SC6.9 Natural assets planning scheme policy

SC6.9.1 Introduction

Short Title -The planning scheme policy (PSP) may be cited as the Natural assets PSP.

SC6.9.1.1 Purpose

(1) The purpose of the planning scheme policy is to:

- (a) support the use of the Natural assets overlay code;
- (b) provide background information on the derivation of the natural assets overlay maps;
- (c) outline information the council may request for a development application; and
- (d) provide guidance or advice about satisfying assessment benchmarks.

SC6.9.1.2 Legislative authority

This planning scheme policy is made under Chapter 2, Part 3 of the *Planning Act 2016*.

SC6.9.1.3 Relationship to Townsville City Plan

This planning scheme policy supports the assessment provisions specified in Townsville City Plan. Natural assets PSP specifically relates to the assessment of the Natural assets overlay code.

SC6.9.2 Natural assets

SC6.9.2.1 General guidance - environment protection

A healthy natural environment underpins the social and economic fabric of a sustainable city. Human modification of the natural environment interferes with physical and biological processes, natural cycles and energy flows. Natural systems can tolerate some amount of human modification however when the resilience level is exceeded, natural system break down and life support functions are diminished or damaged. In extreme cases damage may be irreparable as with endemic habitat loss, species extinction and desertification. Protecting the environment from human activities is a prerequisite for achieving ecological sustainability.

SC6.9.2.2 Land use and environment protection

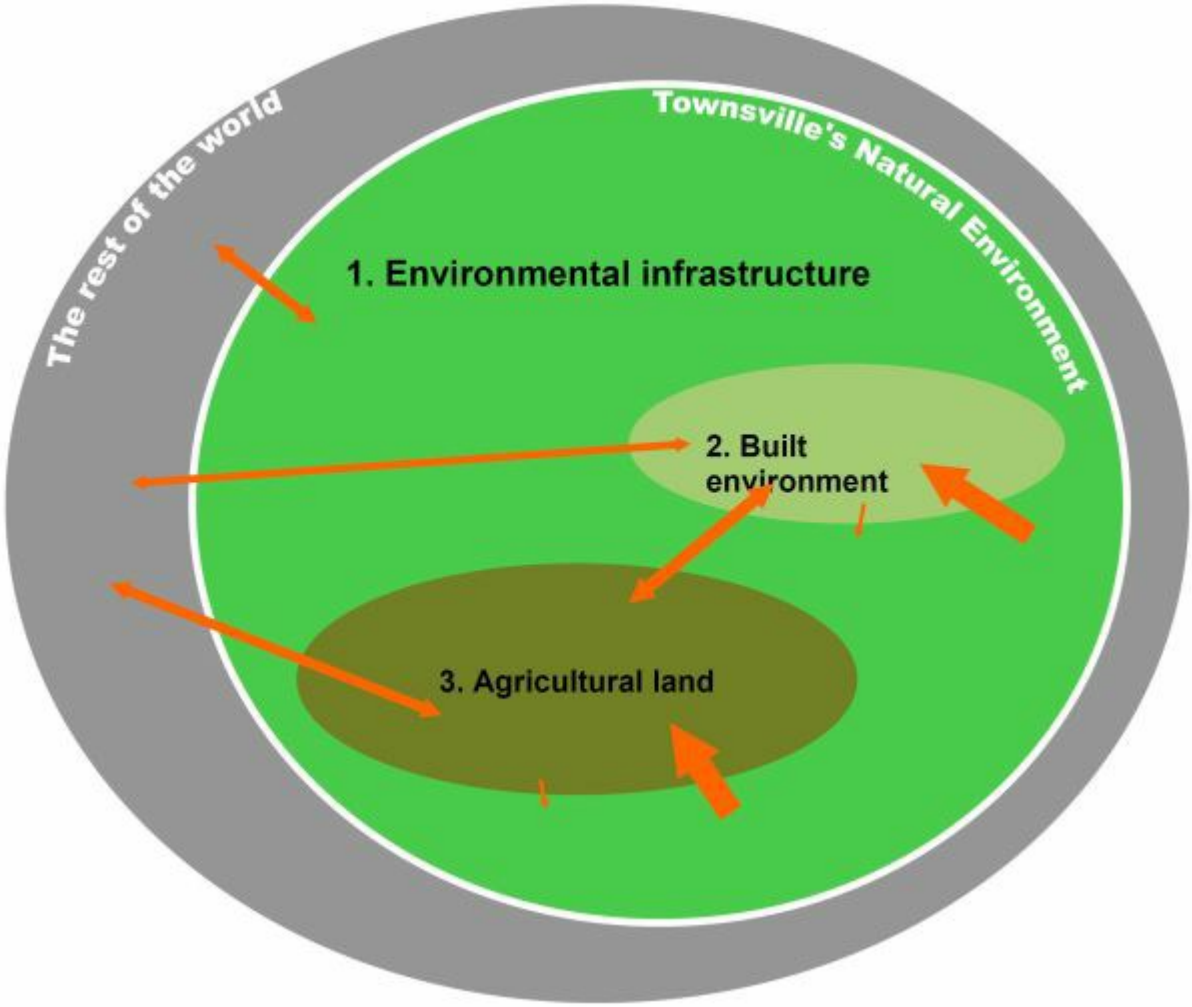
In broad terms, the three main functional land use units are:

(1) Environmental infrastructure;

(2) Built environment; and

(3) Agriculture land.

The three units are overlain on the single pillar of our existence - the natural environment, as illustrated conceptually in the diagram below.



