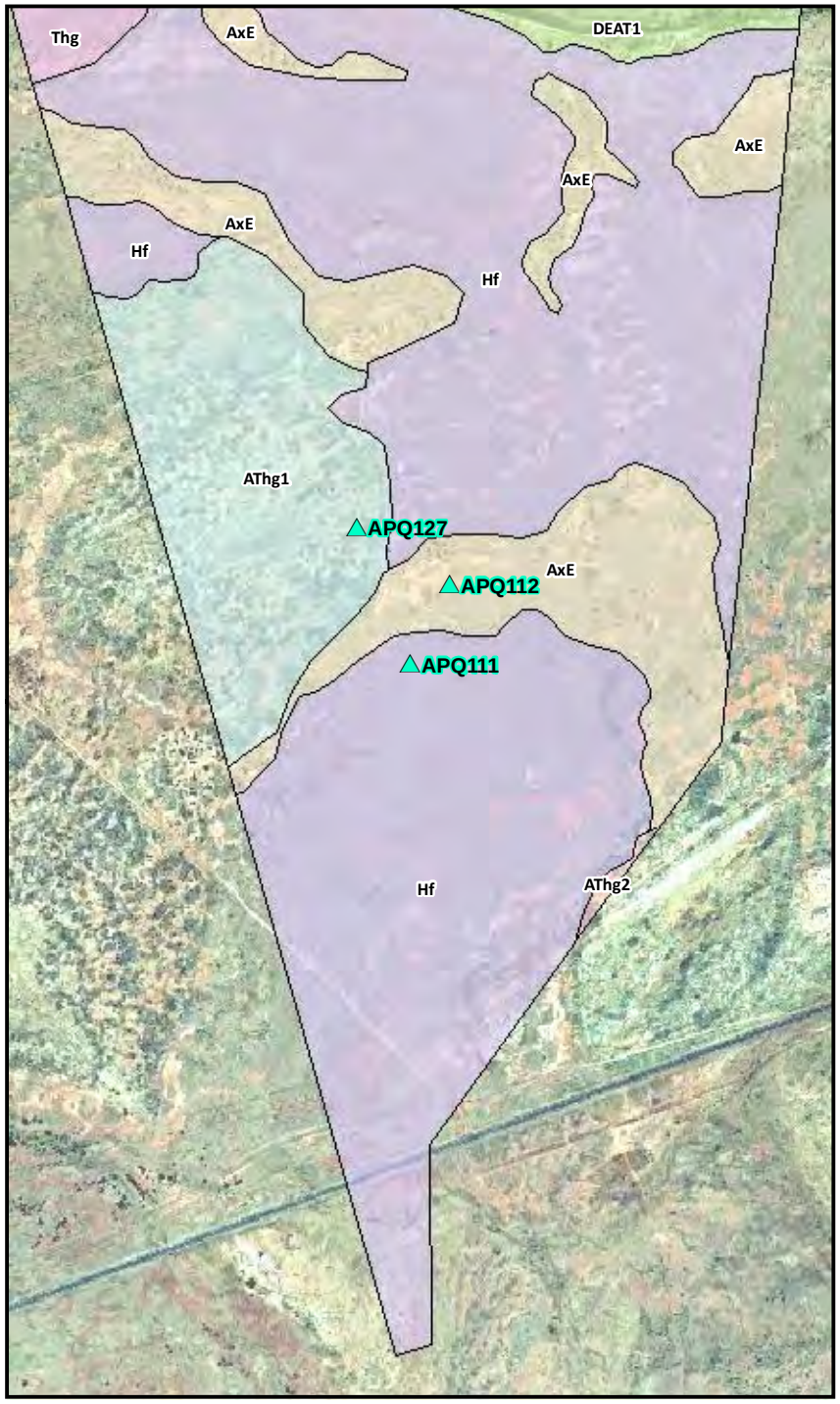
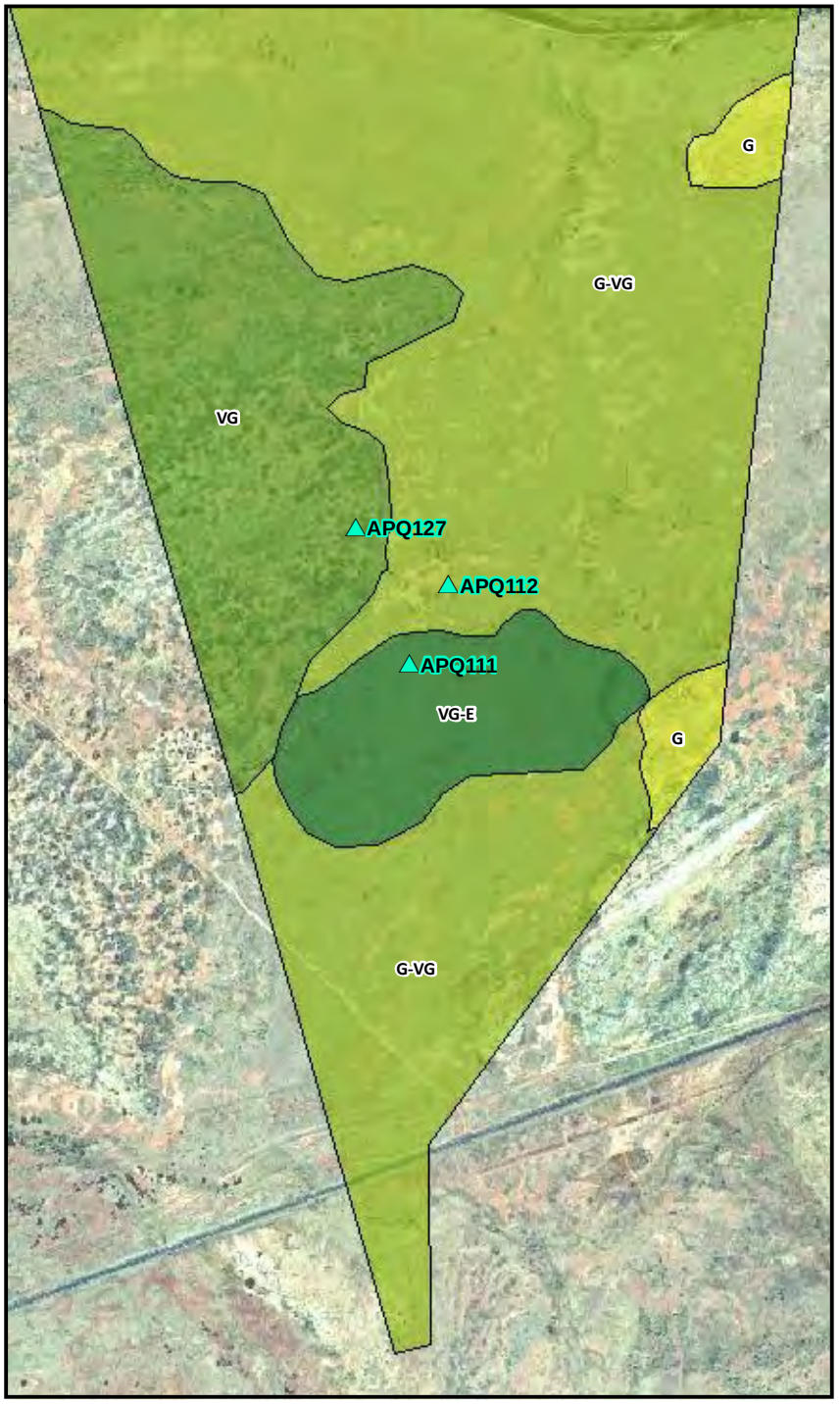
J:\Client_Data\Australian_Premium_IronOre\60027948_API_Rail_Flora_Survey\Workspaces\2011_05_02__Report_Figures\Fig8_Veg_Mapping.mxd

Last Printed: 02/05/11





Anketell Point and Dixon Island Port Project Area

Vegetation Communities and Condition

Figure 8.44

0 100 200 300

Metres

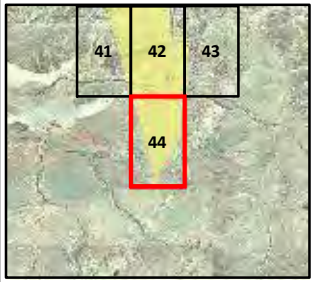
1:10,000 (A4)

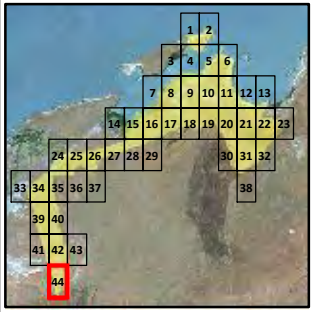
Coordinate System: GDA 1994 MGA Zone 50

Quadrats

Condition

CD
CD-D
D
D-G
G
G-VG
VG
VG-E





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Appendix A

Summary of Vascular Flora Species recorded at each community within the Original Port and Port Access Rail Realignment Survey Areas

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APPENDIX A: SUMMARY OF VASCULAR FLORA SPECIES RECRDED AT EACH COMMUNITY WITHIN DIXON ISLAND, PORT DEVELOPMENT AREAS and PORT ACCESS RAIL RE-ALIGNMENT BETWEEN 2008, 2009, 2010 & 2011

^ Denotes communities and/or species that are common to both areas

# Denotes species which are part of community but recorded in Rail quadrats and/or communities

+ Denotes species recorded in port quadrats only

NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	INFRA SPECIES CLASS	INFRA SPECIES	FORM	AUTHORITY	CONS. STATUS	RANGE EXT.	AGThg	Amg^	ATg	AThg1^	AThg2^	AxE	AxSH	AxT	CAThg1^	CST	DEAT1^	DCAT1^	DCAT2^	FACE	GT	Hf ^	Lit	MAC	MATE^	MAT^	MF	Sam1	Sam2	Thg ^	Thg (c)
13	Marsileaceae		*Marsilea*		*hirsuta*																														
31	Poaceae		*Aristida*		*burbidgeae*							+											+			+								+	
			Aristida		*contorta*								#		#	#	^	+	#							^		+	#	#				^	
			Aristida		*holathera*	var.	*holathera*									+																		#	
			Aristida		*hygrometrica*								+			+								+												
			Aristida		*latifolia*												+										#									
			Aristida		sp.																														#	
			Astrebla		*pectinata*																						#									
			Bothriochloa		*ewartiana*																		#	#												
			Brachyachne		*convergens*														#							#									
			Brachyachne		*prostrata*														#							#									
		*	*Cenchrus*		*ciliaris*							+	+	+	^	#	^	+	#	^	+	+	^	^	+	+	^	+	+	#	^		+		^	+
			Chloris		*pectinata*												+									#									
			Chrysopogon		*fallax*								#	+	#		^	+	#			+	+	^		#									+
			Chrysopogon		sp.								+		+																					
			Cymbopogon		*ambiguus*							+		+		+				#			+						^					^	
			Cymbopogon		*procerus*															#																
			Dactyloctenium		*radulans*								+		#	+	+		#				+		+	^	+		#	#				+	
			Dichanthium		*sericeum*												^						+						#	^					
			Dichanthium		*sericeum*	subsp.	*humilius*								#	#			#				^			^				^				#	
			Dichanthium		sp.											+																			
			Digitaria		*ctenantha*																									#					
			Enneapogon		*caerulescens*									+	#	^	+		#				#	#		+	^			#	#				^	
			Enneapogon		*lindleyanus*																														+	
			Eragrostis		*eriopoda*								+											+												
			Eragrostis	aff.	*eriopoda*																			+				+	+		+					+
			Eragrostis	aff.	*eriopoda*				(WAS site 963)																		+									
			Eragrostis		*falcata*																					#						+	+		
			Eragrostis		*setifolia*												+									+									
			Eragrostis		*tenellula*																	+				^									
			Eragrostis		*xerophila*												^	+	#							^		+	#						
			Eriachne		*aristidea*											+		+																+	
			Eriachne		*benthamii*								#						#							^									
			Eriachne		*ciliata*																			+											
			Eriachne		*mucronata*											+													^						
			Eriachne	aff.	*mucronata*								#													#									
			Eriachne		*obtusa*									+														+						+	
			Eriachne		*pulchella*												+												#						
			Eriachne		*pulchella*	subsp.	*pulchella*						#		#				#	#						#				#				#	
			Eriachne		*pulchella*	subsp.	*dominii*							+	#	^	^		#				+		+	#				^				#	
			Eriachne		sp.																				+			+							
			Eulalia		*aurea*								+	+	+																				
			Iseilema		*dolichotrichum*										#	#	^		#	+			^				#			#	#				#	
			Iseilema		*eremaeum*											+															+					
			Iseilema		*macratherum*										+											^									
			Iseilema		*vaginiflorum*												+																		
			Iseilema		sp.									+			+									+									
			Panicum		*decompositum*											#	+									^			#	#				+	
			Panicum		*laevinode*											#										#									
			Paraneurachne		*muelleri*								+		+	+			#	#			#	#					#	#					
			Paspalidium		*clementii*										#				#											#				#	
			Paspalidium		*tabulatum*									+	+		+								+				^						
			Paspalidium		*tabulatum*			(Whim Creek form)																		#	+			+				#	
			Perotis		*rara*																			+		^									
			Seatria		*dielsii*														#																	
			Schizachyrium		*fragile*											#	+																		
			Sorghum		*plumosum*	var.	*plumosum*																	#											
			Sorghum		*timorense*														#							#			#						
			Spinifex		*longifolius*																+						+									
			Sporobolus		*australasicus*									+	#	^	^	+	#			+	^		+		^			^	^		+		+	
			Sporobolus		*virginicus*																												+			
			Themeda		*triandra*									+	+	+				#		+	^	^						#				#	
			Triodia		*angusta*										+	+			#				#							#				+	
			Triodia		*brizoides*											#																			
			Triodia	aff.	*epactia*																			+							#				
			Triodia		*epactia*								#	+	^	#	+			#			^	#		+	^	+	+		^				^	
			Triodia		*pungens*											+								+												+
			Triodia		*schinzii*																											+				
			Triodia		*wiseana*							+	^	+		+	+	+		^					+				+	#	+				+	
			Triodia		*wiseana*			(fine form)							^	^			#				^	#		+	#				^				^	
			Urochloa		*pubigera*														#																	
			Xerochloa		*barbata*														#							^									
			Xerochloa		*imberbis*																					#				#					
			Yakirra		*australiensis*	var.	*australiensis*						+		#	+									+					+					
32	Cyperaceae		*Bulbostylis*		*barbata*								#		#	#	+		#					+		+	#			^				+	
			Bulbostylis		*turbinata*												+	+																	
			Cyperus		*pygmaeus*																					#									
			Cyperus		sp.																			+											
			Fimbristylis		*dichotoma*												+																		
			Fimbristylis	aff.	*dichotoma*				(M75-4)				#	+	#	#			#				+		+	+	#			#					^	
			Fimbristylis		sp.																									^					
			Cyperaceae		sp.										+																				
054P	Hemerocallidaceae		*Corynotheca*		*pungens*										#															+					
87	Moraceae		*Ficus*		*aculeata*							+																							
90	Proteaceae		*Grevillea*		*pyramidalis*							+		+	#															#					
			Grevillea		*pyramidalis*	subsp.	*leucadendron*						+		+								#	^		+			+					#	
			Grevillea		*wickhamii*	subsp.	*hispidula*								#																				
			Hakea		*lorea*										+															+					
			Hakea		*lorea*	subsp.	*lorea*						#		#														#					#	
92	Santalaceae		*Santalum*		*lanceolatum*																							+							
105	Chenopodiaceae		*Atriplex*	aff.	*amnicola*																					+									
			Atriplex		*bunburyana*													+																	+	
			Atriplex		*codonocarpa*																					+									
			Atriplex		*?codonocarpa*												+	+																	
			Dysphania		*rhadinostachya*	subsp.	*rhadinostachya*									#		+		#				#											+	
			Dysphania		sp.																														+	
			Enchylaena		*tomentosa*	var.	*tomentosa*												#																#	
			Neobassia		*astrocarpa*																												+	+		
			Rhagodia		*eremaea*																								#						
			Rhagodia		*preissii*	subsp.	*obovata*																					+							
			Salsola		*tragus*								+			#	+									#	+		#						
			Salsola		*tragus*	subsp.	*grandiflora*								#	#										#										
			Salsola		*tragus*	subsp.	*tragus*							+	#	#			#		+					#	+			^				+	
			Sclerolaena		*bicornis*																					+									
			Sclerolaena		*costata*										#	#			#							#			#						
			Sclerolaena		*densiflora*										#				#							#			#					#	
			Sclerolaena		*diacantha*																													+	
			Sclerolaena		*glabra*																					+									

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105	Chenopodiaceae (cont.)		*Suaeda*		*arbusculoides*																												+	
			Tecticornia		*halocnemoides*	subsp.	*tenuis*																										+	+		
			Tecticornia		*indica*	subsp.	*bidens*							+							+												+	+		
			Tecticornia		*indica*	subsp.	*leiostachya*																										+			
			Tecticornia		*pruinosa*																												+			
			Threlkeldia		*diffusa*																						+	+							
106	Amaranthaceae	*	*Aerva*		*javanica*							+		+	+	+					+							+	+		#			+	+
			Alternanthera		*nana*																		#												
			Alternanthera		*sp.*																						+								
			Amaranthus		*cuspidifolius*																												+		
			Gomphrena		*affinis*	subsp.	*pilbarensis*								#				#							#								
			Gomphrena		*canescens*										+	+	+									+				+			+	
			Gomphrena		*cunninghamii*							+	+	+	#	^	+	+		^			+	+	+	+		+	^	^		+		^	
			Hemichroa		*diandra*																												+	+		
			Ptilotus		*aervoides*												+	+	#								#				#				
			Ptilotus		*astrolasius*										#				#						+				#	#					
			Ptilotus		*auriculifolius*									+	+	^			#				+											#	
			Ptilotus		*axillaris*										#																				+
			Ptilotus		*calostachyus*									+	#	#			#											^					
			Ptilotus		*carinatus*										#				#					#			^		#	#				#	
			Ptilotus		*clementii*										#	#								#						+					
			Ptilotus		*exaltatus*										#				#				#	#			^							#	
			Ptilotus		*exaltatus*	var.	*exaltatus*							+	^	^	^	+	#	#				#	+	^		+	#	^				#	
			Ptilotus		*?exaltatus*	var.	*exaltatus*								^				#					+											
			Ptilotus		*fusiformis*									+		#		+	#				#							+				^	
			Ptilotus		*gomphrenoides*	var.	*gomphrenoides*																				#								
			Ptilotus		*helipteroides*										#	^	+		#					+			#			#	#				#	+
			Ptilotus		*incanus*																													+	
			Ptilotus		*murrayi*	var.	*murrayi*																				#				#				
			Ptilotus		*obovatus*											+																			
			Ptilotus		*obovatus*	var.	*obovatus*						+		#				#				#						#	#				#	
			Ptilotus		*polystachyus*																			+						+					
			Ptilotus		*sp.*																												+		
107	Nyctaginaceae		*Boerhavia*		*burbidgeana*																												#		
			Boerhavia		*coccinea*								#	+	#	+			#					#			+			^				#	
			Boerhavia		*gardneri*									+	+		+							+			+	+			+			+	+
			Boerhavia		*schomburgkiana*								+																						
110	Aizoaceae		*Trianthema*		*glossostigma*																												+		
			Trianthema	aff.	*triquetra*				(M3.35)						#												#				#				
			Trianthema		*turgidifolia*									+							+						+						+	+	
			Trianthema		sp. Python Pool														#																
110A	Molluginaceae		*Mollugo*		*molluginea*								^			+		+		+				#							#				
111	Portulacaceae		*Portulaca*		*conspicua*																						#							#	
		*	*Portulaca*		*oleracea*										#	^	^		#					#			^			#	^			^	
			Portulaca	aff.	*oleracea*													+													+				
			Portulaca		*pilosa*								+				+	+									+		+		+			+	
113	Caryophyllaceae		*Polycarpaea*		*corymbosa*																												+		
			Polycarpaea		*corymbosa*	var.	*corymbosa*						#			#																				
			Polycarpaea		*holtzei*									+	#																+			#	
			Polycarpaea		*longiflora*										#	+		+	#	#										^				^	
			Polycarpaea		*longiflora*			(red form)						+														+							
			Polycarpaea		*longiflora*			(Whim Creek form WC147-7)								#														#					
			Polycarpaea		*longiflora*			(white form)							#	#									+	+	#							^	
122	Menispermaceae		*Tinospora*		*smilacina*							+			#																		^	
131	Lauraceae		*Cassytha*		*capillaris*									+	#					#			#	#					+	#	#		+		+	
137A	Capparaceae		*Capparis*		*spinosa*									+																					
			Capparis		*spinosa*	var.	*nummularia*								#								#	#							#			^	
137C	Cleomaceae		*Cleome*		*viscosa*							+	^	+	#	+		+	#	+			+	+	+		#	+	+		+	+	+	+	
138	Brassicaceae		*Lepidium*		*pedicellosum*										#																				
			Lepidium		*pholidogynum*																						#			#	#		#			
160A	Surianaceae		*Stylobasium*		*spathulatum*									+																					
162	Fabaceae		*Acacia*		*acradenia*																												#		
			Acacia		*adsurgens*										#																					
			Acacia		*ampliceps*																+							+							
			Acacia		*ancistrocarpa*							+		+	#	+	+			^			#	#						^	#			#	
			Acacia		*ancistrocarpa*		*x stellaticeps*																								#					
			Acacia		*bivenosa*							+	+	+	^	^	+	+	#	+		+	^	^	+	+		+	+	^	^			^	+
			Acacia		*colei*	var.	*colei*																#					+		#					
			Acacia		*coriacea*	subsp.	*coriacea*							+	^					#			+					+	+		+			+	+
			Acacia		*coriacea*	subsp.	*pendens*					+		+	+	+						+	+		+										
			Acacia		*cowleana*										#					#			#												
			Acacia		*elachantha*			(golden hairy variant)							#					#						+										
			Acacia		*glaucocaesia*					3						#																		#		
			Acacia		*gregorii*																							+					+		
			Acacia		*inaequilatera*								^	+	^	+				#				#	+					^	^			+		
			Acacia		*ligulata*																									^					
			Acacia		*maitlandii*										#				#											#					
			Acacia		*pyrifolia*										^	+	+		#				^		+						^			^	
			Acacia		*pyrifolia*	var.	*pyrifolia*							+	^	^				#			^	^		+			+	#	^			^	
			Acacia		*sabulosa*																							+	+				+		
			Acacia		*sphaerostachya*											+																				
			Acacia		*stellaticeps*								+		+	+				#			+						+			^		+	
			Acacia		*synchronicia*									+	^															#	#			#	
			Acacia		*tenuissima*										#		+																		
			Acacia		*trachycarpa*																			#							#				
			Acacia		*trudgeniana*																												#		
			Acacia		*tumida*							+				+		+		+		+									+				
			Acacia		*tumida*	var.	*pilbarensis*						+	+	+					#			+	+							+				
			Acacia		*victoriae*										#																				
			Acacia		*xiphophylla*										#		+	+	#								#			#				#	
			Alysicarpus		*muelleri*										#	+	+	+	#	#		+	#	+			^			#	^		+	^	
			Cajanus		*cinereus*																		#												
			Canavalia		*rosea*																+														
			Crotalaria		*dissitiflora*	subsp.	*benthamiana*																				^			#					
			Crotalaria		*medicaginea*																			+											
			Crotalaria		*medicaginea*	var.	*neglecta*						+	+	#	#			#				#	^		+				^	#			^	
			Crotalaria		*novae-hollandiae*	subsp.	*novae-hollandiae*								#																				
			Crotalaria		*ramosissima*								+													+			+					
			Cullen		*cinereum*										#																			+	
			Cullen		*leucanthum*										#									+											
			Cullen		*leucochaites*																													+	
			Desmodium		*campylocaulon*																						#								
			Desmodium		*filiforme*																			+		+					+				
			Desmodium		*muelleri*																						#								
			Dichrostachys		*spicata*							+			#		+					+		#			#								
			Indigastrum		*parviflorum*										#															#					
			Indigofera		*colutea*								+		#				#				#	+		+				#	^			^	+
			Indigofera		*linifolia*								+		^				#	^			#	+		+	#	+		#	^			^	+

APPENDIX A: SUMMARY OF VASCULAR FLORA SPECIES RECRDED AT EACH COMMUNITY WITHIN DIXON ISLAND, PORT DEVELOPMENT AREAS and PORT ACCESS RAIL RE-ALIGNMENT BETWEEN 2008, 2009, 2010 & 2011

