

# **MANGO HILL INFRASTRUCTURE DEVELOPMENT CONTROL PLAN**

**Precinct Plan No. 003**

**for**

**Central Open Space Precinct**

**North Lakes Development**

**20 July 2000**

(Approved without conditions by Council on the 20 July 2000 (MP 00/2257))

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## **1.0 Introduction**

- 1.1 The Mango Hill Infrastructure Development Control Plan (DCP) provides for the creation of a precinct within any part of the DCP area chosen by the principal developer. The principal developer may then prepare a precinct plan and lodge it with Council for approval in accordance with the relevant provisions of the DCP.
- 1.2 The purpose of a precinct plan, as provided for in the DCP, is to show in indicative terms detail for a planning area within one land use element of the DCP Structure Plan or across a number of elements. This planning area is created to allow for a more detailed interpretation of a part of the structure plan.
- 1.3 The principal developer has created a precinct to be known for planning purposes as the Central *Open Space Precinct*. This document constitutes the precinct plan for the Central Open Space Precinct.
- 1.4 The location of the precinct within the DCP area is shown on Figure 1. The area of the precinct is approximately 67.5 hectares although, consistent with DCP requirements, the boundaries shown on the plan are only notional.
- 1.5 Where a discrepancy arises between the performance criteria of this precinct plan and the requirements of the DCP or Mango Hill Infrastructure Agreement (MHIA), the requirements of the DCP or MHIA will prevail.

## **2.0 Structure Plan Context**

- 2.1 The Central Open Space Precinct forms part of the Open Space land use element of the DCP Structure Plan. More specifically, it forms part of the linear park network extending from the Saltwater Creek drainage system near the northern boundary of the DCP area, through the centre of the DCP area along the Tributary B drainage system to join with the Town Park and the Tributary C drainage system which in turn feeds into the Hays Inlet system. As shown on Figure 2, Structure Plan Context, the Central Open Space Precinct broadly corresponds with the major open space system of gullies which drain the bulk of stormwater flows into Saltwater Creek.

## **3.0 General Desired Environmental Outcomes**

- 3.1 In relation to the predominant land use element of Open Space, the DCP provides for the following general desired environmental outcome:

*“to provide a comprehensive and integrated system of open space fulfilling aesthetic, recreation, conservation, transportation and environmental management functions for the DCP area”*

3.2 The development of the DCP area will recognise ecologically sustainable development (ESD) principles. In respect to this precinct plan, this means a number of environmental objectives, as outlined in section 11.1.2 of the DCP, will be pursued:

- “(c) To adopt appropriate environmental management practises to avoid, or mitigate and manage the potential adverse impacts of development and environmental harm as required by the Environmental Protection Act 1994(EPA).*
- (d) To reduce resource and energy requirements for the Mango Hill development (North Lakes) through providing opportunities for walking and cycling and the establishment of a viable public transport system, innovative building designs, shared use of public facilities and spaces, and the extensive use of low maintenance landscapes in open spaces.*
- (f) To provide the means for the establishment or enhancement of habitat areas and wildlife corridors primarily along the linear parks through the DCP area connecting with the regional open space network.*
- (g) To minimise the loss of remaining stands of native vegetation when undertaking development wherever practicable.”*

## **4.0 Planning Intent**

4.1 Clause 9.2 of the DCP provides an outline of the planning intent for the Open Space land use element, including the following summary:

*“It is intended that a full range of open space opportunities will be conveniently available to the community as it develops. Open spaces include land designated for public park purposes, un-allocated land held by the Council or the Crown as well as areas of private recreational open space.”*

*Examples of open space are:*

- “(a) enlarged areas of roadways used for open space;*
- (b) golf course, including practice areas and buffer areas;*
- (c) landscaped areas, including landscaping for visual or acoustic screening or buffering;*
- (d) pedestrian and bicycle pathways;*
- (e) waterways;*
- (f) water bodies used for environmental management purposes; and*
- (g) other outdoor recreation areas.”*

4.2 This precinct will form an integral element of the linear park system within the DCP area. The linear park system is intended to serve open space, recreational and environmental needs at the district level. As stated in Clause 9.2.2 of the DCP, this will be achieved through:

- “(a) a network of cycleways, paths and trails allowing movement throughout the DCP area while remaining in a natural or landscaped setting;
- (b) retention where practicable of continuous corridors of trees, shrubs and grasslands which is subject to minimal maintenance regimes for the purpose of permitting the movement of fauna through the DCP area and providing natural outlooks for residents....;
- (c) inclusion of artificial wetlands and water bodies for water management prior to discharge into Saltwater Creek;
- (d) direct connections from urban residential areas to district playing fields, the town centre and community facilities;
- (e) enhancement of open spaces by the provision of educational and interpretative facilities;
- (f) control over the design and siting of public facilities such as clubhouses, amenities, car parking areas, furnishing and lighting”.

## **5.0 Development Concept**

### **5.1 Development Context**

The Central Open Space Precinct will be developed as a significant recreational resource in the North Lakes district open space network and will maintain connectivity with the open space network at Saltwater Creek and Hays Inlet on the northern and eastern boundaries of the DCP area. It also forms one of the principal open space features within the DCP area as an integral element of the linear park system.