SC6.9.2.3 Ecological planning

To seek to achieve ecological sustainability requires ecologically-based planning solutions. The underlying principle of ecological planning is the maintenance of our quality of life through the protection of our life support systems. This can best be done in a planning context through the recognition and protection of significant environmental areas.

Ecological planning takes an 'organic' approach to planning where the placement of built structures is dictated by environmental features and the need to protect and maintain natural assets and significant environmental infrastructure.

SC6.9.2.4 Environmental infrastructure

Environmental infrastructure is the basic framework or underlying foundation of the natural environment that contains the myriad of life support systems for all forms of life. Environmental infrastructure and function include:

(1) waterways/drainage systems (water drainage, water storage, seed transport, nutrient relocation, soil formation, sediment redistribution, habitat, connectivity, aquifer recharge, recreation, base flow, food source, biodiversity);

(2) wetlands (water filtering, water storage and aquifer recharge, habitat, seasonally high productivity, food source, biodiversity);

(3) riparian vegetation (shading, nutrients, ground cover; bank stabilisation, erosion prevention, water filtering, shelter/refuge, habitat, connectivity, recreation, food source, buffering, biodiversity);

(4) coastal dune systems (first line storm protection, buffering, water filtering, recreation, habitat, biodiversity);

(5) extensive forest in mid and upper catchments slopes >15% (erosion prevention, soil and slope stabilisation, soil formation, habitat, recreation, food source, aquifer recharge/intake, biodiversity, climate stabilisation);

(6) corridors and connections (wildlife movement, seed and vegetation dispersal, habitat, shade, shelter/refuge, food source, buffering, recreation, biodiversity);

(7) habitat/sustainable living space (biodiversity, connectivity, buffering, food source, recreation);

(8) native vegetation (biodiversity, habitat, wildlife movement, buffering, seed and vegetation dispersal, food source, recreation, soil health, shade, shelter/refuge, fuel, timber, erosion prevention;

(9) floodplains (habitat, biodiversity, nutrient and sediment dispersal, food source);

(10) aquifers (water storage, sub surface connectivity, hydraulic pressure); and

(11) protected areas (National Parks, Conservation Parks, Forest Reserves, Fish Habitat Areas and other socially delineated conservation areas).

Environmental infrastructure is unlikely to follow the same lines as appear on cadastral maps.

SC6.9.2.5 Ecosystem services

When planning and designing the built form we need to be aware of the intrinsic value of the surrounding environment and the ecosystem services operating in the background.

These services are provided without the need for any extra mechanical or chemical intervention and operate continually at variable rates determined by environmental conditions and climate. When we 'adjust' the environmental conditions we change the balance of ecological functions and ecosystem services at times beyond the resilience of the system to bounce back. If the change in environmental conditions is exacerbated by climate variability then a system may collapse due to the cumulative combination of natural and human impacts.

A risk management approach is adopted in ecological planning due to the uncertainties about how much of our natural assets (land, vegetation, water, soil, wildlife, soil microbes) is required to sustain an increasing human population and still maintain ecological processes at functional levels.

Determining or estimating the extent and influence of the ecological processes and ecosystem services is necessary in a planning context so that planning policies and intent can be applied to small areas (e.g. a house lot) as well as across broader landscape units such as regional ecosystems and land units.

SC6.9.2.6 Categories and components

The environmental importance ratings depicted on the Natural assets overlay map identify the likely significance of the natural environment and the likely extent of environment protection required to maintain habitat, species, vegetation communities, strategic habitat units, ecological processes, ecosystem services and hydrological function. Each of the three categories (medium, high and very high) are based on a variety of environmental and ecological components. The components associated with each category are listed in Table SC6.9.1—Environmental importance categories and components.

Table SC6.9.1 — Environmental importance categories and components

Category	Environmental importance components	General description
Very High	• Endangered ecological communities − semi evergreen vine thicket* − littoral rainforest and coastal vine thicket − broad leaf tea tree* • Endangered remnant vegetation (VMA vegetation management status) − Brigalow belt north bioregion − sub-regional (<10% left OR <300ha of pre-clearing extent remains) − local government area (<10% left OR <300ha of pre-clearing extent remains) • Remnant vegetation (VMA biodiversity status - endangered (dominant)) • Endangered high value regrowth (VMA) • Non bioregional ecosystems* • GBR wetland protection areas • Main connecting corridors • Mahogany glider habitat • Southern Cassowary habitat • Land units of limited extent* − Alligator Creek delta − *Eucalyptus acmenoides* lowlands − *Eucalyptus brownii* woodlands major occurrence − *Corymbia clarksoniana* alluvial fans − *Eucalyptus platyphylla — Melaleuca viridiflora* alluvial fan complex − *Eucalyptus tereticornis* on holocene deposits − *Grevillea striata* dominant − Land zone 4 grasslands − Pleistocene dunes − Terminal wetlands − *E. platyphylla — C. clarksoniana* woodlands on old levees and prior streams	This category includes endangered species habitat and vegetation communities along with the main connecting corridors (riparian, coastal and biogeographic units), land units of limited extent and Great Barrier Reef (GBR) wetland protection areas. These areas have been allocated as very high priority as they are the last examples of this type of vegetation community and/or habitat (generally less than 10% remains) and are the most vulnerable to loss and/or extinction in the short to medium term. Any further loss of these endangered elements could result in their loss from the landscape with little chance that they will recover or could result in their loss from the landscape with little chance that they will recover or could be restored.

