PART 5A RESOURCE MANAGEMENT STRATEGY

OUTLINE AND RATIONALE

5A.1 STRATEGY OUTLINE

The resource management strategy for Papakura District places priority upon the conservation and enhancement of the natural and physical resources of the District and the enablement of its community. The special values of the urban and rural landscape, ecological features, heritage resources, local amenity, and the role and future of the commercial precincts and the regional importance of mineral resources are matters recognised in this Plan. The integrated use, development and protection of these resources is provided for in a comprehensive manner which recognises the interrelationships of activities with each other and with the environment.

The strategy embraced by the provisions of this District Plan is to:

> *conserve and enhance those qualities which make Papakura District a distinctive and growing component of Auckland and the southern sub-region and a desirable place to live and work.*

The elements of the strategy include:

1. *The protection and conservation of components of the natural environment such as native bush, the coastline, rivers and streams, ridgelines, habitats and ecosystems;*

2. *The management of the urban areas of the District such that the rural/urban nature of the District is retained and the quality of the coastline and both the quality and quantity of the water resources of the District are protected;*

3. *The encouragement of urban intensification and mixed use development within the Central Area with complementary areas of open space and the directing of new urban expansion to future urban areas identified in Appendix One or Schedule 1 to the RPS timed to include appropriately sized mixed-use nodes to complement and support those growth areas, and by enabling (where appropriate) commercial activities in other locations (in particular neighbourhood centres and other corridors), having regard to Policy 2.6.5 of the RPS;*

4. *The use of zoning and performance standards (and other methods including structure plans) to manage the effects of activities and secure amenity and heritage values throughout the District;*

5. *The adoption of planning techniques to recognise the unique quality, role and potential of the Central Business Area and to achieve the objectives of the Auckland Regional Policy Statement, Regional Growth Strategy and Regional Land Transport Strategy.*

6. *The adoption of planning techniques to recognise the need to protect regionally significant mineral resources located within the District and to*

achieve the objectives if the Auckland Regional Policy Statement in this regard;

7. *The particular zoning of land at Takanini and Hingaia to achieve greater urban intensification specifically near transportation nodes and mixed use development for urban purposes in accordance with evolving community needs which includes the provision of essential services to support these communities and responsible resource management;*

8. *Implementing the recommendations of the Papakura Economic Development Strategy (2007) including the development of a new "heavy construction cluster" and "logistics hub" within the District. The strategy of zoning land at Drury South adjacent to the Drury Quarry for Land Extensive Industrial Activities (including construction, warehousing and distribution and manufacturing activities) will assist in implementing these recommendations.*

9. *The formulation of a District wide waste management policy which incorporates systems, procedures and facilities consistent with the needs of the community;*

10. *The imposition of development impact fees at a level which fairly reflects the cost and benefits to the community of development;*

11. *The monitoring of the quality and quantity of the resources of the District to ensure the achievement of the Council's statutory task of sustainable resource management; and*

12. *The gathering and recording of information about resource management.*

13. *The encouragement of the protection and enhancement of identified ecological and open space linkages through the District;*

14. *The management of growth within the rural parts of the District in accordance with Regional Growth policies in a manner which results in environmental enhancement;*

15. *The management of land use, subdivision and development in identified areas of landscape value to ensure that the landscape values of the District are maintained and enhanced;*

16. *The management of land use, subdivision and development in Takanini and the Hingaia Peninsula so as to ensure that the integrity of the structure plans prepared for these areas is maintained.*

5A.2 THE RATIONALE

The Regional Policy Statement and the growth concept of the Auckland Regional Growth Strategy identify the values of the people who live in the Auckland region and the way they want to live in the future. It establishes principles to manage growth to retain these values and future regional opportunities. The Regional Land Transport Strategy recognises the need for and promotes integrated land use and transportation planning.

The resource management objectives, policies and rules set out in this District Plan are founded on the clear wish of the community to retain the present levels of environmental quality of the District and, where possible, enable actions and responses which will enhance this amenity, having regard to the Regional Policy Statement, Regional Growth Strategy and Regional Land Transport Strategy.

By way of a hierarchy of objectives, policies and rules, the overall goal for Papakura District as articulated in the vision statement may be achieved in a manner consistent with community aspirations. The Plan seeks to translate basic community values and aspirations for the management of the natural and physical resources of the District into understandable objectives and policies and workable rules in a way which benefits the wider community and leaves a suitable legacy for future generations.

Papakura has special meaning for its citizens and through the provisions of the Plan the Council aims to conserve those elements of the District which give Papakura its particular identity and which contribute to the qualities which enhance it as a place to live and visit. The provisions of the Plan are designed to produce quality development which will secure appropriate living, business and heritage opportunities for the future.

Papakura is a place where people live, work and enjoy recreation. A fundamental outcome sought through the planning process is the realisation of the basic needs of people and the freedom to allow a wide variety of lifestyles. The development of a range of living environments across the District is sought in order to cater to the housing needs of the population. It is envisaged that a wide spectrum of housing choice may develop ranging from conventional suburban dwellings located on their own "section" to more intensive styles of multi-unit development. Those choices which produced the development of the present will be protected and enhanced in appropriate locations.

Papakura District is home to an increasingly diverse mix of cultures. The Auckland Region is multi-cultural and this cultural diversity has flowed through to Papakura and adds dimension and richness to the community. The provisions of this Plan give the widest opportunity to the different cultural groups to express the unique significant elements of their culture.

Particular recognition is given to Maori and their special status as tangata whenua. This status will be given substance through the tangible recognition of the Maori contribution to the heritage of the District and the involvement of tangata whenua in the decision making process where proposals impact upon things significant to Maori.

The conservation and preservation of significant elements of the natural environment is an essential component of this District Plan. These elements include those distinctive parts of the natural environment which form part of the heritage of the District and include the coastline, the Hunua Ranges identified Significant Natural Areas, rivers and streams, and specific habitats as well as open-space recreation areas. As most components of the natural environment of the District are utilised by the community, the maintenance of environmental values has a direct relevance in retaining and enhancing the overall amenity of Papakura as a place to live and work.

There is additional economic benefit to accrue from a strategy of conservation. Such places contribute to the attraction of the District as a destination for visitors.

Moreover, the contribution which such aspects make to the overall "quality of life" of Papakura which make it an attractive location for businesses must be fostered. Thus, the health of such areas is seen as intrinsic to the overall economic health of Papakura.

This District Plan acknowledges the importance of industry and commerce to the long term viability of Papakura and seeks to create a regulatory climate which maximises the ability of commerce to take advantage of economic opportunities. The Auckland Regional Growth Forum recognises the importance of Central Papakura as a key sub-regional centre and encourages more intensive and greater mixed use development. Both the District Plan and the Regional Policy Statement recognise the importance of mineral resources to the economic and social wellbeing of the District and Region. In particular, the availability of readily accessible aggregate resources is essential to the ongoing provision of regional infrastructure, notably new roading activities.

With the exclusion of locationally fixed natural resources, the evolution of technology allows for a flexible approach to the location of much industry today. The District Plan does not direct the growth of business and industry but rather lays down the environmental ground rules by which commerce and industry must abide. These ground rules are focused on the management of the effects which such activities may have on their surroundings rather than seeking the arbitrary segregation of activities based on assumptions about their impacts.

The flexibility of a planning approach based on effects offers business and industry much more opportunity to focus locational decision-making on achieving efficiencies through the choice of sites which maximise return and offer economies. It is anticipated that there will be a lessening of the agglomeration of like land uses which results from activity-based patterns of zones and a move towards greater mixed land use as promoted in the Regional Growth Strategy.

It is also anticipated that locational decisions made under such a regime will result in efficiency gains in the use of transport and infrastructure. The provisions of the Plan offer the prospect of linked manufacturing and retailing functions locating on the same or adjacent sites, or location of innocuous service activities within traditional residential areas, thus minimising transport costs and traffic movements.

An underlying intent of this District Plan is to ensure the maintenance of an efficient infrastructure for communication within the District. The importance of securing a high level of access to services and community facilities such as health and educational facilities is fundamental to the well-being of the people of the District and the continued provision of efficient and effective transportation systems and networks is essential to the sustainability of the economic fabric of the city.

The end point for the District Plan is to set out the stage for people and businesses to carry on their lives in an environment which maximises their ability to realise their personal, cultural and business aspirations in a way that does not detract from the ability of others to do the same and which affords later generations the same level of opportunity.

5A.3 THE OBJECTIVES

The overall objectives of the Council directed at achieving the sustainable management of the resources of the District and which underpin the strategy are:

1.0 Natural Environment and Resources

1.1 To conserve, protect and enhance the natural environment of the District.

1.2 To conserve the resources of the District in order to meet the present and on-going needs of the community.

1.3 To protect the resources of the District from any adverse effects of activities and development.

1.4 To protect, preserve and enhance significant habitats and flora.

1.5 To conserve significant landscape features of the District.

1.6 To conserve significant features of the coastline.

1.7 To protect views of the coast from the land and to secure public access around the coastline and waterways of the District, except where the Council is satisfied that restrictions on that access are necessary to protect Maori cultural values or conservation values.

1.8 To protect the quality of water from the catchment areas of the District.

1.9 To protect the natural environment through the promotion of a compact, integrated and quality urban form.

1.10 To protect and enhance the riparian margins of watercourses within the rural areas of the District.

1.11 To protect and enhance identified ecological and open space networks throughout the District.

2.0 Built Environment and Heritage

2.1 To retain and enhance the amenity of the District.

2.2 To protect and conserve significant items of cultural heritage.

2.3 To achieve compact, contained and quality urban growth through encouraging the intensification of activities in the Central Area, and through controlled expansion of the greenfields urban areas at Takanini and Hingaia and other areas identified in the Schedule in Appendix One or Schedule 1 to the RPS, and by enabling commercial activities in other areas (particularly neighbourhood centres and other corridors), where appropriate, having regard to Policy 2.6.5 of the RPS.

2.4 To improve the quality of the built environment while providing for further growth in activities.

2.5 To maximise the use of the existing built environment.

2.6 To give particular recognition to taonga.

2.7 To provide a range of residential and mixed use zonings in the District to enhance the variety of living environments, and to support the intensification of the urban area, especially in the Central Area, Takanini and Hingaia.

2.8 To enable development which :

a) supports a reduction in the number of vehicle trips where practicable and appropriate, or alternatively;

b) supports the efficient use of main transport corridors,

c) and supports a variety of transport modes.

3.0 Rural Land and Lifestyle Opportunities

3.1 To retain the character of the rural areas of the District.

3.2 To provide for a range of rural lifestyles.

3.3 To manage growth within the rural areas in a manner which is consistent with the Auckland Regional Growth Strategy and the Auckland Regional Policy Statement.

3.4 To encourage the environmental protection and enhancement of natural features upon the subdivision of rural land.

4.0 Community

4.1 To achieve a healthy and safe living environment for the community.

4.2 To enable the community to provide for its wellbeing within the District in terms of appropriate local access to services, goods and employment opportunities.