^ Denotes communities and/or species that are common to both areas
# Denotes species which are part of community but recorded in Rail quadrats and/or communities
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NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	INFRA SPECIES CLASS	INFRA SPECIES	FORM	AUTHORITY	CONS. STATUS	RANGE EXT.	AGThg	Amg^	ATg	AThg1^	AThg2^	AxE	AxSH	AxT	CAThg1^	CST	DEAT1^	DCAT1^	DCAT2^	FACE	GT	Hf ^	Lit	MAC	MATE^	MAT^	MF	Sam1	Sam2	Thg ^	Thg (c)
162	Fabaceae (cont.)		*Indigofera*		*linnaei*														#															+	
			Indigofera		*monophylla*															^										^	+				+	
			Indigofera		*monophylla*			(grey leaflet form)																										+	
			Indigofera		*monophylla*			(grey/green leaflet form)					#											#											^	
			Indigofera		*monophylla*										#									#												
			Indigofera		*monophylla*			(Cape Preston form)							#				#	#			#	#							#				^	
			Indigofera		*monophylla*				(MJOPP-2)					+	^									+							+				^	
			Indigofera		*monophylla*			(Burrup form)								+							+			+								#	
			Indigofera	aff.	*monophylla*																														#	
			Indigofera		*trita*								+		^	+							#			+	#			#	#				+	
			Isotropis		*atropurpurea*															#																
			Neptunia		*dimorphantha*												^	+	#								^								+	
			Neptunia		*monosperma*																						+									
			Petalostylis		*labicheoides*																			#												
		*	*Prosopis*		*pallida*													+					#	#			#				+					
			Rhynchosia		*minima*								+	+	^	^	^		#	#			^	^			^	+	+	#	^				^	+
			Senna		*artemisioides*	subsp.	*oligophylla*								#		+	+	#	^			#	#			#				#				#	
			Senna		*artemisioides*	subsp.	*oligophylla*	(thinly sericeous)											#				+							#					#	
			Senna		*artemisioides*	subsp.	*oligophylla x helmsii*							+	#				#					#				+		#	#					
			Senna		*glutinosa*	subsp.	*glutinosa x luerssenii*								#	+															#					
			Senna		*glutinosa*	subsp.	*glutinosa x oligophylla*																												+	
			Senna		*glutinosa*	subsp.	*pruinosa x glutinosa*																												+	
			Senna		*glutinosa*	subsp.	*luerssenii*								#															#	#				+	
			Senna		*glutinosa*	subsp.	*pruinosa*								#															#	#				#	
			Senna		*glutinosa*	subsp.	*x luerssenii*								#	#			#	#			#	#						#	#					
			Senna		*glutinosa*	subsp.	*glutinosa*							+	#	+			#	#				#			#			^	#				#	
			Senna		*hamersleyensis*														#																	
			Senna		*notabilis*									+	#	^	^		#	^			^				#			#	^				#	
			Senna		sp. Karijini				(M.E. Trudgen 10392)						#															#					#	
			Senna		*venusta*										#																				#	
			Sesbania		*cannabina*										#		^		#				+				#								#	
		*	*Stylosanthes*		*hamata*																					+										
			Swainsona		*canescens*										^				#									+	+						^	
			Swainsona		*formosa*									+		+				#				^	+		+				+					
			Swainsona		*pterostylis*																														+	
			Tephrosia		*clementii*								+		#				#				+				#			#					#	
			Tephrosia	aff.	*clementii*										+																				+	
			Tephrosia		*rosea*	var.	*clementii*							+	+																					
			Tephrosia		*rosea*	var.	*rosea*						+																					+		
			Tephrosia		sp. Bungaroo Creek				(M.E Trudgen 11601)						+									+												
			Tephrosia		*supina*								#	+	#					#						+			+		+				+	
			Tephrosia	aff.	*supina*				(HD133-20)						^																^				+	
			Tephrosia	aff.	*supina*				(HD205-10)					+					#																+	
			Tephrosia	aff.	*supina*				(HD88-4)							#											+				#					
			Tephrosia	aff.	*supina*				(MET 12,357)					+	^	#			#				#	+							#					
			Tephrosia		sp.										+																					
		*	*Vachellia*		*farnesiana*																		#													
			Vigna		*lanceolata*	var.	*lanceolata*						+									+												+	
			Vigna		sp. Burrup				(B18)							#																			#	
			Vigna		sp. central					2					#																					
			Zornia		*muelleriana*																					+									
167	Geraniaceae		*Erodium*		*cygnorum*														#																
173	Zygophyllaceae		*Tribulopis*		*angustifolia*																													+	
			Tribulus		*hirsutus*									+	#														+	^				+	
			Tribulus		*macrocarpus*																									+					
			Tribulus		*suberosus*								#																						
183	Polygalaceae		*Polygala*	aff.	*isingii*										#				#				#				^	+		#	#			#	+
			Polygala		sp.																													+	
185	Euphorbiaceae		*Adriana*		*tomentosa*	var.	*tomentosa*																					+							
			Euphorbia		*alsiniflora*								+			+	+			+		^	+						+				+		+
			Euphorbia		*australis*								#	+	#	#	+	+	#				#	+			+				^				^	
			Euphorbia	aff.	*australis*										#													+								
			Euphorbia		*alsiniflora*									+	^	+								+		+	#	+			^				^	
			Euphorbia		*biconvexa*									+	#	#			#	#										#	#				#	
			Euphorbia		*boophthona*																										#				#	
			Euphorbia	aff.	*drummondii*																							+								
			Euphorbia		*schultzii*																										+				+	
			Euphorbia		*tannensis*	subsp.	*eremophila*	(Burrup form)						+	#													+							+	
			Euphorbia		*wheeleri*									+	^	#								#			#								^	
			Euphorbia		sp.				(BPBS10-50)						^	^			#												#				#	
			Euphorbia		sp.																							+		#					
185A	Phyllanthaceae		*Flueggea*		*virosa*	subsp.	*melanthesoides*																												+	
			Notoleptopus		*decaisnei*										#				#	#			#							#						
			Notoleptopus		*decaisnei*	var.	*orbicularis*							+	#	+	+		#			+			+	+				#	^				+	
			Phyllanthus		*maderaspatensis*									+		+	^		#				+				#		+	#	#				+	
207	Sapindaceae		*Diplopeltis*		*eriocarpa*									+	#								#					+		^				+	
221	Malvaceae		*Abutilon*		*fraseri*																									#				+	
			Abutilon	aff.	*lepidum*																										+					
			Abutilon	aff.	*lepidum*				(1) (MET15,352)																						#					
			Abutilon	aff.	*lepidum*				(4)						#	^			#											#	#				^	
			Abutilon		*lepidum*								+	+	^											+					+				+	
			Abutilon		*otocarpum*																								+							
			Abutilon		*oxycarpum*												+																			
			Abutilon		*oxycarpum*	subsp.	*prostratum*								#				#																	
			Abutilon		sp.																									^					
			Brachychiton		*acuminatus*																														#	
			Corchorus		*laniflorus*										#	#			#	^											#					
			Corchorus		*parviflorus*								+	+	+	+	+							+		+			+		+					
			Corchorus	aff.	*parviflorus*				(JW 11-11)																										#	
			Corchorus	aff.	*parviflorus*									+		#			#	#			+			+	#			#	#				#	
			Corchorus		*tectus*										#	#				#										#	#				#	
			Corchorus		*tridens*																				+	+	^								+	
			Corchorus	aff.	*walcotti*				(K.J. Atkins 570)					+	#	+			#				#	#			#		+	#	^				+	
			Corchorus		*walcotti*												+	+																		
			Corchorus		sp.								+																							
			Gossypium		*australe*																															+
			Gossypium		*australe*			(Whim Creek form)					+						#																^	
			Gossypium		*australe*			(Burrup Peninsula form)							^				#	#			#	+							#					
			Gossypium		sp.												+														+				
			Hibiscus		*brachysiphonius*																						#									
			Hibiscus		*burtonii*								+																							
			Hibiscus		*coatesii*										+															#	+				+	
			Hibiscus		*leptocladus*																			+	+											
			Hibiscus	aff.	*platychlamys*				(MET 15,067)						#				#					+			+					#				^	
			Hibiscus		*sturtii*										+																					
			Hibiscus		*sturtii*	var.	*campylochlamys*								#					#																
			Hibiscus		*sturtii*	var.	*platychlamys*						#		#	+				#				+							#				+	
			Keraudrenia		sp.											+																				

APPENDIX A: SUMMARY OF VASCULAR FLORA SPECIES RECRDED AT EACH COMMUNITY WITHIN DIXON ISLAND, PORT DEVELOPMENT AREAS and PORT ACCESS RAIL RE-ALIGNMENT BETWEEN 2008, 2009, 2010 & 2011

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221	Malvaceae (cont.)	*	*Malvastrum*		*americanum*										#		+		#			+	#	#			#									
			Melhania		*oblongifolia*																													+	
			Melhania		sp. Burrup										#																				
			Melhania		sp.			(CH15-39)						+	#								#					+	#						
			Sida		*arsiniata*														#																
			Sida		*cardiophylla*										+																				
			Sida	aff.	*cardiophylla*										+																				
			Sida		*clementii*										#	#				#			#	#					#	#					
			Sida		*echinocarpa*								+	+																+					
			Sida	aff.	*echinocarpa*			(MET 13,350)					#	+	^				#	#										^				#	
			Sida		*fibulifera*												+										+							#	
			Sida	aff.	*fibulifera*																														+
			Sida	aff.	*fibulifera*			(HD200-6)											#				+	+			^								
			Sida	aff.	*fibulifera*			(M37,16)																+											
			Sida	aff.	*fibulifera*			(MET 15,220)						+	#												#							#	
			Sida		*rohlenae*	subsp.	*rohlenae*																	+				+		+					
			Sida		sp.		Pilbara		(A.A.Mitchell PRP 1543)				+	+	+								+	+						+					
			Sida		sp.		spiciform panicles		(E. Leyland s.n 14/08/1990)						#																					
			Sida		sp.		verrucose glands		(F.H. Mollemans 2423)															+											
			Sida		*spinosa*										#				#					#			#								
			Triumfetta		*appendiculata*										#																				
			Triumfetta		*clementii*							+			^	^	+	+	#	^			^	#	+	+	+			^	^				^	
			Triumfetta		*maconochieana*									+																					
			Triumfetta		sp.																								+						
			Waltheria		*indica*							+			+					#															
236	Frankeniaceae		*Frankenia*		*pauciflora*	var.	*pauciflora*				+			+																		+	+		
243	Violaceae		*Hybanthus*		*aurantiacus*								+	+	^	+		+	#	^		+	^	^	+	+			+	^	+				^	
269	Rhizophoraceae		*Rhizophora*		*stylosa*																											+			
273	Myrtaceae		*Corymbia*		*hamersleyana*								+		#	+							^	^							+				
			Corymbia		*opaca*															#															
			Eucalyptus		*victrix*																	+													
280	Araliaceae		*Trachymene*		*oleracea*									+		+									+					^	+			+	
			Trachymene		*oleracea*	subsp.	*oleracea*								#	#			#	#			#			+						#			^	
294	Plumbaginaceae		*Muellerolimon*		*salicorniaceum*																												+		
301	Oleaceae		*Jasminum*		*didymum*							+																							
			Jasminum		*didymum*	subsp.	*lineare*							+	#									#											#	
304	Apocynaceae		*Sarcostemma*		*viminale*												+	+																	
			Sarcostemma		*viminale*	subsp.	*australe*								#														+		#					
307	Convolvulaceae		*Bonamia*		*linearis*								+											+					+	+					
			Bonamia		*media*																		+											^	
			Bonamia		*media*	var.	*villosa*						+	+	#	^			#	#			+	+		+				#	^			^	+
			Bonamia		*pannosa*															+			+								+				
			Bonamia		*rosea*										#																				
			Duperreya		*commixta*																									#					
			Evolvulus		*alsinoides*								+				+														^				
			Evolvulus		*alsinoides*	var.	*decumbens*													#															
			Evolvulus		*alsinoides*	var.	*villosicalyx*						#	+	#	^			#	^			+	#		+	^			#	^			^	+
			Ipomoea		*coptica*												+		#								^							#	
			Ipomoea		*costata*										#															^					
			Ipomoea		*muelleri*								+		+												#								
			Ipomoea		*plebeia*																						#								
			Ipomoea		*polymorpha*								+		#									+		+		+		+					
			Operculina		*aequisepala*																	+					^								
			Polymeria		*ambigua*											+							#	#						#					
			Polymeria		sp.			(site 1365)																							#					
310	Boraginaceae		*Ehretia*		*saligna*	var.	*saligna*								#	+			#				#	#							^				
			Heliotropium		*conocarpum*														#								#								
			Heliotropium		*cunninghamii*								#		#																#				+
			Heliotropium		*?cunninghamii*										+																				
			Heliotropium		*heteranthum*										#		^		#								#			#				#	
			Heliotropium		*inexplicitum*								#			#											#								
			Heliotropium		*ovalifolium*										+	+							#	+					+	#	#				
			Heliotropium		*pachyphyllum*								+		+																				
			Trichodesma		*zeylanicum*								+	+	+					^					+			+	+		#				
			Trichodesma		*zeylanicum*	var.	*zeylanicum*						+	+	^	#			#	#			^	^		+			+	#	^			+	
311	Verbenaceae		*Clerodendrum*		*tomentosum*	var.	*lanceolatum*																											#	
315	Solanaceae		*Solanum*		*diversiflorum*								+	+	#				#	#			+							#	#			#	+
			Solanum		*ellipticum*																													+	
			Solanum		*gabrielae*																													#	
			Solanum		*horridum*										#	#			#					#						#				^	
			Solanum		*lasiophyllum*								+		#	+									+		#		+	#	#			+	
316	Scrophulariaceae		*Eremophila*		*forrestii*										#																				
			Eremophila		*forrestii*	subsp.	*forrestii*								#				#											#	#				
			Eremophila		*longifolia*										#															#					
			Myoporum		*montanum*									+																					
317	Bignoniaceae		*Dolichandrone*		*heterophylla*																				+										
325	Acanthaceae		*Avicennia*		*marina*	subsp.	*marina*														+											+		+	
			Dicliptera		*armata*																													^	
329	Plantaginaceae		*Stemodia*		*grossa*									+	+																				
			Stemodia		*kingii*												^										^								
331	Rubiaceae		*Oldenlandia*		*crouchiana*									+	+																			+	
337	Cucurbitaceae		*Cucumis*		*maderaspatanus*							+		+	#	+	+			#			+				^		+	#	#			^	
		*	*Cucumis*		*melo*	subsp.	*agrestis*									#			#								#				#				
			Trichosanthes		*cucumerina*																													#	
341	Goodeniaceae		*Goodenia*		*forrestii*										#	#			#				#	#						#	#				
			Goodenia		*microptera*									+	^	+			#	^			+	+		+			+		#			+	+
			Goodenia		*pascua*																						#								
			Goodenia		*stobbsiana*															#										#					
			Scaevola		*spinescens*			(narrow form)				+																+							
			Scaevola		*spinescens*			(broad leaf form)							#				#					#						^	#			#	
345	Asteraceae	*	*Flaveria*		*trinervia*											+											#								
			Launaea		*sarmentosa*																	+													
			Pentalepis		*trichodesmoides*							+			#																				
			Pluchea		sp.																						#								
			Podolepis		sp.																									+					
			Pterocaulon		*sphacelatum*										#					#											#				
			Pterocaulon		*sphaeranthoides*									+						#				+											
			Pterocaulon		sp.																													+	
			Streptoglossa		*bubakii*										#		+		#	#							#			#				#	
			Streptoglossa		*decurrens*								#	+					#	#							#				#				^
			Streptoglossa		*liatroides*														#								#								
			Streptoglossa		sp.																													#	

Appendix B

Summary of Vascular Flora Species recorded at each quadrat within the Original Port and Port Access Rail Realignment Survey Areas

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APPENDIXB: SUMMARY OF VASCULAR FLORA SPECIES RECORDED WITHIN EACH QUADRAT WITHIN THE ORIGINAL PORT DEVELOPMENT AND PORT ACCESS RAIL RE-ALIGNEMNT AREAS (2008, 2009, 2010 AND 2011).

NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ061	APQ062	APQ063	APQ064	APQ065	APQ066	APQ067	APQ068	APQ069	APQ079	APQ081	APQ082	APQ087	APQ088	APQ089	APQ090	APQ091	APQ092	APQ093	APQ094	APQ095	APQ096	APQ097	APQ098	APQ100	APQ101	APQ102	APQ103	APQ104	APQ105
13	Marsileaceae		*Marsilea*		*hirsuta*																												+							
31	Poaceae		*Aristida*		*burbidgeae*												+						+																	
			Aristida		*contorta*						+							+									+				+		+		+	+				
			Aristida		*holathera*	var.	*holathera*											+																						
			Aristida		*hygrometrica*																										+				+					
			Aristida		*latifolia*																																			
		*	*Cenchrus*		*ciliaris*						+	+	+	+	+	+	+	+			+		+		+	+	+	+	+	+	+	+		+		+	+	+	+
			Chloris		*pectinata*																																			
			Chrysopogon		*fallax*											+		+													+		+							
			Chrysopogon		sp.																																			
			Cymbopogon		*ambiguus*													+																				+			
			Dactyloctenium		*radulans*							+	+					+	+						+	+						+					+	+		
			Dichanthium		*sericeum*													+																						
			Dichanthium		*sericeum*	subsp.	*humilius*											+																						
			Dichanthium		sp.														+																					
			Enneapogon		*caerulescens*							+							+													+						+		
			Enneapogon		*lindleyanus*																			+																
			Eragrostis	aff.	*eriopoda*						+		+								+										+								
			Eragrostis	aff.	*eriopoda*				(WAS site 963)						+					+																				
			Eragrostis		*eriopoda*																																	+			
			Eragrostis		*falcata*											+				+																				
			Eragrostis		*setifolia*																																			
			Eragrostis		*tenellula*																														+					
			Eragrostis		*xerophila*																														+				+	
			Eriachne		*aristidea*																				+															
			Eriachne		*benthamii*																														+					
			Eriachne		*ciliata*																												+							
			Eriachne		*mucronata*																																			
			Eriachne		*obtusa*																		+						+	+		+							
			Eriachne		*pulchella*																																			
			Eriachne		*pulchella*	subsp.	*dominii*										+	+									+					+		+	+				
			Eriachne		sp.																																			
			Eulalia		*aurea*																					+			+								+			
			Iseilema		*dolichotrichum*												+																			+			+	
			Iseilema		*eremaeum*													+									+												
			Iseilema		*macratherum*																													+						
			Iseilema		sp.																																			
			Iseilema		*vaginiflorum*																																			
			Panicum		*decompositum*																			+									+						
			Paraneurachne		*muelleri*														+												+					+			
			Paspalidium		*clementii*																																			
			Paspalidium		*tabulatum*								+																								+			
			Perotis		*rara*																										+								
			Setaria		*dielsii*																																			
			Sorghum		*timorense*																																			
			Spinifex		*longifolius*									+							+																			
			Sporobolus		*australasicus*											+	+	+						+		+	+	+		+			+		+			+		
			Sporobolus		*virginicus*														+																					
			Themeda		*triandra*												+									+		+				+	+			+			
			Triodia	aff.	*epactia*																										+								
			Triodia		*angusta*											+							+	+	'+															
			Triodia		*epactia*						+	+	+				+									'+	'+	'+	'+	'+	'+	+			+	+		+		
			Triodia		*pungens*										+																									
			Triodia		*schinzii*						+																													
			Triodia		*wiseana*																		+				+									+	+	+		+	
			Triodia		*wiseana*			(fine form)				+					+	+				+		+	'+		'+					+								
			Urochloa		*pubigera*																																			
			Xerochloa		*barbata*																														+					
			Yakirra		*australiensis*																						+						+				+		
			Yakirra		*australiensis*	var.	*australiensis*				+	+							+			+																	
32	Cyperaceae		*Bulbostylis*		*barbata*							+														'+					+	+		+		+		
			Bulbostylis		*turbinata*																																			
			Cyperaceae		sp.																					+													
			Cyperus		sp.																										+								
			Fimbristylis	aff.	*dichotoma*																																			
			Fimbristylis	aff.	*dichotoma*				(M75-4)			+					+																		+	+				
			Fimbristylis		*dichotoma*																																			
			Fimbristylis		sp.																																			
054P	Hemerocallidaceae		*Corynotheca*		*pungens*						+																												
87	Moraceae		*Ficus*		*aculeata*																																			
			Ficus		*aculeata*	var.	*indecora*																																		
90	Proteaceae		*Grevillea*		*pyramidalis*																																			
			Grevillea		*pyramidalis*	subsp.	*leucadendron*					+															+					+	+			+	+		
			Hakea		*lorea*																																			
92	Santalaceae		*Santalum*		*lanceolatum*																+																		+
105	Chenopodiaceae		*Atriplex*		*?codonocarpa*																																			
			Atriplex	aff.	*amnicola*																																		+	
			Atriplex		*bunburyana*																																			
			Atriplex		*codonocarpa*																														+				+	
			Dysphania		*rhadinostachya*	subsp.	*rhadinostachya*																+																	
			Dysphania		sp.																			+															
			Enchylaena		*tomentosa*	var.	*tomentosa*																																		
			Neobassia		*astrocarpa*											+			+																					
			Rhagodia		*preissii*	subsp.	*obovata*						+								+																			
			Salsola		*tragus*								+																	+							+			
			Salsola		*tragus*	subsp.	*tragus*							+							+					+			+	+										

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NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ061	APQ062	APQ063	APQ064	APQ065	APQ066	APQ067	APQ068	APQ069	APQ079	APQ081	APQ082	APQ087	APQ088	APQ089	APQ090	APQ091	APQ092	APQ093	APQ094	APQ095	APQ096	APQ097	APQ098	APQ100	APQ101	APQ102	APQ103	APQ104	APQ105
105	Chenopodiaceae (cont.)		*Sclerolaena*		*bicornis*																												+							
			Sclerolaena		*diacantha*																	+																		
			Sclerolaena		*glabra*																																	+		
			Suaeda		*arbusculoides*																		+																	
			Tecticornia		*halocnemoides*	subsp.	*tenuis*									+			+																				
			Tecticornia		*indica*	subsp.	*bidens*							+		+			+																				
			Tecticornia		*indica*	subsp.	*leiostachya*																																	
			Tecticornia		*pruinosa*											+																							
			Threlkeldia		*diffusa*															+																		+		
106	Amaranthaceae	*	*Aerva*		*javanica*								+	+	+					+		+								+	+			+				
			Amaranthus		*cuspidifolius*																												+						
			Gomphrena		*canescens*						+																												
			Gomphrena		*cunninghamii*							+				+	+	+				+	+	+	+	+	+	+	+	+	+	+		+	+	+			
			Hemichroa		*diandra*											+			+																				
			Ptilotus		*?exaltatus*	var.	*exaltatus*																								+								
			Ptilotus		*aervoides*																																	+		
			Ptilotus		*astrolasius*							+																												
			Ptilotus		*auriculifolius*													+				+					+												
			Ptilotus		*axillaris*										+																								
			Ptilotus		*calostachyus*																								+								+		
			Ptilotus		*carinatus*																																			
			Ptilotus		*clementii*						+																												
			Ptilotus		*exaltatus*																													+					
			Ptilotus		*exaltatus*	var.	*exaltatus*					+						+								+	+		+	+				+			+	
			Ptilotus		*fusiformis*																	+				+										+			
			Ptilotus		*helipteroides*										+			+													+							
			Ptilotus		*incanus*																	+																
			Ptilotus		*obovatus*																																+		
			Ptilotus		*polystachyus*						+																					+							
			Ptilotus		sp.																											+						
107	Nyctaginaceae		*Boerhavia*		*coccinea*													+									+		+	+			+				
			Boerhavia		*gardneri*										+					+		+		+			+	+				+					
			Boerhavia		*schomburgkiana*																															+		
110	Aizoaceae		*Trianthema*		*glossostigma*																		+														
			Trianthema		*turgidifolia*									+		+			+			+								+							+	
110A	Molluginaceae		*Mollugo*		*molluginea*						+																				+					+		
111	Portulacaceae		*Portulaca*	aff.	*oleracea*																																		
		*	*Portulaca*		*oleracea*							+						+					+								+		+	+			+	
			Portulaca		*pilosa*						+	+											+							+						+	+	
113	Caryophyllaceae		*Polycarpaea*		*corymbosa*																																		
			Polycarpaea		*holtzei*																																+		
			Polycarpaea		*longiflora*						+																										+		
			Polycarpaea		*longiflora*			(red form)																						+									
			Polycarpaea		*longiflora*			(white form)				+										+																	
122	Menispermaceae		*Tinospora*		*smilacina*																																		
131	Lauraceae		*Cassytha*		*capillaris*											+	+					+	+	+						+	+					+		
137A	Capparaceae		*Capparis*		*spinosa*																																		
			Capparis		*spinosa*	var.	*nummularia*																										+							
137C	Cleomaceae		*Cleome*		*viscosa*						+		+		+	+	+			+		+		+				+		+	+				+		
138	Brassicaceae		*Lepidium*		*pholidogynum*											+																						
160A	Surianaceae		*Stylobasium*		*spathulatum*																									+								
162	Fabaceae		*Acacia*		*ampliceps*									+																								
			Acacia		*ancistrocarpa*																																		
			Acacia		*bivenosa*							+			+		+	+					+				+	+	+	+	+	+	+		+	+	+			+
			Acacia		*coriacea*																																			
			Acacia		*coriacea*	subsp.	*coriacea*				+		+		+					+							+		+		+								+
			Acacia		*coriacea*	subsp.	*pendens*									+													+										
			Acacia		*elachantha*			(golden hairy variant)				+																												
			Acacia		*gregorii*																+	+																	
			Acacia		*inaequilatera*													+						+		+	+	+								+	+		
			Acacia		*ligulata*																																			
			Acacia		*pyrifolia*																																+	+		
			Acacia		*pyrifolia*	var.	*pyrifolia*					+					+	+								+	+	+	+	+	+							
			Acacia		*sabulosa*						+		+																										
			Acacia		*sphaerostachya*																																			
			Acacia		*stellaticeps*						+						+									+											+		
			Acacia		*synchronicia*																									+						+			
			Acacia		*tenuissima*																																			
			Acacia		*tumida*																																			
			Acacia		*tumida*	var.	*pilbarensis*										+									+					+					+	+		
			Acacia		*xiphophylla*																																			
			Dichrostachys		*spicata*																																			
			Neptunia		*dimorphantha*																																			
			Neptunia		*monosperma*																																		+	
		*	*Prosopis*		*pallida*																																			
			Senna		*artemisioides*	subsp.	*oligophylla*	(thinly sericeous)									+																						
			Senna		*artemisioides*	subsp.	*oligophylla*															+																	
			Senna		*artemisioides*	subsp.	*oligophylla x helmsii*														+									+									
			Senna		*glutinosa*	subsp.	*glutinosa*											+												+			+					
			Senna		*glutinosa*	subsp.	*glutinosa x luerssenii*											+																					
			Senna		*glutinosa*	subsp.	*luerssenii*															+																	
			Senna		*glutinosa*	subsp.	*pruinosa*																																	
			Senna		*glutinosa*	subsp.	*pruinosa x glutinosa*															+																	
			Senna		*notabilis*						+						+	+						+		+	+	+	+							+		
			Senna		*venusta*																					+												
			Alysicarpus		*muelleri*												+	+					+				+	+				+				+		
			Canavalia		*rosea*									+																									
			Crotalaria		*cunninghamii*																																			
			Crotalaria		*dissitiflora*	subsp.	*benthamiana*																																	
			Crotalaria		*medicaginea*																																			
			Crotalaria		*medicaginea*	var.	*neglecta*					+					+	+				+			+					+			+	+		+		+		
			Crotalaria		*ramosissima*							+																			+						+		
			Cullen		*cinereum*																		+																
			Cullen		*lachnostachys*																																			
			Cullen		*leucanthum*												+																						