Table SC6.9.1 — Environmental importance categories and components

Category	Environmental importance components	General description
High	• Of concern remnant vegetation (VMA vegetation management status) − Brigalow belt north bioregion − sub-regional (<10% left OR <300ha of pre-clearing extent remains) − local (30-50% of the pre-clearing extent remains) • Remnant vegetation (VMA biodiversity status - Endangered (sub dominant)) • High value regrowth − endangered (sub dominant) − of concern (dominant) • Wetland regional ecosystems (Estuarine, Palustrine, Lacustrine and Riverine) • Black-throated Finch habitat* • Essential habitat (regional ecosystems) • Very high ecosystem diversity (SDI >75% of the maximum value for the Bioregion) • A significant habitat for 'at risk' species • Waterways (buffered as per VMA bioregion codes) • Essential regrowth habitat (VMA)* • Wet tropics corridors* • Statewide corridors (remnant)* • Magnetic Island corridors (remnant)* • Magnetic Island lowland values(remnant)* • Land units of limited extent* − Castle Hill − (Sandy Creek and Double Barrel Creek) floodplain complex − watercourses (and associated areas subject to flooding)	This category includes the next most threatened suite of habitat, species and regional ecosystems (generally less than 30% of these components remaining in the landscape) along with strategically important connecting corridors, essential regrowth habitat, wetland regional ecosystems and endemically important landscape elements. It also includes a significant portion of the network of waterways and buffers (not included in the very high category) that are critical to the maintenance of ecological functions and ecosystem services. This category includes environmental elements close to the probable 'survival edge' as 30% is considered to be at the lower limit of ecological viability and function for habitat and vegetation communities. Any further reduction of extent is likely to result in a downward spiral that could ultimately lead to species endangerment and/or the endemic loss or degradation of vegetation communities and ecological processes. To take into account the relative importance of this category, if there are two or more environmental parameters with a high rating in a given polygon then the polygon was elevated to the very high category.

Table SC6.9.1 — Environmental importance categories and components

Category	Environmental importance components	General description
Medium	• Least concern remnant vegetation (VMA vegetation management status) − Brigalow belt north bioregion • Remnant vegetation (VMA biodiversity status — Of Concern) • High value regrowth − of concern (sub dominant) − least concern • GBR wetland protection trigger areas (buffers) • Statewide corridors (nonremnant)* • Magnetic Island corridors (nonremnant)* • Magnetic Island lowland values (regrowth)*	This category includes the widest range of environmental values from near threatened (30% remnant vegetation remaining) to relatively stable (100% remnant vegetation remaining). This category also includes some of the less tangible environmental and ecological functions, such as catchment protection, buffers, landscape connectivity and viable- sized habitat and ecosystems. This is the category that is likely to require the highest level of investigation prior to any development, as it is the least 'certain' in terms of priority for environmental protection. It is likely to have very high and high environmental value features, which have not been identified at the mapping resolution used for the categorisation. It may also include some low value features. If there are three or more environmental parameters with a medium rating in a given polygon then the polygon has generally been elevated to the high category.

Footnote—SDI is Simpson's Diversity Index

Footnote—*Denotes amendments/additions using DEHP mapping

It should not be assumed that any area has no environmental values. Areas not included in the overlay map (depicted without an infrastructure rating) generally consist of areas that have significantly less environmental value due to the level of disturbance resulting from anthropogenic activities, including clearing of native vegetation and the construction built form. The environmental values of some of these areas could be reinstated.

Applicants and landowners should be aware that other land not included in the overlay map may contain other remnant and non-remnant vegetation or other environmental value that is subject to the requirements of other state and/or federal legislative requirement.

In addition, there are provisions in some zone codes that require applicants to respond appropriately to any localised values that may exist outside the overlay area.

SC6.9.2.7 Mapping limitations

The general mapping resolution used for the environmental importance ratings map (Overlay Map OM-08) is 1:100,000. The Queensland Government's Regional Ecosystem mapping has been used as the base map for the environmental importance rating map and, while being the best available data source for this type of environmental categorisation, it is recognised that there are inaccuracies in the base map and therefore there will be inaccuracies in the resulting product - i.e. environmental importance ratings.

To overcome some of the inaccuracies, a review of the environmental importance ratings has been undertaken for the urban, rural and rural residential areas using 2011 aerial photography (the most recent available at the time of review). Further refinement of the mapping is required, for example, to accurately locate waterways, wetlands, riparian zones and buffers as the current Queensland Government mapping is not accurate at the local/urban scale and especially for order 1 and order 2 streams.

In light of these mapping limitations, it is imperative that an environmental assessment is undertaken for areas mapped with medium, high and very high environmental importance to ensure that development applications are assessed with the benefit of the best available information.

Council will continue to improve its environmental mapping, over time, to more accurately reflect environmental importance across the entire Townsville landscape, to reduce the incidence of unsustainable land use and development, and thereby contribute to the achievement of ecological sustainability and a sustainable Townsville.

SC6.9.2.8 Supporting maps

Supporting maps have been produced to assist applicants in using the Natural assets overlay code. The data presented on each of the supporting maps has been extracted from data contained on map OM-08 and are provided to assist applicants identify environmental and ecological features within the Townsville landscape.

Supporting maps may be used to assist applicants address relevant assessment benchmarks of the natural assets code.

Maps supporting the natural assets overlay code are:

(1) Figure SC6.9.1 – Natural assets – waterways represent the Queensland Government 1:100,000 waterways mapping. Waterways have been mapped to enable identification of stream orders specifically and are designed to allow applicants to identify the relevant stream order that affects a given location.

