### **Appendices**

GHD | Report for Department of State Development, Tourism and Innovation - Tourism Development Project Division -Wangetti Trail South Section (Wangetti to Palm Cove), 4132458 | 58

# **Appendix A** – Map showing distribution of weeds, pests and pathogen





#### Electric Ant Biosecurity Zone Map EA02 - 15 June 2018



Electric ant biosecurity zone EA02

© State of Queensland (Department of Natural Resources, Mines and Energy) 2020, QPWS, Esri, HERE, Garmin, METI/NASA, USGS, Earthstar Geographics

**Appendix B** – Factsheets about the identification and treatment of high risk weeds, pests and pathogens

#### Miconia (Miconia calvescens)

**Description** Small tree (up to 15 m) with large leaves up to 70 cm long. The underside of the leaves is a distinct, deep iridescent purple. Produces clusters of small white flowers followed by red/purple berries.

**Distribution** Current incursions and infestations occur in Babinda, Deeral, Frenchman's Creek, Harvey Creek, Russell River and Whitfield. Miconia was typically introduced as a garden plant and then spread into neighbouring rainforest and creek lines by birds.

**Impacts** Miconia produces hundreds of small berries every year which are attractive to birds and are spread long distances. It forms dense thickets in rainforest understoreys, potentially replacing native plants and affecting wildlife populations.

**Key projects** Target of the National cost-shared Tropical Weeds Eradication Program led by Biosecurity Queensland. All plants should be reported to Biosecurity Queensland immediately on 13 25 23.

Miconia is a serious weed in Tahiti and Hawaii, where it forms dense thickets in rainforests and displaces native flora and fauna. Miconia was initially brought into Australia via botanic gardens, and was sold in some nurseries and markets between 1978 and the mid-1990s. Dispersal to new locations has been mainly via cultivation – gardeners and plant collectors. Fruit eating birds are then the primary mechanism of dispersal into surrounding forests and gardens.

A community education and awareness program is an important part of the eradication program. Managing the risk of spread to new areas through hygiene protocols for impacted nurseries and growers play an important role in preventing new infestations establishing. Hygiene protocols are also in place for survey and control operations.

*Miconia calvescens* was first discovered in Cairns Regional Council in 1997 at the Flecker Botanical Gardens. Miconia has been detected at 14 locations in the CRC area since 1997.

A National eradication program is underway and is targeting survey, control and monitoring of all known infestations. Bi-annual surveys are conducted to monitor all known infestations and to ensure no new outbreaks have gone undetected; and that plants do not produce seed.

Birds can disperse the small seeds out to many hundreds of metres. The seed of Miconia can remain viable for at least 16 years so it is important to not disturb areas where mature plants have occurred in the past.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.



PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870





ABN: 24 310 025 910

Priority

Details

Background

100% recycled paper.

#### Miconia (Miconia calvescens)

CLIFTON BEACH

YORKEYS KNOB

WHITE ROCK

EDMONTON

ORDONVALE ALOOMBA

NDEN KER

MIRIWINN

10

Kilometres

BARTLE FRERE







#### What is my biosecurity obligation?

In the prevention zone

Program. Landholders are required to report suspected infestations immediately to Biosecurity Queensland on 13 25 23. For more information refer to the biosecurity programs of the Tropical Weed Eradication Program.

Currently the target of the National cost-shared Tropical Weeds Eradication

If you have an active infestation on your property you can assist the survey and control team by maintaining property access points and tracks, and ensuring you do not move soil or plant material from the infestation area.

Landholders are required to report suspected infestations immediately to Biosecurity Queensland on 13 25 23. For more information refer to the biosecurity programs of the Tropical Weed Eradication Program.

In the eradication zone Spread



### Limnocharis (Limnocharis flava)

Details

Background



**Description** Limnocharis is a perennial aquatic weed which can grow to a height of 1 metre. It has pale green leaves and small yellow cup-shaped flowers. Stems of leaves are triangular in cross-section.

**Distribution** Limnocharis can occur in natural or artificial water features and wetlands. There are active infestations in Centenary Lakes, Cairns CBD, Mirriwinni, White Rock, Smithfield and Redlynch. Historical infestations have also occurred in Manunda, Clifton Beach, Woree, East Russell and Trinity Beach.

**Impacts** A major weed in many countries. Limnocharis is a perennial aquatic plant which will colonise shallow wetlands and margins of deeper waterways. It competes with native plants, blocks drains and displaces native flora and fauna.

**Key projects** All known infestations within the Cairns Region are currently the target of the National cost-shared Tropical Weeds Eradication Program. Landholders are required to report suspected infestations immediately to Biosecurity Queensland on 13 25 23.

Due to it's scattered occurrence across the Cairns region it is important to be on the lookout for Limnocharis in natural and artificial water features and wetlands. Regular media campaigns and community displays can assist to identify new infestations. Limnocharis was first discovered in Cairns Regional Council area in 2001. Anecdotal information from the Cairns botanical gardens suggests that it may have been present there since the 1980s. Limnocharis was introduced as an ornamental wetland plant and has escaped from cultivation into drains, creeks and wetlands. Ensuring that aquatic plants are sourced from a weed free source is essential to prevent further spread of invasive aquarium plants. The seed is long-lived and can re-emerge many years after being buried in mud or soil in waterways.

The distinctive yellow flowers help distinguish it from native or introduced water hyacinth which have purple flowers. The leaf stems are also triangular on cross section. The seed longevity is at least fourteen years with plants reaching reproductive maturity in 58 days. Thus infestations must be monitored every 3 -4 weeks to stop all seeding events. Dispersal to new locations has been mainly via cultivation – gardeners and plant collectors. Local movement is via water dispersal of seed or vegetative plantlets.

The seed can remain viable buried in mud and soil for many years so any works in the vicinity of known sites require strict hygiene protocols, contact the eradication team on 13 25 23 for more information or if unsure of the risk.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.



PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870





100% recycled paper.

#### Limnocharis (Limnocharis flava)





#### What is my biosecurity obligation?

In the delimitation zone

In the prevention zone

In the eradication zone Ensure wetland and pond plants are sourced from a weed free area. Do not dump wetland, aquarium plants or fish into waterways. Landholders are required to report suspected infestations immediately to Biosecurity Queensland on 13 25 23. For more information refer to the biosecurity programs of the Tropical Weed Eradication Program. Do not move soils and plants from infested sites. Ensure machinery and other plant operating in vicinity of the known infestation is operating under strict weed hygiene protocols.

If you have an active infestation on your property you can assist the survey and control team by maintaining property access points and tracks, and ensuring you do not move soil or plant material from the infestation area. Landholders are required to report suspected infestations immediately to Biosecurity Queensland on 13 25 23. For more information refer to the biosecurity programs of the Tropical Weed Eradication Program. Spread

Herb

Aquatic

Perennial

Biosecurity Act Restricted matter category

> **2** Must be

reported

3

Do not distribute

> 4 Do not

> > move

**5** Do not keep

**6** Do not feed

Control



### Mexican bean tree (Cecropia peltata, C. pachystachya C. palmata )

Declaration

Status

2.5/5

National priority

0.0/5

**Description** A rapidly growing tree to 20m with hollow stems and large deeply lobed leaves with flocked white undersides. The tree has distinctive leaf scars on trunk which are similar to a paw paw. Cecropia has separate male and female plants with the female plant producing long finger-like fruiting spikes.

**Distribution** There are three known infestations in the Cairns Regional Council area located at Clifton Beach, Cairns City and Garradunga which extends into Cassowary Coast Regional Council.

**Impacts** Cecropia spp. are rapid growing rainforest pioneers which can invade and dominate rainforests, urban gardens, agricultural land and riparian areas. Cecropia seed profusely and are spread by birds and bats and subsequently can be dispersed long distances into adjoining landscapes and forests.

**Key projects** All known locations are the target of a regional eradication program led by Biosecurity Queensland. *C. pachystachya, C. palmata* are under monitoring towards eradication as they have not been detected since early 2017.

Seed longevity in Cecropia is short at less than 2 years. This gives great confidence in eradication programs as sites can be considered free quickly. Properties need to be free of Cecropia for a minimum of three years following the removal of last mature female plant to be considered clear.

All infestations are believed to have originated from plant collections and subsequently spread and naturalised in the surrounding environment via vectors including birds, bats and water. Dispersal by birds or bats of up to 2km has been observed in Far North Queensland, however data suggests a management area which buffers 1.5km from female plants is suitable.

Due to dispersal by birds and flying fox it is important to be on the lookout for Cecropia in gardens, forests and riparian areas.

A community education and awareness program is an important part of the eradication program. Managing risk of spread to new areas through hygiene protocols for impacted nurseries and growers play an important role in prevention. Hygiene protocols are also in place for survey and control operations.

When searching for Cecropia in the field, programs have learnt to adopt three techniques to maximise detection success, namely; 1) look up into the canopy, searching for the unique leaf shape and the leaves' silvery/white underside; 2) look ahead for the distinctive leaf scars on the stems; and 3) look down for the large, dry, silvery grey leaves on the ground.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870





100% recycled paper.

Details

#### Mexican bean tree (Cecropia peltata, C. pachystachya C. palmata)



#### What is my biosecurity obligation?

In the prevention zone

In the eradication zone All suspected sightings of this plant must be reported to Biosecurity Queensland on 13 25 23 within 24 hours. It is an offence under the Biosecurity Act 2014 to sell, distribute or give away Cecropia plants or seeds. If moving to a new property with a history of nursery or fruit tree production, be on the lookout for Cecropia plants.

All suspected sightings of this plant must be reported to Biosecurity Queensland on 13 25 23 within 24 hours. If you have an active infestation on your property you can assist the survey and control team by maintaining property access points and tracks, and ensuring you do not move soil or plant material from the infestation area. Land managers are required to control all known infestations on their land. As plants take 3 years to reach sexual maturity land managers are required to survey their part of the management area twice in the first three years following detection and once every 2 years after until deemed eradicated by an Authorised Officer under the Biosecurity Act 2014.

Woody Terrestrial Perennial **Biosecurity** Act Restricted matter category 2 Must be reported 3 Do not distribute 4 Do not move 5 Do not keep 6 Do not feed Control





Spread



#### Siam weed (Chromolaena odorata)



**Description** A scrambling woody shrub to 3 metres, (higher as a scrambling climber), with distinctive forked leaf venation and purple flush on new leaves. Clusters of white to lilac flowers in May-June and October. Distinguish from the weeds Bluetop and Praxelis, which have short-tasselled mauve to purple flowers and different leaves.

**Distribution** There are occasional infestations of Siam weed in Goldsborough Valley and Little Mulgrave. Larger infestations are throughout the Russell Catchment in Woopen Creek and Bartle Frere areas. A large infestation has recently been detected in Waugh's pocket.

**Impacts** Siam weed forms dense thickets and outcompetes native species and pasture in both disturbed and undisturbed sites. It prefers richer soils in alluvial and riparian zones but will grow in woodlands and coastal zones.

**Key projects** The target of a National Eradication Program up until 2012, Siam weed was devolved to local governments for further management. Contact Cairns Regional Council to report any suspect plants on 1300 692 247. As of publication, Council has implemented a Biosecurity Prevention and Control Program for this pest.

Areas marked for delimitation require on ground surveys to determine extent of distribution. No infestations are currently known in these areas.

Siam weed is likely to arrive with contaminated stock, produce, vehicles or machinery from adjoining infested areas. Ensuring weed hygiene measures are in place and materials/produce are sourced from a clean site will assist to protect your property.

Siam weed has a peak flowering period in May-June with another, less vigorous flowering in October. It is most visible at these times and this feature is used to detect plants prior to seeding. Siam weed is able to be spread by wind and water as well as machinery and vehicles.

The seeds of Siam weed have been confirmed to remain viable in the soil for at least 7 years. Maintaining records of historical infestations and restricting disturbance and movement of soil is essential to prevent spread to new locations.

Conducting surveys during the peak flowering time in May-June is the best way to detect any new outbreaks or to monitor previously controlled areas. Monitoring along forest edges, degraded pastures and riparian areas is a useful strategy to detect new infestations or single plants. Maintaining healthy native vegetation along watercourses and vigorous pastures will assist to reduce opportunities for Siam weed to establish in new locations.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au

PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870





Details

Background

100% recycled paper.

### Siam weed (Chromolaena odorata)



	What is my biosecurity obligation?
In the delimitation zone	Report any suspected outbreaks or detections to Cairns Regional Council on I 300 692 247. Conduct surveys during peak flowering period of May-June.
In the prevention zone	Report any suspected outbreaks or detections to Cairns Regional Council on 1300 692 247. Ensure weed hygiene measures are in place and materials/produce are sourced from a clean site.
In the containment zone	<ul> <li>Ensure best practice weed hygiene measures are in place to reduce risk of spread to new locations. Maintain weed free areas. Identify high value assets and protect them from impacts where possible.</li> <li>Treat isolated infestations with high risk of spread.</li> <li>Conduct annual surveys during peak flowering time to detect any new outbreaks or recruitment of new plants from dormant seeds in known locations.</li> </ul>

### Water hyacinth (Eichhornia crassipes)

Details



**Description** A free-floating, aquatic herb with glossy, spoon shaped leaves and distinctive purple/lilac flowers. Water Hyacinth forms dense blankets over waterways and wetlands. A similar native species occurs but can be distinguished by its yellow flowers and spear-shaped leaves

**Distribution** Occasional and localised in the lower Mulgrave River catchment and Caravonica suburb, within waterways.

**Impacts** Water Hyacinth floats on still or slow-moving water and can rapidly spread to cover the entire water surface with a thick mat of vegetation. This shades out any submerged plant life and impedes oxygen exchange, making the water unsuitable for fish and other animals.

**Key projects** As of publication, Council has implemented a Biosecurity Prevention and Control Program for this pest in riparian areas.

Water Hyacinth is most likely to be introduced in water features and ponds or as an aquarium plant. Ensure water features and ornamental gardens do not contain Water Hyacinth. Water Hyacinth grows from seed and by division of mature plants and may be spread in contaminated soil from water features containing the weed in other areas.

Infestations are currently controlled with herbicide and follow-up surveys to ensure all plant fragments have been treated. Treat new incursions as they are reported or found.

Water hyacinth can be moved on floodwaters, checking wetlands and water features after flooding events. Define assets to protect. As they become impacted, take reasonable measures to reduce impact on asset. Targeted maintenance of drainage and waterway systems.

Water Hyacinth is most likely to be introduced in water features and ponds or as an aquarium plant. Ensure water features and ornamental gardens do not contain Water Hyacinth. Water Hyacinth grows from seed and by division of mature plants and may be spread in contaminated soil from water features containing the weed in other areas.





For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870 Ph: 1300 69 22 47 24 hours / 7 days



### Water hyacinth (Eichhornia crassipes)





#### Sprog



Cairns Biosecurity Plan 2019–2024



#### What is my biosecurity obligation?

247 to report any suspect plants.

In the prevention zone

In the eradication zone

In the asset protection zone has a higher risk of occurring. Contact Cairns Regional Council to report any suspect plants on 1300 692 247.

It is an offence under the Biosecurity Act to move, share, give away or sell this plant. Ensure wetland and pond plants are sourced from a reliable supplier and

waterways. Ensure any machinery or vehicles moving from infested areas are

free from plant material and soil. Contact Cairns Regional Council on 1300 692

Ensure control measures are performed prior to flooding events where spread

are from a weed free area. Do not dump aquarium plants or fish into

Identify high value assets and protect them from impacts where possible. Maintain best practice weed hygiene measures to reduce risk of spread.

### Brillantaisia (Brillantaisia Iamium)



**Description** A small shrubby herb from 20cm to 2m in height. Brillantaisia has hairy square stems with heart shaped leaves. Purple (sometimes white) pea-like flowers are held on thin stems prior to forming cigar shaped seed pods. Brillantaisia can grow in to a dense, thick ground cover right down to the waters edge.

**Distribution** Localised in Freshwater Creek and becoming widespread and common from Babinda south concentrating into the Woopen Creek sub-catchment. There is also an isolated infestation in the East Russell.

**Impacts** Brillantaisia forms a dense mat and outcompetes native plants in riparian zones. It can take over domestic gardens and roadsides. The small seeds spread easily on machinery, vehicles and waterways. It grows well in both full shade and/or full sunlight.

Key projects Brillantaisia is locally declared under Cairns Regional Council local laws.

Areas marked for delimitation require on ground surveys to determine extent of distribution. No infestations are currently known in these areas.

Brillantaisia spreads readily on machinery and within contaminated soils. It was introduced into the Wet Tropics via a nursery in the Mossman area from where it has been spread in garden plants. Because the plant has rapid growth and seed production it can quickly establish and become infestations which are difficult to manage. It causes impact to ground storey vegetation along riparian zones, roadsides and in pastures.

Brillantaisia grows rapidly and can flower and seed all year round requiring survey and treatment on a continual basis. Isolated outbreaks are treated every six weeks to prevent plants from seeding. Survey in and around the known infestations are conducted to ensure all locations are detected.

Small infestations can be hand pulled, however all roots and stem fragments must be removed. Plant fragments should either be double bagged and taken to the dump or preferably hung up to prevent contact with the ground and reshooting.

Larger infestations should be herbicide treated.

For any treatment to be considered effective, follow-up monitoring must occur to identify any new seedlings. Areas marked for delimitation require on ground surveys to determine extent of distribution. No infestations are currently known in these areas.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870
 119-145 Spence St, Cairns Q 4870



Ph: 1300 69 22 47 24 hours / 7 days



Details

#### Brillantaisia (Brillantaisia lamium)





#### What is my biosecurity obligation?

In the delimitation zone

In the prevention zone

Keep an eye out for the distinctive purple flowers, allowing timely detection and treatment of new infestations. Contact Cairns Regional Council on 1300 692 247 to report any suspect plants.

Brillantaisia is a locally declared plant and under local laws cannot be distributed, given away or sold. Ensure sources of garden plants are weed free. Contact Cairns Regional Council on 1300 692 247 to report any suspect plants.

In the intensive control zone

Maintaining healthy pastures and keeping an eye out for the distinctive purple flowers will assist in the timely detection and treatment of new infestations. Do not move soils and plants from infested sites. Restrict stock and machinery movements unless adequate weed hygiene measures are implemented.

Spread

Herb

apply

Must not breed

Must not propagate

Must not

Must not sell or supply

Must not provide harbour



### Water mimosa (Neptunia oleracea & N. plena)

Details

Background



**Description** Water mimosa is an aquatic floating perennial herb that anchors at the waters edge and sends stems out over the water where they form a spongy, fibrous covering between the nodes. Leaves are olive green and are arranged in opposite pairs along the stem. When disturbed or touched the leaflets close up. Water mimosa flowers are yellow, ball-shaped and grow from the base of the leaves.

**Distribution** Several isolated infestations have been detected and removed. Records occur from Lake Placid, Smithfield, Brinsmead and Babinda areas. Water mimosa is associated with South East Asian cuisine where it used as a green vegetable and so may have been introduced as a food plant.

**Impacts** Water mimosa forms dense, floating rafts which can impede flows, reduce light penetration and oxygen levels in the water. The physical barriers can disrupt native fish and wildlife, restrict access for recreation and provide favourable habitat for mosquito.

**Key projects** All known locations the target of a regional eradication program led by Biosecurity Queensland. All suspected sightings of this plant should be reported to Biosecurity Queensland on 13 25 23.

Water mimosa is often used as a culinary plant in South East Asia and so is most likely to be introduced as food plant in the tropics.

The rooted land form has smaller leaves and flowers, and has no spongy floating tissue. It establishes from small plant pieces in water and from seed. Under favourable conditions, water mimosa grows out from the banks to form floating rafts of dense interwoven stems. These can be dislodged by water movement, (especially during floods), and are soon replaced by more water mimosa. These floating rafts can restrict water flow in creeks, channels and drains. It can impede recreational water sports and boating access. The rafts are so dense they can reduce water quality by preventing light penetration and reducing oxygenation of water. This creates favourable habitat for mosquitoes, reduces fish activity, and causes the death of native, submerged water plants and fish.

Management is targeting destruction of all known infestations and complete removal of all infestations in these areas. Infestations are currently controlled with herbicide and follow-up surveys to ensure all plant fragments have been treated.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870





### Water mimosa (Neptunia oleracea & N. plena)



#### What is my biosecurity obligation?

In the delimitation zone

In the prevention zone

In the eradication zone Keep an eye out for Water Mimosa in any natural or man-made freshwater ponds or features. All suspected sightings of Water Mimosa must be reported to Biosecurity Queensland on 13 25 23.

Keep an eye out for Water Mimosa in any natural or man-made freshwater ponds or features.

All suspected sightings of Water Mimosa must be reported to Biosecurity Queensland on 13 25 23. For more information refer to Biosecurity Queensland's Invasive Plants and Animals Biosecurity Program.

All suspected sightings of Water Mimosa must be reported to Biosecurity Queensland on 13 25 23. For more information refer to Biosecurity Queensland's Invasive Plants and Animals Biosecurity Program.



Floating

Aquatic

Perennial

Biosecurity Act Restricted matter category

> **2** Must be

reported

3

Do not distribute

> 4 Do not

> > move

**5** Do not keep

**6** Do not feed

Control

#### Spread



#### Lantana (Lantana camara)

Details

Background



**Description** Lantana is a heavily branched shrub that can grow in compact clumps, dense thickets or as a climbing vine. The stems of lantana are square with small, re-curved prickles. The small leaves (6cm) are covered in fine hairs, bright green above, paler underneath and have round-toothed edges.

**Distribution** Common and widespread across most land types. Lantana fruit is spread by birds so it is a common coloniser of disturbed ground, forest edges and riparian areas across the Wet Tropics.

**Impacts** A significant weed of natural systems and grazing areas. Lantana displaces understorey species and alters fire regimes in tropical woodlands. Lantana can cause poisoning in stock not familiar with it.

**Key projects** Given the spread and level of infestation across the region, no significant projects are currently primarily targeting Lantana. Lantana is one of a suite of widespread weeds managed in key environmental areas.

Lantana is widespread and is considered to occur in all areas where the habitat is suitable across the Cairns region.

Integrated management to reduce impacts including strategic herbicide control and fire management are essential in key environmental areas.

Because it is bird dispersed it can quickly re-infest areas which have been cleared of the weed if no ongoing management is in place. The use of appropriate fire regimes, mechanical control and grazing practices can assist to protect both environmental and grazing assets in woodland areas.

There are a wide range of biocontrol agents present in wild populations which may assist to reduce the vigour or reproduction of lantana. Most are seasonal and will respond when conditions are suitable so they should not be relied upon as the sole management tool.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au







#### Lantana (Lantana camara)



#### What is my biosecurity obligation?

spread to new locations.

In the asset protection zone

Maintain weed free areas. Identify high value assets and protect them from impacts where possible. A wide range of biocontrol agents are established in the wild to assist with management. For more information on best management tools and approaches refer to the Lantana best practice control guide produced by Weeds of National Significance.

Ensure best practice weed hygiene measures are in place to reduce risk of



Woody

Terrestrial

Perennial

Biosecurity Act Restricted matter category

> **2** Must be

reported

**3** Do not distribute

> 4 Do not move

**5** Do not keep

**6** Do not feed

Control

### Yellow crazy ant (Anoplolepis gracilipes)

Details



**Description** Yellow crazy ants (YCA) are slender ants, about 4mm long, with long legs, large eyes and very long antennae. Coloured yellow to orange, they have a brown abdomen which may be faintly striped. They move in a distinctly erratic or 'crazy' manner when disturbed.

**Distribution** Yellow crazy ants were first introduced to Cairns in 2001. They are now found over about 1500ha in numerous infestations south of Cairns between Bayview Heights and Gordonvale. The ants have now invaded about 90ha of the adjacent World Heritage Area. They thrive in a wide range of natural and man-made environments.

**Impacts** Yellow crazy ants are one of the world's worst invasive species. They are a significant threat to the biodiversity of the Wet Tropics. They can inhibit the photosynthesis and pollination of plants, causing environmental and agricultural impacts. They are also a significant hazard to human health and enjoyment of the outdoors.

**Key projects** The Wet Tropics Management Authority operates the Yellow Crazy Ant Eradication Program which started in 2013. It is currently funded to June 2019 through the National Landcare Program and the Queensland Government.

While the exact origin of Yellow crazy ants remains unclear, their current distribution extends through the tropical islands of the Indian and Pacific Oceans, where they are a major pest. This broad distribution is closely linked to human movement activities such as cargo ships and trade which has ultimately assisted them to reach Australian shorelines. In Australia, yellow crazy ants are now present in a number of sites throughout Queensland and Arnhem Land. In the Wet Tropics infestations YCA are found in a variety of habitats including residential areas, sugarcane fields and rainforest.

Delimitation surveys have defined the main infestations. However, several new infestations were found in 2017. Community and industry are being educated to identify Yellow crazy ants and asked to report any additional sightings. Yellow crazy ant queens are not known to disperse by flying; instead they move by 'budding' where a queen and accompanying workers walk to a new location, sometimes rafting on waterways to move downstream. The other key mode of dispersal is human assisted, moving as stowaways in soil, machinery, building materials, pot plants, and dry or green waste. It is crucial that high risk waste is treated on site and that any waste is disposed of at your local landfill so it can be monitored and treated if any outbreaks occur.

Regular treatments, about three times a year using ant specific granular baits have drastically reduced yellow crazy ant numbers in most areas. Eradication has been achieved in some small areas.

Background

- Eggs hatch after 18-20 days.
- Worker larvae develop in 16-20 days
- Pupae of workers develop in 20 days, while queen pupae develop in 30-34 days.
- Total lifespan of a worker ant is approximately 76- 84 days.
- Yellow crazy ants are most active in dry weather in temperatures over 17°C.

For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870



Ph: 1300 69 22 47 24 hours / 7 days



### Yellow crazy ant (Anoplolepis gracilipes)





Spread





#### What is my biosecurity obligation?

In the prevention zone

outbreaks.

transporting it off site.

In the eradication zone You can assist the eradication effort by maintaining access tracks, reducing weeds and rank grass along creek lines and providing access to your yard for any required survey or treatment operations. Yellow Crazy Ants Eradication Program - 07 4241 0525, <u>yca@wtma.qld.gov.au</u>

Dispose of all green waste and other rubbish at your local landfill. Taking your

waste to the local landfill allows for the monitoring and treatment of any

If you are unsure of the risk posed on your property then contact the eradication program for advice or assistance in treating your waste before

#### Electric ant (Wasmannia auropunctata)

Details



**Description** Electric ants are very small, about 1-1.5mm long. They are light brown to golden brown in colour, although the abdomen is sometimes darker. They are slow moving in comparison to many native ants and form distinctive foraging lines. They have a powerful, venomous sting.

**Distribution** Electric ants were first found in the northern beach suburb of Smithfield in May 2006. They are predominantly spread by humans in pot plants, other plant material and illegal dumping of green waste and can now be found in many of the northern beach and city suburbs and one infestation in the southern suburb of Bentley Park.

**Impacts** Electric ants are one of the world's worst invasive species. They have a powerful venomous sting and present a significant threat to biodiversity, agriculture and lifestyle. They are also a hazard to human health with their venomous sting providing a significant danger to sufferers of anaphylaxis.

**Key projects** The National Electric Ant Eradication Program, managed by Biosecurity Queensland, operates an eradication program which began in 2006. It is currently funded by the Queensland Government while a decision on national funding is being considered.

Electric ants are a notifiable Category I pest under the Biosecurity Act 2014 and residents within infestations (restricted zones) cannot move live electric ants or electric ant carriers, such as plants, plant material and soil, without getting a Biosecurity Instrument Permit (BIP) from the Program.

Known infestations are regularly treated with various granular pesticide products, depending on where the infestations are. The active ingredients can be either toxicants, or insect growth regulators (IGR). A gel bait has been developed for use in difficult, wetter areas and other new bait formulations are being trialled. Treatments area undertaken a minimum of I month apart until no more ants are found. All people within FNQ have a general biosecurity obligation (GBO) not to move electric ants.

The longest recorded movement of electric ants was from the relocation of pot plants from Kewarra Beach to Bingil Bay. Most dispersal events occur through the movement of pot plants and plant material.

- Queens live for approximately 12 months and lay up to 70 eggs a day.
- Eggs are incubated for 8-10 days.
- Larvae develop for 14-16 days.
- Nymphal stage lasts 13-14 days.
- Adult workers live for more than 40 days.
- Males live for several weeks.

For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870



Ph: 1300 69 22 47 24 hours / 7 days



Background

### Electric ant (Wasmannia auropunctata)



#### What is my biosecurity obligation?

In the electric ant restricted zone

In electric ant biosecurity zone Electric ants are a notifiable Category I pest under the Biosecurity Act 2014. New detections are required to be reported to the eradication program within 24 hours. Call Biosecurity Queensland on 13 25 23.

Residents within infestations (restricted zones) cannot move live electric ants or electric ant carriers, such as plants, plant material and soil, without getting a Biosecurity Instrument Permit (BIP) from the Program.

All people within FNQ have a general biosecurity obligation (GBO) not to move electric ants.

Along with carefully adhering to movement control of potentially contaminated materials and items you can assist the eradication effort by providing clear access to your property for any required survey or treatment operations. Spread



### Feral pig (Sus scrofa)

Details



**Description** Feral pigs are usually coarsely haired and coloured black, buff or spotted black or white. They are generally nocturnal and camp in thick cover during the day. Feral pigs are omnivorous and can range from 5 to 50 square kilometres. Feral pigs breed year-round if the conditions are suitable often producing two litters a year.

**Distribution** Feral pigs are common and widespread in the floodplains and forests of the entire Wet Tropics region. Feral pigs occupy most suitable habitat in the Cairns region including farmland, wetlands, riparian areas, forests, reserves and peri-urban areas. Distribution is often seasonal based on the availability of food and water.

**Impacts** Feral pigs damage crops, stock, property and the natural environment. They transmit disease and could spread exotic diseases such as foot and mouth if this was introduced to the country. They have been identified as a likely vector of Panama Tropical Race 4 (TR4), a disease of bananas.

**Key projects** Council offers trapping and baiting assistance for feral pigs in the region, dependent on resources, landholder capabilities and obligations. Council also operates a series of traps along the coast to reduce the numbers of pigs.

Feral pigs are thought to number around 24 million in Queensland and are one the most widespread and destructive invasive animals in the State. Their distribution and impacts are often seasonal and are heavily influenced by the availability of food, water and cover.

An individual animal or a small band of pigs can do a large amount of damage in a single night so it is important to be alert to any early signs of feral pig presence in your area; and to take steps to protect key assets like gardens, crops and vulnerable natural areas. Ensure best practice management actions are in place to reduce opportunities for feral pigs.

Pig proof fencing is by far the most effective means of reducing the impacts of feral pigs on domestic gardens and small crops. It is also a useful strategy for protecting vulnerable natural areas.

A range of control options from shooting, to trapping and baiting are used to control feral pigs when required. No individual solution leads to permanent management and feral pigs will be an ongoing management issue in the region. In the Cairns region, trapping is the preferred method of pest animal management ahead of poison baiting. This is due to the relatively higher potential for off-target risks to the community, (population and land use), and wildlife (cassowaries etc.). However, 1080 poison baiting as a control method is considered more efficient for large numbers of pest animals. Ground shooting is considered the least effective method for controlling pig populations but can be useful for controlling small populations in limited access areas. 1080 poison baiting is only available in rural agricultural areas. This is for both poison baiting requirements and risk management necessities. Additional requirements depending on property and identified risks can be discussed.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.

www.cairns.qld.gov.au council@cairns.qld.gov.au PO Box 359, Cairns Q 4870 119-145 Spence St, Cairns Q 4870 Ph: 1300 69 22 47
24 hours / 7 days



Background

### Feral pig (Sus scrofa)



#### What is my biosecurity obligation?

Ensure best practice biosecurity hygiene measures are in place to prevent spread of other biosecurity matter when controlling, trapping or hunting pigs. Residents in rural areas should consider various management solutions including fencing, shooting, baiting and trapping, dependant on their location and capability. Residents in urban areas should consider temporary fencing, alternatives to mulching or garden arrangements and trapping.

Speak to Council on 1300 69 22 47 for best practice management advice and discuss the range of assistance options available. To be eligible for assistance, residents or community groups must be able to:

- Give permissions for activity and entry consent requirements on the land on which the problem persists. Failing that, the land in question must be Council land where permissions can be arranged.
- Be able to monitor any traps placed on land for humane requirements and to monitor against off-target native wildlife capture.
- In agricultural areas, be ready and willing to destroy and/or dispose of any trapped pest animals if practical and reasonable to do so.

In the asset protection

zone

## Wild dog (Canis familiaris)

Description Wild dogs include dingoes, wild populations of dogs and hybrids.

**Distribution** Wild dogs are widespread in both the agricultural and natural landscape. They also frequently exist on the outskirts of towns and even within urban areas. Small populations of feral dogs are known throughout the Cairns region.

**Impacts** Wild dogs can cause stock losses in calving season and often carry parasites and pathogens. Near towns they can cause nuisance and impact on domestic animals. Wild dogs will prey on native animals and may assist maintaining healthy population of animals like wallabies; however they may also impact on more vulnerable animals like cassowary.

**Key projects** Council offers trapping and baiting assistance for wild dogs in the region. This is dependent on resources, landholder capability and obligations.

Wild dogs have defined home territories but are able to cover large distances when moving to new areas either through competition for resources or by being pushed out of areas by more dominant animals.

In urban and settled areas Council will respond to individual issues as they arise on a case by case basis. Whilst wild dogs are generally not aggressive to people, they may display threatening behaviour such as attacking domestic dogs, scavenging or stalking.

Domestic pets and poultry are best protected by dog mesh fencing. Fencing also restrains your domestic animals and may assist in preventing other animals such as wallabies or pigs entering your property. Wild dogs are opportunistic and scavenging can form a regular part of their diet. Ensuring appropriate security and disposal of domestic rubbish and food scraps will assist to reduce food sources for wild dogs.

For advice on best practice wild dog management and possible assistance, contact Council on 1300 69 22 47.

For domestic or escaped dog issues contact Council's Local Laws department on the same number.

Wild and Feral Dog trapping can be very difficult to practically achieve. As such, residents, where reasonable and practical, are encouraged to ground shoot wild dogs as the most efficient method of management. Residents are advised that this does not endorse any illegal or irresponsible actions and does not cover any advice associated with the management of stray dogs or domestic dogs.



For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Cairns Biosecurity Plan available at cairns.qld.gov.au and customer service centres.







100% recycled paper.

<sup>2</sup>riority

Details

### Wild dog (Canis familiaris)

Cairns Biosecurity Plan 2019–2024



Vertebrate

Carnivore

Biosecurity Act Restricted matter category

> **2** Must be

reported

**3** Do not

distribute

4

Do not

move

**5** Do not keep

**6** Do not feed

Control

#### What is my biosecurity obligation?

In the asset protection zone Wild dogs are a restricted invasive animal under the Biosecurity Act 2014. It must not be moved, kept (if a dingo), fed, given away, sold, or released into the environment without a permit.

Fencing your property is the most effective means of reducing the risk of wild dog impacts on domestic pets and poultry. Participating in cluster and district control programs is the most effective means of controlling wild dogs in grazing areas.

The coordinated management of wild dogs outlined in this plan does not include management of straying or problematic domestic dogs (including hunting dogs). These animals are domestic animals and are managed in accordance with Cairns Regional Councils Local Laws. For all requests or enquiries contact Council on 1300 69 22 47.

#### **Biosecurity Action Plans**





64-66 Front Street, Mossiman, QLD, 4873









For more information on using this biosecurity action plan fact sheet, and further information on control tools, refer to the Douglas Shire Biosecurity Management Plan available at douglas.qld.gov.au and customer service centres.











Landholders wishing to participate in the program should contact Douglas Shire Council on 07 4099 9444.




















64-66 Front Street, Mossman, QLD, 4873























### Douglas Shire Biosecurity Plan 2017-2021







64-66 Front Street, Mossman, QLD, 4873



### Douglas Shire Biosecurity Plan 2017-2021











### Douglas Shire Biosecurity Plan 2017-2021



**RESEARCH REPORT** 





# Rainforest Dieback: Risks Associated with Roads and Walking Tracks

Stuart Worboys and Paul Gadek





### RAINFOREST DIEBACK: RISKS ASSOCIATED WITH ROADS AND WALKING TRACK ACCESS IN THE WET TROPICS WORLD HERITAGE AREA

### Stuart Worboys and Paul Gadek School of Tropical Biology, James Cook University





Established and supported under the Australian Cooperative Research Centres Program

Table	5:	Phytophthora	Dieback	Management	Procedures	for	infrastructure	construction	and
mainte	nance	in Phytophthor	a-free are	as.					

PLANNING	•	Map the location of the planned activities, and determine the level of <i>Phytophthora</i> Dieback Management Procedures to be implemented using the flow chart in Appendix A.
PHASE	•	For catchments that are <i>P. cinnamomi</i> -free, the works plan is to incorporate the following <i>Phytophthora</i> Dieback Management Procedures.
TIMING	•	Activities to be planned for the dry season, and postponed during and following rainfall.
MATERIALS	•	Gravel, soil or sand brought onto the site is to be free of <i>P. cinnamomi</i> . If the planned activities involve the supply of a significant amount of materials, it may be more cost effective to survey the site for <i>P. cinnamomi</i> first to confirm the site isn't already infested. If a site is infested, then the materials do not need to be free of <i>P. cinnamomi</i> .
	•	Stockpile topsoil and return it to the site in preference to importing fill.
	•	Imported pipes, stone pitching materials and other construction materials to be free of mud and soil.
	•	Stay within the construction zone.
	•	If moving into forest on foot, footwear is to be free of mud and soil. If it is necessary to leave the catchment, implement the <i>Phytophthora</i> Dieback Management Procedures for bushwalking.
	•	Store gravel and other materials at the work site on a hard, dry, well-drained surface that drains into the impacted catchment.
PROCEDURES	•	When grading:
		<ul> <li>grade from upslope to downslope (when applicable);</li> </ul>
		<ul> <li>grading equipment is to be clean before commencing work;</li> </ul>
		- the angle of the grader blade is to be adjusted to avoid carrying soil/gravel long distances; and
		- do not grade wider than prescribed.
	•	Vehicles, machinery and equipment to be free of mud and soil when:
		<ul> <li>transporting gravel and other construction materials;</li> </ul>
		- arriving at a site; and
		<ul> <li>when moving to an uninfested catchment.</li> </ul>
		(There will be a reduced need for cleaning if the operation is completed in dry soil conditions)
VEHICLES AND	•	If cleaning is to occur in the field:
MACHINERY		- select a hard, well drained surface (e.g. road), well away from vegetation;
		- wash down in the area in which the activities have occurred;
		<ul> <li>one side of the wash down area is assumed to be infested, the other, uninfested. Operations on either side of the boundary are to be kept separate; and</li> </ul>
		- minimise the use of water, and attempt to remove mud and soil with a brush or stick.
	•	Park vehicles and machinery on cleared land.
SOIL MOVEMENT	•	Soil, gravel and plant material removed from any site should not be used in uninfested catchments.
WATER	•	Town water, bore water or sterilised water to be used.

	•	Rehabilitate site with <i>P. cinnamomi</i> resistant species appropriate to the local area. A preliminary list of resistant species is provided in Appendix B.
	•	Revegetation has a high probability of introducing <i>P. cinnamomi</i> , particularly as it needs to occur during or immediately before the Wet Season, therefore:
		<ul> <li>consider direct seeding rather than planting seedlings;</li> </ul>
REHABILITATION		<ul> <li>obtain plants from a nursery with accredited hygiene procedures under the Australian Nursery Industry Accreditation Scheme;</li> </ul>
		<ul> <li>ensure all machinery, tools and equipment are free of mud and soil when commencing works in a new catchment, and are cleaned prior to finishing or moving to another catchment; and</li> </ul>
		<ul> <li>if using mulch, ensure that it has been sourced on site, or has been well composted (the heating part of the composting process kills <i>P.</i> <i>cinnamomi</i>).</li> </ul>
STAFE	•	Staff and contractor involved in road and drain construction and maintenance activities to receive training in <i>Phytophthora</i> dieback management.
JIAFF	•	<i>Phytophthora</i> dieback information to be include in field staff induction process.

**Table 6:** *Phytophthora* Dieback Management Procedures for infrastructure construction and maintenance areas where all catchments are assumed to be infested (e.g. Culpa Road, Mt Lewis Road, access track to the head of Tully Falls).

PLANNING PHASE	<ul> <li>Map the location of the planned activities, and determine the level of <i>Phytophthora</i> Dieback Management Procedures to be implemented using flow chart in Appendix A.</li> <li>For activities that are undertaken entirely within infested catchments, the works plan is to incorporate the following <i>Phytophthora</i> Dieback</li> </ul>
	Management Procedures.
TIMING	• Activities at <i>P. cinnamomi</i> -free sites should be scheduled for dry soil conditions before undertaking works in infested areas.
	• The use of materials that are free of <i>P. cinnamomi</i> is encouraged, but this is not essential.
MATERIALS	• <i>P. cinnamomi</i> –free materials should be used at uninfested sites before infested sites.
	Stay within the construction zone.
PROCEDURES	• If moving into forest on foot, footwear is to be free of mud and soil. If it is necessary to leave the catchment, implement the <i>Phytophthora</i> Dieback Management Procedures for bushwalking.
	• Store gravel and other materials at the work site on a hard, dry, well-drained surface that drains into the impacted catchment.
	• Vehicles, machinery and equipment to be free of mud and soil when leaving the site. (There will be a reduced need for cleaning if the operation is completed in dry soil conditions)
	If cleaning is to occur in the field:
	- select a hard, well drained surface (e.g. road), well away from vegetation;
	<ul> <li>wash down in the area in which the activities have occurred;</li> </ul>
MACHINERT	<ul> <li>one side of the wash down area is assumed to be infested, the other, uninfested. Operations on either side of the boundary are to be kept separate; and</li> </ul>
	<ul> <li>minimise the use of water, and attempt to remove mud and soil with a brush or stick.</li> </ul>
	Park vehicles and machinery on cleared land.
	• Rehabilitate site with <i>P. cinnamomi</i> resistant species appropriate to the local area. A preliminary list of resistant species is provided in Appendix B.
	• Revegetation has a high probability of introducing <i>P. cinnamomi</i> , particularly as it needs to occur during or immediately before the Wet Season, therefore:
	- consider direct seeding rather than planting seedlings;
REHABILITATION	<ul> <li>obtain plants from a nursery with accredited hygiene procedures under the Australian Nursery Industry Accreditation Scheme;</li> </ul>
	<ul> <li>ensure all machinery, tools and equipment are free of mud and soil when commencing works in a new catchment, and are cleaned prior to finishing or moving to another catchment; and</li> </ul>
	- if using mulch, ensure that it has been sourced on site, or has been well composted (the heating part of the composting process kills <i>P. cinnamomi</i> ).
	Staff and contractor involved in road and drain construction and maintenance     activities to receive training in <i>Phytophthora</i> dieback management
STAFF	<ul> <li>Phytophthora dieback information to be include in field staff induction process.</li> </ul>

**Table 7:** Phytophthora Dieback Management Procedures for environmental maintenance activities in P.

 cinnamomi-free areas.

TIMING	Activities such as slashing, removal of woody weeds, etc. to occur in dry soil conditions.
	Rehabilitate sites with <i>P. cinnamomi</i> resistant species appropriate to the local area. A preliminary list of resistant species is provided in Appendix B.
	Revegetation has a high probability of introducing <i>P. cinnamomi</i> , particularly as it needs to occur during or immediately before the Wet Season, therefore:
	<ul> <li>consider direct seeding rather than planting seedlings;</li> </ul>
REHABILITATION	<ul> <li>obtain plants from a nursery with accredited hygiene procedures under the Australian Nursery Industry Accreditation Scheme;</li> </ul>
	<ul> <li>ensure all machinery, tools and equipment are free of mud and soil when commencing works in a new catchment, and are cleaned prior to finishing or moving to another catchment; and</li> </ul>
	- if using mulch, ensure that it has been sourced on site, or has been well composted (the heating part of the composting process kills <i>P. cinnamomi</i> ).
	Off road vehicles, motorcycles and horses to be kept to established roads and trails, which are likely to already be infested.
	Minimise the number of tracks in unaffected catchments, and ensure they have hard, dry, well-drained surfaces.
	When constructing tracks:
	- construct in dry soil conditions;
ACCESS	<ul> <li>map catchments to be impacted by the proposed track – the track should not pass from infested catchments to <i>P. cinnamomi</i>-free catchments;</li> </ul>
	- if tracks are to be constructed in <i>P. cinnamomi</i> -free catchments, implement full hygiene procedures, as outlined in Table 5;
	<ul> <li>consider construction of wooden walkways over muddy areas; and</li> </ul>
	- ensure materials that can be used to construct tracks include <i>P. cinnamomi</i> -free gravel, concrete, and limestone.
SOIL MOVEMENT	Minimise soils disturbance, for example, mow, slash or use herbicide to control weeds and keep open drains, rather than grade or plough.
	If soil, gravel, sand, river stones, etc. are to be imported into bushland reserves, these materials are to be free of <i>P. cinnamomi</i> .
	All machinery and vehicles to be free of mud and soils on tyres, mudflaps, body and underbody when entering a <i>P. cinnamomi</i> -free catchment. As a
VEHICLES, MACHINERY &	matter of routine, all machinery and vehicles to be washed down prior to leaving.
TOOLS	All tools and equipment to be free of mud and soil when entering <i>P. cinnamomi</i> -free catchment. As a matter of routine, all tools and equipment are to be washed down prior to removal.
WATER	Town water, bore water of sterilised water to be used.
	An ongoing commitment to visitor education is essential. <i>P. cinnamomi</i> awareness to be an integral part of signage and interpretive displays within the High Susceptibility zones of the WTWHA.
COMMUNICATION	Provide information to stakeholder groups, such as bushwalking clubs, conservation groups, ecotourism operators, etc.
AND EDUCATION	In High Susceptibility zones of the WTWHA, place signage to recommend avoiding access when soil is muddy (could also highlight that leech abundance is correlated with soil moisture, as an additional deterrent!) and that visitors to keep to tracks.

ROADSIDE MAINTENANCE	• Slashers, tractors and other equipment used on roadsides to be washed down daily, as a matter of routine, when operating in the High Susceptibility zone.
STAFF	• Land Managers and contractors involved in construction and maintenance activities to receive training in <i>Phytophthora</i> Dieback Management Procedures.

**Table 8:** Phytophthora Dieback Management Procedures for bushwalking and other recreational activities within the High Susceptibility zone.

TIMING	Bushwalking activities in the High Susceptibility Zone preferably to occur in dry soil conditions.
	• An ongoing commitment to visitor education is essential. <i>P. cinnamomi</i> awareness to be an integral part of signage and interpretive displays within the High Susceptibility zones of the WTWHA.
COMMUNICATION AND EDUCATON	• Provide information to stakeholder groups, such as bushwalking clubs, conservation groups, ecotourism operators, etc.
	• In High Susceptibility zones of the WTWHA, place signage to recommend avoiding access when soil is muddy and recommend visitors to keep to tracks.
	• Consideration should be given to restricting access to walking tracks in the High Susceptibility zone during the wet season, or at least those which traverse <i>P. cinnamomi</i> -free catchments.
ACCESS	• If a walking track traverses both <i>P. cinnamomi</i> -free catchments and infested catchments, walkers should be directed to commence the walk (with clean boots) in the <i>P. cinnamomi</i> -free areas, before moving into infested catchments.
	• Reduce the likelihood of transporting soil between infested and uninfested catchments by:
	<ul> <li>educating walkers by appropriate signage;</li> </ul>
SOIL MOVEMENTS	<ul> <li>installing signposted clean-down points at appropriate points on the track (including the start of the track); and</li> </ul>
	<ul> <li>encouraging walkers to carry a hard brush and bottle of methylated spirits to use in cleaning and disinfecting boots.</li> </ul>

**Table 9:** Phytophthora Dieback Management Procedures for fire management activities within the High

 Susceptibility zone.

	Machinery, vehicles and equipment to arrive at site free of mud and soil:
	<ul> <li>to clean machinery, use a brush, spade, bar or compressed air in preference to washing down with water;</li> </ul>
HYGIENE	<ul> <li>wash down at designated wash down points or on a hard, well-drained surface that does not run off into forest.</li> </ul>
	- clean machinery, vehicles and equipment before moving to another area.
	• If you know the <i>Phytophthora</i> dieback status of the area, do not move from infested to uninfested areas unless the vehicle, machinery and equipment are free of soil and mud.
FIRE BREAKS	• Procedures for construction and maintenance of fire breaks to follow procedures listed for road construction and maintenance (Tables 5 and 6). The level of <i>Phytophthora</i> Dieback Management Procedures to be implemented to be determined with reference to Appendix A.
	Use hand tools to suppress the fire where this method will succeed.
	Use machinery only when necessary.
	Use scheme or bore water for fire suppression whenever possible.
TRAINING	• Training and practice sessions should not occur in, or adjacent to, bushland areas or horticultural crops in wet soil conditions.
	• <i>Phytophthora</i> dieback information to be included in induction process for new crewmembers.

### 5. REFERENCES

Abell, S. (2002) An investigation of the identification and distribution of *Phytophthora* species and the genetic population structure of *P. cinnamomi* associated with canopy dieback within the tropical rainforests of far north Queensland. Unpublished Honours Thesis. James Cook University, Cairns.

Aberton, M.J., Wilson, B.A. and Cahill, D.M. (1999) The use of potassium phosphonate to control *Phytophthora cinnamomi* in native vegetation at Anglesea, Victoria. *Australasian Plant Pathology* **28**, 225-234.

Anselmi, N. and Vannini, A. (not dated) Ink disease of chestnut caused by *Phytopthhroa cambivora*: a serious threat for chestnut cultivation. Plant Pathology Department, University of Tuscia, Viterbo, Italy.

Aryantha, I.P., Cross, R. and Guest, D.I. (2000) Suppression of *Phytophthora cinnamomi* in potting mixes amended with uncomposted and composted animal manures. *Phytopathology*, **90**, 775-782.

Barker, P.C.J., Wardlaw, T.J. and Brown, M.J. (1996) Selection and design of *Phytophthora* management areas for the conservation of threatened flora in Tasmania. *Biological Conservation* **76**, 187-193.

Brown, B.N. (1976) *Phytophthora cinnamomi* associated with patch death in tropical rainforests in Queensland. *Australian Plant Pathology Society Newsletter*, **5**, 1-4.

Burgess, T., McComb, J.A., Colquhoun, I. and Hardy, G.E.StJ. (1999) Increased susceptibility of *Eucalyptus marginata* to stem infection by *Phytophthroa cinnamomi* resulting from root hypoxia. *Plant Pathology*, **48**, 797-806.

Cahill, D.M. (1993) Review of *Phytophthora* diseases in Australia. Rural Industries Resource and Development Corporation. Report Series No. 93/94, Department of Primary Industries and Energy, Canberra.

Chee, K. H. and Newhook, F.J. (1965) Improved methods for use in studies of *Phytophthora cinnamomi* Rands and other *Phytophthora* species. *New Zealand Journal of Agricultural Research*, **8**, 88-95.

di Stefano, J. (2001) The impact of dieback disease (*Phytophthora cinnamomi*) on vegetation near Mt Stapylton in the Northern Grampians National Park, Western Victoria. *The Victorian Naturalist* **118**, 46-55.

Dieback Working Group (2000) Managing *Phytophthora* Dieback: Guidelines for Local Government. Dieback Working Group, Western Australia.

Dobrowolski, M. P. (1999) Population and sexual genetics of *Phytophthora cinnamomi* in Australia using microsatellite markers. Ph. D. Thesis. School of Biological Sciences and Biotechnology. Murdoch University, Perth.

Drenth, A. and Sendall, B (2001) Practical guide to detection and identification of *Phytophthora*. Cooperative Research Centre for Tropical Plant Protection, Brisbane, Australia.

Environment Australia (2001) *Threat abatement plan for Dieback caused by the root-rot fungus Phytophthora* cinnamomi. Commonwealth of Australia. Canberra, ACT, Notes: Available at www.ea.gov.au/biodiversity/threatened/tap/*Phytophthora* 

Environmental Protection and Biodiversity Conservation Act 1999. Commonwealth of Australia.

Erwin, D.C. and Ribeiro, O.K. (1996) *Phytophthora* Diseases Worldwide. APS Press, St Paul, Minnesota, USA

Gadek, P.A. (1997) Preliminary report on Phytophthora cinnamomi and its association with

threatening processes in rainforests in north east Queensland. Report for the Cooperative Research Centre for Tropical Rainforest Ecology and Management, James Cook University Cairns Campus, Cairns, Australia.

Gadek, P.A. (editor) (1999) *Patch Deaths in Tropical Queensland Rainforests: Association and Impact of* Phytophthora cinnamomi *and other Soil Borne Organisms*. Cooperative Research Centre for Tropical Rainforest Ecology and Management. Cairns, Australia.

Gadek, P.A., Gillieson, D., Edwards, W., Landsberg, J. and Pryce, J. (2001) *Rainforest Dieback Mapping and Assessment in the Wet Tropics World Heritage Area.* Schools of Tropical Biology, Tropical Environmental Studies and Geography, and the Rainforest CRC. James Cook University Cairns Campus, Cairns, Australia.

Gadek, P.A. and Worboys, S.J. (eds) (2002) Rainforest Dieback Mapping and Assessment: *Phytophthora* species diversity and impacts of dieback on rainforest canopies. School of Tropical Biology, James Cook University, and the Rainforest CRC. Cairns.