4.3 To allow for the development of a range of residential neighbourhoods and environments.

4.4 To protect and enhance residential amenities.

4.5 To recognise the status of the tangata whenua and provide for their interests.

4.6 To facilitate the wide use and provision of community resources and facilities.

4.7 To enable the development of community identity and distinctiveness.

4.8 To allow flexible resource management without adversely impacting on neighbouring properties.

5.0 Commerce and Industry

5.1 To ensure that the distribution of commercial development within the District recognises the present and future evolving roles of the Papakura Central Business Area as a sub-regional centre (a status accorded to the Central Business Area in the Auckland Regional Growth Strategy) and RPS.

5.2 To enable commercial activities to locate in the areas identified in the Schedule in Appendix One or Schedule 1 to the RPS, and in other areas (particularly neighbourhood centres and other corridors), where appropriate, having regard to Policy 2.6.5 of the RPS.

5.3 To apply appropriate zoning provisions for the new growth locations including for Land Extensive Industrial Activities in Drury South.

5.4 To enable economic growth and development which does not compromise environmental values.

5.5 To enable economic activities which maintain and enhance the qualities of the District.

5.6 To maintain and enhance the qualities of the District which contribute to its attractiveness for commerce and industry.

5.7 To protect the resources of the District which encourage visitors.

5.8 To allow for the establishment of imaginative and productive business activities.

5.9 To recognise and protect those natural resources (including mineral resources) of the District which contribute to the economic wellbeing of the district and region and to the provision of regional and district infrastructural requirements.

6.0 Infrastructure

6.1 To improve levels of infrastructure to meet the needs of the community, including public transport related facilities and new pedestrian, cycling and road links required for improved connectivity.

6.2 To enable activities and development which recognise servicing constraints.

6.3 To monitor the development of Papakura so that the requirements of growth may be balanced with the environmental capacity of the District.

6.4 To allow for the undertaking of services in accordance with the principles of environmental protection and enhancement.

6.5 To protect the safe and efficient operation of existing utilities and people's amenity, health and safety by ensuring that the design and undertaking of new development recognises known risks to and from existing physical infrastructure resources.

6.6 To provide improved levels in infrastructure to meet the needs of business within the District.

6.7 To recognise that regionally significant infrastructure (including infrastructure corridors) represent an important strategic asset that should not be compromised by urban growth.

6.8 To manage growth to ensure that the operation of infrastructure (including infrastructure corridors) and the current and future operation of regionally significant infrastructure, is not compromised.

6.9 To ensure that infrastructure providers take reasonable and practicable steps to avoid adverse effects on neighbouring land uses.

6.10 To avoid or mitigate conflicts or incompatibility (including reverse sensitivity effects) between new land uses and both existing and known or planned regionally significant infrastructure (including major transport corridors).

7.0 Transport and Land Use Integration

7.1 To ensure the integration of land use and transport infrastructure.

7.2 To integrate land use, transport and infrastructure provision to support a compact and contained urban form.

7.3 To ensure that the continued development of the transport network is not compromised by inappropriate land use or subdivision.

7.4 To facilitate integrated transport management and a multi-modal transport network.

Appendix One – Schedule of Papakura Growth Areas

The following Schedule is based upon the Southern Sector Agreement 2001, prepared under the Auckland Regional Growth Strategy 1999.

See the attached map for the location of the areas listed in the Table.

Growth Area	Comments	Timing of Proposed Plan Changes
Central Area	Intensification of business and residential activities	Operative in 2006
Takanini 1b	Residential development	Operative in 2005
Takanini 1a	Mixed use development and a neighbourhood centre	Notified in 2006
Takanini 2a, part 2b	Residential area	Operative in 2010
Takanini part 2b, 2c	Future residential area	Operative in 2010
Takanini 3	Future development area	Operative in 2007
Takaninin 6a, 6b	Future business area	Notified in 2008
Takanini – Spartan Road	Business area already within MUL	On-going
Takanini – remaining areas 4,5,7,8,9 & 10	Future development area	2020+
Hingaia – Stage One Hingaia East	Mixed residential area, mixed use and a neighbourhood centre	Stage 1A Operative in 2006
Hingaia – Future Stage – Pararekau Island	Countryside Living	2005-2010 Notified in 2009
Hingaia – Remaining areas	Future development – mix of business and different forms of residential development	2020+
Hingaia – Stage 2	Future Development – mix of business and different forms of residential development	2015+

NOTE:

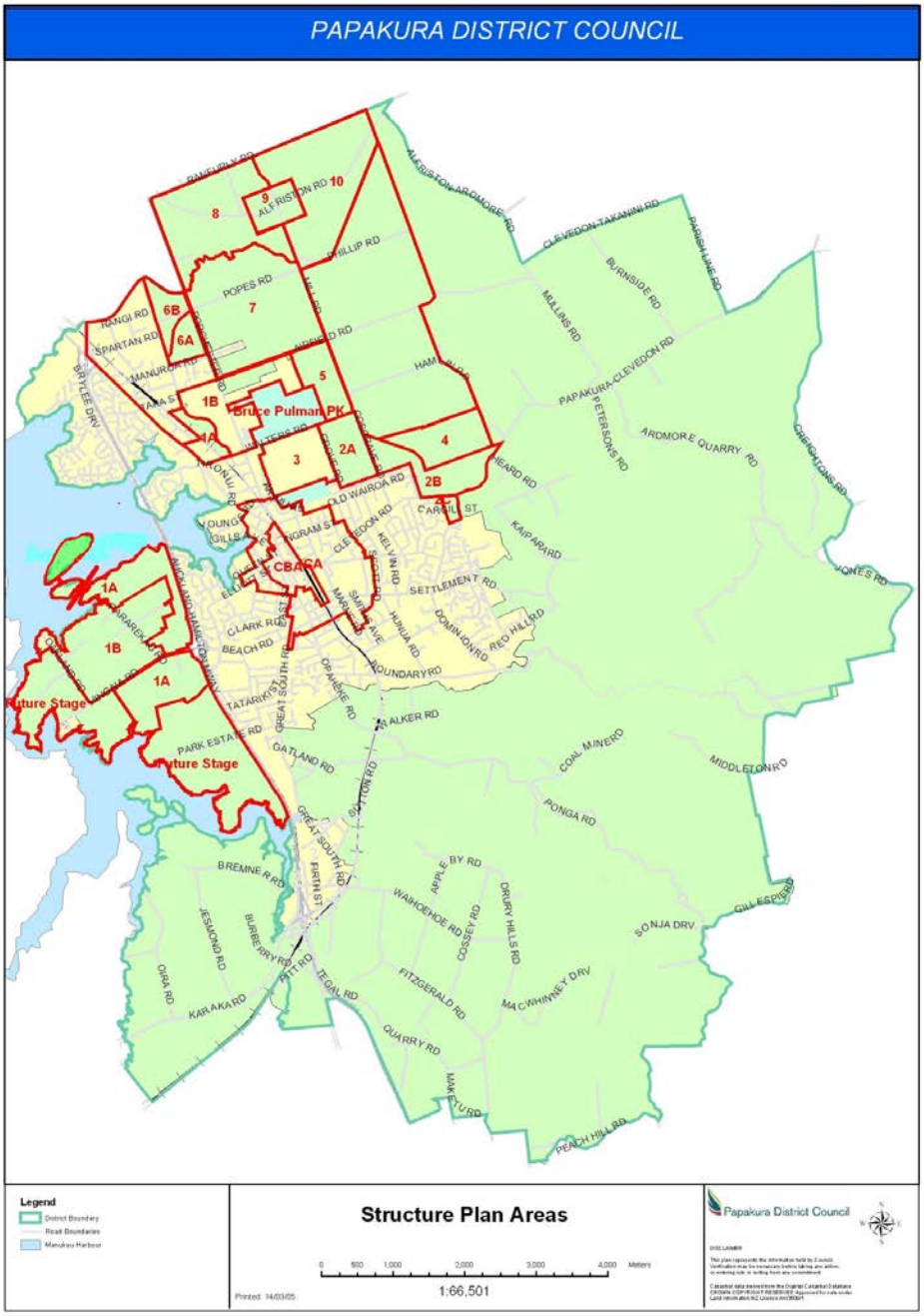
(i) The timing of the district plan change for Hingaia Stage 2 has been brought forward in recognition of the need to provide business land in the Auckland region, particularly for appropriately zoned land to accommodate Land Extensive Industrial Activities. Before a district plan change can be advanced, further assessment needs to occur to address any issues associated with environmental effects and the cost and timing of infrastructure provision, including upgrades to the transport network.

(ii) For clarity it is recorded that Pararekau and Kopuahingahinga Islands do not form part of Hingaia Stage 2.

(iii) The growth areas in Appendix 1 may include neighbourhood centres as defined in Appendix D of the RPS. In the context of the Papakura district these centres play an important role to accommodate commercial activity to meet the needs of the surrounding local community. The District Plan encourages commercial activity in neighbourhood centres but does not seek to elevate all of them to High Density

Centres within the Regional context. This managed flexibility gives effect to the RPS in the specific context of Papakura district.

Figure One: Structure Plan Areas



PART 5B STRUCTURE PLAN AREAS

5B.1 INTRODUCTION

Part 5B of Section One and Parts 16 and 17 of Section Three of the District Plan sets out the provisions for urban growth and countryside living in the following areas:

1. Takanini Structure Plan Area, including Area 1b.
2. Hingaia Structure Plan.

Part 5B.4 includes a structure plan for the development of the Drury South Industrial Area.

The 1999 Auckland Regional Growth Strategy anticipated an additional one million people to be accommodated within the Auckland Region by 2050. Approximately 70% of the population increase would need to be accommodated within the existing metropolitan urban limits and the balance in greenfield areas.

The strategy focuses most urban growth around centres, or nodes of varying sizes, which are located along primary passenger transport corridors. The strategy also seeks to focus growth in locations with good access to passenger transport such as Takanini.

The strategy allocates considerable growth to the Papakura area which takes the form of new settlements in Takanini and Hingaia as well as intensification of the existing Papakura Town Centre and urban area. The strategy envisages the population of Papakura District increasing from a 1996 base of 40,000 to around 95A(4),000 by 2050, representing an increase of 135%. This growth will comprise an additional 17,000 in the existing urban area, 2000 in the rural areas, and 30,000 in the proposed new settlements of Takanini (20,000) and Hingaia (10,000).

The strategy did not adequately address the shortage of land suitable for "Land Extensive Industrial Activities" (i.e. activities such as manufacturing, construction, wholesale trade, transport and storage, warehousing and distribution). Recent industrial land capacity studies in the southern sector of the region indicate a significant future shortfall of industrial land to accommodate projected workforce increases in the sector.

The Drury South Structure Plan Area is strategically well located to address this shortfall while also addressing the need to protect the future functioning of the Drury Quarry and deliver on the former Papakura District Council's Economic Development Strategy which sought the development of a "heavy construction cluster" and "logistics hub" within the district.

5B.2 TAKANINI STRUCTURE PLAN AREA

5B.2.1 OVERVIEW

In February 2000, Papakura District Council commenced a structure plan/charette process for Takanini designed to identify the constraints and opportunities of the land, the objectives of the community and development sector in establishing an overall framework for the planned growth and development of the Takanini area. The structure plan was approved in draft form by Council in May 2000 and adopted in November 2000.

For the purpose of implementation, the Takanini Structure Plan Area (see Plan 1 overleaf) has been broken into sub areas. This section of the District Plan enables the staged implementation of the Takanini Structure Plan. Areas 1a and 1b of the Takanini Structure Plan are governed within this District Plan by the Glenora Structure Plan, set out in Appendix 16A.