(2) Figure SC6.9.2 – Natural assets – wetlands include Great Barrier Reef wetlands of high ecological significance (wetland protection areas), riverine wetland regional ecosystems and other wetland regional ecosystems. Ramsar wetlands and wader roosts have also been shown to identify the presence of these areas at their given location.

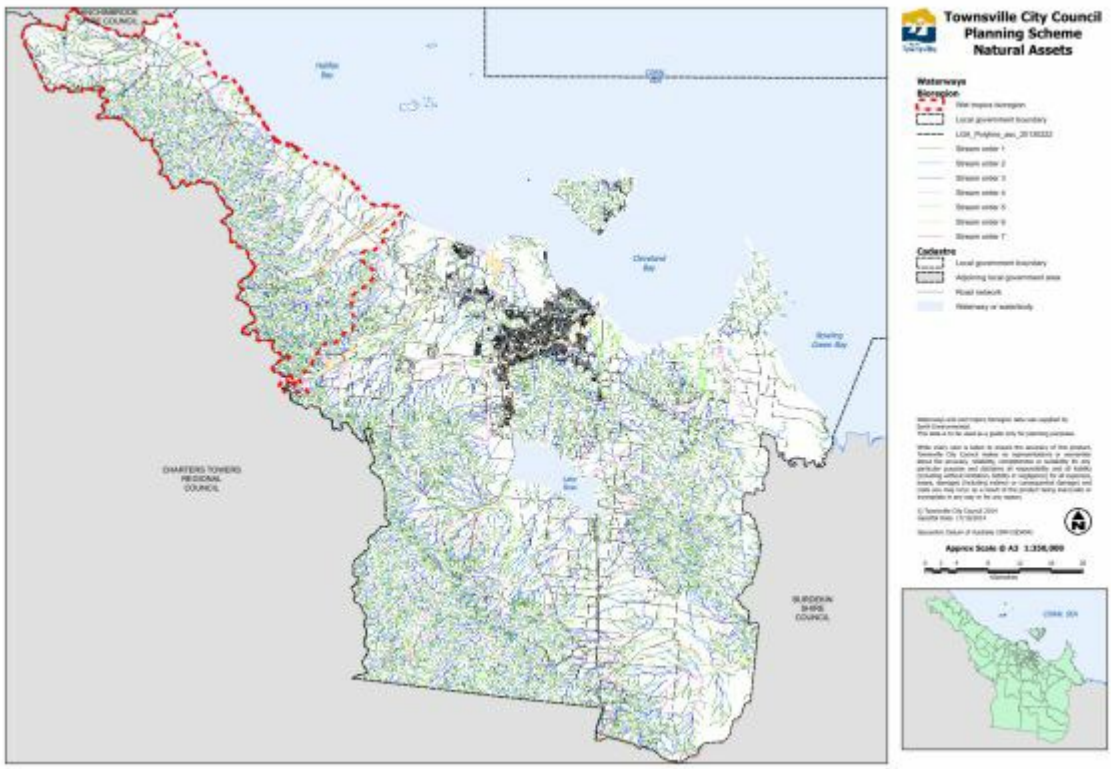
(3) Figure SC6.9.3 – Natural assets – ecological corridors include:

  (a) priority corridors from the Environment and Biodiversity Study: Final Report (Chenoweth April 2011);

  (b) state corridors from data provided by the Department of Environment and Heritage Protection (DEHP); and

  (c) the state and priority corridors as major ecological corridors and the great eastern ranges conservation corridor. Major ecological corridors shown on the map consist of a 250m core corridor and a 50m buffer either side of the core corridor.

(4) Figure SC6.9.4 – Natural assets – core habitat includes Cassowary, Mahogany Glider and draft Black-throated Finch habitats in addition to essential habitat for other threatened species as mapped by DEHP including declared fish habitat areas.



Click here to view PDF high resolution map.