#### **5.1.1 Land Use Elements**

- (i) The development of the precinct for landscaped open space and/or outdoor recreational purposes will be an important land use activity within the DCP area, contributing to the reclamation of land on which few areas of environmental value remain undisturbed as a result of the previous use of the land for a commercial pine plantation. The environmental enhancement of this land is intended to assist in re-establishing the ecological balance, as well as restoring the land for wider community use.
- (ii) Any open space and / or outdoor recreational use will recognise and enhance the significant natural features of the site, including topography, ridge and gully formations and remnant stands of significant native vegetation.
- (iii) The Indicative Recreational Facilities Node identified within the precinct (refer Figure 3) will be situated directly adjacent to collector roads and in close proximity to the future extension of the major road from Discovery Drive. This node may contain clubhouse amenities and related buildings, possible community uses, recreational facilities, car parking and ancillary uses.
- (iv) Local community facilities (external to the precinct) may be located to the east of the Indicative Recreational Facilities Node. The possible close proximity of these two

recreational / community related land use areas will offer ease of access and convenience for future residents and patrons, as well as possible opportunities for the sharing of facilities.

#### 5.1.2 Transport and Circulation System

- (i) The layout of the surrounding road pattern will be influenced by the desire to provide residents with views of this major open space from a range of vantage points. The relationship between the open space and the residential uses is important. The overall ambience of the development will be enhanced by providing a reasonable proportion of the parkland or public road frontage to this precinct. This will ensure a sense of general community “ownership” of the major open space by providing view opportunities and open space interface for all residents to appreciate it, rather than only those residents with direct frontage to the precinct.
- (ii) The road network will generally be designed to parallel the open space corridor, thereby minimising the number of major crossings of the precinct while ensuring a good standard of connectivity within the DCP area.

#### 5.1.3 Pedestrian and Cycleway Network

- (i) The provision of trunk pedestrian and cyclist pathways is a principal function of the linear park designation as discussed in Section 3.1. However, it is acknowledged that this function could also be achieved generally in parallel to this precinct. This outcome is anticipated where a portion of the open space is retained in private ownership and the provision of pathways is considered appropriate having regard to the overall pathway network requirements of the DCP area. This form of private ownership of open space has been anticipated by the DCP.

In the case of private ownership of a portion of the open space, the pedestrian and cycle network will be integrated within the adjacent local parks and open spaces along or close to the edges of the precinct as the preferred option. However, the local road network is also expected to form part of the pedestrian and cycle network in a manner in which the users’ safety is adequately addressed. In addition to the North South Arterial Road crossing of the precinct, a number of dedicated pedestrian/cyclist paths are intended to cross this open space corridor at locations convenient to local residents. User safety will also need to be addressed in the location and design of these crossings.

- (ii) The pedestrian and cycleway network will link into the surrounding residential areas, providing an extensive network of paths connecting throughout the wider community.

#### 5.1.4 Urban Development Interface

- (i) The proposed open space corridor will appear as a ribbon of green within the heart of the community. In this location it serves an important function as the focus and unifying element for the surrounding residential villages.

- (ii) The interface between the precinct and surrounding urban development will need to ensure that the open landscape character of the precinct is not eroded by completely enclosing it with intensive development. Development fronting onto the Central Open Space Precinct will be required to respond in a sensitive manner to the intended open, landscape character.

#### 5.1.5 Open Space Network

- (i) Open space linkages through and adjacent to the precinct will extend into the surrounding residential areas, providing an extensive network of open spaces connecting throughout the wider community.
- (ii) The potential exists for recreational and educational benefits to flow from development of the precinct, by the retention, where practicable, of existing significant stands of vegetation and associated development of recreational and community related facilities, observation points and the like.

## **5.2 Concept Overview**

The Central Open Space Precinct is proposed to be developed as a significant open space which may include major outdoor recreational facilities such as a golf course. It will be a high quality, environmentally responsive and responsible development that will fulfil an important function as part of the linear park system, intended to serve open space, recreational and environmental needs at the district and potentially regional levels.

The open space of the precinct together with the generalised location of infrastructure elements and key features such as an Indicative Recreational Facilities Node and possible water bodies, are shown in Figure 3. The areas and locations of various elements are indicative only and will be subject to variation following detailed planning and engineering design. Consistent with the DCP, it is important that flexibility be maintained for future planning which needs to be responsive to changing requirements.

Figure3, Precinct Plan Map, identifies the principal land use elements, which form the basic structure of the precinct. Features of the development will include:

- 5.2.1 An Indicative Recreational Facilities Node which is likely to incorporate clubhouse, maintenance, amenities, recreational facilities, and associated car parking. This node may be close to the local community facilities (external to precinct) which are centrally located within the DCP area, as identified on the Structure Plan (refer Figure 2). The proximity of these facilities will enable good connectivity between recreational and community related activities in the central part of the DCP area.
- 5.2.2 Major open space will, through the use of native vegetation character and form, and by also endeavouring to recover appropriate regional ecosystems, contribute to a strong landscape character and “sense of place”. This will strengthen the intent to create an identifiable Australian landscape within the DCP area.



- 5.2.3 The precinct will incorporate wetlands and water bodies for aesthetic and water management purposes, to act as natural filters, prior to discharge into Saltwater Creek. These wetlands and water bodies will form an integral part of the larger stormwater management system for Tributary B and Tributary C and should also endeavour to recover appropriate regional ecosystems.
- 5.2.4 If the precinct includes outdoor recreational activities (commercial or non-commercial) such as a golf course, then the use must seek to achieve world's best environmental standards. The Environmental Management Plans for development within the precinct are to be prepared to an appropriate standard and will include the objective of minimising potable water usage by various options such as increasing the use of recycled water and/or urban run-off.
- 5.2.5 The extensive landscape treatments of the precinct will enhance the opportunities for improved wildlife habitat and water resources of wider regional significance. The potential exists to improve the natural habitat within this open space corridor and generally throughout the DCP area by eliminating exotic and weed species and encouraging native vegetation, bird life and native wildlife.