Gillen, K. and Napier, A. (1994) Management of access. *In:* Plant Diseases in Ecosystems: Threats and impacts in south-western Australia. *Journal of the Royal Society of Western Australia*, **77**, 163-168.

Guest, D.I., Anderson, R.D., Foard, H.J., Phillips, D., Worboys, S. and Middleton, R.M. (1994) Long-term control of *Phytophthora* diseases of cocoa using trunk-injected phosphonate. *Plant Pathology*, **43**, 479-492.

Guest, D.I., Pegg, K.G., and Whiley, A.W. (1995) Control of *Phytophthora* diseases of tree crops using trunk-injected phosphonates. *Horticultural Reviews.* **17**, 299-330.

Hardy, G.E.S., Barrett, S. and Shearer, B.L. (2001) The future of phosphite as fungicide to control the soilborne plant pathogen *Phytophthora cinnamomi* in natural ecosystems. *Australasian Plant Pathology* **30**, 133-139.

Hardy, G.E.St J., O'Brien, P.A. and Shearer, B.L. (1994) Control options of plant pahtogens in native plant communities in south-western Australia. *In:* Plant Diseases in Ecosystems: Threats and impacts in south-western Australia. *Journal of the Royal Society of Western Australia*, **77**, 169-177.

Hill, T.C.J., Tippett, J.T. and Shearer, B.L. (1995) Evaluation of three treatments for eradication of *Phytophthora cinnamomi* from deep, leached sands in Southwest Australia. *Plant Disease* **79**, 122-127.

Jung, T., Blaschke, H. and Oßwald, W. (2000) Involvement of soilborne *Phytophthora* species in Central European oak decline and the effect of site factors on the disease. *Plant Pathology*, **49**, 706-718.

Nature Conservation (Wildlife) Regulation 1994. State of Queensland

Podger, F.D. (1968) Aetiology of jarrah dieback. A disease of dry sclerophyll *Eucalyptus marginata* Sm. forests in Western Australia. Unpublished M.Sc. Thesis, University of Melbourne.-

Podger, F.D. (1999) A National Overview of Phytophthora cinnamomi in Australia. Suplementary information to accmpany the draft national Threat Abatement Plan. Environment Australia, Canberra.

Pratt, B. H. and Heather, W.A. (1972) A method for the rapid differentiation of *Phytophthora cinnamomi* from other *Phytophthora* species isolated from soil by lupin baiting. *Transactions of the British Mycological Society*, **59**, 87-96.

Pryce, J. (2000) An Examination of the Nature of *Phytophthora cinnamomi* Mediated 'Dieback' in Tropical Australian Rainforests. Unpublished Honours Thesis, James Cook University Cairns Campus.

Pryce, J., Edwards, W. and Gadek, P.A. (2002) Distribution of *Phytophthora cinnamomi* at different spatial scales: When can a negative result be considered positively? *Austral Ecology*, **27**, 459-462.

Sattler, J. and Williams, R. (1999) *Conservation Status of Queensland's Bioregional Ecosystems.* Environment Protection Authority, Brisbane, Queensland.

Shearer, B.L. and Tippett, J.T. (1989) Jarrah dieback: the dynamics and management of *Phytophthora cinnamomi* in the Jarrah (*Eucalyptus marginata*) forest of south-western Australia. *Research Bulletin No. 3.* Department of Conservation and Land Management, Como, Western Australia.

South Australian Department of Environment and Heritage (2001) *Phytophthora* Newsletter. September 2001. National Parks and Wildlife SA.

Stamps, D.J., Waterhouse, G.M., Newhook, F.J. and Hall, G.S. (1990) Revised tabular key to the species of *Phytophthora*. *Mycological Papers* **No. 162**, 28pp.

Vegetation Management Regulation 2000. State of Queensland.

Waterhouse, G. M. (1963) Key to the species of *Phytophthora* de Bary. *Mycological Papers*, **92**, 1-22.

Weste, G. (1994) Impact of *Phytophthora* species on native vegetation of Australia and Papua New Guinea. *Australasian Plant Pathology*, **23**, 190-209.

Weste, G. (2002) Interaction between *Phytophthora cinnamomi* and Victorian native plant species growing in the wild. *Australasian Mycologist*, **20**, 64-72.

Wilson, B.A., Aberton, J. and Cahill, D.M. (2000) Relationships between site factors and distribution of *Phytophthora cinnamomi* in the Eastern Otway Ranges, Victoria. *Australian Journal of Botany* **48**, 247-260.

Worboys, S.J. and Middleton, R.M. (1991) Cocoa Black Pod Research Trust of Papua New Guinea: 1991 Research Report. Kaviak Plantation, Kar Kar Island, Papua New Guinea.

Zentmyer, G.A. (1980) Phytophthora cinnamomi and the Diseases it Causes. Monograph No. 10, American Phytopathological Society. St Paul, Minnesota.

# STAMP OUT Tramp Ants



# Fact sheet

### We need YOU to help us stamp out the tramp ants!

Two species of highly invasive ants, electric ants and yellow crazy ants, are found in Far North Queensland. These tramp ants, so-called because of their tendency to hitch a ride with people, are among the world's 100 worst invasive species. They are a serious social, economic, agricultural and environmental pest, capable of inflicting devastating impacts on our tropical outdoor lifestyle, tourism and agricultural industries, pets and livestock, and the unique native plants and animals of our World Heritage landscape.

Conservation Volunteers, with funding from the Australian Government's Caring for Our Country initiative, and supported by the Wet Tropics Management Authority and Biosecurity Queensland, is conducting surveillance along the boundary of the Wet Tropics World Heritage Area, between Palm Cove and Edmonton and around Bingil Bay and Mission Beach.

Conservation Volunteers will be laying baits, talking to local residents and organising awareness-raising events in these areas. Please help by spreading the word and allowing volunteers to inspect your property. The ants are easier to eradicate if identified early, but may severely impact on your family and pets if not treated swiftly. How you can help:

- Support Conservation Volunteers when they visit you
- Learn more about electric ants and yellow crazy ants: http://www.daff.qld.gov.au/4790\_6653.htm
- Inspect all purchases of plants and soil for tramp ants
- Check your camping equipment and picnic gear too
- Spray pot plants with insecticide when moving home
- Only dispose of vegetation, plants and soil at approved council sites
  - Report illegal dump sites to : Cairns Regional Council on 4044 3044 Cassowary Coast Regional Council on 4030 2222 Biosecurity Queensland on 13 25 23
- If you find suspected tramp ants, call: Biosecurity Queensland 13 25 23.

Don't delay - remember, early detection of tramp ants is vital. The longer you wait, the harder it is to get rid of them.



http://www.wettropics.gov.au/stamp-out-tramp-ants.html

### Yellow crazy ants

### (Anoplolepis gracilipes)

- Long slender body 5mm body length
- Very long legs and antennae
- Brownish-yellow or orange-yellow, with a brown abdomen, sometimes striped
- Looks like a small green ant but yellow
- Erratic, frantic, "crazy" movement
- Able to forage day and night but less active in intense heat and heavy rain

Yellow crazy ants are opportunistic feeders and consume both sugars and proteins (survey teams use a mix of tuna and jam as bait). They don't bite or sting, but spray formic acid to subdue and kill prey, and sometimes as a defensive mechanism when disturbed. This can irritate skin and eyes, blinding pets, livestock and native animals. Few small animals or insects survive in areas they colonise. Chicks and young animals are particularly at risk.

Yellow crazy ants have recently been found in Little Mulgrave National Park, part of the Wet Tropics World Heritage Area. To learn more, watch and share this YouTube video about yellow crazy ants: http://youtu.be/GgG-LDTRmkM

### Electric ants

### (Wasmannia auropunctata)

- Tiny about 1.5mm in length
- Light / golden brown in colour
- Active 24 hours a day in most weather conditions
- Likes moist areas, especially those close to water
- Tend to move slowly, often in distinct foraging lines
- Inflict a painful sting

Electric ants inject venom when they sting, which can result in painful, itchy pimples that take a long time to clear up, and occasionally triggering severe allergic reactions. They target the eyes and orifices of animals, repeatedly stinging and trying to blind them. They can be a serious nuisance in infected areas, stinging people around the home, the farm, and at tourist sites.

Electric ants frequently colonise people's homes, attracted to food (like peanut butter and hotdogs which are used as bait by survey teams). They have even been known to take a swim in backyard pools, and take over children's playgrounds.



### Behaviou

Both electric and yellow crazy ants lay their eggs in damp niches, under logs, leaf litter, stones, in boxes, plant pots, furniture and even wall cavities. They also take over the burrows and nesting holes of birds and other animals (e.g. parrots, owls and gliders). They reproduce mainly in the wet season, spreading out from the source colony by 'budding', and form super-colonies with multiple queens. Yellow crazy ants are capable of spreading up to 1km per year and both species spread into new areas through movement of timber, soil, vegetation, pot plants, picnic and camping gear, etc.

Tramp ants'farm'honeydew (a sugary liquid) by protecting sap-sucking insects (like scale and aphids), which leads to spread of sooty mould. Sooty mould weakens plants, and can lead to dieback of plants and crops (sugar cane, fruit trees, etc). In addition to sugars tramp ants require protein to breed, and in infected areas, few other invertebrates (including native ants, insects, spiders, worms, etc.) or small vertebrates (like frogs and skinks) survive. Both species forage on the ground and high up into the canopy.

### **Impact on the Wet Tropics**

The Wet Tropics World Heritage Area is a truly exceptional place, which attracts tourists from all over the world who come to experience our spectacular scenery and unique plants and animals. This extraordinary ecosystem is a living museum containing the world's oldest continuous rainforest with over 700 species of plants and nearly 70 vertebrate animals found nowhere else in the world – a real hotspot for biodiversity. For those of us lucky enough to call it home, it also provides a unique sense of place and a stunning backdrop to our daily lives.

Tramp ants are a serious threat to the Wet Tropics World Heritage Area and the surrounding region. Our warm, humid climate is ideal for their spread. Electric and yellow crazy ants could have a devastating impact on our unique plants and animals, including iconic and threatened species like cassowaries and spotted-tailed quolls. The ants' ability to forage high in the canopy means that both ground and tree-dwelling animals are in danger. The region's tourism and agricultural industries could also be adversely affected.

If caught early enough, eradication of tramp ants in urban areas is fairly straightforward, but once they start to invade more remote, rugged natural areas, they will be almost impossible to stop.

Please help us stamp out tramp ants before they destroy the irreplaceable diversity of the Wet Tropics.







Image courtesy of Qld Govt

Restricted invasive animal

## Yellow crazy ants

Anoplolepis gracilipes



Yellow crazy ants are an introduced species of tramp ant, thought to originate in Africa. The name 'crazy ant' refers to the ants' erratic walking style and frantic movements, especially when disturbed. Yellow crazy ants can form densely populated supercolonies with more than one queen. These super-colonies can have a huge impact on natural environments, including both native plants and animals. Yellow crazy ants can damage crops, horticulture and honeybee hives, and can adversely impact on our outdoor lifestyle.



### Legal requirements

Yellow crazy ants are category 3 restricted invasive ant under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment. The Act requires everyone to take all reasonable and practical measures to minimise the biosecurity risks associated with tramp ants. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

### Description

Adults have a long slender body approximately 5 mm in length and are yellow to brownish in colour. The abdomen is usually a uniform dark brown but sometimes is striped dark brown. Legs and antennae also measure approximately 5 mm in length and appear very long in comparison with the body.

Yellow crazy ants have no functional sting, but spray formic acid to subdue prey and act as a defence mechanism, especially when disturbed. In large amounts, this acid may burn or otherwise irritate the skin and eyes of animals and humans. On Christmas Island, yellow crazy ants have decimated the land crab population and radically affected the ecosystem of the island. Yellow crazy ants also protect and farm sap-sucking insects, allowing dense populations of these insects to live on native plants. The high abundance of sap-sucking insects on native plants eventually weaken them, allowing various plant diseases to take hold and decreasing plant health or resulting in premature plant death.

### Life cycle

Worker ants have a life cycle of 76–84 days. Queens survive for several years. Workers are produced throughout the year, but production fluctuates.

Sexual offspring are produced at any time in the year but generally 1–2 months prior to the rainy season.

### **Methods of spread**

Yellow crazy ants can be spread in soil and produce in the agricultural and horticultural industry; on contaminated military, mining and commercial road transport; and in sea and air freight on timber, goods, packaging material and pallets. Yellow crazy ants have been most commonly spread to industrial and transport businesses via timber, timber products and other construction materials.

### Habitat and distribution

Yellow crazy ants were first discovered in Cairns, Queensland in 2001. A number of infestations have been detected in residential, industrial, commercial, agricultural and forest environments in coastal areas of Queensland and in some suburbs in south east Queensland, Hervey Bay, Cairns and Townsville. Yellow crazy ants are also present elsewhere in Australia including the Northern Territory and Christmas Island. Yellow crazy ants prefer to nest in areas with access to water or some moisture, such as along creek banks, in utility service pits or piles of timber, or under logs, debris or leaf litter. They will also nest at the base of trees, around perimeters of buildings and within retaining walls where moisture is retained.

### Control

The GBO requires a person to take reasonable and practical measures to minimise the biosecurity risks posed by yellow crazy ants. This fact sheet provides information and some control options for crazy ants.

### **Prevention and early detection**

Checking for the presence of yellow crazy ants can help prevent further spread of this pest. Landholders and businesses should check their properties and any materials that could harbour yellow crazy ants. This includes soil, timber, timber products and other construction materials, agricultural and horticultural produce, packaging and other potential vectors of spread.

### Baiting

Yellow crazy ant infestations can be treated by spraying or baiting. Landholders may choose to use insecticides that are registered for the control of ants or call a local pest control operator. Distance<sup>®</sup> Plus Ant Bait is an insect growth regulator, specifically a juvenile hormone mimic, similar to the naturally occurring insect growth hormones which control fertility, egg viability and pupation. Distance<sup>®</sup> Plus Ant Bait breaks the reproductive life cycle of ants, eventually causing starvation of the colony through lack of replacement of foraging workers.

Baits may be laid utilising either hand held spreaders, spreaders attached to motor vehicles or aerial application.

Yellow crazy ants could become resistant to Distance<sup>®</sup> Plus Ant Bait, therefore it is recommended to use a combined approach of different insectides and integrated land management practices.

Insecticides should always be used in accordance with the label instructions. Further information about insecticides can be found on the Australian Pesticides and Veterinary Medicines Authority website www.apvma.gov.au.

### **Further information**

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit biosecurity.qld.gov.au.

### Table 1. Insecticide for the control of yellow crazy ants

Situation	Insecticide	Rate	Comments	
Domestic and public service areas, commercial and industrial areas (including parks, gold courses,	Distance® Plus Ant Bait Pyriproxyfen Group 7C Insecticide	2–4 kg per ha 2–4 g per 10 m²	Distance <sup>®</sup> Plus Ant Bait should be applied in the early spring or summer at the first sign of ant activity. Application is most effective when ants are actively foraging	
sports grounds, paths and walkways, gardens, lawns and turf)			For most situations the lower rate is adequate. However, in northern Australia and where beavy infestations occur, use the	
<ul> <li>Cropping areas</li> <li>Plantations and orchards including olives, citrus and tropical fruits and tree nuts.</li> <li>Other fruits and vegetables, herbs, spices</li> <li>Pasture</li> <li>Native and managed forests</li> </ul>			higher rate. Multiple applications may also be required for heavy infestations. Multiple applications may also be required for certa species that have multiple reproductive females inhabiting the same nest, to ensur that all reproductive females are exposed t the juvenile hormone mimic. These include Argentine ant ( <i>Linepithema humile</i> ) and Pony ants ( <i>Rhytidoponera</i> )	
<b>Environmental management</b> <b>areas</b> National parks and reserves			DO NOT exceed three applications per year and a minimum of three months between each treatment	
where invasive ants are a threat to ecosystem values			Avoid exposure to terrestrial arthropods such as land crabs. Apple only in areas of high ant density with zero or low crab density	
			<b>Vegetables</b> DO NOT apply directly to crop plants Apply to inter-row areas only	
			<b>Poultry</b> DO NOT apply in pasture or other areas where poultry are or are intended to be feeding and/or grazing. Baits may only be laid in situations where direct access to the bait by poultry is not possible e.g. in situations with maintained caged poultry above the ground/areas to be baited	

### **Directions for use**

**Restraints:** 

- DO NOT apply direct onto water
- DO NOT apply within 20 m water when applying by aerial application
- Turn off/close the granular applicator during aerial application over or near water
- DO NOT apply as a preventative measure for ant control
- DO NOT apply more than one application per year where terrestrial arthropods such as land crabs may occur
- DO NOT water treated areas for at least 24 hours after application.
- DO NOT apply directly to crop plants (excluding pastures). Apply to inter-row areas where movement to water from irrigation or rainfall is not possible.

### Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.



Yellow crazy ant



Yellow crazy ants pupa



Yellow crazy ants smothering pipe



Yellow crazy ants can be found on meters



Yellow crazy ant



Yellow crazy ants

This fact sheet is developed with funding support from the Land Protection Fund.

Fact sheets are available from Department of Agriculture and Fisheries (DAF) service centres and our Customer Service Centre (telephone 13 25 23). Check our website at biosecurity.qld.gov.au to ensure you have the latest version of this fact sheet. The control methods referred to in this fact sheet should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, DAF does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.

GHD

Level 9 145 Ann Street T: 61 7 3316 3000 F: 61 7 3316 3333 E: bnemail@ghd.com

### © GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

### 4132458-21795-

136/https://projects.ghd.com/oc/sqoc2/wangettitrackapprova/Delivery/Documents/4132458-REP-Wangetti South Weed Pest and Disease Management Plan.docx

**Document Status** 

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	Tasha Schulz	B Steylor	On file	G.Squires	Armin	12/2/21

# www.ghd.com



**Appendix D** – Preliminary Traffic Management Plan





Department of State Development, Tourism, and Innovation Wangetti Trail South Section (Wangetti to Palm Cove)

Preliminary Traffic Management Plan

### July 2021



### **Abbreviation and acronyms**

Abbreviation/acronym	Definition
AS	Australian Standards
DES	Department of Environment and Science
DoR	Department of Resources
DSDTI	Department of State Development, Tourism and Innovation
DTMR	Department of Transport and Main Roads
FNQ	Far North Queensland
km	Kilometre
MNES	Matters of National Environmental Significance
MTBA TDRS	Mountain Bike Trail Guidelines Trail Difficulty Rating System
MUTCD	Manual of Uniform Traffic Control Devices
PPE	Personal Protective Equipment
Project	Wangetti Trail – Wangetti South
TARS	Traffic Analysis and Reporting System
TDPD	Tourism Development Projects Division
TMP / Report	Traffic Management Plan
WTMA	Wet Tropics Management Authority
WTWHA	Wet Tropics World Heritage Area

### **Table of contents**

1.	Introc	roduction				
	1.1	Project background	1			
	1.2	Purpose	1			
	1.3	Scope and limitations	2			
	1.4	Objective and strategies	2			
2.	Proje	ct overview	4			
	2.1	Location	4			
	2.2	Proposed works during construction and operational phases	5			
	2.3	Site assessment and site constraint/impacts to existing traffic and road environment	5			
3.	Traffi	c hazard risk assessment	9			
	3.1	Construction phase	9			
	3.2	Operation phase	9			
	3.3	Methodology	9			
4.	Gene	eral specifications	13			
	4.1	Mitigation measures	13			
	4.2	Responsibilities of contractors	25			
	4.3	General procedures	25			
	4.4	Signage and road marking	25			
	4.5	Service tracks	26			
	4.6	Works within a road corridor	27			
	4.7	Intersections of the trail at Captain Cook Highway road reserve	27			
	4.8	Training	28			
	4.9	Reporting	28			
	4.10	Monitoring	29			
	4.11	Emergency, incidents and complaints	29			
	4.12	Corrective Actions	29			
5.	Refer	rences	30			
## **Table index**

Table 2-1 Wangetti South Project subject properties	4
Table 3-1 Impact significant criteria	10
Table 3-2 Rating criteria	10
Table 3-3 Risk assessment for construction and operation phases in the absence of         mitigation measures	11
Table 4-1 Mitigation measures to be implemented for the construction phase	13
Table 4-2 Mitigation measures to be implemented for the operational phase	20

## **Figure index**

Figure 2-1 Locality plan of Wangetti South Section	6
Figure 2-2 Trail head at Ellis Beach	8
Figure 2-3 End of the Shared Use Trail	8

## 1. Introduction

## 1.1 Project background

The Department of State Development, Tourism and Innovation (DSDTI) – Tourism Development Projects Division (TDPD) is proposing to establish the Wangetti Trail – Wangetti South ('Project') Section, a 29.7 kilometre (km) shared use trail to accommodate both mountain bike users and hikers from the southern boundary Lot 2 SP309094 in the township of Wangetti, to Palm Cove.

Development of a preliminary Traffic Management Plan ('TMP' or 'Report') is required to support environmental approval applications for proposed works associated with the Project and to demonstrate to the regulatory authorities how traffic and the movement of vehicles will be managed to avoid and minimise impacts on matters of national environmental significance (MNES): during the construction and operational phase of the project. This report also discusses the mitigation measures to be implemented during the construction and operational phases.

This TMP has been developed with consideration of the:

- Manual of Uniform Traffic Control Devices (MUTCD), Austroads Guide to Traffic Management
- The Department of Transport and Main Roads Specifications MRTS02 Provision for Traffic and the scope of services described below in Section 1.2.
- Queensland Parks and Wildlife Service Technical Manual Infrastructure and Equipment QPWS road works signage (for works on very low-volume roads in rural areas) (QPWS Technical Manual QPWS road works signage)
- Operational Policy: Mountain Biking in QPWS Managed Areas dated 2011
- Wangetti Trail Construction Methodology Manual April 2020
- Wangetti Trail prepared by World Trail July 2017
- Work Health and Safety legislation
- Tourism Australia Great Walks Guidelines for trail planning, design and management
- Advice from Department of Environment and Science (DES) and Wet Tropics Management Authority (WTMA).

## 1.2 Purpose

This TMP provides preliminary guidance to help establish appropriate traffic control and traffic management procedures to manage potential hazards associated with the traffic environment during the Project and to reduce potential adverse impacts to people and wildlife during the construction and operational phases of the Project. It also helps establish appropriate controls for users of the shared use trail and management procedures to manage potential hazards such as interactions with hikers and cyclist and interactions with wildlife.

It is expected that prior to any construction activity and operational activity for the Project, a detailed work specific TMP will be developed by the Contractor as part of the Environmental Management Plan (EMP). The Contractor should review the preliminary guidance provided in this Report and provide greater detail based on construction methodology, operational activities, and timing of works. The TMP will also need to be in general accordance with the MUTCD,

Austroads Guide to Traffic Management and Transport and Main Roads Specifications MRTS02 Provision for Traffic (as relevant).

## **1.3 Scope and limitations**

This report: has been prepared by GHD for Department of State Development, Tourism and Innovation and may only be used and relied on by Department of State Development, Tourism and Innovation for the purpose agreed between GHD and the Department of State Development, Tourism and Innovation as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Department of State Development, Tourism and Innovation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Department of State Development, Tourism and Innovation and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

## **1.4 Objective and strategies**

As part of the scope of services for this Report, GHD is to provide preliminary traffic management strategies in accordance with the standards outlined in the MUTCD, Transport and Main Roads Specifications MRTS02 Provision for Traffic, Queensland Parks and Wildlife Service Technical Manual - Infrastructure and Equipment QPWS road works signage (for works on very low-volume roads in rural areas) and advice provided by Department of Environment and Science (DES) and TDPD. The following outcomes will be delivered in this Report:

- Identification of disturbed areas throughout the project site, where applicable
- Identification of the type of controls likely required for each disturbed area and indicative locations
- Preliminary guidance on traffic control measures

The objectives of the TMP are to ensure:

- The safety of the workers
- All road users, including vulnerable road users, are safely guided around, through or past any work site
- Reduce impacts to wildlife
- The performance of the road network is not unduly impacted and the disruption and inconvenience to all road users are minimised for the duration of the works

• Impacts on users of the road reserve and adjacent properties and facilities are minimised.

In an effort to meet these objectives the Traffic Management Plan will incorporate the following strategies:

- Ensuring traffic delays are minimised
- Ensuring all road users are managed including motorists, pedestrians, cyclists, people with disabilities and people using public transport (as applicable and necessary)
- Ensuring work activities are carried out sequentially to minimise adverse impacts to the environment, wildlife and road users
- Provision will be made for works personnel to enter the work area in a safe manner in accordance with safety procedures
- All entry and exit movements to and from traffic streams shall be in accordance with the requirements of safe working practices.

## 2. Project overview

## 2.1 Location

Wangetti South Section is located between Wangetti Township and Palm Cove in Far North Queensland (FNQ). The land parcels that Wangetti South Section intersects are outlined in Table 2-1.

#### Table 2-1 Wangetti South Project subject properties

Affected property	Address / Coordinates	Owner Details	Tenure	Locality	Proposed works		
Reserves							
31SP129117	Captain Cook Highway, Ellis Beach, South Reserve	State of QLD (Department of Resources (DoR)	Reserve	Ellis Beach	Trail		
6SP309107	Captain Cook Highway Wangetti	State of QLD (DoR)	Reserve	Wangetti	Service track		
					Trail		
National Park							
174NPW930	Macalister Range National Park	State of QLD (DoR)	National Park	Macalister Range	Trail		
					Service track		
					Dark Jungle		
Road Reserves							
Road Reserve	Captain Cook Highway	Department of Transport and Main Roads (DTMR)	Road Reserve	Palm Cove – Port Douglas	Trail		
Leasehold							
13NR5512	Captain Cook	Lessee Bellbird	State Leasehold Land	Ellis Beach	Service		
	Highway Ellis Beach	Park Developments Pty Ltd	Non-competitive lease 9/2568 – Tourism purposes namely tourist accommodation and ancillary facilities		track		

The Wangetti South Section is located within Douglas Shire Council local government area and Cairns Regional Council local government area. The shared use trail within Wangetti South Section extends over 29.7 km and is constrained by the Coral Sea to the east and the Macalister Ranges to the west and is almost entirely located within the Macalister Range National Parks and the Wet Tropics World Heritage Area (WTWHA) (refer to Figure 2-1 for a locality plan of the trail).

## **2.2 Proposed works during construction and operational phases**

The Wangetti South Section will comprise of the following components:

- 29.7 km shared use trail to accommodate both mountain bike users and hikers, consisting of natural ground and surface treatments, which will be a maximum of 1.5 m wide. The 1.5m wide trail will be located within a 40 m survey corridor, referred to as the construction allowance corridor, to allow flexibility for the placement of infrastructure during the construction phase. The trail has been designed to be a 'Mountain Biking intermediate (blue square with blue outline) as defined in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System (MTBA TDRS) and grade 3 for hikers, as defined in the Australian Walking Track Grading System (AWTGS), which also equates to Class 3 in the Australian Standard for Walking Tracks, Part 1: Classification and Signage (AS 2156.1-2001). The trail will have an average gradient of <10% and a maximum gradient no greater than 15% (for short distances only). Built structures proposed as part of the trail include gully crossings, bridges, staircases, platforms, rock armouring and signage, where appropriate and required</li>
- A number of waterway crossings along the shared use trail that will comprise of the following: rock armouring, boulder crossings and low-level bridge (minor water crossing)
- Dark Jungle (public camping node and amenities block)
- The formalisation of existing access tracks into service tracks to provide restricted access to the shared use trail and Dark Jungle for construction purposes, operational purposes, maintenance purpose and for emergency purposes.

Details of the general construction methodology for the trail and Dark Jungle are outlined in World Trail Pty Ltd (2020) Wangetti Trail Construction – Final Version. During the construction phase the works will be staged and the Contractor will be responsible for determining appropriate construction staging.

All high-risk activities associated with bulk earthworks, pavement works and revegetation / stabilisation must be completed within the proposed construction works period.

During the operational phase of the project the shared use trail will only be used by mountain bike users and hikers. Maintenance vehicles will be able to access Wangetti South Section via the nominated service tracks.

The Wangetti South Section is being proposed over four properties located within the Douglas Shire Council and Cairns Regional Council local government areas. The project area intersects both the Macalister Range National Park and the Wet Tropics World Heritage Area (WTWHA).

Central to the location of the Wangetti Trail, from a traffic perspective, is the Captain Cook Highway linking Palm Cove to Port Douglas. No treatments are proposed along the Captain Cook Highway road reserve as part of the project.

# 2.3 Site assessment and site constraint/impacts to existing traffic and road environment

The proposed Wangetti Trail will comprise a 1.5m wide shared use trail (mountain bikers and hikers). Additional facilities will include a trail head to be located at Ellis Beach, a campsite (raised platforms for tents with ablutions at Dark Jungle) and the trail end at Wangetti.





\lghdnetlghdAUBRisbaneIProjects\41\32458(GISIMaps\MXDI.4132458\_066\_WT\_SP2\_DevApp\_LocalityPlan\_SouthAB\_Rev0.mxd Print date: 16 Dec 2020 - 15.41

Data source: DTID/GHD: Wangetti Trail Alignment (11/2020); DNRME: Roads (2019), Cadastra (2019), Watercourse (2014), Paces Names 2016), Rail (2016), Imagery (2016), Local Government Area Boundary (2018); DAF: Waterway Barrier Works (2016) DES: Prodected Arvas (2018); WTMA: Proposed Campate(2020), Zoning Boundary (2019); GHD:Sei clonin Based ons - Wangetti Noth, Wangetti South (2020), Streice Tracks (2020), dMn: Constluction Adhwance Conridor (2020), Indicative Waterway Consign Locations (2020). Created by xitee It is proposed that existing access tracks that feed off the Captain Cook Highway will be utilised to provide access during construction and maintenance (they are referred to as service tracks). An existing access track will be utilised to service the campsite and ablutions at Dark Jungle. A description of the service tracks are outlined in Appendix A.

The following is noteworthy:

- No new access roads are to be constructed to provide access to the trail and amenities from the Captain Cook Highway
- The existing access roads will be closed to the public and general users of the trail
- No modifications or works are anticipated to be constructed along the Captain Cook Highway
- A marginal increase in vehicle traffic (approx. a maximum of 10 vehicles per day) is expected along the Captain Cook Highway associated with the construction phase of the project. No major construction plant is required as no major earthworks are anticipated
- Once the trail is operational, a marginal increase in vehicle traffic is expected by users of the facility (return trips by car from Ellis Beach, Wangetti or Port Douglas) (estimated <20 cars per day).

## 2.3.1 Captain Cook Highway

The Captain Cook Highway is a state-controlled road administered by the DTMR. Captain Cook Highway provides direct linkage between the Cairns City, Northern Beaches of Cairns and destinations further north to Port Douglas, Mossman and Daintree.

Between Palm Cove and Wangetti, speed limits range from 60 to 100 kph. The road is typically winding with restricted site distances and limited passing opportunities. Current users of the road are vehicle traffic moving between Cairns and Port Douglas, tourists and occasional cyclists. There is no dedicated cycle lane along this section of the Captain Cook Highway. There is not much pedestrian activity along the road apart from at Ellis Beach where pedestrians cross the Captain Cook Highway from the pub and car park to access the beach.

Other hazards to road users include wildlife such as wallabies, feral pigs and the occasional cassowaries which frequent the area.

According to the Traffic Analysis and Reporting System (TARS) Average Annual Daily Traffic measured at Craiglie (just south of Port Douglas) the following traffic volumes were recorded for 2019 (Queensland Government, 2020):

- AADT Average Week Day traffic 6,257
- AADT Average Weekend Day Traffic 6,069
- Traffic growth in last 10 years 1.47%
- Traffic growth last year -3.71%
- Light vehicles 90.99%
- Heavy vehicles 9.00%.

## 2.3.2 Trail head for the shared use trail

During the operational phase of the project, the trail head will start at Ellis Beach where the trail connects to the Captain Cook Highway road reserve at Ellis Beach to be situated on Lot 31 SP129117 (refer to Figure 2-1 and 2-2). Access to the trail head is via an unnamed informal access track off the Captain Cook Highway.

At the trail head, there are existing carparks at Ellis Beach that will be used by trail users. Approval from Cairns Regional Council will be required to establish the trail head, as part of the development application process under the Planning Act 2016. No treatments to Captain Cook Highway road reserve are proposed. TDPD proposes to install shade structures and signage at the trail head to guide users to the trail entrance. There is an existing pedestrian crossing over Captain Cook Highway at Ellis Beach that allows trail users to cross the road to access the trail.



#### Figure 2-2 Trail head at Ellis Beach

#### 2.3.3 End of the shared used trail at Wangetti

The shared use trail will end at Wangetti at the intersection of Quaids Road and the Captain Cook Highway road reserve as shown in Figure 2-1 and 2-3 below. No treatments are proposed with Captain Cook Highway road reserve other than signs and marking as agreed by DTMR. Users of the shared use trail would be responsible for making their own transport arrangements once they complete the trail. For guided tours a shuttle service would be organised as arranged by the operator.



Figure 2-3 End of the Shared Use Trail

## 3. Traffic hazard risk assessment

Traffic related risks that have been identified within the Project and could arise during the construction and operational phases of the Project are discussed below.

## 3.1 Construction phase

The construction phase will involve the construction of a new shared use trail, associated infrastructure, and Dark Jungle within the project area. Potential impacts arising from the construction phase to MNES include:

- Disruption to traffic along Captain Cook Highway associated with construction vehicles accessing the trail and Dark Jungle campsite. High risk areas are where the existing access roads and tracks meet the Captain Cook Highway
- Interference with wildlife by construction vehicles along access roads causing potential injury, mortalities and disturbance.
- Collision with mobile plant and people.
- Damage to protected flora species.
- Damage to sensitive environmental/cultural areas by vehicles/plant.

## **3.2 Operation phase**

The operational phase will involve the shared use trail and Dark Jungle being used by hikers and cyclists. Maintenance and emergency vehicles will be able to access the trail and Dark Jungle via service tracks. Potential impacts arising from the operational phase to MNES and MSES include:

- Congestion by vehicles from trail users and general public at parking areas (Ellis Beach and trail end points such as Palm Cove and Wangetti)
- Increased traffic volumes on the Captain Cook Highway
- Increased pedestrian and cyclist activity on the Captain Cook Highway as a result of trail users returning from the trail back to Palm Cove or Wangetti
- Accidental damage to protected flora species.
- Interference with wildlife by maintenance vehicles along access roads and trail users causing potential mortalities and disturbance.

## 3.3 Methodology

The purpose of this section is to qualitatively determine the risk of potential traffic impacts that could occur as a result of the Wangetti Trail.

The risk assessment methodology in the DTMR's Technical Manual Environmental Processes Manual has been adopted for this document. An initial risk has been assigned to potential impacts occurring during the construction and operational phase in the absence of controls (refer to Table 3-3).

Recommendations to mitigate and manage these impacts are made within Section 4). The significance of the residual impact of the project, taking into consideration the full

implementation of these recommendations, is also determined and is discussed in Section 4 Table 3-2 provides the criteria used to assess significance.

## **Table 3-1 Impact significant criteria**

Significance	Criteria			
	Initial Impact	Residual Impact		
Negligible	Works are not likely to result in identifiable impacts to the environmental factor.	Implementation of recommended mitigation measures likely to result in no identifiable impacts to the environmental factor.		
Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short- term impacts to a factor of limited significance	Implementation of recommended mitigation measures may still result in impacts occurring but are likely to be minor and / or short-term in nature.		
Medium	In the absence of project-specific mitigation measures, major but recoverable impacts to a factor of significance are likely.	Implementation of recommended mitigation measures may reduce the severity of impacts but are still likely to result in major impacts of short / medium duration.		
High	In the absence of project-specific mitigation measures, large-scale, long-term and / or irreversible impacts to a factor of high significance are likely.	Implementation of recommended mitigation measures is unlikely to significantly reduce impacts such that large-scale, long-term and / or irreversible impacts to a factor of high significance are likely.		

## **Table 3-2 Rating criteria**

Rating	Definition of rating for each criterion
Extent	The area over which the impact will be experienced
Local	Confined to project or study area or part thereof i.e. site
Regional	The region, which may be defined in various ways i.e. cadastral, catchment, topographic
(Inter) National	Nationally or beyond

Impact	Extent	Phase	Initial Risk	Comment
Disruption to traffic along Captain Cook Highway	Local	Construction	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance to matter of national environmental significance (MNES) and matter of state environmental significance (MSES). This risk is considered to result in short term impacts.
Interference with wildlife by construction vehicles	Local	Construction	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance. This risk is considered to result in short term impacts.
Impacts to sensitive environmental areas by construction vehicles	Local	Construction	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance.to MNES and MSES. This risk is considered to result in short term impacts.
Congestion of vehicles at existing parking areas	Local	Operational	Negligible	Works are not likely to result in identifiable impacts to the environmental factor
Increased traffic volumes on the Captain Cook Highway	Regional	Operational	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance to MNES and MSES. This risk is considered to result in short term impacts.
Increased pedestrian and cyclist activity on the Captain Cook Highway	Regional	Operational	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance to MNES and MSES.

## Table 3-3 Risk assessment for construction and operation phases in the absence of mitigation measures

Impact	Extent	Phase	Initial Risk	Comment
				This risk is considered to result in short term impacts.
Interference with wildlife by maintenance vehicles	Local	Operational	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance.to MNES. This risk is considered to result in
				short term impacts.
Impacts to sensitive environmental areas by maintenance vehicles	Local	Operational	Low	In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance.to MNES. This risk is considered to result in short term impacts.
Collision of maintenance vehicles with cyclists/hikers	Local	Operational	Medium	In the absence of project-specific mitigation measures, major but recoverable impacts to a factor of significance are likely. This risk is considered to result in short term impacts.
Collision of cyclists with hikers	Local	Operational	Medium	In the absence of project-specific mitigation measures, major but recoverable impacts to a factor of significance are likely. This rick is considered to result in
				short term impacts.

## 4. General specifications

## 4.1 Mitigation measures

This section discusses the mitigation measures that have been developed to minimise the impacts to existing road network, pedestrians and Matters of national environmental significance (MNES) within the Project area and surrounding area associated by the movement of vehicles within the Wangetti South Section, as identified in Section 3.4. Table 4-1 outlines the mitigation measures to be implemented during the construction and operational phases of the project.

### Table 4-1 Mitigation measures to be implemented for the construction phase

#### Factor – traffic

Construction activities resulting in adverse impacts to the project area

- Disruption to traffic along Captain Cook Highway
- Interference with wildlife by construction vehicles
- Increased traffic as a result of construction activities
- Construction activities within the road reserve
- Damage to protected flora species

MNES and MSES applicable (known, likely or may occur in the Wangetti South Section)

Wet Tropics World Heritage Area and National Heritage Site MNES and MSES bird species

- Southern Cassowary
- Migratory birds (e.g. Eastern Curlew, great sand plover)
- Non-migratory species (e.g. masked owl)

MNES and MSES flora species

- Archontophoenix myolensis (Myola palm)
- Anoectochilus yatesiae (Marbled jewel orchid
- Canarium acutifolium
- Dendrobium fellowsii
- Dendrobium mirbelianum (Dark-stemmed antler orchid) -
- Diplazium cordifolium
- Diplazium pallidum
- Myrmecodia beccarii (Ant plant)
- Phaius pictus
- Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)
- Polyscias bellendenkerensis
- Randia audasii
- Rhomboda polygonoides

- Toechima pterocarpum (Orange tamarind)
- Vappodes lithocola (Dwarf butterfly orchid) (Also known as *Dendrobium lithocola*, and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum*)
- Zeuxine polygonoides (Velvet jewel orchid) (Also known as Rhomboda polygonoides)

MNES and MSES amphibian species

- Litoria dayi (Australian lace lid)
- Litoria nannotis (Waterfall frog)
- Litoria nyakalensis (Mountain mistfrog)
- Litoria rheocola (Common mistfrog)
- Litoria serrata (Tapping green eyed frog)

MNES and MSES mammal species

- Dasyurus maculatus gracilis (Spotted-tailed quoll)
- Dasyurus hallucatus ((Northern quoll)
- Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)
- *Hipposideros semoni* (Semon's leaf-nosed bat)
- Phascolarctos cinereus (Koala)
- *Pteropus conspicillatus (*Spectacled flying-fox)
- Rhinolophus robertsi (Large-eared horseshoe bat)
- Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)
- Xeromys myoides (Water mouse)

MNES and MSES aquatic species

- Stiphodon semoni (Opal cling goby)
- Stiphodon rutilarueus (Orange cling goby)
- Stiphodon pelewensis (Emerald cling goby)
- Stiphodon surrufus (Birdsong cling goby)

#### Initial risk with no control

In the absence of project-specific mitigation measures, works are likely to result in only minor, short-term impacts to a factor of limited significance.

Mitigation measure	Timing	Party responsible
Contractor to implement JSEA safe work method statement. Contractor to implement access management plan for access to site of works. Construction crew operating vehicles and mobile plant to have the appropriate certification and completed the required training	Prior to construction and during construction	Contractor Project Manager Site supervisor
The contractor is required to prepare the following documents by a suitably gualified		

person:

• Site access/vehicle movement plan to show where all site access points within the project area.

•	Prepare a TMP and Traffic Guidance	
	Scheme (TGS) by a suitable qualified	
	person. The TGS shows all traffic control	
	devices and their layouts on a plan and	
	shall be consistent with the approved TMP.	
	Where any change to existing traffic	
	arrangements is proposed or where	
	construction conflicts with normal traffic	
	movements, the Contractor shall prepare a	
	TGS which clearly details the revised traffic	
	arrangements at all locations affected by	
	the change or conflict. A separate TGS is	
	required for each stage of the works where	
	changes are made to the traffic control	
	devices.	

 Traffic shall be controlled at all times, during construction, in accordance with the provisions of the MUTCD Part 3 and the TMP.

Appropriate scheduling of deliveries of

Signage erected along tracks and roads where the trail connects to inform construction crew of access points to the project area	Prior to construction	Contractor Project Manager Site supervisor
Signage around awareness of fauna species and sensitive areas.	Prior to construction	Contractor Project Manager
		Site supervisor
Site inductions at the start of the construction phase with construction crews regarding:	Prior to construction	Contractor Project Manager
undertaking works and the movement of vehicles within road reserves, existing access tracks.		
Wildlife present within the project area that could pose a hazard to vehicles and mobile plant		
Incident response procedures will be developed to detail actions to be taken in the event of wildlife injury or mortality during clearing		
Gates with locks to be installed at service tracks where they connect to the existing road network to restrict the illegal use of the tracks by members of the public.	At all times	Contractor Project Manager Site supervisor

At all times

**Contractor Project** 

Factor – traffic		
construction material to reduce frequency and a nominated set out area to be agreed upon with DES and the construction contractor away from MNES and areas of high ecological significance.		Manager Site supervisor
aware of the work area layout, given a copy of the site access plan prior to visiting the site. Provide drivers with safe access to amenities away from loading areas or other vehicular traffic.		
Construction traffic to use nominated roads and nominated service tracks when accessing and exiting the project area.	At all times	Contractor Project Manager Site supervisor
Designated vehicle routes within the project area to have a firm and even surface, be wide and high enough for the largest vehicle using them and be well maintained and free from obstructions.		
Service tracks to be clearly sign-posted to indicate speed limits and traffic calming measures (if required)		
Reducing speed is very important where administrative control measures are the only reasonably practicable approach. Speed limits to be implemented and enforced.		
Speed limits for to be adopted for the construction phase to be developed in consultation with the construction contractor, TDPD, DES, WTMA and DTMR.		
Traffic control devices on service tracks to be installed and operated with consideration of the (QPWS Technical Manual QPWS road works signage) this includes the following:	At all times	Contractor Project Manager Site supervisor
Arriving at the works site:		
• Pre-work preparation and work site assessment - On arrival at the work site a series of actions is required before any work can commence including undertaking a risk assessment of the proposed work site to identify all potential hazards to workers required to work on the work site.		
<ul> <li>Select the most appropriate traffic guidance scheme - The most appropriate standardised Traffic Guidance Scheme shall be selected according to road and</li> </ul>		

traffic conditions at the site and the work requirements of the officer.

- Installation of traffic control devices
- Traffic control devices approved for use by the QPWS technical manual for QPWS road works signage should only be installed according to the approved standardised Traffic Guidance Schemes provided in this document. Any work site requiring a traffic guidance scheme beyond the scope of this document shall require the engagement of an appropriately qualified Traffic Controller or Police Officer.

Operation of the work site:

- The person in control of the work site on or near roads shall:
  - ensure traffic control devices remain in good condition while deployed;
  - ensure traffic control devices remain in place according to the Traffic Guidance Scheme in use;
  - make a record of the time of any inspection or reinspection of the traffic control devices and the Traffic Guidance Scheme being used.
     Photographs be taken of any changes to the work site; and
  - d. make a record of any incidents that occur on or in relation to the work site that might have ongoing consequences.
- Maintenance of traffic guidance scheme Personnel should ensure that the traffic control devices remain in place according to the standardised Traffic Guidance Scheme being used.
- Maintenance of devices Ineffective signs and devices shall be replaced by similar items in good condition, if they cannot be made effective by cleaning or repair. Signs and devices that are no longer in good condition should be returned and replaced. Non-repairable signs should be destroyed so that they are not inadvertently reused.

Factor – traffic		
Regular inspection of service tracks during the construction phase of the project to determine if additional surface treatment is required	At all times	Contractor Project Manager Site supervisor
The contractor will be required to protect pedestrians and wildlife and to make sure people, wildlife and vehicles cannot interact. Spotters to be nominated on the ground to guide plant and ensure no collisions with other workers in the project area.	At all times	Contractor Project Manager Site supervisor
The contractor will be required to make sure clear road markings like reflective paint and signs should be used to alert pedestrians and vehicle operators to traffic hazards in the work area where working within existing road reserves.	At all times	Contractor Project Manager Site supervisor
Signs should be provided to indicate exclusion and safety zones, parking areas, speed limits, movement of wildlife, vehicle crossings and hazards like blind corners and steep gradients. Signs and road markings should be regularly checked and maintained so they can be easily seen.		
Warning signs and speed limiting signs on approaches to bridges over permanent water where cassowaries may be likely to be encountered	At all times	Contractor Project Manager Site supervisor
If reasonably practicable the construction personnel should eliminate the need for reversing by using drive-through loading and unloading systems, multi-directional mobile plant. Where this is not possible consider:	At all times	Contractor Project Manager Site supervisor
using devices like reversing sensors, reversing cameras, mirrors, rotating lights or audible reversing alarms		
using a person to direct the reversing vehicle if they cannot see clearly behind—this person should be in visible contact with the driver at all times and wear high-visibility clothing		
providing designated clearly marked, signposted and well-lit reversing areas, and excluding non- essential workers from the area.		
Construction activities will only occur during daytime hours.	At all time	Contractor Project Manager Site supervisor

Factor – traffic		
Vehicles will be required to service the construction of the facilities. Motorised vehicles may range from quad bikes (or similar) to 4WD vehicles and light trucks. All drivers are to be aware of speed limits for the varying sections of road/track.	Prior to construction	Contractor Project Manager Site supervisor

#### Residual risk with control in place

Implementation of recommended mitigation measures likely to result in no identifiable impacts to the environmental factor.

#### Performance indicator

- No vehicle or mobile plant collision with fauna species within the project area.
- No vehicle or mobile plant adversely impacting environmental sensitive area and/or cultural heritage areas.
- Record register of the traffic management training completed by the construction crew.
- No vehicle or mobile plant collision with other road users/construction crew.

#### Corrective actions

Handling of any traffic complaints will be managed by the process developed by Construction Contractor and TPDP and will be recorded in a complaints register.

Investigations will be undertaken in the case of any traffic incident and in consultation with TPDP.

#### Monitoring

The following parameters will be included in a monitoring program to be developed by the construction contractor:

- The speed limits throughout the project area (regular basis)
- Vehicle routes within project area and on existing road network (regular basis)
- Driver behaviour within project area (Ongoing on a case by case basis)
- Traffic flow to manage congestion (as required)
- Interactions with wildlife (Ongoing on a case by case basis)
- Interactions with other road users (Ongoing on a case by case basis)
- Traffic Management Inspection to be undertaken for the project.
- Regular performance/compliance audits of the Contractor's traffic control measures to be undertake and feedback provided.

#### Table 4-2 Mitigation measures to be implemented for the operational phase

#### Factor – traffic

Construction activities resulting in adverse impacts to the project area

- Congestion of vehicles at existing parking areas
- Increased traffic volumes on the Captain Cook Highway
- Increased pedestrian and cyclist activity on the Captain Cook Highway
- Interference with wildlife by maintenance vehicles
- Accidental damage to protected flora species

MNES and MSES applicable (known, likely or may occur in the Wangetti South Section)

Wet Tropics World Heritage Area and National Heritage Site MNES and MSES bird species

- Southern Cassowary
- Migratory birds (e.g. Eastern Curlew, great sand plover)
- Non-migratory species (e.g. masked owl)

MNES and MSES flora species

- Archontophoenix myolensis (Myola palm)
- Anoectochilus yatesiae (Marbled jewel orchid
- Canarium acutifolium
- Dendrobium fellowsii
- Dendrobium mirbelianum (Dark-stemmed antler orchid) -
- Diplazium cordifolium
- Diplazium pallidum
- Myrmecodia beccarii (Ant plant)
- Phaius pictus
- Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)
- Polyscias bellendenkerensis
- Randia audasii
- Rhomboda polygonoides
- Toechima pterocarpum (Orange tamarind)
- *Vappodes lithocola* (Dwarf butterfly orchid) (Also known as *Dendrobium lithocola*, and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum*)
- Zeuxine polygonoides (Velvet jewel orchid) (Also known as *Rhomboda polygonoides*) MNES and MSES amphibian species
- Litoria dayi (Australian lace lid)
- Litoria nannotis (Waterfall frog)
- Litoria nyakalensis (Mountain mistfrog)

- Litoria rheocola (Common mistfrog)
- Litoria serrata (Tapping green eyed frog)

MNES and MSES mammal species

- Dasyurus maculatus gracilis (Spotted-tailed quoll)
- Dasyurus hallucatus ((Northern quoll)
- Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)
- Hipposideros semoni (Semon's leaf-nosed bat)
- Phascolarctos cinereus (Koala)
- Pteropus conspicillatus (Spectacled flying-fox)
- Rhinolophus robertsi (Large-eared horseshoe bat)
- Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)
- Xeromys myoides (Water mouse)

MNES and MSES aquatic species

- Stiphodon semoni (Opal cling goby)
- Stiphodon rutilarueus (Orange cling goby)
- Stiphodon pelewensis (Emerald cling goby)
- Stiphodon surrufus (Birdsong cling goby)

#### Initial risk with no control

In the absence of project-specific mitigation measures, medium but recoverable impacts to a factor of significance are likely.

Mitigation measure	Timing	Party responsible
Operator to implement JSEA safe work method statement. Operator to implement access management plan. Maintenance staff crew operating vehicles to have the appropriate certification and completed the required training	At all times	Operator
Signage erected along tracks to inform:	Prior to operation	Operator
Maintenance staff of access points to the project area.		
Site inductions during operational phase with maintenance staff regarding:	Prior to operation	Operator/DES/QPWS
undertaking works and the movement of vehicles within road reserves, existing access tracks.		
Wildlife present within the project area that could pose a hazard to vehicles and mobile plant		

Factor – traffic		
Incident response procedures will be developed to detail actions to be taken in the event of wildlife injury or mortality during clearing a		
Incident response procedures will be developed to detail actions to be taken in the event of injury or mortality to hikers or cyclist.		
Gates with locks to be installed at service tracks where it connects to the existing road network to restrict the illegal use of the tracks by members of the public.	At all times	Operator
Appropriate scheduling of deliveries to reduce frequency and a nominated set out area to be agreed upon with DES and the operator away from MNES and areas of high ecological significance.	At all times	Operator
Visitors including visiting drivers are made aware of the work area layout, the route they should take and safe working procedures for the work area.		
Operational and maintenance traffic to use nominated roads and nominated service tracks when accessing the exiting the project area.	At all times	Operator
Designated vehicle routes within the project area to have a firm and even surface, be wide and high enough for the largest vehicle using them and be well maintained and free from obstructions.		
Service tracks to be clearly sign-posted to indicate speed limits and traffic calming measures (if required)		
Reducing speed is very important where administrative control measures are the only reasonably practicable approach. Speed limits to be implemented and enforced and traffic calming devices like speed humps considered		
Speed limits for to be adopted for the operational phase to be developed in consultation with TDPD, DES, WTMA and DTMR.		
Signs and road markings should be regularly checked and maintained so they can be easily seen.		
Regular inspection of service tracks to determine if additional surface treatment is	At all times	Operator

Factor – traffic		
required		
Where powered mobile plant is used the operator is required to ensure it does not collide with pedestrians and/or wildlife or other powered mobile plant.	At all times	Operator
Signs should be provided to indicate exclusion and safety zones, parking areas, speed limits, movement of wildlife, vehicle crossings and hazards like blind corners and steep gradients. Signs and road markings should be regularly checked and maintained so they can be easily seen.	At all times	Operator
The use the of shared use trail will be available to be used during daytime hours. Camp areas that will remain operational overnight, but with movement restricted to the immediate camp surrounds.	At all times	Operator
Motorised vehicles may range from quad bikes (or similar) to 4WD vehicles and light trucks. All drivers are to be aware of speed limits for the varying sections of road/track.	At all times	Operator
Cyclists must not use any trail before first light and after last light each day, times dependent on the season. Times to be set by camp/trail operators with consideration of seasonal visibility early morning/late afternoon to minimise impacts to fauna (the southern cassowary in particular).	At all times	Operator
Cyclists and hikers to be educated on:	At all times	Operator
the environmental values associated the project area, procedures to following if an accident occurs on the trail, accessing and exiting the trail and the appropriate use of the trail. This information can be presented on the Wangetti Trail website, at the trail head and presented by the operational staff.		
Residual risk with control in place		

Implementation of recommended mitigation measures likely to result in no identifiable impacts to the environmental factor.