Figure SC6.9.1 - Natural assets - waterways

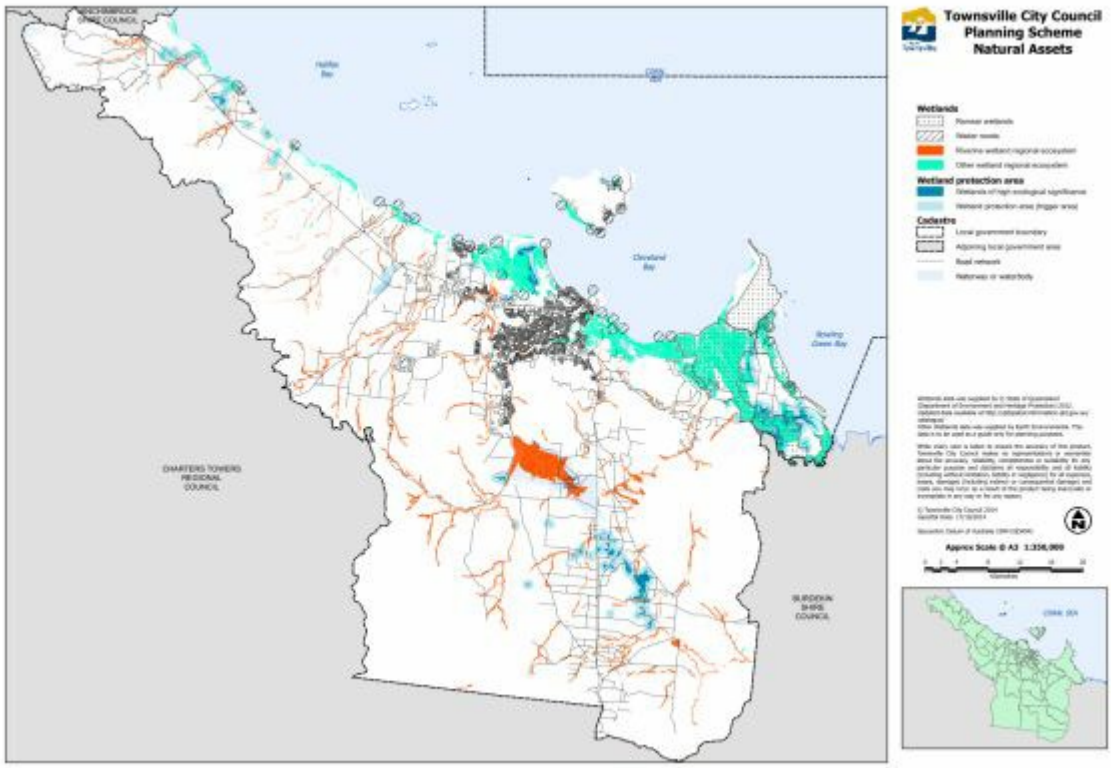


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Figure SC6.9.2 - Natural assets - wetlands