Plan Change 3 introduced a new planning framework for the Structure Plan area, and rezoned the first area (Area 1B-Glenora) for urbanisation. Private Plan Changes 4 and Plan Change 11 respectively, rezone the second, third and fourth areas - Area 2A Cosgrave, part Area 2B Kirikiri and Area 2C Dominion Road, for residential purposes.
Private Plan Change 6 rezoned a further area, being part of the former Papakura Military Camp, for medium density residential development.

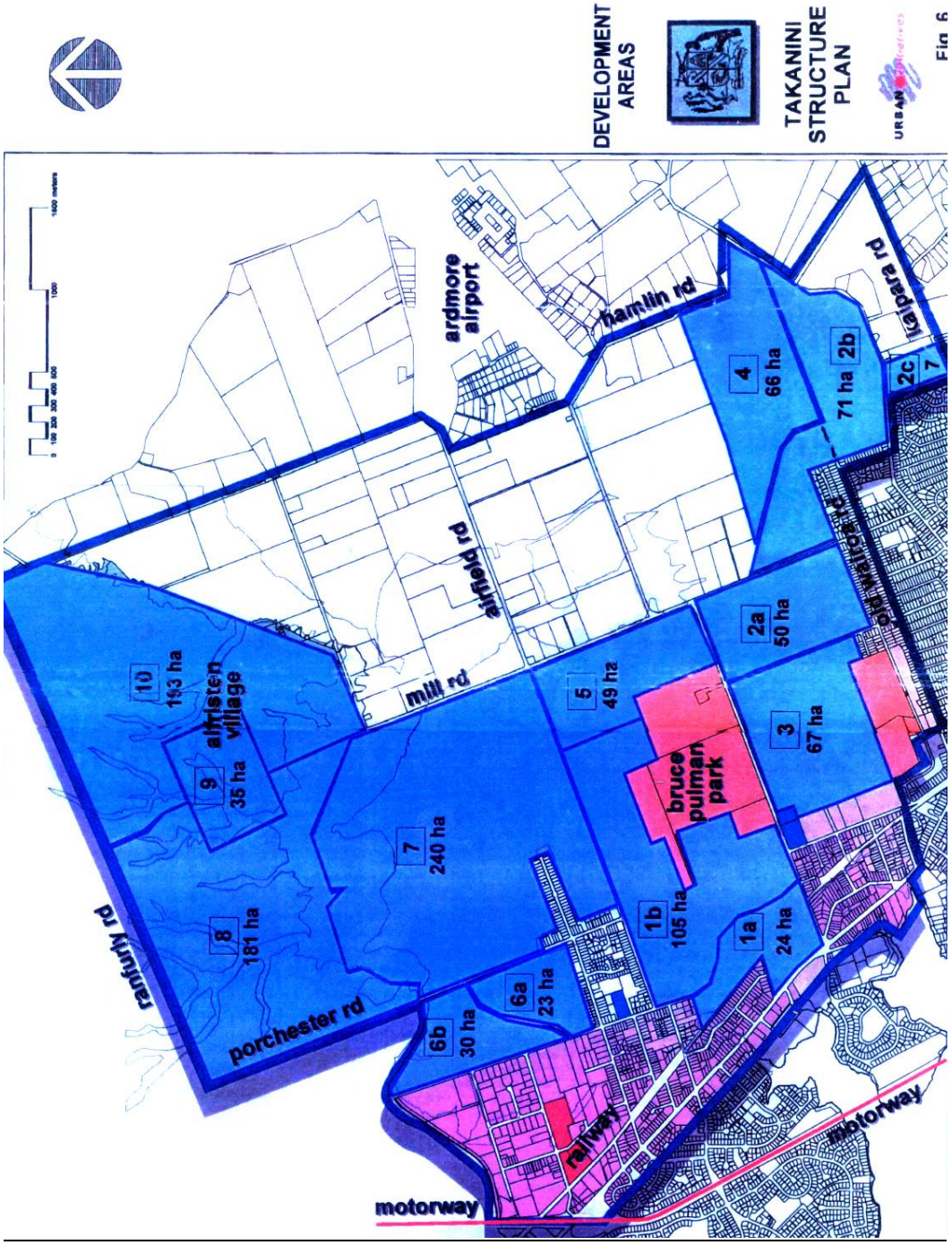
Takanini Area 2A is a rectangular shaped block of land, approximately 50 hectares in area. It is bounded by Walters Road to the north, Cosgrave Road to the east, Grove Road to the west and established residential housing to the south (on the northern side of Fernaig Street). The land is flat in nature and is predominantly used for rural residential living in association with pastoral grazing on land 2 to 3 hectares in size. There is some past glasshouse horticultural activity within the block, a racehorse transport centre and a training track. Ardmore Airport lies about 2.5 kilometres to the north-east. Papakura Military Camp, including the secure facility on Grove Road, adjoins Area 2A to the west. To the northeast of the block across Walters Road is Bruce Pulman Park, a developing regional sports facility. Recent medium density residential development in Takanini Structure Plan Area 1B is immediately to the north and west of the Park.

Takanini Part Area 2B is an irregularly shaped block of land on the eastern edge of urban Papakura. It is bounded by Papakura-Clevedon Road to the south and east, by an unformed extension of Old Wairoa Road to the north and by existing residential housing to the west. The site has two distinct areas. The higher (eastern) portion comprises undulating to rolling terrain and has several gully features. The intervening broad crested ridgelines together with the entire low lying (western) portion of the site are in pasture and used for grazing. Current land use in Area 2B is predominantly pastoral farming, although there are several rural lifestyle blocks and two smaller residential lots. Houses are generally scattered over the eastern half of the site. The whole block is approximately 43 hectares. The Rotowaro-East Tamaki gas pipeline operated by Natural Gas Corporation bisects the low lying terrain at the base of the foothills.

Takanini Area 2C is an irregularly shaped block of land on the eastern edge of urban Papakura to the south of Takanini Area 2B. The land is a corner site located on the South-East corner of Dominion Road and Papakura-Clevedon Road. The site is relatively low lying, with a very slight cross fall from north to south. The Rotowaro-East Tamaki gas pipeline runs along the Dominion Road frontage. The site has an area of 6.58 hectares and adjoins existing residential development to the south and west; rural residential development to the east; and Takanini Area 2B to the north.

Takanini Part Area 3 is the now decommissioned portion of the former Papakura Military Camp. It is bounded to the north by Walters Road and Bruce Pulman Park and to the south by McLennan Park. It is bounded to the east by the remaining New Zealand Defence Force facility and to the west by Papakura Normal School, and the rear of residential properties which front onto Dittmer Place and Arimu Road. The land comprises some 37ha in area, and is flat in contour.

Takanini Areas 6A and 6B comprise some 53 hectares of rural land, which form a rectangular shaped block with a curved triangular shaped head in the northern portion, bounded by the Papakura Stream, and the adjoining territorial authority of Manukau City Council. The subject site is predominantly flat, with some natural dips and hollows. The land is low-lying, with a gradual slope down toward the Papakura Stream. The site is currently characterised by rural activities and facilities have been primarily used by the horse training industry. Built features on the site include horse training tracks, residential buildings, stables, farm workers accommodation and sheds.


DEVELOPMENT AREAS
TAKANINI STRUCTURE PLAN
ardmore airport
hamlin rd
kaipara rd
airfield rd
mill rd
otaiwa rd
ranfurly rd
porchester rd
bruce pulman park
railway
motorway
motorway
4
66 ha
71 ha
2b
2c
7
2a
50 ha
5
49 ha
3
67 ha
10
193 ha
9
35 ha
alfriston village
7
240 ha
8
181 ha
1b
105 ha
1a
24 ha
6a
23 ha
6b
30 ha

5B.2.2 ISSUES, OBJECTIVES, POLICIES AND EXPECTED ENVIRONMENTAL RESULTS FOR THE TAKANINI STRUCTURE PLAN AREA

Eight resource management issues of particular relevance to the Takanini Structure Plan Area have been identified. These are set out below together with the objectives, policies, and a summary of methods that have been adopted to deal with these issues. Additional, more specific objectives and policies apply to the zones within the Structure Plan Area.

5B.2.2.1 Resource Scarcity

5B.2.2.1.1 Issue

The Takanini Structure Plan Area is one of a limited number of areas that have been identified by the Regional Growth Forum as an appropriate location to accommodate population growth within the Auckland Region and in particular within the Southern Sector. Land at Takanini is part of a limited and scarce resource in which to accommodate a share of the Region's projected population growth in an efficient and effective manner.

The uncontrolled release of this land has the potential to undermine regional objectives of achieving more intensive residential areas (to support public transport) and is also likely to undermine the establishment of the coordinated and efficient provision of infrastructure.

Managing the release of land is also required to ensure that land for business and industrial purposes is available to support additional population and business growth.

5B.2.2.1.2 Objective

To achieve the efficient subdivision and development of the Takanini Structure Plan Area in a way which:

a) Accommodates its share of projected population and business growth; and

b) Makes provision for a choice of living environments, commercial, social and community facilities and employment opportunities and the health and safety of the people and their communities; and

c) Does not undermine the potential for urban development nor result in uncoordinated or inefficient provision of infrastructure.

5B.2.2.1.3 Policy

Subdivision and development shall be of a density, design and type that is consistent with Regional objectives of accommodating population and business growth and that provides opportunities for a choice of residential environments, social and community facilities and services, and employment opportunities. Rural zoned land shall not be subdivided to urban densities ahead of rezoning.

5B.2.2.1.4 Explanation

Takanini is one of the limited areas that have been identified as appropriate for urban expansion in the Auckland Region. The area has been identified as having the potential to accommodate a resident population of approximately 20,000 as well as having the potential to establish an additional 3,000 jobs.

A Structure Planning exercise has been undertaken, which underpins the zoning framework for the Structure Plan Area. A range of development densities have been considered throughout the Structure Plan Area, with higher densities located on the flatter land and in proximity to the proposed mixed use nodes centred on the North Island Main Trunk rail line.

A proactive approach toward achieving residential density has been taken in respect of the Residential 8 & 8A Zone to enable medium density development to be achieved within that zone.

In order to ensure that regional objectives of urban intensification are achieved, to manage the effects of development and also to best ensure that infrastructure is provided for in a coordinated and efficient manner, a strategy of staged release of land for urbanisation has been adopted.

The objectives and policies for the Structure Plan Area seek to ensure that subdivision to urban densities does not occur prior to the rezoning of that land.

5B.2.2.1.5 Methods

The following methods have been adopted to implement this policy:

a) Zoning,
b) Subdivision rules,
c) Activity controls,
d) The staging of release of land for urbanisation.

5B.2.2.2 TRANSPORTATION

5B.2.2.2.1 Issue

Extensive lower density urban development places reliance on the private motor vehicle as the main transport mode. Private motor vehicle use results in a range of adverse environmental effects in relation to air and water quality and inefficient utilisation of land.

5B.2.2.2.2 Objective

To achieve forms of development which are supportive of pedestrian, cycle and public transport, and reduce reliance on the private motor vehicle.