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162	Fabaceae (cont.)		*Cullen*		*leucochaites*																				+														
			Desmodium		*filiforme*						+	+																		+									
			Indigofera		*colutea*						+	+			+			+					+						+						+			
			Indigofera		*linifolia*						+	+			+					+			+			+				+					+			
			Indigofera		*monophylla*																								+					+	+			
			Indigofera		*monophylla*			(Burrup form)				+					+	+																				
			Indigofera		*monophylla*			(Cape Preston form)													+																		
			Indigofera		*monophylla*			(Grey leaflet form)																								+							
			Indigofera		*monophylla*				(MJOPP-2)																	+	+	+			+	+							
			Indigofera		*trita*							+						+				+	+	+		+										+			
			Rhynchosia		*minima*										+		+	+		+		+	+		+	+	+	+	+	+	+	+	+	+	+	+		
			Sesbania		*cannabina*																																		
		*	*Stylosanthes*		*hamata*							+																											
			Swainsona		*canescens*															+	+					+				+								
			Swainsona		*formosa*							+					+	+									+	+			+							
			Swainsona		*pterostylis*																	+																
			Tephrosia	aff.	*clementii*																																	
			Tephrosia	aff.	*supina*				(HD133-20)												+			+	+	+	+											
			Tephrosia	aff.	*supina*				(HD205-10)													+						+										
			Tephrosia	aff.	*supina*				(HD88-4)			+																											
			Tephrosia	aff.	*supina*				(MET 12 357)																	+		+			+								
			Tephrosia		*clementii*												+																			+			
			Tephrosia		*rosea*	var.	*clementii*																			+		+										
			Tephrosia		*rosea*	var.	*rosea*																													+	+		
			Tephrosia		sp.																																		
			Tephrosia		sp. Bungaroo Creek				(ME Trudgeon 11601)																	+					+								
			Tephrosia		*supina*							+												+		+				+								
			Vigna		*lanceolata*	var.	*lanceolata*																									+				+			
			Zornia		*muelleriana*							+																											
173	Zygophyllaceae		*Tribulopis*		*angustifolia*																																	
			Tribulus		*hirsutus*																+								+	+				+				
			Tribulus		*macrocarpus*																														+				
183	Polygalaceae		*Polygala*	aff.	*isingii*										+		+			+														+		+		
			Polygala		sp.																											+						
185	Euphorbiaceae		*Adriana*		*tomentosa*	var.	*tomentosa*													+																		
			Euphorbia	aff.	*australis*															+																		
			Euphorbia	aff.	*drummondii*								+																										
			Euphorbia		*alsiniflora*						+	+	+		+	+	+	+				+		+	+					+	+	+	+	+	+	+		
			Euphorbia		*australis*													+												+			+	+		+	+	
			Euphorbia		*biconvexa*						+											+								+								
			Euphorbia		*schultzii*																															+			
			Euphorbia		sp.															+																		
			Euphorbia		sp.				(BPBS10-50)									+																	+				
			Euphorbia		*tannensis*	subsp.	*eremophila*													+	+																	
			Euphorbia		*wheeleri*																					+		+										
185A	Phyllanthaceae		*Flueggea*		*virosa*	subsp.	*melanthesoides*																									+						
			Notoleptopus		*decaisnei*	var.	*orbicularis*					+					+	+									+				+		+	+			
			Phyllanthus		*maderaspatensis*												+					+							+	+							
207	Sapindaceae		*Diplopeltis*		*eriocarpa*															+	+																
221	Malvaceae		*Corchorus*	aff.	*parviflorus*							+					+											+									
			Corchorus	aff.	*walcottii*				(KJ Atkins 570)									+				+					+	+			+							
			Corchorus	aff.	*walcottii*																																	
			Corchorus		*parviflorus*							+												+			+	+		+	+	+	+			+		
			Corchorus		sp.																															+		
			Corchorus		*tridens*							+																			+	+					+	
			Corchorus		*walcottii*																															+			
			Triumfetta		*clementii*							+					+	+				+		+	+	+	+	+				+			+	+		
			Triumfetta		*maconochieana*																							+										
			Abutilon	aff.	*lepidum*																															+			
			Abutilon	aff.	*lepidum*				(MET 15352)																														
			Abutilon	aff.	*lepidum*																			+														
			Abutilon		*fraseri*																	+																
			Abutilon		*lepidum*						+	+													+	+	+			+			+			+		
			Abutilon		*otocarpum*																										+								
			Abutilon		*oxycarpum*																																		
221	Malvaceae (cont.)		*Abutilon*		sp.																																	
			Gossypium		*australe*										+																								
			Gossypium		*australe*			(Burrup penninsula form)																		+						+							
			Gossypium		*australe*			(Whim Creek form)																								+					+		
			Gossypium		sp.																															+			
			Hibiscus	aff.	*platychlamys*				(MET 15 067)			+					+																					
			Hibiscus		*burtonii*																																+		
			Hibiscus		*coatesii*																			+		+										+			
			Hibiscus		*leptocladus*												+																					
			Hibiscus		*sturtii*																					+												
			Hibiscus		*sturtii*	var.	*platychlamys*										+	+									+											
		*	*Malvastrum*		*americanum*																																	
			Sida	aff.	*cardiophylla*																					+												
			Sida	aff.	*echinocarpa*																															+			
			Sida	aff.	*echinocarpa*				(MET 15 350)																	+		+										
			Sida	aff.	*fibulifera*										+																								
			Sida	aff.	*fibulifera*				(HD200-6)								+																			+			
			Sida	aff.	*fibulifera*				(M37.16)																														
			Sida	aff.	*fibulifera*				(oblong:MET 15 220)														+						+										
			Sida		*cardiophylla*				15 220)																											+			
			Sida		*echinocarpa*																						+	+									+		
			Sida		*fibulifera*																																		
			Sida		*rohlenae*	subsp.	*rohlenae*				+																				+	+							
			Sida		sp.		Pilbara		(A.A.Mitchell PRP 1543)									+									+	+				+					+	+		
			Sida		sp.		verrucose glands		(FH Mollemans 2423)																							+							
			Keraudrenia		sp.																																		
			Melhania		*oblongifolia*																			+														
			Melhania		sp.				(CH15-39)																				+	+								
			Waltheria		*indica*																					+												
236	Frankeniaceae		*Frankenia*		*pauciflora*	var.	*pauciflora*									+			+																			

APPENDIXB: SUMMARY OF VASCULAR FLORA SPECIES RECORDED WITHIN EACH QUADRAT WITHIN THE ORIGINAL PORT DEVELOPMENT AND PORT ACCESS RAIL RE-ALIGNEMNT AREAS (2008, 2009, 2010 AND 2011).

NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ061	APQ062	APQ063	APQ064	APQ065	APQ066	APQ067	APQ068	APQ069	APQ079	APQ081	APQ082	APQ087	APQ088	APQ089	APQ090	APQ091	APQ092	APQ093	APQ094	APQ095	APQ096	APQ097	APQ098	APQ100	APQ101	APQ102	APQ103	APQ104	APQ105
243	Violaceae		*Hybanthus*		*aurantiacus*						+	+					+	+				+				+			+	+	+	+			+	+			
273	Myrtaceae		*Corymbia*		*hamersleyana*												+														+				+	+			
			Eucalyptus		*victrix*																																			
280	Araliaceae		*Trachymene*		*oleracea*																						+					+							
			Trachymene		*oleracea*	subsp.	*oleracea*					+									+																		
294	Plumbaginaceae		*Muellerolimon*		*salicorniaceum*														+																				
301	Oleaceae		*Jasminum*		*didymum*																																		
			Jasminum		*didymum*	subsp.	*lineare*																																	
304	Apocynaceae		*Sarcostemma*		*viminale*																																		
			Sarcostemma		*viminale*	subsp.	*australe*						+																											
307	Convolvulaceae		*Bonamia*		*linearis*						+																			+	+				+			
			Bonamia		*media*																																		
			Bonamia		*media*	var.	*villosa*					+			+		+	+			+		+		+	+	+		+		+	+			+	+		
			Bonamia		*pannosa*												+										+											
			Evolvulus		*alsinoides*																																+	+		
			Evolvulus		*alsinoides*	var.	*villosicalyx*					+			+		+	+				+		+		+	+	+	+			+		+				
			Ipomoea		*coptica*																																		
			Ipomoea		*costata*																																		
			Ipomoea		*muelleri*																					+										+			
			Ipomoea		*polymorpha*						+	+																		+	+					+			
			Operculina		*aequisepala*																																		
			Polymeria		*ambigua*																																		
			Polymeria		sp.				(site 1365)																														
310	Boraginaceae		*Ehretia*		*saligna*																																		
			Ehretia		*saligna*	var.	*saligna*																										+							
			Heliotropium		*cunninghamii*										+																								
			Heliotropium		*?cunninghamii*																														+				
			Heliotropium		*heteranthum*																																		
			Heliotropium		*inexplicitum*														+																				
			Heliotropium		*ovalifolium*																										+	+							
			Heliotropium		*pachyphyllum*																																+			
			Trichodesma		*zeylanicum*																														+		+			
			Trichodesma		*zeylanicum*	var.	*zeylanicum*				+	+	+				+					+			+	+	+	+	+	+	+							
315	Solanaceae		*Solanum*		*diversiflorum*										+		+									+		+							+			
			Solanum		*ellipticum*																	+																	
			Solanum		*horridum*																+																	
			Solanum		*lasiophyllum*																		+	+							+							
			Stemodia		*kingii*																																		
316	Scrophulariaceae		*Myoporum*		*montanum*																								+									
317	Bignoniaceae		*Dolichandrone*		*heterophylla*																																		
325	Acanthaceae		*Avicennia*		*marina*	subsp.	*marina*			˙+				+					+																			
329	Plantaginaceae		*Stemodia*		*grossa*																						+		+									
331	Rubiaceae		*Oldenlandia*		*crouchiana*																																		
337	Cucurbitaceae		*Cucumis*		*maderaspatanus*												+								+	+	+	+		+		+						
339	Campanulaceae		*Isotoma*		sp.																																		
341	Goodeniaceae		*Goodenia*		*microptera*							+			+		+	+				+				+			+	+	+				+			
			Scaevola		*spinescens*																														+				
			Scaevola		*spinescens*			(broad leaf form)																																
			Scaevola		*spinescens*			narrow form)													+																		
345	Asteraceae	*	*Flaveria*		*trinervia*																																		
			Launaea		*sarmentosa*									+																									
			Pentalepis		*trichodesmoides*																																		
			Podolepis		sp.																																		
			Pterocaulon		sp.																			+															
			Pterocaulon		*sphaeranthoides*												+													+									
			Streptoglossa		*bubakii*																																		
			Streptoglossa		*decurrens*																			+		+			+	+								

APPENDIXB: SUMMARY OF VASCULAR FLORA SPECIES RECORDED WITHIN EACH QUADRAT WITHIN THE ORIGINAL PORT DEVELOPMENT AND PORT ACCESS RAIL RE-ALIGNEMNT AREAS (2008, 2009, 2010 AND 2011).

NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ106	APQ107	APQ108	APQ109	APQ110	APQ111	APQ112	APQ113	APQ114	APQ115	APQ116	APQ117	APQ118	APQ119	APQ120	APQ121	APQ122	APQ123	APQ124	APQ125	APQ126	APQ127	APQ128	APQ129	APQ130
13	Marsileaceae		*Marsilea*		*hirsuta*																													
31	Poaceae		*Aristida*		*burbidgeae*																				+										
			Aristida		*contorta*					+					+	+				+													+	
			Aristida		*holathera*	var.	*holathera*																											
			Aristida		*hygrometrica*					+																								
			Aristida		*latifolia*																													
		*	*Cenchrus*		*ciliaris*					+		+	+	+	+	+	+	+	+	+	+	+			+				+	+		+	+	+
			Chloris		*pectinata*																						+								
			Chrysopogon		*fallax*							+				+	+										+						+		
			Chrysopogon		sp.																										+				
			Cymbopogon		*ambiguus*														+			+			+	+		+						
			Dactyloctenium		*radulans*										+			+		+														
			Dichanthium		*sericeum*											+						+												
			Dichanthium		*sericeum*	subsp.	*humilius*								+		+	+				+							+		+			
			Dichanthium		sp.																													
			Enneapogon		*caerulescens*										+							+	+				+							
			Enneapogon		*lindleyanus*																													
			Eragrostis	aff.	*eriopoda*																													
			Eragrostis	aff.	*eriopoda*				(WAS site 963)																									
			Eragrostis		*eriopoda*																													
			Eragrostis		*falcata*																													
			Eragrostis		*setifolia*										+												+							
			Eragrostis		*tenellula*							+																						
			Eragrostis		*xerophila*										+	+				+							+		+				+	
			Eriachne		*aristidea*					+																							+	
			Eriachne		*benthamii*										+																		+	
			Eriachne		*ciliata*																													
			Eriachne		*mucronata*																					+		+						
			Eriachne		*obtusa*																													
			Eriachne		*pulchella*																+									+				
			Eriachne		*pulchella*	subsp.	*dominii*			+	+			+			+		+		+						+				+			
			Eriachne		sp.									+																				
			Eulalia		*aurea*																													
			Iseilema		*dolichotrichum*					+							+					+					+							+
			Iseilema		*eremaeum*																													
			Iseilema		*macratherum*						+																							
			Iseilema		sp.										+	+				+														
			Iseilema		*vaginiflorum*																						+							
			Panicum		*decompositum*										+	+				+														
			Paraneurachne		*muelleri*					+	+						+																	
			Paspalidium		*clementii*																													
			Paspalidium		*tabulatum*						+			+						+							+	+						
			Perotis		*rara*																+														
			Setaria		*dielsii*																													
			Sorghum		*timorense*																													
			Spinifex		*longifolius*																													
			Sporobolus		*australasicus*					+	+	+		+	+		+	+			+			+				+	+		+			+	
			Sporobolus		*virginicus*																													
			Themeda		*triandra*					+		+	+																					
			Triodia	aff.	*epactia*																													
			Triodia		*angusta*																		+				+				+	+		
			Triodia		*ejactia*																	+	+						+					
			Triodia		*pungens*					+			+																					
			Triodia		*schinzii*																													
			Triodia		*wiseana*					+	+			+			+		+		+	+		+	+	+	+		+		+	+		+	+
			Triodia		*wiseana*				(fine form)																									
			Urochloa		*pubigera*																													
			Xerochloa		*barbata*																													
			Yakirra		*australiensis*																													
			Yakirra		*australiensis*	var.	*australiensis*																											
32	Cyperaceae		*Bulbostylis*		*barbata*					+											+													
			Bulbostylis		*turbinata*																							+						+	
			Cyperaceae		sp.																													
			Cyperus		sp.																													
			Fimbristylis	aff.	*dichotoma*									+				+	+															
			Fimbristylis	aff.	*dichotoma*				(M75-4)																									
			Fimbristylis		*dichotoma*																+													
			Fimbristylis		sp.																								+					
054P	Hemerocallidaceae		*Corynotheca*		*pungens*																													
87	Moraceae		*Ficus*		*aculeata*																				+									
			Ficus		*aculeata*	var.	*indecora*																				+								
90	Proteaceae		*Grevillea*		*pyramidalis*															+					+					+				
			Grevillea		*pyramidalis*	subsp.	*leucadendron*																												
			Hakea		*lorea*																									+	+				
92	Santalaceae		*Santalum*		*lanceolatum*																													
105	Chenopodiaceae		*Atriplex*		*?codonocarpa*											+																	+	
			Atriplex	aff.	*amnicola*																													
			Atriplex		*bunburyana*													+																+	
			Atriplex		*codonocarpa*																													
			Dysphania		*rhadinostachya*	subsp.	*rhadinostachya*																												
			Dysphania		sp.																													
			Enchylaena		*tomentosa*	var.	*tomentosa*											+																
			Neobassia		*astrocarpa*																												+		
			Rhagodia		*preissii*	subsp.	*obovata*																												
			Salsola		*tragus*																	+								+				
			Salsola		*tragus*	subsp.	*tragus*																												

APPENDIXB: SUMMARY OF VASCULAR FLORA SPECIES RECORDED WITHIN EACH QUADRAT WITHIN THE ORIGINAL PORT DEVELOPMENT AND PORT ACCESS RAIL RE-ALIGNEMNT AREAS (2008, 2009, 2010 AND 2011).

NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ106	APQ107	APQ108	APQ109	APQ110	APQ111	APQ112	APQ113	APQ114	APQ115	APQ116	APQ117	APQ118	APQ119	APQ120	APQ121	APQ122	APQ123	APQ124	APQ125	APQ126	APQ127	APQ128	APQ129	APQ130
105	Chenopodiaceae (cont.)		*Sclerolaena*		*bicornis*																													
			Sclerolaena		*diacantha*																													
			Sclerolaena		*glabra*																													
			Suaeda		*arbusculoides*																													
			Tecticornia		*halocnemoides*	subsp.	*tenuis*																									+		
			Tecticornia		*indica*	subsp.	*bidens*																											
			Tecticornia		*indica*	subsp.	*leiostachya*																									+		
			Tecticornia		*pruinosa*																													
			Threlkeldia		*diffusa*																													
106	Amaranthaceae	*	*Aerva*		*javanica*																				+	+								
			Amaranthus		*cuspidifolius*																													
			Gomphrena		*canescens*					+	+				+		+	+		+				+					+				
			Gomphrena		*cunninghamii*					+				+		+	+		+	+	+	+		+	+	+	+	+				+	+	
			Hemichroa		*diandra*																													
			Ptilotus		*?exaltatus*	var.	*exaltatus*																								+			
			Ptilotus		*aervoides*																						+						+	
			Ptilotus		*astrolasius*												+																	
			Ptilotus		*auriculifolius*						+						+		+			+		+						+			
			Ptilotus		*axillaris*																													
			Ptilotus		*calostachyus*																													
			Ptilotus		*carinatus*										+																			
			Ptilotus		*clementii*																													
			Ptilotus		*exaltatus*																													
			Ptilotus		*exaltatus*	var.	*exaltatus*				+				+	+	+	+		+						+	+					+	
			Ptilotus		*fusiformis*														+														+	
			Ptilotus		*helipteroides*					+	+									+							+			+	+			
			Ptilotus		*incanus*																													
			Ptilotus		*obovatus*					+																								
			Ptilotus		*polystachyus*																													
			Ptilotus		sp.																													
107	Nyctaginaceae		*Boerhavia*		*coccinea*																													
			Boerhavia		*gardneri*										+					+				+										
			Boerhavia		*schomburgkiana*																													
110	Aizoaceae		*Trianthema*		*glossostigma*																													
			Trianthema		*turgidifolia*																													
110A	Molluginaceae		*Mollugo*		*molluginea*					+																+						+	+
111	Portulacaceae		*Portulaca*	aff.	*oleracea*																											+		
		*	*Portulaca*		*oleracea*					+						+		+		+	+								+				
			Portulaca		*pilosa*																						+		+				+	
113	Caryophyllaceae		*Polycarpaea*		*corymbosa*					+								+															
			Polycarpaea		*holtzei*														+															
			Polycarpaea		*longiflora*																					+						+	
			Polycarpaea		*longiflora*			(red form)																										
			Polycarpaea		*longiflora*			(white form)						+																				
122	Menispermaceae		*Tinospora*		*smilacina*																				+								
131	Lauraceae		*Cassytha*		*capillaris*												+																
137A	Capparaceae		*Capparis*		*spinosa*														+														
			Capparis		*spinosa*	var.	*nummularia*																											
137C	Cleomaceae		*Cleome*		*viscosa*					+				+					+					+	+	+						+	+
138	Brassicaceae		*Lepidium*		*pholidogynum*																													
160A	Surianaceae		*Stylobasium*		*spathulatum*																													
162	Fabaceae		*Acacia*		*ampliceps*																													
			Acacia		*ancistrocarpa*					+	+						+		+						+	+	+						+
			Acacia		*bivenosa*					+	+	+		+		+	+		+		+	+			+	+		+		+	+	+	
			Acacia		*coriacea*								+																					
			Acacia		*coriacea*	subsp.	*coriacea*																											
			Acacia		*coriacea*	subsp.	*pendens*			+	+	+		+											+								
			Acacia		*elachantha*			(golden hairy variant)																										
			Acacia		*gregorii*																													
			Acacia		*inaequilatera*					+	+			+			+		+				+			+		+			+		
			Acacia		*ligulata*																									+			
			Acacia		*pyrifolia*					+				+			+		+		+	+		+			+				+		
			Acacia		*pyrifolia*	var.	*pyrifolia*																											
			Acacia		*sabulosa*																													
			Acacia		*sphaerostachya*																						+							
			Acacia		*stellaticeps*					+	+		+					+				+		+		+				+	+		+
			Acacia		*synchronicia*																													
			Acacia		*tenuissima*						+																+							
			Acacia		*tumida*					+	+	+	+									+	+		+							+	+
			Acacia		*tumida*	var.	*pilbarensis*																											
			Acacia		*xiphophylla*											+				+						+		+				+	
			Dichrostachys		*spicata*							+				+									+								
			Neptunia		*dimorphantha*										+	+		+									+		+			+	
			Neptunia		*monosperma*																													
		*	*Prosopis*		*pallida*																+											+	
			Senna		*artemisioides*	subsp.	*oligophylla*	(thinly sericeous)																										
			Senna		*artemisioides*	subsp.	*oligophylla*									+	+			+	+	+									+	+	
			Senna		*artemisioides*	subsp.	*oligophylla x helmsii*																											
			Senna		*glutinosa*	subsp.	*glutinosa*												+								+							
			Senna		*glutinosa*	subsp.	*glutinosa x luerssenii*																												
			Senna		*glutinosa*	subsp.	*luerssenii*																												
			Senna		*glutinosa*	subsp.	*pruinosa*				+											+												
			Senna		*glutinosa*	subsp.	*pruinosa x glutinosa*																												
			Senna		*notabilis*					+								+		+									+				+
			Senna		*venusta*																													
			Alysicarpus		*muelleri*							+			+	+	+			+							+		+	+	+	+	+	
			Canavalia		*rosea*																													
			Crotalaria		*cunninghamii*																													
			Crotalaria		*dissitiflora*	subsp.	*benthamiana*								+																			
			Crotalaria		*medicaginea*																		+											
			Crotalaria		*medicaginea*	var.	*neglecta*					+								+					+		+		+		+			
			Crotalaria		*ramosissima*																													
			Cullen		*cinereum*																													
			Cullen		*lachnostachys*																													
			Cullen		*leucanthum*																													

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NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ106	APQ107	APQ108	APQ109	APQ110	APQ111	APQ112	APQ113	APQ114	APQ115	APQ116	APQ117	APQ118	APQ119	APQ120	APQ121	APQ122	APQ123	APQ124	APQ125	APQ126	APQ127	APQ128	APQ129	APQ130
162	Fabaceae (cont.)		*Cullen*		*leucochaites*																													
			Desmodium		*filiforme*																													
			Indigofera		*colutea*													+																
			Indigofera		*linifolia*												+																	+
			Indigofera		*monophylla*					+	+						+		+		+			+				+		+	+			+
			Indigofera		*monophylla*			(Burrup form)																										
			Indigofera		*monophylla*			(Cape Preston form)																										
			Indigofera		*monophylla*			(Grey leaflet form)																										
			Indigofera		*monophylla*				(MJOPP-2)																									
			Indigofera		*trita*																+													
			Rhynchosia		*minima*					+					+			+	+		+	+		+			+							
			Sesbania		*cannabina*								+														+							
		*	*Stylosanthes*		*hamata*																													
			Swainsona		*canescens*																													
			Swainsona		*formosa*																													
			Swainsona		*pterostylis*																													
			Tephrosia	aff.	*clementii*												+	+																
			Tephrosia	aff.	*supina*				(HD133-20)																									
			Tephrosia	aff.	*supina*				(HD205-10)																									
			Tephrosia	aff.	*supina*				(HD88-4)																									
			Tephrosia	aff.	*supina*				(MET 12 357)																									
			Tephrosia		*clementii*																													
			Tephrosia		*rosea*	var.	*clementii*																											
			Tephrosia		*rosea*	var.	*rosea*																											
			Tephrosia		sp.												+																	
			Tephrosia		sp. Bungaroo Creek				(ME Trudgeon 116																									
			Tephrosia		*supina*														+											+				
			Vigna		*lanceolata*	var.	*lanceolata*					+																						
			Zornia		*muelleriana*																													
173	Zygophyllaceae		*Tribulopis*		*angustifolia*													+																
			Tribulus		*hirsutus*												+							+				+						
			Tribulus		*macrocarpus*																													
183	Polygalaceae		*Polygala*	aff.	*isingii*																													
			Polygala		sp.																													
185	Euphorbiaceae		*Adriana*		*tomentosa*	var.	*tomentosa*																											
			Euphorbia	aff.	*australis*																													
			Euphorbia	aff.	*drummondii*																													
			Euphorbia		*alsiniflora*					+		+					+	+	+	+	+						+			+	+	+			+
			Euphorbia		*australis*										+	+						+					+	+		+	+	+		+	
			Euphorbia		*biconvexa*																													
			Euphorbia		*schultzii*																				+									
			Euphorbia		sp.																													
			Euphorbia		sp.				(BPBS10-50)																									
			Euphorbia		*tannensis*	subsp.	*eremophila*																											
			Euphorbia		*wheeleri*																													
185A	Phyllanthaceae		*Flueggea*		*virosa*	subsp.	*melanthesoides*																											
			Notoleptopus		*decaisnei*	var.	*orbicularis*					+		+						+		+								+	+			
			Phyllanthus		*maderaspatensis*														+							+			+					
207	Sapindaceae		*Diplopeltis*		*eriocarpa*						+								+									+						
221	Malvaceae		*Corchorus*	aff.	*parviflorus*																													
			Corchorus	aff.	*walcottii*				(KJ Atkins 570)																									
			Corchorus	aff.	*walcottii*					+							+					+												
			Corchorus		*parviflorus*												+		+							+	+			+	+			+
			Corchorus		sp.																													
			Corchorus		*tridens*										+			+																
			Corchorus		*walcottii*																							+					+		
			Triumfetta		*clementii*					+	+			+	+		+		+	+	+				+	+	+	+		+	+		+	+
			Triumfetta		*maconochieana*																													
			Abutilon	aff.	*lepidum*																													
			Abutilon	aff.	*lepidum*				(MET 15352)																								+		
			Abutilon	aff.	*lepidum*																													
			Abutilon		*fraseri*																													
			Abutilon		*lepidum*																													
			Abutilon		*otocarpum*																													
			Abutilon		*oxycarpum*																+													
221	Malvaceae (cont.)		*Abutilon*		sp.																								+					
			Gossypium		*australe*																													
			Gossypium		*australe*			(Burrup penninsula form)																											
			Gossypium		*australe*			(Whim Creek form)																											
			Gossypium		sp.																							+						
			Hibiscus	aff.	*platychlamys*				(MET 15 067)																									
			Hibiscus		*burtonii*																													
			Hibiscus		*coatesii*						+																							
			Hibiscus		*leptocladus*																													
			Hibiscus		*sturtii*												+																	
			Hibiscus		*sturtii*	var.	*platychlamys*																+											
		*	*Malvastrum*		*americanum*							+				+																		
			Sida	aff.	*cardiophylla*																													
			Sida	aff.	*echinocarpa*																													
			Sida	aff.	*echinocarpa*				(MET 15 350)																									
			Sida	aff.	*fibulifera*																													
			Sida	aff.	*fibulifera*				(HD200-6)																									
			Sida	aff.	*fibulifera*				(M37.16)																									
			Sida	aff.	*fibulifera*				(oblong:MET 15 22																									
			Sida		*cardiophylla*				15 220)																									
			Sida		*echinocarpa*																							+						
			Sida		*fibulifera*										+	+		+										+		+				
			Sida		*rohlenae*	subsp.	*rohlenae*																											
			Sida		sp.		Pilbara		(A.A.Mitchell PRP :											+															
			Sida		sp.		verrucose glands		(FH Mollemans 24																											
			Keraudrenia		sp.																						+							
			Melhania		*oblongifolia*																													
			Melhania		sp.				(CH15-39)																									
			Waltheria		*indica*																					+								
236	Frankeniaceae		*Frankenia*		*pauciflora*	var.	*pauciflora*																											

APPENDIXB: SUMMARY OF VASCULAR FLORA SPECIES RECORDED WITHIN EACH QUADRAT WITHIN THE ORIGINAL PORT DEVELOPMENT AND PORT ACCESS RAIL RE-ALIGNEMNT AREAS (2008, 2009, 2010 AND 2011).