## **6.0 Precinct Plan**

### **6.1 Introduction**

Figure3, Precinct Plan Map, provides a broad interpretation of the land use planning and development intents for a part of the Mango Hill Structure Plan. The key principles, which have determined the urban design structure for the precinct plan, are outlined below.

### **6.2 Land Use Elements**

In accordance with section 2.3.2(f) of the DCP, the desirable and undesirable land uses are to be identified in generic terms in this precinct plan. The Sector Plan stemming from this precinct plan will finalise the specific land use rights as required by section 2.4.9 of the DCP.

The Central Open Space Precinct will consist entirely of the Open Space land use element as specified in the DCP. The precinct will form a major element of the linear park system within the DCP area. The linear park system is intended to serve open space, recreational and environmental needs at the district level. As stated in Table 9.1 of the DCP, the linear park:

- “(3) *May be maintained in a natural condition or rehabilitated to reflect the natural condition of the bushland in the locality*
- (4) *May include environmental management features such as wetlands and water bodies where considered appropriate following detailed design*
- (5) *May include various forms of commercial recreation such as a golf course*

- (6) *Will be developed to replicate the natural landscape to the fullest extent possible while maintaining its recreational and engineering functions.*
- (7) *To be developed with a network of paths providing linkages between residential areas and community facilities, town park and employment centres.*
- (8) *May be developed with shelters, play structures, gazebos and park furniture.*
- (9) *Playing fields, multipurpose courts, indoor facilities, amenities for community use, car parking and terraced seating may also be developed in certain locations in accordance with the infrastructure agreement.”*

Any other land uses will generally not be acceptable.

Proposed land use activities within the Precinct include the following:

#### 6.2.1 Open space

The precinct will include a variety of landscape character areas, both formal and informal in purpose and design. This may include bushland areas, open, manicured grassland areas, landscape buffer areas, water bodies, wetlands and the like.

#### 6.2.2 Indicative Recreational Facilities Node

This node will form an integral component of any outdoor open space use of the precinct. It will be established to cater for a range of end users, most likely including a full range of clubhouse functions and related facilities.

Associated recreational facilities and carparking will be located within the precinct and in reasonably close proximity to the proposed local community facilities, situated outside the precinct.

### **6.3 Transport and Circulation System**

The Central Open Space Precinct is not intended to contain an internal public road network. Apart from an initial public entrance road, only private vehicular access will be provided within the Indicative Recreational Facilities Node and to other related facilities (eg. for maintenance purposes).

Vehicular access to any part of the precinct outside of the Indicative Recreational Facilities Node is generally limited to the following:

- (i) maintenance vehicles;
- (ii) emergency vehicles; and
- (iii) motorised golf carts, if proposed.

The major road crossing of the precinct by the North South Arterial Road and the proposed road providing access to the Indicative Recreational Facilities Node have been highlighted

on the Precinct Plan Map for completeness. However, consistent with the DCP, these items of infrastructure are not required to form part of the final Sector Plan Map.

As part of the overall transportation network for the DCP area, linkages across and adjacent to the precinct will be provided as previously discussed in sections 5.1.2 and 5.1.3 of this plan.

#### **6.4 Open Space and Landscape Concept**

Development of the precinct and its integration as part of the linear park system will be one of the first major stages of environmental protection and regeneration within the DCP area. Few remnants of the original ecosystem remain in the DCP area after decades of use as a commercial pine plantation, which was substantially harvested in the early 1990's. Patches of remnant melaleuca and eucalypts can be found in the low lying gully lines, however, these gullies could be enhanced so as to improve the open space links, habitat corridors and adequate stormwater retention.

The hydrology of the precinct will be maintained throughout the construction phase of development. Significant stands of vegetation will be retained, where practicable, and integrated into the overall landscape character of the precinct. Large quantities of additional natives will be planted, far outnumbering what currently exists within the precinct.

The landscape concept will be drawn from the regional landscape character and will include particular reference to the appropriate regional ecosystems. It will also reflect the landscape concepts adopted for the balance of the DCP area and will be consistent with the desired environmental outcomes of the development.

Figure 4 shows the Landscape Concept Plan for the precinct. Key principles to consider in the wider development context of the precinct are outlined below:

- (i) The design and development of the precinct for open space is to develop in accordance with the 'garden city' principles on which the Master Plan has been based. This translates as the close integration of urban development and landscape in order to create a garden city environment. This is particularly relevant at the interface between the urban and open space land use elements surrounding the precinct.
- (ii) The landscape design around the perimeter of the precinct will be developed to ensure that the surrounding urban development enjoys good exposure to the open space, while maintaining an internal sense of a predominantly landscaped enclosure along the open space corridors.
- (iii) The landscape theme of the precinct will be used to establish an impressive natural setting for the surrounding urban residential development.
- (iv) The predominant landscape concept for the precinct will combine areas of vegetation to merge with one another much as they do in nature. In contrast to the randomly planted, densely wooded edges, open landscape areas may be integrated as

part of the open space function of the precinct. These two elements will combine to establish the precinct's unique landscape character.