5B.2.2.2.3 Policy

Subdivision and development shall be of a type, density and design which is likely to be supportive of pedestrian, cycle and public transport (such as appropriately located mixed use retail/commercial activities and higher density residential activity).

5B.2.2.2.4 Explanation

The Takanini Structure Plan Area is well located in respect of road access and potential transport connections to the NIMT railway line. The opportunity exists therefore, to encourage and achieve modes of subdivision and development that are supportive of pedestrian, cycle and public transport and reduce reliance on the private motor vehicle consistent with the Auckland Regional Land Transport Strategy. This policy is implemented through the zoning pattern, and in particular locating the higher density residential and mixed use zones in close proximity to the NIMT rail line and main transport routes.

5B.2.2.2.5 Methods

The following methods have been adopted to implement this policy:

a) Zoning,
b) Subdivision rules,
c) Activity controls.

5B.2.2.3 ENVIRONMENTAL CONSTRAINTS

5B.2.2.3.1 Issue

Urbanisation can give rise to adverse effects on natural resources. While the Takanini Structure Plan Area is relatively unconstrained in terms of environmental values, much of it (excluding land north of the Papakura Stream) is subject to geotechnical and stormwater constraints due to the soil conditions (peat) and flat topography.

Because of the flatness of much of the area, it is also subject to potential flooding.

Urban development also has the potential to adversely affect water quality through sediment discharges during the development process, and through pollutant runoff from impervious surfaces arising from development.

5B.2.2.3.2 Objective

To achieve development which avoids, remedies or mitigates adverse effects on the natural environment, particularly in relation to water quality and in relation to the area's geotechnical and hydrological constraints.

5B.2.2.3.3 Policy

Subdivision and development shall be of a type and undertaken in a manner which is consistent with an approved Catchment Management Plan and avoids significant adverse effects in relation to water quality, the area's hydrological regime, flooding and maintains geotechnical stability.

5B.2.2.3.4 Explanation

As part of the structure planning exercise, environmental evaluation work was undertaken. This work showed that while the structure plan area is relatively unconstrained in environmental terms, much of it is subject to geotechnical and stormwater constraints.

The geotechnical conditions place constraints on the loadings of buildings that may be built and also require ground water levels to be maintained in order to maintain stability by preventing drying off of the underlying peat.

The flatness of the area renders it subject to potential flooding, but also presents an opportunity for engineering to avoid flooding, minimise sediment run off and maintain water quality. This opportunity will be implemented through the incorporation of stormwater quality and detention measures in the Structure Plan Area through subdivision controls, and through the requirement for on site stormwater soakage devices. Development will need to conform with the recommendations of an approved Catchment Management Plan for the area which will include measures to avoid or mitigate the potential for flooding.

Stormwater Catchment Management Plans for Takanini South, Takanini North, Old Wairoa Road and Croskery Creek have been developed with the following key objectives:

a) Provide a stormwater design basis for the future development of the Structure Plan Areas, and promote the sustainable management of natural and physical resources;

b) Set design criteria to minimise impacts and mitigate the effects of future development on the overall catchment and the receiving environment;

c) Consider those parts of the catchment that may have physical constraints on development due to topographical, stability or environmental limitations;

d) Provide information for input into an overall framework for assessing and evaluating land use and development proposals;

e) Form the basis of a discharge consent application to the Auckland Regional Council where needed.

5B.2.2.3.5 Methods

The following methods have been adopted to implement this policy:

a) Zoning
b) Subdivision rules
c) Activity controls

5B.2.2.4 HERITAGE VALUES

5B.2.2.4.1 Issue

The Structure Plan Area is located within an established rural area, which has its own existing heritage values. Development within the Structure Plan Area has the potential to maintain these values. Conversely, urbanisation of the land also has the potential to adversely affect these values.

5B.2.2.4.2 Objective

To achieve subdivision and development which does not create significant adverse effects on significant heritage values.

5B.2.2.4.3 Policy

Subdivision and development shall be designed and located so as to avoid, remedy or mitigate significant adverse effects on significant existing heritage values.

5B.2.2.4.4 Explanation

As part of the structure planning exercise, evaluation and consultation was undertaken in respect of existing heritage values within the Structure Plan Area. Significant values were noted, and incorporated into the Structure Plan. The Council recognises that it may be appropriate to ensure that significant heritage values are not adversely affected by development within the Structure Plan Area.

5B.2.2.4.5 Methods

a) Structure Plans

b) Subdivision Design Assessment Criteria

5B.2.2.5 URBAN AMENITY VALUES

5B.2.2.5.1 Issue

The quality, layout and design of an urban area can strongly influence the amenity, attractiveness and functioning of that area and the safety and wellbeing of people living and working in that area. The Takanini Structure Plan Area provides an opportunity for establishment of a new urban area with a positive local identity, high levels of amenity, pedestrian safety and convenience.

5B.2.2.5.2 Objective

To achieve subdivision and development which provides a high standard of amenity and pedestrian safety and convenience, and contributes to the creation of a positive sense of place and identity.

5B.2.2.5.3 Policy

Subdivision and development shall be of a type and design so as to achieve a high standard of amenity, pedestrian safety and convenience, and contribute to a positive sense of place and identity.

Key elements of urban form which are considered likely to contribute to achieving this policy are:

a) Higher intensity development centred on coherent nodes based around significant transport routes and interchanges

b) Nodes comprising accessible, walkable, and convenient community facilities, commercial activities and mixed use developments

c) Highest densities of housing in close proximity to public transport routes and interchanges

d) A highly connected street network, providing footpaths, cycle routes and vehicular access to, and infrastructure for, passenger transport

e) Complementary, consistent and legible landscaping themes within the road reserve and open spaces throughout the Structure Plan Area

f) Quality public open spaces in locations that provide opportunities for passive surveillance (e.g. generally adjacent to streets rather than backing onto residential sections).

g) Attractive wetland areas for stormwater treatment and detention that also provide reserve and amenity opportunities.

h) Development that addresses and engages the street and public realm through quality urban design at the interface.

5B.2.2.5.4 Explanation

Urban form can strongly influence the desirability and liveability of an area, and ultimately the success of a newly developed urban area. Elements of urban layout and design that help promote a high standard of amenity and are likely to assist in the development of a positive sense of place have been identified. This policy is implemented primarily through rules and assessment criteria applied at the time of subdivision and development.

5B.2.2.5.5 Methods

The following methods have been adopted to implement this policy.

a) Zoning,

b) Subdivision rules and assessment criteria,

c) Activity controls and assessment criteria,

d) Performance standards.

e) Structure Plans

5B.2.2.6 ACTIVITIES WITH INAPPROPRIATE EFFECTS

5B.2.2.6.1 Issue

Some activities have the potential to have significant adverse effects on the quality of the environment and amenity values, effects which could compromise the opportunity within the Structure Plan Area to accommodate

residential and employment growth in a manner consistent with the Regional Growth Strategy.

5B.2.2.6.2 Objective

To ensure that activities are not established which have the potential to significantly adversely affect amenity values and the quality of the environment, nor compromise existing infrastructure and/or the Structure Plan Area's potential to accommodate residential and employment growth.

5B.2.2.6.3 Policy

Activities should be located in such a way and be of a type which ensure a high standard of amenity and environmental quality appropriate to new residential, public open space and mixed use areas**.** Amenity and environmental quality should not be undermined by the presence of activities which have potentially significant objectionable, noxious or dangerous effects, or (in the case of residential areas) are likely to compromise the residential character and amenity of those areas.

5B.2.2.6.4 Explanation

Certain activities have the potential to have significant adverse effects on the quality of the environment and amenity values in which they are located. The Plan seeks to discourage such activities from the residential and mixed use zones within the Takanini Structure Plan Area, as well as the zones applied to Bruce Pulman Park and other reserve areas.

5B.2.2.6.5 Methods

The following methods have been adopted to implement this policy:

1. Zoning;
2. Activity controls;
3. Performance standards;
4. Subdivision rules.

5B.2.2.7 REVERSE SENSITIVITY

5B.2.2.7.1 Existing Facilities of Regional and National Importance

5B.2.2.7.1.1 Ardmore Aerodrome

5B.2.2.7.1.1.1 Issue

Urbanisation of a formerly rural area in proximity to an existing facility of regional and national importance such as Ardmore Aerodrome has the potential to create conflicts between activities, particularly in relation to noise effects.

Refer to Part 6.8 of Section Two and Part 18.1 of Section Three for Objectives, Policies and Rules regarding Ardmore Aerodrome and landuse compatibility planning.

5B.2.2.7.1.2 Papakura Military Camp

5B.2.2.7.1.2.1 Issue

Urban development of formerly rural land close to the Papakura Military Camp (Designation 28) has the potential to create conflicts between the Camp and adjacent residential areas. The effects of particular concern relate to noise, visual amenity, traffic, privacy (including overlooking), safety, and security of the Camp.

As regionally and nationally important infrastructure, the ability for the New Zealand Defence Force to continue to undertake its current and future activities at the Papakura Military Camp should be protected from potential reverse sensitivity effects arising from urbanisation within the Cosgrave Structure Plan area.

5B.2.2.7.1.2.2 Objective

a) To recognise and provide for the ongoing (current and future) operation of the Papakura Military Camp, which is an infrastructure facility of regional and national importance.

b) To require the development of land within the Cosgrave Structure Plan area to avoid, in the first instance, or mitigate potential reverse sensitivity effects on the Papakura Military Camp, particularly in relation to noise, visual amenity, traffic, privacy (including overlooking), safety and security effects.

5B.2.2.7.1.2.3 Policy

Subdivision design and development in the Residential 8A Zone within the Cosgrave Structure Plan area will be required to achieve:

a) consistency with the Cosgrave Structure Plan (Appendix 16A) and Design Elements within the Subdivision Design Assessment Criteria (Appendix 16B);
b) compliance with the Design Assessment Criteria for Medium Density Housing Development (Appendix 16C);

c) compliance with the roading layout, cross section, and intersection design for Grove Road contained in Appendix 16B Design Element 3: Design of Roads and Access Routes – Residential 8A zone;
d) compliance with the maximum height rules (Rules 16.2.6.1 and 16.2.7.1) within the Papakura Military Camp Height Restriction Area, as defined on the Cosgrave Structure Plan at Appendix 16A;and
e) compliance with the specific upper-floor design controls (Rules 16.2.6.10 and 16.2.7.8) within the Papakura Military Camp Height Restriction Area, as defined on the Cosgrave Structure Plan at Appendix 16A;

which have been designed to avoid or mitigate potential adverse reverse sensitivity effects on the existing and future Papakura Military Camp operations.

5B.2.2.7.1.2.4 Explanation

The development of land to the east side of Grove Road, opposite the Papakura Military Camp, for residential purposes has the potential to generate reverse sensitivity effects on the current and future activities at, and operation of, the Papakura Military Camp. The effects of particular concern relate to noise, visual amenity, traffic, privacy (including overlooking), safety, and security of the Camp.

The New Zealand Defence Force currently uses the Camp for training, administration, maintenance and accommodation activities in accordance with its 'Defence Purpose' Designation (Designation 28).

Designation 28 does not identify the specific activities that are intended to occur at the site, nor are there any Designation conditions to manage the effects of the 'Defence Purpose' activities. The Camp's activities are not constrained by hours of operation, and may occur at any time of the day or night.