Performance indicator

- No vehicle or mobile plant collision with fauna species within the project area.
- No damage to environmental sensitive areas/cultural heritage areas by

vehicles/cyclists/mobile plant.

- Record register of the traffic management training completed by the operational and maintenance crew.
- No vehicle or mobile plant collision with other road users, hikers and/or cyclists.

#### Corrective actions

Traffic to be managed strictly in accordance with the approved TGS and TMP and any nonconformances that occur the Contractor to raise a non-conformance report.

Handling of any traffic complaints will be managed by the process developed by Operator and TPDP and will be recorded in a complaints register.

Investigations will be undertaken in the case of any traffic incident and in consultation with TPDP.

#### Monitoring

The following parameters will be included in a monitoring program to be developed by the operator:

- The speed limits throughout the project area (regular basis)
- Vehicle routes within project area and on existing road network (regular basis)
- Driver behaviour within project area (Ongoing on a case by case basis)
- Traffic flow to manage congestion (as required)
- Interactions with wildlife (Ongoing on a case by case basis)
- Interactions with other road users (Ongoing on a case by case basis)
- Traffic Management Inspection to be undertaken for the project.
- Regular performance/compliance audits of the Contractor's traffic control measures to be undertake and feedback provided.

## 4.2 **Responsibilities of contractors**

All contractors involved in the construction and operation of the Wangetti South Section should:

- Be mindful of their responsibility to provide, as far as practicable, safe and convenient travelling conditions for road users and a safe workplace for personnel and plant under their control
- Be educated on the wildlife and areas of environmental significance within the project area
- Ensure the workplace is safe and without risk of injury or illness to anyone coming to the workplace to work and to abide by the provisions in the Work Health and Safety Act and Work Health and Safety Regulation.
- Ensure the workplace is safe and without risk of illness or injury from any plant or substance used properly in the course of work
- Remember that they, and personnel under their control, should at all times be courteous to road users. Personnel should not allow themselves to be provoked by members of the public. By exercising restraint they will strengthen their position both then and in the event of any subsequent inquiry into an incident or during any subsequent proceedings
- Ensure that personnel assigned to signing the works are adequately trained to perform the task and that traffic controllers are appropriately trained and informed of their duties
- Be familiar with, and act as far as is practicable, in accordance with the provisions of this procedure and Part 3 of the Manual of Uniform Traffic Control Devices (Queensland Department of Main Roads 2003).

• Provide a safe workplace environment that minimises, as far as practicable, the likelihood of injury to workers by traffic within or adjacent to the work area.

• Steps should be taken to warn the public of prevailing conditions and to guard, delineate and, where necessary, illuminate work that may pose a hazard to road users. Care should be taken to avoid, wherever possible, long delays or detours that may cause unnecessary inconvenience to road users.

## 4.3 General procedures

The construction contractor and operational contractor to ensure that as a minimum the following practices will be adopted:

- Signage to be erected on public roads around the site to warn road users of the project
- Signage erected on service tracks and gates secured to avoid the public access them
- All speed limits are to be obeyed, and construction workers are to give way to public road users at all times
- No new access roads or tracks are to be created.

## 4.4 Signage and road marking

During the construction phase signage and road marking within the project area will be required and the following signage and road markings are proposed:

• Clear road markings like reflective paint and signs should be used to alert pedestrians, cyclists and vehicle operators to potential traffic hazards particularly at the trail head at Ellis Beach and at the end of the trail at Wangetti.

- Signs should be provided to indicate exclusion and safety zones, parking areas, speed limits, vehicle crossings and hazards like blind corners and steep gradients
- Signs and road markings should be regularly checked and maintained so they can be easily seen.
- Appropriate temporary road signage and appropriate marking to be agreed with DTMR and installed at the intersections of the service tracks and Captain Cook Highway road reserve.

During the operational phase signage and road marking within the project area will be required. A suite of different signs is recommended for use on the shared use trail and the service tracks and includes:

- Trailhead Signs A 'trailhead' is a designated entry point to a trail and it is the place where most people would park their car and embark on a ride or walk. Trail head signs will be used at the trail head at Ellis Beach. It will also include information about trail etiquette and encouraging courtesy and harmony between users.
- Decision Point Signs A Decision Point Sign should be used at the start of each section, link trail and alternate trail to enable trail users to make an informed decision about whether to proceed or not. These signs will be installed at various locations along the use trail.
- Directional Signs/ Waymarkers A Waymarker is a simple bollard or post (generally about 100mm wide x 100mm thick x 1500- 2000mm tall [with approximately 600mm embedded in the ground]) with symbols on it to guide trail users in the correct direction at any point of uncertainty. This will be used along various sections of the trail to guide the uses.
- Signs should be provided to indicate exclusion and safety zones, parking areas, speed limits, vehicle crossings and hazards like blind corners and steep gradients. Signs and road markings should be regularly checked and maintained so they can be easily seen.
- Signs will used where the trail intersects service tracks to inform the users that service tracks are restricted to emergency and maintenance vehicles.
- Clear road markings like reflective paint and signs should be used to alert pedestrians, cyclists and vehicle operators to potential traffic hazards particularly at the trail head at Ellis Beach and at the end of the trail at Wangetti.
- All signage and collateral must reinforce the trails' shared use status and must include the message that the trail was designed and constructed for both user groups and a 'code of conduct' for trail users.
- Appropriate road signage and appropriate marking to be agreed with DTMR and installed at the intersections of the service tracks and Captain Cook Highway road reserve.

## 4.5 Service tracks

All contractors undertaking works on the service tracks within the WTWHA or Macalister Range National Park are to implement the Technical Manual: Infrastructure and Equipment QPWS road works signage (for works on very low-volume roads in rural areas) as accessed at: <a href="https://parks.des.qld.gov.au/\_\_\_data/assets/pdf\_file/0022/161833/tm-pk-ie-qpws-road-work-signage.pdf">https://parks.des.qld.gov.au/\_\_\_data/assets/pdf\_file/0022/161833/tm-pk-ie-qpws-road-work-signage.pdf</a>

## 4.6 Works within a road corridor

All ancillary works and encroachments within the road corridor along the Captain Cook Highway require a permit from DTMR according to the *Transport Infrastructure Act 1994*. Anticipated structures and activities proposed within the Captain Cook Highway road reserve for the project include (but not limited to):

- Signs/devices
- Fences
- Gates
- Formalisation of existing access tracks
- Property name signs
- Earthworks including vegetation clearing.

# 4.7 Intersections of the trail at Captain Cook Highway road reserve

Within the project area, there are a number of locations of where the Captain Cook Highway (state-controlled) road reserve is impacted by the proposed works and they are outlined below:

- Existing dirt track from Captain Cook Highway at Palm Cove (refer to service track 1 in Appendix A). At this location the track will be used by construction vehicles during the construction phase and by both hikers, cyclists and maintenance vehicles during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Both pedestrians and vehicles should have good visibility. Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.
- Trail head at Ellis Beach. At this location the track will be used by both hikers and cyclists during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Cyclists and hikers should have good visibility. Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.
- Existing dirt track from Captain Cook Highway at Ellis Beach (refer to service track 2 in Appendix A). At this location the track will be used by construction vehicles during the construction phase and used by emergency and maintenance vehicles during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.
- Service track from Ellis Beach intersecting the alignment in the Ellis Beach South Reserve (refer to service track 3 in Appendix A). At this location the track will be used by construction vehicles during the construction phase and used by emergency and maintenance vehicles during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.
- Service track begins at Redcliff Point area at Captain Cook Highway, the road extends to the Wangetti Trail and continues to the end point. Access road needs to be cut off where it transects the trail (refer to service track 4 in Appendix A). At this location the track will be

used by construction vehicles during the construction phase and used by emergency and maintenance vehicles during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.

- Sealed road providing access to the trail via 2 points, from the Captain Cook Highway (refer to Appendix A). At this location the track will be used by construction vehicles during the construction phase and used by emergency and maintenance vehicles during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.
- Service track near Rifle Range Road (refer to Appendix A). At this location the track will be used by construction vehicles during the construction phase and used by emergency and maintenance vehicles during the operational phase. Visibility at the crossing point should be free and clear of obstacles (overhanging vegetation etc.) Procedures indicating who has right of way at crossings should also be established. Appropriate road marking and signage installed as discussed in Section 4.4.

## 4.8 Training

Personnel working during the construction and operational phases of the Wangetti South Project will be required to undergo site specific induction which includes traffic management requirements on site and the environmental values associated with the project area including MNES fauna species. Appropriate training suiting the different roles and responsibilities is to be undertaken in accordance with appropriate standards as advised by DES, QPWS, Wet Tropics Management Authority (WTMA) and TDPD. Regular toolbox meetings are also conducted.

The construction contractor personnel will be required to ensure the operators of the mobile plant have received the appropriate training and inductions necessary to protect them and others from the risks associated with traffic in the project area.

Workers including contractors who are required to perform duties associated with traffic management within the project area will undergo appropriate training and inductions and will be required to hold the relevant certification.

## 4.9 Reporting

Records collected as part of traffic management activities will be retained by the Contractor and the TDPD for the legally required period of time. Environmental records include but may not be limited to:

- Site inspection checklists
- Environmental audit reports
- Training records
- Monitoring data
- Complaints and associated records of communication
- Meeting minutes.

During construction phase the contractor will make these records available to the TDPD or any relevant authorities and their representatives on request. During the operational phase, the

Proponent will make these records available to any relevant authorities and their representatives on request and where justified and in accordance with legislation.

## 4.10 Monitoring

Monitoring is an essential component of any TMP as it assists in determining how well control methods are working. Personnel will be nominated during the construction phase and the operational phases of the project to undertake monitoring of traffic management controls in accordance with an established schedule for the project.

### 4.11 Emergency, incidents and complaints

Construction personnel and operational personnel are required to report any hazardous items encountered or abnormal occurrences to their Supervisor/Team Leader or Workplace Health and Safety Representative (WHSR).

TDPD will be verbally notified of an incident on the day it occurs and as soon as practicable of the responsible person becoming aware of the incident, and in writing within 24 hours.

All notifications to authorities will be undertaken by TDPD.

The Contractor will be required to provide an Emergency Response Plan and for this plan to be thoroughly communicated to all staff members in the Construction Induction. The Emergency Response Plan should identify evacuation routes, mustering points, communication protocols and provide key contact details for local authorities and services. It should be compatible with the internal emergency response protocols of the various land managers.

When reporting traffic incidents to TDPD, the following information is to be provided:

- The name and contact details of the reporting person
- The date and time the environmental incident occurred
- The activity that was being undertaken when the incident occurred
- How the incident occurred
- Any containment measures put in place to reduce or contain environmental harm
- An assessment of the amount of environmental harm that occurred
- If any other stakeholders are aware of the incident.

The contactor during the construction phase to develop an emergencies, incidents and complaints protocols and reporting documentation to be agreed by TDPD.

The contactor during the operational phase to develop an emergencies, incidents and complaints protocols and reporting documentation to be agreed by TDPD.

## 4.12 Corrective Actions

The Project Manager is responsible for ensuring that on receipt of a complaint relating to traffic management, an investigation should be undertaken promptly, and appropriate actions undertaken. All corrective actions should be implemented to meet the required outcomes of the Administering Authorities.

## 5. References

Department of Environment and Science. 2011. *Operational Policy: Mountain Biking in QPWS Managed Areas dated 2011.* 

Department of Transport and Main Roads 2020. Technical Specification Transport and Main Roads Specifications MRTS02 Provision for Traffic July 2020. Available from: <u>https://www.tmr.qld.gov.au/business-industry/Technical-standards-</u> <u>publications/Specifications/Specifications-Index</u>

Department of Transport and Main Roads 2013. Technical Manual Environmental Processes Manual August 2013. Available from: https://www.tmr.qld.gov.au/business-industry/Technicalstandards-publications/Environmental-processes-manual.aspxGHD Pty Ltd 2020. Department of State Development, Tourism and Innovation - Wangetti Trail South Section (Wangetti to Palm Cove) Matters of National Environmental Significance Baseline Ecology and Impact Assessment Report, Final Version, July 2020

Queensland Government 2020. Traffic Analysis and Reporting System. AADT Segment Report Area 403 - Far North District Road Section 20A - Captain Cook Highway (Cairns - Mossman)

World Trail Pty Ltd (2020), *Wangetti Trail Construction Methodology Manual April* 2020 World Trail Pty Ltd (2017), *Wangetti Trail* 2017.

Appendices

## Appendix A - Proposed Service Tracks

Service Tracks	
Proposal appreciation	The project will include ancillary service tracks to allow for restricted vehicle access along the alignment during the construction phase, operational phase, and maintenance phase and for emergency access. These will connect to the to the existing road network and will predominantly be used by side by side vehicles during maintenance and larger construction vehicles. The service tracks will be gated to members of the public, discouraging access and use. Passive surveillance from users of the trail and monitoring of the trail by QPWS and the trail operator will assist in making sure that the unlawful activities e.g. motorbike riding does not occur with the project area
Key Structures	Grading/improvements of some of the existing access tracks may be undertaken to allow them to cater for the vehicles to be used for the project.
Utility connections	No utility connections are required.
Vegetation	Limited vegetation is required to remove vegetation that has grown over the existing access tracks. Only overhanging vegetation over the existing access tracks will be cut back. Ongoing vegetation management will be required.

#### Service Track 1: Unnamed

**Description:** Existing dirt track from Captain Cook Highway at Palm Cove.

#### Location:

-16.739, 145.664

-16.739, 145.663

Real property descriptions: 13NR5512, 174NPW930, Captain Cook Highway Road reserve



#### Service Tracks

#### Service Track 2: Unnamed

**Description:** Existing dirt track from Captain Cook Highway at Ellis Beach.

## Location:

-16.72560,145.64559

-16.73084,145.64819

Real property descriptions: 13NR5512, 174NPW930, Captain Cook Highway Road reserve



#### Service track 3: Unnamed (Ellis Beach area)

**Description:** Service track from Ellis Beach intersecting the alignment in the Ellis Beach South Reserve.

#### Location:

-16.69678, 145.60883

-16.70038, 145.60947

Real property description: Captain Cook Highway Road reserve, 39SP309107, 174NPW930



#### Service Tracks

#### Service Track 4: Unnamed (Red Cliff Point Area - south east)

**Description:** Service track begins at Redcliff Point area at Captain Cook Highway within Section 2. The road extends to the Wangetti Trail and continues to the end point. Access road needs to be cut off where it transects the trail.

#### Location:

-16.69439, 145.60331

-16.6982.19,145.60313

#### Real property descriptions: 39SP309107, 174NPW930, Captain Cook Highway Road reserve



Service Track 5: Unamed (Red Cliff Point Area - west)

**Description:** Service track extends from the Captain Cook Highway and intersects with the Wangetti Trail in Section 2.

#### Location:

-16.682.189, 145.57818

-16.68646, 145.57689

Real property descriptions: 6SP309107, 174NPW930, Captain Cook Highway Road reserve



#### Service Tracks

#### Service Track 6: Rifle Range Road

**Description:** Sealed road providing access to the trail via 2 points, from the Captain Cook Highway.

### Location:

-16.68023, 145.57397

-16.68392, 145.57544

**Real property descriptions**: 6SP309107 and 11AP17379



Service Track 7: Rifle Range Road

**Description:** Service track near Rifle Range Road

#### Location:

-16.67833,145.57188

-16.67846, 145.57145

-16.68023,145.57396

-16.68037,145.57377

Real property descriptions: Captain Cook Highway Road reserve, 6SP309107





## Construction

Materials and equipment Methodology

Limited works will occur to the existing access tracks other than removal of vegetation where it obstructs the movement of vehicles and some minor surface treatments to provide safe passage for vehicles.
Service Tracks	
Operation and maintance	
Operation and maintance phase	The service tracks will be managed in accordance with QPWS trail maintenance procedures manuals.
	The service tracks will be used by the operators and managers of Wangetti Trail and will be used for the following purposes:
	Deliver equipment and supplies to the camp sites
	Be used by emergency vehicles for emergencies
	Be used to access the trail and camp sites for maintenance purposes
	• The service tracks will be gated to restrict access to the general public.
	The trail and service tracks will be maintained in accordance with QPWS trail maintenance/ procedures/manuals for those parts of the service tracks that are within the protected area estate.

GHD 8th floor Cairns Corporate Tower 15 Lake Street PO Box 819 T: 61 7 4044 2222 F: 61 7 4044 2288 E: cnsmail@ghd.com

#### © GHD 2020

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited. 4132458-40294-

145/https://projects.ghd.com/oc/sqoc2/wangettitrackapprova/Delivery/Documents/4132458 - Wangetti Trail Traffic Management Plan.docx

#### **Document Status**

Revision	Author	Reviewer		Approved for Is	sue	
		Name	Signature	Name	Signature	Date
1	B Steytler	C Hooper	On file	G Squires	Armin	28/7/21

## www.ghd.com



# **Appendix E** – Preliminary Construction Environmental Management Plan





Department of State Development, Tourism, and Innovation Wangetti Trail South Section (Wangetti to Palm Cove)

Preliminary Construction Environmental Management Plan

#### July 2021



### **Abbreviation and acronyms**

Abbreviation/acronym	Definition
ACH Act	Aboriginal Cultural Heritage Act 2003
AHD	Australian height datum
CEMP	Preliminary Construction Environmental Management Plan
CESCP	Concept Erosion and Sediment Control Plan
CHMA	Cultural Heritage Management Agreement
CMP	Cassowary Management Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DATSIP	The Department of Aboriginal and Torres Strait Islander Partnerships'
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
DR	Department of Resources (previously referred to as Department of Natural Resources Energy and Mines)
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning (previously referred to as Department of State Development, Infrastructure and Planning)
DSDTI	Department of State Development, Tourism and Innovation
DTMR	Department of Transport and Main Roads
EMP	Environmental Management Plan
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EP Act	Environmental Protection Act 1994
ESCP	Erosion and Sediment Control Plan
FNQ	Far North Queensland
GED	General Environmental Duty
GHD	GHD Pty Ltd
IECA	International Erosion Control Association
ILUA	Indigenous Land Use Agreement
km	Kilometre
MNES	Matters of national environmental significance
MSES	Matters of state environmental significance
NC Act	Nature Conservation Act 1992
PPE	Personal Protective Equipment
QPWS	Queensland Parks and Wildlife Service
RE	Regional ecosystem
RPP	Riverine protection permit
SMP	Species Management Plan
TDPD	Tourism Development Projects Division (TDPD)
TI Act	Transport Infrastructure Act 1994

Abbreviation/acronym	Definition
ТМР	Preliminary Traffic Management Plan
VM Act	Vegetation Management Act 1999
WPDMP	Preliminary Weed, Pest and Disease Management Plan
WTWHA	Wet Tropics World Heritage Area

### **Table of contents**

1.	Introd	Juction	1
	1.1	Project background	1
	1.2	Purpose	3
	1.3	Structure of the CEMP	3
	1.4	Assumptions and limitations	4
2.	Legis	lative requirements	5
	2.1	Wet Tropics Management Plan 1998 (superseded 3 <sup>rd</sup> July 2017)	8
	2.2	Wet Tropics Management Plan 1998 (11 September 2020)	10
	2.3	Wet Tropics Strategic Plan 2020 – 2030	12
3.	Poter	ntial environmental impacts and risks	14
	3.1	Key environmental factors	14
	3.2	Risk assessment	20
	3.3	Rationale and approach	25
	3.5	Training, awareness and competence	28
4.	CEM	P provisions	29
	11	Biodiversity	20
	4.1	•	
	4.1	Soil and land management	
	4.1 4.1 4.2	Soil and land management Cultural heritage	47 58
	4.1 4.1 4.2 4.3	Soil and land management Cultural heritage Water management	
	4.1 4.2 4.3 4.4	Soil and land management Cultural heritage Water management Waste management	
	4.1 4.2 4.3 4.4 4.5	Soil and land management Cultural heritage Water management Waste management Public amenity and health	
5.	4.1 4.2 4.3 4.4 4.5 Work	Soil and land management Cultural heritage Water management Waste management Public amenity and health completion	
5. 6.	4.1 4.2 4.3 4.4 4.5 Work Monit	Soil and land management Cultural heritage Water management Waste management Public amenity and health completion toring and environmental inspections.	
5. 6. 7.	4.1 4.2 4.3 4.4 4.5 Work Monit	Soil and land management Cultural heritage Water management Waste management Public amenity and health completion toring and environmental inspections.	
5. 6. 7. 8.	4.1 4.2 4.3 4.4 4.5 Work Monit Audit	Soil and land management Cultural heritage Water management Waste management Public amenity and health completion toring and environmental inspections.	
5. 6. 7. 8. 9.	4.1 4.2 4.3 4.4 4.5 Work Monit Audit Revie	Soil and land management Cultural heritage Water management Waste management Public amenity and health completion toring and environmental inspections	47 

### **Table index**

Table 1-1	Structure of the CEMP	3
Table 2-1	Statutory approvals associated with Wangetti South	5
Table 2-2	Assessment against the provisions of the Wet Tropics Management Plan 1998 (3 July 2017 version)	9
Table 2-3	Assessment against the provisions of the Wet Tropics Strategic Plan 2020 – 2030	12
Table 3-1	Key environmental factors relevant to construction	15
Table 3-2	Qualitative measure of likelihood (Australian Government Department of the Environment, 2014)	20
Table 3-3	Qualitative measure of consequences (Australian Government Department of the Environment, 2014)	20
Table 3-4	Risk assessment (Australian Government Department of the Environment, 2014)	21
Table 3-5	Risk assessment of construction activities on environmental factors for Wangetti South Section without environmental controls in place	21
Table 3-6	Environmental roles and responsibilities	26
Table 4-1	Biodiversity (fauna) environmental factors	30
Table 4-2	Biodiversity (flora) environmental factors	42
Table 4-3	Chemical and fuel management environmental factors	49
Table 4-4	Hazardous materials environmental factors	52
Table 4-5	Fuels and oils environmental factors	54
Table 4-6	Cultural heritage environmental factors	59
Table 4-7	Water management environmental factors	63
Table 4-8	Waste management environmental factors	68
Table 4-9	Public amenity environmental factors	74
Table 4-10	Bushfire environmental factors	77
Table 4-11	Hazards, health and safety environmental factors	83
Table 4-12	Noise and vibration environmental factors	87
Table 4-13	Air quality environmental factors	92
Table 6-1	Construction phase monitoring requirements	98
Table 9-1	Example environmental incidents and mitigation and reporting requirements	104

### **Figure index**

Figure 1-1	Wangetti South locality	/
------------	-------------------------	---

### **Appendices**

Appendix A - Waterways within Wangetti South Section

- Appendix B Potential and marginal habitat for the opal cling goby (Stiphodon semoni) in the vicinity of the Wangetti South Section and proposed location of single span bridges
- Appendix C Wangetti South Section Ecological Field Survey Assessment Sites
- Appendix D Wangetti South Section Potential Habitat Types

### 1. Introduction

#### 1.1 Project background

The Department of State Development, Tourism and Innovation (DSDTI) – Tourism Development Projects Division (TDPD) is proposing to establish the Wangetti Trail – Wangetti South (Project) Section, a 29.7 kilometre (km) shared use trail to accommodate both mountain bike users and hikers from the southern boundary Lot 2 SP309094 in the township of Wangetti, to Palm Cove (refer to Figure 1-1).

The Wangetti South Section will comprise of the following components:

- 29.7 km shared use trail to accommodate both mountain bike users and hikers, consisting of natural ground and surface treatments, which will be a maximum of 1.5 m wide. The 1.5 m wide trail will be located within a 40 m survey corridor, referred to as the construction allowance corridor, to allow flexibility for the most suitable placement of infrastructure during the construction phase to minimise impacts to the greatest extent possible. The trail has been designed to be a 'Mountain Biking intermediate (blue square with blue outline) as defined in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System (MBTA TDRS) and grade 3 for hikers, as defined in the Australian Walking Track Grading System (AWTGS), which also equates to Class 3 in the Australian Standard for Walking Tracks, Part 1: Classification and Signage (AS 2156.1-2001). The trail will have an average gradient of <10% and a maximum gradient no greater than 15% (for short distances only). Built structures proposed as part of the trail include gully crossings, bridges, staircases, platforms, rock armouring and signage, where appropriate and required.</li>
- A number of waterway crossings along the shared use trail that will comprise of the following: rock armouring, boulder crossings and low-level bridge (minor water crossing) (refer to Appendix A showing the locations of the waterways within the project area).
- Dark Jungle (public camping node and amenities block).
- The formalisation of existing access tracks into service tracks to provide restricted access to the shared use trail and Dark Jungle for construction purposes, operational purposes, maintenance purpose and for emergency purposes.

Further details of the construction methodology associated with Wangetti South Section is captured in the World Trail Pty Ltd (2020), Wangetti Trail Construction Methodology Manual April 2020.

The Wangetti South Section is being proposed over four properties located within the Douglas Shire Council and Cairns Regional Council local government areas. The project area intersects both the Macalister Range National Park and the Wet Tropics World Heritage Area (WTWHA).

The project is being delivered by TDPD as part of an adventure-based ecotourism development in north Queensland. The shared use trail will provide walkers and mountain bike riders with a unique experience to traverse through natural areas of north Queensland covering bushland and coastal areas, including the Wet Tropics of Queensland (Wet Tropics), and national parks.

Development of a Preliminary Construction Environmental Management plan (CEMP) is required to demonstrate the management of environmental values within the project area during the construction phase of the Wangetti South Section. It forms part of a sub-plan in the Preliminary Environmental Management Plan (EMP) for the Wangetti South Section.





VghdneftghdAUBFrisbane\Projects\41\32458\GISWaps\MXDH132458\_052\_WT\_SP2\_MNES\_LocalItyPlan\_Rev5.mxd Print date: 01 Dec 2020 - 13:22

Data source: DITIDIGHD: Wangetti Trail Alignment (11/2020): DNRME: Roads (2019), Cadastre (2019), Watercourse (2014), Place Names (2016), Rai (2016), Imagery (2016); DES: Protected Area (2018); WTM A: Proposed Camp and Amenties Block (2020), Zoning Boundary (2019); GHDSection Intersections - Mowbray North, Wangetti North, Wangetti South (2020), Services Tracks (2020), 20m Construction Buffer for the Shared Use Trail (2020) - Created by: xlee

#### 1.2 Purpose

GHD Pty Ltd (GHD) has been commissioned to develop a Preliminary Construction Environmental Management plan (CEMP) for the Wangetti South Section to guide construction activities associated with the Wangetti Section project to prevent or minimise the environmental impacts and disturbance on site and to the surrounding environment during the construction phase. An overview of all legislative requirements with respect to Commonwealth, State (Queensland) and local legislation and a summary of the statutory approvals associated with the project has been included in this document. This CEMP has also been prepared to satisfy the environmental obligations during the construction phase and complements the overarching Wangetti South Section Environmental Management Plan.

#### **1.3 Structure of the CEMP**

The structure of the CEMP has been developed to align with requirements in the Department of the Environment – Environmental Management Plan (DEMP) Guidelines 2014. Table 1-1 below demonstrates that this CEMP has considered the sections of the DEMP Guidelines.

Section	Consistent with the DEMP Guidelines
1.0 Introduction	Compiles with Section 3.4, 3.5 and 3.6 in Department of Environment Environmental Management Plan Guidelines 2014
2.0 Potential environmental impacts and risks	Compiles with Section 3.8, 3.10, 3.12 and 4.0 in Department of Environment Environmental Management Plan Guidelines 2014.
3.0 CEMP Provisions	Compiles with Section 3.12 and 3.13 in Department of Environment Environmental Management Plan Guidelines 2014
4.0 Rehabilitation of works areas	Compiles with Section 3.13 in Department of Environment Environmental Management Plan Guidelines 2014
5.0 Monitoring	Compiles with Section 3.9 and 3.14 in Department of Environment Environmental Management Plan Guidelines 2014
6.0 Audit	Compiles with Section 3.14 in Department of Environment Environmental Management Plan Guidelines 2014
7.0 Review	Compiles with Section 3.14 in Department of Environment Environmental Management Plan Guidelines 2014
8.0 Emergency incident planning and response	Compiles with Section 3.11 in Department of Environment Environmental Management Plan Guidelines 2014

#### **Table 1-1 Structure of the CEMP**

#### **1.4** Assumptions and limitations

This report has been prepared by GHD for Department of State Development, Tourism and Innovation and may only be used and relied on by Department of State Development, Tourism and Innovation for the purpose agreed between GHD and the Department of State Development, Tourism and Innovation as set out in this report.

GHD otherwise disclaims responsibility to any person other than Department of State Development, Tourism and Innovation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Department of State Development, Tourism and Innovation and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

### 2. Legislative requirements

Wangetti South Section is to comply with all legislative requirements with respect to Commonwealth, State (Queensland) and local legislation and a summary of the statutory approvals associated with the project is outlined in Table 2-1 below.

Legislation and Approval Type	Relevance to the project area
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) DAWE Referral	Wangetti South is considered to involve undertaking an action which has, will have, or is likely to have, an impact on a Matters of National Environmental Significance (MNES). Therefore, project has been referred and is a controlled action that requires approval (reference EPBC 2020/8722).
Wet Tropics Management Plan 1998 <i>Wet Tropics Permit</i> Wet Tropics Management Authority (WTMA)	Wangetti South Section is located within the Wet Tropics World Heritage Area. The project has been approved (Wet Tropics Permit No: WTMA20001a) and a permit issued under Part 4, Division 1, Section 45 of the Wet Tropics Management Plan 1998 ( <i>Wet Tropics World Heritage Protection Management Act 1993</i> ) to allow for the proposed works to occur within the Wet Tropics Management Zone.
Nature Conservation Act 1992 (NC Act) Authority required to construct trail and public camping areas under s34 of the NCA.	Subject to s34 of the NC Act, a lease, agreement, license, permit or other authority over, or in relation to land in a protected area may be granted if the activity is consistent with the management principles for the areal and, if a management plan has been approved for the area, the management plan. The grant of an authority will be considered by the Chief Executive of the Department of Environment and Science (DES) for the construction of Wangetti Trail and public camping areas in the protected area estate.
<i>Nature Conservation Act 1992</i> (NC Act) Protected plant clearing permit	Where the alignment intersects a flora survey trigger area, a protected plant clearing permit or exemption notice will be required.
Species management program (SMP) under the <i>Nature Conservation Act</i> 1992 (NC Act)	Given a number of protected fauna species that are located within the project area are high-risk, a SMP may be required to allow for tampering with an animal breeding place for endangered, vulnerable and near threatened and special least concern fauna species listed under the <i>Nature Conservation (Wildlife) Regulation</i> 2006
<i>Native Title Act 1993</i> Indigenous Land Use Agreement (ILUA) or notification procedures	TDPD has been conducting meaningful engagement with Traditional Owners who have a native title claim or assert a native title interest in relation to trail area as outlined in Section 1.7 to address native title requirements for the project. Indigenous Land Use Arrangements (ILUA) will be negotiated between native title parties and the State accordingly.

#### Table 2-1 Statutory approvals associated with Wangetti South

Legislation and Approval Type	Relevance to the project area
Under the <i>Aboriginal Cultural</i> <i>Heritage Act 2003 (</i> ACH Act) a Cultural Heritage Management Plan (CHMP)	TDPD has been conducting meaningful engagement with Traditional Owners who have interests in relation to trail area to address cultural heritage requirements under the ACH Act for the project.
or similar may need to be established with the relevant Aboriginal parties	Archaeological reporting, including a Cultural Heritage Management Plan between the proponent and the Traditional Owners outlining how the project will be managed to avoid or minimise harm to Aboriginal cultural heritage (to the extent that harm cannot reasonably be avoided)will be negotiated before works commence
	The Department of Aboriginal and Torres Strait Islander Partnerships' (DATSIP) Duty of Care Guidelines are required to be followed to assist in conducting due diligence.
Under the <i>Planning Act 2016</i> and Planning Regulation 2017 a Material Change of Use development permit assessable under the Douglas Shire Council planning scheme and a Material Change of Use development permit assessable under the Cairns Regional Council Planning Scheme	A material change of use development permit application will be required for Wangetti South to establish the use within the project area. Pre-lodgement meetings have been undertaken with the former Department of State Development, Infrastructure and Planning (referred to now as Department of State Development, Infrastructure, Local Government and Planning (DSDILGP), Douglas Shire Council, Cairns Regional Council, Department of Environment and Science (DES), former Department of Natural Resources Energy and Mines (referred now as Department of Resources (DR)), Department of Agriculture and Fisheries (DAF) and Department of Transport and Main Roads (DTMR).
Under the Planning Regulation 2017 and <i>Vegetation Management Act</i> <i>1999</i> (VM Act) an Operational works development approval for clearing of native vegetation	Wangetti South does not trigger operational work involving clearing native vegetation under Schedule 10, Part 3, Division 4, Table 1, Item 1 under the Planning Regulation 2017, as the proposed works is considered to meet the definition of government supported transport infrastructure and is therefore exempt from the clearing of remnant Category B, Category C and Category R vegetation.
Under the Planning Regulation 2017 and <i>Fisheries Act 1994</i> Development Permit for operational works for constructing/raising waterway barrier works Compliance with Accepted development requirements for operational work that is constructing or raising waterway barrier works and	Boulder rock crossing will trigger a development permit for operational works waterway barrier woks where the work does not comply with DAF's accepted development requirements. Bed level crossings associated with the project are considered to meet the accepted development requirements for operational work that is constructing or raising waterway barrier works' and riverine protection permit exemption requirements WSS/2013/726.

Legislation and Approval Type	Relevance to the project area
<i>Water Act 2000</i> Riverine Protection Permit Exemption Requirements.	
Under the Planning Regulation and <i>Coastal</i> <i>Protection and Management</i> <i>Act 1995.</i> Development permit for operational works for interfering with quarry material on state coastal land above the high-water mark within a Coastal Management District (CMD)	Parts of the project area are proposed within mapped coastal management district and therefore the proposed works would trigger a development permit for operational works for interfering with quarry material on state coastal land above the high-water mark within the coastal management district under Schedule 10 of the <i>Planning Regulation 2017</i> .
Under the <i>Land Act 1994</i> land owners consent for works on State Land	Land owner's consent is required from DR for work on state land to support material change of use development application.
Riverine protection permit (RPP) under the Water Act 2000	There are a number of DR mapped watercourses along the proposed alignment. Bed level crossings are considered to meet the Riverine Protection Permit (RPP) exemption requirements WSS/2013/726. TDPD is an entity under schedule 2 of the RPP Exemption Requirements and therefore can follow the RPP exemption requirements WSS/2013/726 for any works proposed in a watercourse. Proposed works will be required to work within the vegetation clearing limit and excavation and placement of fill limit requirements. Where works result in the clearing of less than 0.5 ha of least concern regional ecosystem in a category B, C, R or X or carried out under an accepted development vegetation clearing code (other than if the vegetation is in a category A area), then the exemption requirements apply.
	Where works result in the placement of less than 150 cubic metres of fill, then the exemption requirements apply.
Road corridor permit under the <i>Transport Infrastructure Act 1994</i> (TI Act)	Part of the project area is located within State controlled road reserve namely Captain Cook Highway which is managed by DTMR. Works within a state-controlled road reserve triggers a road corridor permit from DTMR.

Legislation and Approval Type	Relevance to the project area
Under the <i>Land Act 1994</i> Permanent closure or short- term occupation within road reserves	Permanent road closures or short-term occupation and construction within road reserves (excluding state-controlled roads) will be required during the construction phase of the project.
General Biosecurity Obligation (GBO) under the <i>Biosecurity Act 2014</i>	During the construction and operation phase of the project, activities are to be undertaken in accordance with the General Biosecurity Obligations whereby all reasonable and practical measures are to be undertaken to prevent or minimise biosecurity risks. The Act identifies seven categories of restricted matters. Where activities are proposed contrary to the restriction for each category under the Act, a Restricted Matter Permit is required.
General Environmental Duty under the <i>Environmental</i> <i>Protection Act 1994</i>	Under the provisions of the EP Act, all persons, whether undertaking an activity authorised under the EP Act, are required to comply with the General Environmental Duty. The duty requires that: 'A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm.' This is applicable to all phases of the project.
Environmental offset requirements under the <i>Environmental Offsets Act</i> 2014 <i>Commonwealth Environment</i> <i>Protection and Biodiversity</i> <i>Conservation Act 1999 -</i> <i>Environmental Offsets Policy</i> <i>October 2012</i>	DES has advised that state environmental offsets will be triggered for the project which will be administered under s34 and s35 of the NC Act. EPBC Act offsets are proposed in relation to impacts on the southern cassowary.

#### 2.1 Wet Tropics Management Plan 1998 (superseded 3<sup>rd</sup> July 2017)

The project has been approved (Wet Tropics Permit No: WTMA20001a) and a permit issued under Part 4, Division 1, Section 45 of the Wet Tropics Management Plan 1998 (superseded 3rd July 2017) (*Wet Tropics World Heritage Protection Management Act 1993*) to allow for the proposed works to occur within the Wet Tropics Management Zone. While the project was assessed in accordance with the Wet Tropics Management Plan 1998 plan, the project is considered to comply with the intent of the Wet Tropics Management Plan 2020.

An assessment has been undertaken against the provisions of the Wet Tropics Management Plan 1998 (superseded 3rd July 2017) and is presented in Table 2-2.

### Table 2-2 Assessment against the provisions of the Wet Tropics ManagementPlan 1998 (3 July 2017 version)

Wet Tropics Management Plan 1998 (3((3 <sup>rd</sup> July 2017 version)	Response
Zone B – Zone B is comprised of land that is mostly of high	The majority of the project is located within Zone B under the Wet Tropics Management Plan 1998.
<ul><li>integrity but not necessarily</li><li>remote from disturbance.</li><li>It is intended that, in Zone B,</li><li>land be undergoing recovery or</li><li>rehabilitation towards its natural</li><li>state or becoming remote from</li></ul>	The proposed trail is considered to meet the intent of Zone B by providing opportunities to connect with nature and to be surrounded by nature along the trail. The trail will allow for winding around natural obstacles and integrating within the natural environment. Vegetation disruption, including canopy cover, is minimised.
associated with modern technological society; and a visitor may expect opportunities for solitude in a natural area	The Wangetti South Section has been designed to minimise built structures like bridges, boardwalks and viewing platforms. These built structures pose a number of challenges:
requiring a degree of self- reliance; and management	<ul> <li>They are normally constructed from imported materials and can be intrusive in the natural environment</li> </ul>
presence be limited mainly to	• They can burn during bushfires or prescribed burns
recovery or rehabilitation of the area.	• They can be difficult to construct in remote areas, due to the challenges of importing the materials
The management purpose of	• They increase the maintenance burden.
Zone B is, to the greatest possible extent—	Where built structures are required, the design and finish will prioritise the use of local timbers and other materials that will
a. To protect and enhance the integrity of land in the zone	age gracefully with time. Above all, the materials must be durable enough to withstand the harsh tropical climate and natural environment. Any built structures must be designed
b. If the land is disturbed—	and engineered to be fit-for-purpose, to have minimal impact
<ul> <li>(i) To restore land in the zone to its natural state, as opportunities arise</li> </ul>	to the surrounding environment, to have minimal maintenance requirements and will need to take a minimalistic approach to materials given the remote nature of the trail, resulting in a
<ul> <li>(ii) To include the land in zone A once it is sufficiently recovered or rehabilitated.</li> </ul>	minimal impact on the scenic beauty of the Wet tropics.
Zone C – Zone C is comprised of land on which, or adjacent to which, there is disturbance associated with community	Where the trail is located within Zone C land, it is considered to meet the intent of Zone C areas, being, land be mostly natural, but with some disturbance associated with community services infrastructure.
services infrastructure.	The Wangetti South Section has been designed to minimise
<ul> <li>c. Land be mostly natural, but</li> </ul>	platforms. These built structures pose a number of challenges:
associated with community services infrastructure	• They are normally constructed from imported materials and can be intrusive in the natural environment
(community services infrastructure means infrastructure for community	• They can burn during bushfires or prescribed burns

Wet Tropics Management Plan 1998 (3((3 <sup>rd</sup> July 2017 version)	Response
<ul> <li>services such as, for example, transport services, electricity supply, water supply and telecommunications services), other community facilities and visitor facilities</li> <li>d. A visitor may expect various low-key opportunities for nature appreciation and social interaction in a natural setting, but with some disturbance by activities associated with modern technological society</li> </ul>	<ul> <li>They can be difficult to construct in remote areas, due to the challenges of importing the materials</li> <li>They increase the maintenance burden.</li> <li>Where built structures are required, the design and finish will prioritise the use of local timbers and other materials that will age gracefully with time. Above all, the materials must be durable enough to withstand the harsh tropical climate and natural environment. Any built structures must be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will need to take a minimalistic approach to materials given the remote nature of the trail, resulting in a minimal impact on the scenic beauty of the Wet tropics.</li> </ul>
e. Management presence may be obvious.	
The management purpose of Zone C is—	
f. To accommodate community services infrastructure, other community facilities and visitor facilities; but (b) to the greatest possible extent—	
<ul> <li>(i) To ensure any adverse impact of activities carried out in the zone on the area's integrity is minimal and acceptable under this plan</li> </ul>	
<ul><li>(ii) To otherwise protect and enhance the integrity of land in the zone.</li></ul>	

#### 2.2 Wet Tropics Management Plan 1998 (11 September 2020)

Under the latest Wet Tropics Management Plan 1998 (11 September 2020), Wangetti South Section project area is located within Zone A, B and C.

#### 2.2.1 Zone A

The intent of Zone A is:

- The main management purpose of zone A is to protect and conserve the world heritage values and integrity of land in the zone.
- Other management purposes of zone A are-

- a. if land in the zone is disturbed—to restore and enhance the world heritage values and integrity of the land if, and
- b. to the extent, it is reasonably practicable; and
- c. to enable visitors to access parts of the land in the zone to appreciate and enjoy the area.

Part of the shared use trail and Dark Jungle are located within Zone A and are defined as limited visitor infrastructure under the Plan. Limited visitor infrastructure includes walking or cycling track, information board, small-scale viewing platform, small-scale toilet facility, visitors' shelter and camping platforms.

#### 2.2.2 Zone B

The intent of Zone B is:

- The main management purpose of zone B is to protect and conserve the world heritage values and integrity of land in the zone.
- Other management purposes of zone B are
  - a. if land in the zone is disturbed—to restore and enhance the world heritage values and integrity of the land if, and to the extent, it is reasonably practicable; and
  - b. to enable visitors to access parts of the land in the zone to appreciate and enjoy the area; and
  - c. to be a buffer between zone A and community services infrastructure.

The shared use trail is partly located within Zone B and the proposed use is defined as limited visitor infrastructure and is considered to be consistent with the intent of Zone B.

#### 2.2.3 Zone C

The intent of Zone C is:

- The main management purposes of zone C are
  - a. to protect and enhance the world heritage values and integrity of the land in the zone, subject to paragraphs (b) and (c); and
  - b. subject to paragraph (c), to accommodate
    - i. community services infrastructure and visitor infrastructure; and
    - ii. particular existing uses of parts of the zone shown on the zoning map; and
  - c. to minimise any adverse impact of any activities allowed to be carried out in the zone on the world heritage values and integrity of the land in the zone.

Another management purpose of zone C is to ensure, so far as is reasonably practicable, that any visitor infrastructure on land in the zone is built and maintained in a way that—

- a. is ecologically sustainable; and
- b. is sensitively integrated into the surrounding landscape; and
- c. enhances visitors' understanding and appreciation of the natural and cultural heritage of the area.

Part of the service tracks are located within Zone C and the project is anticipated to meet the intent of Zone C.

#### 2.3 Wet Tropics Strategic Plan 2020 – 2030

The Wet Tropics Strategic Plan 2020 - 2030 provides a 10-year policy framework to guide decisionmaking under the *Wet Tropics World Heritage Protection and Management Act 1993*. The primary purpose of the Wet Tropics Strategic Plan 2020 - 2030 is to enable the identification, protection, and conservation of the Wet Tropics for future generations. It states the desired outcomes that will be delivered and outlines the actions that will achieve this. An assessment has been undertaken against the provisions of the Wet Tropics Strategic Plan 2020–2030 with respect to Wangetti South Section and is outlined in Table 2-3.

Wet Tropics Strategic Plan 2020 – 2030	Response
<ol> <li>Climate change and other threats</li> <li>Respond to the impacts of climate change and priority cross-tenure threats to the area</li> </ol>	<ul> <li>With respect to the production of greenhouse gases as a result of machinery use, selection of machinery is to be fit-for-purpose and low emission, wherever possible.</li> <li>Construction mitigation measures will be required to be incorporated into the contractor's CEMP. The contractor is also required to comply with the general environmental duty under the <i>Environmental Protection Act 1994</i> (EP Act) and Environmental Protection (Air) Policy 2008, as well as appropriate provisions under the contract documentation.</li> </ul>
2. Support Rainforest Aboriginal Peoples Promote and incorporate the rights, interests and aspirations of Rainforest Aboriginal Peoples in the management of the area.	During the development of the project, cultural heritage representatives were engaged to provide advice regarding the significant Aboriginal areas, significant Aboriginal objects and or evidence, of archaeological or historic significance along the trail. As part of the Project, TDPD has been engaging with Traditional Owners regarding the proposed works and to avoid impacts on cultural heritage values.
3. Involve the community Optimise community participation and connection with the area through innovative interpretation, with a focus on education, volunteering and social inclusion	The Wangetti South Section experience will be uniquely Australian, emphasising the culture, history and way of life of the Traditional Owners, the Yirrganydji people. It will encourage a sense of exploration and a spirit of adventure. It will foster an appreciation of the natural environment and the diversity of flora and fauna within it. The Project will provide economic, cultural and educational benefits to the community, as summarised below. <i>Economic</i> Wangetti South Section has the potential to diversify the tourism
<ul> <li>4. World-class tourism and recreation</li> <li>Enhance the World</li> <li>Heritage presentation and support</li> <li>opportunities for natural and cultural tourism and recreation</li> </ul>	product offering in North Queensland, involve Traditional Owners and increase jobs by utilising Queensland's natural assets. The construction phase of the Project will provide an opportunity for the creation of local jobs and employment through the sourcing of material and equipment or through manual labour, while the operational phase of the Project will increase visitors to the area, supporting the local economies of Cairns, Wangetti and Port Douglas. The Wangetti South Section will provide access to a World Heritage listed assets –the WTWHA, which will create value for money experiences for tourists and provide opportunities for tourism

### Table 2-3 Assessment against the provisions of the Wet Tropics Strategic Plan2020 – 2030

Wet Tropics Strategic Plan 2020 – 2030	Response
	operators to extend their offerings and capture markets that are seeking access to unique nature-based experiences (PWC, 2018).
	Cultural and spiritual
	The Wangetti South Section supports a healthy wellbeing and lifestyle by encouraging the physical, mental, and spiritual activity of participants. Contact with nature can enhance spiritual health, which underpins all other aspects of health (PWC, 2018).
	Educational
	The Wangetti South Section will create several educational opportunities, including the community, schools and universities to increase their knowledge and understanding around wildlife and conservation in WTWHA, with the opportunity to develop education programs to help teach and upskill students (PWC, 2018).
5. Minimise impacts Manage activities that may have been an impact on the area appropriately through permit and zoning system.	Wangetti South Section has received a WTMA permit and therefore will be undertaken in accordance with Strategy 5 of the Wet Tropics Strategic Plan 2020 - 2030.

3. Potential environmental impacts and risks

#### 3.1 Key environmental factors

Eight preliminary key environment factors have been identified in the referral for Wangetti South Section and they include:

- Biodiversity Flora
- Biodiversity Fauna
- Waterways
- Soils and topography
- Public amenity
- Waste management
- Biosecurity
- Cultural heritage

Table 3-1 presents the eight preliminary key environmental factors relevant to construction, the proposal activities that would affect the factors and the site-specific environmental values, uses and sensitive components that will be affected. Table 3-1 also identifies potential Matter of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) that could be potentially impacted by construction activities.

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES		
Biodiversity – Flora	<ul> <li>Vegetation clearing - permanent and temporary loss of vegetation and habitat (direct impact).</li> <li>Construction vehicle movements.</li> <li>Construction plant operation.</li> <li>Soil erosion and sediment generated from earthworks.</li> <li>Illegal collection of flora species by construction crew and members of the public</li> <li>Introduction and spread of invasive species from material brought into the project area.</li> <li>Damage to flora species by construction crew not using designated routes.</li> <li>Notophyll vine forest – these forest areas are environmentally significant and need to be protected from potential visitor impacts. This includes protecting some of the large native orchids (dendrobium sp.) that may be at risk from being removed and exploited.</li> </ul>	<ul> <li>are known, likely or may occur in the Wangetti South Section:</li> <li>Archontophoenix myolensis (Myola palm)</li> <li>Anoectochilus yatesiae (Marbled jewel orchid</li> <li>Canarium acutifolium</li> <li>Dendrobium fellowsii</li> <li>Dendrobium mirbelianum (Darkstemmed antler orchid)</li> <li>Diplazium cordifolium</li> <li>Diplazium pallidum</li> <li>Myrmecodia beccarii (Ant plant)</li> <li>Phaius pictus</li> <li>Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)</li> <li>Polyscias bellendenkerensis</li> <li>Randia audasii</li> <li>Rhomboda polygonoides</li> <li>Toechima pterocarpum (Orange tamarind)</li> <li>Vappodes lithocola (Dwarf butterfly orchid) (also known as Dendrobium biggibum)</li> <li>Vappodes phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium biggibum)</li> <li>Zeuxine polygonoides (Velvet jewel orchid) (also known as Rhomboda polygonoides</li> </ul>		
Biodiversity – Fauna	<ul> <li>Vegetation clearance resulting in injury and mortality to the local fauna.</li> <li>Vegetation clearance has the potential to impact on breeding areas for local fauna.</li> <li>Construction vehicle movements.</li> <li>Construction plant operation.</li> <li>Soil erosion and sediment generated from earthworks.</li> <li>Storage and management of waste from construction crew</li> </ul>	<ul> <li>MNES and MSES bird species that are known likely or may occur:</li> <li><i>Casuarius casuarius</i> (Southern cassowary)</li> <li>Migratory birds (e.g. eastern curlew, great sand plover)</li> <li>Non-migratory species (e.g. masked owl)</li> <li>MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section</li> </ul>		

#### Table 3-1 Key environmental factors relevant to construction

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES	
	<ul> <li>Injury and mortality of wildlife resulting from direct collision with vehicles and mountain bike riders</li> <li>Illegal collection of wildlife by construction crew and members of the public</li> <li>Disturbance of wildlife behaviour by increased noise from hikers and mountain bike riders</li> <li>Introduction and spread of invasive species by the movement of hikers, cyclists and maintenance vehicles</li> <li>Interference of local wildlife by domestic animals</li> <li>Barrier effects and reduced movement to wildlife</li> </ul>	<ul> <li>Litoria dayi (Australian lace lid)</li> <li>Litoria nannotis (Waterfall frog)</li> <li>Litoria nyakalensis (Mountain mistfrog)</li> <li>Litoria rheocola (Common mistfrog)</li> <li>Litoria serrata (Tapping green eyed frog)</li> <li>MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section</li> <li>Dasyurus maculatus gracilis (Spotted-tailed quoll)</li> <li>Dasyurus hallucatus (Northern quoll)</li> <li>Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)</li> <li>Hipposideros semoni (Semon's leaf-nosed bat)</li> <li>Phascolarctos cinereus (Koala)</li> <li>Pteropus conspicillatus (Spectacled flying-fox)</li> <li>Rhinolophus robertsi (Large-eared horseshoe bat)</li> <li>Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)</li> <li>Xeromys myoides (Water mouse)</li> <li>MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> </ul>	
Biosecurity	<ul> <li>Introduction or spread of weeds/ pests/pathogens from construction/ operation activities or materials</li> <li>Interference of local wildlife by domestic animals</li> </ul>	MNES and MSES species as outlined in the Biodiversity – Fauna and Flora rows above. Wet Tropics World and National Heritage Area. Protected Areas - estates protected under the NC Act.	
Waterways	<ul> <li>Earthworks - Soil erosion and sediment.</li> <li>Installation of waterway crossings.</li> </ul>	MNES and MSES amphibian and aquatic species as outlined in Biodiversity – Fauna row above.	