- (v) The re-establishment and management of continuous corridors of predominantly native trees, shrubs and grassland will enhance and may lead to expansion of the existing fauna and flora ecosystems. This landscape strategy will also provide natural outlooks from some of the roads and neighbourhood parkland of surrounding urban residential development. Planting predominantly native trees and shrubs will assist in recreating to the extent possible, the natural environment before the commercial pine forest activities commenced.
- (vi) The patchy remnants of paperbark and eucalypt plant communities within the precinct will be investigated and retained where practicable.
- (vii) Within the landscape concept plan for the open space will be a wide variety of plants and materials to emphasise form, texture and colour so as to create interest, contrast, mood, transitional space, and framed and screened views.
- (viii) Planting will also be used for functional purposes such as screening, shading and landscape buffers to adjoining residences.
- (ix) Plants that are known "environmental weeds" or that are likely to proliferate in natural areas will not be used.

## **6.5 Engineering Services**

### 6.5.1 General

The Principal Developer anticipates construction of the open space to be completed as soon as practically possible and ideally by about June 2002. Comprehensive investigations have been undertaken to determine the infrastructure requirements for this precinct. An overview of the findings of these investigations is provided below.

### 6.5.2 Sewerage

There are a number of options available to service the precinct. The facilities to be serviced within the precinct potentially include clubhouse and maintenance facilities and a range of related recreational and ancillary uses within the Indicative Recreational Facilities Node.

The preferred short term option to service facilities within this node is an interim pump station and rising main to discharge into newly completed infrastructure within North Lakes. This interim measure will be similar to that currently in operation for the adjacent Lakeside Residential Precinct.

The long term permanent solution will be to gravity discharge directly into sewerage mains planned for this sewer catchment in accordance with the MHIA.

### 6.5.3 Water Supply

Town water supply will be required to the facilities within the Indicative Recreational Facilities Node. It is envisaged that the precinct will be serviced by advanced construction of trunk mains designed for future surrounding urban residential development or initially by temporary mains which will become superseded as surrounding residential development is completed.

It is also intended that the opportunity for recycled water to be used for irrigation purposes within this precinct should be investigated.

### 6.5.4 Energy and Communications

Electricity supply will be provided by Energex or another authorised electricity supplier. The primary supply to the area will be determined by the provision of road access to the precinct. The precinct will be serviced by underground power to pad-mounted transformers located within the Indicative Recreational Facilities Node access road reserve and to the irrigation pump station. Temporary supply by overhead services may be provided but will require replacement by underground services when adjacent land is being developed.

Gas can be supplied from an existing gas main in Anzac Avenue. It will be provided by Origin Energy or another authorised service provider and will run as an underground supply in the road reserve.

Communications and cable services will be installed underground. Towers are not proposed to be located within this precinct.

### 6.5.5 Provision of Services for Adjacent Development

Provision of services at appropriate intervals across the precinct (i.e. in conjunction with pedestrian / cyclist / road crossings) will need to be made for engineering services connections to future adjacent urban residential areas. Physical and legal access to these services for operation and maintenance will be subject to the requirements of the relevant service authority.

## **6.6 Stormwater Management**

The Central Open Space Precinct contains two major stormwater flow paths, namely Tributary B and Tributary C. Both of these tributaries follow the DCP area's natural drainage pattern, draining stormwater flows into Saltwater Creek to the north and east of the precinct. A network of water bodies and stormwater filtration wetlands within the precinct and gross pollutant traps along the edges of the open space will be integrated into this continuous open space system. These devices are part of an overall stormwater management strategy to manage the impacts of development on stormwater flows and quality.

The water bodies, wetlands and other devices within the precinct are part of the system designed to achieve stormwater discharge quality standards. The water bodies and

associated wetlands will be constructed in conjunction with the overall construction of the precinct.

The Tributary B and Tributary C Stormwater Management Plans have already been submitted to Council in support of this precinct plan, and in accordance with the requirements of Section 9.6 of the Mango Hill Infrastructure Agreement (MHIA).

## **7.0 Design Intents and Performance Criteria**

The following general design intents and performance criteria have been developed for the open space, Indicative Recreational Facilities Node and the surrounding urban residential development interface:

### **7.1 Open space**

#### **7.1.1 Intent**

To provide open space which:

- (i) is conveniently located in relation to the wider community of the DCP area;
- (ii) is appropriately designed;
- (iii) is functionally and aesthetically integrated with other major open space elements of the DCP area;
- (iv) provides appropriate fencing, buffering or safety measures to protect both users of the open space and adjoining developments;
- (v) is in harmony with the natural environment;
- (vi) does not impact adversely on the surrounding predominantly urban residential development; and
- (vii) maximises the opportunity for open space – urban residential interface.

#### **7.1.2 Performance Indicators**

The intent may be achieved where:

- (i) The development brings an overall community benefit;
- (ii) The development enhances the existing or likely future amenity of the surrounding area;
- (iii) The design and character of the development is compatible with the likely future amenity of the surrounding urban residential areas; and
- (iv) Light fixtures, noise sources and buffer planting associated with outdoor recreational activities developed within the precinct are located and designed to minimise impacts on residential amenity which may potentially arise from glare and noise associated with any night time use, in order to avoid visual intrusion and to integrate into the open space setting.

## **7.2 Indicative Recreational Facilities Node**

### 7.2.1 Intent

To provide centrally located recreational and related facilities which:

- (i) are of an appropriate scale and design so as to not adversely impact on the open space and surrounding urban residential development; and
- (ii) enhance the sense of community “ownership” through the provision of a range of recreational and community related facilities in the Indicative Recreational Facilities Node which will complement community uses on the central local community facilities area identified in notional terms on the DCP Structure Plan.