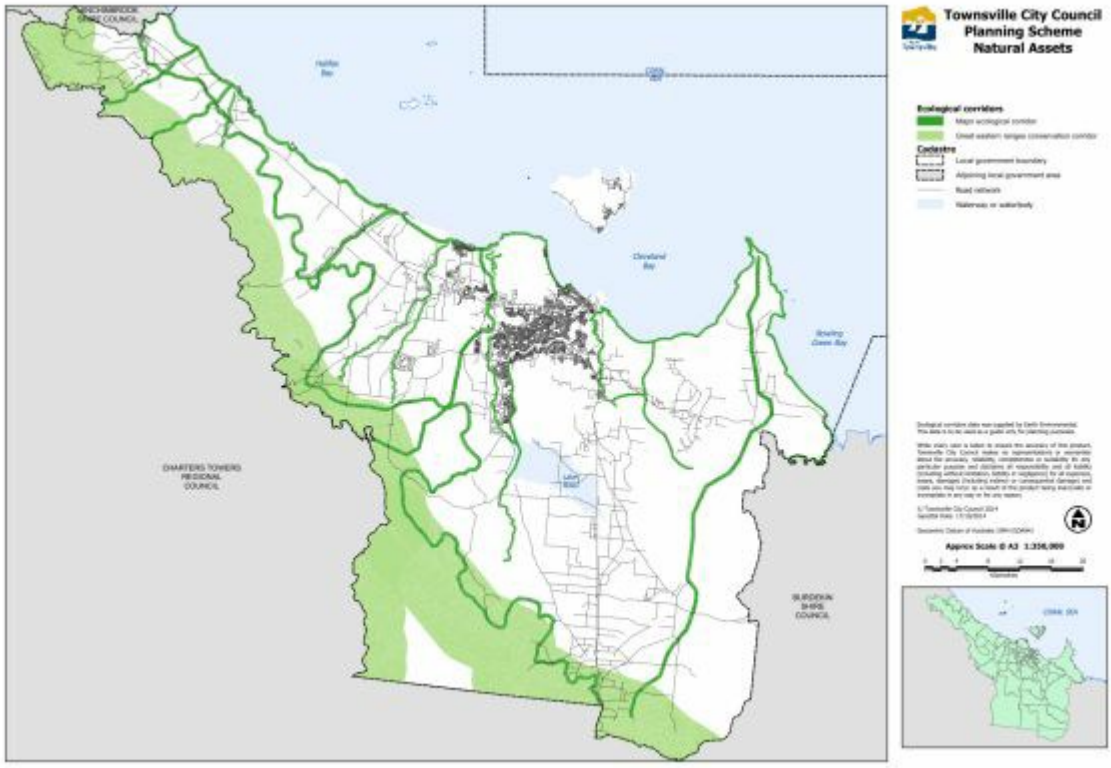

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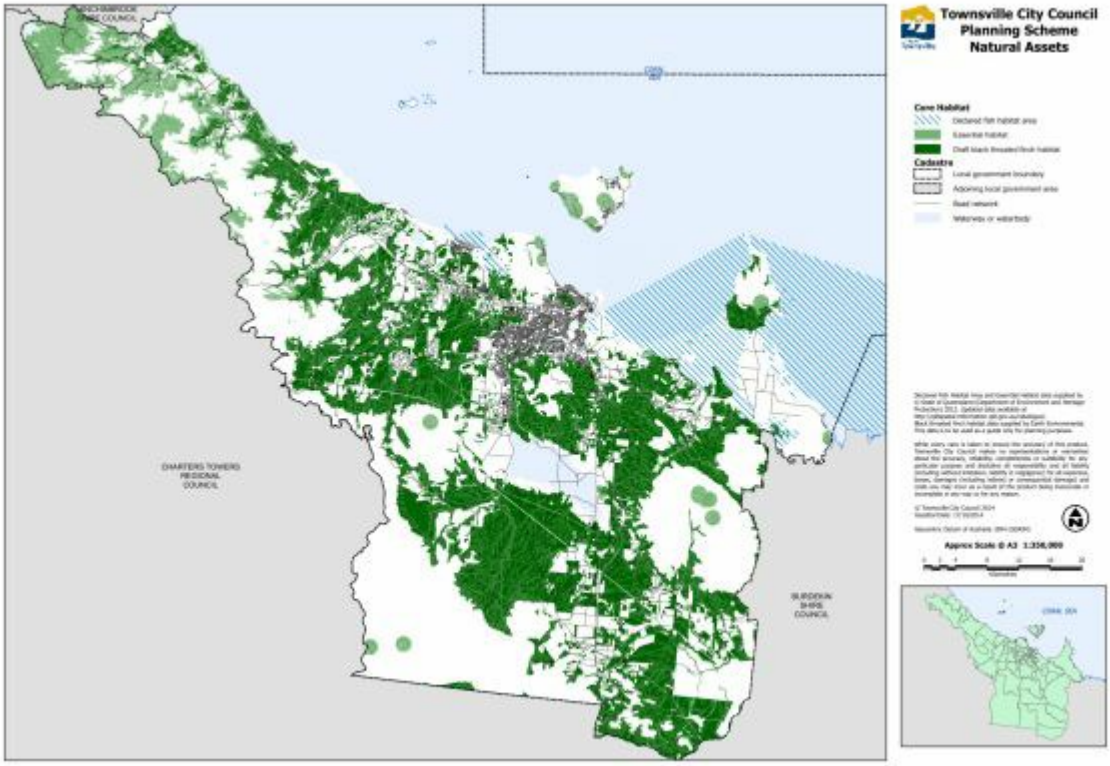
Figure SC6.9.3 - Natural assets - ecological corridors



Click here to view PDF high resolution map.

Figure SC6.9.4 - Natural assets - core habitat

SC6.9.2.9 Environmental assessments

An environmental assessment may be required to show what impacts the development activity may have on the environment and how potential adverse impacts on the environment can be mitigated. To demonstrate compliance with the Natural assets overlay code, such an assessment may need to include a detailed ecological assessment.

The required assessments should be undertaken by a suitably qualified and experienced professional and provide a site specific investigation of the values present and their significance to ground truth the data reflected on the overlay mapping. The level of investigation required and techniques utilised should be commensurate with the scale and nature of the proposed development and the type of values present on the site. The environmental assessment should provide the appropriate level of information to assess the potential impact of a proposed development on the environment including:

(1) identification of the physical and ecological features of the site;

(2) identification of the ecological processes and ecosystem services associated with the site;

(3) identification of the physical and ecological connections between the site and the surrounding environment, including ecological processes and ecosystem services; and

(4) comparison of the environmental importance components and features identified on OM-08 to on ground findings.

The environmental assessment and reporting process also provides the development proponent with the opportunity to propose potential solutions that prevent or minimise potential environmental harm to natural assets and ecological processes associated with the proposed development. Potential solutions may include:

(1) environmental offsets;

(2) operational environmental management plans;

(3) succession plans and criteria for handover of natural assets to council;

(4) establishment of Nature Refuge areas;

(5) stormwater management plans incorporating water sensitive urban design (WSUD);

(6) resourced rehabilitation plans (in addition to or instead of environmental offsets); and

(7) innovative ideas for the progression of the development and protection of environmental values.

SC6.9.2.10 Environmental assessment report

The environmental assessment report should be set out in accordance with the framework provided below.

Physical and ecological features of the site including:

(1) Introduction providing information about:
   (a) the applicant;
   (b) tenure;
   (c) location; and
   (d) current land use and proposed land use.

(2) Site description including:
   (a) surrounding land use;
   (b) location in the water catchment;
   (c) proximity to HEV waters;
   (d) proximity to World Heritage Areas and other protected areas;
   (e) geology and soils; and
   (f) Regional ecosystems.

(3) Environmental importance components and features identified on OM-08 (Natural assets overlay).

(4) Likely ecological processes and ecosystem services associated with the site and adjoining areas.

(5) Social, physical and environmental constraints identified in other overlays including flooding, fire hazard, slope and visual amenity.

Physical and ecological features of the site (on ground site assessment results):

(6) The physical and ecological features of the site, based on on-ground assessment including:
   (a) soils and their geological derivation;
   (b) drainage and wetland features;
   (c) Other native vegetation and regrowth;
   (d) Regional Ecosystem type and extent;
   (e) habitat type and extent;
   (f) exotic species presence (terrestrial and aquatic – plant and animal); and
   (g) fauna sightings and signs (additional targeted survey work may be required where threatened species and ecological communities are likely to be present).

(7) Ecological processes and ecosystem services associated with the site.

(8) The physical and ecological connections between the site and the surrounding environment including ecological processes and ecosystem services.

Comparison of desktop review features with site assessment features:

(9) Comparison of the environmental importance components and features identified on OM-08 council's Natural assets overlay to on ground findings.

Suggestions for development impact avoidance or mitigation, including, but not limited to the following considerations:

(10) stormwater management including erosion prevention and sediment movement control;

(11) habitat management including weed control;

(12) maintenance of ecological processes; and

(13) maintenance or improvement of connectivity.

Environmental assessments and the preparation of management and rehabilitation plans are to be undertaken by a

person/people/organisation with the appropriate skills and experience. Where a person with less than four years' experience in field work is involved in the assessment, they should be supervised by an experienced environmental practitioner. Regardless of experience and qualifications, all work should be thoroughly reviewed as part of a quality assurance process prior to submission of studies, reports and plans to council.