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES	
	<ul> <li>Earthworks and other construction activities have the potential to cause indirect degradation of aquatic habitats, particularly to opal cling goby habitat as shown in Appendix B.</li> <li>Use of construction machinery in and around aquatic habitat.</li> <li>The shared use trail has potential to contribute to sedimentation to the environment. The movement of hikers and mountain bike riders have the potential to cause localised habitat degradation through exposure to run-off and sedimentation, and trail widening to avoid muddy or puddled areas.</li> </ul>	Wet Tropics World Heritage Area Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act</i> 2000 Coastal management districts protected under the <i>Coastal</i> <i>Protection and Management Act</i> 1995.	
Soil and land management	<ul> <li>Earthworks - Soil erosion and sediment.</li> <li>Soil compaction as a result of construction equipment moving in the area.</li> <li>Construction equipment causing displacement of soils and/or rocks.</li> <li>Chemicals and fuel used on-site during construction impacting on the natural environment.</li> </ul>	<ul> <li>Wet Tropics World Heritage Area</li> <li>MNES and MSES amphibian and aquatic species as outlined in Biodiversity – Fauna row above.</li> <li>Protected Areas - estates protected under the NC Act.</li> <li>Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act 2000</i></li> <li>Coastal management districts protected under the <i>Coastal</i> <i>Protection and Management Act 1995</i>.</li> </ul>	
Public amenity and health	<ul> <li>Vegetation clearance</li> <li>Construction vehicle movements.</li> <li>Construction plant operation</li> <li>Soil erosion and earthworks.</li> <li>Storage and management of waste from construction crew.</li> <li>Construction activities may be visible to varying degrees by people living, working, and travelling through the surrounding areas.</li> <li>Noise and vibration generated by construction plant, vehicles and equipment impacting on sensitive receptors including wildlife.</li> </ul>	MNES and MSES species as outlined in the Biodiversity – Fauna row above Wet Tropics World and National Heritage Area Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act 2000</i> Coastal management districts protected under the Coastal Protection and Management Act 1995. Protected Areas - estates protected under the NC Act.	

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES
	<ul> <li>Noise generated by members of the public using vehicles illegally within the project area.</li> <li>Potential air and dust impacts to sensitive receptors as a result of construction activities, attributable to exhaust emissions and fugitive dust.</li> <li>During construction, construction activities have the potential to increase bushfire hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc.</li> <li>Bushfires occurring within the project area impacting threatened flora and fauna species.</li> <li>Steep terrain, remote location, the presence of dangerous animals and plants and potential of extreme weather events are associated with Wangetti South Section and could adversely impact on construction personnel in the following ways:         <ul> <li>Bites from snakes, spiders, and insects.</li> <li>Allergic reactions to plant species along the trail.</li> <li>Heat/cold exposure, falls and sprains, etc.</li> <li>Another hazard is the operation of a helicopter to transport construction material to the project area.</li> <li>Potential hostile intersection with fauna species</li> <li>Extreme weather events requiring evacuation</li> </ul> </li> <li>Disruption to traffic along Captain Cook Highway from construction vehicles</li> <li>Impacts to sensitive environmental areas as a result of vehicles not using designated service tracks</li> </ul>	

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES	
	<ul> <li>and/or members of the public using vehicles illegally within the project area.</li> <li>Congestion of vehicles at existing parking areas.</li> </ul>		
Waste management	<ul> <li>Clearing of vegetation and cut and fill activities will be required to allow for the construction of the trail, camp sites and access tracks resulting in vegetation waste and excess spoil.</li> <li>Construction camps will produce general waste.</li> <li>Inappropriate waste management by construction personnel.</li> </ul>	<ul> <li>MNES and MSES species as outlined in the Biodiversity – Fauna and Flora rows above.</li> <li>Wet Tropics World and National Heritage Area.</li> <li>Protected Areas - estates protected under the NC Act.</li> <li>Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act</i> 2000</li> </ul>	
Cultural heritage	<ul> <li>Potential to find unrecorded cultural heritage and to disturb identified cultural heritage</li> <li>Additional access to sensitive and restricts sites that may impact on Traditional Owner cultural values.</li> <li>Damage to sensitive environmental areas within Wet Tropics World Heritage Area because of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.</li> </ul>	MNES and MSES species as outlined in the Biodiversity – Fauna and Flora rows above. Wet Tropics World and National Heritage Area. Protected Areas - estates protected under the NC Act.	

#### 3.2 Risk assessment

The purpose of this section is to qualitatively determine the risk of potential impacts to environmental factors that could occur as a result of undertaking construction activities for Wangetti South Section without having environmental controls in place. The risk assessment methodology has been based off the risk assessment methodology in the Department of Agriculture, Water and the Environment (DAWE) Environmental Management Plan Guidelines 2014.

#### 3.2.1 Ranking impact criteria

Each potential impact was ranked according to specific criteria namely likelihood and consequence, using the criteria in Table 3-2 and Table 3-3, respectively, where

- Likelihood is based on how likely it is that the event/issue will occur after control strategies have been put in place
- Consequence is what the consequence/result will be if the issue does occur.

These ratings are then combined using the risk assessment (refer Table 3-4) to generate a risk rating of low, medium, high or severe and have been derived from the AS/NZS ISO 31000:2009 Risk management – Principles and guidelines (Standards Australia 2009).

### Table 3-2 Qualitative measure of likelihood (Australian GovernmentDepartment of the Environment, 2014)

Likelihood	Qualitative measure
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

#### Table 3-3 Qualitative measure of consequences (Australian Government Department of the Environment, 2014)

Consequence	Qualitative measure
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

### Table 3-4 Risk assessment (Australian Government Department of the<br/>Environment, 2014)

	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possibly	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 3-5 summarises the predicted initial impacts the proposed construction activities can on have on environmental factors within the project area without environmental controls in place.

The subsequent residual impacts for each environmental factor based upon implementation of recommended management measures are outlined in Section 4.

# Table 3-5 Risk assessment of construction activities on environmentalfactors for Wangetti South Section without environmental controlsin place

Environment al value	Impact	Probability	Consequence	Risk
Biodiversity - flora and fauna	Construction activities resulting in the removal of vegetation, including MNES and MSES outside of the designated works area.	Possible	Moderate	Medium
	Construction activities may impact flora and fauna biodiversity in the area by reducing acceptable habitat and breeding areas for fauna and flora species.	Possible	Moderate	Medium
	Fauna strikes with vehicles are an increased risk during construction phase.	Possible	Moderate	Medium
	Development within Ecologically Significant Areas	Unlikely	Moderate	Low
	Injury or loss of native flora and fauna from the use of construction vehicles and/or equipment. Injury or loss of native flora and fauna from drivers not using designed service tracks to access the work area.	Possible	Moderate	Medium
	Additional disturbance to aquatic environments associated with construction	Possible	Moderate	Medium

Environment al value	Impact	Probability	Consequence	Risk
	and increased foot traffic and potential deviation from designated trail areas			
	Additional disturbance and disruption of flora and fauna due to increased access of area	Possible	Minor	Low
	Additional noise and vibration associated with construction/ may negatively impact flora and fauna*	Possible	Minor	Low
	Light sources generated from the construction activities adversely impacting on wildlife.	Possible	Minor	Low
	Illegal collection of flora and/or fauna species by construction crew and/or members of the public	Possible	Moderate	Medium
Biosecurity (weeds, pests and pathogens)	Introduction or spread of weeds/ pests/pathogens from construction activities or materials	Possible	Moderate	Medium
	As the trail is mostly situated within a national park, domestic animals will be prohibited. Interference of local wildlife by domestic animals is related to unintended introduction of domestic animals on the trail.	Possible	Minor	Low
Water resources	Potential for flooding to occur upstream or downstream as a result of the sizing and treatment of waterway crossings	Possible	Unlikely	Low
	Reduction in water quality through ineffective treatment of pollutant (nitrogen, phosphorous, total suspended solids and gross pollutants) load in stormwater runoff	Possible	Moderate	Medium
	Major storms and resulting flooding may cause undue erosion and impact the trail impact. Trail impact due to erosion may potentially impacts surrounding MNES habitat.	Possible	Moderate	Medium
	Potential for contamination and/or pollutant load in local drainage lines	Unlikely	Moderate	Low
	Use of construction machinery in and around waterways resulting in the degradation of aquatic habitats, bed and	Possible	Moderate	Medium

Environment al value	Impact	Probability	Consequence	Risk
	banks of waterways and adverse impacts to the opal cling goby habitat.			
Soil and land management	Movement of soils can adversely impact on dispersive soils which have a high erosion risk and tunnel and gully erosion can occur.	Possible	Moderate	Medium
	Erosion of soils may occur during construction. Trafficability could also prove difficult within upper layers (such as sand or clay) in wet conditions	Possible	Moderate	Medium
	Soil compaction as a result of construction and operation equipment and vehicles moving in the area and could prove difficult within the upper loose sandy layers and the silty clay layers if exposed and trafficked under wet conditions. The upper sandy layer often overlies the less permeable silty clay layer. This ground profile can often result in wet or saturated upper layers for some time following periods of high rainfall as the sand layer is typically limited to horizontal drainage.	Possible	Moderate	Medium
Soil and land management	Chemicals and fuels used on-site during construction phase not appropriately managed resulting in contaminating the natural environment.	Possible	Moderate	Medium
Public amenity and health	Production of greenhouse gases as a result of machinery use*	Possible	Minor	Low
	Decline of air quality related to construction machinery and dust particles* Production of greenhouse gases as a result of vehicles using the access tracks to service the trail and nodes.	Unlikely	Minor	Low
	Noise and vibration generated by construction plant, vehicles and equipment impacting on sensitive receptors including wildlife.	Possible	Moderate	Medium
	Noise generated by members of the public using vehicles illegally within the project area.	Possible	Minor	Low
	During construction, construction activities have the potential to increase bushfire	Possible	High	Medium

Environment al value	Impact	Probability	Consequence	Risk
	hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc			
	Interference with wildlife by construction vehicles	Possible	Moderate	Medium
	Impacts to sensitive environmental areas because of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.	Possible	Moderate	Medium
	Increased traffic because of construction activities and potential adverse impacts to existing communities surrounding the project area	Possible	Minor	Low
	Construction activities within the road reserve and potential adverse impacts to existing road users	Likely	Minor	Low
Public amenity and health	<ul> <li>Steep terrain, remote location, the presence of dangerous animals and plants and potential of extreme weather events are associated with Wangetti South Section and could adversely impact on construction personnel in the following ways:</li> <li>Bites from snakes, spiders, and insects.</li> <li>Allergic reactions to plant species along the trail.</li> <li>Heat/cold exposure, falls and sprains, etc.</li> <li>Another hazard is the operation of a helicopter to transport construction material to the project area.</li> <li>Potential hostile intersection with fauna species</li> </ul>	Possible	Minor	Low
	Natural hazard events (including bushfire, landslides and storm events) occurring within the project area threatening people and structures and requiring evacuation	Possible	High	Medium

Environment al value	Impact	Probability	Consequence	Risk
Waste Management	Waste generation/ pollution of local area during construction because of inappropriate waste management by construction personnel.	Possible	Minor	Low
Cultural heritage	Potential to find unrecorded cultural heritage*and to disturb identified cultural heritage	Possible	Moderate	Medium
	Additional access to sensitive and restricts sites that may impact on Traditional Owner cultural values	Possible	Moderate	Medium
	Damage to sensitive environmental areas within Wet Tropics World Heritage Area because of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.	Possible	Moderate	Medium

#### 3.3 Rationale and approach

This CEMP has been prepared with consideration of the following site-specific environmental investigations:

- Wangetti South Section Baseline Ecology and Impact Assessment Report 2020 prepared by GHD
- Four ecological field survey events were undertaken on the following dates:
  - 11 March to 15 March 2019 and this field survey focused on areas between south of Mowbray River to Campsite 5, area near Campsite 3, near Hartleys Creek and along Ellis Beach
  - 8 April to 12 April 2019: this field survey focused on areas between Hartleys Creek and Buchan Point
  - 26 August to 30 August 2019 by a team of four ecologists. This survey focused on the coastal, mountainous sections from Hartley's Creek to Turtle Cove. It also covered Simpson Point and Ellis Beach
  - 2 September to 6 September 2019: this field trip focused on the western part of the alignment (from Tresize Road to Turtle Cove) and any remaining areas surveyed from Slip Cliff Point to Redcliff Point.
- According to the 2018 Wangetti Trail Cultural Heritage Survey Report, cultural heritage ground-truthing was conducted in the following areas and dates:
  - Ellis Beach and Mount Buchan Tuesday 24th July 2018;
  - Hartleys Creek Wednesday 25th July 2018;

 Ellis Beach overtaking lane to Red Cliff Point - Tuesday 31st July to Thursday 2<sup>nd</sup> August 2018.

The location fauna and flora surveys undertaken in Wangetti South Section are shown in the maps in Appendix C.

The key findings are summarised in Table 3-1.

#### 3.3.1 Key assumptions

Key assumptions associated with the development of this CEMP include the following:

- The construction period to be undertaken from April 2021 to April 2022
- A soil investigation has not been undertaken for the project and will need to be undertaken to confirm soil conditions (refer to ESCP)
- Construction teams are to be accommodated off site where practical
- Working areas will be clearly defined and demarcated and construction operations must not occur outside of the marked area

• During construction phase the Contractor is to consider having a trailer mounted portable toilet or something similar to be able to service the construction crew. The setup of temporary amenities to be located in disturbed areas and outside of areas of high ecological significance

• Designated eating areas and smoko areas are to be provided. The setup of the area to be located in disturbed areas and outside of areas of high ecological significance

- Material laydown areas are to be allocated and demarcated prior to storage of materials
- All fuels, chemicals, paints, wastes and other potentially environmentally hazardous substances must be stored in a weatherproof container with adequate bunding
- Construction crew will be required to carry their waste off site.

#### 3.3.2 Management approach

This CEMP adopts a risk-based approach to identify and prioritise actions, which addresses the key environmental values, uses and sensitive components summarised in Table 3-5.

This CEMP adopts provisions based on industry standard practices for minimisation and rehabilitation of environmental impacts during construction. The provisions reflect the potential for indirect and direct impacts posed by construction activities, such as unauthorised clearing, dust emissions during high winds and collisions with wildlife.

#### 3.3.3 Roles and responsibilities

This section outlines parties associated with the Wangetti South Section and the responsibilities during the construction phase. All personnel are responsible for ensuring they comply with the EMP, their General Environmental Duty (GED) and Duty to Notify in accordance with the EP Act, as detailed in Table 3-6.

Responsible parties	Responsibilities
TDPD (as	The Project Manager shall support all project personnel in the
proponent)	implementation of the CEMP. The Project Manager may delegate
	responsibilities to appropriately qualified personnel where appropriate.

#### Table 3-6 Environmental roles and responsibilities
Responsible parties	Responsibilities
	<ul> <li>The Project Manager's responsibilities are to:</li> <li>Ensure that all personnel are familiar with the CEMP and are aware of their environmental responsibilities.</li> <li>Ensure that all personnel operate in accordance with the CEMP, statutory approvals and legislative requirements.</li> <li>Ensure necessary guidance and advice is provided to all personnel with regard to environmental management requirements.</li> <li>Ensure that all relevant licenses/permits/approvals are in place prior to any works being undertaken (if required).</li> <li>An audit program be developed by the contractor in consultation with TDPD and DES and following the review of the environment approval conditions and it be undertaken at the end of the construction phase.</li> <li>Where necessary, coordinate and/or assist in the response to environmental incidents through implementation of corrective actions.</li> <li>Report environmental incidents to relevant Administering Authority.</li> </ul>
Contractor's Project Manager Contractor's Trail Designer/Builder	<ul> <li>Implementation of the provisions relating to construction phase of this CEMP during the construction phase including:</li> <li>Complying with the EMP, statutory approvals, legislative requirements, Australian Standards and any relevant Code of Practice and/or Industry Standard.</li> <li>Provide the resources and training systems and appropriate SME trainers to develop, schedule and deliver induction to all staff and contractors including site induction and any relevant site-specific training.</li> <li>Record training events and maintain personnel records.</li> <li>Provide portable toilets onsite if required and ensure that maintenance and disposal of waste is conducted by a licensed contractor as required.</li> <li>Ensure all vehicles arriving onsite utilise the designated entry/exit points and parking area. Ensure that all equipment is fuelled, maintained and 'fit for purpose' for the required task prior to arriving at the site.</li> <li>Notify the Project Manager of environmental incidents and corrective actions taken (if any).</li> <li>Record and maintain a database detailing environmental incidents and non-conformances including corrective actions taken.</li> </ul>

# 3.5 Training, awareness and competence

All personnel involved in the construction process shall be required to attend a compulsory induction before commencing any work on site. The environmental component of the induction shall include (but not be limited to) the following items:

- Guidance on the significance and sensitivity of environmental features along the Wangetti Trail
- Individual's and organisation's environmental obligations under relevant environmental legislation
- The potential environmental impacts of construction (where relevant)
- Controls and procedures to prevent impacts
- All staff shall be made aware of their General Environmental Duty (GED) and Duty to Notify responsibilities as per the EP Act and the implications of failing to fulfil these duties
- All staff shall be made aware of their environmental responsibilities under the CEMP in relation to implementing mitigation measures, reporting environmental incidents and complaints and implementing corrective actions
- All staff shall be made aware of their environmental responsibilities under the CEMP in relation to contaminated land, including identification of potentially contaminated land and procedures for working with potentially contaminated land
- All staff shall be given instructions on environmental emergency response procedures (i.e. fire fighting, snake bite, spill kit locations and usage).

The environmental induction training should be developed prior to construction commencing.

## Site inductions and toolbox talks

All Contractor personnel including sub-contractors will either be briefed on environmental requirements for specific construction activities or on a site-specific basis, concentrating on reinforcing practical measures. It is typical for these briefings to become a part of the Toolbox agenda. Typical topics for toolbox talks include:

- Permit conditions
- Vegetation clearing demarcations
- Refuelling plant and machinery
- Precautions to prevent sediment-laden run-off entering watercourses
- Waste management (including re-use, recycling, segregation, storage and disposal)
- Noise management measures
- Precautions for protected flora and fauna
- Wildlife care.

## 3.5.1 Training register

A register of all environmental training delivered during the course of the construction of the Project, (including inductions and toolbox talks), will be maintained for the duration specified by any environmental approvals. The register will be maintained to record training attendance and currency of training for each staff, contractor and visitor.

# 4. **CEMP** provisions

This section of the CEMP presents the environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control. It discusses the residual impact once controls measures are implemented, nominates performance indicators used for measuring the controls, a list of corrective actions and how the controls will be monitored.

The CEMP provisions represent the TDPD commitments for environmental management and demonstrate that construction activities will be appropriately managed to reduce impacts to MNES, MSES and other significant environmental values associated with the project area.

# 4.1 **Biodiversity**

Wangetti South Section supports an array of unique and threatened flora and fauna species and ecosystems, given that the majority of works are located within a sensitive environmental area being Macalister Range National Park and the Wet Tropics World Heritage Area. Minimising impacts to threatened species and ecosystems during the construction phase will be a key aspect of environmental management for Wangetti South.

This section outlines proposed environmental controls in response to protecting threatened flora and fauna species during the construction phase. Refer to Section 4.1.1 and 4.1.2. It also outlines proposed environmental controls in response to managing weeds, pests and pathogens during the construction phase. Refer to Section 4.1.3 below.

# 4.1.1 Fauna

The construction phase has the potential to impact on the threatened fauna species. Habitat for MNES and MSES fauna species that are known, likely or may occur in the Wangetti South Section could be potentially affected by proposed works are outlined in Table 4-1,

Appendix D describes and shows the potential fauna habitat types have been recorded within the Wangetti South survey area, Potential habitat for the southern cassowary is captured in the Cassowary Management Plan. Appendix B shows potential modelled habitat for opal cling goby (*Stiphodon semoni*) in vicinity of Wangetti Trail - South Section.

The biodiversity (flora) environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-1.

#### Table 4-1 Biodiversity (fauna) environmental factors

## Factor – Biodiversity (fauna)

#### Construction activities resulting in adverse impacts to the project area

Construction activities resulting in the removal of vegetation, including MNES and MSES

Construction activities may impact flora and fauna biodiversity in the area

Illegal collection of wildlife

Development within Ecologically Significant Areas

Injury or loss of native flora and fauna

Additional disturbance to aquatic environments associated with increased foot traffic and potential deviation from designated trail areas

Additional disturbance and disruption of flora and fauna due to increased access of area

Additional noise and vibration associated with construction/ may negatively impact flora and fauna

Light sources generated from the construction adversely impacting on wildlife.

#### Initial Risk with no control

Medium to low risk

Mitigation measures/controls	Timing	Applicable MNES & MSES	Responsibility
Signs will be erected along the project area to remind people that the collection of wildlife within National parks is prohibited.	During pre-start At all times MNES and MSES bird species known, likely or may occur: • Casuarius casuarius (South cassowant)	<ul> <li>MNES and MSES bird species that are known, likely or may occur:</li> <li><i>Casuarius casuarius</i> (Southern cassowary)</li> </ul>	Contractor's Project Manager Site Supervisor
Site inductions and toolbox talks with the construction crew will occur prior construction to educate them about fauna species in the project area.	During pre-start	<ul> <li>cassowary)</li> <li>Migratory birds (e.g. eastern curlew, great sand plover)</li> </ul>	Contractor's Project Manager Site Supervisor

Factor – Biodiversity (fauna)			
Clearing of trees that provide habitat to fauna species is carried out in a way that ensures animals in the area being cleared (the clearing site) have enough time to move out of the clearing site without human intervention; The clearing must be carried out in stages.	At all times	<ul> <li>Non-migratory species (e.g. masked owl)</li> <li>MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section</li> </ul>	Contractor's Project Manager Site Supervisor
Suitability qualified fauna spotter/ecologist to be available during the construction phase to provide advice. An experienced fauna spotter-catcher is to conduct an inspection of the trail alignment and public campsites ahead of vegetation disturbance and track construction clearing. The spotter must be present through all stages of clearing. Standard fauna spotter-catcher vegetation clearing protocols are to be followed, including inspection of potential habitat features prior to disturbance	During pre-start At all times	<ul> <li>Litoria dayi (Australian lace lid)</li> <li>Litoria nannotis (Waterfall frog)</li> <li>Litoria nyakalensis (Mountain mistfrog)</li> <li>Litoria rheocola (Common mistfrog)</li> <li>Litoria serrata (Tapping green eyed frog)</li> <li>MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section</li> <li>Dasyurus maculatus gracilis (Spotted-tailed quoll)</li> <li>Dasyurus hallucatus (Northern quoll)</li> <li>Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)</li> <li>Hipposideros semoni (Semon's leafnosed bat)</li> </ul>	Contractor's Project Manager Site Supervisor
Speed limits are to be restricted on access roads to avoid the incidence of vehicle strike with fauna to be nominated in the Traffic Management Plan.	At all times		All personnel
A response procedure to be developed and implemented with regards to wildlife injury or mortality during construction	At all times		Contractor's Project Manager Site Supervisor
No fires are to be permitted within the project area.	At all times	<ul> <li>Phascolarctos cinereus (Koala)</li> <li>Pteropus conspicillatus (Spectacled)</li> </ul>	All personnel
Works impacting fauna to comply with the conditions in the environmental permits issued for Wangetti South Section.	At all times	<ul> <li>flying-fox)</li> <li>Rhinolophus robertsi (Large-eared horseshoe bat)</li> <li>Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)</li> </ul>	All personnel
Records of pest animals observed on site to be recorded and addressed in accordance with the provision in the weed, pest and disease management plan.	At all times		All personnel

Se	quential clearing of vegetation to allow resident fauna the portunity to disperse away from the immediate construction area	During vegetation clearing	<ul> <li>Xeromys myoides (Water mouse)</li> <li>MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section</li> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> </ul>	All personnel
Ор асс •	al cling goby to be managed during the construction phase in cordance with the following: Provisions are made to minimise the risk of fish kills arising from the works e.g. through entrapment of fish upstream or between works. In the event that fish that have been trapped by the works, fish salvage activities in accordance with the Fisheries Queensland Guidelines for Fish Salvage (available at www.daf.qld.gov.au) are implemented immediately	At all times	<i>Stiphodon semoni</i> (Opal cling goby)	All personnel
•	All clearing is to comply with requirements of relevant permits and approval conditions, with specific reference to erosion and sediment control plans that clearly identify mechanisms to avoid the discharge of sediment during construction off site into local habitat.			
•	Transit to construction sites will be via approved and designated services tracks only and speed limits of maximum 40 km/hr on formed roads. Construction vehicles will be of the smallest practical size to access the required areas.			

- Signs will be erected along the project area to remind people that the collection of wildlife within National parks is prohibited.
- Within opal cling goby habitat, bridges will be designed to completely span suitable habitat and limit public access to waterways. No in-stream crossings will be included.
- Adherence to daytime construction times only and all machinery to be silenced to manufacturers specifications. No blasting of rock is permitted.
- Limiting construction equipment operating adjacent to waterways and undertaking hand construction where possible.
- Undertake a pre-clearing weed survey and pre-clearing pest survey and treatment and management and report areas of existing weed infestation.
- During construction phase, all machinery and vehicle hygiene protocols to be followed at all times to prevent the introduction of weeds and pathogens. Vehicles, plant and equipment to be used for the project would be required to be clean with Weed and Seed Hygiene Declaration certificates. Vehicles, plant and equipment to be inspected prior to being used to ensure they are clean.
- Weed identification to be included in the site induction training.
- Trail construction will minimise disruption of forest canopy wherever possible to avoid additional sunlight that can promote weed growth on forest floor.
- Techniques for installing the bridges has been outlined in the Wangetti Trail Construction Methodology Manual and include spanning the full width of the waterway so that no works occurs

within the waterway and existing nature features are left in place within the waterway.

- Construction of waterway crossings only to occur in the approved areas as documented on a map in a register.
- Pre-works and post works reporting to be undertaken in accordance with the Accepted development requirements for operational work that is constructing or raising waterway barrier works, Department of Agriculture and Fisheries, 2018 and information reported in the contractor's environment system.
- For any part of the waterway bed or banks adjacent to the works that has been altered by construction activities, the site is restored and/or rehabilitated so that as a minimum:
- Stability and profiles of the bed and banks are re-instated to natural stream profiles and stability within five (5) business days of the completion of the works
- The waterway bed is retained with natural substrate or reconstructed with substrate comparable to the natural substrate size and consistency
- Site conditions allow the rapid re-establishment of native vegetation and cover or native species are replanted to reestablish the natural plant community
- All vegetation that is removed is cut into small pieces and dispersed throughout the surrounding area (where possible) with no large windrows or stockpiles being present within the project area. The temporary (construction) footprint will be left in such a manner that natural regeneration of the local vegetation community will be encouraged, including soil, and weed

management as appropriate to the disturbance and existing environment.

- Storage of fuels, chemicals, wastes and other potentially environmentally hazardous substances will be bunded or otherwise contained areas away from waterways.
- No refuelling activities should take place within 50 m of a watercourse.
- Degradation will be mitigated through minimising the size of the disturbance area, implementing an Erosion Sediment and Control Plan (ESCP), constructing bridges that span the width of the waterway, constructing during dry conditions, and minimising disturbance by noise, vibration and/or artificial lighting.

Southern cassowaries to be managed during the construction phase in accordance with the provisions in the Wangetti Trail Cassowary Management Plan in the EMP.

Site clearance survey of camp areas by experienced ecologist to be undertaken prior to any construction with the following requirements:

- Location of potentially important cassowary foodplant trees within and immediately adjacent development footprint.
- Location and orientation of permanent water in relation to development footprint.

Assessment of likely cassowary access routes to any of the above resources identified (tracks, pads etc)

Use of any recreational radios, playing of music, or general broadcasting will be strictly confined to in-vehicle operation whilst transiting to and from site only and not played within any highest, high or moderate priority areas during construction.

ne			
s S	At all times	MNES and MSES bird species that are known likely or may occur: • Southern cassowary	Contractor's Project Manager Site Supervisor

The induction program for all construction personnel will include a component on cassowary management measures and will include methodologies for de-escalating confrontational interactions. On any construction work site, should a cassowary approach the works area then works in that particular location will cease until the cassowary has left of its own accord. All construction work should have a plan for alternate work sites and tasks in this contingency.

On-site standard construction hours will apply as per EP (noise) policy 2019, local government statutes and permit conditions. Adherence to daytime construction times only and all machinery to be silenced to manufacturers specifications. No blasting of rock is permitted.

All machinery used in construction and operation should be silenced to manufacturers specifications and maintained to that condition. Lighting and electrical supply to the eco-accommodation and emergency lighting should be reliant on alternatives to fuel generators.

Helicopters can be used for the transport of materials to sites in low and lowest priority areas where:

- They are able to operate outside of the ground effect zone when hovering.
- Drop zones are in low or lowest priority areas where likely cassowary occurrence is nil or extremely unlikely.
- Preclearance of any drop zones for materials near watercourses or rainforest (essential habitat areas) identifies no evidence of cassowary presence.
- Helicopter overfly of WTWHA is in accordance with regulatory provisions of the Wet Tropics Plan

 All machinery used in construction and operation should be silenced to manufacturers specifications and maintained to that condition

Helicopters will not be used for the transport of construction personnel.

Works adjacent permanent or significant ephemeral watercourses (e.g. bridge works) will have full erosion and sediment control measures implemented and maintained for the duration of the works as per the ESCP to be developed for the project.

Where possible, all constructed watercourse crossings will be at level that will not obstruct potential cassowary movement. Preference is given to a bed level crossing that will not obstruct waterflow, and to be comprised primarily of natural material, e.g. laid stone pavements. Where there are practical limitations to the construction of bed level crossings, crossings should be designed such that their height will not obstruct cassowary movement, i.e., are capable of being stepped up onto, and over (or under). Heights are to comply with the Building Code of Australia AS 2156.2 (Walking Tracks Part 2: Infrastructure) and AS 5100 (Bridge Design) with respect to requirements for handrails. Hand rails/balustrades on bridges/crossings will pose an impediment to cassowary movement and hence crossings should be of a 'low fall' design, less than the 1300 – 1400mm specified in AS 5100 for bicycles.

Permanent barrier fencing, of any sort, is not be employed in any situation. Any secured areas e.g. around waste disposal locations, should use wooden palisade fencing. Temporary fencing for construction purposes (e.g. around open pits, newly laid concrete areas) will not be made of wire, nor obstruct movement across the general site area.

Undertake a pre-clearing weed survey treatment and management and report areas of existing weed infestation. Pre-clearance onground weed, and pest surveys will be undertaken by an appropriately skilled person to confirm biosecurity matters within the project area and this will assist with determining the appropriate treatments to be used to treat weeds and pests.

All machinery and vehicle hygiene protocols to be followed at all times to prevent the introduction of weeds and pathogens. Vehicles, plant and equipment to be used for the project would be required to be clean. Vehicles, plant and equipment to be inspected prior to being used to ensure they are clean.

Disinfecting vehicles and machinery. This will be undertaken during the construction phase of the project and maintained throughout. Plant/machinery to be washed down at a commercial washdown facility or washdown facility at QPWS works depot prior to construction and if they used again for the different areas of the project area.

Any weed infestation shall be treated at earliest stage while small and manageable. Treatment methods to be approved by WTMA, DES, TDPD and QPW, as applicable.

Weed material that is cleared within the project area must be disposed of appropriately. Any weed removal as part of the construction phase will be cleared and disposed of at an approved waste disposal facility. Any infestations that subsequently establish during the construction period will be treated, and post-construction weed management of rehabilitated areas will be undertaken.

The contractor will be required to complete a pre-clearing pest survey and report documenting areas of existing electric ant infestation and identifying treatment and management

requirements. Pre-clearance on-ground pest surveys will be undertaken by an appropriately skilled person. Before starting construction, discussions with WTMA, Douglas Shire Council and Cairns Regional Council to be undertaken during the pre-start trail review to discuss and agree on specific treatments regarding pest species including but not limited to yellow crazy ants, electric ants, pigs and dogs

Feeding of cassowaries is banned in all parts of the project area and is to be a prominent message at trailhead hub locations, at camp areas. Signage will be placed in all these locations and be part of any information package given to hikers, campers, mountain bike riders. Food scraps to be disposed of into bins with closed/secured lids and removed from site daily to minimise vermin infestations.

#### Residual risk within control in place

Low risk - Implementation of recommended mitigation measures will minimise impacts to fauna within the project area.

Performance indicator	
No injury or death to native fauna species.	
Corrective actions	
Incident	Corrective action
Pre-clearing inspection find	If during clearing an active breeding place is identified, works should cease immediately, and a fauna spotter/catcher be contacted.
Fauna within clearing area	Relocation of fauna captured during clearing works to an appropriate nearby habitat area to be undertaken by a fauna spotter/catcher.

Factor – Biodiversity (fauna)					
Injured animals	To be taken immediately to a licensed wildlife carer.				
Monitoring					
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.					
Any non-conformances are to be documented and reported to TDPD and rectified immediately					

## 4.1.2 Flora

The biodiversity (flora) environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-2.

In addition, to the environmental controls outlined in Table 4-2 below, the Wangetti Trail South Section (Wangetti to Palm Cove) Matters of national environmental significance flora preclearance survey methodology has been prepared for Wangetti South Section. The purpose of the Matters of national environmental significance flora pre-clearance survey methodology was to outline the pre-clearance survey methodology to be adopted before starting construction works to demonstrate how protected flora species will be identified and managed as part of the project. Protected flora considered by the document are those that are listed as MNES under the EPBC Act. The document outlines the timing of the MNES flora pre-clearance survey, the personnel required to undertake the MNES flora pre-clearance survey and the methods to be adopted. Refer to Appendix F in the EMP for a copy of the document.

#### Table 4-2 Biodiversity (flora) environmental factors

## Factor – Biodiversity (flora)

#### Construction activities resulting in adverse impacts to the project area

Clearing of vegetation will be required to allow for the construction of the trail, camp sites and service tracks.

Construction activities may impact flora biodiversity in the area

**Development within Ecologically Significant Areas** 

Additional disturbance to aquatic environments associated with increased foot traffic and potential deviation from designated trail areas

Additional disturbance and disruption of flora due to increased access of area

Additional noise and vibration associated with construction/ may negatively impact flora and fauna

#### Initial risk with no control

Low risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
During vegetation clearing preference is given to trimming vegetation rather than clearing to retain overhead canopy.	During vegetation clearing	MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section:	All personnel
During the MNES flora pre-clearance survey, the botanist/ecologist will comprehensively traverse the project footprint on foot in search of MNES plants. Where an MNES flora species is encountered, the tree protection zone of the individual tree (or the host tree / adjacent tree, as relevant to the particular flora species) is to be determined and an exclusion zone established. In accordance with Australian Standard Protection of Trees on Development Sites (AS 4970-2009), the formula to use is: Tree Protection Zone radius = DBH (trunk	During vegetation clearing	<ul> <li>Archomophoenix myolensis (myola palm)</li> <li>Anoectochilus yatesiae (Marbled jewel orchid</li> <li>Canarium acutifolium</li> <li>Dendrobium fellowsii</li> <li>Dendrobium mirbelianum (Dark-stemmed antler orchid)</li> <li>Diplazium cordifolium</li> <li>Diplazium pallidum</li> <li>Myrmecodia beccarii (Ant plant)</li> </ul>	Contractor's Project Manager Site Supervisor

#### Factor – Biodiversity (flora)

diameter measured at 1.4 m above ground) x 12. For trees with a diameter at breast height larger than 1.5 m, a maximum tree protection zone radius of 18 m is to be established.

As per AS 4970-2009, encroachment of up to 10 percent of the tree protection zone is allowable when the suitably qualified and experienced the botanist/ecologist assesses that this will not adversely affect plant health.

Where an MNES plant species is detected, the botanist/ecologist will notify the trail builders, and an exclusion zone will be clearly demarcated using coloured flagging tape or bunting. The precise location of all observed MNES flora species will be recorded with a hand-held global positioning system (GPS) for future reference and for notification to relevant parties (e.g. Queensland Herbarium) and inclusion on site plans.

Upon completion of works in the vicinity of an exclusion zone, all marking will be removed.

Vegetation clearing must only take place in those areas where preclearance surveys have been completed. During the PSTR, the scope of the environmental issue is visually identified and marked as an exclusion zone (using different coloured flagging tape or bunting). The exact alignment of the trail is flagged, ensuring an adequate buffer from the exclusion zone.

Detailed documentation is gathered, including photographs showing the pre-existing conditions on site before any works are undertaken. This allows for post-construction photos to be taken, which will enable before/after comparison.

- Phaius pictus
- Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)
- Polyscias bellendenkerensis
- Randia audasii
- Rhomboda polygonoides
- Toechima pterocarpum (Orange tamarind)
- Vappodes lithocola (Dwarf butterfly orchid) (also known as Dendrobium lithocola, and the Queensland Flora Census 2019 groups this species into Dendrobium biggibum)
- Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)
- Zeuxine polygonoides (Velvet jewel orchid) (also known as Rhomboda polygonoides))

Factor – Biodiversity (flora)		
Toolbox talks with the construction crew will occur prior construction to educate them about flora species in the project area.	During pre-start	Contractor's Pro Manager Site Supervisor
Plant operators are to exercise due care when operating to ensure any parts of trees are not damaged from blades or booms.	At all times	All personnel
Clearing for trail, public campsite and associated structure construction is to avoid, where practical, trees greater than 10 cm diameter at breast height (dbh).	At all times	All personnel
Suitability qualified botanist/ecologist to be onsite during the construction phase to provide advice.	During vegetation clearing	Contractor's Pro Manager Site Supervisor
Where unavoidable, restrict vegetation clearing to the smallest practical work area with retention of vegetation associated with riparian areas.	During vegetation clearing	Contractor's Pro Manager Site Supervisor
Clearing for public campsite facilities and associated structures is to be restricted to the footprint of individual features such as camping platforms, amenities blocks, rainwater tanks and tracks or raised walkways. Clearing is only to occur where it is unavoidable.	At all times	All personnel
Manual construction methods are encouraged in preference to mechanical methods	During vegetation clearing	All personnel
No unapproved clearing to occur beyond the required limits for construction	During vegetation clearing	All personnel

Factor – Biodiversity (flora)			
Identified sensitive areas are demarcated and managed appropriately with minimal impacts	During pre-start		All personnel
	During vegetation clearing		
			A.I.
No burning of vegetation is to occur on site	At all times		All personnel
No collection of firewood is to take place	At all times		All personnel
All vegetation that is cleared should not be stockpiled and should be dispersed of within the 40 m corridor to resemble the natural surrounds and to allow natural decomposition processes to take place.	At all times		Contractor's Project Manager Site Supervisor
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will	minimise impacts to	vegetation to the approved footprint.	
Performance indicator			
No vegetation clearing outside of the approved clearing footprint.			
Corrective actions			
Incident	Corrective action		
Clearing extends outside of the approved area	Immediately stop works and report to TDPD and Project Manager.		
	Let areas naturally regenerate and implement weed control to manage any outbreaks. Areas to be monitored to check health and condition of regenerating areas.		to manage any tion of regenerating
Damage to high visibility flagging and exclusion fencing	Replacement of flagging and fencing as soon as possible to reduce the potential of accidental clearing.		

## Factor – Biodiversity (flora)

## Monitoring

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

Any non-conformances are to be documented and reported to TDPD and rectified immediately

# 4.1.3 Biosecurity

A Preliminary Weed, Pests and Disease Management Plan (WPDMP) have been developed for the construction and operational phases of Wangetti South Section. The WPDMP provides an overview of the strategy, methods and controls implemented as part of the Wangetti South Section to manage the issue of weeds, pests and diseases. Specifically, this WPDMP identifies weeds, pests and potential diseases within the Wangetti South Section and describes management strategy, to identify, avoid and, prevent/minimise and control the introduction of and spread of weeds, pests and diseases within the Wangetti South Section and to neighbouring areas.

The objectives of the WPDMP is to:

- Protect the biodiversity of the surrounding landscape of the adverse impacts from weeds
- Reduce weed infestations by integrating control methods and cost-effective management
- Manage weeds in disturbed areas and to protect rehabilitated areas
- Manage the weed species that are currently present on the site as well as off-site work areas
- Prevent introduction of new weed infestations to the Project area and adjoining areas
- Increase on-site awareness about the major weed species and manage pest species though strategic management, where possible.
- Avoid and effectively manage impacts associated with weeds, pests and diseases.

Weed and pest species and pathogens identified onsite are to be managed in accordance with the WPDMP which can be found in Appendix C of the Wangetti South EMP.

# 4.1 Soil and land management

Soil and land management measures will be a key aspect of environmental management for Wangetti South given the terrain, climate and that the majority of works are located within a sensitive environmental area being Macalister Range National Park and the Wet Tropics World Heritage Area.

This section outlines proposed environmental controls in response to managing soils and erosion during the construction phase. It also outlines proposed environmental controls in response to managing chemicals and fuels related to plant, vehicle and equipment used to complete works during the construction phase. Refer to Section 4.1.1 and Section 4.1.2 below.

## 4.1.1 Erosion and sediment control

The Department of State Development, Tourism and Innovation - Tourism Development Project Division - Wangetti Trail South Section (Wangetti to Palm Cove) Concept Erosion and Sediment Control Plan (CESCP) has been prepared for Wangetti South Section and outlines the control measures to be adopted and considered the Contractor. Refer to Appendix A in the EMP for a copy of the CESCP.

## 4.1.2 Chemical and fuel management

Chemicals and fuel used on site will largely be related to the equipment used to complete works and the chemicals used in the construction.

Equipment used for on-site works during the construction phase include:

- Mini Excavators
- Bobcats
- Power carriers
- Chainsaws
- Compactors
- Generators
- General construction tools and equipment (drills, saws, sanders, etc.).

Some of this equipment will require petrol to be stored on site. Equipment will be refuelled using petrol storage containers on site.

All chemicals will be stored in a designated bunded chemical storage compound located at the project site office. Chemicals will be stored according to the storage and handling requirements listed in the relevant safety data sheet and comply with AS 1940 and AS 3833, including minor storages in accordance with Section 2 of the Standards, with incompatible chemicals not stored together.

Spill kits and chemical containment measures will be maintained at the project site compound, as well as in the site vehicles when required.

The chemical and fuel management environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-3 and Table 4-5.

The fuels and oils environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-5.

#### **Table 4-3 Chemical and fuel management environmental factors**

## Factor – Chemical and fuel management

#### Construction activities resulting in adverse impacts to the project area

Chemicals and fuel used on-site for project works will largely be related to the equipment used to complete works and the chemicals used in the construction.

Equipment used for on-site works during the construction phase include:

- Mini Excavators
- Bobcats
- Power carriers
- Chainsaws
- Compactors
- Generators
- General construction tools and equipment (drills, saws, sanders, etc.).

#### Initial risk with no control

Medium

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
All chemicals will be stored in a designated bunded chemical storage compound located at the project site office.	At all times	nes MNES and MSES amphibian species that are known, likely or may occur in the Was netting South Coastien	All personnel
Chemicals will be stored according to the storage and handling requirements listed in the relevant safety data sheet and comply with AS 1940 and AS 3833, including minor storages in accordance with Section 2 of the Standards, with incompatible chemicals not stored together.	At all times	<ul> <li>Litoria dayi (Australian lace lid)</li> <li>Litoria nannotis (Waterfall frog)</li> <li>Litoria nyakalensis (Mountain mistfrog)</li> </ul>	All personnel

Factor – Chemical and fuel management			
Refuelling and transfer operations must be done in areas with adequate containment systems, away from watercourses. Safe handling techniques will be employed during refuelling, such as using pumps to prevent spillage.	At all times	<ul> <li><i>Litoria rheocola</i> (Common mistfrog)</li> <li><i>Litoria serrata</i> (Tapping green eyed frog</li> <li>MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section</li> <li><i>Stiphodon semoni</i> (Opal cling goby)</li> <li><i>Stiphodon rutilarueus</i> (Orange cling goby)</li> <li><i>Stiphodon pelewensis</i> (Emerald cling goby)</li> <li><i>Stiphodon surrufus</i> (Birdsong cling goby)</li> <li><i>Stiphodon surrufus</i> (Birdsong cling goby)</li> <li>Wet Tropics World Heritage Area National Heritage Site</li> <li>Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act 2000</i></li> <li>Protected Areas - estates protected under the NC Act</li> <li>Coastal Management District</li> </ul>	All personnel
All plant and equipment must be maintained and operated in their proper and effective condition and no routine maintenance and servicing to be undertaken on site.	At all times		All personnel
Contaminants must not be directly or indirectly released to any waters or land.	At all times		All personnel
Spill kits and chemical containment measures will be maintained at the project site compound, as well as in the site vehicles when required.	At all times		All personnel
Spills are to be isolated, stopped and contained and will be cleaned up utilising onsite spill kits. Waste to be placed in a sealed container, suitable to hold such materials and waste to be consigned to a contractor licensed to receive such wastes for disposal.	At all times		All personnel
In an instance of a spill, irrespective of the quantity, a report detailing the incident, investigations, corrective actions and monitoring requirements will be prepared.	At all times		Contractor's Project Manager Site Supervisor
Residual risk within control in place			

Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.

## Factor – Chemical and fuel management

#### Performance indicator

No contamination of water quality, soil, and vegetation as a result of the storage and handling of chemicals and fuels

Appropriate storage of fuels and chemicals

Adequately maintained spill response kits and procedures

Corrective actions			
Incident	Corrective action		
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure.		
Containers damaged or bunded areas in poor condition Fix bunded areas to be in working order.			
Appropriate equipment in spill kits If spill kits are lacking equipment, equipment is to be replaced as soon as possible.			
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			

Any non-conformances are to be documented and reported to TDPD and rectified immediately

#### **Table 4-4 Hazardous materials environmental factors**

## Factor – Hazardous materials

## Construction activities resulting in adverse impacts to the project area

Hazardous materials used on-site for project works will largely be related to the equipment and materials used to complete works.

## Initial risk with no control

Medium risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
Material Safety Data Sheets (MSDS) are to be available to all personnel for all chemicals that are stored on site.	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section	Contractor's Project Manager Site Supervisor
Hazardous waste (i.e. paint, thinners, cleaning materials, petrochemicals and other toxic chemicals) must be stored at a dedicated hazardous waste container/containment area. The hazardous waste must be disposed of as a registered waste handling facility for toxic/hazardous materials/chemicals	At all times	<ul> <li><i>Litoria dayi</i> (Australian lace lid)</li> <li><i>Litoria nannotis</i> (Waterfall frog)</li> <li><i>Litoria nyakalensis</i> (Mountain mistfrog)</li> <li><i>Litoria rheocola</i> (Common mistfrog)</li> <li><i>Litoria serrata</i> (Tapping green eyed)</li> </ul>	Contractor's Project Manager Site Supervisor
Hazardous materials should be stored in a contained, stable and safe environment with relevant labels placed on storage containers and lids firmly applied to prevent spillage	At all times	frog MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section	All personnel
Special care must be taken to avoid the spillage of hazardous materials/chemicals onto the ground or into water resources	At all times	<ul> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> </ul>	All personnel
A mixing of concrete to take place on an impermeable surface	At all times		All personnel
No wastewater from concrete mixing is to be discharged to the receiving environment.	At all times		All personnel

Factor – Hazardous materials			
	Wet Tropics World Heritage Area National Heritage Site		
	Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act 2000</i>		
	Protected Areas - estates protected under the NC Act		
	Coastal Management District		
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.			
Performance indicator			
No contamination of water quality, soil, and vegetation, as a result of the storage and handling of hazardous materials.			
Appropriate storage of hazardous materials.			
Adequately maintained spill response kits and procedures			
Corrective actions			
Incident	Corrective action		
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure.		
Containers damaged or bunded areas in poor condition	Fix bunded areas to be in working order.		
Appropriate equipment in spill kits	If spill kits are lacking equipment, equipment is to be replaced as soon as possible.		

#### Factor – Hazardous materials

#### Monitoring

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

Any non-conformances are to be documented and reported to TDPD and rectified immediately

#### Table 4-5 Fuels and oils environmental factors

## Factor – Fuels and oils

Construction activities resulting in adverse impacts to the project area

Fuels and oils used on-site for project works will largely be related to the equipment and materials used to complete works.

#### Initial risk with no control

Medium risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
Fuel shall be stored in appropriate storage containers or bunded areas away from waterways.	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section	All personnel
<ul> <li>Refuelling of machinery shall conform with the following:</li> <li>i. Occur away from waterways unless for tracked machinery and contingency plan management measures are available in the immediate area;</li> <li>ii. Fuelling activity to be supervised at all times; and</li> <li>iii. Hoses to be fitted with a stop valve at the nozzle end.</li> </ul>	At all times	<ul> <li>Litoria dayi (Australian lace lid)</li> <li>Litoria nannotis (Waterfall frog)</li> <li>Litoria nyakalensis (Mountain mistfrog)</li> <li>Litoria rheocola (Common mistfrog)</li> <li>Litoria serrata (Tapping green eyed frog</li> </ul>	All personnel
For smaller equipment that may require more regular re-fuelling (e.g. chainsaws, a limit of 5 litres of extra fuel in an appropriate container can be kept along the trail). Spill kits will also be available		MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section	

Factor – Fuels and oils			
on site for all personnel to use. All personnel will be trained in spill response procedures and in the use of spill kits.		<ul> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> <li>MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section:         <ul> <li>Archontophoenix myolensis (Myola palm)</li> <li>Anoectochilus yatesiae (Marbled jewel orchid</li> <li>Canarium acutifolium</li> <li>Dendrobium fellowsii</li> <li>Dendrobium gellidum</li> <li>Diplazium cordifolium</li> <li>Diplazium pallidum</li> <li>Myrmecodia beccarii (Ant plant)</li> <li>Phaiaenopsis amabilis subsp. rosenstromii (Native moth orchid)</li> <li>Polyscias bellendenkerensis</li> <li>Randia audasii</li> <li>Rhomboda polygonoides</li> <li>Toechima pterocarpum (Orange tamarind)</li> <li>Vappodes lithocola (Dwarf butterfly orchid) (also known as Dendrobium lithocola, and the Queensland Flora Census 2019</li> </ul> </li> </ul>	
No refuelling activities to occur within 50 m of a watercourse.	At all times		All personnel
Site supervisor should be supplied with the contact number for the local fire department unit.	At all times		All personnel
All chemical storage and handling will be in accordance with material SDS, with appropriate firefighting equipment (e.g. specific fire extinguisher types) identified in the SDS to be maintained on- site.	At all times		Contractor's Project Manager Site Supervisor
Adequate fire suppression equipment should be on site.	At all times		Contractor's Project Manager Site Supervisor
Machinery will be used and serviced as per manufacturer's instructions.	At all times		All personnel
No burning of any substances, including wooden debris or products, will be undertaken as part of this project.	At all times		All personnel

groups this species into Dendrobium biggibum) • Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum) • Zeuxine polygonoides (Velvet jewel orchid) (also known as Rhomboda polygonoides)) Wet Tropics World Heritage Area National Heritage Site Waterways protected under the Fisheries Act 1994 and Water Act 2000 Protected Areas - estates protected under the NC Act	
Coastal Management District	

## Residual risk within control in place

Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.

## **Performance indicator**

No contamination of water quality, soil, and vegetation as a result of the storage and handling of hazardous materials.

Appropriate storage of hazardous materials.

Adequately maintained spill response kits and procedures

Factor – Fuels and oils		
Corrective actions		
Incident	Corrective action	
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure. Where spills occur compromised soil/vegetation should be treated as hazardous waste and disposed of accordingly.	
Containers damaged or bunded areas in poor condition	Fix bunded areas to be in working order.	
Appropriate equipment in spill kits	If spill kits are lacking equipment, equipment is to be replaced as soon as possible.	
Monitoring		
We also improve the second the implementation of the above mitige	tion measures with records least in a weakly any incompartal shealdist	

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

Any non-conformances are to be documented and reported to TDPD and rectified immediately

# 4.2 Cultural heritage

Sections of the Wangetti South Section are considered to have high cultural heritage values. Environmental management for the project should adhere to the measures in the Aboriginal Cultural Heritage Act 2003 Duty of Care Guidelines. The project would constitute a Category 5 development and should not proceed without cultural heritage assessment.

The Wangetti South Section is also located within the Wet Tropics World Heritage Area, which is recognised as a national heritage place for both natural and Indigenous values.

The cultural heritage environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-6.

#### **Table 4-6 Cultural heritage environmental factors**

### Factor – Cultural heritage

#### Construction activities resulting in adverse impacts to the project area

Clearing of vegetation will be required to allow for the construction of the trail, camp sites and access tracks which may impact on cultural heritage sites.

Damage to sensitive environmental areas within Wet Tropics World Heritage Area as a result of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.

Initial risk with no control

Medium risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
All works are to be undertaken in accordance with the <i>Queensland Heritage Act 1992</i> , ACH Act and the Duty of Care Guidelines unless otherwise agreed in a CHMP.	At all times	Wet Tropics World Heritage Area National Heritage Site Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act</i> 2000 Protected Areas - estates protected under the NC Act Coastal Management District	All personnel
All site personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, a cultural heritage induction should be delivered by the nominated cultural heritage officer to all site personnel before entering the site, with the notification procedure in the event of an unexpected find to be clearly indicated during the induction	At all times		All personnel
<ul> <li>In the event of a find the following actions are to be undertaken:</li> <li>1. FIND: A potential Cultural Heritage item or object is found.</li> <li>2. STOP: STOP WORK IMMEDIATELY and install an exclusion zone around the area.</li> <li>3. NOTIFY: Notify a responsible person (e.g. Site Supervisor, Project Manager).</li> </ul>	At all times		All personnel

## Factor – Cultural heritage

4. MANAGE: Report the discovery to the project manager for advice on management.

Cease operations and follow cultural heritage reporting procedure. Report to TDPD and Project Manager. Protocols to follow as outlined in the Cultural Heritage Agreement. Let areas naturally regenerate and implement weed control to manage any outbreaks. Areas to be monitored to check health and condition of regenerating areas. Construction Manager should be notified immediately who will then notify the Archaeologist appointed to the project Archaeologist is to provide management recommendations to the Construction Manager and will liaise (if necessary) with the Department of Environment and Science to ensure compliance with the Queensland Heritage Act 1992 and the ACH Act.		
Within the WTWHA minimise clearing to designed and demarcated areas; weed and pest management to avoid disturbance and degradation of flora and fauna environmental values.	Prior to construction	Contractor's Pr Manager Site Supervisor
Prior to conducting construction works within the WTWHA the contractor conducting the works has been informed of the requirements of the Wet Tropics Permit No: WTMA20001a	Prior to construction	Contractor's Pr Manager Site Supervisor
The works supervisor has obtained a briefing describing the natural values of the subject site from the relevant QPWS Ranger or a Wet Tropics Management Authority officer.		
The works supervisor must also be given direction by the relevant QPWS Ranger or a Wet Tropics Management Authority officer as to the nature and extent of the clearing or earthworks to be undertaken.		