### 7.2.2 Performance Indicators

The intent may be achieved where:

- (i) any buildings within the Indicative Recreational Facilities Node are of a suitable scale, low rise, horizontal character and sympathetic to the landscaped open space of the Central Open Space Precinct and surrounding predominantly urban residential character;
- (ii) access and parking facilities are appropriate for the outdoor recreational facilities and do not undermine the landscape values of the open space uses or the amenity of adjacent urban residential areas; and
- (iii) uses and light fixtures within the outdoor open space do not have an unreasonable impact on the amenity of adjacent residential areas, particularly through glare and noise associated with any night time use.
- (iv) Uses in the Indicative Recreation Facilities Node do not adversely impact on the open space and surrounding residential development.

## **7.3 Urban Residential Development Fronting the Central Open Space Precinct**

### 7.3.1 Intent

To provide for development fronting the open space which:

- (i) reflects a balanced approach to opportunities for the open space – urban residential interface;
- (ii) is sensitively designed in relation to the landscape character of the precinct;
- (iii) does not impact adversely on the operations of the open space uses of the precinct;
- (iv) is satisfactorily buffered from the recreational activities within the open space areas with respect to aesthetic, safety and amenity considerations; and
- (v) ensures that the safety for users of the pedestrian and cycle networks is not compromised.

### 7.3.2 Performance Indicators

The intent may be achieved where:

- (i) opportunities for views of the open space, from both adjoining residences and from the surrounding road network and park system, are optimised;
- (ii) the surrounding road system, access and car parking do not undermine the landscape values of the open space;
- (iii) any buildings surrounding the open space are of a suitable scale and character and sympathetic to the landscape qualities of the precinct.
- (iv) the pedestrian and cycle network aims to minimise conflict with vehicular traffic while not compromising the personal safety of the users of the network.

The design intents, performance indicators and development requirements for urban residential development fronting this precinct will need to be addressed in more detail in future precinct and sector plans for adjacent urban residential areas.

## **8.0 Environmental Management Objectives**

Development of the Central Open Space Precinct presents a range of environmental management issues that are required to be managed effectively throughout the design, construction and operational phases of any development of the precinct.

The objective will be to identify strategies for managing the key environmental risks occurring during both the construction and the operational phases of the development.

The following objectives and performance criteria provide a summary of the environmental issues that will, inter alia, need to be considered as part of the detailed planning and design for the open space and related facilities. These environmental requirements will need to be outlined in greater detail in the subsequent Sector Plan and Environmental Management Plans.

### **8.1 Design and Construction Phase**

Site management and development during the design and construction phase of any development within the precinct will address all requirements included in the Environmental Management Plans, including but not necessarily limited to the following key issues:



### 8.1.1 Earthworks Management

#### .1 Objectives

To adopt appropriate environmental management practices to avoid, or mitigate and manage, the potential adverse effects of earthworks and related land development activities

#### .2 Performance Indicators

- (i) Identify the extent of acceptable earthworks activities consistent with the protection of overall environmental values and prepare designs complying with these limitations.
- (ii) Erosion and Sediment Control - Implement appropriate soil erosion protection measures, monitor and maintain.
- (iii) Topsoil Management - Preserve this valuable resource as required in the development of the open space.
- (iv) Bulk Earthworks -Manage the excavation of water bodies and reshaping to establish the finished surface profile of the open space in a manner which is sensitive to the impact of the earthworks on the environment.
- (v) Fine Shaping -Establish the finished shape of the open space to achieve the intended design philosophy and in accordance with sound environmental management practices.
- (vi) Compliance with the Environmental Protection Act, Environmental Protection Policies and other relevant legislation from time to time.

### 8.1.2 Stormwater Management

#### .1 Objectives

- (i) To manage stormwater within and from the precinct so as not to cause a nuisance or annoyance to any person.
- (ii) To ensure that stormwater discharged from the precinct is an acceptable quality.
- (iii) To maintain flow regimes at the pre-development level.
- (iv) To permit discharge of stormwater from upstream catchments through the precinct.

#### .2 Performance Indicators

- (i) Implementation of management systems which seek to control the quality of surface water in compliance with:
  - (a) The Environmental Protection Act 1994 and the Environmental Protection Policy (Water) and other relevant legislation from time to time;

- (b) The planning scheme, local laws, the Design Manual and policies except where Clause 2.6 of the Mango Hill Infrastructure Agreement applies;
  - (c) The Mango Hill Infrastructure Agreement; and
  - (d) The performance objectives of the Saltwater Creek Catchment Management Plan.
  - (e) The Stormwater Management Plans for Tributary B and Tributary C
- (ii) Control of volumes and flows from this precinct for all storm events so as not to cause nuisance or annoyance to any person.

### 8.1.3 Nutrient Application and Run-Off Management

#### .1 Objectives

To ensure that water quality impacts from both the open space and surrounding urban development are satisfactorily controlled.

#### .2 Performance Indicators

- (i) Implement a combination of structural measures and management procedures, including limited and controlled application of fertilisers, herbicides and pesticides, use of natural organic materials, and implementation of filtration systems and constructed wetland systems.
- (ii) Implement staff training and monitoring measures to ensure wasteful over-fertilisation and detrimental impacts on water quality of receiving environments (i.e. Saltwater Creek and Hays Inlet) do not occur.
- (iii) Preparation of, compliance with, monitoring of and periodic review of Environmental Management Plans for Nutrient Application and Run-off Management.
- (iv) Compliance with the Environmental Protection Act, the Environmental Protection Policy (Water) and other relevant legislation from time to time.

### 8.1.4 Site Contamination

#### .1 Objective

To effectively manage instances of discovery or exposure of contaminated materials.

#### .2 Performance Indicators

- (i) Establish and implement an Environmental Management Plan for use in the discovery or exposure of contaminated materials.