The noise generated by the Camp may include the intermittent and irregular use of helicopters for transportation and training exercises. This noise can occur at any time of the day or night. The frequency, duration and type of noise from the Camp may change in the future.

The potential effects on activities within the Cosgrave Structure Plan area of other noise producing activities at the Camp, such as noise produced by vehicles, training, maintenance work, or gunfire (shooting range) are proposed to be mitigated, to an extent, by providing a generous width in the design of Grove Road. This road design, and minimum yard setback requirements, will keep buildings at least 28 metres from the boundary of the Camp. Over time, Grove Road will perform a busy collector road function and a noisier environment is reasonably expected as a result of urbanisation.

The Grove Road layout and cross section diagrams, contained in Appendix 16B Design Element 3: Design of Roads and Access Routes – Residential 8A zone, seek to minimise overlooking and adverse effects on the security of the Camp, soften the view to the Camp from the residential area, and allow passive surveillance of the future pedestrian footpath and cycleway on the western side of Grove Road (in front of the Camp). Subdivision of land within the Cosgrave Structure Plan area fronting Grove Road will need to vest in

Council that land required for the future widening and upgrade of Grove Road, in accordance with the Grove Road layout and cross section diagrams,

Activities undertaken at the Camp should be shielded as much as practicable from outside observers. To mitigate potential overlooking effects and adverse effects to the security of the Papakura Military Camp, a maximum upper-floor floor-level height restriction and specific upper floor design controls apply to that part of the Cosgrave Structure Plan area falling within the Papakura Military Camp Height Restriction Area. The Papakura Military Camp Height Restriction Area is shown on the Cosgrave Structure Plan at Appendix 16A, and includes that land immediately opposite the Camp and extending from Grove Road in the west to the first Local Road to the east. Buildings that exceed 9 metres in height or exceed the maximum permissible upper-floor floor-level height restriction or design controls within the Papakura Military Camp Height Restriction Area are not envisaged and, therefore, require a non-complying resource consent.

It is considered appropriate that the surrounding urban form supports the protection of the Camp's perimeter. Of specific concern are any future road linkages that enable a direct vehicular approach to the Camp (especially the Main Gate). The subdivision standards (16.2.3.5) therefore require access roads onto Grove Road to avoid aligning with the Main Gate and compliance with the Grove Road intersection diagram (Appendix 16B Design Element 3: Design of Roads and Access Routes – Residential 8A zone). In addition, subdivision of land within the Cosgrave Structure Plan area fronting Grove Road will need to ensure that sufficient land is vested in Council to provide for the widening and upgrade of Grove Road in accordance with the Grove Road layout, cross section, and intersection diagrams (contained in Appendix 16B Design Element 3: Design of Roads and Access Routes – Residential 8A zone). These diagrams include measures to mitigate potential adverse effects to the Camp's perimeter, such as a median strip in Grove Road, traffic slowing features, and protection of the verge in front of the Camp.

The use of Grove Road by heavy military vehicles has been considered in designing Grove Road and developing the layout, intersection and cross section diagrams. The design takes into account the Camp's use of the road and the integration with traffic (including pedestrian and cycling modes) generated by the development of the Cosgrave Structure Plan area and the wider network traffic growth.

5B.2.2.7.1.2.5 Methods

a) Rules: General

b) Structure Plans and Design Elements

c) Subdivision Rules

5B.2.2.7.2 Network Utility Operations

5B.2.2.7.2.1 Issue

Development in close proximity to existing electrical or natural gas infrastructure resources can adversely affect people's health and safety and the efficient and safe operation of those resources.

5B.2.2.7.2.2 Objective

To minimise risks to health and safety that can arise from development in close proximity to electrical and natural gas infrastructure. To ensure that development is undertaken so as to minimise adverse effects on the efficient and safe operation of existing electrical and natural gas infrastructure.

5B.2.2.7.2.3 Policy

Development shall be undertaken so as to minimise the potential for conflicts with existing electrical or gas infrastructure resources such as high voltage transmission lines or natural gas pipelines and supply stations.

5B.2.2.7.2.4 Explanation

Development in close proximity to high voltage electrical transmission infrastructure or natural gas pipelines and supply stations has the potential to generate significant adverse effects and should be undertaken so as to ensure that risks to health and safety are minimised and that the integrity of supply is not compromised. The Plan seeks to ensure that appropriate distances or mitigation is provided between development and existing infrastructure.

5B.2.2.7.2.5 Methods

a) Subdivision Rules

b) Structure Plans

5B.2.2.8 EFFECTS OF PREVIOUS LAND USES

5B.2.2.8.1 Issue

Some rural service activity and horticultural practices which have historically been undertaken in the Takanini Structure Plan area have involved the use of pesticides, fungicides and fertilisers. In sufficient concentrations, residues of these chemicals may be harmful to human health.

5B.2.2.8.2 Objective

To ensure that the risk to human health associated with concentrations of residues of agricultural or horticultural chemicals is minimised.

5B.2.2.8.3 Policy

Prior to urban subdivision or development, the presence (or otherwise) of residues of agricultural chemicals shall be established, and appropriate remedial works recommended and undertaken to remove any significant risk to human health.

5B.2.2.8.4 Explanation

Some parts of the Takanini Structure Plan area have been historically utilised for rural service activity, and horticultural purposes. These uses generally expired at the beginning of the 1990s, however some limited rural service and horticultural uses remain.

Conventional horticultural practices involved the utilisation of pesticides, fungicides and fertilisers which can potentially leave residues in the soil, some of which are believed to be harmful to public health. Residues in the soil in the Takanini Structure Plan area are not believed to pose a significant risk, although there are some isolated hotspots which warrant further investigation and possible remedial works prior to urban development. A conservative approach has been adopted, requiring soil testing and identification of remedial works (if required) to be undertaken prior to any subdivision or development (whichever comes first).

5B.2.2.8.5 Methods

General Rules: Applying to all Takanini Structure Plan Zones.

5B.2.2.9 EXPECTED ENVIRONMENTAL RESULTS

The expected environmental results for the Takanini Structure Plan Area are as follows:-

a) The establishment of a choice of housing types, industrial and commercial activity, social and community facilities.

b) Accommodation of a resident population of approximately 20,000 and new employment opportunities for some 3,000, upon the ultimate development of the Structure Plan Area.

c) Maintenance (as far as is practicable) of water quality and hydrological regimes.

d) Establishment of development which is compatible with geotechnical constraints.

e) Higher density and intensity development in close proximity to the NIMT railway line and main transport routes, which is supportive of public transport use.

f) Maintenance and enhancement of significant heritage values and maintenance of significant elements of rural character in more physically constrained areas which have an existing rural residential character.

g) Maintenance and enhancement of urban amenity values.

h) The protection of existing infrastructure resources and facilities of Regional and National importance.

i) Establishment of a high standard of amenity. Aspects of urban form expected in the Residential 8 and 8A zone are as follows:-

(i) Higher intensity development centred on coherent nodes based around significant transport routes and interchanges.

(ii) Nodes comprising accessible, walkable, and convenient community facilities, commercial activities and mixed use developments.

(iii) Highest densities of housing in close proximity to public transport routes and interchanges.

(iv) A highly connected street network, providing footpaths, cycle routes and vehicular access to, and infrastructure for, passenger transport.

(v) Complementary, consistent and legible landscaping themes within the road reserve and open spaces throughout the Growth Area.

(vi) Quality public open spaces in locations that provide opportunities for passive surveillance (e.g. adjacent to streets rather than backing onto residential sections).

(vii) Attractive ponds or wetland areas for stormwater treatment and detention that also provide reserve and amenity opportunities.

(viii) Development that addresses and engages the street and public realm through quality urban design at the interface.

(ix) Absence of new activities with potentially significant objectionable, noxious or dangerous effects.

j) Aspects of urban form expected in the Residential 8B Zone are as follows:

(i) A connected street network, providing footpaths, cycle routes and vehicular access to any local centres and the main transport routes.

(ii) Complementary, consistent and legible landscaping themes within the road reserve and open spaces throughout the Takanini Structure Plan Area.

(iii) Quality public open spaces in locations that provide opportunities for passive surveillance (e.g. generally adjacent to streets rather than backing onto residential sections).

(iv) Development that addresses and engages the street and public realm through quality urban design at the interface.

(v) Residential development that maintains the appearance of a high quality area with a spacious character.

(vi) A network of connected reserves providing pedestrian and cycle routes and enhancement of significant streams where appropriate.

(vii) Provision of public access to any heritage areas with quality reserves which recognise the prevailing amenity and landscape character and values.

The Takanini South Stormwater, Takanini North Stormwater, Old Wairoa Road Stormwater and Croskery Creek Catchment Management Plans (referred to in 5B.2.2) have been developed with the following expected environmental results:

(i) Maintenance (as far as practicable) of the hydrological balance between groundwater recharge and surface runoff.

(ii) Mitigation of the effects of development on the quality of stormwater discharged into the receiving environment.

(iii) Minimising (as far as practicable) flood risk in the Growth Areas and downstream developed areas.

(iv) Provision of landscaped swales, stormwater wetlands or ponds or other low impact measures identified in ARC TP124 to assist in improving water quality and minimising flood risk, while also providing amenity features.

5B.2.2.10 PROCEDURES FOR MONITORING

In order to assess the suitability and effectiveness of the objectives, policies and methods for achieving the anticipated environmental results for the Takanini Structure Plan Area, the Council will develop a monitoring programme which will include the following monitoring procedures:

i) Monitoring complaints and enforcement actions regarding the nuisance aspects of activities in residential, industrial and mixed use areas;

ii) Undertaking surveys of residents to ascertain the level of satisfaction with the facilities available in mixed use areas, choice of housing stock, the usability and quality of the public open space network, the level of amenity and environmental quality being achieved and the availability of transport options;

iii) Monitoring resource consents in residential, industrial and mixed use areas, including the number of applications granted consent, diversity of housing types, compliance with consent conditions, and the effectiveness of those conditions.

iv) Undertaking safety audits of public spaces (e.g. residential streets, neighbourhood parks and walkways) and analysing crime and traffic accident statistics to assess the impacts of design and planning on the sense of personal safety people might experience in residential areas;

v) Undertaking streetscape assessments of the level of visual amenity being attained in residential areas;

vi) Monitoring the level of uptake of vacant land and the density to which it is developed.

vii) Monitoring the diversity of housing types by assessing building consents and census data.

viii) Monitoring groundwater levels to assess the performance of methods adopted to maintain groundwater recharge.