NB: * Denotes introduced (weed) species

FAMILY CODE	FAMILY NAME	I	GENUS	aff.	SPECIES	infra species class	INFRA SPECIES	FORM	AUTHORITY	APQ106	APQ107	APQ108	APQ109	APQ110	APQ111	APQ112	APQ113	APQ114	APQ115	APQ116	APQ117	APQ118	APQ119	APQ120	APQ121	APQ122	APQ123	APQ124	APQ125	APQ126	APQ127	APQ128	APQ129	APQ130
243	Violaceae		*Hybanthus*		*aurantiacus*					+	+	+		+			+		+							+		+					+	+
273	Myrtaceae		*Corymbia*		*hamersleyana*					+			+										+												
			Eucalyptus		*victrix*							+																							
280	Araliaceae		*Trachymene*		*oleracea*						+			+					+							+		+						
			Trachymene		*oleracea*	subsp.	*oleracea*																												
294	Plumbaginaceae		*Muellerolimon*		*salicorniaceum*																														
301	Oleaceae		*Jasminum*		*didymum*																				+										
			Jasminum		*didymum*	subsp.	*lineare*												+																
304	Apocynaceae		*Sarcostemma*		*viminale*															+													+	
			Sarcostemma		*viminale*	subsp.	*australe*																												
307	Convolvulaceae		*Bonamia*		*linearis*																														
			Bonamia		*media*																+	+		+											
			Bonamia		*media*	var.	*villosa*			+	+						+		+												+			
			Bonamia		*pannosa*																														+
			Evolvulus		*alsinoides*															+	+														
			Evolvulus		*alsinoides*	var.	*villosicalyx*			+					+		+	+	+									+			+	+			+
			Ipomoea		*coptica*										+	+		+									+							
			Ipomoea		*costata*																							+						
			Ipomoea		*muelleri*																														
			Ipomoea		*polymorpha*																														
			Operculina		*aequisepala*							+			+																				
			Polymeria		*ambigua*					+																									
			Polymeria		sp.				(site 1365)																										
310	Boraginaceae		*Ehretia*		*saligna*					+																									
			Ehretia		*saligna*	var.	*saligna*																												
			Heliotropium		*cunninghamii*																														
			Heliotropium		*?cunninghamii*																														
			Heliotropium		*heteranthum*																							+							
			Heliotropium		*inexplicitum*																														
			Heliotropium		*ovalifolium*					+							+													+				
			Heliotropium		*pachyphyllum*						+																								
			Trichodesma		*zeylanicum*									+					+			+										+			
			Trichodesma		*zeylanicum*	var.	*zeylanicum*																												
315	Solanaceae		*Solanum*		*diversiflorum*																														
			Solanum		*ellipticum*																														
			Solanum		*horridum*																														
			Solanum		*lasiophyllum*					+	+			+								+		+											
			Stemodia		*kingii*										+														+						
316	Scrophulariaceae		*Myoporum*		*montanum*																														
317	Bignoniaceae		*Dolichandrone*		*heterophylla*									+																					
325	Acanthaceae		*Avicennia*		*marina*	subsp.	*marina*																												
329	Plantaginaceae		*Stemodia*		*grossa*																														
331	Rubiaceae		*Oldenlandia*		*crouchiana*						+							+		+															
337	Cucurbitaceae		*Cucumis*		*maderaspatanus*					+			+		+	+	+			+						+			+		+			
339	Campanulaceae		*Isotoma*		sp.																								+						
341	Goodeniaceae		*Goodenia*		*microptera*					+							+																		+
			Scaevola		*spinescens*																					+									
			Scaevola		*spinescens*			(broad leaf form)																					+						
			Scaevola		*spinescens*			narrow form)																											
345	Asteraceae	*	*Flaveria*		*trinervia*																						+								
			Launaea		*sarmentosa*																														
			Pentalepis		*trichodesmoides*																						+								
			Podolepis		sp.																									+					
			Pterocaulon		sp.																														
			Pterocaulon		*sphaeranthoides*																														
			Streptoglossa		*bubakii*																							+							
			Streptoglossa		*decurrens*																														

Appendix C

Quadrat Data recorded from vegetation communities within the Original Port and the Port Access Rail-realignment Survey Areas

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API rail Flora **Site** APQ61

Described by KG **Date** 19/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 512563 **mE** 7716148 **mN**
Soil Brown tidal clay
Vegetation Mangroves of *Avicennia marina* subsp. *marina* on brown tidal clay.
Veg Condition Excellent - Very Good

APQ61 19/05/2009

APQ61 22/03/2011

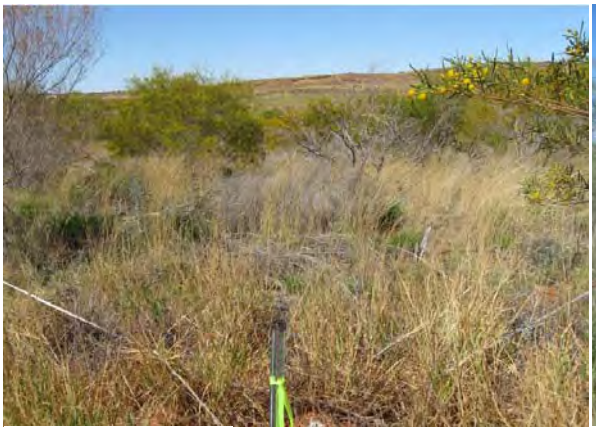
SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Avicennia marina subsp. *marina*	80	3.5	D3.1
Rhizophora stylosa	opp	-	61-opp1

API rail Flora **Site** APQ62

Described by KG **Date** 19/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 512111 **mE** 7715692 **mN**
Soil Orange sand
Vegetation Tall shrubland of *Acacia sabulosa* and *Acacia coriacea* subsp. *coriacea* over a Low Open Shrubland of *Acacia stellaticeps* over a Mid-Dense Hummock Grassland of *Triodia schinzii* and *Triodia epactia* over a Tussock Grassland of **Cenchrus ciliaris* on orange sand midslopes.
Veg Condition Good – Degraded



APQ62 19/05/2009

APQ62 22/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.2	63-10
Acacia coriacea subsp. *coriacea*	2	3	D4.17
Acacia sabulosa	15	3	D4.16
Acacia stellaticeps	10	1	D4.13
Aristida contorta	<1	0.6	62-03
Bonamia linearis	<1	0.1	95-08
**Cenchrus ciliaris*	50	0.5	D4.11
Cleome viscosa	<1	0.2	D4.14
Corynotheca pungens	<1	0.3	D4.02
Desmodium filiforme	<1	0.2	63-15
Eragrostis aff. *eriopoda*	<1	0.5	95-05
Euphorbia alsiniflora	<1	0.1	95-03
Euphorbia biconvexa	<1	0.2	62-04
Gomphrena canescens	<1	0.2	-
Hybanthus aurantiacus	<1	0.2	-
Indigofera colutea	<1	0.1	D4.19
Indigofera linifolia	<1	0.1	D4.18
Ipomoea polymorpha	<1	0.3	95-02
Mollugo molluginea	<1	0.4	62-01
Polycarpaea longiflora	<1	0.2	-
Portulaca pilosa	<1	0.2	-
Ptilotus clementii	<1	0.1	D4.12
Ptilotus polystachyus	1	0.7	62-02
Ptilotus polystachyus var. *arthrotrichus*	<1	0.1	D4.01
Senna notabilis	<1	0.1	D4.06
Sida rohlenae subsp. *rohlenae*	<1	0.2	D4.05

Name	Cover (%)	Height (m)	Specimen
Trichodesma zeylanicum var. *zeylanicum*	<1	0.3	-
Triodia epactia (Form B)	20	0.7	D4.04
Triodia schinzii	40	1.5	D4.03
Yakirra australiensis var. *australiensis*	<1	0.2	63.06

API rail Flora **Site** APQ63

Described by KG **Date** 19/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 511852 **mE** 7715452 **mN**
Soil Orange sand with rocks on upper slopes
Vegetation Tall shrubland of *Grevillea pyramidalis* subsp. *leucadendron* over a Tussock Grassland of **Cenchrus ciliaris* with scattered *Triodia wiseana* (fine form) on rocky mid to upper slope sand.

Veg Condition Good

APQ63 19/05/2011

APQ63 22/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.2	63-10
Acacia bivenosa	<1	0.9	D5.11
Acacia elachantha (golden hairy variant)	<1	1.2	D5.29
Acacia pyrifolia var. *pyrifolia*	<1	-	D5.33
Bonamia media var. *villosa*	<1	0.2	63-01
Bulbostylis barbata	<1	0.3	D5.22
**Cenchrus ciliaris*	10	0.7	D5.38
Corchorus aff. *parviflorus*	<1	0.2	63-12
Corchorus parviflorus	<1	0.2	63-14
Corchorus tridens	<1	0.2	95-07
Crotalaria medicaginea var. *neglecta*	<1	0.2	63-07
Crotalaria ramosissima	<1	0.2	D5.31
Dactyloctenium radulans	<1	0.25	63-02
Desmodium filiforme	<1	0.15	63-15
Enneapogon caerulescens	<1	0.2	-
Euphorbia alsiniflora	<1	0.1	95-03
Evolvulus alsinoides var. *villosicalyx*	<1	0.1	D5.24
Fimbristylis aff. *dichotoma* (M75-4)	<1	0.3	D5.13
Gomphrena cunninghamii	<1	0.1	D5.18
Goodenia microptera	<1	0.3	D5.08
Grevillea pyramidalis subsp. *leucadendron*	12	2.5	D5.32
Hibiscus aff. *platychlamys* (MET 15,067)	<1	0.2	D5.06
Hybanthus aurantiacus	<1	0.2	D5.34
Indigofera colutea	<1	0.1	D5.26
Indigofera linifolia	<1	0.2	D5.16
Indigofera monophylla (Burrup form)	<1	0.4	63-04
Indigofera trita	<1	0.2	D5.25

Name	Cover (%)	Height (m)	Specimen
Ipomoea polymorpha	<1	0.3	95-02
Notoleptopus decaisnei var. *orbicularis*	<1	0.1	100-18
Polycarpaea longiflora (white form)	<1	0.2	D5.09
**Portulaca oleracea*	<1	0.1	63-08
Portulaca pilosa	<1	0.2	-
Ptilotus astrolasius	<1	0.05	D5.04
Ptilotus exaltatus var. *exaltatus*	<1	0.2	-
**Stylosanthes hamata*	<1	0.2	63-09
Swainsona formosa	<1	0.2	D5.21
Tephrosia aff. *supina* (HD88-4)	<1	0.05	D5.23
Tephrosia supina	<1	0.2	95-opp1
Trachymene oleracea subsp. *oleracea*	<1	0.2	D5.14
Trichodesma zeylanicum var. *zeylanicum*	<1	0.2	D5.10
Triodia epactia	<1	0.3	D5.27
Triodia wiseana (fine form)	4	0.3	D5.37
Triumfetta clementii	<1	0.4	D5.30
Yakirra australiensis var. *australiensis*	<1	0.2	63-06
Zornia muelleriana	<1	creeper	63-11

API rail Flora **Site** APQ64

Described by KG **Date** 19/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 511242 **mE** 7716066 **mN**
Soil Pale brown sand
Rock Type
Vegetation Tall Open Scrub of *Acacia sabulosa* with scattered *Acacia coriacea* subsp. *coriacea* over a Herbland of **Aerva javanica* over a Tussock Grassland of **Cenchrus ciliaris* on pale brown sandy midslopes.
Veg Condition Degraded

APQ64 19/05/2009

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia coriacea subsp. *coriacea*	<1	2	D6.9
Acacia sabulosa	40	2.5	D6.1
**Aerva javanica*	50	1.3	D6.2
**Cenchrus ciliaris*	60	1.5	D6.3
Cleome viscosa	<1	0.3	new
Dactyloctenium radulans	<1	0.1	63-02
Eragrostis aff. *eriopoda*	<1	0.3	95-05
Euphorbia aff. *drummondii*	<1	0.1	64-01
Euphorbia alsiniflora	<1	0.3	D6.5
Paspalidium tabulatum	<1	1	64-02
Rhagodia preissii subsp. *obovata*	<1	0.8	D6.4
Salsola tragus	<1	0.4	D6.8
Sarcostemma viminale subsp. *australe*	<1	0.3	64-03
Trichodesma zeylanicum var. *zeylanicum*	<1	0.3	new
Triodia epactia	1	0.6	D6.6

API rail Flora **Site** APQ65

Described by KG **Date** 19/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 511327 **mE** 7716119 **mN**
Soil Pale brown sand
Vegetation Scattered *Spinifex longifolius* over **Aerva javanica* on pale brown sands on shoreline.
Veg Condition Good

APQ65 19/05/2009

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ampliceps	<1	0.8	65-01
**Aerva javanica*	<1	0.5	D7.4
Avicennia marina subsp. *marina*	<1	1.2	D7.9
Canavalia rosea	<1	creeper	D7.3
**Cenchrus ciliaris*	<1	0.5	D7.8
Launaea sarmentosa	<1	Creeper	D7.7
Salsola tragus subsp. *tragus*	<1	0.5	D7.5
Spinifex longifolius	2.5	0.5	D7.1
Tecticornia indica subsp. *bidens*	1	0.5	D7.2
Trianthema turgidifolia	<1	0.2	D7.6

API rail Flora **Site** APQ66

Described by KG **Date** 21/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 509566 **mE** 7718701 **mN**
Soil Pale orange sandy clay
Vegetation Mid to Dense Hummock Grassland of *Triodia pungens* over an Open Tussock Grassland of **Cenchrus ciliaris* and *Eragrostis* aff. *eriopoda* (WAS site 963) on pale orange sandy clay midslopes.
Veg Condition Good

APQ66 21/05/2009

APQ66 5/04/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	2	2	D8.9
Acacia coriacea subsp. *coriacea*	<1	0.5	D8.13
**Aerva javanica*	2	0.6	D8.12
Boerhavia gardneri	<1	0.2	AP66-07
Bonamia media var. *villosa*	<1	creeper	D8.7
**Cenchrus ciliaris*	30	0.6	D8.4
Chrysopogon fallax	<1	1.5	D8.8
Cleome viscosa	<1	0.2	-
Eragrostis aff. *eriopoda* (WAS site 963)	<1	0.5	D8.10
Euphorbia alsiniflora	<1	0.2	AP66-06
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	-
Goodenia microptera	<1	0.2	D8.11
Gossypium australe	<1	1.5	AP66-05
Heliotropium cunninghamii	<1	0.1	AP66-03
Indigofera colutea	<1	0.1	D8.1
Indigofera linifolia	<1	0.1	D8.5
Polygala aff. *isingii*	<1	0.1	AP66-04
Ptilotus axillaris	<1	0.2	D8.6
Ptilotus helipteroides	<1	0.1	AP66-02
Rhynchosia minima	<1	creeper	D8.3
Sida aff. *fibulifera*	<1	0.2	AP66-01
Solanum diversiflorum	<1	0.3	D8.14
Triodia pungens	50	0.5	D8.2

API rail Flora **Site** APQ67

Described by KG **Date** 21/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 506725 **mE** 7715803 **mN**
Soil Brown clayey loam
Vegetation Low Shrubland dominated by *Tecticornia halocnemoides* subsp. *tenuis* with *scattered Trianthema turgidifolia* and *Tecticornia pruinosa* on brown clayey loam.
Veg Condition Very Good - Good

APQ67 21/05/2009

APQ67 5/04/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Cassytha capillaris	<1	creeper	D9.18
**Cenchrus ciliaris*	1	0.3	D9.06
Cleome viscosa	<1	0.2	D9.07
Eragrostis falcata	1	0.2	AP67-02
Euphorbia alsiniflora	<1	0.1	D9.09
Frankenia pauciflora var. *pauciflora*	2	0.2	D9.16
Gomphrena cunninghamii	<1	0.1	D9.12
Hemichroa diandra	2	0.2	AP67-01
Lepidium pholidogynum	<1	0.05	D9.08
Neobassia astrocarpa	<1	0.2	D9.10
Sporobolus australasicus	<1	0.2	D9.11
Tecticornia halocnemoides subsp. *tenuis*	30	0.2	D9.02
Tecticornia indica subsp. *bidens*	1	0.6	D9.14
Tecticornia pruinosa	3	0.3	D9.05
Trianthema turgidifolia	3	0.2	D9.01
Triodia angusta	<1	0.4	D9.15

API rail Flora **Site** APQ68

Described by KG **Date** 21/05/2009 **Type** Q30 x 50
Season E

MGA Zone 50 502884 **mE** 7713085 **mN**
Soil Orange stony clay
Vegetation Low Open Woodland of *Corymbia hammersleyana* over Tall Open Scrub of *Acacia bivenosa* and *Acacia tumida* var. *pilbarensis* over a Mid to Dense Hummock Grassland of *Triodia epactia* and *Triodia wiseana* (fine form) woth scattered **Cenchrus ciliaris* on orange stony clay drainage lines.
Veg Condition Good

APQ68 21/05/2009

APQ68 5/04/2011

SPECIES LIST

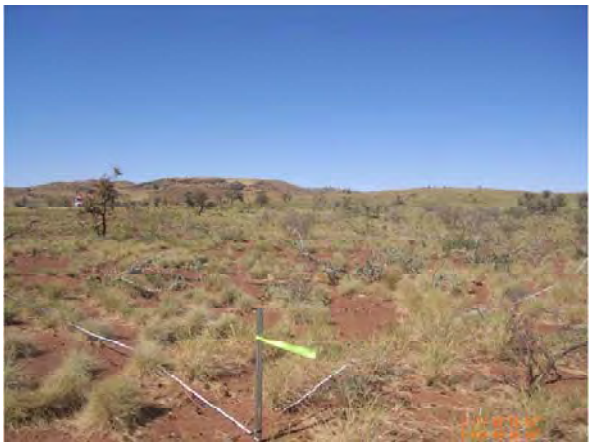
Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	40	3.5	D10.03
Acacia coriacea subsp. *pendens*	<1	1	-
Acacia pyrifolia var. *pyrifolia*	<1	2	D10.04
Acacia stellaticeps	<1	0.5	D10.22
Acacia tumida var. *pilbarensis*	3	2.8	D10.08
Alysicarpus muelleri	<1	0.2	-
Aristida burbidgeae	<1	0.3	AP68-05
Bonamia media var. *villosa*	<1	creeper	D10.26
Bonamia pannosa	<1	creeper	D10.23
Cassytha capillaris	<1	creeper	-
**Cenchrus ciliaris*	10	0.3	D10.46
Chrysopogon fallax	<1	1	D10.34
Cleome viscosa	<1	0.3	D10.13
Corchorus aff. *parviflorus*	<1	0.2	D10.07
Corymbia hamersleyana	6	6	D10.29
Crotalaria medicaginea var. *neglecta*	<1	0.3	-
Cucumis maderaspatanus	<1	creeper	D10.05
Cullen leucanthum	<1	1.2	AP68-01
Cymbopogon ambiguus	<1	0.3	-
Dactyloctenium radulans	<1	0.2	-
Dichanthium sericeum	<1	0.2	AP68-06
Dichanthium sericeum subsp. *humilius*	<1	0.2	D10.31
Eriachne pulchella subsp. *dominii*	<1	0.2	D10.17
Euphorbia alsiniflora	<1	0.2	AP97-04
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	D10.33

Name	Cover (%)	Height (m)	Specimen
Fimbristylis aff. *dichotoma* (M75-4)	<1	0.2	D10.38
Gomphrena cunninghamii	<1	0.1	-
Goodenia microptera	<1	0.4	D10.42
Hibiscus aff. *platychlamys* (MET 15,067)	<1	0.3	D10.20
Hibiscus leptocladus	<1	0.3	D10.12
Hibiscus sturtii var. *platychlamys*	<1	0.3	AP68-02
Hybanthus aurantiacus	<1	0.3	D10.24
Indigofera monophylla (Burrup form)	<1	0.2	D10.06
Iseilema dolichotrichum	<1	0.1	D10.30
Notoleptopus decaisnei var. *orbicularis*	<1	0.2	-
Phyllanthus maderaspatensis	<1	0.2	D10.43
Polygala aff. *isingii*	<1	0.1	AP68-07
Pterocaulon sphaeranthoides	<1	0.2	AP68-03
Rhynchosia minima	<1	creeper	D10.21
Senna artemisioides subsp. aff. *oligophylla* (thinly sericeous)	<1	0.5	D10.25
Senna notabilis	<1	0.2	D10.36
Sida aff. *fibulifera* (HD200-6)	<1	0.3	D10.19
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	<1	0.2	D10.41
Solanum diversiflorum	<1	0.3	D10.10
Sporobolus australasicus	<1	0.1	D10.32
Swainsona formosa	<1	0.3	D10.14
Tephrosia clementii	<1	0.2	D10.37
Themeda triandra	1	0.6	D10.15
Trichodesma zeylanicum var. *zeylanicum*	<1	0.3	D10.28
Triodia epactia	20	0.4	D10.01
Triodia wiseana (fine form)	10	0.4	D10.02
Triumfetta clementii	<1	0.4	D10.09

API rail Flora **Site** APQ69

Described by KG **Date** 21/05/2009 **Type** Q50 X 50
Season E

MGA Zone 50 501559 **mE** 7713280 **mN**
Soil Orange stony clay
Vegetation Tall Shrubland of *Acacia bivenosa*, *Acacia inaequilatera* and *Acacia pyrifolia* subsp. *pyrifolia* over a Mid to Dense Hummock Grassland of *Triodia wiseana* (fine form) on orange stony clay flats.
Veg Condition Good



APQ69 21/05/2009

APQ69 7/04/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon aff. *lepidum* (4)	<1	0.2	D11.28
Acacia bivenosa	5	1.2	D11.8
Acacia inaequilatera	5	3	D11.9
Acacia pyrifolia var. *pyrifolia*	6	1.5	D11.32
Alysicarpus muelleri	<1	0.6	-
Aristida contorta	<1	0.2	AP69-02
Aristida holathera var. *holathera*	<1	0.3	AP69-04
Boerhavia coccinea	<1	0.1	D11.6
Bonamia media var. *villosa*	<1	0.1	D11.25
**Cenchrus ciliaris*	1	0.6	-
Corchorus aff. *walcotti* (K.J. Atkins 570)	<1	0.2	D11.24
Crotalaria medicaginea var. *neglecta*	<1	0.2	-
Dactyloctenium radulans	<1	0.2	-
Dichanthium sp.	<1	0.3	-
Enneapogon caerulescens	<1	0.1	D11.27
Eriachne pulchella subsp. *dominii*	<1	0.2	D11.17
Euphorbia australis	<1	0.1	AP69-01
Euphorbia alsiniflora	<1	0.2	D11.30
Euphorbia sp. (BPBS10-50)	<1	0.3	D11.16
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	D11.10
Gomphrena cunninghamii	<1	0.2	D11.23
Goodenia microptera	<1	0.3	D11.29
Heliotropium inexplicitum	<1	0.2	AP69-05
Hibiscus sturtii var. *platychlamys*	<1	0.3	D11.33
Hybanthus aurantiacus	<1	0.3	D11.14
Indigofera colutea	<1	0.1	-

Name	Cover (%)	Height (m)	Specimen
Indigofera monophylla (Burrup form)	<1	0.2	D11.26
Indigofera trita	<1	0.1	D11.31
Iseilema eremaeum	<1	0.2	AP92-01
Notoleptopus decaisnei var. *orbicularis*	<1	0.1	D11.11
Paraneurachne muelleri	<1	0.2	AP69-03
**Portulaca oleracea*	<1	0.05	D11.15
Ptilotus auriculifolius	<1	0.2	D11.18
Ptilotus exaltatus var. *exaltatus*	<1	0.3	D11.4
Ptilotus helipteroides	<1	0.2	D11.19
Rhynchosia minima	<1	creeper	D11.21
Senna glutinosa subsp. *glutinosa*	<1	0.8	D11.22
Senna glutinosa subsp. *glutinosa x luerssenii*	<1	0.8	-
Senna notabilis	<1	0.1	D11.13
Sporobolus australasicus	<1	0.1	D11.1
Swainsona formosa	<1	0.1	D11.2
Triodia wiseana (fine form)	60	0.4	D11.34
Triumfetta clementii	<1	0.3	D11.7
Yakirra australiensis var. *australiensis*	<1	0.1	D11.12

API rail Flora **Site** APQ79

Described by KG **Date** 18/05/2009 **Type** Q10 X 50
Season E

MGA Zone 50 506842 **mE** 7719247 **mN**

Soil Orangey brown sandy loam under rock and shell fragments

Vegetation Low Open Heath dominated by *Hemichroa diandra*, *Tecticornia halocnemoides* subsp*. tenuis* and *Tecticornia indica* subsp*. bidens* with scattered *Avicennia marina* subsp. *marina* on edges of tidal mudflats.