- (ii) Compliance with the Environmental Protection Act and other relevant legislation from time to time.

#### 8.1.5 Acid Sulfate Soils

##### .1 Objective

To protect environmental values from the effects of acid sulfate soils and attain acceptable surface water quality of the receiving environment.

##### .2 Performance Indicators

- (i) Undertake investigations to determine if these soil types exist.
- (ii) Protect water within and downstream of the Precinct including Saltwater Creek and Hays Inlet from adverse impacts of acid sulfate soils within the Precinct.
- (iii) If required, preparation of, compliance with, monitoring of and periodic review of Environmental Management Plans for Acid Sulfate Soils.
- (v) Compliance with the Environmental Protection Policy (Water) and other relevant legislation from time to time.

#### 8.1.6 Air Quality

##### .1 Objective

To minimise the effects of traffic and construction works on air quality.

##### .2 Performance Indicator

Adopt effective air pollution mitigation measures to comply with the Environmental Protection Act, Environmental Protection Policy (Air) and other relevant legislation from time to time in relation to dust, smoke, fumes and gases.

#### 8.1.7 Acoustic Conditions

##### .1 Objective

To minimise noise effects of traffic and construction activities on urban residential areas.

.2 Performance Indicator

Implement effective noise mitigation measures to comply with the Environmental Protection Act, Environmental Protection Policy (Noise) and other relevant legislation from time to time.

8.1.8 Dirt/Mud on Public Roads

.1 Objective

To minimise site-generated dirt / mud on public roads, particularly after rain periods.

.2 Performance Indicators

Implement management and maintenance actions in accordance with Best Management Practice.

8.1.9 Flora and Fauna

.1 Objective

To identify stands of native vegetation and associated fauna habitats to be retained, wherever practicable, and implement protective measures, when undertaking development works.

.2 Performance Indicators

- (i) Preserve and rehabilitate, wherever practicable, significant stands of remnant vegetation.
- (ii) Implement measures during the design and construction works to preserve the local conditions and natural systems which are important to the survival of existing stands of vegetation and any identified habitat areas, including that of the Vulnerable Species, the *Crinia tinnula* (Wallum Froglet) and any other identified vulnerable species.

## 8.2 Operational Phase

The operational phase will commence from the completion of construction (estimated to be June 2002 as outlined in Section 10), and will address the following issues:-

### 8.2.1 Stormwater Management

#### 1. Objectives

- (i) To manage stormwater within and from the precinct so as not to cause a nuisance or annoyance to any person.
- (ii) To ensure that stormwater discharge from the precinct is an acceptable quality.
- (iii) To maintain flow regimes at the pre-development level.
- (iv) To permit discharge of stormwater from upstream catchments through the precinct in accordance with the MHIA and the relevant Stormwater Management Plan.

#### .2 Performance Indicators

- (i) Implementation of management systems which seek to control the quality of surface water in compliance with:
  - (a) The Environmental Protection Act 1994 and the Environmental Protection Policy (Water) and other relevant legislation from time to time;
  - (b) The planning scheme, local laws, the Design Manual and policies except where Clause 2.6 of the Mango Hill Infrastructure Agreement applies;
  - (c) The Mango Hill Infrastructure Agreement;
  - (d) The performance objectives of the Saltwater Creek Catchment Management Plan.
  - (e) The Stormwater Management Plans for Tributary B and Tributary C.
- (ii) Control of volumes and flows from the precinct for all storm events so as not to cause nuisance or annoyance to any person.

### 8.2.2 Nutrient Application and Run-off Management

#### .1 Objective

To ensure that water quality impacts from both the open space and surrounding urban development are satisfactory controlled.

.2 Performance Indicators

- (i) Implement a combination of structural measures and management procedures, including limited and controlled application of fertilisers, herbicides and pesticides, use of natural organic materials, and implementation of filtration systems and constructed wetland systems.
- (ii) Implement best practice staff training and monitoring measures to ensure wasteful over-fertilisation and detrimental impacts on water quality of receiving environments (ie. Saltwater Creek and Hays Inlet) do not occur.
- (iii) Preparation of, compliance with, monitoring of and periodic review of Environmental Management Plans for Nutrient Application and Run-Off Management.
- (iv) Compliance with the Environmental Protection Act, the Environmental Protection Policy (Water) and other relevant legislation from time to time.

8.2.3 Use of Recycled Water for Irrigation

.1 Objective

To potentially utilise recycled water for irrigation of open space in a manner, which protects the environment and public health.

.2 Performance Indicators

- (i) Source the recycled water from Council, pump it to the precinct and make provisions to temporarily store the recycled water on-site prior to controlled distribution and spraying onto internal open space areas.
- (ii) Manage the use of the recycled water to produce best results for the open space and to minimise the risks of impacts on surrounding urban residential areas and uncontrolled mixing in the event of major and minor storm events.
- (iii) Preparation of, compliance with, monitoring of and periodic review of Environmental Management Plans for Nutrient Application of Run-Off Management.
- (iv) Compliance with the Environmental Protection Act, the Environmental Protection Policy (Water) and other relevant legislation from time to time.
- (v) Compliance with State Government and Council requirements for the protection of public health in relation to irrigation of recycled water.

#### 8.2.4 Flora and Fauna

##### .1 Objectives

- (i) To re-establish, where practicable, interconnected stands of predominantly native vegetation.
- (ii) To re-establish, where practicable, fauna habitats and wildlife corridors which were significantly impacted by the previous commercial pine harvesting operations.
- (iii) To protect and manage the habitat of the Vulnerable Species, the *Crinia tinnula* (Wallam Froglet) and any other identified vulnerable species.