5B.2.3 IMPLEMENTATION

The objectives and policies set out above will be implemented through the application of zones within the Structure Plan Area, with rules applying to the zones. Each of the zones may have more specific objectives and policies which apply in addition to those set out above. The zones within the Structure Plan Area are as follows:

a) Residential 8 and 8A Zones: This zone provides for medium density housing and retail, service station, commercial and community activities that will meet day-to-day local needs within the Addison Neighbourhood Centre, located on Porchester Road. (See Part 16.1 and 16.2 of Section Three).

b) Residential 8B Zone: This provides for lower density housing at the margins of the Takanini Structure Plan area in locations which are more topographically constrained and/or where it is appropriate to retain elements of the existing landscape and character. (See Part 16.2 of Section Three).

c) Reserves and Community Uses Zone: This zone is applied to the eastern portion of Bruce Pulman Park (Bratlie Block). (See Part 16.3 of Section Three).

d) Special Purpose and Recreation Zone: This zone is applied to the western portion of Bruce Pulman Park. (See Part 16.4 of Section Three).

e) Commercial 2 zone at Takanini: This zone is applied to Part Area 1A west of the railway line. (See Part 5 of Section Three)

f) Takanini Mixed Use zone: This zone is applied to Part Area 1A east of the railway corridor (See Part 16.5 of Section Three)

g) Industrial 1 Zone: This zone is applied at the interface with existing and proposed residential activities and the medium Industrial 3 zone proposed within Takanini Structure Plan Areas 6a and 6b (See Part 6.9 of Section Three).

h) Industrial 3 Zone: This zone is applied to enable larger scale medium industrial activities to be located in identified areas within Takanini Structure Plan Areas 6a and 6b (See Part 6.11 of Section Three).

5B.2.4 RULES APPLYING TO ALL TAKANINI STRUCTURE PLAN ZONES

5B.2.4.1 SOIL INVESTIGATION

1. Prior to the development of land within the Takanini Structure Plan Area, soil sampling and testing shall be undertaken to verify the presence (or otherwise) of contaminants associated with rural service activity, horticultural use or other potentially contaminating land uses and a report shall be provided to the satisfaction of the Council setting out the results of this sampling, together with recommendations as to (if required) appropriate remedial works.

2. Where the Council is satisfied that no remedial works are necessary, no further action shall be required in this regard. Council will confirm this in writing.
3. In instances where the Council is satisfied that remedial work may be required, then any activity or development on the site which would otherwise be a Permitted or Controlled Activity will be a Restricted Discretionary Activity. Council will confirm this in writing.
4. Except as provided for by Section 95A(4) of the Resource Management Act 1991, such an application will be considered without notification or the need to obtain approval from affected persons.
5. Council has restricted the exercise of its discretion to the following matters and may impose conditions in relation to these.

    a) The nature, extent and implementation of remedial works proposed

    b) Mitigation measures necessary to deal with any potential adverse effects of undertaking these works

    c) Verification of effective completion of works.

6. In instances where the Council is satisfied that remedial work may be required, any activity or development which is otherwise provided for as a Restricted Discretionary Activity, Discretionary Activity or Non-complying Activity will in addition to any other relevant criteria be assessed with regard to the matters set out in 5 above and conditions may be imposed in respect of these.
7. Council retains the discretion to waive the requirements above and may do so in instances where an investigation has been undertaken previously, and either the Council is satisfied that no remediation is necessary or any remediation required has or will be implemented.

Notes:

a) In instances where subdivision precedes development, the soil investigation report shall be submitted together with the application to subdivide. The requirement to undertake any recommended works (if required) will be imposed as a condition of the subdivision consent.

b) Consent from the Auckland Regional Council may be required for earthworks or for remediation of sites which are contaminated associated with remedial works.

Explanation:

Investigations have identified some limited risk to human health caused by contamination of soil by rural servicing activity, horticultural chemical residue and previous land fill activity in specified locations. The Plan adopts a precautionary approach in respect of this risk and requires site specific investigation and rehabilitation as part of the subdivision and development process and prior to occupation by new residents.

5B.3 HINGAIA STRUCTURE PLAN AREA

5B.3.1 OVERVIEW

In July 2000, Papakura District Council commenced a structure plan/charrette process for Hingaia designed to identify the constraints and opportunities of the land, the objectives of the community and development sector in establishing an overall framework for the planned growth and development of the Hingaia Peninsula.

These findings were embodied in the adopted "Draft Hingaia Structure Plan, October 2000". It sought to provide for a living environment with high amenity, character, access to public open space, a range of housing and lifestyle opportunities and business and employment provision.

The Hingaia Structure Plan was further reviewed in 2001 to include additional technical information, in particular stormwater catchment management plan provisions, and to accord with the Southern Sector Agreement requirements for greenfields.

"The Hingaia Peninsula Structure Plan November 2002" supersedes all earlier reports. This Structure Plan develops and refines the community aspirations and vision identified for the area, Regional Growth Strategy and Sector Agreement requirements, subsequent community consultation, with supplementary technical inputs to provide a comprehensive framework for the staged development of the Peninsula.

For the purpose of implementation in the short to medium term, Hingaia East has been identified as the first stage of the Hingaia Peninsula Structure Plan Area (see Plan 1 overleaf). Hingaia East comprises some 318ha of currently Future Urban zoned land. This is generally located to the west of the Southern Motorway and to the north and south of Hingaia Road. It includes the area of lifestyle block properties located in the vicinity of Pararekau, Normanby and Oaklands Roads. Hingaia East is itself split into two sub areas - Area 1a comprising some 146ha, and the balance.

Part 5B of Section One and Part 17 of Section Three of the District Plan enables the staged implementation of the Hingaia Structure Plan Area beginning with the proposed zoned areas within Area 1a and followed by a structure plan for development of Pararekau and Kopuahingahinga Islands. It is anticipated that further Plan Changes will follow to introduce appropriate rules to manage subdivision and development within the balance of Hingaia East, which includes Karaka Park and the remaining portion of the Hingaia Structure Plan Area.

In 2009 a Plan Change was introduced to enable the development of Pararekau Island for countryside living purposes. This involved rezoning Pararekau Island, along with the access ways linking the Island to the mainland, for 'Countryside Living' purposes. The 'Rural Papakura Zone' was retained for the balance of the smaller Kopuahingahinga Island.

The issues, objectives and policies set out in the following Part 5B.3.2 relate to the whole of the Hingaia Structure Plan Area, including Pararekau and Kopuahingahinga Islands. More specific objectives and policies set out in Parts 17.1.1, 17.2.1 and 17.3.1 of Section Three relate only to those parts of the Hingaia Structure Plan Area to be rezoned Residential 9, Mixed Use 1 and Pararekau Island Countryside Living.

As further Plan Changes relating to other areas are introduced, further objectives and policies may be introduced that relate to issues specific to those areas.

Until specific land areas are rezoned for urban or countryside living purposes, the existing future urban zone provisions (objectives, policies, rules) shall apply.

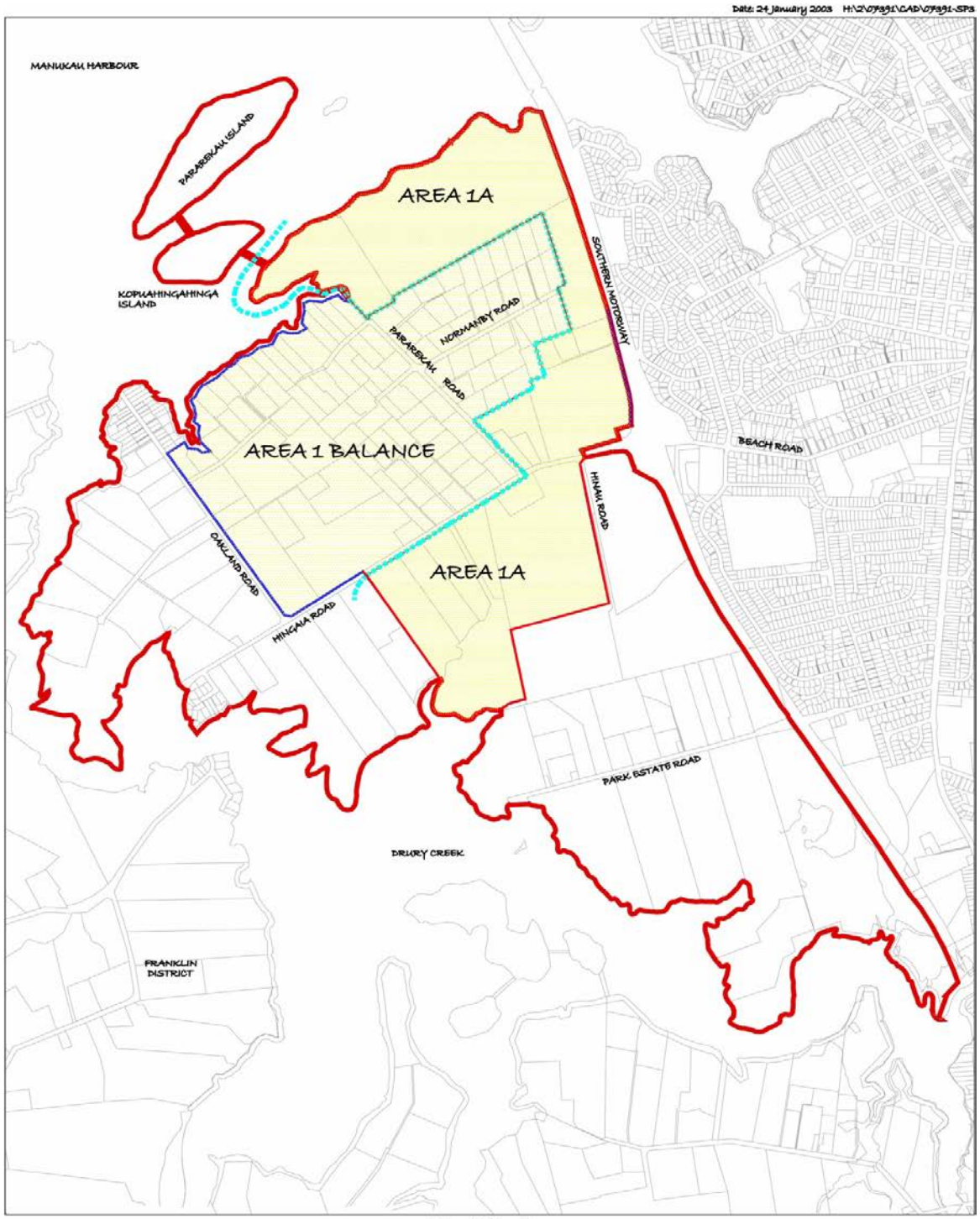
Note in relation to Papakura Interchange

It is recognised that, as of May 2006, the Southern Motorway Papakura Interchange will require upgrading to provide an appropriate level of service to accommodate both existing traffic levels and the future growth in Papakura and Franklin District that is anticipated by the Auckland Regional Policy Statement, the Auckland Regional Growth Strategy and the Southern Sector Agreement between Auckland Regional Council, Papakura District Council, Manukau City Council and Franklin District Council.

These are various possible sources of funding available for those upgrade works which include one or more of the following:

- Land Transport New Zealand (LTNZ) funding via Transit New Zealand;
- LTNZ and/or Auckland Regional Transport Authority funding secured by Council (where applicable);
- Contributions via Council's development contributions policy under the Local Government Act 2002;
- Contributions via financial contributions under the RMA (to the extent permitted by Council's Long Term Council Community Plan);
- Contributions secured under development agreements executed over land in the District;
- Contributions secured through other mechanisms that may be available.

The appropriate source of funding, or funding mix, needs to be determined by further discussions outside the current District Plan process. As an initial step, Transit New Zealand, the Papakura District Council and the principal developers of Area 1A of the Hingaia Structure Plan have made a good faith commitment to discuss cost sharing and funding options for the upgrade works.