Veg Condition Very Good

APQ79 18/05/2009

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Avicennia marina subsp. *marina*	<1	0.5	DQ3.3
Eragrostis falcata	<1	0.15	DQ3.1
Frankenia pauciflora var. *pauciflora*	5	0.25	DQ3.7
Hemichroa diandra	10	0.3	DQ3.8
Muellerolimon salicorniaceum	2	0.3	DQ3.12
Neobassia astrocarpa	5	0.2	DQ3.13
Sporobolus virginicus	<1	0.2	DQ3.2
Tecticornia halocnemoides subsp. *tenuis*	15	0.3	DQ3.5
Tecticornia indica subsp. *bidens*	12	0.3	DQ3.10
Trianthema turgidifolia	2	0.2	DQ3.6

API rail Flora **Site** APQ81

Described by KG **Date** 15/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 508546 **mE** 7719437 **mN**
Soil Pale brown sand
Vegetation Tall Shrubland of *Acacia coriacea* subsp*. coriacea* with scattered *Santalum lanceolatum* and *Senna artemisioide*s subsp. *oligophylla* x *helmsii* over a Closed Tussock Grassland of **Cenchrus ciliaris* on shorelines.
Veg Condition Degraded

APQ81 15/05/2009

APQ81 21/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia coriacea subsp*. coriacea*	12	2.2	D1.14A
Acacia gregorii	<1	0.2	D1.2
Adriana tomentosa var. *tomentosa*	<1	0.7	D1.9
**Aerva javanica*	<1	0.9	D1.15
Boerhavia gardneri	<1	0.05	81-03
**Cenchrus ciliaris*	70	0.4	D1.11
Cleome viscosa	<1	0.5	new
Diplopeltis eriocarpa	<1	0.2	81-06
Eragrostis aff. *eriopoda*	<1	0.4	81-01
Eragrostis aff. *eriopoda* (WAS site 963)	<1	0.2	D1.12
Euphorbia aff. *australis*	<1	0.05	81-02
Euphorbia sp.	<1	0.05	D1.17
Euphorbia tannensis subsp. *eremophila*	<1	0.3	81-04
Indigofera linifolia	<1	0.1	D1.18
Polygala aff. *isingii*	<1	0.1	D1.14B
Rhagodia preissii subsp. *obovata*	<1	0.5	D1.10
Rhynchosia minima	<1	creeper	D1.5B
Salsola tragus subsp*. tragus*	<1	0.3	D1.8
Santalum lanceolatum	2.5	1.5	D1.1
Scaevola spinescens (narrow form)	<1	0.6	D1.6
Senna artemisioides subsp. *oligophylla x helmsii*	<1	0.2	D1.13
Spinifex longifolius	<1	0.9	D1.4
Swainsona canescens	<1	0.2	D1.16
Threlkeldia diffusa	<1	0.3	81-05

API rail Flora **Site** APQ82

Described by KG **Date** 15/05/2009 **Type** Q50 x 50
Season E

MGA Zone 50 508445 **mE** 7719529 **mN**
Soil Orange stony clay loam
Vegetation Closed Hummock Grassland of *Triodia wiseana* (fine form) on orange stony clayey loam midslopes.
Veg Condition Good to Very Good

APQ82 15/05/2009

APQ82 21/03/2011

SPECIES LIST

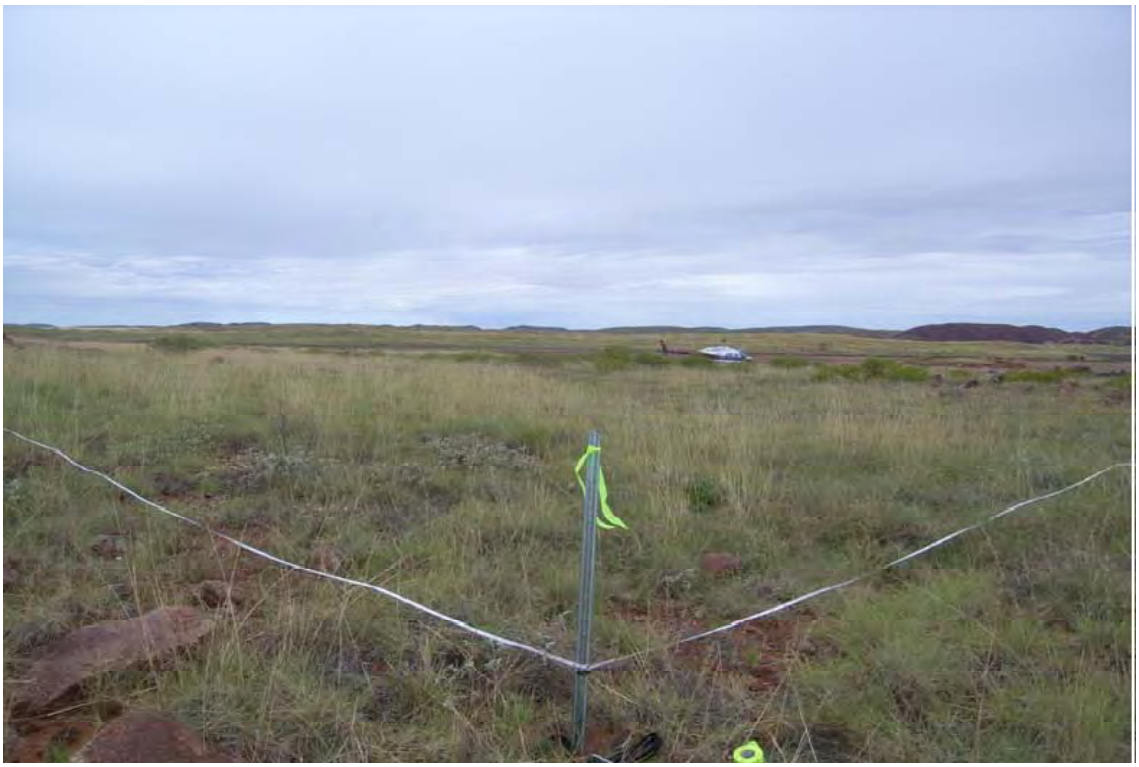
Name	Cover (%)	Height (m)	Specimen
Abutilon fraseri	<1	0.4	82-06
Acacia gregorii	<1	0.05	D2.11
Boerhavia gardneri	<1	0.15	82-02
Bonamia media var. *villosa*	<1	0.05	new
Cassytha capillaris	<1	creeper	D2.23
Cleome viscosa	<1	0.4	new
Crotalaria medicaginea var. *neglecta*	<1	0.2	D2.13
Diplopeltis eriocarpa	1	0.1	81-06
Dysphania rhadinostachya subsp. *rhadinostachya*	<1	0.2	D2.16
Euphorbia biconvexa	<1	0.2	82-03
Euphorbia alsiniflora	<1	0.2	D2.21
Euphorbia tannensis subsp. *eremophila*	<1	0.2	81-04
Gomphrena cunninghamii	<1	0.05	100-01
Indigofera monophylla (Cape Preston form)	<1	0.2	D2.03
Polycarpaea longiflora (white form)	<1	0.3	D2.09
Ptilotus auriculifolius	<1	0.4	82-07
Ptilotus fusiformis	<1	0.25	82-05
Ptilotus incanus var. *incanus*	<1	0.3	D2.05
Senna artemisioides subsp. *oligophylla*	<1	0.3	new
Senna glutinosa subsp. *luerssenii*	<1	0.9	D2.08
Senna glutinosa subsp. *pruinosa x glutinosa*	<1	1.5	D2.22
Solanum horridum	<1	0.1	D2.15
Swainsona canescens	<1	0.1	D2.20
Tephrosia aff. *supina* (HD133-20)	<1	0.1	D2.18
Trachymene oleracea subsp. *oleracea*	<1	0.3	D2.02
Tribulus hirsutus	<1	0.1	82-1
Trichodesma zeylanicum var. *zeylanicum*	<1	0.2	D2.04

Name	Cover (%)	Height (m)	Specimen
Triodia wiseana (fine form)	70	0.4	D2.01
Triumfetta clementii	<1	0.2	D2.17
Yakirra australiensis var. *australiensis*	<1	0.2	82-08

API rail Flora **Site** APQ87

Described by KG **Date** 29/06/2009 **Type** Q50 x 50
Season E

MGA Zone 50 506918 **mE** 7716617 **mN**
Soil Red fine sandy clay, rocky with shell fragments
Vegetation Mid Dense Hummock Grassland of *Triodia angusta* over a Very Open Tussock Grassland of **Cenchrus ciliaris* on fine red sandy clay with rock and shell nodules.
Veg Condition Good



APQ87 29/06/2009

SPECIES LIST

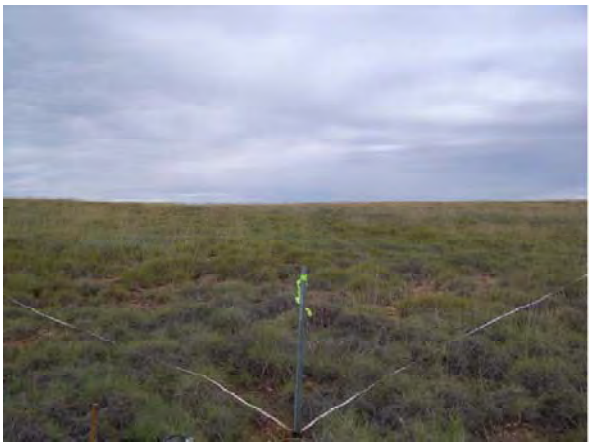
Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	4	1.2	87.08
**Aerva javanica*	<1	0.5	87.17
Alysicarpus muelleri	<1	0.1	87.21
Cassytha capillaris	<1	creeper	87.03
**Cenchrus ciliaris*	10	0.4	87.04
Corchorus aff. *walcotti* (K.J. Atkins 570)	<1	0.2	87.07
Cullen cinereum	<1	0.02	87.23
Eriachne obtusa	<1	0.6	87.02
Evolvulus alsinoides var. *villosicalyx*	<1	0.1	87.22
Gomphrena cunninghamii	<1	0.1	87.05
Goodenia microptera	<1	0.5	87.14
Hybanthus aurantiacus	<1	0.1	87.20
Indigofera trita	<1	0.1	87.13
Phyllanthus maderaspatensis	<1	0.15	87.12
**Portulaca oleracea*	<1	0.05	87.06
Portulaca pilosa	<1	0.1	87.18
Rhynchosia minima	<1	creeper	87.19
Sclerolaena diacantha	<1	0.3	87.16

Sida aff. *fibulifera* (oblong; MET 15 220)	<1	0.3	87.09
Solanum ellipticum	<1	0.2	87.11
Swainsona pterostylis	<1	0.3	87.10
Trianthema turgidifolia	1	0.3	87.15
Triodia angusta	60	0.5	87.01
Triodia wiseana	<1	0.5	87.01A

API rail Flora **Site** APQ88

Described by KG **Date** 29/06/2009 **Type** Q50 x 50
Season E

MGA Zone 50 507086 **mE** 7716422 **mN**
Soil Red loamy clay, rocky with shell fragments
Vegetation Closed Hummock Grassland of *Triodia wiseana* (fine form) and *Triodia angusta* on red rocky hillslope.
Veg Condition Very Good - Good



APQ88 29/06/2009

APQ69 5/04/2011

SPECIES LIST

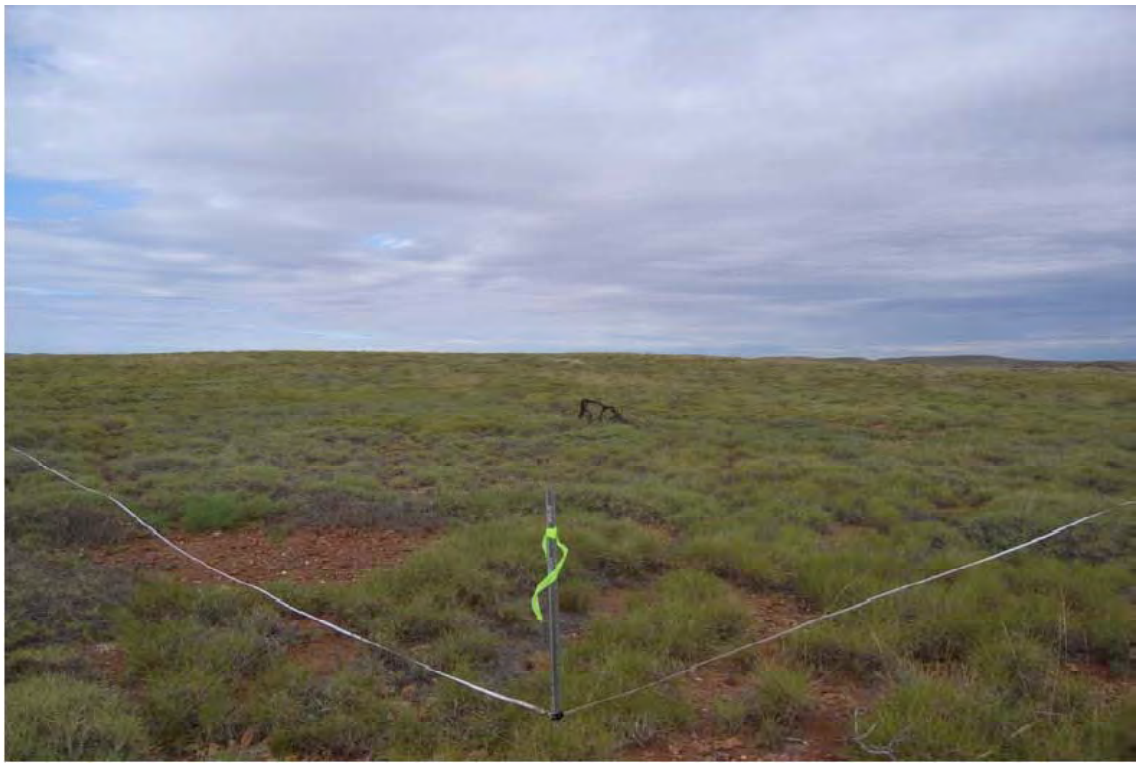
Name	Cover (%)	Height (m)	Specimen
Abutilon aff. *lepidum* (4)	<1	0.3	AP88-05
Aristida burbidgeae	1	0.3	88.10
Boerhavia gardneri	<1	88.06	-
Bonamia media var. *villosa*	<1	creeper	88.09
Cassytha capillaris	<1	creeper	-
Cleome viscosa	<1	0.2	-
Corchorus parviflorus	<1	0.3	88.01
Dysphania sp.	<1	0.2	AP88-08
Enneapogon lindleyanus	<1	0.2	AP88-06
Euphorbia alsiniflora	<1	0.3	88.18
Gomphrena cunninghamii	<1	0.1	88.03
Indigofera colutea	<1	88.17	-
Indigofera linifolia	<1	0.2	88.05
Indigofera trita	2	88.04	-
Melhania oblongifolia	<1	0.4	AP88-02
Panicum decompositum	<1	88.14	-
Pterocaulon sp.	<1	0.1	-
Rhynchosia minima	<1	88.08	-
Senna notabilis	<1	0.1	-
Solanum lasiophyllum	<1	0.2	AP88-03
Sporobolus australasicus	<1	0.1	-
Streptoglossa decurrens	<1	0.6	AP88-04
Suaeda arbusculoides	<1	0.2	AP88-07
Tephrosia aff. *supina* (HD205-10)	<1	88.17B	-
Tephrosia supina	<1	0.1	AP88-01

Name	Cover (%)	Height (m)	Specimen
Trianthema glossostigma	<1	88.02	-
Triodia angusta	40	0.4	88.13
Triodia wiseana (fine form)	50	0.3	88.12
Triumfetta clementii	<1	0.3	88.15

API rail Flora **Site** APQ89

Described by KG **Date** 29/06/2009 **Type** Q50 x 50
Season E

MGA Zone 50 507382 **mE** 7716589 **mN**
Soil Red loamy clay, rocky with shell fragments
Vegetation Closed Hummock Grassland of *Triodia wiseana* (fine form) and *Triodia angusta* on a red loamy clay, rocky hillslope.
Veg Condition Very Good - Good



APQ89 29/06/2009

SPECIES LIST

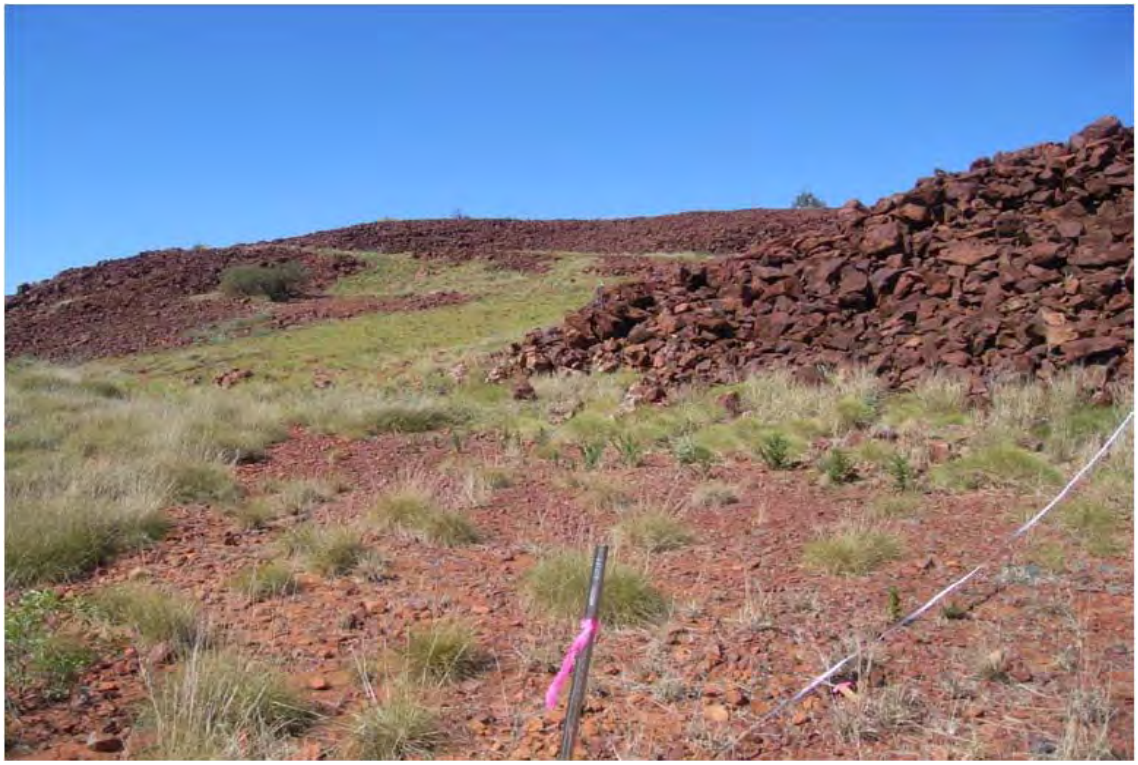
Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.7	89.20
Acacia inaequilatera	<1	0.8	89.04
**Cenchrus ciliaris*	<1	0.4	89.15
Cleome viscosa	<1	0.2	89.01
Crotalaria medicaginea var. *neglecta*	<1	0.2	89.18
Cymbopogon ambiguus	1	1.6	89.23
Eriachne aristidea	<1	0.1	89.13
Euphorbia alsiniflora	<1	0.2	89.10
Evolvulus alsinoides var. *villosicalyx*	<1	0.3	89.21
Gomphrena cunninghamii	<1	0.2	89.06
Hibiscus coatesii	<1	0.3	89.03
Indigofera linifolia	<1	0.2	89.08
Indigofera linnaei	<1	0.2	89.17
Indigofera trita	5	0.2	89.05
Salsola tragus subsp. *tragus*	<1	0.4	89.07
Solanum lasiophyllum	<1	0.3	89.19
Tephrosia aff. *supina* (HD133-20)	<1	0.2	89.09A
Triodia angusta	30	0.4	89.22

Triodia wiseana (fine form)	60	0.4	89.11
Triumfetta clementii	<1	0.2	89.02

API rail Flora **Site** APQ90

Described by GM **Date** 21/07/2009 **Type** Q50 x 50
Season E

MGA Zone 50 512069 **mE** 7714528 **mN**
Soil Rocks over sandy clay
Vegetation Closed Hummock Grassland of *Triodia epactia* on rocky ridgetop.
Veg Condition Very Good



APQ90 21/07/2009

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.4	90.17
Bonamia media var. *villosa*	<1	0.1	90.15
**Cenchrus ciliaris*	1	0.4	90.06
Cucumis maderaspatanus	<1	creeper	90.05
Cullen leucochaites	1	0.5	90.04
Cymbopogon ambiguus	<1	0.5	90.18
Gomphrena cunninghamii	<1	0.2	90.12
Ptilotus fusiformis	<1	0.3	90.01
Rhynchosia minima	<1	0.2	90.08
Senna notabilis	<1	0.4	90.10
Senna venusta	<1	0.6	90.11
Sporobolus australasicus	<1	0.2	90.03
Streptoglossa decurrens	<1	0.5	90.02
Tephrosia aff. *supina* (HD133-20)	<1	0.2	90.14
Trichodesma zeylanicum var. *zeylanicum*	<1	0.3	90.09
Triodia epactia	70	0.3	90.16
Triumfetta clementii	<1	0.3	90.13
Abutilon fraseri	Opp	0.2	90.23
Acacia coriacea subsp. *coriacea*	Opp	2	90.22

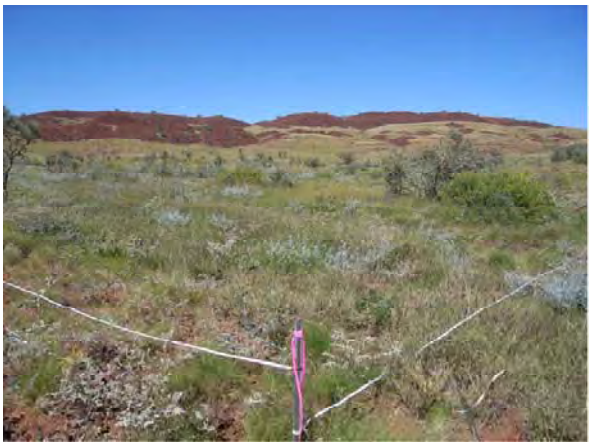
Acacia pyrifolia var. *pyrifolia*	Opp	0.6	90.24
Corchorus parviflorus	Opp	0.3	90.25
Dicliptera armata	Opp	0.3	90.21
Senna glutinosa subsp. *glutinosa x oligophylla*	Opp	0.4	90.20
Tinospora smilacina	Opp	Creeper	90.19

API rail Flora **Site** APQ91

Described by GM **Date** 21/07/2009 **Type** Q50 x 50
Season E

MGA Zone 50 511750 **mE** 7714694 **mN**
Soil Orange rocky sand
Vegetation Open Shrubland of *Acacia inaequilatera* and *Acacia bivenosa* over a Closed Hummock Grassland of *Triodia epactia* and *Triodia wiseana* (fine form) on orange rocky flats.

Veg Condition Good



APQ91 21/07/2009

APQ91 5/04/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.2	91.17
Acacia bivenosa	1	1.5	91.08
Acacia coriacea subsp. *coriacea*	<1	1	91.30
Acacia inaequilatera	5	3	91.32
Acacia pyrifolia var. *pyrifolia*	<1	1.5	91.06
Acacia stellaticeps	<1	0.3	-
Acacia tumida var. *pilbarensis*	<1	0.4	91.42
Alysicarpus muelleri	<1	0.4	AP91-05
Boerhavia gardneri	<1	0.3	AP91-12
Bonamia media var. *villosa*	<1	creeper	-
**Cenchrus ciliaris*	5	0.4	91.26
Corchorus parviflorus	1	0.3	91.21
Cucumis maderaspatanus	<1	creeper	AP91-11
Cyperaceae sp.	<1	0.2	AP91-01
Eulalia aurea	1	0.1	AP91-02
Euphorbia alsiniflora	<1	0.3	91.28
Euphorbia sp. (BPBS10-50)	<1	0.1	91.31
Euphorbia wheeleri	<1	0.2	AP91-03
Evolvulus alsinoides var. *villosicalyx*	<1	0.1	-
Gomphrena cunninghamii	<1	0.2	-
Goodenia microptera	<1	0.3	91.38
Gossypium australe (Burrup Peninsula form)	<1	0.6	91.14
Grevillea pyramidalis subsp. *leucadendron*	1	2	91.12
Hibiscus coatesii	<1	0.2	AP91-04
Hibiscus sturtii	<1	0.2	AP91-10
Hybanthus aurantiacus	<1	0.3	91.19

Name	Cover (%)	Height (m)	Specimen
Indigofera linifolia	<1	0.2	91.01
Indigofera monophylla (MJOPP-2)	<1	0.3	91.04
Indigofera trita	<1	0.2	91.16
Ipomoea muelleri	<1	creeper	AP91-06
Ptilotus auriculifolius	<1	0.4	91.02
Ptilotus exaltatus var. *exaltatus*	<1	0.4	91.13
Rhynchosia minima	<1	creeper	91.33
Senna notabilis	<1	0.2	-
Sida aff. *cardiophylla*	<1	0.2	AP91-09
Sida aff. *echinocarpa* (MET 15,350)	<1	0.2	AP91-08
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	<1	0.3	AP91-09
Solanum diversiflorum	<1	0.2	-
Sporobolus australasicus	<1	0.2	-
Stemodia grossa	1	0.4	91.23
Swainsona canescens	<1	0.1	91.34
Tephrosia aff. *supina* (HD133-20)	<1	0.1	91.09
Tephrosia aff. *supina* (MET 12,357)	<1	0.1	91.07
Tephrosia rosea var. *clementii*	1	0.6	91.03
Tephrosia sp. Bungaroo Creek (M.E. Trudgen 11601)	<1	0.3	91.20
Tephrosia supina	<1	0.2	AP88-01
Themeda triandra	<1	0.4	91.10
Trichodesma zeylanicum var. *zeylanicum*	<1	0.4	91.18
Triodia epactia	70	0.4	91.36
Triodia wiseana (fine form)	10	0.3	91.40
Triumfetta clementii	<1	0.2	91.29
Waltheria indica	<1	0.4	91.24

API rail Flora **Site** APQ92

Described by GM **Date** 21/07/2009 **Type** Q50 x 50
Season E

MGA Zone 50 511312 **mE** 7714355 **mN**
Soil Red rocky sandy clay
Vegetation Tall Open Shrubland to Open Shrubland of of *Acacia inaequilatera* over an Open Shrubland of *Acacia bivenosa* and *Acacia pyrifolia* var. *pyrifolia* over a Closed Hummock Grassland of *Triodia epactia* on sandy clay flats.
Veg Condition Very Good
Notes North-west corner on track

APQ92 21/07/2009

APQ92 5/04/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	2	1	92.06
Acacia inaequilatera	5	2.5	92.08
Acacia pyrifolia var. *pyrifolia*	3	1.2	92.16
Alysicarpus muelleri	<1	0.2	92.05
Aristida contorta	<1	0.2	AP92-02
Boerhavia coccinea	<1	0.3	92.12
Boerhavia gardneri	<1	creeper	AP91-12
Bonamia media var. *villosa*	<1	creeper	-
Bonamia pannosa	<1	0.3	92.13
Bulbostylis barbata	10	0.2	92.01
**Cenchrus ciliaris*	1	0.4	92.03
Corchorus aff. *walcotti* (K.J. Atkins 570)	<1	0.3	92.22
Corchorus parviflorus	1	0.3	92.18
Cucumis maderaspatanus	<1	creeper	AP91-11
Dactyloctenium radulans	<1	0.3	-
Dichanthium sericeum subsp. *humilius*	<1	0.2	92.34
Eriachne pulchella subsp. *dominii*	<1	0.1	92.21
Euphorbia australis	<1	0.1	92.32
Euphorbia alsiniflora	<1	0.2	92.29
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	92.17
Gomphrena cunninghamii	<1	0.2	92.25
Hibiscus sturtii var. *platychlamys*	<1	0.2	AP91-04
Indigofera monophylla (MJOPP-2)	<1	0.3	92.15
Iseilema eremaeum	<1	0.1	AP92-01

Name	Cover (%)	Height (m)	Specimen
Notoleptopus decaisnei var. *orbicularis*	<1	0.2	92.10
Polycarpaea longiflora	<1	0.1	-
**Portulaca oleracea*	<1	0.1	92.02
Ptilotus exaltatus var. *exaltatus*	<1	0.4	92.11
Rhynchosia minima	<1	creeper	92.14
Salsola tragus subsp. *tragus*	<1	0.2	92.28
Senna notabilis	<1	0.1	92.19
Sida echinocarpa	<1	0.3	92.31
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	<1	0.4	92.20
Sporobolus australasicus	<1	0.1	92.04
Swainsona formosa	<1	0.1	92.30
Tephrosia aff. *supina* (HD133-20)	<1	0.4	92.27
Trachymene oleracea	<1	0.5	92.23
Trichodesma zeylanicum var. *zeylanicum*	<1	1	92.07
Triodia epactia	70	0.4	92.33
Triodia wiseana	2	0.3	-
Triumfetta clementii	<1	0.4	92.26
Yakirra australiensis	<1	0.2	AP91-02

API rail Flora **Site** APQ93

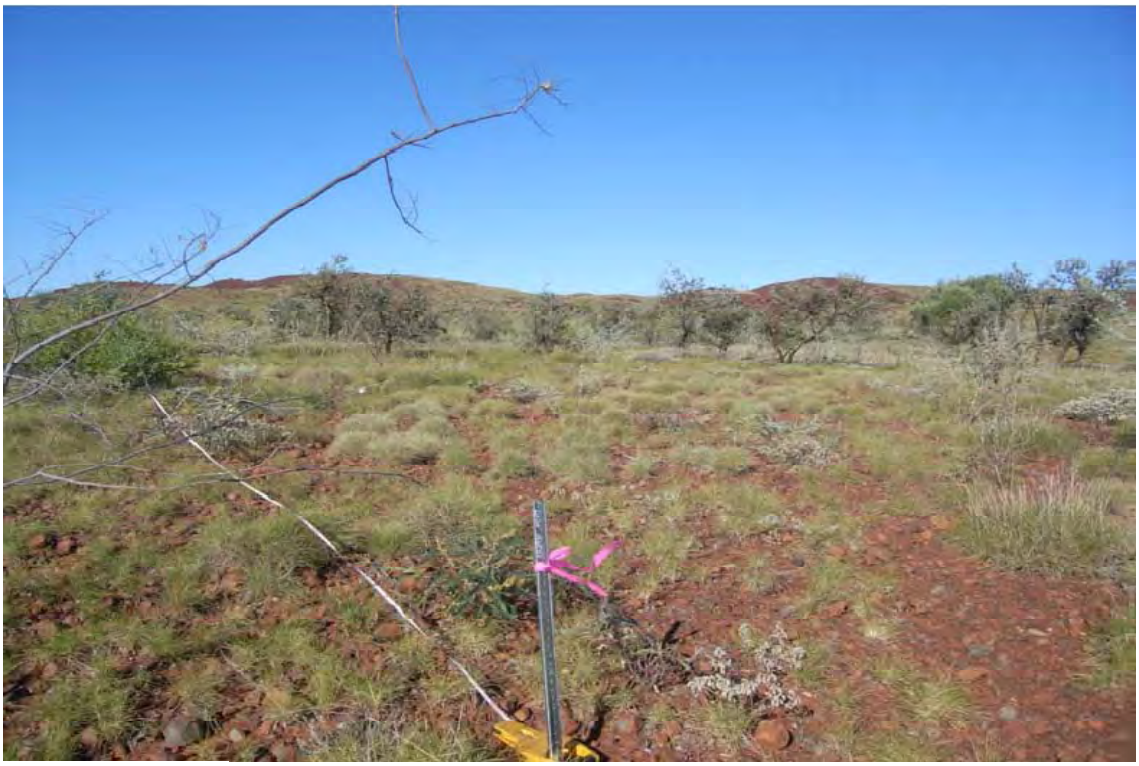
Described by GM **Date** 21/07/2009 **Type** R25 x 100
Season E

MGA Zone50 511039 **mE** 7714266 **mN**

Soil Orange sandy clay with rocky nodules

Vegetation Shrubland of *Acacia inaequilatera*, *Acacia tumida* var. *pilbarensis* with occasional *Acacia coriacea* subsp. *coriacea*, *Acacia coriacea* subsp. *pendens, Acacia bivenosa* and *Acacia inaequilatera* over an Open Shrubland of *Corchorus* aff. *parviflorus*, *Corchorus* aff. *walcottii* (K.J. Atkins 570*), Stemodia grossa* and *Sida* aff. *echinocarpa* (MET 15,350) over a Hummock Grassland of *Triodia epactia* over a Very Open Tussock Grassland of **Cenchrus ciliaris* on orange sandy clay drainage lines.