## Factor – Cultural heritage

#### Residual risk within control in place

Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.

## **Performance indicator**

No damage to known or unknown to cultural heritage sites.

Corrective actions	
Incident	Corrective action
Construction works extend outside of approved disturbance footprint and uncover of cultural heritage artefact.	Cease operations and follow cultural heritage reporting procedure. Report to TDPD and Project Manager.
	Protocols to follow as outlined in the Cultural Heritage Agreement.
	Let areas naturally regenerate and implement weed control to manage any outbreaks. Areas to be monitored to check health and condition of regenerating areas.

#### Monitoring

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

Any non-conformances are to be documented and reported to TDPD and rectified immediately

# 4.3 Water management

Wangetti South Section traverses several watercourses protected under the *Water Act 2000* and *Fisheries Act 1994*. The shared use trail will require a number of waterway crossings to be installed over waterways to allow hikers and mountain bikers to safely cross the waterways.

The exact and type of structure proposed as the waterway crossings will be determined by the trail builder and will comprise of the following options: rock armouring, boulder crossings and low-level bridge (minor water crossing).

Habitat for the following MNES and MSES fauna species that are known, likely or may occur in the Wangetti South Section could be potentially affected by proposed works within and adjoining waterways and they include:

- Casuarius casuarius (Southern cassowary)
- Litoria dayi (Australian lace lid)
- Litoria nannotis (Waterfall frog)
- Litoria nyakalensis (Mountain mistfrog)
- Litoria rheocola (Common mistfrog)
- Litoria serrata (Tapping green eyed frog)
- Xeromys myoides (Water mouse)
- Stiphodon semoni (Opal cling goby)
- Stiphodon rutilarueus (Orange cling goby)
- Stiphodon pelewensis (Emerald cling goby)
- Stiphodon surrufus (Birdsong cling goby).

Appendix D describes and shows the potential fauna habitat types have been recorded within the Wangetti South survey area, including potential breeding and calling habitat for amphibians, potential feeding and breeding habitat for aquatic species and foraging and breeding habitat for fish species.

Potential habitat for the southern cassowary is captured in the Cassowary Management Plan.

Appendix B shows potential modelled habitat for opal cling goby (*Stiphodon semoni*) in vicinity of Wangetti Trail - South Section.

The water resources potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-7.
#### **Table 4-7 Water management environmental factors**

## Factor – Water management

## Construction activities resulting in adverse impacts to the project area

A number of low-level bridges and crossings and gully crossing style bridges for minor waterway crossings will be used to minimise the loss of aquatic habitats. Instream crossings, including boulder rock crossings will be designed during the detailed design to maintain natural characteristics of the waterway and not impact flows or fish passage

#### Initial risk with no control

Medium risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
All construction phase related aspects of the ESCP (refer to the EMP) are to be implemented	At all times	MNES and MSES species that are known, likely or may occur in the Wangetti South Section and could be	All personnel
Construction of waterway crossings only to occur in the approved areas as documented on a map in a register.	At all times	potentially affected by proposed works within and adjoining waterways and they include:	All personnel
No refuelling activities should take place within 50 m of a watercourse.	At all times	<ul> <li>Casuarius casuarius (Southern cassowary)</li> </ul>	All personnel
Degradation will be mitigated through minimising the size of the disturbance area, implementing an Erosion Sediment and Control Plan (ESCP), constructing bridges that span the width of the waterway, constructing during dry conditions, and minimising disturbance by noise, vibration and/or artificial lighting.	At all times	<ul> <li>Litoria dayi (Australian lace lid)</li> <li>Litoria nannotis (Waterfall frog)</li> <li>Litoria nyakalensis (Mountain mistfrog)</li> <li>Litoria rheocola (Common mistfrog)</li> </ul>	All personnel
Provisions are made to minimise the risk of fish kills arising from the works e.g. through entrapment of fish upstream or between works. In the event that fish that have been trapped by the works, fish salvage activities in accordance with the Fisheries Queensland	During works within waterways.	<ul> <li>Litoria serrata (Tapping green eyed frog)</li> <li>Xeromys myoides (Water mouse)</li> </ul>	All personnel

Factor – Water management			
Guidelines for Fish Salvage (available at www.daf.qld.gov.au) are implemented immediately		<ul> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby).</li> <li>Wet Tropics World Heritage Area National Heritage Site</li> <li>Waterways protected under the Fisheries Act 1994 and Water Act 2000</li> <li>Protected Areas - estates protected under the NC Act</li> <li>Coastal Management District</li> </ul>	
Fish kills must be reported in accordance with the emergency procedure.	During works within waterways.		All personnel
Where possible, all constructed watercourse crossings will be at level that will not obstruct potential cassowary movement. Preference is given to a bed level crossing that will not obstruct waterflow, and to be comprised primarily of natural material, e.g. laid stone pavements. Where there are practical limitations to the construction of bed level crossings, crossings should be designed such that their height will not obstruct cassowary movement, i.e., are capable of being stepped up onto, and over (or under). Heights are to comply with the Building Code of Australia AS 2156.2 (Walking Tracks Part 2: Infrastructure) and AS 5100 (Bridge Design) with respect to requirements for handrails. Handrails/balustrades on bridges/crossings will pose an impediment to cassowary movement and hence crossings should be of a 'low fall' design, less than the 1300 – 1400 mm specified in AS 5100 for bicycles.	During works within waterways.		All personnel
Limit the use of machinery within waterways. Use machinery no greater than the capacity required for the purpose.	During works within waterways.		All personnel
Excess spoil, if generated, shall be disposed of in a suitable disposal area outside of the WTWHA, unless prior approval has been sought from WTMA.	At all times		All personnel
Pre-works and post works reporting to be undertaken in accordance with the Accepted development requirements for operational work	At all times		Contractor's Project Manager

Factor – Water management			
that is constructing or raising waterway barrier works, Department of Agriculture and Fisheries, 2018 and information reported in the contractor's environment system.			Site Supervisor
No major alterations to waterway bed/banks. For any part of the waterway bed or banks adjacent to the works that has been altered by construction activities. The site is restored and/or rehabilitated so that as a minimum:	During works within waterways.		All personnel
<ul> <li>Stability and profiles of the bed and banks are re-instated to natural stream profiles and stability within five (5) business days of the completion of the works</li> <li>The waterway bed is retained with natural substrate or reconstructed with substrate comparable to the natural substrate size and consistency</li> <li>Site conditions allow the rapid re-establishment of native vegetation and cover or native species are replanted to re-establish the natural plant community</li> </ul>			
Works within/adjacent to waterways to comply with the conditions in the environmental permits issued for Wangetti South Section.	At all times		All personnel
Within opal cling goby habitat, bridges will be designed to completely span suitable habitat and limit public access to waterways. No in-stream crossings will be included.	At all times	<i>Stiphodon semoni</i> (Opal cling goby)	Contractor's Project Manager Site Supervisor
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for impacts to waterways.			
Performance indicator			
No residual impacts to waterways.			

Factor – Water management			
Corrective actions			
Incident	Corrective action		
Impacts to waterways outside of approved areas.	Reinstate any changes to the waterway.		
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			
Weather conditions to be monitored and temporary controls established during extreme weather events.			
Any non-conformances are to be documented and reported to TDPD and rectified immediately.			

# 4.4 Waste management

TDPD is committed to undertaking the project sustainability, and to minimise waste production during the project.

While the production of waste during construction is expected to be minimal, waste will be disposed of according to the waste and resource management hierarchy:

- 2. AVOID unnecessary resource consumption
- 3. REDUCE waste generation and disposal
- 4. RE-USE waste resources without further manufacturing
- 5. RECYCLE waste resources to make the same or different products
- 6. RECOVER waste resources, including the recovery of energy
- 7. TREAT waste before disposal, including reducing the hazardous nature of waste
- 8. DISPOSE of waste only if there is no viable alternative.

An indication of the types and an estimate of the volume of waste produced during the project is provided below:

- Waste soil material no soil to be removed from site unless contaminated
- Miscellaneous waste worker's personal waste, to be removed and disposed daily.

The following waste management controls detailed in Table 4-8 are proposed to meet the requirements of the *Waste Reduction and Recycling Act 2011* (Qld) and associated regulations.

#### **Table 4-8 Waste management environmental factors**

#### Factor – Waste management

#### Construction activities resulting in adverse impacts to the project area

Clearing of vegetation and cut and fill activities will be required to allow for the construction of the trail, camp sites and access tracks resulting in vegetation waste and excess spoil.

Construction camps will produce general waste.

Inappropriate waste management by construction personnel.

#### Initial risk with no control

Low risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
All project personnel will be instructed in applicable waste management practices as a part of the environmental induction	At all times	MNES and MSES bird species that are known, likely or may occur:	Contractor's Project Manager
process.		<ul> <li>Casuarius casuarius (Southern cassowary)</li> <li>Migratory birds (e.g. eastern curlew, great sand plover)</li> <li>Non-migratory species (e.g. masked owl)</li> </ul>	Site Supervisor
All vegetation waste to be cut into practical sizes and placed at edge of clearings to naturally decompose.	At all times		Contractor's Project Manager
Material from any restricted invasive plant species will be cleared and disposed of at an approved waste disposal facility.			Site Supervisor
All general refuse and food wastes to be collected and transported to a local government approved disposal site and suitable bins will be provided for waste streams (general and recyclable) to reduce	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section	All personnel
proclivity of waste to attract fauna and pest species.		Litoria dayi (Australian lace lid)	
Adopt the waste management hierarchy (i.e. avoid, re-use, recycle, energy recover and disposal) before materials are considered	At all times	Litoria nyakalensis (Mountain	Contractor's Project Manager
		<ul> <li><i>Litoria rheocola (</i>Common mistfrog)</li> </ul>	Site Supervisor

Factor – Waste management			
waste for disposal in landfill, determine if they can first be recycled, reused or recovered.		• <i>Litoria serrata (</i> Tapping green eyed frog)	
General housekeeping shall be undertaken on an ongoing basis to keep the site clean, and housekeeping duties monitored to ensure that waste is contained appropriately and site is clean at all times	At all times	<ul> <li>MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section</li> <li>Dasyurus maculatus gracilis</li> </ul>	All personnel
No on-site burial or burning of waste material.	At all times	<ul><li>(Spotted-tailed quoll)</li><li>Dasvurus hallucatus (Northern</li></ul>	All personnel
Excavated soils will be reused on site where possible.	At all times	quoll) • Dendrolagus lumboltzi (Lumboltz's	All personnel
Any wastewater shall be collected and appropriately disposed of offsite. Disposal of water onsite is only to be undertaken if analysis has proven the water suitable.	At all times	<ul> <li>Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)</li> <li>Hipposideros semoni (Semon's leaf-nosed bat)</li> <li>Phascolarctos cinereus (Kosla)</li> </ul>	All personnel
Provide portable toilets onsite if required during the construction phase and ensure that maintenance and disposal of waste is conducted by a licensed contractor as required. The setup of temporary amenities to be located in disturbed areas and outside of areas of high ecological significance. Where trail builders are required to camp overnight along the trail due to the remoteness of the area, they will be required to carry all rubbish out; bury human waste at least 100 m from streams and at least 15 cm deep, or carry it out.	At all times	<ul> <li>Pteropus conspicillatus (Spectacled flying-fox)</li> <li>Rhinolophus robertsi (Large-eared horseshoe bat)</li> <li>Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)</li> <li>Xeromys myoides (Water mouse)</li> <li>MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section</li> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> </ul>	Contractor's Project Manager Site Supervisor

• Stiphodon surrufus (Birdsong cling goby)

MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section:

- Archontophoenix myolensis (Myola palm)
- Anoectochilus yatesiae (Marbled jewel orchid
- Canarium acutifolium
- Dendrobium fellowsii
- Dendrobium mirbelianum (Darkstemmed antler orchid)
- Diplazium cordifolium
- Diplazium pallidum
- *Myrmecodia beccarii* (Ant plant)
- Phaius pictus
- Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)
- Polyscias bellendenkerensis
- Randia audasii
- Rhomboda polygonoides
- *Toechima pterocarpum (*Orange tamarind)
- Vappodes lithocola (Dwarf butterfly orchid) (also known as Dendrobium lithocola, and the Queensland Flora Census 2019 groups this species into Dendrobium biggibum)
- Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census

Factor – Waste management			
	<ul> <li>2019 groups this species into Dendrobium bigibbum)</li> <li>Zeuxine polygonoides (Velvet jewel orchid) (also known as Rhomboda polygonoides))</li> <li>Protected Areas - estates protected under the NC Act</li> <li>Wet Tropics World Heritage Area National Heritage Site</li> <li>Waterways protected under the Fisheries Act 1994 and Water Act 2000</li> </ul>		
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for incorrect waste management.			
Performance indicator			
No land or water contamination as a result of inappropriate waste ma	nagement.		
Wastes minimised and opportunities for reuse and recycling identified	d and implemented		
All waste disposal to be removed from site.			
Corrective actions			
Incident	Corrective action		
Improper waste management	Inspect waste storage areas.		
	If area is untidy or unkempt, undertake measures to rectify.		

# Factor – Waste management

# Monitoring

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

Any non-conformances are to be documented and reported to TDPD and rectified immediately

# 4.5 **Public amenity and health**

Sensitive receptors (e.g. existing residences, places of work, schools, agricultural or ecologically significant areas/species that could be impacted) within and surrounding the Project that may be potentially affected by the proposed construction works associated with Wangetti South Section include:

- Wet Tropics World Heritage Area and National Heritage area including wildlife
- National Parks
- Residential communities within Palm Cove and Wangetti.

Wangetti South Section is predominantly within an area which has been subjected to very limited disturbance and is set back from urbanises areas. Construction related activities have the potential to adversely impact on the amenity of the area.

Wangetti South Section is also characterised by steep terrain, is home to dangerous animals and plants and there is the potential for extreme weather events to occur in the area. All of these matters could have adverse impacts on construction personnel working within Wangetti South Section during the construction phase.

This section outlines proposed environmental controls in response to protecting the amenity of the area, managing bushfire and extreme weather events, managing dangerous animals and plants and managing traffic during the construction phase. Refer to Table 4-9, Section 4.5.1 to Section 4.5.5.

## **Table 4-9 Public amenity environmental factors**

# Factor – Public amenity

#### Construction activities resulting in adverse impacts to the project area

Construction activities may be visible to varying degrees by people living, working, and travelling through the surrounding areas.

## Initial risk with no control

Low risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility	
Construction equipment, stockpiles and other visible elements to be located away from views to or from sensitive visual receptors.	At all times	Wet Tropics World and National Heritage Area Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act</i> 2000 Coastal management districts protected under the Coastal Protection and Management Act 1995. Protected Areas - estates protected under the NC Act	All personnel	
Construction work area to be marked out and fenced to restrict construction crew to the works area.	At all times		All personnel	
Should equipment or stockpiles be located in visually prominent locations for any reasonable period of time, incorporate screening measures and practices to keep areas tidy.	At all times		All personnel	
Provide notification to surrounding properties of upcoming works.	At all times		All personnel	
Residual risk within control in place				
Low risk - Implementation of recommended mitigation measures will minimise the potential for incorrect waste management.				
Performance indicator				

No complaints from the public.

Factor – Public amenity			
Corrective actions			
Incident	Corrective action		
Visual amenity complaint	Inspect the area for where the complaint was made to ensure all equipment and stockpiling is adequately stored. If area is untidy or unkempt, undertake measures to rectify.		
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			
Any non-conformances are to be documented and reported to TDPD and rectified immediately			

# 4.5.1 Bushfire

Bushfires pose a significant risk to human safety, for both the construction personnel working on the trails but also other local residents and workers. Bushfires also pose a significant threat to threatened flora and fauna. The main hazards related to bushfire are the risk of works on-site being an ignition source for a bushfire and the risk of a bushfire in the region impacting on site works.

With this in mind, the following practices detailed in Table 4-10 have been identified to reduce the likelihood of site works contributing to a bushfire, as well as measures to control a fire should site works result in a fire being ignited.

#### Table 4-10 Bushfire environmental factors

#### Factor – Bushfire

#### Construction activities resulting in adverse impacts to the project area

The site is located within the very high potential intensity and bushfire hazard buffer of the bushfire hazard overlay. During construction, construction activities have the potential to increase bushfire hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc. Bushfires occurring within the project area impacting threatened flora and fauna species

#### Initial risk with no control

Medium risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
Fire extinguishers to be kept in all vehicles, as well as the project site office and/or work areas.	At all times	MNES and MSES flora species that are known, likely or may occur in the	All personnel
Fuel shall be stored in appropriate storage containers.	At all times	<ul> <li>Archontophoenix myolensis (Myola nolm)</li> </ul>	All personnel
Fire management plan is to be developed for the construction phase of the project, in conjunction with WTMA. The nominated construction contractor of the trail and public campsites will be required to develop a bushfire management plan as part of their contract.	Prior to construction	<ul> <li>palm)</li> <li>Anoectochilus yatesiae (Marbled jewel orchid</li> <li>Canarium acutifolium</li> <li>Dendrobium fellowsii</li> <li>Dendrobium mirbelianum (Dark-stemmed antler orchid)</li> <li>Diplazium cordifolium</li> <li>Diplazium pallidum</li> <li>Myrmecodia beccarii (Ant plant)</li> <li>Phaius pictus</li> <li>Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)</li> <li>Polyscias bellendenkerensis</li> <li>Randia audasii</li> <li>Rhomboda polygonoides</li> </ul>	Contractor's Project Manager Site Supervisor
All chemical storage and handling will be in accordance with material SDS, with appropriate firefighting equipment (e.g. specific fire extinguisher types) identified in the SDS to be maintained on- site.	At all times		Contractor's Project Manager Site Supervisor
Adequate fire suppression equipment should be on site.	At all times		All personnel
No burning of any substances, including wooden debris or products, will be undertaken as part of this project.	At all times		All personnel

Factor – Bushfire			
Toolbox talks with the construction crew will occur prior construction to educate them about bushfire management, bushfire hazards and evacuation routes.	At all times	<ul> <li>Toechima pterocarpum (Orange tamarind)</li> <li>Vappodes lithocola (Dwarf butterfly orchid) (also known as Dendrobium lithocola, and the Queensland Flora Census 2019 groups this species into Dendrobium biggibum)</li> <li>Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)</li> <li>Zeuxine polygonoides (Velvet jewel orchid) (also known as Rhomboda polygonoides))</li> <li>MNES and MSES bird species that are known, likely or may occur:</li> <li>Casuarius casuarius (Southern cassowary)</li> <li>Migratory birds (e.g. eastern</li> </ul>	Contractor's Project Manager Site Supervisor
Working during the fire season, ensure that each team has at least one team member who has been trained in basic bushfire awareness	During pre-start		Contractor's Project Manager Site Supervisor
<ul> <li>During the fire season, each team must always have the following equipment on hand:</li> <li>Viable, functioning, two-way communications – e.g. mobile phone, UHF radio or satellite phone. Each team needs to be able to contact each other team and external contacts and each team needs to be contactable;</li> <li>One filled and operational knapsack pump or charged airwater extinguisher (not less than 9L capacity);</li> <li>Two rake hoes;</li> <li>Weather instruments capable of measuring temperature, wind speed and humidity;</li> <li>Fire Weather Log Book.</li> </ul>	At all times		All personnel
During the fire season, chainsaw work to be scheduled to take place early in the morning, when fire danger risk is lowest.	At all times	<ul> <li>Non-migratory species (e.g. masked owl)</li> <li>MNES and MSES amphibian species</li> </ul>	All personnel
<ul> <li>During the fire season, prior to starting chainsaw work:</li> <li>Ensure that the immediate area has been manually cleared of twigs, leaves, scrub and other flammable material;</li> <li>Have another staff member act as spotter. Spotter to standby at all times while chainsaw is being used;</li> <li>Ensure that the knapsack is on hand, filled and ready for use.</li> </ul>	At all times	<ul> <li>that are known, likely or may occur in the Wangetti South Section</li> <li><i>Litoria dayi</i> (Australian lace lid)</li> <li><i>Litoria nannotis</i> (Waterfall frog)</li> <li><i>Litoria nyakalensis</i> (Mountain mistfrog)</li> </ul>	All personnel

# Factor – Bushfire

<ul> <li>Working on Total Fire Ban Days – If TDPD approves work to go ahead, then the following rules must be applied:</li> <li>Only work in areas with good communication including mobile phone reception</li> <li>Only work in areas with quick/easy access where vehicles can be parked close by</li> <li>No operating excavators, chainsaws, brush cutters, or any other machinery/equipment that could conceivably emit sparks during operation</li> <li>Generally, all work should be conducted with hand tools only</li> <li>Ensure all workers have adequate sun protection</li> <li>Ensure all workers work to the conditions and drink plenty of water</li> </ul>	At all times	<ul> <li>Litoria rheocola (Common mistfrog)</li> <li>Litoria serrata (Tapping green eyed frog)</li> <li>MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section</li> <li>Dasyurus maculatus gracilis (Spotted-tailed quoll)</li> <li>Dasyurus hallucatus (Northern quoll)</li> <li>Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)</li> <li>Hipposideros semoni (Semon's leaf-nosed bat)</li> </ul>	All personnel
<ul> <li>On TFB days, the following weather monitoring protocols apply:</li> <li>At arrival to site in the morning, check weather observations and record in Fire weather logbook</li> <li>Before returning to work, check weather observations and record in Fire weather logbook</li> <li>Before returning to work after lunch, check weather observations and record in Fire weather logbook</li> <li>Before returning to work after afternoon smoko, check weather observations and record in Fire weather logbook</li> <li>If there is a fire danger, consider suspending operations and leaving site.</li> </ul>	At all times	<ul> <li>Phascolarctos cinereus (Koala)</li> <li>Pteropus conspicillatus (Spectacled flying-fox)</li> <li>Rhinolophus robertsi (Large-eared horseshoe bat)</li> <li>Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)</li> <li>Xeromys myoides (Water mouse)</li> <li>MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section</li> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> </ul>	All personnel

Factor – Bushfire				
	<ul> <li>Stiphodon surrufus (Birdsong cling goby)</li> <li>Wet Tropics World Heritage Area National Heritage Site Waterways protected under the <i>Fisheries Act 1994</i> and <i>Water Act 2000</i></li> <li>Protected Areas - estates protected under the NC Act Coastal Management District</li> </ul>			
Residual risk within control in place				
Low risk - Implementation of recommended mitigation measures will minimise impacts to fauna within the project area.				
Performance indicator				

No injury or death to humans or native fauna species, loss of vegetation and/or damage to property or buildings.

Corrective actions			
Incident	Corrective action		
Fire starts during the construction phase	Staff re- trained in the use of firefighting equipment.		
Replacement of firefighting equipment.	Staff re- trained to minimise exposure to hazardous materials.		

# Monitoring

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

At the start of each working week (or some other agreed schedule) provide reports to TDPD depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel in construction crew.

## Factor – Bushfire

At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high temperatures and high winds. They generally only occur during the hot summer months or during periods of drought)

On the day before any anticipated high-risk days, check to see if a Total Fire Ban (TFB) has been called for the area. Local fire bans will be checked to see if they are in place, with any project works that pose a high fire risk not performed during this time. If a TFB day has been called, contact DES via the Shadow Ranger immediately to discuss whether it is safe/appropriate to work.

During the fire season, the following weather monitoring protocols apply:

- At arrival to site in the morning, check weather observations and record in Fire Weather Log Book
- Before returning to work after lunch, check weather observations and record in Fire Weather Log Book

Any non-conformances are to be documented and reported to TDPD and rectified immediately

# 4.5.2 Hazards, health and safety

Wangetti South Section traverses an area which is susceptible to a number of hazards, health and safety matters. This section provides a summary of the existing hazard, health and safety matters within the project area and immediate surrounds. It also assesses the potential impacts as a result the construction activities.

The majority of Wangetti South Section will be located within national park offering a remote trail experience to hikers and mountain bikers and as a result carries an inherent risk for the users detailed in Table 4-11.

Another hazard is the operation of a helicopter to transport construction material to the project area.

The hazards, health and safety environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-11.

#### Table 4-11 Hazards, health and safety environmental factors

## Factor – Hazards, health, and safety

#### Construction activities resulting in adverse impacts to the project area

Steep terrain, remote location, the presence of dangerous animals and plants and potential of extreme weather events are associated with Wangetti South Section and could adversely impact on construction personnel in the following ways:

- Bites from snakes, spiders, and insects.
- Allergic reactions to plant species along the trail.
- Heat/cold exposure, falls and sprains, etc.
- Another hazard is the operation of a helicopter to transport construction material to the project area.
- Potential hostile intersection with fauna species
- Extreme weather events requiring evacuation

## Initial risk with no control

#### Low risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
All health and safety related aspects of the Traffic Management Plan (in the EMP)) as it relates to the construction phase are to be adhered to.	At all times	MNES and MSES bird species that are known likely or may occur; Southern cassowary	All personnel
Appropriate Personal Protective Equipment (PPE) must be worn by all personnel on site (i.e. steel-cap boots, high-vis shirt/vest as appropriate, etc.)	At all times	Protected Areas - estates protected under the NC Act Wet Tropics World Heritage Area National Heritage Site	All personnel
Helicopter operations to be carefully controlled, and clustered into half or full day blocks. Helicopter operations to be scheduled to	At all times		Contractor's Project Manager Site Supervisor

Factor –	Hazards	health	and	satety
1 4000	i la La la C	, no artir	,	Carocy

occur on a recurring fortnightly/monthly basis (as required), with operations organised in advance.	
The Contractor to liaise with TDPD Project Manager to coordinate the use of helicopters and ensure all permits and approvals are obtained prior to operations commencing.	
Contractor to map out helicopter staging area locations for the project.	
All aircraft used for construction material delivery or waste removal shall be flown not less than 1000ft above	
ground level when operating over the World Heritage Area unless:	
a) Taking off or landing; or	
<ul> <li>b) Flying at a level that is reasonably necessary for safety purposes; or</li> </ul>	
c) Flying over infrastructure footprints.	
Workplace health and safety plans need to be developed and implemented by the contractor on site.	At all times
All signage installed with the project area must have a unique 'location identification number' on it, to be quoted in case of emergency. Emergency responders would be provided with GPS coordinates corresponding to each 'location identification number' and instructions about the most direct and reliable routes of access to that point.	At all times
Identify any locations where mobile phone coverage is poor or unavailable.	At all times

Factor – Hazards, health, and safety				
Toolbox talk with construction crew about working within difficult terrain and procedure to follow.	At all times		All personnel	
First aid kits to be available on site.	At all times		All personnel	
Residual risk within control in place				
Low risk - Implementation of recommended mitigation measures will r	minimise the potent	ial for incorrect waste management.		
Performance indicator				
No injuries to construction personnel.				
Corrective actions				
Incident	Corrective action			
njury as a result of improper use of construction material or from Identify action and prepare corrective action to manage any future impacts.				
lora and fauna. Administer first aid treatment (as required).				
Monitoring				
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.				
Any non-conformances are to be documented and reported to TDPD and rectified immediately				

## 4.5.3 Noise and vibration

Due to the proximity of the trails to population centres, the number of noise-sensitive receptors that may be impacted by site works is limited as identified by the following:

- Residents in close proximity to site works (at the trail head/entry and exit points)
- Wildlife inhabiting the park.

Site works that may contribute to noise that impacts on these receptors include:

- The use of chainsaws
- The use of excavation equipment
- The use of compacting equipment
- The use of power carriers
- Helicopters
- Vehicular use (4WD, ATV).

Vehicle use will involve the carting of materials and equipment to and from the works sites. The nature of the site and the location of works in bushland means that the main noise-sensitive receptors that will be impacted by site works are park visitors and wildlife inhabiting the park. As such, management actions have been designed to reduce the impact of noise on these receptors.

Hazards related to vibration works will be associated with track compaction works. However, the risk from vibration work should be minimal and localised.

The main noise-sensitive receptors that will likely be impacted by site works are users of the national park and the local fauna. As such, management actions have been designed to reduce the impact of noise on these receptors.

The noise and vibration environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-12.

#### Table 4-12 Noise and vibration environmental factors

#### Factor – Noise and vibration

#### Construction activities resulting in adverse impacts to the project area

Due to the proximity of the trails to population centres, the number of noise-sensitive receptors that may be impacted by site works is limited as identified by the following:

- Residents in close proximity to site works (noting this is limited);
- Wildlife inhabiting the park.

Site works that may contribute to noise that impacts on these receptors include:

- The use of chainsaws
- The use of excavation equipment
- The use of compacting equipment
- The use of power carriers
- Helicopters
- Vehicular use (4WD, ATV).

Noise generated by members of the public using vehicles illegally within the project area.

#### Initial risk with no control

Low risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
Notifying adjoining residences of the timing of construction works prior to undertaking construction works and providing them with a contact in case they have questions.	Prior to construction commencingMNES and MSES bird species that are known, likely or may occur: • Casuarius casuarius (Southern	TDPD	
All construction vehicles to comply with maintenance schedules and has up to date service records and operational restrictions designed to limit noise impacts during construction.	At all times	<ul> <li>cassowary)</li> <li>Migratory birds (e.g. eastern curlew, great sand plover)</li> <li>Non-migratory species (e.g.</li> </ul>	Contractor's Project Manager Site Supervisor
Vehicles and machinery to be switched off when not in use.	At all times	masked owl)	All personnel

# Factor – Noise and vibration

		MNES and MSES amphibian analise	
Equipment is to be fitted with noise control devices.	At all times	that are known likely or may occur in	All personnel
<ul> <li>Helicopters can only be used for the transport of materials to construction sites in low and lowest priority areas where:</li> <li>They are able to operate outside of the ground effect zone when hovering.</li> <li>Drop zones are in low or lowest priority areas where likely cassowary occurrence is nil or extremely unlikely.</li> <li>Preclearance of any drop zones for materials near watercourses or rainforest (essential habitat areas) identifies no evidence of cassowary presence.</li> <li>Helicopter overfly of WTWHA is in accordance with regulatory provisions of the Wet Tropics Plan</li> <li>Helicopters can be used in any area where emergency evacuation is required.</li> </ul>	At all times	<ul> <li>the Wangetti South Section</li> <li>Litoria dayi (Australian lace lid)</li> <li>Litoria nannotis (Waterfall frog)</li> <li>Litoria nyakalensis (Mountain mistfrog)</li> <li>Litoria rheocola (Common mistfrog)</li> <li>Litoria serrata (Tapping green eyed frog)</li> <li>MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section</li> <li>Dasyurus maculatus gracilis (Spotted-tailed quoll)</li> <li>Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)</li> <li>Hipposideros semoni (Semon's leaf-nosed bat)</li> <li>Phascolarctos cinereus (Koala)</li> <li>Pteropus conspicillatus (Spectacled flying-fox)</li> <li>Rhinolophus robertsi (Large-eared horseshoe bat)</li> <li>Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)</li> <li>Xeromys myoides (Water mouse)</li> </ul>	Contractor's Project Manager Site Supervisor

Factor – Noise and vibration			
	<ul> <li>MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section</li> <li>Stiphodon semoni (Opal cling goby)</li> <li>Stiphodon rutilarueus (Orange cling goby)</li> <li>Stiphodon pelewensis (Emerald cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> <li>Stiphodon surrufus (Birdsong cling goby)</li> <li>Protected Areas - estates protected under the NC Act</li> <li>Wet Tropics World Heritage Area National Heritage Site</li> </ul>		
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for noise and vibration impacts to listed threatened species, residents, and other wildlife within the Wet Tropics.			
Performance indicator			

Negligible noise and vibration impacts to sensitive receptors.

No noise complaints

# **Corrective actions**

Incident	Corrective action
Construction equipment requiring a service resulting in additional noise produced.	Vehicles and equipment to be serviced as soon as possible

Factor – Noise and vibration	
Receiving complaints about excess noise and vibration impacting sensitive receivers	Reporting incidents relating to noise and/or vibration are the responsibility of all personnel onsite at all times and are to be recorded and managed in a complaints register with the corrective actions undertaken. The contractor in the construction phase will be required to develop a complaints management system and register and seek approval from TDPD, DES and QPWS.
Menitering	

#### Monitoring

Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.

Any non-conformances are to be documented and reported to TDPD and rectified immediately

# 4.5.4 Air quality

The Project is predominantly within an area which is previously undisturbed. As such, air quality is largely influenced by the coastal location and surrounding related to the natural environment including bird calls and vegetation movements from wind. There are also a number of sensitive receivers located along Wangetti South Section including national parks and residential areas in the southern extent.

It is anticipated that limited air quality nuisances will be generated as a result of the Project, with the construction phase representing the highest potential for air quality changes. During construction, the use of machinery will have the most significant impact on air quality. However, these impacts are anticipated to be minor and short term and intermittent as works progress along the trail alignment.

The air quality environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-13.

## Table 4-13 Air quality environmental factors

# Factor – Air quality

## Construction activities resulting in adverse impacts to the project area

Potential air and dust impacts to sensitive receptors as a result of construction activities, attributable to exhaust emissions and fugitive dust.

## Initial risk with no control

Low risk

Mitigation measures/controls	Timing	Applicable MNES and MSES	Responsibility
Consider weather conditions and prevailing winds when conducting construction activities that may result in air emissions. Reduce clearing during periods of high wind.	At all times	<ul> <li>MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: <ul> <li>Archontophoenix myolensis (Myola palm)</li> <li>Anoectochilus yatesiae (Marbled jewel orchid</li> <li>Canarium acutifolium</li> <li>Dendrobium fellowsii</li> <li>Dendrobium mirbelianum (Dark- stemmed antler orchid)</li> <li>Diplazium cordifolium</li> <li>Diplazium pallidum</li> <li>Myrmecodia beccarii (Ant plant)</li> <li>Phaius pictus</li> <li>Phalaenopsis amabilis subsp. rosenstromii (Native moth orchid)</li> <li>Polyscias bellendenkerensis</li> <li>Randia audasii</li> <li>Rhomboda polygonoides</li> <li>Toechima pterocarpum (Orange tamarind)</li> </ul> </li> </ul>	All personnel
Wetting the road/work area during dry periods to reduce dust being generated.	At all times		All personnel
Construction vehicles to be cleaned of soils before driving on sealed roads to reduce dust being generated.	At all times		All personnel
A maximum speed limit of 40 km/hr shall apply to access roads and tracks to minimise the potential for dust generation.	At all times		All personnel
All temporary soil stockpiles will be covered, stabilised and/or moistened as required to prevent generation of dust particles.	At all times		All personnel
Soil stockpiles will be kept minimal to prevent any wind erosion.	At all times		All personnel
Stockpiles that are anticipated to be present in the medium (1-3 months) and long term (>3 months) are to be covered to minimise dust emissions.	At all times		All personnel

Factor – Air quality			
All vehicles carrying loads with the potential to create dust shall cover their loads.	At all times	<ul> <li>Vappodes lithocola (Dwarf butterfly orchid) (also known as Dendrobium lithocola, and the Queensland Flora Census 2019 groups this species into Dendrobium biggibum)</li> <li>Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)</li> <li>Zeuxine polygonoides (Velvet jewel orchid) (also known as</li> </ul>	All personnel
Minimal ground disturbance during construction to reduce dust emissions.	At all times		All personnel
At the commencement of the construction, the entire trail will be broken into Construction Segments. The Construction Segments assist in reducing the amount of area to be exposed during the construction phase, which in turns reduces impacts to the natural environment and reduces the impact to the movement of wildlife in the area.	Prior to construction		Contractor's Project Manager Site Supervisor
Vehicles, plant and equipment will be regularly serviced and comply with Australian Design Standards.	At all times	<i>Rhomboda polygonoides))</i> MNES and MSES bird species that are known, likely or may occur:	All personnel
All machinery and equipment are to have proprietary emission control equipment fitted and in working order.	At all times	Casuarius casuarius (Southern cassowary)	All personnel
When not in use, vehicles and machinery shall be turned off.	At all times	<ul> <li>Migratory birds (e.g. eastern curlew, great sand plover)</li> <li>Non-migratory species (e.g. masked owl)</li> <li>MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section</li> <li><i>Litoria dayi</i> (Australian lace lid)</li> <li><i>Litoria nannotis</i> (Waterfall frog)</li> <li><i>Litoria nheocola</i> (Common mistfrog)</li> </ul>	All personnel

• Litoria serrata (Tapping green eyed frog)

MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section

- Dasyurus maculatus gracilis
   (Spotted-tailed quoll)
- Dasyurus hallucatus (Northern quoll)
- Dendrolagus lumholtzi (Lumholtz's tree-kangaroo)
- *Hipposideros semoni* (Semon's leaf-nosed bat)
- Phascolarctos cinereus (Koala)
- Pteropus conspicillatus (Spectacled flying-fox)
- *Rhinolophus robertsi* (Largeeared horseshoe bat)
- Saccolaimus saccolaimus nudicluniatus (Bare-rumped sheath-tailed bat)
- *Xeromys myoides* (Water mouse) MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section
- *Stiphodon semoni* (Opal cling goby)
- *Stiphodon rutilarueus* (Orange cling goby)
- Stiphodon pelewensis (Emerald cling goby)

Factor – Air quality			
	<ul> <li>Stiphodon surrufus (Birdsong cling goby)</li> <li>Wet Tropics World Heritage Area National Heritage Site</li> <li>Protected Areas - estates protected under the NC Act</li> </ul>		
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for impacts to air quality.			
Performance indicator			
Negligible air and dust impacts to sensitive receptors.			
Corrective actions			
Incident	Corrective action		
Vehicles and equipment servicing not up to date	Vehicles and equipment to be serviced as soon as possible.		
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			
Any non-conformances are to be documented and reported to TDPD and rectified immediately			

# 4.5.5 Roads and traffic

A Preliminary Traffic Management Plan (TMP) have been developed for the construction and operational phases of Wangetti South Section. The TMP provides preliminary guidance to help establish appropriate traffic control and traffic management procedures manage potential hazards associated with the traffic environment during the Project and to reduce potential adverse impacts to people and wildlife during the construction and operational phases of the Project.

It is expected that prior to any construction activity and operational activity for the Project, a detailed work specific TMP will be developed by the contractor as part of the EMP. The contractor should review the preliminary guidance provided in this TMP and provide greater detail based on construction methodology, operational activities, and timing of works. The TMP will also need to be in general accordance with the MUTCD, Austroads Guide to Traffic Management and Transport and Main Roads Specifications MRTS02 Provision for Traffic.

Refer to Appendix D in the EMP for a copy of the TMP.

# 5. Work completion

At the completion of each construction trail segment and the Dark Jungle campground, the Contractor will undertake rehabilitation of all temporary disturbed areas that are not associated with long standing fixtures of the Wangetti trail and Dark Jungle. This will involve:

- Remove all flagging tape that may still be visible;
- Removal any rubbish or construction debris;
- Remove all construction equipment and machinery;

• Leave in place any sediment control measures for a duration as agreed and determined by the DES Shadow Ranger. As a minimum, sediment control measures should be retained until the Trail Curing Period has finished dependent on weather conditions and the trail or Construction Segment is deemed ready to be opened to the public;

- Trim any tree branches that may protrude into the riding or walking corridor;
- Trim or remove any sharp tree stumps within the fall zone adjacent to the trail;
- Check that any imported surfacing materials or raised embankments have been compacted to a suitable level;
- Check that all rock work is stable and secure;

• Check that the trail is draining as intended – i.e. no puddling of water anywhere on the trail, all grade reversals have a clear outlet and are draining effectively with no blockages, that any outsloped sections of trail have the appropriate gradients and there are no blockages along the lower edge;

• If excavators and other plant/machinery are being relocated to another project or a different area, they are to be washed down at a commercial washdown facility or washdown facility at QPWS works depot.

• Scattering cut vegetation (excluding weeds) into the surrounding environment, without smothering existing vegetation

Should at any time, any aspect of the activity be closed or decommissioned, all construction equipment and material must be removed off site and the disturbed site must be rehabilitated to a condition with a suitable vegetation cover that is the same or better than the surrounding environment

On completion of the construction works, the Contractor shall decommission their facilities and related works and ensure that the site is clean and left in a state which is safe, stable and non-polluting. Further details are in the rehabilitation plan has been developed for Wangetti South Section and is in the EMP.

6. Monitoring and environmental inspections

The contractor will be required to develop an environment monitoring plan and schedule to be approved by TDPD for the construction phase of Wangetti South Section and to include the following requirements in Table 6-1.

Environmental Aspect	Monitoring requirements
Biodiversity (fauna)	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Biodiversity (flora)	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Bushfire, heavy rainfall and other extreme weather events.	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	At the start of each working week (or some other agreed schedule) provide reports to TDPD depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel in construction crew.
	At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high temperatures and high winds. They generally only occur during the hot summer months or during periods of drought).
	On the day before any anticipated high-risk days, check to see if a Total Fire Ban (TFB) has been called for the area. Local fire bans will be checked to see if they are in place, with any project works that pose a high fire risk not performed during this time. If a TFB day has been called, contact DES via the Shadow Ranger immediately to discuss whether it is safe/appropriate to work.
	During the fire season, the following weather monitoring protocols apply: At arrival to site in the morning, check weather observations and record in Fire Weather Log Book.
	Before returning to work after lunch, check weather observations and record in Fire Weather Log Book.
	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.

## Table 6-1 Construction phase monitoring requirements
Environmental Aspect	Monitoring requirements
	At the start of each working week (or some other agreed schedule) provide reports to TDPD depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel in construction crew.
	At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high rainfall and high winds). They generally only occur during the hot summer months.
	Check with local area news for any heavy rainfall events or forecast cyclones for the region.
Chemical and fuel management	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Cultural heritage	Monitoring in accordance with the project's Cultural Heritage Management Plan (CHMP).
Erosion and sediment control	A formal monitoring and maintenance program prior to site establishment. The monitoring and maintenance program shall make allowance for required site inspections.
Water management	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Weather conditions to be monitored and temporary controls established during extreme weather events.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Noise and vibration	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Waste management	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Hazards, health, safety	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Air quality	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.

Environmental Aspect	Monitoring requirements
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Roads and traffic	<ul> <li>The following parameters will be included in a monitoring program to be developed by the construction contractor:</li> <li>The speed limits throughout the project area (regular basis).</li> <li>Vehicle routes within project area and on existing road network (regular basis).</li> <li>Drive behaviour within project area (Ongoing on a case by case basis).</li> <li>Traffic flow to manage congestion (as required)</li> <li>Interactions with wildlife (Ongoing on a case by case basis) Interactions with other road users (Ongoing on a case by case basis).</li> </ul>
	Traffic Management Inspection to be undertaken for the project.
	Regular performance/compliance audits of the Contractor's traffic control measures to be undertake and feedback provided.
	<ul> <li>The following parameters will be included in a monitoring program to be developed by the operator:</li> <li>The speed limits throughout the project area (regular basis)</li> <li>Vehicle routes within project area and on existing road network (regular basis)</li> <li>Traffic flow to manage congestion (as required)</li> <li>Interactions with wildlife (Ongoing on a case by case basis)</li> <li>Interactions with other road users (Ongoing on a case by case basis)</li> </ul>
	Traffic Management Inspection to be undertaken for the project.
	Regular performance/compliance audits of the Contractor's traffic control measures to be undertake and feedback provided.
Public amenity	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.

## 7. Audit

During construction activities, compliance audits will be conducted in accordance with the requirements of CEMP as well as construction procedures, relevant legislation, licence and permit conditions and industry standards.

An audit program be developed by the contractor in consultation with TDPD and DES and following the review of the environment approval conditions and it be undertaken at the end of the construction phase.

All inspection and audit reports of environmental performance will be stored in an electronic database that is used to enable corrective actions identified during the inspection/auditing process to be recorded, tracked and closed out. The information will be made available to the relevant regulatory authorities as required.

## 8. Review

During the construction phase TDPD will regularly review and (if necessary) update the CEMP. The review will take into account the following:

- Changes in legislative requirements (including conditions of approvals)
- Environmental performance, findings of environmental audits and inspections
- Outcomes of agency consultation
- Outcomes of consultation with communities and resolution of complaints
- Changes in external and internal policies, standards and guidelines.

The review will ensure the continuing suitability, adequacy, and effectiveness of the EMP. The review will include assessing opportunities for improvement.

# 9. Emergency incident planning and response

Emergency and incident responses will vary depending on the nature of the incident.

TDPD will be verbally notified of an incident on the day it occurs and as soon as practicable of the responsible person becoming aware of the incident, and in writing within 24 hours.

All notifications to authorities including but not limited to Wet Tropics Management Authority (WTMA), Department of Environment and Science (DES), Queensland Parks and Wildlife Service (QPWS)), State emergency services (police/fire/ambulance) and Department of Transport and Main Roads will be undertaken by TDPD.

The Contractor will be required to provide an Emergency Response Plan and for this plan to be thoroughly communicated to all staff members in the Construction Induction. The Emergency Response Plan should identify evacuation routes, mustering points, communication protocols and provide key contact details for local authorities and services. It should be compatible with the internal emergency response protocols of the various land managers.

When reporting environmental incidents to TDPD, the following information is to be provided:

- The name and contact details of the reporting person
- The date and time the environmental incident occurred
- The activity that was being undertaken when the incident occurred
- How the incident occurred
- · Any containment measures put in place to reduce or contain environmental harm
- An assessment of the amount of environmental harm that occurred
- If any other stakeholders are aware of the incident.

Environmental incidents and emergencies have been identified within Section 4. However, proactive environmental risk management measures should be undertaken wherever possible, if events such as extreme rainfall or flooding are forecast.

Some examples of environmental risk responses are provided in Table 9-1 below.

## Table 9-1 Example environmental incidents and mitigation and reporting requirements

Incident	Mitigation Measures	Report
Failure of erosion and sediment control devices following rainfall event or flooding	Re-instatement of ESC devices	Report to TDPD
Identification of cultural heritage aspects during excavation	Cease operations and follow cultural heritage reporting procedure	Report to TDPD
Injury to fauna during site works	Following notification procedure.	Report to TDPD
Damage to vegetation	Cease operations in the vicinity of impacted vegetation. Attempt to stabilise area and engage project botanist.	Report to TDPD

## 10. References

Australian Government Department of the Environment 2014. Environmental Management Plan Guidelines 2014. Available from:

https://www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines

GHD Pty Ltd 2020. Department of State Development, Tourism and Innovation - Wangetti Trail South Section (Wangetti to Palm Cove) Matters of National Environmental Significance Baseline Ecology and Impact Assessment Report, Final Version, July 2020

World Trail Pty Ltd 2020. Wangetti Trail Construction Methodology Manual April 2020.

## Appendices

**Appendix A** – Waterways within Wangetti South Section







\lghdnetlghdiAUBrisbane\Projects\41132458IGIS\Maps\MXDI4132458\_070\_WT\_SP2\_DevApp\_CoastalWaterFeatures\_SouthAB\_Rev0.mxd Print date: 16 Dec 2020 - 15:14 Data source: DITID/GHD: Wargetti Trail Algoment (11/2020); DNRME: Roads (2019), Cadastre (2019), Watercourse (2014), Place Names (2016), Enail (2016), Indigery (2016), Local Government Area Boundary (2018), Contours (2016), Erosion Prone Areas (2013); DEHP: Coastal Management District (2016); DES: Protected Area (2018); WTMA: Proposed Campsite (2020), Zoning Boundary (2019); GHD: Section Intersections - Wangetti North, Wangetti South (2020), Service Tracks (2020), 40m Construction Allowance Corridor (2020), Indicative Waterway Crossing Locations (2020), Vatercourse (WIM) Intercetions with Wangetti South Alignment and Service Tracks (2020). Created by: xee **Appendix B** - Potential and marginal habitat for the opal cling goby (*Stiphodon semoni*) in the vicinity of the Wangetti South Section and proposed location of single span bridges



Based on or contains data provided by the State of QLD (DNRME) 2020. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



Nghd netighd A UBrisbane IProjectsl 4132458/GISIMaps M XD/4132458\_063\_WT\_SP2\_OpalCing Goby\_Hab\_RevB.mxd Print date: 01 Dec 2020 - 14:31



Based on or contains data provided by the State of QLD (DNRME) 2020. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in braceth of the originary liability. marketing or be used in breach of the privacy laws.



Nghd netighd A UBrisbane IProjects 41324581GISIM aps IM XDI4 132458\_063\_WT\_SP2\_OpalCing Goby\_Hab\_RevB.mxd Print date: 01 Dec 2020 - 14:31



Based on or contains data provided by the State of QLD (DNRME) 2020. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation b the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



Nghd netghdAUBridsane/Projectal 4132458/GISIMaps/MXD/4132458\_063\_WT\_SP2\_OpalCling Goby\_Hab\_RevB.mxd Print date: 01 Dec 2020 - 14.31

Data source: DITIDIGHD: Proposed Infrastructure (2019), Wang etti Trail Alignment (04/2020); DNRME: Roads (2016), Watercourse (2014), Imagery (2015), 30m ASL Contour (2016); GHD: Opal Cring Goby Potential and Marginal Habitat (2020), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020); DAWE and GHD: SPRAT Distribution created by and digitised by GHD (2020). Created by: xlee **Appendix C** – Wangetti South Section Ecological Field Survey Assessment Sites





N:\AU\Brisbane\Proje.d:si.4113.2458\GISIMaps\WXD/4132458\_050\_WT\_SP2\_AssessmentStles\_Rev2.mxd Print date: 30 Jun 2020 - 13:11 Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2020), Roads (2016), Watercourse (2014), Imagery (2015); GHD: Survey Site (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020), C reated by: kee





N:\AU\Brisbane\Projeds\41\32458\GIS\Maps\MXDl4132458\_050\_WT\_SP2\_Assess Print date: 30 Jun 2020 - 13:11 nentSites\_Rev2.mxc





N:\AU\Brisbane\Proje.ds\41\32458\GISM\aps\MXDl4132458\_050\_WT\_SP2\_AssessmentSites\_Rev2.mxd Print date: 30 Jun 2020 - 13:11 Data source: DITIDIGHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2020), Roads (2016), Walercourse (2014), Imagery (2015); GHD: Survey Sites (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020), Created by: xtee

#### **Appendix D** - Wangetti South Section Potential Habitat Types

#### Fauna habitat types within Wangetti South Section

Nine distinct fauna habitat types have been recorded within the Wangetti South survey area during the field surveys. These include the following:

- Acacia woodland
- Disturbed rainforest
- Ephemeral waterways
- Eucalypt woodland on steep rocky slopes
- Melaleuca swamp
- Mixed Melaleuca viridiflora woodlands on inundated plains
- Open woodland over grasses on undulating plains
- Permanent streams
- Vine forest
- Modified landscapes.

A representative photograph and description of each of these habitat types is provided in Table D-1, together with identification of which habitat types provide potential habitat for MNES fauna species.

The distribution of fauna habitat types within the Wangetti South Section is presented in Appendix D-1 to D-3.