##### .2 Performance Indicators

- (i) Enhance retained areas of significant vegetation with supplementary plantings of locally indigenous species.
- (ii) Establish protective vegetation buffers between open space and surrounding urban residential areas.
- (iii) Wherever practicable, establish continuous vegetation links of sufficient sustainable width at all forest levels (eg. understory, mid-storey and canopy) in order to encourage habitat areas and wildlife corridors which connect with other parts of the DCP area linear open space and the regional open space network.

#### 8.2.5 Lighting

##### .1 Objective

To ensure that lighting associated with development, eg. night lighting of outdoor recreational activity areas and of facilities within the Indicative Recreational Facilities Node, does not create a nuisance.

##### .2 Performance Indicators

Implement design elements, buffer treatments and curfew hours to control the obtrusive effects of outdoor lighting.

#### 8.2.6 Noise

##### .1 Objective

To ensure that noise associated with the open space and associated facilities, including maintenance activities does not create a nuisance.

## .2 Performance Indicators

Implement effective noise mitigation measures, including the use of landscape buffers and segregation of incompatible land uses (e.g. maintenance facilities) from residential areas, which meet Environmental Protection Policy (Noise) standards and accord with relevant Council policies.

## **9.0 Special Design Criteria**

During the course of development and as contemplated by the DCP, variations to Council's existing development standards are anticipated and will be considered on their technical merits with reference to the intents and performance criteria outlined in the above sections. Technical details and supporting information on design variances will be recorded in Council's *North Lakes Register of Alternative Acceptable Design Solutions*.

## **10.0 Infrastructure Obligations of the Principal Developer**

### **10.1 Overview of Infrastructure Obligations**

The infrastructure items required to be provided by the principal developer to serve this precinct are roads, water, sewerage, stormwater, parks, electricity and communications as required by the MHIA. State infrastructure which will be affected by development in this precinct is the North South Arterial Road as to which the provisions of the MHIA - Main Roads and MHIA - Queensland Transport are to be referred. The infrastructure to be provided in the precinct may be summarised as follows:

#### **10.1.1 Roads**

Road access to this precinct will ultimately be provided by a number of roads, which will be constructed as part of the final form of development of the DCP area. In particular, a road running from the Indicative Recreational Facilities Node in the northern part of the DCP area will connect with the extension of Discovery Drive. In the interim, pending development of the urban residential areas in the northern part of the DCP area, a road connecting from the Indicative Recreational Facilities Node to the extension of Discovery Drive further to the south may be provided, as shown indicatively on Figure 3. The alignment and design standard for the ultimate road system will be dependent on the final form of development proposed in Sector Plans for development to be serviced by these roads. The alignments and design standards for all roads accessing the Indicative Recreational Facilities Node are to be located so as to not cause any environmental harm.

The principal developer's obligations for road construction will be (unless already constructed) to construct the following roads, including carriageways, stormwater drainage, verges, bus setdowns, footpaths, bikeways, landscaping, traffic control devices and street lighting. Any reference to initial construction in this section is a



reference to construction approved by Council in accordance with the rezoning conditions and the MHIA. The principal developer is to construct:-

- .1 An extension of Discovery Drive north to the proposed intersection with the road in 10.1.1.2.
- .2 A road from Discovery Drive to the Indicative Recreational Facilities Node, as shown indicatively on Figure 3, Precinct Plan Map.
- .3 That part of the North South Arterial Road which crosses the Precinct, being a four lane median divided road with provision for a public transport corridor in accordance with the MHIA. It is intended to create legal access lot below the proposed level of the road for use as a tunnel for access between lots forming part of development of the precinct. The tunnel is to be constructed by the principal developer to accommodate the final standard for the North South Arterial Road. The intermediate standard of construction of the North South Arterial Road and associated tunnel will be a two lane standard road.
- .4 An intersection at the point where Discovery Drive crosses the North South Arterial Road to be developed at the time of construction of the North South Arterial Road and in accordance with the MHIA (see Figure 5).
- .5 Roadways and pathways under the North South Arterial Road to permit vehicular/pedestrian/ cyclist / motorised cart access with provision for the extension of Copeland Drive.
- .6 Bikeways and pathways in accordance with the MHIA.

The abovementioned infrastructure is to be constructed to the standard required by the MHIA. Construction of the initial access road to the Indicative Recreation Facilities Node must be undertaken prior to the operational phase of the development in the precinct commencing. Construction of the road further to the north is dependent on the rate of development of precincts to the north of North South Arterial Road and subject to the MHIA. Construction of the North South Arterial Road must be undertaken when the roads of which they form part are constructed in accordance with the MHIA. However earthworks and the grade separated structure for the intermediate standard of the North South Arterial Road through the Precinct is to be constructed prior to the operational phase of the development in the precinct commencing.

The construction of the abovementioned infrastructure to the final standard is to be undertaken in accordance with the staging and timing outlined in the MHIA. The initial standard of construction referred to above will be undertaken to suit the rate of development of the precinct. Where initial construction is not stated, the road is to be constructed to the standard described above to suit the rate of development of the precinct.

### 10.1.2 Water

The Principal Developer is to:

- .1 Construct an internal reticulation system to service the development within the Indicative Recreational Facilities Node.
- .2 If not already constructed, construct a connection at node 89 as shown on Figure 6.
- .3 Construct trunk main sections 89 to 83C to 83E and 83E to 83D and connect to section 83D to 83H in a staged manner to suit the rate of development, all as shown on plan 5/2 in the MHIA.
- .4 Provide contributions towards water headworks and bulk water supply in accordance with the MHIA.
- .5 If available and appropriate, use recycled water supplied by Council.