SC6.9.2.11 Site-based management and rehabilitation plan

Where there is a requirement in the Natural assets overlay code, a site based management plan and/or a rehabilitation plan should be prepared to address the site specific situation. Generally, content should be in a format that identifies:

(1) the physical and biological condition of the site (from the Environmental assessment report);

(2) the issue/s being addressed and their location (from the Environmental assessment report);

(3) how and over what time scale the issue will be addressed (with input from Part 4 of the Environmental assessment report); and

(4) the commitment of resources allocated to implement the plan.

Plans need to provide enough information to show that the performance outcomes in the Natural assets overlay code will be met by the implementation of the plan. The use of maps and accompanying tables with management actions are encouraged to simplify the plan and reduce the size of documents.

SC6.9.2.12 Additional information

Additional material may be required as part of the environmental assessment depending on the environmental importance components and features identified in the Natural assets overlay. This involves proximity to areas of significant ecological or environmental value and requirements for vegetated buffers as well as the proximity to wader roosts. Additional information will be required if the proposed development is within:

(1) 200 metres of a wader roost area as indicated on Figure SC6.9.2 – Natural assets – wetlands;

(2) 200 metres of core habitat and endangered ecological communities;

(3) 200 metres of HEV waters;

(4) 200 metres of a wetland area;

(5) 100 metres of an ecological corridor;

(6) 100 metres of a declared fish habitat area; and

(7) 100 metres of a waterway.

Information derived from on ground investigations will be required to show:

(1) the actual distance from the environmental feature to the edge of the development and a comparison to the Natural assets overlay.

(2) the physical condition of the area between the environmental feature and the development including:

  (a) soils;

  (b) drainage patterns;

  (c) habitat type/s;

  (d) vegetation type and condition;

  (e) presence of exotic species;

  (f) observed fauna and signs of fauna; and

  (g) built infrastructure e.g. fences, drains and roads; and

(3) how buffer areas will maintain natural assets and ecological processes if a proposed buffer area/width is less than that specified in the Natural assets overlay code.

It is the responsibility of the development proponent to provide council with alternative solutions, when digressing from council's acceptable solutions, to ensure natural assets and ecological processes are not degraded as a consequence of the proposed development. Council may adopt the proponent's suggestions as conditions of development approvals.

SC6.9.2.13 Background information to assist environmental assessments

Council has compiled a range of environmental information to assist development proponents with the preparation of their environmental assessments. A list of the information is provided below with associated references:

(1) schedule of locally significant fauna, flora and vegetation/ecological communities along with those scheduled under legislation;

(2) landscaping guidelines expounding the use of local native species and excluding environmental weed species;

(3) local and regional movement requirements of wildlife (refine connectivity corridors based on species habitat location and known ecology);

(4) fauna survey techniques (e.g. types of trapping, call play back etc.) including the most appropriate targeted survey techniques and when these may be required for particular species;

(5) pest species (flora and fauna) specific to Townsville and appropriate management techniques; and

(6) Black Ross (Townsville) Water Quality Improvement Plan

SC6.9.2.14 Terminology

The following table provides a useful compendium of environmental terms, including terms used in this policy.

Word / Term	**Explanation**
Aquatic	Of the water, or living or growing in water.
Arboreal	Tree dwelling. Adapted to living in or among trees. Spending a significant part of the life cycle in trees or relying on arboreal habitats for shelter and/or food.
Avian	Birds. Of or pertaining to birds.
Biodiversity	The variety of all life forms: (1) *genetic diversity*—the variety of genetic information contained in individual plants, animals and other organisms. (2) *species diversity*—the variety of species. (3) *ecosystem diversity*—the variety of habitats, ecological communities and ecological processes. (from National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012, pp.45-49).
Biodiversity values	As biodiversity is the variety of all forms of life biodiversity values are difficult to quantify. Biodiversity values are often based on a combination of biological and biophysical parameters including; habitat species richness and endemic anomalies. Some of these parameters have been included in the environmental importance rating map prepared for the Natural Assets Overlay.
Biophysical processes	Processes involving interaction between the biological (organic) world and the physical (inorganic) world e.g. soil formation and nutrient recycling.
Bioregion	As described in the *Vegetation Management Act 1999* (VMA).
BTF is Black-throated Finch	The Black-throated Finch BTF is an Endangered species under the *Commonwealth Environmental Protection and Biodiversity Conservation Act 2000* (EPBC Act) and Queensland's *Nature Conservation Act 1992*. BTF habitat mapping is draft and will require further investigation to determine actual core habitat. A greater level of assessment will be required for development applications in BTF habitat areas.
Buffer	The threat management space between a natural or environmental asset and the threat. Buffers can also act as ecological corridors and provide habitat for wildlife. [anything serving to neutralise the shock of opposing forces (The Macquarie Dictionary (2nd Edition) 1991, p.234)]