Veg Condition Very Good



APQ93 21/07/2009

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	1	1	93.25
Acacia coriacea subsp. *coriacea*	1	0.8	93.20
Acacia coriacea subsp. *pendens*	1	1.2	93.12
Acacia inaequilatera	2	2	93.26
Acacia pyrifolia var. *pyrifolia*	20	93.30	-
Acacia tumida var. *pilbarensis*	10	5	93.32
Boerhavia gardneri	<1	0.4	93.27
**Cenchrus ciliaris*	10	0.4	93.21
Cleome viscosa	<1	0.4	93.31
Corchorus aff. *parviflorus*	3	0.4	93.07
Corchorus aff. *walcotti* (K.J. Atkins 570)	4	0.3	93.03
Crotalaria medicaginea var. *neglecta*	<1	0.1	93.38
Cucumis maderaspatanus	<1	creeper	93.34
Cymbopogon ambiguus	1	0.8	93.10
Euphorbia alsiniflora	<1	0.1	93.23

Name	Cover (%)	Height (m)	Specimen
Euphorbia wheeleri	<1	0.1	93.05
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	93.35
Gomphrena cunninghamii	<1	0.2	93.33
Indigofera monophylla (MJOPP-2)	1	0.4	93.41
Ptilotus calostachyus var. *calostachyus*	<1	1.2	93.06
Rhynchosia minima	<1	0.1	93.22
Salsola tragus subsp. *tragus*	<1	0.4	93.09
Senna notabilis	<1	0.2	93.04
Sida aff. *echinocarpa* (MET 15,350)	2	0.3	93.08
Sida echinocarpa	<1	0.2	93.16
Solanum diversiflorum	<1	0.2	93.19
Stemodia grossa	2	0.5	93.02
Streptoglossa decurrens	<1	0.4	93.39
Swainsona formosa	<1	0.4	93.37
Tephrosia aff. *supina* (MET 12,357)	1	0.3	93.24
Tephrosia rosea var. *clementii*	<1	0.5	93.29
Themeda triandra	<1	0.7	93.11
Trichodesma zeylanicum var. *zeylanicum*	<1	0.6	93.14
Triodia epactia	30	0.3	93.01
Triumfetta clementii	1	0.4	93.28
Triumfetta maconochieana	<1	0.5	93.17

API rail Flora **Site** APQ94

Described by GM **Date** 22/07/2009 **Type** Q 50 x 50
Season E

MGA Zone 50 513165 **mE** 7715001 **mN**

Soil Orange clayey loam

Vegetation Open Heath of *Acacia bivenosa* and *Acacia synchronicia*, with occasional *Acacia pyrifolia* var. *pyrifolia* and **Aerva javanica* over a Closed Tussock Grassland of **Cenchrus ciliaris* on orange clayey loam.

Veg Condition Good

APQ94 22/07/2009

APQ94 21/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.3	94.04
Acacia bivenosa	40	2	94.01
Acacia pyrifolia var. *pyrifolia*	<1	1	94.19
Acacia synchronicia	5	1.5	94.08
**Aerva javanica*	1	0.4	94.16
Boerhavia coccinea	<1	0.3	100-07
Bonamia media var. *villosa*	<1	0.1	94.26
Cassytha capillaris	1	creeper	94-06
**Cenchrus ciliaris*	35	0.3	94.10
Chrysopogon fallax	<1	0.8	94-02
Corchorus parviflorus	<1	0.3	94.22
Enneapogon caerulescens	1	0.2	94.09
Eriachne obtusa	<1	0.4	94-01
Eulalia aurea	<1	0.5	94.17
Euphorbia alsiniflora	<1	0.3	94.23
Euphorbia australis	<1	0.1	94-09
Euphorbia biconvexa	<1	0.2	94-05
Euphorbia tannensis subsp. *eremophila*	<1	0.3	94-03
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	100-03
Gomphrena cunninghamii	<1	0.2	94-08
Goodenia microptera	<1	0.4	94-10
Hybanthus aurantiacus	<1	0.2	94.13
Indigofera monophylla	<1	0.2	94-12
Melhania sp. (CH15-39)	<1	0.2	94-07
Myoporum montanum	<1	0.8	94.02
Notoleptopus decaisnei var. *orbicularis*	<1	0.3	100-18

Name	Cover (%)	Height (m)	Specimen
Oldenlandia crouchiana	<1	0.2	94.33
Phyllanthus maderaspatensis	<1	0.3	94.30
Polycarpaea longiflora (red form)	<1	0.2	94.15
Pterocaulon sphaeranthoides	<1	0.4	94.31
Ptilotus exaltatus var. *exaltatus*	<1	0.2	94.18
Rhynchosia minima	<1	0.1	94.06
Salsola tragus	<1	0.2	-
Senna artemisioides subsp. *oligophylla x helmsii*	<1	0.3	94.12
Senna glutinosa subsp. *glutinosa*	<1	0.8	94-13
Sida aff. *fibulifera* (oblong; MET 15 220)	<1	0.2	94.28
Sporobolus australasicus	<1	0.1	100-02
Streptoglossa decurrens	<1	0.2	94.29
Stylidium spathulatum	1	1.5	94-11
Tephrosia aff. *supina* (HD205-10)	<1	0.2	94.05
Trianthema turgidifolia	<1	0.2	94.11
Tribulus hirsutus	<1	0.3	100-20
Trichodesma zeylanicum var. *zeylanicum*	<1	0.2	94.27
Triodia epactia	55	0.3	94.34
Frankenia pauciflora var. *pauciflora*	Opp	-	94.36
Tecticornia indica subsp. *bidens*	Opp	-	94.35

API rail Flora **Site** APQ95

Described by GM **Date** 22/07/2009 **Type** Q50 x 50
Season E

MGA Zone 50 512772 **mE** 7715197 **mN**

Soil Orange sandy clay on granite outcropping

Vegetation Tall Open Scrub to Open Heath dominated by *Acacia sabulosa* and *Acacia bivenosa* with occasional *Acacia pyrifolia* var. *pyrifolia* over a Closed Tussock Grassland of **Cenchrus ciliaris* on sandy clay slopes.

Veg Condition Good - Degraded

APQ95 22/07/2009

APQ95 22/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon otocarpum	<1	0.2	95-09
Acacia bivenosa	15	1.8	95.03
Acacia coriacea subsp. *coriacea*	<1	2.5	95.06
Acacia pyrifolia var. *pyrifolia*	1	1	95.18
Acacia sabulosa	30	3.5	95.11
**Aerva javanica*	1	0.6	95.13
Aristida contorta	<1	0.3	95-04
Boerhavia coccinea	-	-	100-07
Bonamia linearis	<1	creeper	95-08
Cassytha capillaris	<1	creeper	95.16
**Cenchrus ciliaris*	80	0.6	95.02
Cleome viscosa	<1	0.2	95.07
Corchorus aff. *walcotti* (K.J. Atkins 570)	<1	0.3	95.21
Corchorus parviflorus	<1	0.3	95.14
Corchorus tridens	<1	0.2	95-07
Crotalaria ramosissima	<1	0.4	95.20
Cucumis maderaspatanus	<1	creeper	95-11
Eragrostis aff. *eriopoda*	<1	0.3	95.19
Eriachne obtusa	-	-	94-01
Euphorbia alsiniflora	<1	0.15	95-03
Gomphrena cunninghamii	Opp	100-0	-
Goodenia microptera	<1	0.3	95.05
Grevillea pyramidalis subsp. *leucadendron*	<1	1.2	-
Heliotropium ovalifolium	<1	0.2	95.22
Hybanthus aurantiacus	<1	0.3	-
Ipomoea polymorpha	<1	0.3	95-02

Name	Cover (%)	Height (m)	Specimen
Melhania sp. (CH15-39)	<1	0.4	95-06
Phyllanthus maderaspatensis	<1	0.2	95-01
Polycarpaea longiflora (red form)	<1	0.2	-
Portulaca pilosa	<1	0.2	95.17
Ptilotus exaltatus var. *exaltatus*	<1	0.2	-
Rhynchosia minima	<1	0.1	95.08
Sida rohlenae subsp. *rohlenae*	<1	0.4	95.01
Solanum lasiophyllum	-	-	-
Swainsona canescens	<1	0.2	95.09
Tephrosia supina	Opp	95-opp01	-
Tribulus hirsutus	95-10	-	-
Trichodesma zeylanicum var. *zeylanicum*	<1	0.2	95.10
Triodia epactia	1	0.4	95.12

API rail Flora **Site** APQ96

Described by GM **Date** 22/07/2009 **Type** Q50 x 50
Season E

MGA Zone 50 512012 **mE** 7713046 **mN**
Soil Orange sand
Vegetation Low Woodland of *Corymbia hamerselyana* over an Open Shrubland of *Acacia bivenosa* and *Grevillea pyramidalis* subsp. *leucadendron* over a Mid Dense Hummock Grassland of *Triodia* aff. *epactia* on sandy lower slopes in association with drainage lines.

Veg Condition Very Good - Good

APQ96 22/07/2009

APQ96 5/04/2011

SPECIES LIST

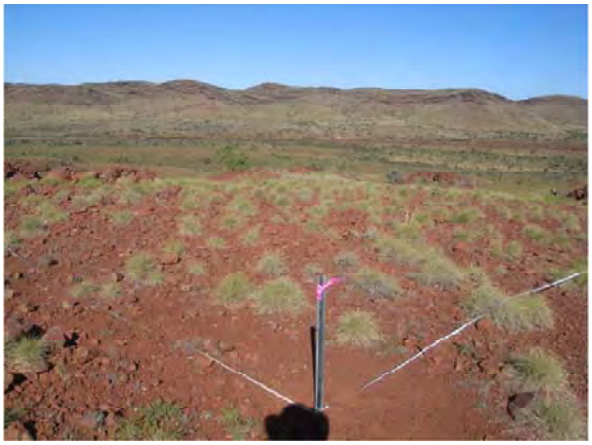
Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	2	1	96.14
Acacia pyrifolia var. *pyrifolia*	<1	2.5	96.04
Acacia tumida var. *pilbarensis*	<1	0.5	96.10
Alysicarpus muelleri	<1	0.3	-
Aristida hygrometrica	1	0.3	-
Boerhavia gardneri	<1	0.2	AP96-09
Bonamia linearis	<1	creeper	AP96-05
Bonamia media var. *villosa*	<1	creeper	-
Bulbostylis barbata	<1	0.1	AP96-07
**Cenchrus ciliaris*	5	0.4	96.03
Chrysopogon fallax	5	1	96.02
Cleome viscosa	<1	0.8	96.22
Corchorus parviflorus	<1	0.3	96.34
Corchorus tridens	<1	0.2	AP96-15
Corymbia hamersleyana	20	4	96.12
Crotalaria medicaginea var. *neglecta*	<1	0.6	96.26
Cyperus sp.	<1	0.2	AP96-08
Desmodium filiforme	<1	0.2	AP96-03
Eragrostis eriopoda	<1	0.3	AP96-10
Eriachne ciliata	<1	0.3	AP96-16
Euphorbia australis	<1	0.2	AP96-02
Euphorbia alsiniflora	<1	0.4	96.21
Gomphrena cunninghamii	<1	0.2	-
Goodenia microptera	<1	0.4	96.06
Gossypium australe (Burrup Peninsula form)	<1	0.8	96.18

Name	Cover (%)	Height (m)	Specimen
Grevillea pyramidalis subsp. *leucadendron*	3	1	96.15
Heliotropium ovalifolium	<1	0.4	AP96-19
Hibiscus leptocladus	<1	0.4	96.25
Hybanthus aurantiacus	<1	0.3	AP96-06
Indigofera colutea	<1	0.1	96.05
Indigofera linifolia	<1	0.2	96.08
Indigofera monophylla (MJOPP-2)	<1	0.4	96.17
Ipomoea polymorpha	<1	0.2	AP96-11
Mollugo molluginea	<1	0.3	AP96-21
Paraneurachne muelleri	<1	0.3	AP96-18
Perotis rara	<1	0.2	AP96-14
**Portulaca oleracea*	<1	0.2	96.24
Ptilotus ? exaltatus var. *exaltatus*	<1	0.2	
Ptilotus helipteroides	<1	0.2	96.27
Ptilotus polystachyus var. *polystachyus*	<1	0.4	96.07
Rhynchosia minima	<1	creeper	96.13
Sida aff. *fibulifera* (HD200-6)	<1	0.2	AP96-13
Sida aff. *fibulifera* (M37.16)	<1	0.2	AP96-12
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	<1	0.3	96.30
Sida rohlenae subsp. *rohlenae*	<1	0.3	AP96-17
Sida sp. verrucose glands (F.H. Mollemans 2423)	<1	0.3	96.28
Swainsona formosa	<1	0.3	AP96-20
Tephrosia aff. *supina* (MET 12,357)	<1	0.7	96.20
Tephrosia sp. Bungaroo Creek (M.E. Trudgen 11601)	<1	0.4	96.31
Themeda triandra	<1	0.8	96.01
Trichodesma zeylanicum var. *zeylanicum*	<1	0.4	96.29
Triodia aff. *epactia*	50	0.4	AP96-01

API rail Flora **Site** APQ97

Described by GM **Date** 22/07/2009 **Type** Q50 x 50
Season E

MGA Zone 50 511795 **mE** 7713450 **mN**
Habitat Closed Hummock Grassland of *Triodia wiseana* (fine form) on hillslopes and ridgetops
Soil Orange rocky sandy clay
Vegetation
Veg Condition Very Good



APQ97 22/07/2009

APQ97 5/04/2011

SPECIES LIST

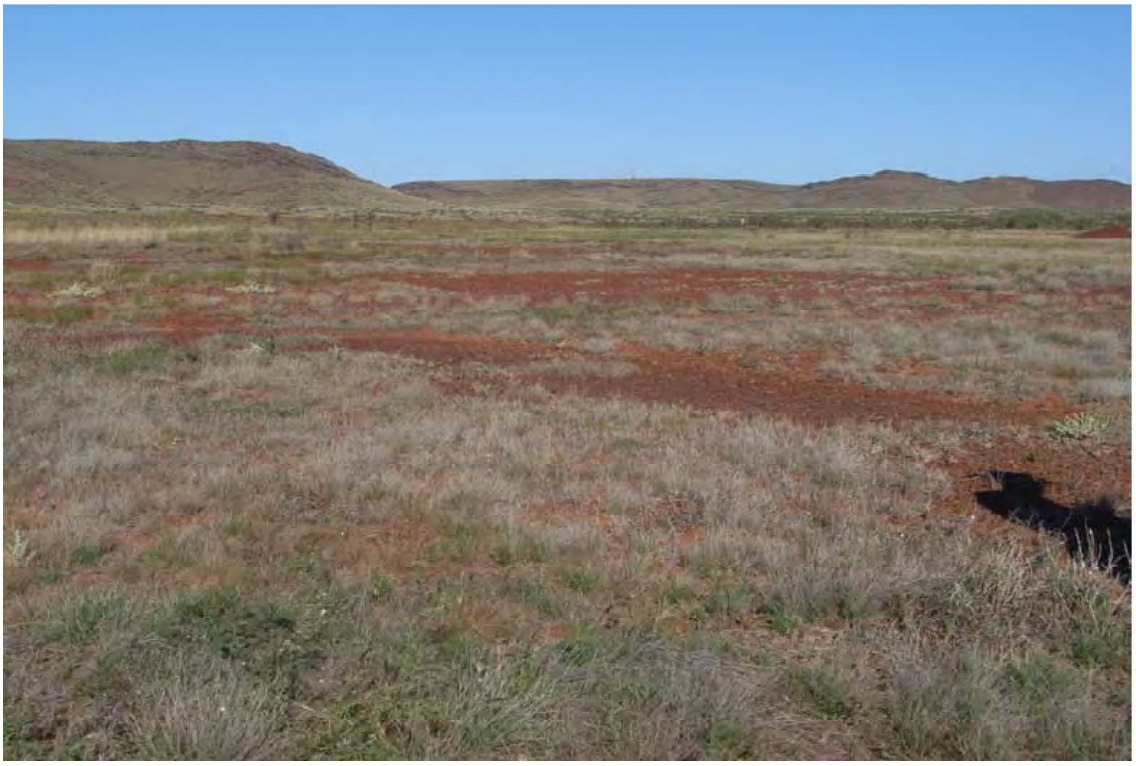
Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.4	97.07
Acacia bivenosa	<1	1	97.18
Acacia pyrifolia	<1	1	-
Amaranthus cuspidifolius	<1	0.4	97.03
Aristida contorta	<1	0.2	97.21
Bonamia media var. *villosa*	<1	creeper	-
Bulbostylis barbata	1	0.2	-
Capparis spinosa var. *nummularia*	<1	0.6	97.06
**Cenchrus ciliaris*	1	0.4	97.25
Corchorus parviflorus	<1	0.3	AP97-05
Crotalaria medicaginea var. *neglecta*	<1	0.2	-
Cucumis maderaspatanus	<1	creeper	97.05
Cullen lachnostachys	<1	0.6	AP97-06
Cymbopogon ambiguus	<1	0.7	97.16
Ehretia saligna var. *saligna*	<1	3	97.02
Enneapogon caerulescens	<1	0.2	97.24
Eriachne obtusa	<1	0.3	AP97-03
Eriachne pulchella subsp. *dominii*	<1	0.2	-
Euphorbia australis	<1	0.3	97.12
Euphorbia alsiniflora	<1	0.2	AP97-04
Euphorbia wheeleri	<1	0.2	97.14
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	97.20
Fimbristylis aff. *dichotoma* (M75-4)	1	0.2	AP97-01
Flueggea virosa subsp. *melanthesoides*	<1	1.5	97.13
Gomphrena cunninghamii	5	0.2	97.19
Gossypium australe (Whim Creek form)	1	0.8	97.08

Name	Cover (%)	Height (m)	Specimen
Hibiscus aff. *platychlamys* (MET 15,067)	<1	0.2	97.27
Hybanthus aurantiacus	<1	0.3	-
Indigofera linifolia	<1	0.1	-
Indigofera monophylla (grey leaflet form)	<1	0.2	97.04
Indigofera monophylla (MJOPP-2)	<1	0.3	97.09
Notoleptopus decaisnei var. *orbicularis*	<1	0.2	-
Oldenlandia crouchiana	<1	0.3	97.26
Polycarpaea longiflora	<1	0.1	-
Polygala sp.	<1	0.1	AP97-02
Ptilotus sp.	<1	0.2	-
Rhynchosia minima	<1	creeper	97.15
Senna glutinosa subsp. *glutinosa*	<1	0.8	-
Sporobolus australasicus	<1	0.2	-
Themeda triandra	<1	0.3	-
Trachymene oleracea	<1	0.2	97.17
Trichodesma zeylanicum var. *zeylanicum*	<1	0.8	97.23
Triodia wiseana (fine form)	70	0.3	97.10
Triumfetta clementii	<1	0.2	97.01
Vigna lanceolata var. *lanceolata*	<1	creeper	AP97-07
Yakirra australiensis	<1	0.2	AP91-02

API rail Flora **Site** APQ98

Described by GM **Date** 22/07/2009 **Type** V
Season E

MGA Zone 50 510567 **mE** 7712512 **mN**
Soil Orange loamy clay
Vegetation Mid to dense tussock grassland of *Eragrostis xerophila* with scattered *Sclerolaena bicornis* on loamy clayey lower slopes.
Veg Condition Degraded



APQ98 22/07/2009

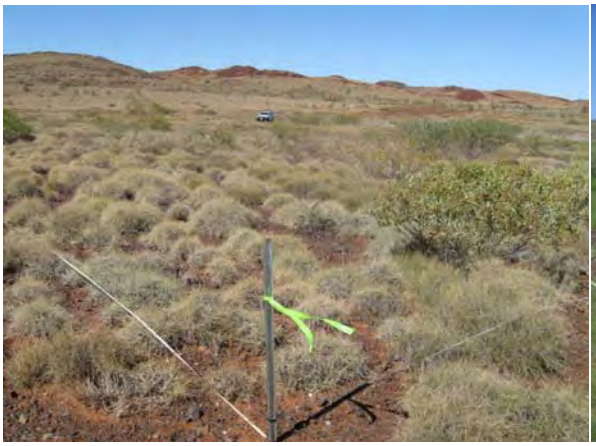
SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Atriplex codonocarpa	<1	0.3	98.02
Eragrostis tenellula	<1	0.4	98.12
Eragrostis xerophila	40	0.3	98.10
Eriachne benthamii	<1	0.4	98.13
Iseilema macratherum	<1	0.1	98.09
Marsilea hirsuta	<1	0.1	98.05
Neptunia dimorphantha	<1	0.2	98.04
Panicum decompositum	<1	0.3	98.06
Polygala aff. *isingii*	<1	0.3	98.14
**Portulaca oleracea*	<1	0.1	98.16
Ptilotus exaltatus	<1	0.4	98.01
Rhynchosia minima	<1	creeper	98.03
Sclerolaena bicornis	1	0.4	98.11
Sida aff. *fibulifera* (HD200-6)	<1	0.1	98.08
Xerochloa barbata	<1	0.3	98.17

API rail Flora **Site** APQ100

Described by GM **Date** 30/05/2010 **Type** Q 50x50

MGA Zone50 510296 **mE** 7714058 **mN**
Soil orange sandy clay
Rock Type ironstone
Vegetation AThg1
Veg Condition Very Good



APQ100 30/05/2010

APQ100 21/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	4	1.3	-
Acacia pyrifolia	<1	0.4	-
Acacia synchronicia	2	1.3	-
**Aerva javanica*	1	0.6	-
Alysicarpus muelleri	<1	0.2	100-06
Aristida contorta	<1	0.4	100-16
Boerhavia coccinea	1	0.2	100-07
Bulbostylis barbata	<1	0.1	100-15
**Cenchrus ciliaris*	2	0.5	-
Corchorus walcottii	<1	0.2	100-04
Crotalaria medicaginea var. *neglecta*	<1	0.2	100-13
Dichanthium sericeum subsp. *humilius*	<1	0.3	100-19
Enneapogon caerulescens	1	0.3	-
Eriachne pulchella subsp. *dominii*	<1	0.4	100-14
Euphorbia biconvexa	<1	0.4	100-08
Euphorbia sp. (BPBS10-50)	<1	0.1	100-11
Evolvulus alsinoides var. *villosicalyx*	<1	0.2	100-03
Fimbristylis aff. *dichotoma* (M75-4)	<1	0.3	100-17
Gomphrena cunninghamii	<1	0.2	100-01
Heliotropium ?cunninghamii	<1	0.3	-
Iseilema dolichotrichum	<1	0.1	100-05
Notoleptopus decaisnei var. *orbicularis*	<1	0.3	100-10
**Portulaca oleracea*	<1	0.2	100-09
Ptilotus exaltatus var. *exaltatus*	<1	0.4	-
Rhynchosia minima	<1	0.1	-
Scaevola spinescens	1	0.5	-

Name	Cover (%)	Height (m)	Specimen
Sida cardiophylla	<1	0.3	100-12
Sporobolus australasicus	<1	0.1	100-02
Tribulus hirsutus	<1	0.15	100-20
Trichodesma zeylanicum	<1	0.1	-
Triodia epactia	25	0.6	-
Triodia wiseana	60	0.5	-
Triumfetta clementii	<1	0.2	-
Acacia pyrifolia var. *pyrifolia*	Opp	-	-

API rail Flora **Site** APQ101

Described by GM **Date** 31/05/2010 **Type** Q 50x50

MGA Zone50 511281 **mE** 7712776 **mN**

Habitat Elevation 16.7m, Slope - 2 degrees, Aspect - West. Site slopes down into a gully and slopes back up the other side.

Soil Orange brown rocky clay loam

Vegetation Tall Shrubland of *Acacia inaequilatera* with scattered *Corymbia hamersleyana* over an Open Shrubland of *Acacia pyrifolia* var. *pyrifolia* and *Acacia bivenosa* over a Low Open Shrubland of *Sida* aff. *echinocarpa* over a Mid-Dense Hummock Grassland of *Triodia wiseana* and *Triodia epactia* on rocky clay/loam hillslopes.