PLAN 1
HINGAIA STRUCTURE PLAN AREA – HINGAIA EAST

Boundary of Hingaia East

5B.3.2 ISSUES, OBJECTIVES, POLICIES AND EXPECTED ENVIRONMENTAL RESULTS FOR THE HINGAIA STRUCTURE PLAN AREA

Seven resource management issues of particular relevance to the Hingaia Structure Plan Area have been identified. These are set out below together with the objectives, policies, and a summary of methods that have been adopted to deal with these issues. Additional, more specific objectives and policies apply to the zones within the Structure Plan Area (refer to Part 17 of Section Three).

5B.3.2.1 RESOURCE SCARCITY

5B.3.2.1.1 Issue

The Hingaia Structure Plan Area is one of a limited number of areas that have been identified by the Regional Growth Strategy 1999 as an appropriate location to accommodate population growth within the Auckland Region and in particular within the Southern Sector. Land at Hingaia is part of a limited and scarce resource in which to accommodate a share of the Region's projected population growth.

The uncontrolled release of this land has the potential to undermine regional objectives of achieving more intensive residential areas (to support public transport) and is also likely to undermine the establishment of the coordinated and efficient provision of infrastructure.

5B.3.2.1.2 Objective

To achieve the efficient subdivision and development of the Hingaia Structure Plan Area in a way which:

a) Accommodates its share of projected population growth; and

b) Makes provision for a choice of living environments, commercial, social and community facilities, employment opportunities and the health and safety of the people and communities.

c) Does not undermine the potential for urban intensification, compromise the ability to provide for a strategically and well planned urbanised area with high amenity, nor result in uncoordinated or inefficient provision of infrastructure, except for Pararekau and Kopuahingahinga Islands, which have been identified through a structure plan process as not being suitable for urbanisation due to the combination of existing coastal, landscape and visual amenity values and the potential for adverse effects on the receiving ecological environment.

5B.3.2.1.3 Policy

Subdivision and development shall be of a density, design and type that is consistent with Regional objectives of accommodating population growth and that provides opportunities for a choice of residential environments, social and

community facilities and services, and employment opportunities. Subdivision to urban densities or to provide for countryside living in appropriate locations shall be undertaken on a staged basis consistent with the Structure Plan for the Peninsula. Future Urban zoned land should not be subdivided for lifestyle or urban use ahead of rezoning this land for urban subdivision and/or development and the MUL boundary being moved as required to include this area.

5B.3.2.1.4 Explanation

Hingaia is one of the limited areas that have been identified as appropriate for urban expansion in the Auckland Region. The area has been identified as having the potential to accommodate a resident population of a minimum of 10,000 as well as having the potential to establish infrastructure for employment provision.

The Hingaia Structure Plan November 2002 (for the Hingaia Structure Plan Area shown on Plan 1) identified the sequence and form that development of the Hingaia Peninsula should take. Further and subsequent structure plans will address in more detail how parts of the Hingaia Structure Plan Area will develop, in a staged manner (refer Appendix 17A Hingaia East Structure Plan and 17E Pararekau and Kopuahingahinga Islands Structure Plan). A range of development densities have been considered throughout the Structure Plan Area. The preferred densities resulting from the structure plan processes seek to accommodate growth while maintaining elements of the existing spacious character of much of the Peninsula. The initial Structure Planning / Charrette exercise recommended a "Village Concept" – i.e. that provision be made for some medium densities around a Mixed Use / Neighbourhood Centre and local centres in appropriate areas, surrounded by existing lifestyle blocks and low density residential areas.

In order to ensure that regional objectives of urban intensification are achieved, to manage the effects of development and also to best ensure that infrastructure is provided in a coordinated and efficient manner, a strategy of staged release of land for urbanisation for Area 1 and the future stages of the Hingaia Structure Plan Area has been adopted. For the proposed zoned areas within Area 1a, this will be in accordance with financial contribution development agreements between landowners and Council.

In order to ensure that eventually the whole of the future urban part of the Hingaia Peninsula Structure Plan Area is a well planned urban area with high amenity values and efficient infrastructure the objectives and policies for the Structure Plan Area seek to ensure that subdivision of future urban zoned land both inside and outside the MUL boundary for lifestyle or urban use, does not occur ahead of rezoning of this land at some future time for urban subdivision and development.

The Pararekau and Kopuahingahinga Islands Structure Plan process (refer Part 17.3, Section Three) identified that Pararekau Island is not suitable for urbanisation, and consequently a countryside living zoning was applied in order to maintain and enhance the existing open space character and rural amenity values of the island. Kopuahingahinga Island was identified as not being suitable for development, other than providing for vehicular, pedestrian and cyclist access to Pararekau Island, and a private or public open space use was identified in the Structure Plan process (refer Pararekau and Kopuahingahinga Islands Structure Plan Appendix 17E).

5B.3.2.1.5 Methods

The following methods have been adopted to implement this policy:

a) Structure planning
b) Zoning
c) Subdivision rules
d) Activity controls

5B.3.2.2 ENVIRONMENTAL CONSTRAINTS

5B.3.2.2.1 Water Quality

5B.3.2.2.1.1 Issue

Urbanisation and countryside living subdivision and development can give rise to adverse effects on natural resources. Urban development and countryside living has the potential to adversely affect water quality through sediment discharges during the development process and through pollutant run-off from impervious surfaces arising from development.

While the Hingaia Structure Plan Area is generally unconstrained in terms of environmental values it contains some areas which are sensitive to development and warrant some form of protection, conservation or limitation on development.

The approved Stormwater Catchment Management Plan for the Hingaia Peninsula identifies the following features in particular:

a) Two perennial watercourses, which warrant enhancement and protection of their natural channels.

b) Two freshwater wetlands with potential for enhancement.

c) A valuable coastal and estuarine environment surrounding the Peninsula, which requires protection for the avoidance and mitigation of adverse effects to water quality.

d) Four maritime marsh areas of high ecological value which require protection because of their high ecological value.

Other ephemeral watercourses may also warrant protection and riparian enhancement, and all these features have the potential to provide ecological linkages and form the basis of a public walkway network.

5B.3.2.2.1.2 Objective

To achieve subdivision and development which maintains or enhances the coastal and estuarine environment, key watercourses, and wetland areas.

5B.3.2.2.1.3 Policy

Subdivision and development shall be of a type and be undertaken in a manner which is consistent with an approved Stormwater Catchment Management Plan and maintains or enhances the estuarine environment, esplanade areas and key watercourses.

5B.3.2.2.1.4 Explanation

As part of the structure planning process, environmental evaluation work was undertaken. This work showed that while the Structure Plan Area is relatively unconstrained in environmental terms, it contains some locally significant watercourses, wetlands and coastal fringes with varying constraints. The protection and enhancement of streams can maintain and enhance water quality within them and also contribute to maintaining and enhancing water quality in the receiving estuarine environment. The protection of streams also has the potential to provide ecological linkages and improve habitat quality, and will contribute to the green spacious character of the area. Development also has the potential to adversely affect water quality (and ultimately damage downstream ecology) through sediment run-off during development and pollutant run off from impervious surfaces. The location of streams and nature of protection afforded is shown on the Hingaia East Structure Plan (Appendix 17A).

Water quality, riparian areas and coastal margins will be safeguarded through the incorporation of stormwater treatment mechanisms in the Structure Plan Area through the subdivision consent process, through the requirement for detention devices for riparian enhancement of identified streams and through appropriate building setbacks. Development will need to conform with the recommendations of an approved Stormwater Catchment Management Plan for the area which includes measures to avoid or mitigate the potential for flooding.

A Stormwater Catchment Management Plan for Hingaia has been developed with the following key objectives:-

a) Study the effect of the urbanisation on the aquatic environment. This includes the existing ecology on the Peninsula and the receiving coastal marine environment.

b) Provide a design base for the future development of the Structure Plan Area and promote the sustainable management of natural and physical resources.

c) Set criteria that avoid, remedy, or mitigate the stormwater effects of future development in the area.

d) Consider parts of the catchment, which may be subject to physical constraints on development due to conservation, topographical or stability limitations.

e) Provide information for input into an overall framework for assessing and evaluating land use and future development proposals.

f) Form the basis of an application to the ARC for a comprehensive catchment stormwater discharge consent.

Environmental evaluation work undertaken as part of development of Pararakau Island showed that while Pararakau Island is relatively unconstrained in environmental terms, the coastal and receiving environments are sensitive to land use change.

Water quality and coastal margins are to be safeguarded through the incorporation of stormwater treatment mechanisms in the Structure Plan Area through the subdivision consent process and through the requirement for appropriate building setbacks. Development will also need to conform with the recommendations of an approved Stormwater Catchment Management Plan for Pararekau Island, which includes measures to avoid or mitigate the potential for sediment removal and flooding.

A stormwater Catchment Management Plan for Pararekau Island has been developed with the following key objectives:

(i) Establish the effect of development on the aquatic environment within the coastal marine receiving environment;

(ii) Provide a design base for the future development of the Island which promotes the sustainable management of natural and physical resources;

(iii) Set criteria that avoid, remedy, or mitigate the stormwater effects of future development in the area;

(iv) Consider parts of the catchment which may be subject to physical constraints on development due to stability limitations;

(v) Provide information for input into an overall framework for assessing and evaluating land use and future development proposals; and

(vi) Form the basis of an application to the Auckland Regional Council for a comprehensive catchment stormwater discharge consent.

5B.3.2.2.1.5 Methods

a) Subdivision rules

b) Activity controls

5B.3.2.2.2 Coastal Erosion and Instability

5B.3.2.2.2.1 Issue

Coastal erosion and instability can pose a hazard to people, property and the environment. Inappropriate subdivision, use and development of land can also change natural processes, exacerbating coastal erosion and instability or creating new risks for people, property and the environment.

Coastal Hazard assessment investigations suggest that some areas of the Peninsula's coastline is subject to erosion that may affect future development. A precautionary approach is necessary, restricting subdivision and development in particularly sensitive locations. Areas of the coast subject to coastal erosion are identified as "Controlled Building Area" on the Hingaia East Structure Plan in Appendix 17A and as "Coastal Building Limitation Line" on the Pararekau and Kopuahingahinga Islands Structure Plan in Appendix 17E.

Historical Aerial photos indicate that Pararekau Island has been subject to coastal regression that may affect its future development. For that reason there are specific restrictions on subdivision and development on the Island.

5B.3.2.2.2.2 Objectives

a) To avoid the adverse effects of coastal erosion and instability on people, property and the environment and, where this is not possible, to remedy or mitigate the adverse effects of coastal instability.

b) To avoid coastal erosion and instability being exacerbated through changes to natural processes as a result of inappropriate subdivision, development and land use.

c) To locate and design new subdivision and development so that the need for hazard protection works is avoided.

5B.3.2.2.2.3 Policies

a) In areas prone to coastal erosion and instability, activities which are sensitive to those hazards, shall, where possible, be avoided. Where this is not possible, activities shall ensure that any risk to people, property or environmental damage is minimised through appropriate mitigation or remedial measures.

b) Development, subdivision and land use activities, including:

   i) Vegetation clearance.

   ii) Changes in overland flow paths and stormwater.

   iii) Earthworks and services.

   shall be prevented if they are likely to significantly exacerbate any hazard, unless it can be demonstrated that the adverse effects can be mitigated, remedied or avoided.

c) Remedial measures to address coastal erosion and instability may include extensive revegetation planting within esplanade reserves and esplanade strips.