Buffering	The practice of providing a managed ecotone between the area of environmental significance and the threatening process/es.
Connectivity	The physical linkages serving to connect dissimilar or separated patches of habitat. The name given to the concept of landscape elements being connected. The capacity of landscapes or aquatic environments to allow ecological movement and function. The broad concept can be considered to have several main elements:*landscape connectivity*—the physical connection between areas with vegetation cover across a landscape. (1) *habitat connectivity*—the connection between patches of habitat suitable to a particular species. (2) *ecological connectivity*—the ecological processes that underpin the function of landscapes; for example, the transfer of pollen or seeds and the sequestration of soil carbon. (3) *evolutionary connectivity*—populations of species are able to interact naturally, sharing genes and adapting to changing environmental conditions. (from National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012, pp.45-49).
Core area, core habitat area	An area of habitat that is of a suitable size, shape and condition for an assemblage of species or a single organism. Core habitat provides nutrients and water resources, and supports successful reproduction. (from National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012, pp.45- 49).
Corridors	Corridors are passageways that facilitate the movement of organisms and serve as habitat. Corridors exist at a range of scales depending on the organism and their ecological requirements. Corridors are not confined to linear strips of vegetation or riparian zones but rather include an interconnected network of native vegetation and habitat across the landscape. Waterways and wetlands provide ecological corridors for aquatic organisms.
Degraded	In a lessor state as a result of human interaction and natural causes e.g. storms.
Ecological communities	Assemblages of species (plants, animals, bacteria and fungi) that interact with each other in a common environment and often as part of a food chain or trophic web.
Ecological functions	Functions and processes involving the interaction of organisms with each other and their environments including , nutrient cycling, pollination, animal and plant breeding.
Ecological significance	The term used to describe areas that are important for maintaining biodiversity and ecological processes.
Ecotone	The gradation or transition zone between different habitats or vegetation communities.
Ecosystem	Ecosystem is “1. a community of organisms interacting with one another and with the environment in which they live.” (The Macquarie Dictionary (2nd Edition) 1991, p.555). A complex network or interconnected system or a biological community of interacting organisms and their physical environment; for example, combinations of plant, animal and other organisms in communities and their non-living environment (soil, water, climate, and so on) interacting as a functional unit, such as forest, wetland or grassland. (from National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012, pp.45-49).
Ecosystem health	A measure of the condition of ecosystems from sustainable to threatened.

Ecosystem processes	Those life processes and interactions between organisms and the environment that (generally) contribute to the overall health of the ecosystem.
Ecosystem services	The multitude of resources and processes that are supplied by natural ecosystems. Collectively, these benefits are known as ecosystem services and include products like clean drinking water and processes such as the decomposition of wastes. The term is generally applied to benefits to human beings as with the Millennium Ecosystem Assessment 2005 definition “the benefits people obtain from ecosystems”. This is a narrow, anthropogenic definition that could restrict the protection of important ecosystem services if they are not seen as beneficial to humans. The definition has been broadened in the National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012 to read; “the processes or materials provided by ecosystems. Ecosystem services benefit biodiversity, humans and society through the provision of essential goods and services such as clean air, water, food, shelter, energy, nutrients, amenity values and cultural resources”. (pp.45-49)
Endemic	Refers to organisms that are native to a particular area or region. Having a limited distribution or habitat extent or confined to a specific area.
Environmental infrastructure	Environmental infrastructure is the basic framework or underlying foundation of the natural environment that contains the myriad of life support systems for all forms of life.
Hydrological function	The function of water moving through the landscape as part of a natural drainage process. Hydrological function is shaped by geological features and influences those features over time e.g. erosion. Hydrological function can be impeded by: (1) the placement of obstacles in waterways, (2) obstructing overland flow e.g. raised roads and rail lines, (3) reduced aquifer recharge.
Migratory species	Animals, especially birds and marine species, that travel significant distances (compared to remaining in a home range) to: (1) avoid climatic extremes and resource (food) depletion, (2) find sufficient resources to maintain physical health, (3) breed in more favourable conditions.
Native habitat	Habitat that is in a relatively natural state with minimal disturbance from human activities with a low incidence of exotic plant species.
Native species	Species (plant or animal) that would normally be found in the (Townsville) natural environment.
Natural areas	Those parts of the environment that have not been significantly altered from their natural state and that retain their ecological processes, biophysical functions and suite of native species.
Naturalised	Non-native species introduced to Australia that flourish and become part of the landscape.
Non-native	Not having evolved in Australia. Introduced into Australia from another country within the last 300 years.
Pest fauna and flora	Introduced species that threaten the viability and/or productivity of native ecosystems.

Refuge/refugia	An area that provides shelter, food or water for organisms when other parts of the landscape are inhospitable. For example, rocky areas can provide shelter during bushfires, while riparian areas might provide food and water during times of drought (from National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012, pp.45-49).
Resilience	The ability to recover after being impacted by threatening processes.
Riparian areas	Areas of vegetation alongside watercourses, lakes and wetlands. They often contain vegetation that differs from that in the surrounding landscape, providing important habitat and ecological resources (from National Wildlife Corridors Plan: A framework for landscape-scale conservation 2012 pp.45-49).
Significant ecological communities	Those ecological communities that are limited in extent (endemic) or population, confined to specific habitats or have characteristics that result in a vulnerability to environment changes and threatening process.
Threatened species	Threatened wildlife means native wildlife that is prescribed under the *Nature Conservation Act 1992* as— (a) extinct in the wild wildlife; or (b) endangered wildlife; or (c) vulnerable wildlife.
Threatening processes	Human activities that adversely impact the environment, natural values and ecological processes and result in adverse impacts including habitat loss, native vegetation destruction and reduced populations of native and migratory species.
Wader roosts	As defined in the Environment and Biodiversity Study: Final Report (Chenoweth 2011) and represented as a 700 metre buffer trigger area around wader roosts.
Wetland mapping and classification methodology	The "A Method to Provide Baseline Mapping and Classification for Wetlands in Queensland (VERSION 1.2) published by the Environmental Protection Agency, Queensland Government and produced in conjunction with the Australian Government (Department of the Environment and Heritage) in 2005.