Habitat type	Characteristics	Ecological values	
Disturbed rainforest	<ul> <li>Canopy dominated by <i>Acacia celsa</i>, and retains a variety of mature rainforest tree species</li> <li>Dense vines including <i>Calamus australis</i> (wait-a-while) and ground palms, dominate the shrub and understorey layer</li> <li>Occasional large, hollow-bearing trees</li> <li>Dense leaf litter, rotting woody debris logs, and scattered rocks</li> <li>Soft friable soils suitable for burrowing.</li> </ul>	<ul> <li>Canopy vegetation provides foraging and nesting opportunities for a range of rainforest specialists, including doves, honeyeaters, monarchs, flycatchers, gerygones and figbirds, and foraging habitat for flying foxes</li> <li>Abundance of fruits provide foraging habitat for frugivorous birds and ground mammals</li> <li>Microhabitats for snakes, geckos and skinks</li> <li>Potential conservation significant species – southern cassowary.</li> </ul>	
<image/>	<ul> <li>Closed canopy dominated by mature rainforest tree species</li> <li>Dense shrub layer dominated by palms, ferns and vines</li> <li>Dense vine understorey</li> <li>Occasional large, hollow-bearing trees</li> <li>Abundance of fruit and berries</li> <li>Understorey relatively open with dense leaf litter, rotting woody debris logs, and scattered rocks</li> <li>Soft friable soils suitable for burrowing.</li> </ul>	<ul> <li>Canopy vegetation provides foraging and nesting opportunities for a range of rainforest specialists, including doves, honeyeaters, monarchs, flycatchers, gerygones and figbirds, and foraging habitat for flying foxes</li> <li>Microhabitats for snakes, geckos and skinks</li> <li>Refuge for microbats</li> <li>Refuge and foraging habitat for rodents and other ground-dwelling mammals</li> <li>Potential conservation significant species – southern cassowary and migratory birds.</li> </ul>	

#### Table D-1 Fauna habitat recorded during the field survey within the Wangetti South Section

Habitat type	Characteristics	Ecological values
Eucalypt woodland on steep rocky slopes	<ul> <li>Canopy dominated by <i>Eucalyptus</i> <i>portuensis</i> or retains a variety of mature canopy sclerophyll tree species, including <i>E. tessellaris, E. tereticornis, Lophostemon</i> <i>suaveolens, Corymbia intermedia</i> and <i>C. clarksoniana</i></li> <li>Hollow-bearing trees are moderately prevalent</li> <li>Sparse shrub layer</li> <li>Dense ground cover, including <i>Imperata</i> <i>cylindrical</i> (blady grass) and native ferns</li> <li>Presence of logs, woody debris and leaf litter</li> <li>Presence of rocky outcrops and boulders.</li> </ul>	<ul> <li>Canopy vegetation provides foraging and nesting opportunities for honeyeaters and parrots, and foraging habitat for flying foxes and arboreal mammals</li> <li>Hollow-bearing trees provide den sites for arboreal mammals, such as possums, microbats, and nesting habitat for hollownesting birds, such as lorikeets, cockatoos and owls</li> <li>Rocky outcrops and boulders provide basking and sheltering habitat for snakes, monitors and skinks</li> <li>Potential conservation significant species – migratory birds.</li> </ul>
Open woodland over grasses on undulating plains	<ul> <li>Tall, sparse canopy vegetation</li> <li>Hollow-bearing trees are moderately prevalent</li> <li>Very sparse shrub layer present</li> <li>Open understorey</li> <li>Presence of logs, woody debris and leaf litter.</li> </ul>	<ul> <li>Canopy vegetation provides blossoms and nesting opportunities for honeyeaters and parrots, and foraging habitat for flying foxes</li> <li>Refuge and foraging habitat for arboreal mammals and nocturnal birds</li> <li>Microhabitats for snakes, geckos, skinks and other reptile species</li> <li>Grasses provide food resources for granivorous birds and herbivorous mammals</li> <li>Potential conservation significant species – none.</li> </ul>

Habitat type	Characteristics	Ecological values
Acacia woodland	<ul> <li>Dense regrowth canopy cover of <i>Acacia melanoxylon</i></li> <li>Dense leaf litter and woody debris</li> <li>Scattered rock and decorticating bark present.</li> </ul>	<ul> <li>Canopy vegetation provides blossoms for honeyeaters and parrots</li> <li>Microhabitats for snakes, geckos, skinks and other reptile species</li> <li>Potential conservation significant species – none.</li> </ul>
Mixed Melaleuca viridiflora woodlands on inundated plains	<ul> <li>Dense canopy cover of Melaleuca viridiflora</li> <li>Shrub layer absent</li> <li>Diverse ground layer of grasses, sedges and forbs</li> <li>Presence of woody debris and leaf litter</li> <li>Soft friable soils suitable for burrowing.</li> </ul>	<ul> <li>Canopy vegetation provides blossoms and nesting opportunities for honeyeaters and parrots, and foraging habitat for flying foxes and arboreal mammals</li> <li>Grasses provide food resources for granivorous birds and herbivorous mammals</li> <li>Burrowing habitat for reptiles and amphibians</li> <li>Potential conservation significant species – migratory birds.</li> </ul>

Habitat type	Characteristics	Ecological values	
Melaleuca swamp	<ul> <li>Dense canopy cover of <i>Melaleuca viridiflora</i></li> <li>Dense sedges and grasses fringing swamp.</li> </ul>	<ul> <li>Canopy vegetation provides blossoms for honeyeaters and parrots</li> <li>Drinking sites for birds and mammals</li> <li>Breeding and calling habitat for amphibians</li> <li>Foraging habitat for frog-eating snakes</li> <li>Foraging habitat for flying foxes and microbats</li> <li>Potential conservation significant species – migratory birds.</li> </ul>	
Ephemeral waterways	<ul> <li>Tall closed canopy vegetation</li> <li>Presence of complex riparian habitat</li> <li>In stream complexity with undercut banks, roots balls, trailing vegetation, and large rocks to boulders.</li> </ul>	<ul> <li>Canopy vegetation provides blossoms and fruits for doves, honeyeaters, friarbirds, figbirds and parrots</li> <li>Temporary feeding and breeding habitat for aquatic species, and important for facilitating movement during flow events between permanent streams</li> <li>Drinking site for birds and mammals</li> <li>Breeding and calling habitat for amphibians</li> <li>Foraging habitat for frog-eating snakes</li> <li>Foraging habitat for flying foxes and microbats</li> <li>Potential conservation significant species – southern cassowary and migratory birds.</li> </ul>	

Habitat type	Characteristics	Ecological values
<image/>	<ul> <li>Tall closed canopy vegetation</li> <li>Slow and fast flowing permanent streams with splash zones</li> <li>Large boulders and rocks</li> <li>Rock crevices.</li> </ul>	<ul> <li>Foraging and breeding habitat for fish species and crustaceans</li> <li>Foraging habitat for kingfishers and other fishing birds</li> <li>Drinking site for birds and mammals</li> <li>Breeding and foraging habitat for amphibians</li> <li>Foraging habitat for frog-eating snakes</li> <li>Foraging habitat for flying foxes and microbats</li> <li>Potential conservation significant species – southern cassowary. Suitable habitat for the waterfall frog, common mistfrog and Australian lace-lid.</li> </ul>
Modified landscapes	<ul> <li>Canopy and shrub layer absent</li> <li>Ground layer heavily altered.</li> </ul>	<ul> <li>Foraging habitat for raptors and birds adapted to open landscapes</li> <li>Foraging habitat for macropods</li> <li>Potential conservation significant species – none.</li> </ul>







N:AU/Brisbane \Projectsi41132458\GIS/Maps\MXD/4132458\_053\_WT\_SP2\_MNES\_Habitat Types\_Rev3.mxd Print date: 30 Jun 2020 - 13:17 Data source: DITIDIGHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2019), Roads (2016), Watercourse (2014), Inagery (2015); GHD: Surveyed Habitat Types (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTIM: Proposed Camp and Amenities Block (2020). Created by xlee





N:\AU\Brisbane\Projects\41\32458\GIS\Maps\MXD\4132458\_053\_WT\_SP2\_MNES\_HabitatTypes\_Rev3.mxd Print date: 30 Jun 2020 - 13:17





N:\AU\Brisbane\Projects\41\32458\GIS\Maps\MXD\4132458\_053\_WT\_SP2\_MNES\_HabitatTypes\_Rev3.mxd Print date: 30 Jun 2020 - 13:18 Data source: DITIDIGHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2019), Roads (2016), Watercourse (2014), Imagery (2015), GHD: Surveyed Habitat Types (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTIMA: Proposed Camp and Amenities Block (2020), . Created by, xlee

GHD

8th floor Cairns Corporate Tower 15 Lake Street PO Box 819 T: 61 7 4044 2222 F: 61 7 4044 2288 E: cnsmail@ghd.com

© GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

4132458-11006-

139/https://projects.ghd.com/oc/sqoc2/wangettitrackapprova/Delivery/Documents/4132458-REP\_Wangetti South CEMP.docx

**Document Status** 

Revision	Author	Reviewer		Approved for Is	ssue	
		Name	Signature	Name	Signature	Date
1	N. Schulz	B. Steytler	On file	G Squires	Armin	26.7.21

## www.ghd.com



**Appendix F** – Matters of national environmental significance flora pre-clearance survey methodology





Department of State Development, Tourism, and Innovation Wangetti Trail South Section (Wangetti to Palm Cove) Matters of national environmental significance flora pre-clearance survey methodology July 2021



#### **Table of contents**

1.	Introduction2		2
	1.1	Project background	2
	1.2	Purpose of this report	4
2.	MNE	S flora pre-clearance survey methodology	5
	2.1	Overview of the Pre-Start Trail Review and pre-clearance surveys for Wangetti Trail South Section	5
	2.2	Target species	6
	2.3	Survey team	7
	2.4	Timing	7
	2.5	Target area	8
	2.6	Flora pre-clearance survey method	9
3.	Repo	rting	13
	3.1	Reporting results of the MNES flora pre-clearance survey	13
4.	Predi	cted effectiveness	14
	4.1	Identification of MNES flora	14
	4.2	Avoidance of impacts	14
5.	Refe	rences	15

#### **Table index**

Table 2.1	Seasonality for survey of target MNES flora species7
Table 2.2	Determination of protection zones for target MNES species10

#### **Figure index**

Figure 1.1 Location of Wangetti Trail - Wangetti South Section
Figure 2.1 Tree protection zone (source: Australian Standard Protection of Trees on
Development Sites AS 4970-2009)

### **Appendices**

- Appendix A Mapping of the preferred habitat for MNES flora species within Wangetti South Section
- Appendix B Determination of preferred habitat for MNES flora species within Wangetti South Section

#### 1. Introduction

#### 1.1 **Project background**

#### 1.1.1 Overview

The Department of State Development, Tourism and Innovation (DSDTI) - Tourism Development Projects Division (TDPD) is proposing to establish the Wangetti Trail – Wangetti South Section, a 29.7 kilometre (km) shared use trail to accommodate both mountain bike users and hikers from Lot 2 SP309094 in the township of Wangetti, to Palm Cove. Figure 1.1 shows the location of the Wangetti South Section.

The Wangetti South Section will comprise the following components:

- 29.7 km shared use trail to accommodate both mountain bike users and hikers, consisting of natural ground and surface treatments, which will be a maximum of 1.5 m wide. The 1.5 m wide trail will be located within a 40 m survey corridor, referred to as the construction allowance corridor, to allow flexibility for the placement of infrastructure during the construction phase. The trail has been designed to be a 'Mountain Biking intermediate (blue square with blue outline) as defined in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System (MTBA TDRS) and grade 3 for hikers, as defined in the Australian Walking Track Grading System (AWTGS), which also equates to Class 3 in the Australian Standard for Walking Tracks, Part 1: Classification and Signage (AS 2156.1-2001). The trail will have an average gradient of <10% and a maximum gradient no greater than 15% (for short distances only). Built structures proposed as part of the trail include gully crossings, bridges, staircases, platforms, rock armouring and signage, where appropriate and required.</p>
- A number of waterway crossings along the shared use trail that will comprise of the following: rock armouring, boulder crossings and low-level bridge (minor water crossing).
- Dark Jungle (public camping node and amenities block) which will have a footprint of 0.25 ha and will comprise of:
  - 10 x 4 m diameter elevated camping decks
  - 1 x 2.5 m x 2.5 m toilet block
  - 1 communal gathering area including bike rack, table and seating, cooking and bench area and shelter
  - Interconnecting pathways, boardwalks and access tracks.
- The formalisation of existing access tracks into service tracks to provide restricted access to the shared use trail and Dark Jungle for construction purposes, operational purposes, maintenance purpose and for emergency purposes.

The Wangetti South Section is being proposed over four properties located within the Douglas Shire Council and Cairns Regional Council local government areas. The project area intersects both the Macalister Range National Park and the Wet Tropics World Heritage Area (WTWHA).

The project is being delivered by TDPD as part of an adventure-based ecotourism development in north Queensland. The shared use trail will provide walkers and mountain bike riders with a unique experience to traverse through natural areas of north Queensland covering bushland and coastal areas, including the Wet Tropics of Queensland (Wet Tropics), and national parks.





Nghd netghd A UBrisbane IPojectsl 4113 2458 (GISM aps/M XD/4 132 458\_052\_WT\_SP2\_MNES\_L ocalls/Plan\_Rev5.m.id Print date: 01 Dec 2020: 13:22

In August 2020, TDPD submitted a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the proposed Wangetti South Section (ref: EPBC 2020/8722). As part of the referral, the Wangetti South Section (Wangetti to Palm Cove) Matters of National Environmental Significance Baseline Ecology and Impact Assessment Report was prepared by GHD (2020) noted the following regarding threatened flora species:

- No threatened flora species have been confirmed present within the project area during field surveys.
- Four threatened flora species were considered 'likely to occur' within the project area based on the presence of potentially suitable habitat and previous records, namely:
  - Myrmecodia beccarii (Ant plant) Vulnerable
  - Toechima pterocarpum (Orange tamarind) Endangered
  - Vappodes lithocola<sup>1</sup> (Dwarf butterfly orchid) Endangered
  - Zeuxine polygonoides<sup>2</sup> (Velvet jewel orchid) Vulnerable.
- Nine threatened flora species were rated as 'may occur' within the project area.

Following the assessment of the referral documentation by Commonwealth Department of Agriculture, Water and the Environment (DAWE), it was determined on 11 September 2020, that the Project would be a controlled action and would be assessed by preliminary documentation. DAWE requested that further information, in particular a pre-clearance survey methodology document be developed to demonstrate its predicted effectiveness to avoid listed threatened flora species during the construction stage. As a result, the Wangetti Trail – South Section (Wangetti – Palm Cove) MNES flora pre-clearance survey methodology document has been prepared.

#### **1.2 Purpose of this report**

The purpose of this document is to outline the pre-clearance survey methodology to be adopted before starting construction works for the Wangetti South Section to demonstrate how protected flora species will be identified and managed as part of the project. Protected flora considered by the document are those that are listed as Matters of National Environmental Significance (MNES) under the EPBC Act. This document outlines the timing of the MNES flora pre-clearance survey, the personnel required to undertake the MNES flora pre-clearance survey and the methods and reporting to be adopted.

This document will be incorporated in the Construction Environmental Management Plan for Wangetti South Section. This document has been developed with reference to the following documents:

- Department of State Development, Tourism and Innovation Wangetti Trail South Section (Wangetti to Palm Cove) - Matters of National Environmental Significance -Baseline Ecology and Impact Assessment Report prepared by GHD dated July 2020
- Wangetti Trail Construction Methodology Manual, prepared by World Trail dated April 2020
- Department of Environment and Science Flora Survey Guidelines (DES Flora Survey Guidelines) – Protected Plants Nature Conservation Act 1992 NCS/2016/2534 version 2.01 dated 22 August 2020.

<sup>&</sup>lt;sup>1</sup> Also known as *Dendrobium lithocola*, and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum* 

<sup>&</sup>lt;sup>2</sup> Also known as *Rhomboda polygonoides* 

GHD | Report for Department of State Development, Tourism and Innovation - Matters of national environmental significance flora pre-clearance survey methodology, 4132458 | 4

## 2. MNES flora pre-clearance survey methodology

#### 2.1 Overview of the Pre-Start Trail Review and pre-clearance surveys for Wangetti Trail South Section

At the commencement of the construction of the Wangetti Trail South Section, the entire trail will be broken into Construction Segments. The Construction Segments assist in reducing the amount of area to be exposed during the construction phase, which in turns reduces impacts to the natural environment and reduces the impact to the movement of wildlife in the area.

Before starting the construction of a Construction Segment, a Pre-Start Trail Review (PSTR) will be undertaken. The purpose of the PSTR is to review and inspect the proposed alignment of the trail with the TDPD Project Manager, prior to construction starting, to confirm the exact alignment within the groundtruthed corridor, identify any specific environmental values to be protected (including values identified to date together with any additional values identified during the PSTR) and to discuss and agree on specific construction treatments.

The following personnel will be involved in the PSTR:

- TDPD Project Manager
- Contractor's Project Manager
- Contractor's Trail Designer/Builder for that Construction Segment
- Suitably qualified botanist/ecologist
- DES Shadow Ranger.

A representative of the respective land manager(s), Queensland Parks and Wildlife Services (QPWS), Wet Tropics Management authority (WTMA), Douglas Shire Council, Cairns Regional Council, and the Traditional Owners will be invited to attend the PSTR.

Other personnel may also be required – for example, if the trail is in close proximity to areas of high environmental values, qualified environmental specialists should be present to provide assistance in micro-siting the trail to avoid impacts to these values. In areas of high cultural heritage values, qualified archaeologists and/or Traditional Owners should be present.

Prior to commencing the PSTR, known information about the Construction Segment will be gathered and assessed – length, proposed difficulty rating, likely construction treatments, known environmental issues that have been identified including protected flora species.

MNES flora pre-clearance survey will be undertaken during the PSTR and will be carried out across the entire project footprint.

The Construction Segments, PSTR and pre-clearance surveys are control measures being adopted by the Project to demonstrate how the Project can avoid, minimise and mitigate impacts on MNES:

 This process includes the delineation of the approved clearing area with flagging tape or survey pegs and this ensures that any areas of high ecological values encountered can be avoided in the first instance by the proposed works (including values identified to date together with any additional values identified during the PSTR). Where there is an environmental issue specific to the trail during the field inspection of the pre-start phase, the
environmental issue would be visually identified and then marked in the field as an exclusion zone (using different coloured flagging tape or bunting). The exact alignment of the trail is flagged and detailed documentation is gathered, including photographs showing the pre-existing conditions on site and photo points using GPS coordinates before any works are undertaken. This allows for post-construction photos to be taken, which will enable before/after comparison. A suitably qualified botanist/ecologist will be involved during the process.

- A QPWS ranger will be invited to attend the PSTR for areas with high environmental; significance in order to aid in micro-siting the trail to avoid impacts to environmental values.
- Record any MNES flora species encountered during the PSTR and pre-clearance survey. Where any MNES flora species are identified, the botanist/ecologist and trail builders will be able to collaborate and achieve a satisfactory solution to micro-site the trail and avoid potential impact to MNES flora species. Findings from the MNES flora pre-clearance survey will be discussed with TDPD Project Manager, Contractor's Project Manager and the Contractor's Trail Designer/Builder to determine if additional protection measures are required and/or if any changes need to be made to the alignment.
- Detailed documentation is gathered, including photographs showing the pre-existing conditions on site before any works are undertaken. This allows for post-construction photos to be taken and to create photo points using a GPS coordinate, which will enable before/after comparison. This information will be used to develop a monitoring plan of the MNES flora species to monitor the number and condition of MNES species within the project area.
- Hand construction may need to be undertaken in areas of high environmental values, therefore requiring minimal excavation and disturbance footprints.
- The construction segments allow for disturbed areas to be rehabilitated in a timely manner.

# **2.2 Target species**

No MNES flora species have been confirmed present within the construction allowance corridor during field surveys. However, four MNES flora species were considered likely to occur by the MNES Baseline Report (GHD 2020), namely:

- Ant Plant (*Myrmecodia beccarii*) Vulnerable
- Dwarf butterfly orchid (Vappodes lithocola<sup>3</sup>) Endangered
- Orange Tamarind (*Toechima pterocarpum*) Endangered
- Velvet jewel orchid (*Zeuxine polygonoides*<sup>4</sup>) Vulnerable.

DAWE identified a further eight MNES flora species that have the potential to occur, however no historic records of these species were identified by the baseline assessment undertaken for the project such that they were not rated as 'likely to occur' by the MNES Baseline Report (GHD 2020). These additional species are identified by DAWE are as follows:

- Canarium acutifolium Vulnerable
- Dark-stemmed Antler Orchid (*Dendrobium mirbelianum*) Endangered
- Diplazium cordifolium Vulnerable

<sup>&</sup>lt;sup>3</sup> Also known as *Dendrobium lithocola*, and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum* 

<sup>&</sup>lt;sup>4</sup> Also known as *Rhomboda polygonoides* 

GHD | Report for Department of State Development, Tourism and Innovation - Matters of national environmental significance flora pre-clearance survey methodology, 4132458 | 6

- Diplazium pallidum Endangered
- Phaius pictus Vulnerable
- Native Moth Orchid (Phalaenopsis amabilis subsp. rosenstromii) Endangered
- Polyscias bellendenkerensis Vulnerable
- Cooktown Orchid (Vappodes phalaenopsis) Vulnerable (also known as Vappodes phalaenopsis and the Queensland Flora Census 2019 recognises this species as Dendrobium biggibum)

# 2.3 Survey team

The MNES flora pre-clearance survey will be undertaken by a qualified botanist or ecologist. Given the complexity and diversity of ecosystems that characterise the construction area, the botanist/ecologist must have significant and demonstrable experience in survey of the relevant ecosystem types and identifying the specific target species.

Prior to the PSTR/pre-clearance flora survey commencing, the experience of the botanist/ecologist undertaking the requirements of the flora survey will be reviewed by TDPD Project Manager. The qualifications and experience of the botanist/ecologist will be included in the flora survey report.

During the MNES pre-clearance survey, the qualified botanist or ecologist will be accompanied by the Contractor's Trail Designer/Builder for that construction segment to facilitate clear communications and allow for development of on-the-ground practical solutions in the event than an MNES flora species is encountered.

# 2.4 Timing

Construction is anticipated to commence in April 2021. Accordingly, the MNES flora preclearance survey will be undertaken in March 2021 so as to complete this survey and reporting prior to commencement of construction activities.

This proposed timing is suitable for detection of all target species (refer Table 2.1). Specifically, the target species are all long-lived species, and the survey timing will coincide with the flowering season for many of the more cryptic species. Where any orchid species with an absence of flowers are recorded and the identity cannot be confidently determined at the time of survey, these plants will either be completely avoided (i.e. assumed to be a potential MNES species for the purpose of flora management) or works in that area will not be undertaken until identification during a suitable season can be undertaken.

Any areas that are not cleared within 18 months from the time of the MNES flora pre-clearance survey are to be re-surveyed prior to clearing.

Species	Seasonality for survey
Canarium acutifolium	Seasonality not critical (long-lived tree that can be identified based on vegetative features)
Dendrobium mirbelianum	Flowering is variable, generally August to November. However, it is a perennial species that can be detected outside of flowering season based on vegetative features (also see footnote* below).

#### Table 2.1 Seasonality for survey of target MNES flora species

Species	Seasonality for survey
Diplazium cordifolium	Seasonality not critical (long-lived fern that can be identified based on vegetative features)
Diplazium pallidum	Seasonality not critical (long-lived fern that can be identified based on vegetative features)
Myrmecodia beccarii	Seasonality not critical (long-lived plant that is highly distinctive based on vegetative features)
Phaius pictus	Flowers in April to June. This is a long-lived evergreen orchid and the genus is highly distinctive, such that the presence of this genus can be detected outside of the flowering season and therefore seasonality is not critical (also see footnote* below).
Phalaenopsis amabilis subsp. rosenstromii	Flowers in December to April such that the seasonality of the survey will be appropriate (also see footnote* below).
Polyscias bellendenkerensis	Seasonality not critical (long-lived shrub / small tree that can be identified based on vegetative features)
Toechima pterocarpum	Seasonality not critical (long-lived tree that can be identified based on vegetative features)
Vappodes lithocola	Flowers in March to July such that the timing of the survey will be appropriate (also see footnote* below)
Vappodes phalaenopsis	Flowers in March to July such that the timing of the survey will be appropriate (also see footnote* below)
Zeuxine polygonoides	The species flowers from June to August; however vegetative features are distinctive such that seasonality is not critical.

\* Where any orchid species with an absence of flowers are recorded and the identity cannot be confidently determined at the time of survey, these plants will either be completely avoided (i.e. assumed to be a potential MNES species for the purpose of flora management) or works in that area will not be undertaken until identification during a suitable season can be undertaken.

# 2.5 Target area

The MNES flora pre-clearance survey will be undertaken across the entire project footprint.

For the purpose of identifying where particular species may occur, a map has been developed to identify habitats that may be suitable for the target MNES flora species. This map was developed by researching the habitat requirements of each species (based primarily on the DAWE's Species Profile and Threats Database (SPRAT), and then using Regional Ecosystem mapping to identify areas supporting potentially suitable vegetation communities. Where habitats are likely to be only marginally suitable, a precautionary approach was adopted, and these were included in the habitat map. Where relevant, geological and/or altitudinal information was used to refine the mapping for species with specific requirements relating to these characteristics.

The mapping is provided as Appendix A and the attributes on which the mapping was developed are provided in Appendix B.

#### 2.5.1 Disturbance areas

#### Shared Use Trail

The width of the shared use trail will be a maximum of 1.5 m and the total length of the trail (excluding mountain bike trail) is 29.7 km. Details of the vegetation clearing technique to be adopted during the construction phase of the project is outlined in the Wangetti Trail Construction Methodology Manual (World Trail 2020). Vegetation clearing will be used to clear the pathway of vines, shrubs, bushes, ground covers and small trees, to allow clear access for construction equipment such as a small excavator.

Up to 1.0 m temporary disturbance (i.e. 0.5 m on either side of the 1.5 m trail) has been allowed during the construction phase in order to accommodate construction equipment including a small excavator. Up to 2.5 m height temporary disturbance has been allowed during the construction phase in order to accommodate construction equipment such as a small excavator.

A construction allowance corridor (20 m on either side of the trail for a total corridor of 40 m width) has been allowed for the trail to provide flexibility to the trail builders to deviate from the alignment up to 20 m to either side, in order to respond to any unexpected issues that may arise including avoiding any identified MNES flora species. Taking into consideration the population characteristics that are typical for the target species (i.e. no extensive populations of clustered individuals are anticipated to occur), the 40 m construction allowance corridor should be sufficient in most cases to enable the trail to be moved or adjusted to avoid any MNES plants.

#### Proposed single span bridges along Shared Use Trail

In order to accommodate the construction of the abutments and to allow for the installation of the single span bridge a maximum area of 21  $m^2$  has been allowed on either side of the waterway (total disturbance area 42  $m^2$ ) or a width of 1.5 m over the waterway.

#### Service tracks

Limited vegetation disturbance is required for only one service track to remove vegetation that has grown over the existing access track. In regard to the other service tracks, only overhanging vegetation over the existing access tracks will be cut back.

#### Dark Jungle

For Dark Jungle, an area of up to 0.25 ha will be permanently disturbed for the public camping node and amenities block camp site. The design of the public camping node will be refined during the detailed design phase by the nominated construction contractor with a maximum of 0.25 ha allowed.

#### 2.6 Flora pre-clearance survey method

During the MNES flora pre-clearance survey, the botanist/ecologist will comprehensively traverse the project footprint on foot in search of MNES plants. This is feasible given that the total width of the footprint is 2.5 m (i.e. permanent and temporary footprints combined). Areas beyond the 2.5 m footprint will be surveyed within the 40 m wide corridor should the footprint require adjustment at any location.

Where an MNES plant species is detected, the botanist/ecologist will notify the trail builders, and an exclusion zone will be clearly demarcated using coloured flagging tape or bunting. The

precise location (including accuracy of recorded location) of all observed MNES flora species will be recorded with a hand-held global positioning system (GPS) for future reference and for notification to relevant parties (e.g. Queensland Herbarium) and inclusion on site plans. Supplementary information regarding the occurrence of the MNES flora species is to be recorded including a description of the supporting habitat, the size and maturity of individuals, the presence of reproductive output, and ay observations on health and condition.

The re-positioning of the footprint will be to an appropriate distance from the MNES plant within the 40 m wide construction allowance corridor to allow for a buffer from the impact, also taking into consideration indirect impacts that could occur such as reduction of canopy cover. In this regard, the buffer will be determined by the botanist/ecologist and will be based on *Australian Standard Protection of Trees on Development Sites* (AS 4970-2009). Application of AS 4970-2009 allows for determination of the structural root zone (SRZ) together with a wider tree protection zone (TPZ), based on a calculation formula that was developed to consider both above and below ground tree components.

In accordance with AS 4970-2009, the radius of the TPZ is determined by measuring the diameter at breast height (DBH) of the trunk at a height of 1.4 m above the ground, and multiplying this number by 12. For target MNES species that are not tree species, the approach will be to determine the TPZ for the host tree or an adjoining tree/s that functions in providing habitat conditions (primarily shading) required to sustain the MNES species. This approach is outlined in Table 2.2 below and a diagrammatic representation is provided as Figure 2.1.

By way of an example to demonstrate determination of the TPZ, a *Toechima pterocarpum* (orange tamarind) individual with a stem diameter of 0.1 m (measured at 1.4 m above the ground), the TPZ would comprise a radius of 1.2 m surrounding the individual.

As per AS 4970-2009, encroachment of up to 10 percent of the TPZ can occur without adverse impacts to tree health. Should encroachment into the TPZ be necessary, this will be assessed on a case-by-case basis by the botanist/ecologist and will depend on the characteristics and health of the tree together with the nature of any proposed encroachment.

Upon completion of works in the vicinity of an exclusion zone, all marking will be removed.

Category	Relevant species^	Determination of protection zone
Trees and shrubs	Polyscias bellendenkerensis Toechima pterocarpum	TPZ of individual plant calculated as DBH multiplied by 12 in accordance with AS 4970-2009.
Epiphytes	Dendrobium mirbelianum Myrmecodia beccarii Phalaenopsis amabilis subsp. rosenstromii Vappodes phalaenopsis	TPZ of host tree calculated as DBH multiplied by 12 in accordance with AS 4970-2009.
Lithophytes	Dendrobium mirbelianum Phalaenopsis amabilis subsp. rosenstromii Vappodes lithocola	Immediately surrounding tree/s assessed to identify tree/s functioning in providing suitable habitat conditions for MNES species. TPZ of those tree/s calculated as

#### Table 2.2 Determination of protection zones for target MNES species

	Vappodes phalaenopsis Zeuxine polygonoides	DBH multiplied by 12 in accordance with AS 4970-2009.
Ground layer species	Diplazium cordifolium Diplazium pallidum Phaius pictus	Immediately surrounding tree/s assessed to identify tree/s functioning in providing suitable habitat conditions for MNES species. TPZ of those tree/s calculated as DBH multiplied by 12 in accordance with AS 4970-2009.

^Some species occur in more than one category based on their habitat preferences



Figure 2.1 Tree protection zone (source: Australian Standard Protection of Trees on Development Sites AS 4970-2009)

## 3.1 Reporting results of the MNES flora pre-clearance survey

During the MNES flora pre-clearance survey during the PSTR, findings will be recorded using a handheld GPS device and reported in a flora survey report. The flora survey report must include photos and specific GPS coordinates associated with the protected plant species. A copy of the completed and signed document must be provided to the TDPD Project Manager.

Findings from the MNES flora pre-clearance survey will be discussed with TDPD Project Manager, Contractor's Project Manager and the Contractor's Trail Designer/Builder to determine if additional protection measures are required and/or if any changes need to be made to the alignment.

Where a protected plant species has been identified within the disturbance area of the shared use trail, the following protocol would apply:

- TDPD Project Manager, Contractor's Project Manager and the Contractor's Trail Designer/Builder and the relevant regulatory authority would be contacted prior to the field inspection for specific recommendations and invited to attend if required (for example, micro-siting to avoid MNES flora sites).
- During the MNES flora pre-clearance survey, the plant would be visually identified and then marked in the field as an exclusion zone (using different coloured flagging tape or bunting). The exact alignment of the trail to be constructed would be flagged in the field, ensuring an adequate buffer from the exclusion zone.
- Detailed documentation will be gathered, including photographs showing the pre-existing conditions on site before any works are undertaken. This allows for post-construction photos to be taken, which will enable before/after comparison.

# 4.1 Identification of MNES flora

This survey method is expected to be highly effective in identifying any MNES flora species that are present within the project footprint for the following reasons:

- Given the narrow extent of the project footprint for the shared use trail (i.e. maximum of 2.5 m in width) and Dark Jungle (0.25 ha), it will be feasible to comprehensively ground-truth the entire project footprint.
- The seasonality of the survey will be appropriate for detection of the target species.
- The requirement for the botanist/ecologist to demonstrate significant experience in the specific ecosystems and relevant species provides assurance in the outcomes of the survey.

# 4.2 Avoidance of impacts

The approach is also expected to be highly effective in achieving avoidance of potential impacts to MNES flora species for the following reasons:

- Given the flexibility of the precise project footprint location within the construction allowance corridor, it will be achievable for the project footprint to be re-positioned as required so as to successfully avoid impact to any MNES flora species that are detected.
- The documented population characteristics that are typical of the target species are such that no large populations comprising numerous clustered individuals are anticipated to occur, and therefore the construction allowance corridor is expected to provide sufficient space for avoidance of impacts to an overall population, including consideration of indirect impacts such as reduced canopy cover.
- The presence of the Contractor's Trail Designer/Builder during the MNES flora preclearance survey will facilitate clear communication between the botanist/ecologist and the trail builder, such that there is no misinformation or misunderstanding regarding the presence of MNES flora species. Where any MNES flora species are identified, the botanist/ecologist and trail builders will be able to collaborate and achieve a satisfactory solution to micro-site the trail and avoid potential impact to MNES flora species.
- Where a MNES plant is encountered, the re-positioning of the footprint will be at an appropriate distance from the MNES plant within the construction allowance corridor to allow for a buffer from the impact. Applying *Australian Standard Protection of Trees on Development Sites AS 4970-2009* provides a sound base for determination of the buffer width as this standard has been widely and successfully used, and the calculation formula for tree protection zones was developed considering both above and below ground tree components.

# 5. References

- Barker, M. 1997. *Dendrobium lithocola*, in Species Management Manual. Department of Natural Resources, Brisbane.
- Department of Agriculture, Water and Environment (DAWE) 2020. *Species Profiles and Threats Database*. Canberra: Department of Agriculture, Water and Environment
  - Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008a. *Approved Conservation Advice for <u>Canarium acutifolium</u> var. <u>acutifolium</u>. Canberra: Department of the Environment, Water, Heritage and the Arts.*
  - Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008b. *Approved Conservation Advice for <u>Diplazium cordifolium</u>. Canberra: Department of the Environment, Water, Heritage and the Arts.*
  - Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008c. *Approved Conservation Advice for <u>Diplazium pallidum</u>.* Canberra: Department of the Environment, Water, Heritage and the Arts.
  - Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008d. *Approved Conservation Advice for <u>Myrmecodia beccarii</u>. Canberra: Department of the Environment, Water, Heritage and the Arts.*
  - Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008e. *Approved Conservation Advice for <u>Toechima pterocarpum</u>. Canberra: Department of the Environment, Water, Heritage and the Arts.*
  - Dockrill, A.W 1992. Australian Indigenous Orchids: The Epiphytes, the Tropical Terrestrial Species, Volume 2. Surrey Beattie and Sons, Chipping Norton.
  - Elliot, W.R and Jones, D.L 1997. Encyclopaedia of Australian Plants Suitable for Cultivation, vol. 7, Thomas C Lothian Pty Ltd, Port Melbourne.

GHD Pty Ltd 2020. Department of State Development, Tourism and Innovation - Wangetti Trail South Section (Wangetti to Palm Cove) Matters of National Environmental Significance Baseline Ecology and Impact Assessment Report, Final Version, July 2020

Jones, D.L. 2006. *Native orchids of Australia including the island territories.* Reed New Holland, Sydney.

**Appendix A** – Mapping of the preferred habitat for MNES flora species within Wangetti South Section



Based on or contains data provided by the State of QLD (DNRME) 2020. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



DITID Environment Assessment Stage 2 Wangetti Trail

Wangetti Trail South Section -Wangetti to Palm Cove Potential habitat for threatened flora species Project No. **41-32458** Revision No. **B** Date **30/04/2021** 

> Appendix A (Sheet 1 of 3)

N:AU/Brisbane/Projedsi41132458/GIS/Maps/MXD/4132458\_065\_WT\_SP2\_South\_ThreatenedFloraSpecies\_RevA.mxd Print date: 23 Dec 2020 - 10:51 Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Roads (2016), Watercourse (2014), Imageny (2015); GHD: Threatened Species Potential Habitat (2020) WTMA: Proposed Camp and Amenities Block (2020); Source: Earl, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USCS, AeroGRD, IGN, and the GIS User Community, Created by xites





Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Roads (2016), Watercourse (2014), Imagery (2015); GHD: Threatened Species Potential Habitat (2020) WTMA: Proposed Camp and Amentiles Block (2020); Source: Esti, DigitalGlobe, GeoEye, Eathstar Geographics, CNES/Airbus DS, USDA, USGS, Areo GRD, IGN, and the GIS User Community. Created by: xee



Based on or contains data provided by the State of QLD (DNRME) 2020. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts to liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.



DITID Environment Assessment Stage 2 Wangetti Trail

Project No. 41-32458 Revision No. в Date 30/04/2021

Wangetti Trail South Section -Wangetti to Palm Cove Potential habitat for threatened flora species

Appendix A (Sheet 3 of 3)

N:AUUBrisbane/Projed:sl4132458/GISIMaps/MXD/4132458\_065\_WT\_SP2\_South\_ThreatenedFloraSpecies\_RevA.mxd Print d ate: 24 Dec 2020 - 11:39

Data source: DITIDIGHD: Proposed Infrastructure (2019), Wangetti Trail Aligament (04/2020); DNRME: Roads (2016), Wateroourse (2014), Imagery (2015); GHD: Threatened Species Potential Habitat (2020) WTMA: Proposed Camp and Amenties Block (2020); Source: Esri, Maxer, GeoEye, Earth star Geographics, CNESIAirbus DS, USDA, USGS, AeroGRD, IGN, and the GIS User Community, Created by: New

**Appendix B** – Determination of preferred habitat for MNES flora species within Wangetti South Section

Threatened flora species	Preferred habitat	Relevant Regional Ecosystems (REs)	Altitudinal limits
Canarium acutifolium	Dense, primary rainforest, also in the more open, secondary formations; especially along forest-edges, riverbanks and in clearings (DEWHA 2008a).	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.1a – Mesophyll vine forest</li> <li>7.11.1b – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> <li>7.11.7a – Notophyll vine forest</li> <li>7.11.7b – Notophyll vine forest</li> <li>7.12.1a – Mesophyll to notophyll vine forest</li> <li>7.12.1a – Mesophyll vine forest</li> <li>7.12.7 – Notophyll vine forest</li> <li>7.12.48 – Notophyll vine forest</li> </ul>	Occurring between 5 and 200 m AHD (DEWHA 2008a).
Dark-stemmed antler orchid ( <i>Dendrobium</i> <i>mirbelianum</i> )	Grows mainly on trees (epiphytic) in mangroves and coastal swamps in humid locations and has also been recorded growing on rocks (Jones 2006).	7.3.8b - contains coastal melaleuca swamps	Occurring between 2 and 150 m AHD (Jones 2006).
Diplazium cordifolium	Occurs in rainforests and along creek banks (DEWHA 2008b).	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.1a – Mesophyll vine forest</li> <li>7.11.1b – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> <li>7.11.7a – Notophyll vine forest</li> <li>7.11.7b – Notophyll vine forest</li> <li>7.12.1a – Mesophyll to notophyll vine forest</li> <li>7.12.7a – Notophyll vine forest</li> <li>7.12.48 – Notophyll vine forest</li> </ul>	-
Diplazium pallidum	Fern growing in lowland rainforest, particularly near streams, but has not been found growing in creeks. It occurs on basalt soils (DEWHA 2008c).	Nil (This species requires soils derived of basalt, which are not known to be present in the project area).	-
Ant plant ( <i>Myrmecodia</i> <i>beccarii</i> )	This species is known from the coastal woodlands between Cooktown and Ingham in Queensland and occurs in open woodland dominated by Melaleuca viridiflora or mangroves (DEWHA 2008d).	7.3.8 – Melaleuca woodland	-
Phaius pictus	This species is highly localised and restricted to rainforests from 0 to 600 m altitude. It usually occurs in sheltered humid sites, close to streams and seepage	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.1a – Mesophyll vine forest</li> <li>7.11.1b – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> </ul>	Occurring between 0 and 600 m AHD (Jones 2006).

	among forest litter on boulders (Jones 2006).	<ul> <li>7.11.7a – Notophyll vine forest</li> <li>7.11.7b – Notophyll vine forest</li> <li>7.12.1a – Mesophyll to notophyll vine forest</li> <li>7.12.7 – Notophyll vine forest</li> <li>7.12.7a – Notophyll vine forest</li> <li>7.12.12 – Notophyll vine forest</li> <li>7.12.48 – Notophyll vine forest</li> </ul>	
Native moth orchid ( <i>Phalaenopsis amabilis</i> <i>subsp. rosenstromii</i> )	Species is known to grow in trees in humid airy environments, on sheltered slopes and gullies in deep gorges and close to streams in rainforests (Jones 2006).	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.1a – Mesophyll vine forest</li> <li>7.11.1b – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> <li>7.11.7a – Notophyll vine forest</li> <li>7.11.7b – Notophyll vine forest</li> <li>7.12.1a – Mesophyll vine forest</li> <li>7.12.7a – Notophyll vine forest</li> <li>7.12.48 – Notophyll vine forest</li> </ul>	Occurring between 200 and 500 m AHD (Jones 2006).
Polyscias bellendenkerensis	Grows in microphyll vine/fern thickets, notophyll vine forest and stunted shrublands (Elliot and Jones 1997).	Nil (No potential habitat was identified as altitude requirements for the species are not met).	Occurring between 1100 and 1600 m AHD (Elliot and Jones 1997).
Orange tamarind ( <i>Toechima pterocarpum</i> )	Occurs in lowland tropical rainforest, often along watercourses, with an altitude range from sea level to 450 m. It occurs around Julatten, Mossman and Wangetti in north Queensland (DEWHA 2008f).	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> <li>7.12.1 – Mesophyll to notophyll vine forest</li> </ul>	-
Dwarf butterfly orchid ( <i>Vappodes lithocola</i> ) (also known as <i>Dendrobium lithocola</i> and recognised as <i>Dendrobium bigibbum</i> by the Queensland Flora Census 2019)	Species occurs in coastal ranges between Daintree and Cairns, growing in rainforest on rocks, boulders and cliff faces on ridges and slopes (Jones 2006).	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.1a – Mesophyll vine forest</li> <li>7.11.1b – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> <li>7.11.7a – Notophyll vine forest</li> <li>7.11.7b – Notophyll vine forest</li> <li>7.12.1a – Mesophyll to notophyll vine forest</li> <li>7.12.7 – Notophyll vine forest</li> <li>7.12.7a – Notophyll vine forest</li> <li>7.12.48 – Notophyll vine forest</li> </ul>	Occurring between 250 and 800 m AHD (Dockrill 1992; Barker 1997; Jones 2006).
Cooktown orchid (Vappodes phalaenopsis) (also known as Dendrobium phalaenopsis and recognised as Dendrobium bigibbum by	Species grows on trees and rocks in coastal scrub, littoral rainforest, riverine vegetation, monsoon thickets, swamps and gullies in open forests1 at altitudes of up to 400 m above sea level (Jones 2006).	<ul> <li>7.3.8b - Contains coastal melaleuca swamps</li> <li>7.3.10 - Mesophyll to notophyll vine forest</li> <li>7.3.44 - Open forest to woodland</li> <li>7.11.1 - Mesophyll vine forest</li> <li>7.11.1a - Mesophyll vine forest</li> <li>7.11.1b - Mesophyll vine forest</li> </ul>	Occurring between 0 and 400 m AHD (Jones 2006).

the Queensland Flora Census 2019)	1Note - Mapping of this species for the purposes of this report is highly conservative as fine scale information to identify gullies was not available, such that a precautionary approach was adopted and all open forest was identified as potentially suitable.	<ul> <li>7.11.5 - Open forest</li> <li>7.11.5a - Open forest</li> <li>7.11.5d - Open forest</li> <li>7.11.7a - Notophyll vine forest</li> <li>7.11.7a - Notophyll vine forest</li> <li>7.11.7b - Notophyll vine forest</li> <li>7.11.7b - Notophyll vine forest</li> <li>7.11.7b - Open to closed forest</li> <li>7.11.16 - Open forest to woodland</li> <li>7.11.26 - Open shrubland to closed scrub</li> <li>7.11.44 - Open forest to woodland</li> <li>7.11.51 - Open forest to woodland</li> <li>7.12.1a - Mesophyll to notophyll vine forest</li> <li>7.12.7 - Notophyll vine forest</li> <li>7.12.7 - Notophyll vine forest</li> <li>7.12.9 - Open forest to woodland</li> <li>7.12.24 - Open forest to woodland</li> <li>7.12.29 - Open forest to woodland</li> <li>7.12.29 - Open forest to woodland</li> <li>7.12.34 - Open forest to woodland</li> <li>7.12.53 - Open forest to woodland</li> <li>7.12.53 - Open forest to woodland</li> <li>7.12.54 - Open forest to woodland</li> <li>7.12.55 - Open forest to woodland</li> <li>7.12.61a - Open forest to woodland</li> <li>7.12.61a - Open forest to woodland</li> <li>7.12.61a - Open forest to tall open forest</li> <li>7.12.61a - Open forest to tall open forest and woodland</li> </ul>	
Velvet jewel orchid ( <i>Zeuxine polygonoides</i> ) (Also known as <i>Rhomboda polygonoides</i> )	Mesophyll vine forests and simple notophyll vine forests (DAWE 2020). This species grows in mostly moist, cloudy or wet rainfall zones on metamorphic substrates, granite or rhyolite (Jones 2006).	<ul> <li>7.3.10 – Mesophyll to notophyll vine forest</li> <li>7.11.1 – Mesophyll vine forest</li> <li>7.11.1a – Mesophyll vine forest</li> <li>7.11.1b – Mesophyll vine forest</li> <li>7.11.7 – Notophyll vine forest</li> <li>7.11.7a – Notophyll vine forest</li> <li>7.11.7b – Notophyll vine forest</li> <li>7.12.1a – Mesophyll vine forest</li> <li>7.12.7 – Notophyll vine forest</li> <li>7.12.48 – Notophyll vine forest</li> </ul>	-

GHD 8th floor Cairns Corporate Tower 15 Lake Street PO Box 819 T: 61 7 4044 2222 F: 61 7 4044 2288 E: cnsmail@ghd.com

#### © GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

4132458-81498-

138/https://projects.ghd.com/oc/sqoc2/wangettitrackapprova/Delivery/Documents/4132458-REP-Wangetti South Section-Pre Clearance Survey Methodology.docx

**Document Status** 

Revision	Author	Reviewer		Approved for Is	ssue	
		Name	Signature	Name	Signature	Date
0	M. Ward	S. Potts	SQ.	G Squires	Anis	15.12.20
1	M. Ward	S. Potts	Ø.	G Squires	Armin	24.12.20
2	M. Ward	S. Potts	SØX.	G Squires	Amin	30.07.21

# www.ghd.com



GHD 8th floor Cairns Corporate Tower 15 Lake Street PO Box 819 T: 61 7 4044 2222 F: 61 7 4044 2288 E: cnsmail@ghd.com

#### © GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

4132458-41763-135/\ghdnet\ghd\AU\Birtinya\Projects\41\32458\Tech\Environment\Approval Documentation\SP2\EPBC Referral\Prelim Docs\EMP\FINAL\4132458-REP\_Wangetti South EMP\_0.docx

#### **Document Status**

Revision	Author	Reviewer		Approved for Is	ssue	
		Name	Signature	Name	Signature	Date
1	N Schulz/ B Steytler	S Wilson	s Mila-	G Squires	Aris	26/7/2021

# www.ghd.com



**Appendix L** – Assessment of Douglas Shire Regional Council Planning Codes

## 1. Acid sulfate soils overlay code

Performance outcomes	Acceptable Solutions	Compliance
For assessable developments		
PO1 The extent and location of potential or actual acid sulfate soils is accurately identified.	<ul> <li>AO1.1 No excavation or filling occurs on the site.</li> <li>Or</li> <li>AO1.2 An acid sulfate soils investigation is undertaken.</li> <li>Note - Planning scheme policy SC 6.12– Potential and actual acid sulfate soils provides guidance on preparing an acid sulfate soils investigation.</li> </ul>	<ul> <li>AO1.1 – AO2.2 – Complies The proposed development will be undertaken on land above 20m AHD with proposed excavation limited to less than 1.5m in depth. </li> <li>No detailed acid sulfate soils investigations have been undertaken to date for the Wangetti South Section A project area as the proposed works will not be impacting acid sulfate soils. According to the Australian Atlas of Soils, the project area consists of three major soil groups:</li></ul>
PO2 Development avoids disturbing potential acid sulfate soils or actual acid sulfate soils, or is managed to avoid or minimise the release of acid and metal contaminants.	<ul> <li>AO2.1 The disturbance of potential acid sulfate soils or actual acid sulfate soils is avoided by: <ul> <li>(a) not excavating, or otherwise removing, soil or sediment identified as containing potential or actual acid sulfate soils;</li> <li>(b) not permanently or temporarily extracting groundwater that results in the aeration of previously saturated acid sulfate soils;</li> <li>(c) not undertaking filling that results in:</li> <li>(d) actual acid sulfate soils being moved below the water table;</li> <li>(e) previously saturated acid sulfate soils being aerated. </li> <li>Or</li> <li>AO2.2</li> <li>The disturbance of potential acid sulfate soils or actual acid sulfate soils is undertaken in accordance with an acid sulfate soils management plan and avoids the release of metal contaminants by: <ul> <li>(f) neutralising existing acidity and preventing the generation of acid and metal contaminants;</li> <li>(g) preventing the release of surface or groundwater flows containing acid and metal contaminants into the environment;</li> </ul> </li> </ul></li></ul>	<ul> <li>Dermosols – these soils generally have a well-structured surface and are usually non-dispersive due to the low sodium content, therefore erosion risk is reduced. These soils are present in the northern section of the trail alignment.</li> <li>Ferrosols – are typically well-drained and have good ability to produce vegetation. This soil type is present in the southern portion of the trail alignment.</li> <li>Kurosols – these soils typically have poor infiltration due to their hard-setting surface. This results in a large proportion of water running off and causing erosion. These soils can be dispersive in the subsoil and contain high salt levels which can lead to erosion. These soils are present in the central portion of the trail alignment.</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>(h) preventing the in situ oxidisation of potential acid sulfate soils and actual acid sulfate soils through ground water level management;</li> <li>(i) appropriately treating acid sulfate soils before disposal occurs on or off site;</li> <li>(j) documenting strategies and reporting requirements in an acid sulfate soils environmental management plan.</li> <li>Note - Planning scheme policy SC 6.12 – Acid sulfate soils provides guidance on preparing an acid sulfate soils management plan.</li> </ul>	
PO3	AO3	PO3 – Complies
No environmental harm is caused as a result of exposure to potential acid sulfate soils or actual acid sulfate soils.	No acceptable outcomes are prescribed.	The proposed development will be undertaken on land above 20m AHD with proposed excavation limited to less than 1.5m in depth.
		No detailed acid sulfate soils investigations have been undertaken to date for the Wangetti South Section A project area as this will be the responsibility of the nominated design and construction contractor.

## 1. Bushfire hazard overlay code

Performance outcomes	Acceptable Solutions	Compliance
For self-assessable and assessable dev	elopment	
Compatible development		
PO1 A vulnerable use is not established or materially intensified within a bushfire hazard area (bushfire prone area) unless there is an overriding need or other exceptional circumstances. Note - See the end of this code for examples of vulnerable uses.	AO1 Vulnerable uses are not established or expanded. Note – Where, following site inspection and consultation with Council, it is clear that the mapping is in error in identifying a premises as being subject to a medium, high, very high bushfire hazard or potential impact buffer sub-category, Council may supply a letter exempting the need for a Bushfire Management Plan. Note – Where the assessment manager has not previously approved a Bushfire Management Plan (either by condition of a previous development approval), the development proponent will be expected to prepare such a plan. Note – Planning scheme policy SC6.9 - Natural hazards, provides a guide to the preparation of a Bushfire Management Plan.	AO1 – Complies The proposed development does not involve the establishment of a 'vulnerable use'.
PO2 Emergency services and uses providing community support services are able to function effectively during and immediately after a bushfire hazard event.	AO2 Emergency Services and uses providing community support services are not located in a bushfire hazard sub-category and have direct access to low hazard evacuation routes.	<ul> <li>AO2 – Complies</li> <li>The site is located within the medium to very high bushfire hazard over the bushfire hazard overlay. During construction, construction activities have the potential to increase bushfire hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc A Preliminary Construction Environmental Management Plan (CEMP) has been developed to manage environmental risks to the project area during the construction phase. Refer the CEMP in Appendix I.</li> <li>To address bushfire risk during the operational phase the following measures will be implemented:</li> <li>The operator will prepare and implement a bushfire management plan Signage will be installed along the trail with a unique 'location identification number' to be quoted in case of an emergency</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
Performance outcomes	Acceptable Solutions	<ul> <li>Compliance</li> <li>During fire season an assessment will be made by the operator whether to open the trail to the public</li> <li>A network of service tracks has been included in the proposed development and provide access to the shared use trail for construction purposes, operational purposes, maintenance purpose and for emergency purpose. The service tracks will also be maintained during the operational phase to provide access to the trail by emergency services</li> <li>The trail will be a designated non-smoking area, minimising the potential for any fires to ignite from cigarettes.</li> <li>The operator will be responsible for undertaken education and awareness programs for dealing with bushfires within the project area with the operational staff.</li> <li>Aboriginal bushfire management measures will be adopted during the operational phase of the project.</li> <li>QPWS rangers undertaking increase patrols in high-fire-risk areas (including camping areas) on high-fire-danger days.</li> <li>The use of fire-retardant treated timbers in accordance with AS 3959 Construction of buildings in bushfire-prone areas. The use of different external applications.</li> <li>Management and maintenance of vegetation in and around trail to reduce the build-up of combustible vegetation.</li> <li>Weed management will be carried out during the operational phase.</li> </ul>
		phase of the project, in conjunction with WTMA. The nominated construction contractor of the trail and public campsites will be

Performance outcomes	Acceptable Solutions	Compliance
		required to develop a bushfire management plan as part of their contract.
<b>PO3</b> Development involving hazardous materials manufactured or stored in bulk is not located in bushfire hazard sub- category.	<b>AO3</b> The manufacture or storage of hazardous material in bulk does not occur within bushfire hazard sub- category.	<b>AO3 – Not Applicable</b> The proposed work does not involve the manufacturing or bulk storage of hazardous materials.
Development design and separation from	m bushfire hazard – reconfiguration of lots	
<ul> <li>PO4.1 Where reconfiguration is undertaken in an urban area or is for urban purposes or smaller scale rural residential purposes, a separation distance from hazardous vegetation is provided to achieve a radiant heat flux level of 29kW/m<sup>2</sup> at the edge of the proposed lot(s).</li> <li>Note - "Urban purposes" and "urban area" are defined in the <i>Sustainable Planning Regulations 2009</i>. Reconfiguration will be taken to be for rural residential purposes where proposed lots are between 2000m<sup>2</sup> and 2ha in area. "Smaller scale" rural residential purposes will be taken to be where the average proposed lot size is 6000m2 or less.</li> <li>Note - The radiant heat levels and separation distances are to be established in accordance with method 2 set out in AS3959-2009.</li> <li>PO4.2</li> <li>Where reconfiguration is undertaken for other purposes, a building envelope of reasonable dimensions is provided on</li> </ul>	<ul> <li>AO4.1 No new lots are created within a bushfire hazard sub-category.</li> <li>or</li> <li>AO4.2 Lots are separated from hazardous vegetation by a distance that: <ul> <li>(a) achieves radiant heat flux level of 29kW/m<sup>2</sup> at all boundaries; and</li> <li>(b) is contained wholly within the development site.</li> </ul> </li> <li>Note - Where a separation distance is proposed to be achieved by utilising existing cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation.</li> <li>For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.</li> <li>Note - The achievement of a cleared separation distance may not be achievable where other provisions within the planning scheme require protection of certain ecological, slope, visual or character features or functions.</li> </ul>	AO4.1 – AO4.2 – Not Applicable The proposed work does not involve the creation of new lots within an urban area and/or for urban purposes.