### 10.1.3 Sewerage

The Principal Developer is to:

- .1 As an interim measure, construct a Temporary Pump Station (TPS) approximately at the junction of TM4A and TM4B as shown on plan 6/1 of the MHIA (see Figure 7).
- .2 Construct a temporary rising main from the TPS to connect to TMI
- .3 Prior to the capacity of TMI reaching 11976EP, construct TM4, GTS4, PS2 and RM2 and connect the precinct to this network.
- .4 Construct internal sewerage systems to service the precinct.
- .5 Construct or make provision for the future construction of all trunk mains and sewers required to be installed in the Precinct.
- .6 Make contributions towards sewerage headworks in accordance with the MHIA.

### 10.1.4 Stormwater

The Principal Developer must:

- .1 Comply with the provisions of the Stormwater Management Plans for Tributary B and Tributary C as approved by council, and construct stormwater management works so far as they relate to this precinct.

- .2 Construct stormwater drainage systems as required by the MHIA to access roads and development in the precinct.

#### 10.1.5 Park

The Principal Developer must:

- .1 Provide parks throughout the DCP area as set out in the DCP and the MHIA, and those areas to be transferred to the Crown for use as park are to be specified in the sector plan.
- .2 Undertake Park Enhancement works in land to be transferred to the Crown for use as park and provide these works in accordance with the provisions of the MHIA.

#### 10.1.6 Electricity Supply and Lighting

The Principal Developer must:

- .1 Provide underground electricity distribution as required to development within the precinct to Energex or another authorised supplier of electricity and Council standards.
- .2 Provide external lighting to access roads and facilities within the Indicative Recreational Facilities Node of the precinct to Energex or another authorised supplier of electricity and Council standards.
- .3 Provide high voltage electricity services to service the precinct to Energex or another authorised supplier of electricity and Council standards.
- .4 Provide lighting to footpaths, bikeways and roads within the Precinct to Energex or another authorised supplier of electricity and Council standards.

#### 10.1.7 Communications

The Principal Developer must:

- .1 Arrange for the installation of underground telephone and communications services as required for development within the precinct.

### **10.2 State Government Infrastructure Requirements**

- 10.2.1 State Government Infrastructure to be provided by the principal developer in conjunction with the development of the precinct includes any aspects of construction on the North South Arterial Road provided for in Infrastructure Agreements with the Department of Main Roads and Queensland Transport.

### **10.3 Infrastructure Affected by Precinct Development**

10.3.1 The development of this precinct may place demands on the following infrastructure:

- .1 Roads external to the DCP area and accessing the precinct;
- .2 Water supply infrastructure;
- .3 Sewerage infrastructure;
- .4 Stormwater infrastructure;
- .5 Parks;
- .6 Community facilities;
- .7 Electricity supply;
- .8 Communication systems; and
- .9 State Government infrastructure.

10.3.2 The infrastructure items described in clause 10.1, together with the obligations of the principal developer under the MHIA, are required to mitigate the adverse affect on those items of infrastructure which are affected by, or required as a result of, the development of the precinct.

### **10.4 How the Required Infrastructure Relates to the Infrastructure Agreements**

10.4.1 The MHIA describes the infrastructure, which must be provided by the principal developer in accordance with its obligations as envisaged by chapter 12 of the DCP. The works described in clause 10.1 are the principal developer's obligations under the MHIA in so far as they relate to this precinct.

10.4.2 Infrastructure Agreements have been entered into by the principal developer with the Department of Main Roads and Queensland Transport. Any infrastructure requirements of those State Government departments relating to this precinct will be provided in accordance with the existing agreements.

### **10.5 Preliminary Program for Infrastructure Provision**

10.5.1 Subject to Clause 10.1, the MHIA and Development Approvals which may be issued from time to time, the Principal Developer anticipates infrastructure to be provided in accordance with the following timetable.

- .1 The extension of Discovery Drive and the road referred to in clause 10.1.1.2 will be constructed at or about the same time as development in the precinct occurs which is anticipated in December 2001.
- .2 Completion of the construction of that part of the North South Arterial Road crossing the precinct will be constructed at the time when adjoining sections of the road are constructed which is anticipated in June 2004 or as required by the MHIA.
- .3 Construction of trunk water mains in a staged manner are anticipated to be completed by December 2001.

- .4 Internal water reticulation is to be provided at the time development commences in the precinct which is anticipated by June 2002.
  - .5 The temporary sewerage system is to be provided in conjunction with commencement of the operational phase of the development within the precinct which is anticipated by June 2002.
  - .6 Construction of the permanent sewerage system which is anticipated by June 2006.
  - .7 Construction of stormwater works provided in conjunction with the development within the precinct, which is anticipated by June 2002.
- 10.5.2 Except as described elsewhere in this section, no other works depend on the provision of this infrastructure.
- 10.5.3 Council is to use its best endeavours, including its powers of resumption if lawful, to obtain all necessary rights to permit the construction of water and sewerage infrastructure if such infrastructure is constructed on land external to the DCP area over which Council does not have such rights.

## **10.6 Water and Sewerage Demands**

10.6.1 As required by the MHIA, the principal developer states as follows:

- .1 For the purpose of assessing water supply capacity, the estimated number of Equivalent Tenements for this sector is 33.25 ET.
- .2 For the purpose of assessing sewerage capacity, the estimated number of Equivalent Persons for this sector is 57.5 ET.