Veg Condition Very Good

Fire Age ~5yrs

APQ101 31/05/2010

APQ101 07/04/2011

SPECIES LIST

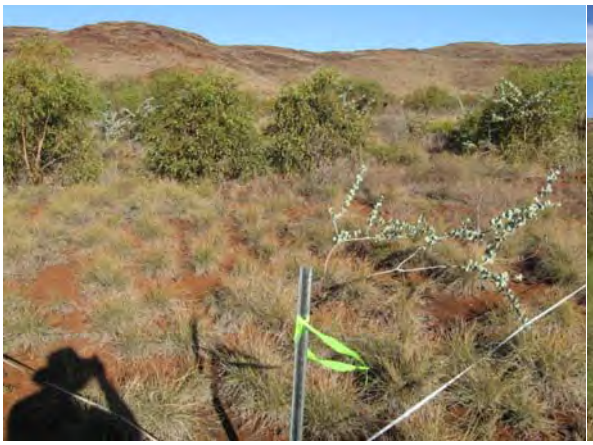
Name	Cover (%)	Height (m)	Specimen
Abutilon aff. *lepidum*	<1	0.3	-
Acacia bivenosa	3	1	-
Acacia inaequilatera	15	3	-
Acacia pyrifolia	10	1.5	-
Acacia tumida var. *pilbarensis*	<1	0.4	API-05
Aristida contorta	<1	0.2	-
Bonamia media var. *villosa*	<1	creeper	-
Corymbia hamersleyana	Opp	-	-
Eriachne pulchella subsp. *dominii*	<1	0.2	-
Euphorbia australis	<1	0.1	AP101-02
Euphorbia alsiniflora	<1	0.3	-
Euphorbia schultzii	<1	0.2	API-06
Evolvulus alsinoides	<1	0.2	-
Fimbristylis aff. *dichotoma* (M75-4)	6	0.2	AP101-01
Gomphrena cunninghamii	<1	0.2	-
Gossypium sp.	<1	0.6	-
Grevillea pyramidalis subsp. *leucadendron*	1	1.2	-
Hibiscus coatesii	<1	0.2	AP101-08
Hybanthus aurantiacus	1	0.3	-
Indigofera monophylla	<1	0.3	-
Notoleptopus decaisnei var. *orbicularis*	<1	0.1	-
Paspalidium tabulatum	<1	0.2	AP11-02
Polycarpaea holtzei	<1	0.1	AP23-01

Name	Cover (%)	Height (m)	Specimen
Polycarpaea longiflora	<1	0.2	AP101-10
Ptilotus calostachyus	<1	1	-
Ptilotus fusiformis	<1	0.3	-
Rhynchosia minima	<1	creeper	-
Senna notabilis	<1	0.2	-
Sida aff. *echinocarpa*	5	0.3	AP101-04
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	<1	0.3	AP101-09
Tephrosia rosea var. *rosea*	<1	0.1	AP101-05
Themeda triandra	<1	0.6	-
Tribulus macrocarpus	<1	0.6	AP101-03
Triodia epactia	70	0.4	AP101-07
Triodia wiseana	5	0.4	AP101-06
Triumfetta clementii	<1	0.3	-

API rail Flora **Site** APQ102

Described by GM **Date** 30/05/2010 **Type** Q 50x50

MGA Zone 50 512215 **mE** 7713248 **mN**
Soil orange sandy clay
Vegetation Amg
Veg Condition Good
Fire Age <3 years



APQ102 30/05/2010

APQ102 07/04/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon lepidum	<1	0.8	AP102-15
Acacia bivenosa	1	1.5	-
Acacia inaequilatera	3	2.5	-
Acacia stellaticeps	1	1.1	APJ2
Acacia tumida var. *pilbarensis*	<1	0.6	APJ5
Aristida hygrometrica	2	0.8	AP102-01
Boerhavia schomburgkiana	<1	0.3	AP102-11
Bonamia linearis	<1	creeper	AP102-03
Bonamia media var. *villosa*	<1	creeper	-
**Cenchrus ciliaris*	25	0.6	-
Chrysopogon sp.	<1	0.8	AP102-14
Cleome viscosa	<1	0.4	-
Corchorus parviflorus	<1	0.4	-
Corchorus sp.	<1	0.4	-
Corymbia hamersleyana	4	3	-
Crotalaria medicaginea var. *neglecta*	<1	0.8	-
Crotalaria ramosissima	<1	0.1	AP102-13
Dactyloctenium radulans	0.1	<1	-
Eragrostis eriopoda	<1	0.3	-
Eulalia aurea	<1	0.8	AP102-05
Euphorbia australis	<1	creeper	AP69-01
Euphorbia alsiniflora	<1	0.2	-
Evolvulus alsinoides	<1	0.2	-
Gomphrena cunninghamii	<1	0.2	-
Goodenia microptera	<1	0.2	-
Gossypium australe (Whim Creek form)	<1	0.6	APJ4
Grevillea pyramidalis subsp. *leucadendron*	<1	0.8	-

Name	Cover (%)	Height (m)	Specimen
Heliotropium pachyphyllum	<1	0.4	AP102-09
Hibiscus burtonii	<1	0.4	AP102-16
Hybanthus aurantiacus	<1	0.3	-
Indigofera colutea	<1	0.1	-
Indigofera linifolia	<1	0.2	-
Indigofera monophylla	10	0.4	-
Indigofera trita	<1	0.5	-
Ipomoea muelleri	<1	creeper	AP102-10
Ipomoea polymorpha	<1	0.2	AP102-08
Mollugo molluginea	<1	0.2	AP101-07
Paraneurachne muelleri	<1	0.3	-
Portulaca pilosa	<1	0.2	-
Ptilotus obovatus	<1	0.6	-
Rhynchosia minima	<1	creeper	-
Salsola tragus	<1	0.1	-
Sida echinocarpa	<1	0.2	AP102-17
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	<1	0.8	AP102-12
Solanum diversiflorum	<1	0.2	-
Tephrosia clementii	<1	0.4	-
Tephrosia rosea var. *rosea*	<1	creeper	AP102-04
Trichodesma zeylanicum	<1	0.3	-
Triodia wiseana	<1	1.5	AP101-06
Vigna lanceolata var. *lanceolata*	<1	creeper	AP13-03
Yakirra australiensis	<1	0.1	AP102-02

API rail Flora **Site** APQ103

Described by GM **Date** 31/05/2010 **Type** Q 50x50

MGA Zone50 508016 **Me** 7715427 **mN**

Habitat Coastal grassland. Flat, elevation 8.7m

Soil Red orange, loamy/silty clay

Vegetation Tussock grassland of **Cenchrus ciliaris* over scattered *Chenopodiaceae* sp on red orange loamy clay coastal flat with bare rocky areas.

Veg Condition Good – Degraded

APQ103 31/05/2010

APQ103 23/03/2011

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Atriplex aff. *amnicola*	<1	0.9	103-04
Atriplex codonocarpa	<1	0.6	API-08
Bulbostylis barbata	<1	0.2	-
**Cenchrus ciliaris*	35	0.7	-
Corchorus tridens	<1	0.2	95-07
Dactyloctenium radulans	<1	0.2	63-02
Enneapogon caerulescens	<1	0.2	
Eragrostis xerophila	2	0.3	103-02
Iseilema dolichotrichum	<1	0.1	103-05
Neptunia monosperma	<1	0.2	API-12
Polygala aff. *isingii*	<1	0.1	103-06
**Portulaca oleracea*	<1	0.3	API-09
Portulaca pilosa	<1	0.2	-
Ptilotus aervoides	<1	0.2	103-01
Rhynchosia minima	<1	creeper	-
Sclerolaena glabra	<1	0.5	API-07
Sida aff. *fibulifera* (HD200-6)	<1	0.3	103-07
Sporobolus australasicus	<1	0.1	-
Threlkeldia diffusa	<1	0.1	API-11
Trianthema turgidifolia	<1	0.6	-
Triodia epactia	<1	0.3	API-13

API rail Flora **Site** APQ104

Described by GM **Date** 31/05/2010 **Type** Q 50x50

MGA Zone 50 512910 **mE** 7714671 **mN**
Soil Orange sandy clay
Vegetation
Veg Condition Degraded
Fire Age <2 years

APQ104 31/05/2010

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
**Cenchrus ciliaris*	65	0.6	-
Ptilotus exaltatus var. *exaltatus*	<1	0.2	-
Trichodesma zeylanicum		0.4	-
Triodia wiseana	3	0.4	-
Acacia bivenosa	Assoc.	-	-
Acacia stellaticeps	1	0.7	-
Acacia ampliceps	1	0.7	-
Acacia colei var. *colei*	<1	0.6	-
Eragrostis xerophila	<1	0.3	-
Triumfetta sp.	<1	0.2	-
Sida sp.	<1	0.2	-
Eriachne sp.	<1	0.4	-

API rail Flora **Site** APQ105

Described by GM **Date** 31/05/2010 **Type** Q 50x50

Location Dixon Island

MGA Zone 50 504234 **mE** 7718085 **mN**
Habitat Elevation 7m, undulating dune
Soil light brown sand with shell fragments
Vegetation Tall Open Scrub of *Acacia coriacea* subsp. *coriacea* over a Tussock Grassland of **Cenchrus ciliaris*
Veg Condition Degraded

APQ105 31/05/2010

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	2	1	-
Acacia coriacea subsp. *coriacea*	35	2.5	-
**Cenchrus ciliaris*	35	0.3	-
Santalum lanceolatum	1	1.3	-
Alternanthera sp. (juvenile)	<1	0.6	-
Adriana tomentosa var. *tomentosa*	<1	0.6	-

API rail Flora **Site** APQ106

Described by VY **Date** 6/04/2011 **Type** Vegetation Description

Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 500369 **mE** 7709395 **mN**

Soil orange loamy clay with pebbles

Vegetation Shrubland to Tall Open Scrub of *Acacia inaequilatera*, *Acacia ancistrocarpa* and *Acacia bivenosa* with occasional dominance by *Acacia stellaticeps* over a Hummock Grassland of *Triodia pungens* and *Triodia wiseana* with scattered patches of ephemeral herbs and grasses on orange loamy clay.

Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	2.5	-
Acacia bivenosa	-	2	-
Acacia coriacea subsp. *pendens*	-	6	-
Acacia inaequilatera	-	2.5	-
Acacia pyrifolia	-	1	-
Acacia stellaticeps	-	0.5	-
Acacia tumida	-	2	-
Aristida contorta	-	0.3	-
Aristida hygrometrica	-	0.4	-
Bonamia media var. *villosa*	-	prostrate	-
Bulbostylis barbata	-	0.2	AP9-02
**Cenchrus ciliaris*	-	0.4	-
Cleome viscosa	-	0.4	-
Corchorus aff. *walcottii*	-	0.4	-
Corymbia hamersleyana	-	3	-
Cucumis maderaspatanus	-	creeper	-
Ehretia saligna	-	1.2	-
Eriachne aristidea	-	0.4	AP9-04

Name	Cover (%)	Height (m)	Specimen
Eriachne pulchella subsp. *dominii*	-	0.2	-
Euphorbia alsiniflora	-	0.3	-
Evolvulus alsinoides var. *villosicalyx*	-	0.2	-
Gomphrena canescens	-	0.3	-
Gomphrena cunninghamii	-	0.2	-
Goodenia microptera	-	0.4	-
Heliotropium ovalifolium	-	0.3	AP9-03
Hybanthus aurantiacus	-	0.35	-
Indigofera monophylla	-	0.4	-
Iseilema dolichotrichum	-	0.2	-
Mollugo molluginea	-	0.2	AP96-21
Paraneurachne muelleri	-	0.4	AP96-18
Polycarpaea corymbosa	-	0.2	AP-9.06
Polymeria ambigua	-	creeper	AP9.07
**Portulaca oleracea*	-	prostrate	-
Ptilotus helipteroides	-	0.35	AP-9.05
Ptilotus obovatus	-	0.3	-
Rhynchosia minima	-	creeper	-
Senna notabilis	-	0.2	-
Solanum lasiophyllum	-	0.4	-
Sporobolus australasicus	-	0.2	-
Themeda triandra	-	0.5	
Triodia pungens	-	-	AP9-01
Triodia wiseana	-	0.5	-
Triumfetta clementii	-	0.2	-

API rail Flora **Site** APQ107

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 499841 **mE** 7708223 **mN**
Soil orange loamy clay with scattered quartz pebbles
Vegetation Shrubland of *Acacia bivenosa* with scattered *Acacia ancistrocarpa* and *Acacia inaequilatera* over a Low Open Shrubland of *Acacia stellaticeps* over a Hummock Grassland of *Triodia wiseana* on orange loamy clay.
Veg Condition Very Good - Excellent

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	2.3	-
Acacia bivenosa	-	2	-
Acacia coriacea subsp. *pendens*	-	1.5	-
Acacia inaequilatera	-	4	-
Acacia stellaticeps	-	0.4	-
Acacia tenuissima	-	1.2	AP10-20
Acacia tumida	-	1.5	-
Bonamia media var. *villosa*	-	0.1	-
Diplopeltis eriocarpa	-	0.3	-
Eriachne pulchella subsp. *dominii*	-	0.2	-
Gomphrena canescens	-	0.2	-
Heliotropium pachyphyllum	-	0.3	AP11-03
Hibiscus coatesii	-	0.4	AP11-01
Hybanthus aurantiacus	-	0.4	-
Indigofera monophylla	-	0.4	-
Iseilema macratherum	-	0.2	-

Name	Cover (%)	Height (m)	Specimen
Oldenlandia crouchiana	-	0.15	AP11-05
Paraneurachne muelleri	-	0.4	AP96-18
Paspalidium tabulatum	-	0.1	AP11-02
Ptilotus auriculifolius	--	0.4	-
Ptilotus exaltatus var. *exaltatus*	-	0.4	-
Ptilotus helipteroides	-	0.2	AP09-05
Senna glutinosa subsp. *pruinosa*	-	1.8	AP01-02
Solanum lasiophyllum	-	0.2	-
Sporobolus australasicus	-	0.25	-
Trachymene oleracea	-	0.2	-
Triodia wiseana	-	0.4	-
Triumfetta clementii	-	0.3	-

API rail Flora **Site** APQ108

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone50 500636 **mE** 7707735 **mN**
Habitat Narrow Drainage Channel
Soil Red loamy clay
Vegetation Open Forest of *Eucalyptus victrix* over a Tall Shrubland *Acacia coriacea* subsp. *pendens* and *Acacia tumida* over a Grassland of *Themeda triandra*, *Eragrostis tenellula* and **Cenchrus ciliaris* on red clay in drainage lines.
Veg Condition Good - Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	2.5	-
Acacia coriacea subsp. *pendens*	-	2.5	-
Acacia tumida	-	2.3	-
Alysicarpus muelleri	-	0.3	-
**Cenchrus ciliaris*	-	0.4	
Chrysopogon fallax	-	0.4	-
Crotalaria medicaginea var. *neglecta*	-	0.3	-
Dichrostachys spicata	-	2.3	AP13-02
Eragrostis tenellula	-	0.2	AP13-01
Eucalyptus victrix	-	15	-
Euphorbia alsiniflora	-	0.2	-
Hybanthus aurantiacus	-	0.3	-
**Malvastrum americanum*	-	0.3	-
Notoleptopus decaisnei var. *orbicularis*	-	0.15	-
Operculina aequisepala	-	creeper	AP13-04

Name	Cover (%)	Height (m)	Specimen
Sporobolus australasicus	-	0.2	
Themeda triandra	-	0.4	AP13-05
Vigna lanceolata var. *lanceolata*	-	creeper	AP13-03

API rail Flora **Site** APQ109

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 500568 **mE** 7707706 **mN**
Soil Red/brown coarse river sand
Vegetation Low Woodland of *Corymbia hamersleyana* over a Tall Open Shrubland of *Acacia tumida* with occasional *Acacia stellaticeps* over a Grassland of **Cenchrus ciliaris* and *Themeda triandra* with edges surrounded by *Triodia pungens* on red sand.
Veg Condition Good - Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia coriacea	-	2.5	-
Acacia stellaticeps	-	0.4	-
Acacia tumida	-		-
**Cenchrus ciliaris*	-	0.4	-
Corymbia hamersleyana	-	5	-
Cucumis maderaspatanus	-	creeper	-
Sesbania cannabina	-	0.5	-
Themeda triandra	-	0.4	-
Triodia pungens	-	0.4	AP09-01

API rail Flora **Site** APQ110

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 500498 **mE** 7707772 **mN**
Soil Red rocky loam clay
Vegetation Scattered trees of *Dolichandrone heterophylla* over a Very Open Shrubland of *Acacia coriacea* subsp. *pendens*, *Acacia inaequilatera*, *Acacia pyrifolia* and *Acacia bivenosa* over a Tussock Grassland of *Eriachne* sp. and **Cenchrus ciliaris* with changing dominance between *Triodia wiseana* over a Herbland of *Gomphrena cunninghamii* red rocky clay loam.
Veg Condition Good - Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	2	-
Acacia coriacea subsp. *pendens*	-	1.3	-
Acacia inaequilatera	-	3	-
Acacia pyrifolia	-	1.2	-
**Cenchrus ciliaris*	-	0.3	-
Cleome viscosa	-	0.35	-
Dolichandrone heterophylla	-	0.5	AP16-02
Eriachne pulchella subsp. *dominii*	-	0.15	-
Eriachne sp.	-	0.3	AP16-01
Fimbristylis aff. *dichotoma*	-	0.2	-
Gomphrena cunninghamii	-	0.2	-
Hybanthus aurantiacus	-	0.2	-
Notoleptopus decaisnei var. *orbicularis*	-	0.2	-
Paspalidium tabulatum	-	0.2	AP11-02
Polycarpaea longiflora (white form)	-	0.2	-
Solanum lasiophyllum	-	0.3	-

Name	Cover (%)	Height (m)	Specimen
Sporobolus australasicus	-	0.2	-
Trachymene oleracea	-	0.2	-
Trichodesma zeylanicum	-	0.2	-
Triodia wiseana	-	0.4	-
Triumfetta clementii	-	0.4	-

API rail Flora **Site** APQ111

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone50 500215 **mE** 7705707 **mN**
Soil Orange crackling clay with quartz nodules
Vegetation Tussock Grassland of *Eragrostis xerophila*, *Panicum decompositum* and Dichanthium *sericeum* subsp*. humilius* on orange cracking clay with quartz nodules.
Veg Condition Very Good - Excellent
Notes Crackling clay plains - depressions are generally dominated by *Eriachne benthamii* with some **Cenchrus ciliaris* invasion.

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Alysicarpus muelleri	-	0.4	AP19-08
Aristida contorta	-	0.2	-
Boerhavia gardneri	-	0.1	-
**Cenchrus ciliaris*	-	0.4	-
Corchorus tridens	-	prostrate	AP19-05
Crotalaria dissitiflora subsp. *benthamiana*	-	0.2	AP19-09
Cucumis maderaspatanus	-	creeper	-
Dactyloctenium radulans	-	0.25	-
Dichanthium sericeum subsp. *humilius*	-	0.3	-
Enneapogon caerulescens	-	0.25	-
Eragrostis setifolia	-	0.2	AP19-11
Eragrostis xerophila	-	0.3	-
Eriachne benthamii	-	0.4	-
Euphorbia australis	-	prostrate	-
Evolvulus alsinoides var. *villosicalyx*	-	0.2	-

Name	Cover (%)	Height (m)	Specimen
Gomphrena canescens	-	0.3	-
Ipomoea coptica	-	creeper	AP19-03
Iseilema sp.	-	0.3	AP19-02
Neptunia dimorphantha	-	creeper	AP19-01
Operculina aequisepala	-	creeper	AP13-04
Panicum decompositum	-	0.45	AP19-06
Ptilotus carinatus	-	0.3	AP19-07
Ptilotus exaltatus var. *exaltatus*	-	0.4	-
Rhynchosia minima	-	creeper	-
Sida fibulifera	-	0.35	AP19-04
Sporobolus australasicus	-	0.2	-
Stemodia kingii	-	0.3	AP19-10
Triumfetta clementii	-	0.4	-

API rail Flora **Site** APQ112

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 500268 **mE** 7705814 **mN**
Soil Orange crackling clay overlain by quartz pebbles
Vegetation Open Shrubland to Tall Open Shrubland of *Acacia xiphophylla* over a Tussock Grassland of *Eragrostis xerophila* and **Cenchrus ciliaris* on orange cracking clay with quartz nodules.
Veg Condition Good - Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	2	-
Acacia xiphophylla	-	3.8	-
Alysicarpus muelleri	-	0.4	-
Aristida contorta	-	0.2	-
Atriplex ? codonocarpa	-	0.2	AP21-03
**Cenchrus ciliaris*	-	0.4	-
Chrysopogon fallax	-	0.5	-
Cucumis maderaspatanus	-	creeper	-
Dichanthium sericeum	-	0.3	-
Dichrostachys spicata	-	0.3	AP13-02
Eragrostis xerophila	-	0.3	-
Euphorbia australis	-	prostrate	-
Gomphrena cunninghamii	-	0.2	-
Ipomoea coptica	-	creeper	AP19-03
Iseilema sp.	-	0.3	AP19-02
**Malvastrum americanum*	-	0.4	-
Neptunia dimorphantha	-	creeper	AP19-01

Name	Cover (%)	Height (m)	Specimen
Panicum decompositum	-	0.4	AP19-06
**Portulaca oleracea*	-	prostrate	AP21-02
Ptilotus exaltatus var. *exaltatus*	-	0.3	-
Senna artemisioides subsp. *oligophylla*	-	0.2	AP01-01
Sida fibulifera	-	0.3	AP19-04

API rail Flora **Site** APQ113

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 498984 **mE** 7710052 **mN**
Soil Red loamy cracking clay
Vegetation Shrubland of *Acacia bivenosa* over a Hummock Grassland of *Triodia wiseana* and *Eriachne pulchella* subsp. *dominii* with patches of *Sporobolus australasicus* over a mixed herbland on red loamy cracking clay.
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	1.8	-
Acacia bivenosa	-	2	-
Acacia inaequilatera	-	2.2	-
Acacia pyrifolia	-	1	-
Alysicarpus muelleri	-	0.2	-
Bonamia media var. *villosa*	-	prostrate	-
Cassytha capillaris	-	creeper	-
**Cenchrus ciliaris*	-	0.3	-
Chrysopogon fallax	-	0.8	-
Corchorus aff. *walcottii*	-	0.25	-
Corchorus parviflorus	-	0.4	-
Cucumis maderaspatanus	-	creeper	-
Dichanthium sericeum subsp. *humilius*	-	0.2	-
Eriachne pulchella subsp. *dominii*	-	0.2	-
Euphorbia alsiniflora	-	0.4	-
Evolvulus alsinoides var. *villosicalyx*	-	0.15	-

Name	Cover (%)	Height (m)	Specimen
Gomphrena canescens	-	0.4	-
Gomphrena cunninghamii	-	0.3	-
Goodenia microptera	-	0.25	-
Heliotropium ovalifolium	-	0.1	AP96-19
Hibiscus sturtii	-	0.4	AP05-03
Hybanthus aurantiacus	-	0.4	-
Indigofera linifolia	-	0.1	-
Indigofera monophylla	-	0.5	-
Iseilema dolichotrichum	-	0.1	-
Oldenlandia crouchiana	-	0.3	AP05-06
Paraneurachne muelleri	-	0.3	AP96-18
Ptilotus astrolasius	-	0.3	AP05-02
Ptilotus auriculifolius	-	0.4	-
Ptilotus exaltatus var. *exaltatus*		0.25	-
Senna artemisioides subsp. *oligophylla*	-	1	AP01-01
Sporobolus australasicus	-	0.2	-
Tephrosia aff. *clementii*	-	0.1	AP05-05
Tephrosia sp.	-	0.15	AP05-04
Tribulus hirsutus	-	0.1	-
Triodia wiseana	-	0.4	-
Triumfetta clementii	-	0.3	-

API rail Flora **Site** APQ114

Described by AS **Date** 6/04/2011 **Type** Vegetation Description

Location Port Access Rail Re-alignment Survey Area

MGA Zone50 499814 **mE** 7707083 **mN**

Habitat Wide valley sloping down from rocky hill to saline drainage line.

Soil Red loamy clay

Vegetation Hummock Grassland of *Triodia angusta* with scattered *Acacia stellaticeps* on upper slopes and *Enchylaena tomentosa* var. *tomentosa* on lower slopes on red loamy clay overlain with ironstone pebbles.

Veg Condition Good - Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia stellaticeps	-	0.4	-
Atriplex bunburyana	-	0.5	AP22-01
**Cenchrus ciliaris*	-	0.45	-
Corchorus tridens	-	prostrate	AP19-05
Dactyloctenium radulans	-	0.15	-
Dichanthium sericeum subsp. *humilius*	-	0.25	-
Enchylaena tomentosa var. *tomentosa*	-	0.3	AP22-01
Euphorbia alsiniflora	-	0.2	-
Evolvulus alsinoides var. *villosicalyx*	-	0.2	-
Fimbristylis aff. *dichotoma*	-	0.2	-
Gomphrena canescens	-	0.3	-
Indigofera colutea	-	0.1	-
Ipomoea coptica	-	prostrate	AP19-03
Neptunia dimorphantha	-	0.15	AP19-01
Polycarpaea corymbosa	-	0.1	AP09-06
**Portulaca oleracea*	-	0.1	-
Ptilotus exaltatus var. *exaltatus*	-	0.3	-

Name	Cover (%)	Height (m)	Specimen
Rhynchosia minima	-	creeper	-
Senna notabilis	-	0.1	-
Sida fibulifera	-	0.2	AP19-04
Sporobolus australasicus	-	0.2	-
Tephrosia aff. *clementii*	-	0.2	AP05-05
Triodia angusta	-	0.5	-

API rail Flora **Site** APQ115

Described by AS **Date** 7/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone50 500193 **mE** 7710537 **mN**
Habitat Rocky hillslope
Soil Red rocky granite
Vegetation Open Shrubland to Tall Open Shrubland of *Acacia inaequilatera* and *Acacia bivenosa* over scattered shrubs of *Corchorus parviflorus* and *Indigofera monophylla* over a Hummock Grassland of *Triodia wiseana* with patches of *Cymbopogon ambiguus* and *Gomphrena cunninghamii* on red rocky soil.
Veg Condition Vey Good - Excellent

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	1.5	-
Acacia bivenosa	-	2.5	-
Acacia inaequilatera	-	3	-
Acacia pyrifolia	-	0.3	-
Bonamia media var. *villosa*	-	0.1	-
Capparis spinosa	-	0.4	-
**Cenchrus ciliaris*	-	0.35	-
Cleome viscosa	-	0.2	-
Corchorus parviflorus	-	0.35	-
Crotalaria medicaginea var. *neglecta*	-	0.2	-
Cucumis maderaspatanus	-	creeper	-
Cymbopogon ambiguus	-	0.6	AP12-02
Diplopeltis eriocarpa	-	0.3	-
Eriachne pulchella subsp. *dominii*	-	0.25	-
Euphorbia alsiniflora	-	0.3	-
Evolvulus alsinoides var. *villosicalyx*	-	0.25	-

Name	Cover (%)	Height (m)	Specimen
Fimbristylis aff. *dichotoma*	-	0.25	-
Gomphrena cunninghamii	-	0.3	-
Grevillea pyramidalis	-	1.5	-
Hybanthus aurantiacus	-	0.3	-
Indigofera monophylla	-	0.3	-
Iseilema sp.	-	0.3	AP19-02
Jasminum didymum subsp. *lineare*	-	0.4	AP06-03
Notoleptopus decaisnei var. *orbicularis*	-	0.2	-
Oldenlandia crouchiana	-	0.1	AP11-05
Paspalidium tabulatum	-	0.2	AP11-02
Phyllanthus maderaspatensis	-	0.25	-
Polycarpaea holtzei	-	0.05	AP23-01
Ptilotus auriculifolius	-	0.35	-
Ptilotus fusiformis	-	0.2	-
Rhynchosia minima	-	creeper	-
Senna glutinosa subsp. *glutinosa*	-	1.2	-
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	-	0.3	AP23-02
Tephrosia supina	-	0.15	AP23-03
Trachymene oleracea	-	0.1	-
Trichodesma zeylanicum	-	0.25	-
Triodia wiseana	-	0.35	-
Triumfetta clementii	-	0.3	-

API rail Flora **Site** APQ116

Described by AS **Date** 7/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone50 500493 **mE** 7709638 **mN**
Habitat Clay plains
Soil Orange loamy cracking clay
Vegetation Open Shrubland of *Acacia xiphophylla* over a Hummock/Tussock Grassland mosaic of *Triodia wiseana*, *Eragrostis xerophila* and *Aristida contorta* on orange loamy cracking clay.
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon oxycarpum	-	0.5	AP25-02
Acacia xiphophylla	-	2.8	-
Alysicarpus muelleri	-	0.5	-
Aristida contorta	-	0.3	-
Boerhavia gardneri	-	0.1	-
Bulbostylis barbata	-	0.1	-
**Cenchrus ciliaris*	-	0.4	-
Chloris pectinata	-	0.5	AP25-01
Dactyloctenium radulans	-	0.2	-
Eragrostis xerophila	-	0.3	-
Eriachne pulchella	-	0.2	-
Euphorbia alsiniflora	-	0.25	-
Evolvulus alsinoides	-	0.2	-
Fimbristylis dichotoma	-	0.2	-
Gomphrena canescens	-	0.2	-
Gomphrena cunninghamii	-	0.2	-

Name	Cover (%)	Height (m)	Specimen
Panicum decompositum	-	0.5	AP19-06
Perotis rara	-	0.2	AP25-03
**Portulaca oleracea*	-	0.1	-
Ptilotus exaltatus var. *exaltatus*	-	0.25	-
Ptilotus helipteroides	-	0.2	AP09-05
Sarcostemma viminale	-	0.3	-
Senna artemisioides subsp. *oligophylla*	-	0.2	AP01-01
Senna notabilis	-	0.1	-
Triodia wiseana	-	0.4	-
Triumfetta clementii	-	0.3	-

API rail Flora **Site** APQ117

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 499243 **mE** 7711659 **mN**
Soil Orange clayey loam
Vegetation Open Shrubland of *Acacia bivenosa* and *Acacia pyrifolia* over a Hummock Grassland dominated by *Triodia epactia* and *Triodia wiseana* with patches of *Sporobolus australasicus* and **Cenchrus ciliaris* on orange clayey loam on rocky rises.
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	-	-
Acacia pyrifolia	-	-	-
Acacia tumida	-	1	-
Bonamia media	-	0.2	-
**Cenchrus ciliaris*	-	-	-
Corchorus aff. *walcottii*	-	0.3	-
Dichanthium sericeum	-	0.4	-
Dichanthium sericeum subsp. *humilius*	-	0.1	AP68-06
Enneapogon caerulescens	-	0.2	-
Eriachne pulchella subsp. *dominii*	-	0.2	-
Euphorbia australis	-	0.1	-
Euphorbia alsiniflora	-	0.2	-
Evolvulus alsinoides	-	0.2	-
Gomphrena cunninghamii	-	0.2	-
Hibiscus sturtii var. *platychlamys*	-	0.3	AP01-03
Indigofera monophylla	-	0.3	-

Name	Cover (%)	Height (m)	Specimen
Indigofera trita	-	0.2	-
Iseilema dolichotrichum	-	0.2	-
Notoleptopus decaisnei var. *orbicularis*	-	0.2	-
**Portulaca oleracea*	-	0.2	-
**Prosopis pallida*	-	3	-
Rhynchosia minima	-	creeper	-
Salsola tragus	-	-	-
Senna artemisioides subsp. *oligophylla*	-	1.5	AP01-01
Senna glutinosa subsp. *pruinosa*	-	1.5	AP01-02
Solanum lasiophyllum	-	0.2	-
Sporobolus australasicus	-	-	-
Triodia epactia	-	-	-
Triodia wiseana	-	-	-
Triumfetta clementii	-	0.3	-

API rail Flora **Site** APQ118

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone50 499199 **mE** 7711079 **mN**
Habitat Drainage line
Soil Red/brown sand
Vegetation Low Open Woodland of *Corymbia hamersleyana* over a Tall Open Scrub of *Acacia bivenosa*, *Acacia tumida* and *Acacia pyrifolia* with scattered *Acacia stellaticeps* over a Hummock Grassland dominated mainly by *Triodia angusta* and *Triodia epactia* over a Very Open Tussock Grassland of **Cenchrus ciliaris* on red sandstone in association with drainage lines.

Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	0.4	-
Acacia pyrifolia	-	0.6	-
Acacia stellaticeps	-	0.4	-
Acacia tumida	-	0.5	-
Bonamia media	-	0.1	-
**Cenchrus ciliaris*	-	0.4	-
Corymbia hamersleyana	-	8	-
Crotalaria medicaginea	-	0.3	-
Cymbopogon ambiguus	-	0.4	-
Enneapogon caerulescens	-	0.1	-
Euphorbia alsiniflora	-	0.2	-
Gomphrena cunninghamii	-	0.2	-
Ptilotus auriculifolius	-	0.3	AP82-01
Rhynchosia minima	-	creeper	-
Senna artemisioides subsp. *oligophylla*	-	0.2	AP01-01

Name	Cover (%)	Height (m)	Specimen
Trichodesma zeylanicum	-	0.2	-
Triodia angusta	-	0.4	-
Triodia epactia	-	0.3	-

API rail Flora **Site** APQ119

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

Location Port Access Rail Re-alignment Survey Area

MGA Zone 50 499184 **mE** 7711023 **mN**
Soil Rocky orange loam
Vegetation Open Shrubland of *Acacia inaequilatera* over a Hummock Grassland of *Triodia wiseana* on rocky orange loam on hillslopes/ridgetops.
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia inaequilatera	-	2	-
Solanum lasiophyllum	-	0.2	-
Triodia wiseana	-	0.4	-

API rail Flora **Site** APQ120

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 498266 **mE** 7710828 **mN**
Soil Rocky orange/brown loam
Vegetation Hummock Grassland of *Triodia wiseana* with *Acacia stellaticeps* dominant in valleys on rocky brown loam
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia pyrifolia	-	0.4	-
Acacia stellaticeps	-	0.5	-
Boerhavia gardneri	-	0.2	-
Bonamia media	-	0.2	-
Cleome viscosa	-	0.2	-
Crotalaria medicaginea var. *neglecta*	-	0.3	-
Euphorbia schultzii	-	0.1	AP04-02
Gomphrena canescens	-	0.2	-
Gomphrena cunninghamii	-	0.2	-
Indigofera monophylla	-	0.3	-
Ptilotus auriculifolius	-	0.3	AP82-01
Rhynchosia minima	-	creeper	-
Sporobolus australasicus	-	0.1	-
Tribulus hirsutus	-	0.1	-
Triodia wiseana	-	0.4	AP4-01

API rail Flora **Site** APQ121

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 498877 **mE** 7710167 **mN**
Habitat Ridge
Soil Orange Rocky Loam
Vegetation Rocky Hillslopes of mixed Open Shrubland of *Acacia tumida*, *Acacia ancistrocarpa*, *Grevillea pyramidalis*, *Acacia bivenosa*, *Ficus aculeata* and *Acacia coriacea* subsp. *pendens* over a Hummock Grassland of *Triodia wiseana* with patches of *Gomphrena* sp. and *Cleome* sp. in rocky crevices.

Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	-	-
Acacia bivenosa	-	-	-
Acacia coriacea subsp. *pendens*	-	-	-
Acacia tumida	-	-	-
**Aerva javanica*	-	-	-
Aristida burbidgeae	-	-	6-01
**Cenchrus ciliaris*	-	-	-
Cleome viscosa	-	-	-
Cucumis maderaspatanus	-	-	-
Cymbopogon ambiguus	-	-	-
Dichrostachys spicata	-	-	6-02
Ficus aculeata	-	-	6-06
Gomphrena cunninghamii	-	-	-
Grevillea pyramidalis	-	-	-
Jasminum didymum	-	-	6-03
Pentalepis trichodesmoides	-	-	6-04
Scaevola spinescens	-	-	6-08

Name	Cover (%)	Height (m)	Specimen
Tinospora smilacina	-	-	6-05
Triodia wiseana	-	-	-
Triumfetta clementii	-	-	-
Waltheria indica	-	-	6-07

API rail Flora **Site** APQ122

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 499975 **mE** 7709708 **mN**

Habitat Black /lateritic ironstone eroded mesas, sandstone hillocks on top of some

Soil Brown Rocky Clay Loam

Vegetation Open Woodland of *Acacia inaequilatera* with scattered *Acacia bivenosa* over Low Open Shrubland of *Corchorus parviflorus* over Hummock Grassland of *Triodia wiseana* with patches of *Triodia angusta* in pockets

Veg Condition

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	-	-
Acacia bivenosa	-	-	-
Acacia inaequilatera	-	-	-
Acacia sphaerostachya	-	-	8-01
Acacia stellaticeps	-	-	-
**Aerva javanica*	-	-	-
Cleome viscosa	-	-	-
Corchorus parviflorus	-	-	-
Crotalaria medicaginea var. *neglecta*	-	-	-
Cymbopogon ambiguus	-	-	-
Eriachne mucronata	-	-	8-03
Euphorbia australis	-	-	-
Ficus aculeata var. *indecora*	-	-	Rock fig
**Flaveria trinervia*	-	-	8-04
Gomphrena cunninghamii	-	-	-
Hybanthus aurantiacus	-	-	-
Keraudrenia sp.	-	-	8-02

Name	Cover (%)	Height (m)	Specimen
Mollugo molluginea	-	-	8-05
Phyllanthus maderaspatensis	-	-	-
Polycarpaea longiflora	-	-	-
Ptilotus exaltatus var. *exaltatus*	-	-	-
Trachymene oleracea	-	-	-
Triodia angusta	-	-	-
Triodia wiseana	-	-	-
Triumfetta clementii	-	-	-

API rail Flora **Site** APQ123

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 500627 **mE** 7709343 **mN**
Soil Orange Sandy Loam
Vegetation Scattered *Acacia xiphophylla*, *Acacia tumida* and *Acacia tenuissima* over a Grassland of *Aristida contorta, Triodia wiseana, Eragrostis xerophila*, *Chrysopogon fallax*, and *Iseilema dolichotrichum*.
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	-	-
Acacia pyrifolia	-	-	-
Acacia xiphophylla	-	-	-
Alysicarpus muelleri	-	-	-
Acacia tenuissima	-	-	10-12
Aristida contorta	-	-	10-14
Bulbostylis turbinata	-	-	10-13
Chloris pectinata	-	-	10-19
Chrysopogon fallax	-	-	-
Corchorus parviflorus	-	-	-
Corchorus walcottii	-	-	-
Enneapogon caerulescens	-	-	10-03
Eragrostis setifolia	-	-	10-08
Eragrostis xerophila	-	-	-
Eriachne pulchella subsp. *Dominii*	-	-	-
Euphorbia alsiniflora	-	-	10-16
Euphorbia australis	-	-	10-10
Evolvulus alsinoides var. *villosicalyx*	-	-	-

Name	Cover (%)	Height (m)	Specimen
Gomphrena cunninghamii	-	-	-
Gossypium sp.	-	-	-
Heliotropium heteranthum	-	-	10-07
Ipomoea coptica	-	-	10-17
Iseilema dolichotrichum	-	-	10-18
Iseilema vaginiflorum	-	-	10-02
Isotoma sp.	-	-	10-01
Neptunia dimorphantha	-	-	10-15
Paspalidium tabulatum	-	-	-
Portulaca pilosa	-	-	-
Ptilotus aervoides	-	-	10-11
Ptilotus exaltatus var. *exaltatus*	-	-	-
Ptilotus helipteroides	-	-	-
Rhynchosia minima	-	-	-
Sesbania cannabina	-	-	-
Sida echinocarpa	-	-	10-09
Sida fibulifera	-	-	10-06
Sporobolus australasicus	-	-	-
Streptoglossa bubakii	-	-	10-04
Triumfetta clementii	-	-	-

API rail Flora **Site** APQ124

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone50 499859 **mE** 7708474 **mN**
Habitat Quartzite sandstone hillock
Soil Orange Brown Loam
Vegetation Tall Open shrubland of *Acacia inaequilatera* with *Acacia bivenosa* over Hummock Grassland of *Triodia wiseana* with pockets of *Eriachne mucronata* and *Cymbopogon 83mbiguous* on rocks.

Veg Condition

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon sp.	-	-	-
Acacia ancistrocarpa	-	-	-
Acacia bivenosa	-	-	-
Acacia inaequilatera	-	-	-
Acacia ligulata	-	-	12-08
Crotalaria medicaginea var. *neglecta*	-	-	-
Crotalaria novae-hollandiae subsp. *Novae-hollandiae*	-	-	12-05
Cymbopogon ambiguus	-	-	12-02
Diplopeltis eriocarpa	-	-	-
Eriachne mucronata	-	-	12-06
Fimbristylis sp.	-	-	-
Gomphrena cunninghamii	-	-	-
Hybanthus aurantiacus	-	-	-
Indigofera monophylla	-	-	-
Ipomoea costata	-	-	12-01
Paspalidium tabulatum	-	-	12-03
Podolepis sp.	-	-	12-09

Name	Cover (%)	Height (m)	Specimen
Scaevola spinescens (broad leaf form)	-	-	12-07
Senna glutinosa subsp. *Glutinosa*	-	-	-
Sporobolus australasicus	-	-	-
Trachymene oleracea	-	-	-
Tribulus hirsutus	-	-	12-04
Triodia wiseana	-	-	-
Triumfetta clementii	-	-	-

API rail Flora **Site** APQ125

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 500712 **mE** 7707558 **mN**
Soil Brown Clay
Vegetation Scattered *Acacia xiphophylla* over a Grassland of *Eragrostis xerophila*, *Gomphrena canescens*, **Portulaca oleracea*, *Panicum decompositum* and *Dichanthium sericeum* subsp. *Humilis*.

Veg Condition

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia xiphophylla	-	-	-
Alysicarpus muelleri	-	-	-
Aristida latifolia	-	-	14-05
**Cenchrus ciliaris*	-	-	-
Cucumis maderaspatanus	-	-	-
Dichanthium sericeum subsp. *Humilius*	-	-	14-06
Eragrostis xerophila	-	-	-
Euphorbia australis	-	-	14-03
Euphorbia alsiniflora	-	-	-
Gomphrena canescens	-	-	-
Neptunia dimorphantha	-	-	10
Notoleptopus decaisnei var. *orbicularis*	-	-	-
Panicum decompositum	-	-	14-01
Phyllanthus maderaspatensis	-	-	-
**Portulaca oleracea*	-	-	14-04
Portulaca pilosa	-	-	-
Salsola tragus	-	-	-
Senna notabilis	-	-	-
Sida fibulifera	-	-	10

Name	Cover (%)	Height (m)	Specimen
Stemodia kingii	-	-	14-02
Triodia epactia	-	-	-

API rail Flora **Site** APQ126

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone50 500656 **mE** 7707393 **mN**
Soil Orange sandy clay with pebbles of quartz
Vegetation Shrubland of *Acacia bivenosa* over *Triodia wiseana* with scattered shrubs and herbs as below
Veg Condition Very Good to Excellent

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	-	-
Acacia stellaticeps	-	-	-
Alysicarpus muelleri	-	-	-
**Cenchrus ciliaris*	-	-	-
Corchorus parviflorus	-	-	-
Crotalaria medicaginea var. *neglecta*	-	-	-
Eriachne pulchella	-	-	-
Euphorbia australis	-	-	-
Euphorbia alsiniflora	-	-	-
Evolvulus alsinoides var. *villosicalyx*	-	-	-
Grevillea pyramidalis	-	-	-
Hakea lorea	-	-	-
Heliotropium ovalifolium	-	-	16-01
Hibiscus sturtii var. *platychlamys*	-	-	-
Indigofera monophylla	-	-	-
Notoleptopus decaisnei var. *orbicularis*	-	-	-
Portulaca aff. *Oleracea*	-	-	-
Ptilotus helipteroides	-	-	10
Sporobolus australasicus	-	-	-
Tephrosia supina	-	-	16-02

Name	Cover (%)	Height (m)	Specimen
Triodia angusta	-	-	-
Triodia wiseana	-	-	-
Triumfetta clementii	-	-	-

API rail Flora **Site** APQ127

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 500143 **mE** 7705891 **mN**
Soil Orange loam with pebbles of quartz
Vegetation Low Shrubland of *Acacia stellaticeps* over a Hummock Grassland of *Triodia wiseana* on hillslopes.
Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Abutilon aff. *Lepidum* (1) (MET 15 352)	-	-	18-01
Acacia bivenosa	-	-	-
Acacia inaequilatera	-	-	-
Acacia pyrifolia	-	-	-
Acacia stellaticeps	-	-	-
Alysicarpus muelleri	-	-	-
Bonamia media var. *villosa*	-	-	-
Chrysopogon sp.	-	-	-
Corchorus parviflorus	-	-	-
Cucumis maderaspatanus	-	-	-
Dichanthium sericeum subsp. *Humilius*	-	-	14
Eriachne pulchella subsp. *Dominii*	-	-	-
Euphorbia australis	-	-	18-02
Euphorbia alsiniflora	-	-	-
Evolvulus alsinoides var. *villosicalyx*	-	-	-
Hakea lorea	-	-	-
Indigofera monophylla	-	-	-
Ptilotus ? exaltatus var. *exaltatus*	-	-	-
Ptilotus auriculifolius	-	-	82-01
Ptilotus helipteroides	-	-	10
Senna artemisioides subsp. *Oligophylla*	-	-	-
Trichodesma zeylanicum	-	-	-
Triodia angusta	-	-	-
Triodia wiseana	-	-	-
Triumfetta clementii	-	-	-

API rail Flora **Site** APQ128

Described by VY **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 499785 **mE** 7706955 **mN**
Soil Brown sandy loam with salt crusts
Vegetation Halophyte Low Shrubland of *Tecticornia halocnemoides* subsp*. Tenuis* and *Tecticornia indica* subsp. *Leistachya* with *Triodia angusta* fringing.
Veg Condition

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Alysicarpus muelleri	-	-	-
**Cenchrus ciliaris*	-	-	-
Neobassia astrocarpa	-	-	-
Tecticornia halocnemoides subsp. *Tenuis*	-	-	20-01
Tecticornia indica subsp. *Leistachya*	-	-	20-02
Triodia angusta			

API rail Flora **Site** APQ129

Described by VY **Date** 7/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 499224 **mE** 7709047 **mN**
Soil Orange clay
Vegetation Open Shrubland of *Acacia xiphophylla, Acacia tumida* and *Acacia bivenosa* over a Low Open Shrubland of *Senna artemisioides* var. *oligophylla* over a Tussock Grassland of *Aristida contorta* and *Eragrostis xerophila* with patches of *Chrysopogon fallax* and *Triodia wiseana* over an Open Herbland of *Gomphrena cunninghamii* and *Ptilotus exaltatus.*

Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia bivenosa	-	-	-
Acacia tumida	-	-	-
Acacia xiphophylla	-	-	-
Alysicarpus muelleri	-	-	-
Aristida contorta	-	-	10-14
Atriplex ? codonocarpa	-	-	-
Atriplex bunburyana	-	-	26-
Bulbostylis turbinata	-	-	10-13
**Cenchrus ciliaris*	-	-	-
Chrysopogon fallax	-	-	26-
Cleome viscosa	-	-	-
Corchorus walcottii	-	-	26-
Eragrostis xerophila	-	-	-
Eriachne aristidea	-	-	26-02
Euphorbia australis	-	-	10-10
Gomphrena cunninghamii	-	-	
Hybanthus aurantiacus	-	-	-

Name	Cover (%)	Height (m)	Specimen
Mollugo molluginea	-	-	-
Neptunia dimorphantha	-	-	10-
Polycarpaea longiflora	-	-	-
Portulaca aff. *oleracea*	-	-	-
Portulaca pilosa	-	-	-
**Prosopis pallida*	-	-	-
Ptilotus aervoides	-	-	-
Ptilotus exaltatus var. *exaltatus*	-	-	-
Ptilotus fusiformis	-	-	26-01
Sarcostemma viminale	-	-	-
Senna artemisioides subsp. *oligophylla*	-	-	26-
Sporobolus australasicus	-	-	-
Triodia wiseana	-	-	-
Triumfetta clementii	-	-	-

API rail Flora **Site** APQ130

Described by AS **Date** 6/04/2011 **Type** Vegetation Description
Season E

MGA Zone 50 499754 **mE** 7709725 **mN**

Habitat Narrow, shallow drainage line on flat plain, distinguished by change from *Triodia* dominated hummock grassland to *Acacia* shrubland. Drainage lines off nearby hills.

Soil Brown-red clay

Vegetation Tall Open Scrub of *Acacia ancistrocarpa* over a Hummock Grassland of *Triodia wiseana* in shallow drainage line.

Veg Condition Very Good

SPECIES LIST

Name	Cover (%)	Height (m)	Specimen
Acacia ancistrocarpa	-	2	-
Acacia bivenosa	-	2	-
Acacia stellaticeps	-	0.5	-
Acacia tumida	-	1.2	-
Bonamia pannosa	-	0.3	7.1
**Cenchrus ciliaris*	-	0.3	-
Cleome viscosa	-	0.45	-
Corchorus parviflorus	-	0.2	-
Euphorbia alsiniflora	-	0.3	-
Evolvulus alsinoides var. *villosicalyx*	-	0.3	-
Gomphrena cunninghamii	-	0.2	-
Goodenia microptera	-	0.3	-
Hybanthus aurantiacus	-	0.3	-
Indigofera linifolia	-	0.2	-
Indigofera monophylla	-	0.4	-
Iseilema dolichotrichum	-	0.1	-

Name	Cover (%)	Height (m)	Specimen
Mollugo molluginea	-	0.1	96-21
Senna artemisioides subsp. *oligophylla*	-	0.2	1.1
Senna notabilis	-	0.2	-
Triodia wiseana	-	-	-
Triumfetta clementii	-	0.1	-

Appendix D

Recommended *Department of Agriculture and Food* control measures for **Prosopis* spp.

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Mesquite (*Prosopis spp.* and hybrids)

Declaration

(Code: C= City; S=Shire; T=Town)

Category : P1
Location : For the whole of the State

Category : P2
Location : For the whole of the State except the area on Mardie Station bordered by the coast, the boundary between Mardie and Karratha stations, the North West Coastal Highway, Peter's Creek and the boundary between Yarraloola and Mardi stations.

Category : P4
Location : For the area on Mardie Station bordered by the coast, the boundary between Mardie and Karratha stations, the North West Coastal Highway, Peter's Creek and the boundary between Yarraloola and Mardie stations.

Standard Control Codes (these may vary for individual plants)	
P1 REQUIREMENTS Prohibits movement	The movement of plants or their seeds is prohibited within the State. This prohibits the movement of contaminated machinery and produce including livestock and fodder.
P2 REQUIREMENTS Aim is to eradicate infestation	Treat all plants to destroy and prevent propagation each year until no plants remain. The infested area must be managed in such a way that prevents the spread of seed or plant parts on or in livestock, fodder, grain, vehicles and/or machinery.

P4 REQUIREMENTS Aims to prevent infestation spreading beyond existing boundaries of infestation.	The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property on or in livestock, fodder, grain, vehicles and/or machinery. Treat to destroy and prevent seed set all plants: • within 100 metres inside of the boundaries of the infested property • within 50 metres of roads and high-water mark on waterways • within 50 metres of sheds, stock yards and houses Treatment must be done prior to seed set each year. Properties with less than 2 hectares of infestation must treat the entire infestation. Additional areas may be ordered to be treated.
Special considerations	In the case of P4 infestations where they continue across property boundaries there is no requirement to treat the relevant part of the property boundaries as long as the boundaries of the infestation as a whole are treated. There must be agreement between neighbours in relation to the treatment of these areas .

Control Method

Recommended herbicides	**:**	• When actively growing - basal bark spray and/or overall foliar spray **Triclopyr** **Triclopyr + picloram** • At any time **Velpar®** **Access™ Herbicide** • small plants **Tryclopyr**

Herbicide	**:**	**Access™ Herbicide**
Active ingredient	**:**	240 g/L triclopyr + 120 g/L picloram **(Group I)**
Rates of dilution for spot spraying	**:**	1:60 in distillate
Amount of product per 10 litres distillate	**:**	160 mL
Time of application	**:**	When actively growing at all stages before pod formation
Remarks	**:**	Treat plants with stems up to 5 cm diameter. If using ‘cut stump’ treatment, the tree diameter is not restrictive
More information and other control methods	**:**	• Treat stems up to a height of 30 cm above ground level for ‘basal bark’. • For ‘cut stump’cut stem as close to the ground (<15 cm) as possible. • Do not treat trees with wet bark

Herbicide	**:**	**Triclopyr** (Various trade names)
Active ingredient	**:**	600 g/litre triclopyr **(Group I)**
Rates of dilution for spot spraying	**:**	1:60-1:120 in distillate
Amount of product per 10 litres distillate	**:**	1:60 = 160 mL; 1:120 = 80 mL
Rate of product per hectare	**:**	Not Recommended
Time of application	**:**	When actively growing.
Remarks	**:**	Apply as a 'basal bark' spray to mature trees. Poor results can be expected if treatment undertaken during or after long dry spell. Mix only what can be used on day of spraying. Agitate regularly. Use 1:60 on large mature trees. The mixture can be used as a 'cut-stump' treatment at any time of year.
More information and other control methods	**:**	Individual trees can be removed mechanically. There will be seedling regrowth in subsequent years.

Herbicide	**:**	**Tryclopyr** (various trade names - AVPMA site)
Active ingredient	**:**	600 g/litre triclopyr **(Group I)**
Rates of dilution for spot spraying	**:**	1:330
Amount of product per 10 litres water	**:**	30 mL
Rate of product per hectare	**:**	Not Recommended
Remarks	**:**	Use to treat small plants as overall foliar spray.

Herbicide	**:**	**Triclopyr + picloram** (various trade names - AVPMA site)
Active ingredient	**:**	300 g/litre triclopyr + 100 g/litre picloram **(Group I)**
Amount of product per 10 litres water	**:**	350 - 670 mL
Rate of product per hectare	**:**	Not Recommended
Wetting agent	**:**	BS 1000 @ 100mL/100L
Time of application	**:**	When actively growing, up to pod formation

Herbicide	**:**	**Velpar®**
Active ingredient	**:**	250 g/litre hexazinone **(Group C)**
Rates of dilution for spot spraying	**:**	Use undiluted at 4 mL/spot. One spot/tree up to 5 m tall. Recommendation for parkinsonian.
Amount of product per 10 litres water	**:**	Not Recommended
Rate of product per hectare	**:**	Not Recommended
Time of application	**:**	At any time. Inject into soil (sub-surface) if dry. Use spotgun.

Remarks	**:**	Needs rain to activate. Distribute dose around doipline of large trees. Keep clear of desirable trees. Best suited to isolated small plants (up to 2 m in height). For prickly acacia (*Acacia nilotica*) 4 mL/spot using one spot for every meter of height.

Weed Description

Family : Mimosaceae
Form : Tree – Perennial
Status : Present in WA

Can be evergreen or deciduous shrub or low tree with one to several trunks and arched branches. It has different growth forms depending on its location and water supply. Mesquite is a Weed of National Significance.

- Drier soils – short, many stemmed shrubs 1-3 m high
- Near permanent water – large single trunk 6-15 m high.
- Floodplains – branching from the base, forming dense thickets 5-8 m high, particularly along the banks of intermittently flowing creeks.

Reproduce by seed and suckers.

Branches: Small branches have a zigzag appearance. Plants can have an irregular outline, with some branches protruding out of the canopy. Spines are solitary or paired along the stem, and range from 4 mm to 75 mm in length.

Leaves: Bipinnate (like jacaranda leaves),i.e. divided twice, with 1-4 pairs of pinnae, each with 7-21 pairs of small opposite leaflets.

Flowers: Long finger-like spikes (5-12 cm long) of many small greenish, cream or yellow flowers, all densely crowded. Stamens 10 in number and protrude out of the flower.

Seed: Pods are 5-20 cm long, compressed, straight to curved, smooth or with slight restrictions between the seeds. Ripe pods are yellow, purple, or yellow with purple streaks and patches. The flat seeds are oval or elliptical 2.5-7 mm long by 2-3 mm wide, each enclosed in a flattened fibrous case, and surrounded by sweet pulp.

Other relevant information related to this topic:

- Quarantine WA
- Permitted and quarantine species list
- Weeds of National Significance
- CSIRO
- Permit for minor off-label-use of a registered agvet chemical product (Permit number – per9655)
- Off-label permit (olp) for use of a registered agvet chemical product (Permit number - per4590)