Performance outcomes	Acceptable Solutions	Compliance
each lot which achieves radiant heat flux level of 29kW/m <sup>2</sup> at any point.		
P05 Where reconfiguration is undertaken in an urban area or is for urban purposes, a constructed perimeter road with reticulated water supply is established between the lots and the hazardous vegetation and is readily accessible at all times for urban fire fighting vehicles. The access is available for both fire fighting and maintenance/defensive works.	<ul> <li>A05.1</li> <li>Lot boundaries are separated from hazardous vegetation by a public road which: <ul> <li>(a) has a two lane sealed carriageway;</li> <li>(b) contains a reticulated water supply;</li> <li>(c) is connected to other public roads at both ends and at intervals of no more than 500m;</li> <li>(d) accommodates geometry and turning radii in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines;</li> <li>(e) has a minimum of 4.8m vertical clearance above the road;</li> <li>(f) is designed to ensure hydrants and water access points are not located within parking bay allocations; and</li> <li>(g) incorporates roll-over kerbing.</li> </ul> </li> </ul>	AO5.1 – AO5.2 – Not Applicable The proposed work does not involve the creation of new lots within an urban area and/or for urban purposes.
	accordance with AS2419.1 2005, unless otherwise specified by the relevant water entity. Note - Applicants should have regard to the relevant standards set out in the reconfiguration of a lot code and works codes in this planning scheme.	
<b>P06</b> Where reconfiguration is undertaken for smaller scale rural residential purposes, either a constructed perimeter road or a formed, all weather fire trail is established between the lots and the hazardous vegetation and is readily accessible at all times for the type of fire fighting vehicles servicing the area.	<ul> <li>AO6</li> <li>Lot boundaries are separated from hazardous vegetation by a public road or fire trail which has:</li> <li>(h) a reserve or easement width of at least 20m;</li> <li>(i) a minimum trafficable (cleared and formed) width of 4m capable of accommodating a 15 tonne vehicle and which is at least 6m clear of vegetation;</li> </ul>	AO6 – Not Applicable The proposed work does not involve the creation of new lots within an urban area and/or for urban purposes.

Performance outcomes	Acceptable Solutions	Compliance
The access is available for both fire fighting and maintenance/hazard reduction works.	<ul> <li>(j) no cut or fill embankments or retaining walls adjacent to the 4m wide trafficable path;</li> <li>(k) a minimum of 4.8m vertical clearance;</li> <li>(l) turning areas for fire-fighting appliances in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines;</li> <li>(m) a maximum gradient of 12.5%;</li> <li>(n) a cross fall of no greater than 10 degrees;</li> <li>(o) drainage and erosion control devices in accordance with the standards prescribed in a planning scheme policy;</li> <li>(p) vehicular access at each end which is connected to the public road network at intervals of no more than 500m;</li> <li>(q) designated fire trail signage;</li> <li>(r) if used, has gates locked with a system authorised by Queensland Fire and Emergency Services; and</li> <li>(s) if a fire trail, has an access easement that is granted in favour of Council and Queensland Fire and Emergency Services.</li> </ul>	
<b>PO7</b> Where reconfiguration is undertaken for other purposes, a formed, all weather fire trail is provided between the hazardous vegetation and either the lot boundary or building envelope, and is readily accessible at all times for the type of fire fighting vehicles servicing the area. However, a fire trail will not be required where it would not serve a practical fire management purpose.	<ul> <li>A07</li> <li>Lot boundaries are separated from hazardous vegetation by a public road or fire trail which has:</li> <li>(t) a reserve or easement width of at least 20m;</li> <li>(u) a minimum trafficable (cleared and formed) width of 4m capable of accommodating a 15 tonne vehicle and which is at least 6m clear of vegetation;</li> <li>(v) no cut or fill embankments or retaining walls adjacent to the 4m wide trafficable path;</li> <li>(w) a minimum of 4.8m vertical clearance;</li> <li>(x) turning areas for fire-fighting appliances in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines;</li> <li>(y) a maximum gradient of 12.5%;</li> </ul>	AO7 – Not Applicable The proposed work does not involve the creation of new lots within an urban area and/or for urban purposes.

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>(z) a cross fall of no greater than 10 degrees;</li> <li>(aa)drainage and erosion control devices in accordance with the standards prescribed in a planning scheme policy;</li> <li>(bb)vehicular access at each end which is connected to the public road network;</li> <li>(cc) designated fire trail signage;</li> <li>(dd)if used, has gates locked with a system authorised by Queensland Fire and Emergency Services; and</li> <li>if a fire trail, has an access easement that is granted in favour of Council and Queensland Fire and Emergency Services.</li> </ul>	
PO8 The development design responds to the potential threat of bushfire and establishes clear evacuation routes which demonstrate an acceptable or tolerable risk to people.	<ul> <li>AO8</li> <li>The lot layout: <ul> <li>(a) minimises the length of the development perimeter exposed to, or adjoining hazardous vegetation;</li> <li>(b) avoids the creation of potential bottle-neck points in the movement network;</li> <li>(c) establishes direct access to a safe assembly /evacuation area in the event of an approaching bushfire; and</li> <li>(d) ensures roads likely to be used in the event of a fire are designed to minimise traffic congestion.</li> </ul> </li> <li>Note - For example, developments should avoid finger-like or hour-glass subdivision patterns or substantive vegetated corridors between lots.</li> <li>In order to demonstrate compliance with the performance outcome, a bushfire management plan prepared by a suitably qualified person may be required. The bushfire management plan should be developed in accordance with the Public Safety Business Agency (PSBA) guideline entitled "Undertaking a Bushfire Protection Plan.</li> <li>Advice from the Queensland Fire and Emergency Services (QFES) should be sought as appropriate</li> </ul>	AO8 – Not Applicable The proposed work does not involve the creation of new lots within an urban area and/or for urban purposes.

Performance outcomes	Acceptable Solutions	Compliance
<b>PO9</b> Critical infrastructure does not increase the potential bushfire hazard.	AO9 Critical or potentially hazardous infrastructure such as water supply, electricity, gas and telecommunications are placed underground.	<b>AO9 – Not Applicable</b> The proposed work does not involve the creation of new lots within an urban area and/or for urban purposes.
Development design and separation from	n bushfire hazard – material change of use	
<ul> <li>PO10 Development is located and designed to ensure proposed buildings or building envelopes achieve a radiant heat flux level at any point on the building or envelope respectively, of: (a) 10kW/m<sup>2</sup> where involving a vulnerable use; or (b) 29kW/m<sup>2</sup> otherwise.</li> <li>The radiant heat flux level is achieved by separation unless this is not practically achievable.</li> <li>Note - The radiant heat levels and separation distances are to be established in accordance with method 2 set out in AS3959-2009.</li> </ul>	<ul> <li>AO10 Buildings or building envelopes are separated from hazardous vegetation by a distance that: <ul> <li>(a) achieves a radiant heat flux level of at any point on the building or envelope respectively, of 10kW/m<sup>2</sup> for a vulnerable use or 29kW/m<sup>2</sup> otherwise; and</li> <li>(b) is contained wholly within the development site.</li> </ul> Note - Where a separation distance is proposed to be achieved by utilising existing cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation. For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages. Note - The achievement of a cleared separation distance may not be achievable where other provisions within the planning scheme require protection of certain ecological, slope, visual or character features or functions.</li></ul>	AO10 – Complies The site is located within the medium to very high bushfire hazard over the bushfire hazard overlay. Wangetti South Section A comprises a shared use trail accommodating both hikers and mountain bikers, a public camping node and amenities block, water way crossing structures along the trail, and service track connections to the existing road network. The building design incorporates fire resistant structures for the project including bridges and campsites. A fire management plan is to be developed for the construction phase of the project, in conjunction with WTMA. The nominated construction contractor of the trail and public campsites will be required to develop a bushfire management plan as part of their contract.
<b>PO11</b> A formed, all weather fire trail is provided between the hazardous vegetation and the site boundary or building envelope, and is readily accessible at all times for the type of fire fighting vehicles servicing the area.	<ul> <li>AO11</li> <li>Development sites are separated from hazardous vegetation by a public road or fire trail which has:</li> <li>(c) a reserve or easement width of at least 20m;</li> <li>(d) a minimum trafficable (cleared and formed) width of 4m capable of accommodating a 15 tonne vehicle and which is at least 6m clear of vegetation;</li> <li>(e) no cut or fill embankments or retaining walls adjacent to the 4m wide trafficable path;</li> </ul>	<b>PO11 – Complies</b> The site is located within the medium to very high bushfire hazard over the bushfire hazard overlay. During construction, construction activities have the potential to increase bushfire hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc A Preliminary Construction Environmental Management Plan (CEMP) has been developed to manage environmental risks to

Performance outcomes	Acceptable Solutions	Compliance
However, a fire trail will not be required where it would not serve a practical fire management purpose. Note - Fire trails are unlikely to be required where a development site involves less than 2.5ha	<ul> <li>(f) a minimum of 4.8m vertical clearance;</li> <li>(g) turning areas for fire-fighting appliances in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines;</li> <li>(h) a maximum gradient of 12.5%;</li> <li>(i) a cross fall of no greater than 10 degrees;</li> <li>(j) drainage and erosion control devices in accordance with the standards prescribed in a planning scheme policy;</li> <li>(k) vehicular access at each end which is connected to the public road network which is connected to the public road network at intervals of no more than 500m;</li> <li>(l) designated fire trail signage;</li> <li>(m) if used, has gates locked with a system authorised by Queensland Fire and Emergency Services; and</li> <li>(n) if a fire trail, has an access easement that is granted in favour of Council and Queensland Fire and Emergency Services.</li> </ul>	<ul> <li>the project area during the construction phase. Refer the CEMP in Appendix I.</li> <li>To address bushfire risk during the operational phase the following measures will be implemented: <ul> <li>The operator will prepare and implement a bushfire management plan Signage will be installed along the trail with a unique 'location identification number' to be quoted in case of an emergency</li> <li>During fire season an assessment will be made by the operator whether to open the trail to the public</li> <li>A network of service tracks has been included in the proposed development and provide access to the shared use trail for construction purposes, operational purposes, maintenance purpose and for emergency purpose. The service tracks will also be maintained during the operational phase to provide access to the trail by emergency services</li> <li>The trail will be a designated non-smoking area, minimising the potential for any fires to ignite from cigarettes.</li> <li>The operator will be responsible for undertaken education and awareness programs for dealing with bushfires within the project area with the operational staff.</li> <li>Aboriginal bushfire management measures will be adopted during the operational phase of the project.</li> <li>QPWS rangers undertaking increase patrols in high-fire-risk areas (including camping areas) on high-fire-danger days.</li> <li>The use of fire-retardant treated timbers in accordance with AS 3959 Construction of buildings in bushfire-prone areas. The use of fire-retardant paint finishes or 'intumescent' paint systems, which have been used and trialled successfully in a number of different external applications.</li> <li>Management and maintenance of vegetation in and around trail to reduce the build-up of combustible vegetation.</li> </ul> </li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
		Firebreaks are not proposed along the shared use trail, given that the project aims to minimise vegetation clearing within an area known for its protected species. Furthermore, there is minimal infrastructure being proposed as part of Wangetti South Section A and it can be easily repair or replaced in an event of a fire. A fire management plan is to be developed for the construction phase of the project, in conjunction with WTMA. The nominated construction contractor of the trail and public campsites will be required to develop a bushfire management plan as part of their contract.
All development		
<b>PO12</b> All premises are provided with vehicular access that enables safe evacuation for occupants and easy access by fire fighting appliances.	<ul> <li>AO12</li> <li>Private driveways:</li> <li>(o) do not exceed a length of 60m from the street to the building;</li> <li>(p) do not exceed a gradient of 12.5%;</li> <li>(q) have a minimum width of 3.5m;</li> <li>(r) have a minimum of 4.8m vertical clearance;</li> <li>(s) accommodate turning areas for fire-fighting appliances in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines; and serve no more than 3 dwellings or buildings.</li> </ul>	AO12 – Complies The project area is almost entirely located within the Macalister Range National Parks and the WTWHA. Therefore, vehicular access is constrained. Bushfire management measures will be implemented and outlined in the project proposal.
<b>PO13</b> Development outside reticulated water supply areas includes a dedicated static supply that is available solely for fire fighting purposes and can be accessed by fire fighting appliances.	<ul> <li>AO13</li> <li>A water tank is provided within 10m of each building (other than a class 10 building) which:</li> <li>(t) is either below ground level or of non-flammable construction;</li> <li>(u) has a take off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters: <ul> <li>(i) 10,000l for residential buildings</li> </ul> </li> </ul>	<b>PO13 – Complies</b> The site is located within the medium to very high bushfire hazard over the bushfire hazard overlay. A fire management plan is to be developed for the construction phase of the project, in conjunction with WTMA. The nominated construction contractor of the trail and public campsites will be required to develop a bushfire management plan as part of their contract.

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>Note – A minimum of 7,500l is required in a tank and the extra 2,500l may be in the form of accessible swimming pools or dams.</li> <li>(ii) 45,000l for industrial buildings; and</li> <li>(iii) 20,000l for other buildings;</li> <li>(v) includes shielding of tanks and pumps in accordance with the relevant standards;</li> <li>(w) includes a hardstand area allowing medium rigid vehicle (15 tonne fire appliance) access within 6m of the tank;</li> <li>(x) is provided with fire brigade tank fittings – 50mm ball valve and male camlock coupling and, if underground, an access hole of 200mm (minimum) to accommodate suction lines; and is clearly identified by directional signage provided at the street frontage.</li> </ul>	
P014	A014	AO14 – Not Applicable
Landscaping does not increase the potential bushfire risk.	Landscaping uses species that are less likely to exacerbate a bushfire event, and does not increase fuel loads within separation areas.	No landscape is required for this development.
PO15	A015	AO15 – Complies
The risk of bushfire and the need to mitigate that risk is balanced against other factors (such as but not limited to, biodiversity or scenic amenity).	Bushfire risk mitigation treatments do not have a significant impact on the natural environment or landscape character of the locality where this has value.	The intent of the proposed development is to showcase the natural environment of Far North Queensland through nature-based tourism. The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. Therefore, the bushfire management measures will not have a detrimental impact on scenic amenity values.

## 1. Conservation zone code

Performance outcomes	Acceptable Solutions	Compliance
For assessable developments		
<b>PO1</b> The establishment of uses is consistent with the outcomes sought for the Conservation zone and protects the zone from the intrusion of inconsistent uses.	AO1 Uses identified in <i>Error! Reference source not</i> <i>found.</i> – <i>Inconsistent uses within the Conservation</i> <i>zone</i> are not established in the Conservation zone.	AO1 – Complies The proposed development is not identified as an 'inconsistent use' in the Conservation zone outlined in the Douglas Shire Planning Scheme. The intent being to showcase the natural environment of Far North Queensland through nature-based tourism.
PO2 The height of buildings is compatible with the character of the area and does not adversely affect the amenity of the area.	AO2 Buildings and structures are not more than 8.5 metres in height and two storeys. Note - Height is inclusive of roof height.	<ul> <li>AO2 - Complies</li> <li>A limited number of buildings are proposed as part of Wangetti South Section A. The proposed development involves a share use trail and ecotourism facilities setback more than 40m from the existing road. The buildings will be no greater than 8.5m in height and two storeys.</li> <li>Structures proposed for the project include: <ul> <li>Rock Walling is used to retain soils of height between 0 and 500mm. They may be used to retain the upslope or downslope batter.</li> <li>Retaining Walls are used to retain soils of height up to 1000mm. They may be used to retain the upslope batter or the downslope batter.</li> </ul> </li> <li>The shared use trail will be predominantly natural surface, constructed from the natural soil and rock found along the trail. Imported surfacing materials such as fine crushed rock may be used from time to time, but only in high traffic areas or where other requirements dictate its use. Imported materials can be visually unappealing and can</li> </ul>
Performance outcomes	Acceptable Solutions	Compliance
---	--	---
		<ul> <li>that are used should be of local provenance and suitable for the intended purpose.</li> <li>The shared use trail has been designed to minimise built structures as they pose a number of challenges. Built structures (including bridges, stairs) will be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will take a minimalistic approach to materials.</li> <li>The project will utilise the natural rock and stone to maximum advantage, including rock slabs, rock outcrops and loose surface rock. Rock is the ultimate trail building material, especially when it is locally sourced. Loose surface rock provides the raw materials for rock walls, rock armouring and even the construction of trail-side furniture like bench seats.</li> <li>The suite of different signs required along the shared use trail will be complementary to each other and will be made of durable material and will use earthy natural tones.</li> <li>The shared use trail and ancillary infrastructure is located in a remote location away from sensitive land uses and will be surrounded by existing vegetation which will allow the proposed works to blend into the landscape.</li> </ul>
PO3	AO3	AO2.1 – Not Applicable
Development is setback from site boundaries so they are screened from view from the boundaries of adjoining properties and adjoining roads to maintain the scenic values of the area.	<ul> <li>Buildings and structures are setback not less than:</li> <li>(a) 40 metres from the frontage of a State- controlled road, existing or proposed arterial road, existing or proposed sub-arterial road, as identified on the Transport network overlay maps contained in Schedule 2;</li> </ul>	A limited number of buildings are proposed as part of Wangetti South Section A. The proposed development

Performance outcomes	Acceptable Solutions	Compliance
Perromance outcomes	<ul> <li>(b) 25 metres from Cape Tribulation Road frontage;</li> <li>(c) 20 metres from any other road frontage 10 metres from side and rear boundaries.</li> </ul>	<ul> <li>involves a share use trail and ecotourism facilities setback more than 40m from the existing road.</li> <li>The shared use trail will be predominantly natural surface, constructed from the natural soil and rock found along the trail. Imported surfacing materials such as fine crushed rock may be used from time to time, but only in high traffic areas or where other requirements dictate its use. Imported materials can be visually unappealing and can introduce weeds and pathogens. Any surfacing materials that are used should be of local provenance and suitable for the intended purpose.</li> <li>The shared use trail has been designed to minimise built structures as they pose a number of challenges. Built structures (including bridges, stairs) will be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will take a minimalistic approach to materials.</li> <li>The project will utilise the natural rock and stone to maximum advantage, including rock slabs, rock outcrops and loose surface rock. Rock is the ultimate trail building material, especially when it is locally sourced. Loose surface rock provides the raw materials for rock walls, rock armouring and even the construction of trail-side furniture like bench seats.</li> <li>The suite of different signs required along the shared use trail will be complementary to each other and will be made of durable material and will use earthy natural tones.</li> </ul>
		The shared use trail, ecotourism facilities and ancillary infrastructure is located in a remote location away from sensitive land uses and will be surrounded by existing

Performance outcomes	Acceptable Solutions	Compliance
		vegetation which will allow the proposed works to blend into the landscape.
<b>PO4</b> The site coverage of all buildings and structures does not have an adverse effect on the conservation or scenic amenity values of the site and surrounding area and buildings are subservient to the natural environment.	AO4 Development is sited in an existing cleared area or an area approved for clearing, but which is not yet cleared until a development permit to carry out Building Works is issued. Any clearing is limited to a maximum area of 700m <sup>2</sup> and is sited clear of the high bank of any watercourse. Note – The 700m <sup>2</sup> area of clearing does not include an access driveway.	<b>AO4 – Complies</b> Given the nature of the project a development permit to carry out Building Works is not necessary. The proposed trail will be a maximum of 1.5 m wide and approximately 17.7 km. The amenities block will have a total footprint of 0.25 hectares (ha). This involves minimal disturbance to environmental integrity and maintains the high level of ecological amenity in the locality.
<b>PO5</b> Development is consistent with the overall outcomes sought for the Conservation zone.	AO5 No acceptable outcomes are prescribed.	<b>PO5 – Complies</b> The intent of the proposed development is to showcase the natural environment of Far North Queensland through nature-based tourism. The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. It is, therefore, considered that the proposed development achieves the purpose of the Conservation Zone.
<b>PO6</b> Development complements and is subservient to the surrounding environment and is in keeping with the ecological, landscape and scenic values of the area.	AO6 The exterior finishes and colours of all development are non-reflective and consist of colours that blend easily with surrounding native vegetation and view-shed.	AO6.1 – Complies The shared use trail will be predominantly natural surface, constructed from the natural soil and rock found along the trail. Imported surfacing materials such as fine crushed rock may be used from time to time, but only in high traffic areas or where other requirements dictate its use. Imported materials can be visually unappealing and can introduce weeds and pathogens. Any surfacing materials that are used should be of local provenance and suitable for the intended purpose. The shared use trail has been designed to minimise built structures as they pose a number of challenges. Built

Performance outcomes	Acceptable Solutions	Compliance
		<ul> <li>structures (including bridges, stairs) will be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will take a minimalistic approach to materials.</li> <li>The project will utilise the natural rock and stone to maximum advantage, including rock slabs, rock outcrops and loose surface rock. Rock is the ultimate trail building material, especially when it is locally sourced. Loose surface rock provides the raw materials for rock walls, rock armouring and even the construction of trail-side furniture like bench seats.</li> <li>The suite of different signs required along the shared use trail will be complementary to each other and will be made of durable material and will use earthy natural tones.</li> <li>The shared use trail and ancillary infrastructure is located in a remote location away from sensitive land uses and will be surrounded by existing vegetation which will allow the proposed works to blend into the landscape.</li> </ul>
<ul> <li>PO7</li> <li>Development is screened from view from adjoining roads and properties with a dense screen of endemic/native landscape which:</li> <li>(d) is informal in character and complementary to the existing natural environment;</li> <li>(e) provides screening;</li> <li>(f) enhances the visual appearance of the development.</li> </ul>	A07.1 For any development, the balance area of the site not built upon, including all setback areas must be landscaped/revegetated with dense three tier, endemic planting which is maintained to ensure successful screening is achieved.	<ul> <li>PO7 – Complies</li> <li>A limited number of buildings are proposed as part of Wangetti South Section A. The proposed development involves a share use trail and ecotourism facilities setback more than 40m from the existing road, screened from view from adjoining roads and properties with existing mature vegetation.</li> <li>The shared use trail will be predominantly natural surface, constructed from the natural soil and rock found along the trail. Imported surfacing materials such as fine crushed rock may be used from time to time, but only in high traffic areas or where other requirements dictate its use.</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
Note – Planning scheme policy – Landscaping provides further guidance on meeting the performance outcome.		Imported materials can be visually unappealing and can introduce weeds and pathogens. Any surfacing materials that are used should be of local provenance and suitable for the intended purpose. The shared use trail has been designed to minimise built structures as they pose a number of challenges. Built structures (including bridges, stairs) will be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will take a minimalistic approach to materials. The project will utilise the natural rock and stone to maximum advantage, including rock slabs, rock outcrops and loose surface rock. Rock is the ultimate trail building material, especially when it is locally sourced. Loose surface rock provides the raw materials for rock walls, rock armouring and even the construction of trail-side furniture like bench seats. The suite of different signs required along the shared use trail will complementary to each other and will be made of durable material and will use earthy natural tones. The shared use trail and ancillary infrastructure is located in a remote location away from sensitive land uses. It is also screened from the Captain Cook Highway and will be surrounded by existing vegetation which will allow the proposed works to blend into the landscape.
	A07.2 Endemic palm species, where used, are planted as	A07.2 – Not Applicable The proposed trail does not involve the use of endemic
	not in a regular pattern.	pain species.

Performance outcomes	Acceptable Solutions	Compliance
Porformance outcomes PO8 Development is complementary to the surrounding environment.	Acceptable Solutions AO8.1 Development harmonises with the surrounding environment, for example, through suspended, light-weight construction on sloping sites, which requires minimal excavation or fill.	<ul> <li>Compliance</li> <li>PO8 – Complies</li> <li>The Wangetti South Section A has been designed such that it is responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland. World Trail were appointed to design the alignment and completed a walkthrough, working closely with Traditional Owners, specialist consultants and engineers.</li> <li>The Project will result in minimal impacts to forest vistas, wild rivers, waterfalls, rugged gorges and coastal scenery through the construction of the trail will allow for managed access for tourists to view the scenic beauty of the Wet Tropics.</li> <li>The Wangetti South Section and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. The Wangetti Trail has been designed to minimise built structures like bridges, boardwalks and viewing platforms.</li> <li>Where built structures are required, the design and finish will prioritise the use of local timbers and other materials must be durable enough to withstand the harsh tropical climate and natural environment. Any built structures must be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal impact to the surrounding environment, to have minimal impact on the scenic</li> </ul>
		If during construction, high environmental value areas, such as areas containing identified flora species, are identified, qualified environmental specialises will be present to micro-site the trail around high environmental value areas. The trail will avoid large trees where possible

Performance outcomes	Acceptable Solutions	Compliance
		and, as is the nature of hiking trails, will wind around trees and large objects to minimise the requirement for clearing and removal of significant areas.
		Comprehensive management and mitigation strategies have been developed to reduce: the loss of vegetation and habitats; minimise injury and mortality of wildlife; minimise habitat degradation; mitigate barrier effect on fauna movement; restrict the introduction of invasive species; and minimise the disturbance of waterways and waterbodies.
		The following management plans have been developed for the project:
		Environmental Management Plan (EMP)
		<ul> <li>Construction Environmental Management Plan (CEMP)</li> </ul>
		Concept Erosion and Sediment Control Plan (CESCP)
		<ul> <li>Weeds, Pest and Diseases Management Plan (WPDMP)</li> </ul>
		Traffic Management Plan (TMP)
		Matters of National Environmental Significance     (MNES) flora pre-clearance survey methodology.
		No fences are proposed along the shared use trail. No works are proposed in protected wetlands.
		Vegetation clearing to be restricted so that only areas required for safe construction, operation and maintenance are cleared, with vegetation clearing clearly demarcated on drawings and plans and high visible survey tape used. All vegetation waste to be cut into practical sizes and placed at edge of clearings to naturally decompose.

Performance outcomes	Acceptable Solutions	Compliance
		The potential for direct impact on waterways has been largely avoided by installing the bridge structures away from the existing banks of waterways. This avoids undertaking construction works within the waterway. Single span bridges for minor waterway crossings will be used to minimise disturbance with waterways and loss of aquatic habitats. Techniques for installing the bridges has been outlined in the Wangetti Trail Construction Methodology Manual and include spanning the full width of the waterway so that no works occurs within the waterway and existing nature features are left in place within the waterway. Instream crossings, including boulder rock crossings will be designed to maintain natural characteristics of the waterway and not impact flows or fish passage.
	<ul> <li>AO8.2</li> <li>A driveway or parking areas are constructed and maintained to:</li> <li>(g) minimise erosion, particularly in the wet season;</li> <li>(h) minimise cut and fill;</li> <li>(i) follow the natural contours of the site;</li> <li>(j) minimise vegetation clearing.</li> </ul>	<b>AO8.2 – Not Applicable</b> A parking area is not required for the proposed development.

Performance outcomes	Acceptable Solutions	Compliance
Performance outcomes	<ul> <li>AO8.3 Buildings and structures are erected on land not exceeding a maximum gradient of 1 in 6 (16.6%) </li> <li>Or On land steeper than 1 in 6 (16.6%) gradient: <ul> <li>(a) A split level building form is utilised;</li> <li>(b) A single plane concrete slab is not utilised;</li> <li>(c) Any voids between building and ground level, or between outdoor decks and ground level are screened from view using lattice/battens and/or landscaping. </li> <li>and (d) is accompanied by a Geotechnical Report prepared by a qualified engineer at development application stage which includes certification that the site can be stabilised, followed by a certificate upon completion of </li> </ul></li></ul>	AO8.3 – Complies The trail will have an average gradient of <10% and a maximum gradient no greater than 15% (for short distances only).
	AO8.4 Buildings and structures are sited below any	<b>AO8.4 – Complies</b> The public camping node and amenities block which
	ridgelines and are sited to avoid protrusion above the surrounding tree-level canopy.	includes 10 x 4m diameter elevated camping decks and 1 x 2.5m x 2.5m toilet block are proposed below ridgelines. The development, being for a nature-based tourism environmental facility, is considered to appropriately integrate into the natural environment.
<ul> <li>PO9</li> <li>Development is located to:</li> <li>(e) protect the ecological values of the site and surrounding land;</li> <li>(f) maintain the scenic values of the area;</li> </ul>	AO9 No acceptable outcomes are prescribed.	<b>PO9 – PO12 – Complies</b> The Wangetti South Section A has been designed such that it is responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland. World Trail were appointed

Performance outcomes	Acceptable Solutions	Compliance
<ul> <li>(g) maintain appropriate setbacks to waterways, watercourses, wetlands, tidal areas and overland flow paths;</li> <li>(h) avoid areas that are vulnerable to natural hazards;</li> <li>(i) minimise to the greatest extent possible on site excavation and filling;</li> <li>(j) provide buffers to cultural, historical or ecological features;</li> <li>(k) minimise visibility from external sites or public viewing points;</li> <li>minimises to the greatest extent possible the loss of native vegetation and fauna habitat</li> </ul>		<ul> <li>to design the alignment and completed a walkthrough, working closely with Traditional Owners, specialist consultants and engineers.</li> <li>The Project will result in minimal impacts to forest vistas, wild rivers, waterfalls, rugged gorges and coastal scenery through the construction of the trail will allow for managed access for tourists to view the scenic beauty of the Wet Tropics.</li> <li>The Wangetti South Section and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect</li> </ul>
PO10 Development does not result in adverse impacts on: (I) ecological function or features; on-site or surrounding waterways and wetlands.	AO10 No acceptable outcomes are prescribed.	community resources. The Wangetti Trail has been designed to minimise built structures like bridges, boardwalks and viewing platforms. Where built structures are required, the design and finish will prioritise the use of local timbers and other materials
<b>PO11</b> Rehabilitation of natural processes on disturbed sites is undertaken to improve the environmental integrity of the area.	AO11 No acceptable outcomes are prescribed	that will age gracefully with time. Above all, the materials must be durable enough to withstand the harsh tropical climate and natural environment. Any built structures must be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have
<b>PO12</b> Fencing is designed to not impede the free movement of native fauna through the site.	AO12 No acceptable outcomes are prescribed.	minimal maintenance requirements and will need to take minimalistic approach to materials given the remote nat of the trail, resulting in a minimal impact on the scenic beauty of the Wet tropics. If during construction, high environmental value areas, such as areas containing identified flora species, are identified, qualified environmental specialises will be present to micro-site the trail around high environmenta value areas. The trail will avoid large trees where possil and, as is the nature of hiking trails, will wind around tre and large objects to minimise the requirement for cleari and removal of significant areas

Performance outcomes	Acceptable Solutions	Compliance
		Comprehensive management and mitigation strategies have been developed to reduce: the loss of vegetation and habitats; minimise injury and mortality of wildlife; minimise habitat degradation; mitigate barrier effect on fauna movement; restrict the introduction of invasive species; and minimise the disturbance of waterways and waterbodies.
		The following management plans have been developed for the project:
		Environmental Management Plan (EMP)
		<ul> <li>Construction Environmental Management Plan (CEMP)</li> </ul>
		Concept Erosion and Sediment Control Plan (CESCP)
		<ul> <li>Weeds, Pest and Diseases Management Plan (WPDMP)</li> </ul>
		Traffic Management Plan (TMP)
		<ul> <li>Matters of National Environmental Significance (MNES) flora pre-clearance survey methodology.</li> </ul>
		No fences are proposed along the shared use trail. No works are proposed in protected wetlands.
		Vegetation clearing to be restricted so that only areas required for safe construction, operation and maintenance are cleared, with vegetation clearing clearly demarcated on drawings and plans and high visible survey tape used. All vegetation waste to be cut into practical sizes and placed at edge of clearings to naturally decompose.
		The potential for direct impact on waterways has been largely avoided by installing the bridge structures away

Performance outcomes	Acceptable Solutions	Compliance
		from the existing banks of waterways. This avoids undertaking construction works within the waterway. Single span bridges for minor waterway crossings will be used to minimise disturbance with waterways and loss of aquatic habitats.
		Techniques for installing the bridges has been outlined in the Wangetti Trail Construction Methodology Manual and include spanning the full width of the waterway so that no works occurs within the waterway and existing nature features are left in place within the waterway.
		Instream crossings, including boulder rock crossings will be designed to maintain natural characteristics of the waterway and not impact flows or fish passage.
PO13	A013	PO11 – Not Applicable
<ul> <li>New lots contain a minimum lot size of 200 hectares, unless:</li> <li>(m) the lot reconfiguration results in no additional lots (e.g. amalgamation, boundary realignments);</li> <li>(n) the reconfiguration is limited to one additional lot to accommodate an existing or approved: <ul> <li>(i) Telecommunications facility;</li> <li>(ii) Utility installation;</li> </ul> </li> <li>(o) the lot reconfiguration facilitates and outcome consistent with the Return to Country local plan.</li> </ul>	No acceptable outcomes are prescribed.	The proposed development not for reconfiguring a lot.
Note – Boundary realignments must result in an improved environmental outcome or resolve encroachments.		

# 1. Environmental performance code

Performance outcomes	Acceptable Solutions	Compliance
Lighting		
<b>PO1</b> Lighting incorporated within development does not cause an adverse impact on the amenity of adjacent uses and nearby sensitive land uses.	<b>AO1.1</b> Technical parameters, design, installation, operation and maintenance of outdoor lighting comply with the requirements of Australian standard AS4282-1997 Control of the obtrusive effects of outdoor lighting.	<b>AO1.1 – Complies</b> There are no lights proposed along the shared use trail, lights sources could come from construction crews during the construction phase and the public node camping site during the operational phase.
		To mitigate adverse impacts from lighting the following mitigation measures have been developed and will be implemented:
		<ul> <li>All machinery used in construction and operation will be silenced to manufacturers specifications and maintained to that condition. Lighting and electrical supply to the eco- accommodation and emergency lighting should be reliant on alternatives to fuel generators.</li> </ul>
		<ul> <li>Minimise disturbance by noise, vibration and/or artificial lighting near waterways.</li> </ul>
		<ul> <li>Construction works to be limited to daytime hours</li> </ul>
		Operational phase:
		<ul> <li>The Dark Jungle camping node will be located away from the boundaries with ample existing vegetation in between such that no light will leave the site</li> </ul>
		Users will only be able to use the trail during daylight hours.

Performance outcomes	Acceptable Solutions	Compliance
	AO1.2 Development that involves flood lighting is restricted to a type that gives no upward component of light where mounted horizontally. AO1.3 Access, car parking and manoeuvring areas are designed to shield nearby residential premises from impacts of vehicle headlights.	<ul> <li>AO1.2 - AO1.3 - Not Applicable There are no flood lights proposed along the shared use trail, regular lights sources could come from construction crews during the construction phase and the public node camping site during the operational phase. To mitigate adverse impacts from lighting the following mitigation measures have been developed for the construction phase and will be implemented: <ul> <li>All machinery used in construction and operation will be silenced to manufacturers specifications and maintained to that condition. Lighting and electrical supply to the eco-accommodation and emergency lighting should be reliant on alternatives to fuel generators. </li> <li>Minimise disturbance by noise, vibration and/or artificial lighting near waterways.</li> <li>Construction works to be limited to daytime hours</li> <li>Users will only be able to use the trail during daylight hours.</li> </ul></li></ul>
Noise		
PO2 Potential noise generated from the development is avoided through design, location and operation of the activity. Note – Planning Scheme Policy SC6.4 – Environmental management plans provides guidance on preparing a report to demonstrate compliance with the purpose and outcomes of the code.	<ul> <li>AO2.1 Development does not involve activities that would cause noise related environmental harm or nuisance. </li> <li>or AO2.2 Development ensures noise does not emanate from the site through the use of materials, structures and architectural features to not cause an adverse noise impact on adjacent uses.</li></ul>	<ul> <li>AO2.1 - Complies Due to the proximity of the trails to population centres, the number of noise-sensitive receptors that may be impacted by site works is limited as identified by the following: <ul> <li>Residents in close proximity to site works (at the trail head/entry and exit points)</li> <li>Wildlife inhabiting the park. </li> <li>The main noise-sensitive receptors that will likely be impacted by site works are users of the national park and the local fauna. As such, management actions have been designed to reduce the impact of noise on these receptors. </li> </ul></li></ul>

Performance outcomes	Acceptable Solutions	Compliance
		<ul> <li>The following mitigation measures will be implemented during the project:</li> <li>Notifying adjoining residences of the timing of construction works prior to undertaking construction works and providing them with a contact in case they have questions.</li> <li>All construction and operational vehicles to comply with maintenance schedules and has up to date service records and operational restrictions designed to limit noise impacts during construction.</li> <li>Constructing the shared use trail away from fauna breeding areas/nests</li> <li>There will be limited vegetation clearing to retain as much vegetation as possible within the project area.</li> <li>Vehicles and machinery to be switched off when not in use.</li> <li>Equipment is to be fitted with noise control devices.</li> <li>Helicopter operations to be carefully controlled, and clustered into half or full day blocks. Helicopter operations to be scheduled to occur on a recurring fortnightly/monthly basis (as required), with operations organised in advance.</li> <li>The Contractor to liaise with TDPD Project Manager to coordinate the use of helicopters and ensure all permits and approvals are obtained prior to operations commencing.</li> <li>All aircraft used for construction material delivery or waste removal shall be flown not less than 1000ft above ground level when operating over the World Heritage Area unless: <ul> <li>Taking off or landing; or</li> <li>Flying at a level that is reasonably necessary for safety purpose; or</li> <li>Flying over infrastructure footprints.</li> </ul> </li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>AO2.3</li> <li>The design and layout of development ensures car parking areas avoid noise impacting directly on adjacent sensitive land uses through one or more of the following: <ul> <li>(a) car parking is located away from adjacent sensitive land uses;</li> <li>(b) car parking is enclosed within a building;</li> <li>(c) a noise ameliorating fence or structure is established adjacent to car parking areas where the fence or structure will not have a visual amenity impact on the adjoining premises;</li> <li>(d) buffered with dense landscaping.</li> </ul> </li> <li>Editor's note - The Environmental Protection (Noise) Policy 2008, Schedule 1 provides guidance on acoustic quality objectives to ensure environmental harm (including nuisance) is avoided.</li> </ul>	AO2.3 – Not Applicable The proposed development does not involve the development of a car parking area.
Airborne particles and other emissions		
<b>PO3</b> Potential airborne particles and emissions	AO3.1 Development does not involve activities that will	<b>AO3.1 – Complies</b> The Project is predominantly within an area which is

Potential airborne particles and emissions generated from the development are avoided through design, location and operation of the activity.

Note – Planning Scheme Policy SC6.4 – Environmental management plans provides guidance on preparing a report to demonstrate compliance with the purpose and outcomes of the code. Development does not involve activities that wil result in airborne particles or emissions being generated;

or

#### AO3.2

The design, layout and operation of the development activity ensures that no airborne particles or emissions cause environmental harm or nuisance.

Note - examples of activities which generally cause airborne particles include spray painting, abrasive blasting, manufacturing activities and car wash facilities.

The Project is predominantly within an area which is previously undisturbed. As such, air quality is largely influenced by the coastal location and surrounding related to the natural environment including bird calls and vegetation movements from wind. There are also a number of sensitive receivers located along Wangetti South Section B including national parks and residential areas in the southern extent.

It is anticipated that limited air quality nuisances will be generated as a result of the Project, with the construction phase representing the highest potential for air quality changes. During construction, the use of machinery will have the most significant impact on air quality. However, these impacts are anticipated to be minor and short term

Performance outcomes	Acceptable Solutions	Compliance
	Examples of emissions include exhaust ventilation from basement or enclosed parking structures, air conditioning/refrigeration ventilation and exhaustion.	and intermittent as works progress along the trail alignment.
	The Environmental Protection (Air) Policy 2008, Schedule 1 provides guidance on air quality objectives to ensure environmental harm (including nuisance) is avoided.	<ul> <li>The following mitigation measures will be implemented during the project:</li> <li>Consider weather conditions and prevailing winds when conducting construction activities that may result in air emissions. Reduce clearing during periods of high wind.</li> <li>Wetting the road/work area during dry periods to reduce dust being generated.</li> <li>Construction vehicles to be cleaned of soils before driving on sealed roads to reduce dust being generated.</li> <li>A maximum speed limit of 40 km/hr shall apply to access roads and tracks to minimise the potential for dust generation.</li> <li>All temporary soil stockpiles will be covered, stabilised and/or moistened as required to prevent generation of dust particles.</li> <li>Soil stockpiles will be located in areas not susceptible to wind erosion.</li> <li>Stockpiles that are anticipated to be present in the medium and long term are to be covered to minimise dust emissions.</li> <li>All vehicles carrying loads with the potential to create dust shall cover their loads.</li> <li>Minimal ground disturbance during construction to reduce dust emissions.</li> <li>At the commencement of the construction, the entire trail will be broken into Construction Segments. The Construction Segments assist in reducing the amount of area to be exposed during the construction phase, which in turns reduces impacts to the movement of wildlife in the area.</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
		<ul> <li>Vehicles, plant and equipment will be regularly serviced and comply with Australian Design Standards.</li> <li>All machinery and equipment are to have proprietary emission control equipment fitted and in working order.</li> <li>When not in use, vehicles and machinery shall be turned off.</li> </ul> AO3.2 – Not Applicable The proposed development complies with AO2.1.
Odours		
PO4 Potential odour causing activities associated with the development are avoided through design, location and operation of the activity. Note – Planning Scheme Policy SC6.4 – Environmental management plans provides guidance on preparing a report to demonstrate compliance with the purpose and outcomes of the code.	<ul> <li>AO4.1 The development does not involve activities that create odorous emissions;</li> <li>Or</li> <li>AO4.2 The use does not result in odour that causes environmental harm or nuisance with respect to surrounding land uses.</li> </ul>	<ul> <li>AO4.1 – Complies</li> <li>The proposed development is for a shared use trail and will not result in odorous air emissions.</li> <li>AO4.2 – Not Applicable</li> <li>The proposed development complies with AO2.1.</li> </ul>
Waste and recyclable material storage		
<b>PO5</b> Waste and recyclable material storage facilities are located and maintained to not cause adverse impacts on adjacent uses.	<b>A05.1</b> The use ensures that all putrescent waste is stored in a manner that prevents odour nuisance and is disposed of at regular intervals.	AO5.1 – AO5.2 – Complies TDPD is committed to undertaking the project sustainability, and to minimise waste production during the project. While the production of waste during construction is expected to be minimal, waste will be disposed of according to the waste and resource management hierarchy:

Performance outcomes	Acceptable Solutions	Compliance
Note – Planning Scheme Policy SC6.4 – Environmental management plans provides guidance on preparing a report to demonstrate compliance with the purpose and outcomes of the code.	<ul> <li>AO5.2</li> <li>Waste and recyclable material storage facilities are located, designed and maintained to not cause an adverse impact on users of the premises and adjacent uses through consideration of: <ul> <li>(e) the location of the waste and recyclable material storage areas in relation to the noise and odour generated;</li> <li>(f) the number of receptacles provided in relation to the collection, maintenance and use of the receptacles;</li> <li>(g) the durability of the receptacles, sheltering and potential impacts of local climatic conditions;</li> <li>(h) the ability to mitigate spillage, seepage or leakage from receptacles into adjacent areas and sensitive receiving waters and environments.</li> </ul> </li> <li>Editor's note - the Environmental Protection (Waste Management) Policy 2008 provides guidance on the design of waste containers (receptacles) to ensure environmental harm (including nuisance) is avoided.</li> </ul>	<ol> <li>AVOID unnecessary resource consumption</li> <li>REDUCE waste generation and disposal</li> <li>RE-USE waste resources without further manufacturing</li> <li>RECYCLE waste resources to make the same or different products</li> <li>RECOVER waste resources, including the recovery of energy</li> <li>TREAT waste before disposal, including reducing the hazardous nature of waste</li> <li>DISPOSE of waste only if there is no viable alternative.</li> <li>The following waste management controls detailed in Table 4 10 are proposed to meet the requirements of the <i>Waste Reduction and Recycling Act 2011</i> (Qld) and associated regulations:</li> <li>All project personnel will be instructed in applicable waste management practices as a part of the environmental induction process.</li> <li>All general refuse and food wastes to be collected and transported to a local government approved disposal site and suitable bins will be provided for waste streams (general and recyclable) to reduce proclivity of waste to attract fauna and pest species.</li> <li>Adopt the waste management hierarchy (i.e. avoid, re- use, recycle, energy recover and disposal), before materials are considered waste for disposal in landfill, determine if they can first be recycled, reused or recovered.</li> <li>General housekeeping shall be undertaken on an ongoing basis to keep the site clean, and housekeeping duties monitored to ensure that waste is contained appropriately and site is clean at all times</li> <li>No on-site burial or burning of waste material.</li> <li>Excavated soils will be reused on site where possible.</li> <li>Any wastewater shall be collected and appropriately disposed of offsite. Disposal of water onsite is only to</li> </ol>

Performance outcomes	Acceptable Solutions	Compliance
		<ul> <li>be undertaken if analysis has proven the water suitable.</li> <li>Provide portable toilets onsite if required during the construction phase and ensure that maintenance and disposal of waste is conducted by a licensed contractor as required.</li> <li>Waste produced by patrons is to be held and disposed of, offsite.</li> </ul>
Sensitive land use activities		
<b>P06</b> Sensitive land use activities are not established in areas which will receive potentially incompatible impacts on amenity from surrounding, existing development activities and land uses.	<ul> <li>AO6.1</li> <li>Sensitive land use activities are not established in areas that will be adversely impacted upon by existing land uses, activities and potential development possible in an area;</li> <li>or</li> <li>AO6.2</li> <li>Sensitive land activities are located in areas where potential adverse amenity impacts mitigate all potential impacts through layout, design, operation and maintenance.</li> </ul>	AO6.1 – AO6.2 – Not Applicable The proposed development does not involve a sensitive land use.
Stormwater quality		
<b>PO7</b> The quality of stormwater flowing over, through or being discharged from development activities into watercourses and drainage lines is of adequate quality	<b>A07.1</b> Development activities are designed to ensure stormwater over roofed and hard stand areas is directed to a lawful point of discharge.	<b>AO7.1 – Not Applicable</b> The proposed development does not involve any roofed or hardstand areas.
<ul> <li>for downstream environments, with respect to:</li> <li>(i) the amount and type of pollutants borne from the activity;</li> <li>(j) maintaining natural stream flows;</li> <li>(k) the amount and type of site disturbance;</li> </ul>	<b>AO7.2</b> Development ensures movement of stormwater over the site is not impeded or directed through potentially polluting activities.	AO7.2 – Complies The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. The proposal is not expected to result in a meaningful increase in pervious surfaces. There is expected to be negligible impact to the existing stormwater

Performance outcomes	Acceptable Solutions	Compliance
site management and control measures.		drainage systems onsite. Therefore, the proposal does not involve any changes to the existing lawful points of discharge.
		A CESCP has been developed for the project. The CESCP provides preliminary guidance to establish appropriate site erosion and sediment control (ESC) management measures to reduce potential adverse impacts during the construction phase of the Project. It is expected that prior to any construction activity for the Project, a detailed work specific ESCP will be developed by the contractor as part of the CEMP. The contractor will review the preliminary guidance provided in the CESCP and provide greater detail based on construction methodology, geotechnical conditions, and timing of works. The CESCP does not prescribe or locate any permanent or temporary erosion or sediment control measures in detail but provides indicative locations for erosion and
		sediment control devices as one measure of meeting the contractor's responsibilities.
		The CESCP has been developed in general accordance with International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (2008).

Performance outcomes	Acceptable Solutions	Compliance
	AO7.3 Soil and water control measures are incorporated into the activity's design and operation to control sediment and erosion potentially entering watercourses, drainage lines and downstream receiving waters. Note - Planning scheme policy - FNQROC Regional Development Manual provides guidance on soil and water control measures to meet the requirements of the <i>Environmental Protection Act 1994</i> . During construction phases of development, contractors and builders are to have consideration in their work methods and site preparation for their environmental duty to protect stormwater quality.	<ul> <li>AO7.3 - Complies</li> <li>A CESCP has been developed for the project.</li> <li>The CESCP provides preliminary guidance to establish appropriate site erosion and sediment control (ESC) management measures to reduce potential adverse impacts during the construction phase of the Project. It is expected that prior to any construction activity for the Project, a detailed work specific ESCP will be developed by the contractor as part of the CEMP. The contractor will review the preliminary guidance provided in the CESCP and provide greater detail based on construction methodology, geotechnical conditions, and timing of works.</li> <li>The CESCP does not prescribe or locate any permanent or temporary erosion or sediment control measures in detail but provides indicative locations for erosion and sediment control devices as one measure of meeting the contractor's responsibilities.</li> <li>The CESCP has been developed in general accordance with International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (2008).</li> <li>No construction works will occur during extreme weather events and where heavy rains or floods are predicted, work will cease.</li> </ul>
Pest plants (for material change of use of	on vacant land over 1,000m <sup>2</sup> )	

# PO8AO8.1AO12.1 – CompliesDevelopment activities and sites provide<br/>for the removal of all pest plants and<br/>implement ongoing measures to ensureThe land is free of declared pest plants before<br/>development establishes new buildings, structures<br/>and practices;<br/>orAO12.1 – Complies<br/>A preliminary Weed, Pests and Diseases Management<br/>Plan (WPDMP) has been prepared to satisfy the

Performance outcomes	Acceptable Solutions	Compliance
that pest plants do not reinfest the site or nearby sites. Editor's note - This does not remove or replace all land owner's obligations or responsibilities under the Land Protection (Pest and Stock Route Management) Act 2002.	AO8.2 Pest plants detected on a development site are removed in accordance with a management plan prepared by an appropriately qualified person prior to construction of buildings and structures or earthworks. Note - A declaration from an appropriately qualified person validates the land being free from pest plants. Declared pest plants include locally declared and State declared pest plants.	<ul> <li>obligations and complements the overarching Wangetti South Section A and B Environmental Management Plan. The objectives of the WPDMP is to:</li> <li>Protect the biodiversity of the surrounding landscape of the adverse impacts from weeds</li> <li>Reduce weed infestations by integrating control methods and cost-effective management</li> <li>Manage weeds in disturbed areas and to protect rehabilitated areas</li> <li>Manage the weed species that are currently present on the site as well as off-site work areas</li> <li>Prevent introduction of new weed infestations to the Project area and adjoining areas</li> <li>Increase on-site awareness about the major weed species and manage pest species though strategic management, where possible</li> <li>Avoid and effectively manage impacts associated with weeds, pests and diseases.</li> </ul> The WPDMP provides an overview of the strategy, methods and controls implemented as part of the Wangetti South Section to manage the issue of weeds, pests and diseases. Specifically, this WPDMP identifies weeds, pests and potential diseases within the Wangetti South Section and describes management strategy, to identify, avoid and prevent/minimise and control the introduction of and spread of weeds, pests and diseases within the Wangetti South Section A and B and to neighbouring areas.

## 1. Filling and excavation code

Performance outcomes	Acceptable Solutions	Compliance
For self-assessable and assessable dev	elopment	
PO1 All filling and excavation work does not create a detrimental impact on the slope stability, erosion potential or visual amenity of the site or the surrounding area.	<ul> <li>AO1.1 The height of cut and/or fill, whether retained or not, does not exceed 2 metres in height. </li> <li>and Cuts in excess of those stated in A1.1 above are separated by benches/ terraces with a minimum width of 1.2 metres that incorporate drainage provisions and screen planting.</li></ul>	<b>AO1.1 – Complies</b> The proposed development is for a shared use hiking trail and the establishment of a low impact camping node and therefore excavation will be limited. Excavation or fill is not expected to exceed the amounts prescribed by <b>AO1.1</b> .
	<ul> <li>AO1.2 Cuts are supported by batters, retaining or rock walls and associated benches/terraces are capable of supporting mature vegetation.</li> <li>AO1.3 Cuts are screened from view by the siting of the building/structure, wherever possible.</li> <li>AO1.4 Topsoil from the site is retained from cuttings and reused on benches/terraces.</li> </ul>	AO1.2 – AO1.4 - Complies Any proposed cuts will be designed such that they are responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland. The cuts will be screened from view and topsoil retained.
	<b>AO1.5</b> No crest of any cut or toe of any fill, or any part of any retaining wall or structure is closer than 600mm to any boundary of the property, unless the prior written approval of the adjoining landowner has been obtained.	AO1.5 – Complies None of the structures outlined in AO1.5 will be within 600mm to any boundary of the property.
	AO1.6 Non-retained cut and/or fill on slopes are stabilised and protected against scour and erosion by suitable measures, such as grassing, landscaping or other protective/aesthetic measures.	<b>AO1.6 – Complies</b> A Construction Environmental Management Plan will be prepared and implemented prior to construction and include soil and erosion management.

Performance outcomes	Acceptable Solutions	Compliance
Visual Impact and Site Stability		
<b>PO2</b> Filling and excavation are carried out in such a manner that the visual/scenic amenity of the area and the privacy and stability of adjoining properties is not compromised.	A02.1 The extent of filling and excavation does not exceed 40% of the site area, or 500m <sup>2</sup> whichever is the lesser, except that AO2.1 does not apply to reconfiguration of 5 lots or more.	<b>AO2.1 – Complies</b> The proposed development is for a shared use hiking trail and camping node. Therefore, excavation will be limited and will not exceed 500m <sup>2</sup> .
	AO2.2 Filling and excavation does not occur within 2 metres of the site boundary.	<b>AO2.2 – Complies</b> No filling and excavation will occur within 2 metres of the site boundary.
Flooding and drainage		
PO3 Filling and excavation does not result in a change to the run off characteristics of a site which then have a detrimental impact on the site or nearby land or adjacent road reserves.	<ul> <li>AO3.1 Filling and excavation does not result in the ponding of water on a site or adjacent land or road reserves. </li> <li>AO3.2 Filling and excavation does not result in an increase in the flow of water across a site or any other land or road reserves. AO3.3 Filling and excavation does not result in an increase in the volume of water or concentration of water in a watercourse and overland flow paths. AO3.4 Filling and excavation complies with the specifications set out in Planning Scheme Policy No SC5 – FNQROC Development Manual.</li></ul>	AO3.1 – AO3.4 – Complies The proposal is not expected to result in a meaningful increase in pervious surfaces. There is expected to be negligible impact to the existing stormwater drainage systems onsite. Therefore, the proposal does not involve any changes to the existing lawful points of discharge. There is expected to be no worsening effect caused by the proposed development.
Water quality		
<b>PO4</b> Filling and excavation does not result in a reduction of the water quality of receiving waters.	AO4 Water quality is maintained to comply with the specifications set out in Planning Scheme Policy No SC5 – FNQROC Development Manual.	<b>AO4 – Complies</b> The proposed development will maintain water quality in accordance with the Design guidelines set out in section 5

Performance outcomes	Acceptable Solutions	Compliance
		of the Planning scheme policy - FNQROC Regional Development Manual.
Infrastructure		
<b>P05</b> Excavation and filling does not impact on Public Utilities.	<b>A05</b> Excavation and filling is clear of the zone of influence of public utilities.	<b>A05 – Complies</b> The subject site does not contain any public utilities. Any proposed earthworks will occur clear of the zone of influence of any public utilities.

# 1. Hillslopes overlay code

Performance outcomes	Acceptable Solutions	Compliance
For self-assessable developments		
<b>PO1</b> The landscape character and visual amenity quality of hillslopes areas is retained to protect the scenic backdrop to the region.	<b>A01.1</b> Development is located on parts of the site that are not within the Hillslopes constraint sub-category as shown on the Hillslopes overlay Maps contained in schedule 2.	AO1.1 – Complies The Douglas Shire Council Planning Scheme hillslopes overlay map indicates the southern region of the Wangetti South Section A project area is affected by hillslopes. However, given the development has been designed such that it is responsive to the natural environmental values, the landscape character and visual amenity is expected to be retained.
For assessable development		
PO2 The landscape character and visual amenity quality of hillslopes areas is retained to protect the scenic backdrop to the region.	AO2.1 Development does not occur on land with a gradient in excess of 1 in 6 (16.6%) or AO2.2 Where development on land steeper than 1 in 6 (16.6%) cannot be avoided, development follows the natural contours of the site.	<ul> <li>AO2.1 – AO2.2 – Complies</li> <li>The Wangetti South Section alignment traverses the eastern slopes of the Macalister Ranges. Therefore, the proposed ecotourism development involves areas of steep land. The trail will have an average gradient of &lt;10% and a maximum gradient no greater than 15% (for short distances only).</li> <li>The project will follow the natural contours of the site as the development has been designed such that it is responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland.</li> </ul>
	<ul> <li>AO2.3</li> <li>Access ways and driveways are: <ul> <li>(a) constructed with surface materials that blend with the surrounding environment;</li> <li>(b) landscaped with dense planting to minimise the visual impact of the construction;</li> <li>(c) provided with erosion control measures immediately after construction.</li> </ul> </li> </ul>	<b>AO2.3 – Complies</b> The proposed shared trail and access tracks are constructed to be sensitive to the natural environment and landscape. The project is for ecotourism and therefore has been designed such that it is responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland.

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>AO2.4</li> <li>The clearing or disturbance of vegetation is limited to clearing and disturbance that:</li> <li>(d) is necessary for the construction of driveways;</li> <li>(e) is necessary to contain the proposed development;</li> <li>(f) minimises canopy clearing or disturbance;</li> <li>(g) minimises riparian clearing or disturbance.</li> </ul>	<ul> <li>AO2.4 – Complies</li> <li>The proposed development is for an ecotourism facility including a shared use trail, public camping node and amenities block, water way crossing structures along the trail, and service track connections to the existing road network. This project traverses through largely untouched land and therefore some vegetation clearing is required. However, as the project has been designed such that it is responsive to the natural environmental values clearing is limited.</li> <li>For the shared use trail clearing is limited to the construction corridor which is defined as 2.5 m (0.5 m either side of the 1.5 m permanent trail width) and to about 2.5 m high. Clearing of the corridor will be undertaken in 100 – 150 m sections and will be undertaken manually using tools such as brush cutters, chainsaws and hedge trimmers, and hand tools like loppers, hand saws and secateurs. The process of clearing only 100-150 m ahead at a time allows for a visible amount of vegetation to be cleared ahead of where the machine is operating. Natural obstacles e.g. large trees will not be removed, and the trail will be re-routed around them.</li> <li>Design details of the campsite will be developed further during the detailed phase and will result in the permanent disturbance footprint of 0.25 ha. The node will be designed to avoid trees to the greatest extent possible and rocks or other important landscape features. Vagetation clearing</li> </ul>
		will be required for site infrastructure, however, will be minimised where possible.

Performance outcomes	Acceptable Solutions	Compliance
	<b>AO2.5</b> On land with slopes greater than 1 in 6 (16.6%) or greater, alternative construction methods to concrete slab on ground are utilised (i.e. split level or post and beam constructed buildings that minimise modification to the natural terrain of the land).	AO2.5 - Complies The proposed development is for an ecotourism shared use hiking trail and camping node through largely untouched land, therefore involving areas of steep land. The project has been designed such that it is responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland.
	AO2.6 Development does not alter the sky line.	AO2.6 – AO2.10 – Complies The proposed public camping node (including toilet block)
	<ul> <li>AO2.7</li> <li>Buildings and structures: <ul> <li>(a) are finished predominantly in the following exterior colours or surfaces:</li> <li>(i) moderately dark to darker shades of olive green, brown, green, blue, or charcoal; or</li> <li>(ii) moderately dark to darker wood stains that blend with the colour and hues of the surrounding vegetation and landscape;</li> </ul> </li> <li>(b) are not finished in the following exterior colours or surfaces: <ul> <li>(i) pastel or terracotta colours, reds, yellows, shades of white or beige, or other bright colours that do not blend with the surrounding vegetation and landscape;</li> <li>(ii) reflective surfaces.</li> </ul> </li> <li>AO2.8</li> <li>Exterior colour schemes limit the use of white or other light colours to exterior trim and highlighting of architectural features.</li> </ul>	<ul> <li>would be obscured from the walking trail so as to provide privacy and security. The node will be sympathetic to the terrain and topography – It will blend into the landscape and create a sense of purpose and movement through the landscape.</li> <li>The project has been designed such that it is responsive to the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland.</li> </ul>
	<b>AO2.9</b> Areas between the first floor (including outdoor deck areas) and ground level are screened from view.	

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>AO2.10</li> <li>Recreational or ornamental features (including tennis courts, ponds or swimming pools) do not occur on land:</li> <li>(a) with a gradient of 1 in 6 (16.6%) or more; are designed to be sited and respond to the natural constraints of the land and require minimal earthworks.</li> </ul>	
<ul> <li>PO3</li> <li>Excavation or filling does not have an adverse impact on the amenity, safety, stability or function of the site or adjoining premises through:</li> <li>(b) loss of privacy;</li> <li>(c) loss of access to sunlight;</li> <li>(d) intrusion of visual or overbearing impacts;</li> <li>complex engineering solutions.</li> </ul>	<ul> <li>AO3</li> <li>Excavation or fill:</li> <li>(e) is not more than 1.2 metres in height for each batter or retaining wall;</li> <li>(f) is setback a minimum of 2 metres from property boundaries;</li> <li>(g) is stepped with a minimum 2 metre wide berm to incorporate landscaping in accordance with Planning scheme policy SC6.7 – Landscaping;</li> <li>does not exceed a maximum of 3 batters and 3 berms (i.e. not greater than 3.6 metres in height) on any one lot.</li> </ul>	AO3 – Complies The proposed development is for a shared use hiking trail and camping node and therefore excavation will be limited to that establishing the natural trail. Excavation will not exceed 1.2 metres in height for each batter or retaining wall.
Lot reconfiguration		
<b>PO4</b> For development that involves reconfiguring a lot, lot layout and design is responsive to the natural constraints of the land and each lot is capable of being used for its intended purpose.	<ul> <li>AO4.1</li> <li>The frontage and depth of all lots is of sufficient width to:</li> <li>(h) allow driveways to follow the natural contours of the site and not exceed a gradient of 1 in 6 (16.6%);</li> <li>(i) accommodate any changes in gradient between the road and lot within the lot boundary and not within the road reserve.</li> </ul>	<b>AO4.1 – A04.4 Not Applicable</b> The proposal development is not designed for lot reconfiguration.

Performance outcomes	Acceptable Solutions	Compliance
	AO4.2 Development does not create new lots containing land of greater than 1 in 6 (16.6%), except where a rectangular area of land of lesser grade is contained within the new lots to accommodate the intended land use, with the balance left in its natural state to the greatest extent possible. Note – The size of rectangular areas is outlined within each zone code.	
	AO4.3 Development does not alter ridgelines.	
	<b>AO4.4</b> Lots are designed to ensure rooflines of future buildings and structures do not protrude above a ridgeline.	

### 1. Infrastructure work codes

Performance outcomes	Acceptable Solutions	Compliance
For assessable developments		
Works on a local government road		
PO1 Works on a local government road do not adversely impact on footpaths or existing infrastructure within the road verge and maintain the flow, safety and efficiency of pedestrians, cyclists and vehicles.	A01.1 Footpaths/pathways are located in the road verge and are provided for the hierarchy of the road and located and designed and constructed in accordance with Planning scheme policy SC5 – FNQROC Regional Development Manual.	<b>PO1.1 – Complies</b> The proposed development is for a shared use hiking trail. Wangetti South Section A including connections to the Captain Cook Highway (state-controlled road) at Borderline Beach, Wangetti Beach and at Wangetti. No surface road treatments and no drainage infrastructure are proposed on Captain Cook Highway.
	AO1.2 Kerb ramp crossovers are constructed in accordance with Planning scheme policy SC 5 – FNQROC Regional Development Manual.	<b>AO1.2 – Not Applicable</b> The proposed development does not involve kerb ramp crossovers.
	<ul> <li>AO1.3</li> <li>New pipes, cables, conduits or other similar infrastructure required to cross existing footpaths:</li> <li>(a) are installed via trenchless methods; or</li> <li>(b) where footpath infrastructure is removed to install infrastructure, the new section of footpath is installed to the standard detailed in the Planning scheme policy SC5 – FNQROC Regional Development Manual, and is not less than a 1.2 metre section.</li> </ul>	AO1.3 – Not Applicable The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. The proposed development is for a shared use hiking trail. Wangetti South Section A including connections to the Captain Cook Highway (state-controlled road) at Borderline Beach, Wangetti Beach and at Wangetti. No surface road treatments and no drainage infrastructure are proposed on Captain Cook Highway.

Performance outcomes	Acceptable Solutions	Compliance
	AO1.4 Where existing footpaths are damaged as a result of development, footpaths are reinstated ensuring: (a) similar surface finishes are used; (b) there is no change in level at joins of new and existing sections; (c) new sections are matched to existing in terms of dimension and reinforcement. Note – Error! Reference source not found. provides guidance on meeting the outcomes.	<ul> <li>AO1.4 – Complies</li> <li>The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. It is unlikely the proposed development will result in damage to existing footpaths. Where any damage occurs, footpaths will be reinstated.</li> <li>The proposed development is for a shared use hiking trail. Wangetti South Section A including connections to the Captain Cook Highway (state-controlled road) at Borderline Beach, Wangetti Beach and at Wangetti. No surface road treatments and no drainage infrastructure are proposed on Captain Cook Highway.</li> </ul>
	<b>AO1.5</b> Decks, verandahs, stairs, posts and other structures located in the road reserve do not restrict or impede pedestrian movement on footpaths or change the level of the road verges.	<b>AO1.5 – Not Applicable</b> The proposed development does not involve decks, verandah stairs, posts or other structures located in the road reserve.
Accessibility structures		
PO2 Development is designed to ensure it is accessible for people of all abilities and accessibility features do not impact on the efficient and safe use of footpaths. Note – Accessibility features are those features required to ensure access to premises is provided for people of all abilities and include ramps and lifts.	AO2.1 Accessibility structures are not located within the road reserve.	<ul> <li>AO2.1 – Not Applicable</li> <li>The proposed development does not involve any accessibility structures. The proposed shared hiking trail is only accessible to persons that are required to undertake activities of a physical nature that would not be possible for a person with a mobility impairment or physical disability.</li> <li>Wangetti South Section A has been designed to be a shared use trail for hikers and mountain bikers. To this end, the shared use trail has been designed to have the following rating:</li> <li>Mountain Biking – Intermediate (blue square with blue outline) as defined in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System (MTBA TDRS);</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
		<ul> <li>Hiking – Grade 3 for hikers, as defined in the Australian Walking Track Grading System</li> <li>(AWTGS), which also equates to Class 3 in the Australian Standard for Walking Tracks, Part 1: Classification and Signage (AS 2156.1-2001).</li> </ul>
	A02.2	AO2.2 – Not Applicable
	Accessibility structures are designed in accordance with AS1428.3.	The proposed development does not involve any accessibility structures. The proposed shared hiking trail is only accessible to persons that are required to undertake activities of a physical nature that would not be possible for a person with a mobility impairment or physical disability.
		Wangetti South Section A has been designed to be a shared use trail for hikers and mountain bikers.
		To this end, the shared use trail has been designed to have the following rating:
		<ul> <li>Mountain Biking – Intermediate (blue square with blue outline) as defined in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System (MTBA TDRS);</li> <li>Hiking – Grade 3 for hikers, as defined in the Australian Walking Track Grading System</li> <li>(AWTGS), which also equates to Class 3 in the Australian Standard for Walking Tracks, Part 1: Classification and Signage (AS 2156.1-2001).</li> </ul>
	AO2.3	AO2.3 – Not Applicable
	When retrofitting accessibility features in existing buildings, all structures and changes in grade are contained within the boundaries of the lot and not within the road reserve.	The proposed development does not involve any accessibility structures. The proposed shared hiking trail is only accessible to persons that are required to undertake activities of a physical nature that would not be possible for a person with a mobility impairment or physical disability.
Water supply		
PO3	A03.1	AO3.1 – Not Applicable
		The proposed development complied with AO3.1.

Performance outcomes	Acceptable Solutions	Compliance
An adequate, safe and reliable supply of potable, fire fighting and general use water is provided.	The premises is connected to Council's reticulated water supply system in accordance with the Design Guidelines set out in Section D6 of the Planning scheme policy SC5 – FNQROC Regional Development Manual; or <b>A03.2</b> Where a reticulated water supply system is not available to the premises, on site water storage tank/s with a minimum capacity of 10,000 litres of stored water, with a minimum 7,500 litre tank, with the balance from other sources (e.g. accessible swimming pool, dam etc.) and access to the tank/s for fire trucks is provided for each new house or other development. Tank/s are to be fitted with a 50mm ball valve with a camlock fitting and installed and connected prior to occupation of the house and sited to be visually unobtrusive.	AO3.2 – Complies To ensure the project will be of low-impact to the surrounding environment, no utility connections will be installed to connect to municipal infrastructure. There is limited water infrastructure proposed within Wangetti South Section A within Douglas Shire Council LGA. On-site water tanks will be include in Wangetti South Section A within the Douglas Shire Council area.
<b>PO4</b> Provision is made for the treatment and	<b>AO4.1</b> The site is connected to Council's sewerage	<b>PO4 – Not Applicable</b> The project has been designed such that it is responsive to
disposal of effluent to ensure that there are no adverse impacts on water quality and no adverse ecological impacts as a result of the system or as a result of increasing the cumulative effect of systems in the locality.	system and the extension of or connection to the sewerage system is designed and constructed in accordance with the Design Guidelines set out in Section D7 of the Planning scheme policy SC5 – FNQROC Regional Development Manual;	the natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland. World Trail were appointed to design the alignment and completed a walkthrough, working closely with Traditional Owners, specialist consultants and engineers.
	or	To ensure the project will be of low-impact to the surrounding environment, no utility connections will be
	Where not in a sewerage scheme area, the proposed disposal system meets the requirements of Section 33 of the <i>Environmental Protection</i> <i>Policy (Water) 1997</i> and the proposed on site effluent disposal system is designed in accordance with the <i>Plumbing and Drainage Act (2002)</i> .	installed to connect to municipal infrastructure. There is no wastewater infrastructure proposed within Wangetti South Section A within Douglas Shire LGA.

Performance outcomes	Acceptable Solutions	Compliance
Stormwater quality		
P05 Development is planned, designed, constructed and operated to avoid or minimise adverse impacts on stormwater quality in natural and developed catchments by: (c) achieving stormwater quality objectives; (d) protecting water environmental values; maintaining waterway hydrology.	<ul> <li>AO5.1 <ul> <li>A connection is provided from the premises to Council's drainage system;</li> </ul> </li> <li>or <ul> <li>AO5.2</li> <li>An underground drainage system is constructed to convey stormwater from the premises to Council's drainage system in accordance with the Design Guidelines set out in Sections D4 and D5 of the Planning scheme policy SC5 – FNQROC Regional Development Manual.</li> </ul></li></ul>	<b>PO5 – Complies</b> The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. The proposal is not expected to result in a meaningful increase in pervious surfaces. There is expected to be negligible impact to the existing stormwater drainage systems onsite. Therefore, the proposal does not involve any changes to the existing lawful points of discharge.
	<ul> <li>AO5.3</li> <li>A stormwater quality management plan is prepared, and provides for achievable stormwater quality treatment measures meeting design objectives listed in Error! Reference source not found. and Error! Reference source not found., reflecting land use constraints, such as:</li> <li>(e) erosive, dispersive and/or saline soil types;</li> <li>(f) landscape features (including landform);</li> <li>(g) acid sulfate soil and management of nutrients of concern;</li> <li>(h) rainfall erosivity.</li> </ul>	<b>PO5 – Complies</b> The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. The proposal is not expected to result in a meaningful increase in pervious surfaces. There is expected to be negligible impact to the existing stormwater drainage systems onsite. Therefore, the proposal does not involve any changes to the existing lawful points of discharge.
	A05.4 Erosion and sediment control practices are designed, installed, constructed, monitored, maintained, and carried out in accordance with an erosion and sediment control plan.	AO5.4 – Complies A CESCP has been developed for the project. The CESCP provides preliminary guidance to establish appropriate site erosion and sediment control (ESC) management measures to reduce potential adverse impacts during the construction phase of the Project. It is expected that prior to any construction activity for the Project, a detailed work specific ESCP will be developed by the contractor as part of the CEMP. The contractor will review the preliminary guidance provided in the CESCP
Performance outcomes	Acceptable Solutions	Compliance
----------------------	---	---
		and provide greater detail based on construction methodology, geotechnical conditions, and timing of works. The CESCP does not prescribe or locate any permanent or temporary erosion or sediment control measures in detail but provides indicative locations for erosion and sediment control devices as one measure of meeting the contractor's responsibilities. The CESCP has been developed in general accordance with International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (2008).
	AO5.5 Development incorporates stormwater flow control measures to achieve the design objectives set out in Error! Reference source not found. and Error! Reference source not found., including management of frequent flows, peak flows, and construction phase hydrological impacts. Note – Planning scheme policy SC5 – FNQROC Regional Development Manual provides guidance on soil and water control measures to meet the requirements of the <i>Environmental Protection Act 1994.</i> Note – During construction phases of development, contractors and builders are to have consideration in their work methods and site preparation for their environmental duty to protect stormwater quality.	<ul> <li>AO5.5 – Complies</li> <li>The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. The design of the shared use trail and ancillary infrastructure are not considered to impede the flow of stormwater within the project area and is not expected to result in a meaningful increase in pervious surfaces.</li> <li>A CESCP has been developed for the project.</li> <li>The CESCP provides preliminary guidance to establish appropriate site erosion and sediment control (ESC) management measures to reduce potential adverse impacts during the construction phase of the Project. It is expected that prior to any construction activity for the Project, a detailed work specific ESCP will be developed by the contractor as part of the CEMP. The contractor will review the preliminary guidance provided in the CESCP and provide greater detail based on construction methodology, geotechnical conditions, and timing of works.</li> <li>The CESCP does not prescribe or locate any permanent or temporary erosion or sediment control measures in detail but provides indicative locations for erosion and</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance
		sediment control devices as one measure of meeting the contractor's responsibilities. The CESCP has been developed in general accordance with International Erosion Control Association's (IECA) Best Practice Erosion and Sediment Control Guidelines (2008).

#### Non-tidal artificial waterways

#### **PO6**

Development involving non-tidal artificial waterways is planned, designed, constructed and operated to:

(i) protect water environmental values;

 be compatible with the land use constraints for the site for protecting water environmental values;

(k) be compatible with existing tidal and non-tidal waterways;

(I) perform a function in addition to stormwater management;

achieve water quality objectives.

#### AO6.1

Development involving non-tidal artificial waterways ensures:

- (m) environmental values in downstream waterways are protected;
- (n) any ground water recharge areas are not affected;
- (o) the location of the waterway incorporates low lying areas of the catchment connected to an existing waterway;
- (p) existing areas of ponded water are included.

# AO6.2

Non-tidal artificial waterways are located:

- (q) outside natural wetlands and any associated buffer areas;
- (r) to minimise disturbing soils or sediments;
- (s) to avoid altering the natural hydrologic regime in acid sulfate soil and nutrient hazardous areas.

# AO6.1 – AO6.7 – Not Applicable

The proposed development does not involve non-tidal artificial waterways.

<ul> <li>AO6.3</li> <li>Non-tidal artificial waterways located adjacent to, or connected to a tidal waterway by means of a weir, lock, pumping system or similar ensures:</li> <li>(a) there is sufficient flushing or a tidal range of &gt;0.3 m; or</li> <li>(b) any tidal flow alteration does not adversely</li> </ul>	Performance outcomes	Acceptable Solutions	Compliance
<ul> <li>impact on the tidal waterway; or</li> <li>(c) there is no introduction of salt water into freshwater environments.</li> <li>AO6.4 Non-tidal artificial waterways are designed and managed for any of the following end-use purposes: <ul> <li>(a) amenity (including aesthetics), landscaping or recreation; or</li> <li>(b) flood management, in accordance with a drainage catchment management plan; or</li> <li>(c) stormwater harvesting plan as part of an integrated water cycle management plan; or</li> <li>(d) aquatic habitat.</li> </ul></li></ul>	Performance outcomes	<ul> <li>Acceptable Solutions</li> <li>AO6.3</li> <li>Non-tidal artificial waterways located adjacent to, or connected to a tidal waterway by means of a weir, lock, pumping system or similar ensures: <ul> <li>(a) there is sufficient flushing or a tidal range of &gt;0.3 m; or</li> <li>(b) any tidal flow alteration does not adversely impact on the tidal waterway; or</li> <li>(c) there is no introduction of salt water into freshwater environments.</li> </ul> </li> <li>AO6.4 <ul> <li>Non-tidal artificial waterways are designed and managed for any of the following end-use purposes:</li> <li>(a) amenity (including aesthetics), landscaping or recreation; or</li> <li>(b) flood management, in accordance with a drainage catchment management plan; or</li> <li>(c) stormwater harvesting plan as part of an integrated water cycle management plan; or</li> </ul> </li> </ul>	Compliance
(d) aquatic habitat. AO6.5 The end-use purpose of the non-tidal artificial waterway is designed and operated in a way that protects water environmental values. AO6.6 Monitoring and maintenance programs adaptively manage water quality to achieve relevant water quality objectives downstream of the waterway.		<ul> <li>(d) aquatic habitat.</li> <li>AO6.5</li> <li>The end-use purpose of the non-tidal artificial waterway is designed and operated in a way that protects water environmental values.</li> <li>AO6.6</li> <li>Monitoring and maintenance programs adaptively manage water quality to achieve relevant water quality objectives downstream of the waterway.</li> </ul>	

Performance outcomes	Acceptable Solutions	Compliance
	<b>AO6.7</b> Aquatic weeds are managed to achieve a low percentage of coverage of the water surface area, and pests and vectors are managed through design and maintenance.	
Wastewater discharge		
<ul> <li>PO7</li> <li>Discharge of wastewater to waterways, or off site: <ul> <li>(e) meets best practice environmental management;</li> <li>(f) is treated to: <ul> <li>(i) meet water quality objectives for its receiving waters;</li> <li>(ii) avoid adverse impact on ecosystem health or waterway health;</li> <li>(iii) maintain ecological processes, riparian vegetation and waterway integrity;</li> <li>(iv) offset impacts on high ecological value waters.</li> </ul> </li> </ul></li></ul>	<ul> <li>AO7.1 <ul> <li>A wastewater management plan is prepared and addresses:</li> <li>(g) wastewater type;</li> <li>(h) climatic conditions;</li> <li>(i) water quality objectives;</li> <li>(j) best practice environmental management.</li> </ul> </li> <li>AO7.2 The waste water management plan is managed in accordance with a waste management hierarchy that: <ul> <li>(k) avoids wastewater discharge to waterways; or</li> <li>(l) if wastewater discharge cannot practicably be avoided, minimises wastewater discharge to waterways by re-use, recycling, recovery and treatment for disposal to sewer, surface water and ground water. </li> </ul></li></ul>	<b>PO7 – Not applicable</b> The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. For this reason, the proposed development does not involve any wastewater infrastructure within Wangetti Trail Section A within Douglas Shire Council LGA.
	<b>AO7.3</b> Wastewater discharge is managed to avoid or minimise the release of nutrients of concern so as to minimise the occurrence, frequency and intensity of algal blooms.	

Performance outcomes	Acceptable Solutions	Compliance
	<ul> <li>AO7.4 Development in coastal catchments avoids or minimises and appropriately manages soil disturbance or altering natural hydrology and: <ul> <li>a) avoids lowering ground water levels where potential or actual acid sulfate soils are present;</li> <li>b) manages wastewater so that: <ul> <li>i. the pH of any wastewater discharges is maintained between 6.5 and 8.5 to avoid mobilisation of acid, iron, aluminium and other metals;</li> <li>ii.</li> <li>iii. holding times of neutralised wastewater ensures the flocculation and removal of any dissolved iron prior to release;</li> <li>iv. visible iron floc is not present in any discharge;</li> <li>v. precipitated iron floc is contained and disposed of;</li> <li>vi. wastewater and precipitates that cannot be contained and treated for discharge on site are removed and disposed of through trade waste or another lawful method.</li> </ul> </li> </ul></li></ul>	
Electricity supply		
<b>PO8</b> Development is provided with a source of power that will meet its energy needs.	<ul> <li>AO8.1 <ul> <li>A connection is provided from the premises to the electricity distribution network;</li> </ul> </li> <li>or <ul> <li>AO8.2</li> <li>The premises is connected to the electricity distribution network in accordance with the Design Guidelines set out in Section D8 of the Planning scheme policy SC5 – FNQROC Regional Development Manual.</li> </ul> </li> </ul>	<b>PO8 – Not Applicable</b> The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. For this reason, the proposed development involves limited electrical infrastructure (solar panels) proposed within the Dark Jungle public camping node of Wangetti South Section A within Cairns Regional Council local government area.

Performance outcomes	Acceptable Solutions	Compliance
<b>PO9</b> Development incorporating pad-mount electricity infrastructure does not cause an adverse impact on amenity.	<ul> <li>AO9.1</li> <li>Pad-mount electricity infrastructure is:</li> <li>(m) not located in land for open space or sport and recreation purposes;</li> <li>(n) screened from view by landscaping or fencing;</li> <li>(o) accessible for maintenance.</li> </ul>	
	Pad-mount electricity infrastructure within a building, in a Town Centre is designed and located to enable an active street frontage.	
	located on the street frontage.	
Telecommunications		
PO10 Development is connected to a telecommunications service approved by the relevant telecommunication regulatory authority. PO11 Provision is made for future	AO10 The development is connected to telecommunications infrastructure in accordance with the standards of the relevant regulatory authority. AO11 Conduits are provided in accordance with Planning	PO10 – PO11 – Not Applicable The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. For this reason, the proposed development does not involve any telecommunication infrastructure preserved within Managetti South Section A within Develop
telecommunications services (e.g. fibre optic cable).	scheme policy SC5 – FNQROC Regional Development Manual.	proposed within Wangetti South Section A within Dougl Shire Council LGA.
Road construction		
<ul><li>PO12</li><li>The road to the frontage of the premises is constructed to provide for the safe and efficient movement of:</li><li>(p) pedestrians and cyclists to and from the site;</li></ul>	<b>AO12.1</b> The road to the frontage of the site is constructed in accordance with the Design Guidelines set out in Sections D1 and D3 of the Planning scheme policy SC5 – FNQROC Regional Development Manual, for the particular class of road, as identified in the road hierarchy.	<b>AO12.1 – Not Applicable</b> The proposed development is for a shared use hiking trail and therefore does not involve car parking meaning no road to the frontage of the site is proposed.

Performance outcomes	Acceptable Solutions	Compliance
<ul> <li>(q) pedestrians and cyclists adjacent to the site;</li> <li>(r) vehicles on the road adjacent to the site;</li> <li>(s) vehicles to and from the site; emergency vehicles.</li> </ul>	AO12.2 There is existing road, kerb and channel for the full road frontage of the site.	PO12 – Complies The proposed development is for a shared use hiking trail and therefore facilitates the safe and efficient movement of pedestrian and cyclists to and from the site. The proposed development is for eco-tourism and does not encourage vehicles to/from the site. The project will include ancillary service tracks to allow for restricted vehicle access along the alignment during the construction phase, operational phase, and maintenance phase and for emergency access.
	<b>AO12.3</b> Road access minimum clearances of 3.5 metres wide and 4.8 metres high are provided for the safe passage of emergency vehicles.	AO12.3 – Complies The project will include ancillary service tracks to allow for restricted vehicle access along the alignment during the construction phase, operational phase, and maintenance phase and for emergency access. Road access will achieve the minimum clearances prescribed by the Acceptable Outcome.
Alterations and repairs to public utility s	ervices	
<b>PO13</b> Infrastructure is integrated with, and efficiently extends, existing networks.	<b>A013</b> Development is designed to allow for efficient connection to existing infrastructure networks.	<b>AO13.1 – Complies</b> The proposed service tracks will be designed for efficient connection onto the existing road network.
PO14 Development and works do not affect the efficient functioning of public utility mains, services or installations.	<ul> <li>AO14.1 Public utility mains, services and installations are not required to be altered or repaired as a result of the development; or </li> <li>AO14.2 Public utility mains, services and installations are altered or repaired in association with the works so that they continue to function and satisfy the relevant Design Guidelines set out in Section D8 of the Planning scheme policy SC5 – FNQROC Regional Development Manual</li></ul>	<ul> <li>AO14.1 – Complies</li> <li>No public utility mains, services or installations are required to be altered or repaired as a result of the development.</li> <li>AO14.2 – Not Applicable</li> <li>The proposed development complies with AO14.1.</li> </ul>

Performance outcomes	Acceptable Solutions	Compliance	
Construction management			
P015 Work is undertaken in a manner which minimises adverse impacts on vegetation that is to be retained.	<ul> <li>AO15</li> <li>Works include, at a minimum: <ul> <li>(t) installation of protective fencing around retained vegetation during construction;</li> <li>(u) erection of advisory signage;</li> <li>(v) no disturbance, due to earthworks or storage of plant, materials and equipment, of ground level and soils below the canopy of any retained vegetation;</li> <li>(w) removal from the site of all declared noxious weeds.</li> </ul> </li> </ul>	<ul> <li>AO15.1 – Complies</li> <li>The project and its ancillary facilities will be low-impact and, to the greatest extent possible, ecologically sustainable and preserve and protect community resources. A Construction Environmental Management Plan will be prepared, prior to construction to ensure construction works minimise adverse impacts on vegetation.</li> <li>Vegetation clearing must only take place in those areas where pre-clearance surveys have been completed. During the PSTR, the scope of the environmental issue is visually identified and marked as an exclusion zone (using different coloured flagging tape or bunting). The exact alignment of the trail is flagged, ensuring an adequate buffer from the exclusion zone.</li> <li>Detailed documentation is gathered, including photographs showing the pre-existing conditions on site before any works are undertaken. This allows for post-construction photos to be taken, which will enable before/after comparison.</li> </ul>	
<b>PO16</b> Existing infrastructure is not damaged by construction activities.	AO16 Construction, alterations and any repairs to infrastructure is undertaken in accordance with the Planning scheme policy SC5 – FNQROC Regional Development Manual. Note - Construction, alterations and any repairs to State- controlled roads and rail corridors are undertaken in accordance with the Transport Infrastructure Act 1994.	<b>AO16.1 – Complies</b> Any construction, alterations or repairs to infrastructure will be undertaken in accordance with the Planning scheme policy – FNQROC Regional Development Manual.	
For assessable developments			
High speed telecommunication infrastru	cture		
P017	AO17 No acceptable outcomes are prescribed.	PO17 – Not Applicable	

Performance outcomes	Acceptable Solutions	Compliance
Development provides infrastructure to facilitate the roll out of high speed telecommunications infrastructure.		The proposed development is not located within an urban area and it is not currently serviced by telecommunications infrastructure as it is located within the Macalister Range National Park.The proposed development will not inhibit the roll out of hi-speed telecommunications infrastructure.
Trade waste		
<ul> <li>PO18</li> <li>Where relevant, the development is capable of providing for the storage, collection treatment and disposal of trade waste such that:</li> <li>(x) off-site releases of contaminants do not occur;</li> <li>(y) the health and safety of people and the environment are protected; the performance of the wastewater system is not put at risk.</li> </ul>	AO18 No acceptable outcomes are prescribed.	<b>PO18 – Not applicable.</b> The proposed development will not produce trade waste during the construction phase and/or operational phase.
Fire services in developments accessed by common private title		
<b>PO19</b> Hydrants are located in positions that will enable fire services to access water safely, effectively and efficiently.	<b>AO19.1</b> Residential streets and common access ways within a common private title places hydrants at intervals of no more than 120 metres and at each intersection. Hydrants may have a single outlet and be situated above or below ground.	AO19.1 – Not Applicable The proposed development does not involve developments access by common private title.
	<b>AO19.2</b> Commercial and industrial streets and access ways within a common private title serving commercial properties such as factories and warehouses and offices are provided with above or below ground fire hydrants located at not more than 90 metre intervals and at each intersection. Above ground fire hydrants have dual-valved outlets.	AO19.2 – Not Applicable The proposed development does not involve developments access by common private title.
<b>PO20</b> Hydrants are suitable identified so that fire services can locate them at all hours.	AO20 No acceptable outcomes are prescribed.	<b>PO20 – Not Applicable</b> The proposed development does not involve developments access by common private title.

Performance outcomes	Acceptable Solutions	Compliance
Note – Hydrants are identified as specified in the Department of Transport and Main Roads Technical Note: 'Identification of street hydrants for fire fighting purposes' available under 'Publications'.		

# 1. Landscape code

Performance outcomes

#### Acceptable Solutions

For self-assessable and assessable development

#### Landscape design

#### **PO1**

Development provides landscaping that contributes to and creates a high quality landscape character for the site, street and local areas of the Shire by:

- (a) promoting the Shire's character as a tropical environment;
- (b) softening the built form of development;
- (c) enhancing the appearance of the development from within and outside the development and makes a positive contribution to the streetscape;
- (d) screening the view of buildings, structures, open storage areas, service equipment, machinery plant and the like from public places, residences and other sensitive development;
- (e) where necessary, ensuring the privacy of habitable rooms and private outdoor recreation areas;
- (f) contributing to a comfortable living environment and improved energy efficiency, by providing shade to reduce glare and heat absorption and re-radiation from buildings, parking areas and other hard surfaces;
- (g) ensuring private outdoor recreation space is useable;
- (h) providing long term soil erosion protection;
- (i) providing a safe environment;

# AO1

Development provides landscaping:

- (k) in accordance with the minimum area, dimensions and other requirements of applicable development codes;
- (I) that is designed and planned in a way that meets the guidelines for landscaping outlined in Planning Scheme Policy SC6.7 – Landscaping;
- (m) that is carried out and maintained in accordance with a landscaping plan that meets the guidelines for landscaping outlined in Planning Scheme Policy SC6.7 – Landscaping.

Note - Planning scheme policy SC6.7 – Landscaping provides guidance on meeting the outcomes of this code. A landscape plan submitted for approval in accordance with the Planning policy is one way to achieve this outcome.

# PO1 – Complies

Wangetti South Section A does not involve any additional landscaping along the shared use trail and the service tracks due the project area being located within the Wet Tropics World Heritage Area (WTWHA). Mulching and plants will not be allowed to be brought into the project area, as they can carry weeds/pests/pathogens.

Sensitive design principles have been employed during detailed design to minimise impacts to visual and landscape amenity. The proposed infrastructure will blend into the landscape and it will be designed and positioned to consider the landscape character of the area.

The shared use trail will be sited in accordance with the natural landform to avoid earthworks. The surface of shared use trail will be predominantly natural soil, the tread of the trail will be constructed from the natural soil and rock found along the trail. Materials used during the construction phase will be required to respond to the local environment and be locally sourced where possible.

Given the nature of the proposed use, the clearing footprints will be narrow with a permanent footprint of 1.5m in width, and clearing will retain large canopy trees wherever possible. This will allow the trail to blend into the natural landscape.

Existing access track will be use for the service tracks and no new roads or fences are proposed within the project area.

Compliance

Performance outcomes	Acceptable Solutions	Compliance
<ul> <li>(j) integrating existing vegetation and other natural features of the premises into the development;</li> </ul>		
not adversely affecting vehicular and pedestrian sightlines and road safety.		
For assessable development		
PO2 Landscaping contributes to a sense of place, is functional to the surroundings and enhances the streetscape and visual appearance of the development.	<ul> <li>AO2.1 No acceptable outcomes are specified.</li> <li>Note - Landscaping is in accordance with the requirements specified in Planning scheme policy SC6.7 – Landscaping. '</li> <li>AO2.2 Tropical urbanism is incorporated into building design.</li> <li>Note – 'Tropical urbanism' includes many things such as green walls, green roofs, podium planting and vegetation incorporated into the design of a building.</li> </ul>	PO2 – Complies Refer to PO1.
<b>PO3</b> Development provides landscaping that is , as far as practical, consistent with the existing desirable landscape character of the area and protects trees, vegetation and other features of ecological, recreational, aesthetic and cultural value.	A03.1 Existing vegetation on site is retained and incorporated into the site design, wherever possible, utilising the methodologies and principles outline in AS4970-2009 Protection of Trees on Development Sites. A03.2 Mature vegetation on the site that is removed or	<b>PO3 – Complies</b> Wangetti South Section A does not involve any additional landscaping along the shared use trail and the service tracks due the project area being located within the WTWHA. Mulching and plants will not be allowed to be brought into the project area, as they can carry weeds/pests/ pathogens.
	damaged during development is replaced with advanced species.	detailed design to minimise impacts to visual and landscape amenity. The proposed infrastructure will blend

Performance outcomes	Acceptable Solutions	Compliance
	<b>AO3.3</b> Where there is an existing landscape character in a street or locality which results from existing vegetation, similar species are incorporated into new development.	<ul><li>into the landscape and it will be designed and positioned to consider the landscape character of the area.</li><li>The shared use trail will be sited in accordance with the natural landform to avoid earthworks. The surface of shared use trail will be predominantly natural soil, the tread</li></ul>
	AO3.4 Street trees are species which enhance the landscape character of the streetscape, with species chosen from the Planning scheme policy SC6.7 – Landscaping.	shared use trail will be predominantly natural soil, the tread of the trail will be constructed from the natural soil and rock found along the trail. Materials used during the construction phase will be required to respond to the local environment and be locally sourced where possible. Given the nature of the proposed use, the clearing footprints will be narrow with a permanent footprint of 1.5m in width, and clearing will retain large canopy trees wherever possible. This will allow the trail to blend into the natural landscape. The shared use trail will avoid large trees where possible and, as is the nature of hiking trails, will wind around trees and large objects to minimise the requirement for clearing and removal of significant areas. Refer to the photos below. Comprehensive management and mitigation strategies have been developed to reduce: the loss of vegetation and habitats; minimise injury and mortality of wildlife; minimise habitat degradation; mitigate barrier effect on fauna movement; restrict the introduction of invasive species; and minimise the disturbance of waterways and waterbodies. Existing access track will be use for the service tracks and no new roads or fences are proposed within the project

Performance outcomes	Acceptable Solutions	Compliance	
PO4	AO4	AO4 – Not Applicable	

Performance outcomes	Acceptable Solutions Compliance			
Plant species are selected with consideration to the scale and form of development, screening, buffering, streetscape, shading and the locality of the area.	Species are selected in accordance with Planning scheme policy SC6.7 – Landscaping.	The proposed development does not involve any additional landscaping. The project has been designed such that it is responsive to the surrounding natural environmental values, enhancing conservation and protection of a cherished part of Tropical North Queensland.		
<b>PO5</b> Shade planting is provided in car parking areas where uncovered or open, and adjacent to driveways and internal roadways.	A05 Species are selected in accordance with Planning scheme policy SC6.7 – Landscaping.	<b>PO5 – Not Applicable</b> The proposed development does not involve any car parking areas.		
<b>PO6</b> Landscaped areas are designed in order to allow for efficient maintenance.	AO6.1 A maintenance program is undertaken in accordance with Planning scheme policy SC6.7 – Landscaping.	PO6 – Complies Refer to the response in PO1.		
	AO6.2 Tree maintenance is to have regard to the 'Safe Useful Life Expectancy of Trees (SULE). Note – It may be more appropriate to replace trees with a SULE of less than 20 years (as an example), and replant with younger healthy species.			
<b>PO7</b> Podium planting is provided with appropriate species for long term survival and ease of maintenance, with beds capable of proper drainage.	<b>A07.1</b> Podium planting beds are provided with irrigation and are connected to stormwater infrastructure to permit flush out.	<b>AO7.1 – Not Applicable</b> The proposed development does not involve any podium planting.		
	<b>A07.2</b> Species of plants are selected for long term performance designed to suit the degree of access to podiums and roof tops for maintenance.	<b>AO7.2 – Not Applicable</b> The proposed development does not involve any podium planting.		
<b>PO8</b> Development provides for the removal of all weed and invasive species and implement on-going measures to ensure	<b>AO8</b> Weed and invasive species detected on a development site are removed in accordance with a management plan prepared by an appropriately qualified person.	AO8.1 – Complies		

Performance outcomes	Acceptable Solutions	Compliance		
that weeds and invasive species do not reinfest the site and nearby premises.		The proposed development will prepare and implement a Construction Environmental Management Plan to include a weed, pest and disease management plan. During operation, a boot wash facility at both ends of the facility will be provided to ensure users do not track pest weeds on or off the trail. Signage will be installed to discourage trail users from picking or carrying flowers or plants from one area to another.		
PO9 The landscape design enhances personal safety and reduces the potential for crime and vandalism.	AO9 No acceptable outcomes are specified. Note - Planning scheme policy SC6.3 – Crime prevention through environmental design (CPTED) provides guidance on meeting this outcome.	<ul> <li>PO9 – Complies</li> <li>Wangetti South Section A does not involve any additional landscaping along the shared use trail and the service tracks due the project area being located within the WTWHA. Mulching and plants will not be allowed to be brought into the project area, as they can carry weeds/pests/ pathogens.</li> <li>Passive surveillance from users of the trail and monitoring of the trail by QPWS and the trail operator will assist in making sure that the unlawful activities e.g. motorbike riding does not occur with the project area and the illegal taking of protected species.</li> </ul>		
<b>PO10</b> The location and type of plant species does not adversely affect the function and accessibility of services and facilities and service areas.	AO10 Species are selected in accordance with Planning scheme policy SC6.7 – Landscaping.	<ul> <li>PO10 – Complies</li> <li>Wangetti South Section A does not involve any additional landscaping along the shared use trail and the service tracks due the project area being located within the WTWHA. Mulching and plants will not be allowed to be brought into the project area, as they can carry weeds/pests/ pathogens.</li> <li>Existing access track will be used for the service tracks and will be maintained during the operation of the trail.</li> </ul>		

Performance outcomes	Acceptable Solutions	Compliance
		The shared use trail will be inspected regulator by the operator and maintained to provide safe passage for the trail users.

# 1. Vegetation management code

erformance outcomes Acceptable Solutions		Compliance				
For self-assessable and assessable development						
<ul> <li>PO1</li> <li>Vegetation is protected to ensure that: <ul> <li>(a) the character and amenity of the local area is maintained;</li> <li>(b) vegetation damage does not result in fragmentation of habitats;</li> <li>(c) vegetation damage is undertaken in a sustainable manner;</li> <li>(d) the Shire's biodiversity and ecological values are maintained and protected;</li> <li>(e) vegetation of historical, cultural and / or visual significance is retained;</li> <li>vegetation is retained for erosion prevention and slope stabilisation.</li> </ul> </li> </ul>	<ul> <li>AO1.1 Vegetation damage is undertaken by a statutory authority on land other than freehold land that the statutory authority has control over;</li> <li>Or</li> <li>AO1.2 Vegetation damage is undertaken by or on behalf of the local government on land controlled, owned or operated by the local government;</li> <li>Or</li> <li>AO1.3 Vegetation damage, other than referenced in AO1.1 or AO1.2 is the damage of:</li> <li>(f) vegetation declared as a pest pursuant to the <i>Land Protection (Pest and Stock Route Management) Act 2002</i>; or</li> <li>(g) vegetation identified within the local govern- ment's register of declared plants pursuant to the local government's local laws; or</li> <li>(h) vegetation is located within a Rural zone and the trunk is located within the Conservation zone or Environmental management zone and the trunk is located within three metres of an existing building; or</li> <li>(i) vegetation is located within three metres of an existing or approved structure, not including a boundary fence;.</li> <li>Or</li> <li>AO1.4</li> </ul>	<ul> <li>AO1.1 – AO1.14– Complies</li> <li>Vegetation clearing is required for some sections of the shared use, public camping node and associated infrastructure.</li> <li>During construction, vegetation clearing will be undertaken and will be limited to the temporary construction corridor is defined as 2.5 m (0.5 m either side of the 1.5 m permanent trail width) and to about 2.5 m high.</li> <li>Clearing of the corridor will be undertaken in 100 – 150 m sections and will be undertaken manually using tools such as brush cutters, chainsaws and hedge trimmers, and hand tools like loppers, hand saws and secateurs. Large trees will not be removed and the trail will re-routed around them. All cleared vegetation will be cut into small pieces and dispersed throughout the surrounding area. The process of clearing only 100-150 m ahead at a time allows for a visible amount of vegetation to be cleared ahead of where the machine is operating.</li> <li>A public mapping node footprint of 0.25ha will be cleared for the required site infrastructure, however, will be minimised where possible.</li> <li>The VM Act does not apply to any native vegetation clearing within a protected area (i.e. national park) under the <i>Nature Conservation Act 1992</i>.</li> <li>Under Schedule 21, Part 1, Item 1 (19) of the <i>Planning Regulation 2017</i>, an exemption applies to native vegetation clearing that the VM Act does not apply to or affect.</li> </ul>				

Performance outcomes	Acceptable Solutions Compliance	
	<ul> <li>Vegetation damage that is reasonably necessary for carrying out work that is:</li> <li>(j) authorised or required under legislation or a local law;</li> <li>(k) specified in a notice served by the local government or another regulatory authority;</li> <li>or</li> </ul>	Under Schedule 21, part 1, section 1, item 14(b) of the Planning Regulation 2017, an exemption applies for the clearing of native vegetation for constructing or maintaining Infrastructure stated in Schedule 5 of the Planning Regulation, where the infrastructure is government supported transport. As previously advised the proposal is considered to be government supported transport infrastructure.
	AO1.5 Vegetation damage for development where the damage is on land the subject of a valid development approval and is necessary to give effect to the development approval; or	A Preliminary Construction Environmental Management Plan and a Matters of National Environmental Significance flora pre-clearance survey methodology document have been developed to manage potential impacts to threatened flora species during the construction phase (they are found in the Preliminary Environmental Management Plan in Appendix I).
	AO1.6 Vegetation damage is in accordance with an approved Property Map of Assessable Vegetation issued under the <i>Vegetation Management Act</i> <i>1999;</i> or AO1.7 Vegetation damage is essential to the maintenance of an existing fire break;	The Project has adopted the principles of the mitigation hierarchy, whereby impacts are addressed through the preferential order of avoidance, minimisation and compensation (offset). Throughout the project design, avoidance measures have been considered wherever possible, including minimisation of the total disturbance footprint of the Project and locating proposed infrastructure in previously disturbed areas. Where this avoidance is not possible, the proposed clearing footprint will be minimised to the greatest extent possible through selection of clearing techniques.
	or AO1.8 Vegetation damage is essential to prevent interference to overhead service cabling; or	Where the trail is in close proximity to areas of high environmental values, qualified environmental specialists should be present to provide assistance in miro-siting the trail to avoid impacts to these values including qualified botanist/ecologists.
	A01.9	

Performance outcomes	Acceptable Solutions	Compliance		
	Vegetation damage is for an approved Forest practice, where the lot is subject to a scheme approved under the <i>Vegetation Management Act 1999;</i> or			
	<b>AO1.10</b> Vegetation damage is undertaken in accordance with section 584 of the <i>Sustainable Planning Act 2009.</i>			
	<b>A01.11</b> Vegetation damage where it is necessary to remove one tree in order to protect an adjacent more significant tree (where they are growing close to one another).			
	<b>AO1.12</b> Private property owners may only remove dead, dying, structurally unsound vegetation following receipt of written advice from, at minimum, a fully qualified Certificate V Arborist. A copy of the written advice is to be submitted to Council for its records, a minimum of seven business days prior to the vegetation damage work commencing.			
PO2 Vegetation damaged on a lot does not result in a nuisance	AO2.1 Damaged vegetation is removed and disposed of at an approved site; or AO2.2 Damaged vegetation is mulched or chipped if used onsite.	AO2.1 – Complies Vegetation cleared during the construction phase will be scattered (excluding weeds) around the surrounding environment, without smothering existing vegetation. Otherwise it will be disposed in a suitable disposal area outside of the WTWHA unless prior approval has been sought from WTMA.		
For assessable development				
PO3	A03	PO3 – Not Applicable		
Vegetation damage identified on the Places of significance overlay lot does	No acceptable outcomes are prescribed.	The site is not located within the Places of Significance Overlay.		

Performance outcomes	Acceptable Solutions	Compliance
not result in a negative impact on the site's heritage values.		

GHD Level 9 145 Ann Street T: 61 7 3316 3000 F: 61 7 3316 3333 E: bnemail@ghd.com

© GHD 2022

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited. 4132458-29752-

126/https://projects.ghd.com/oc/sqoc2/wangettitrackapprova/Delivery/Documents/4132458-REP-Planning Report-MCU-Wangetti South-DSC.docx

# Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	B Schulz / S Munns	A Douglas	On file	G Squires	On file	17.01.22

GHD | Report for Report for Department of State Development, Tourism and Innovation - Wangetti Trail South Section Development Application for a Material Change of Use for an Environmental Facility and Nature Based Tourism, 4132458 | 141

GHD | Report for Report for Department of State Development, Tourism and Innovation - Wangetti Trail South Section Development Application for a Material Change of Use for an Environmental Facility and Nature Based Tourism, 4132458 | 142

# www.ghd.com



GHD | Report for Report for Department of State Development, Tourism and Innovation - Wangetti Trail South Section Development Application for a Material Change of Use for an Environmental Facility and Nature Based Tourism, 4132458 | 143