5B.3.2.2.2.4 Explanation

The coastal zone is an area of dynamic equilibrium, constantly changing and adapting to inputs from the sea, land and weather.

A Coastal Hazard investigation identified varying rates of coastal erosion around the Peninsula. Where higher erosion rates are identified, a precautionary approach to land development is suggested by use of full width esplanade strips, yard setbacks and additional development restrictions on lots and buildings. Applications for subdivision adjacent to a required esplanade strip will need to be accompanied by a Geotechnical Report.

A Geotechnical Report for Pararekau Island has established Identified Building Platforms and a Coastal Building Limitation Line which specifies building locations and set backs for development within the Island. The illustration of Identified Building Platforms and a Coastal Building Limitation Line are intended to ensure that development avoids areas likely to be susceptible to erosion and sea level changes. The Coastal Building Limitation Line illustrates what is believed to be a safe setback based on information regarding indicative and average rates of erosion. Ensuring that subdivision and development does not take place in a manner that would put people and buildings at risk of coastal erosion is in accordance with the Council's duties and functions under the Resource Management Act 1991 to ensure natural hazards are avoided or mitigated, including through the control of subdivision.

5B.3.2.2.2.5 Methods

The following methods have been adopted to implement these policies:

a) Zoning

b) Subdivision rules

c) Activity controls

d) Land Information Memorandum (LIM). A LIM can include information on potential erosion and inundation hazards that may affect the site

e) Placing notices of coastal hazard risk on property titles.

5B.3.2.3 EXISTING AMENITY VALUES AND CHARACTER

5B.3.2.3.1 Issue

The Structure Plan Area is an area of rolling countryside on the fringe of the existing urban area, which has its own existing rural and rural/residential amenity values and character. With urbanisation and countryside living subdivision and development this character will change. However, the District Plan provisions seek to maintain certain key elements of this character such as riparian margins and coastal landscapes.

Inappropriate subdivision and development may adversely affect the coastal character including any identified archaeological sites on Pararekau Island.

There is also potential for ecological values and existing landscape and amenity values of Pararekau Island to be compromised.

5B.3.2.3.2 Objective

To achieve subdivision, development and use which maintains and enhances significant elements of existing amenity values and character, including the amenity values and character of the coastal environment and public access to and along the coast.

In the case of Pararekau Island, subdivision, development and use should not adversely affect the historical and cultural values of archaeological sites on the island.

5B.3.2.3.3 Policy

Subdivision and development shall be designed and located so as to maintain significant elements of existing amenity values and character and enhance natural and landscape values of riparian margins and the natural coastal environment, create a green network of open spaces, neighbourhood reserves, and provide a connected system of public access to and along the coastal margins.

In the case of subdivision and development on Pararekau Island this shall be designed and located so as to avoid or mitigate any adverse effects on archaeological sites on the Island.

5B.3.2.3.4 Explanation

As part of the structure planning exercise, evaluation and consultation was undertaken in respect of existing archaeological, amenity and landscape values within the Structure Plan Areas. Values were noted, and incorporated into the Structure Plans. The Council recognises that it is appropriate to maintain significant elements of these values and character by controlling subdivision and development within the Structure Plan Areas.

5B.3.2.3.5 Methods

The following methods have been adopted to implement this policy:

a) Zoning

b) Subdivision rules

c) Activity controls

5B.3.2.4 URBAN AMENITY VALUES

5B.3.2.4.1 Issue

The quality, layout and design of an urban area can strongly influence the amenity, attractiveness and functioning of that area and the safety and wellbeing of people living in that area. The Hingaia Structure Plan Area provides an opportunity for establishment of a new urban area with a positive local identity, high levels of amenity, pedestrian safety and convenience.

5B.3.2.4.2 Objective

To achieve subdivision and development which provides a high standard of amenity and pedestrian safety and convenience, and contributes to the creation of a positive sense of place and identity.

5B.3.2.4.3 Policy

Subdivision and development shall be of a type and design so as to achieve a high standard of amenity, pedestrian safety and convenience, and contribute to a positive sense of place and identity.

Key elements of urban form which are considered to contribute to achieving this policy in Hingaia are:

a) Neighbourhood and local centres comprising accessible, walkable, and convenient community facilities, commercial activities and mixed use developments.

b) A connected street network, providing footpaths, cycle routes and vehicular access to neighbourhood and local centres, main transport routes and the coastal edge.

c) Complementary, consistent and legible landscaping themes within the road reserve and open spaces throughout the Structure Plan Area.

d) Quality public open spaces in locations that provide opportunities for passive surveillance (e.g. generally adjacent to streets rather than backing onto residential sections) and which enable recreational use of the coastal edge.

e) Development that addresses and engages the street and public realm through quality urban design at the interface.

f) Residential developments that maintain the appearance of a high quality area with a spacious character.

g) A network of connected reserves providing pedestrian and cycle routes and enhancement of significant streams where appropriate, providing access opportunities within the Structure Plan Area and along its coastal margins.

5B.3.2.4.4 Explanation

Urban form can strongly influence the desirability and liveability of an area, and ultimately the success of a newly developed urban area. Elements of urban layout and design that help promote a high standard of amenity and are likely to assist in the development of a positive sense of place have been identified. This policy is implemented primarily through rules and assessment criteria applied at the time of subdivision and development.

5B.3.2.4.5 Methods

The following methods have been adopted to implement this policy.

a) Zoning

b) Subdivision rules and assessment criteria

c) Activity controls and assessment criteria

d) Performance standards

5B.3.2.5 ACTIVITIES WITH INAPPROPRIATE EFFECTS

5B.3.2.5.1 Issue

Some activities have the potential to have significant adverse effects on the quality of the environment and amenity values, effects which could compromise the opportunity within the Structure Plan Area to accommodate residential and employment growth in a manner consistent with Regional Growth Strategy principles.

5B.3.2.5.2 Objective

To ensure that activities are not established which have the potential to significantly adversely affect amenity values and the quality of the environment, and hence compromise existing infrastructure and/or the Structure Plan Area's potential to accommodate residential, countryside living and employment growth.

5B.3.2.5.3 Policy

Activities shall be located in such a way and be of a type which ensure a high standard of amenity and environmental quality appropriate to new residential, countryside living, public open space and mixed use areas. Amenity and environmental quality shall not be undermined by the presence of activities which have potentially significant objectionable, noxious or dangerous effects, or (in the case of residential areas) are likely to compromise the residential or countryside living character and amenity of those areas.

5B.3.2.5.4 Explanation

Certain activities have the potential to have significant adverse effects on the quality of the environment and amenity values in which they are located. The Plan seeks to discourage such activities from the Residential, Countryside Living and Mixed Use Zone within the Hingaia Structure Plan Area.

5B.3.2.5.5 Methods

The following methods have been adopted to implement this policy:

a) Zoning

b) Activity controls

c) Performance standards

5B.3.2.6 EFFECTS OF PREVIOUS LAND USES

5B.3.2.6.1 Issue

Some rural service activity and horticultural practices which have historically been undertaken on the Peninsula have involved the use of pesticides, fungicides and fertilisers. In sufficient concentrations, residues of these chemicals may be harmful to human health.

5B.3.2.6.2 Objective

To ensure that the risk to human health associated with concentrations of residues of agricultural or horticultural chemicals is minimised.

5B.3.2.6.3 Policy

Prior to urban subdivision or development, the presence (or otherwise) of residues of agricultural chemicals shall be established, and appropriate remedial works recommended and undertaken to remove any significant risk to human health.

5B.3.2.6.4 Explanation

Some areas of the Hingaia Peninsula have been historically utilised for rural service activity, and horticultural purposes. These uses generally expired at the beginning of the 1990s, however some limited rural service and horticultural uses remain.

Conventional horticultural practices involved the utilisation of pesticides, fungicides and fertilisers which can potentially leave residues in the soil, some of which are believed to be harmful to public health. Residues in the soil in the Hingaia Peninsula are not believed to pose a significant risk, although

there are some localised hotspots which warrant further investigation and possible remedial works prior to urban development. A conservative approach has been adopted, requiring soil testing and identification of remedial works (if required) to be undertaken prior to any subdivision or development (whichever comes first).

5B.3.2.6.5 Methods

This policy will be implemented through rules.

5B.3.2.7 REVERSE SENSITIVITY

5B.3.2.7.1 Urban / Rural Interface

5B.3.2.7.1.1 Issue

Urbanisation of a formerly rural area adjacent to land which is likely to remain rural in the short to medium term has the potential to create conflicts between urban and rural / semi rural activities and land management practices, particularly in relation to noise, odour and spray drift.

5B.3.2.7.1.2 Objective

To minimise the potential for conflicts and nuisance effects between urban zones and adjacent future urban zoned land.

5B.3.2.7.1.3 Policy

Residential activity shall be located so as to minimise the potential for conflicts with adjacent rural and semi-rural activities.

5B.3.2.7.1.4 Explanation

There is the potential for conflicts arising from nuisance effects particularly in relation to odour, noise and spray drift associated with rural activities experienced at the interface of adjacent urban and rural / semi-rural areas. The Plan seeks to minimise the potential for these conflicts to arise by requiring a buffer to be provided at the boundary of new urban development zones and the Future Urban Zone.

5B.3.2.7.1.5 Methods

a) Performance standards – Rural Amenity Yard.

5B.3.2.7.2 Network Utility Operations

5B.3.2.7.2.1 Issue

Development in close proximity to existing electrical or natural gas infrastructure resources can adversely affect people's health and safety and the efficient and safe operation of those resources.

5B.3.2.7.2.2. Objective

To minimise risks to health and safety that can arise from development in close proximity to electrical and natural gas infrastructure.

To ensure that development is undertaken so as to minimise adverse effects on the efficient and safe operation of existing electrical and natural gas infrastructure.

5B.3.2.7.2.3 Policy

Development shall be undertaken so as to minimise the potential for conflicts with existing electrical or gas infrastructure resources such as high voltage transmission lines or natural gas supply stations.

5B.3.2.7.2.4 Explanation

Development in close proximity to high voltage electrical transmission infrastructure or natural gas supply stations has the potential to generate significant adverse effects and should be undertaken so as to ensure that risks to health and safety are minimised and that the integrity of supply is not compromised. The Plan seeks to ensure that appropriate distances are provided between development and existing infrastructure.

5B.3.2.7.2.5 Methods

a) Subdivision rules

5B.3.2.8 EXPECTED ENVIRONMENTAL RESULTS

The expected environmental results for the Hingaia Structure Plan Area are as follows:-

a) The establishment of a choice of housing types, commercial activity, social and community facilities.

b) Accommodation of a resident population of a minimum of 10,000 (a minimum of 5,000 for Hingaia East) and new employment opportunities upon the ultimate development of the Structure Plan Area.

c) Maintenance (as far as is practicable) of water quality and hydrological regimes.

d) Maintenance and enhancement of the habitat value of significant streams and water courses.

e) Maintenance and enhancement of amenity values and ecological values associated with the protection of the coastal edge of the Peninsula.

f) Medium density residential and mixed use development in close proximity to the Neighbourhood Centre.

g) Low Density Countryside Living on Pararekau Island with control over the number of lots and Identified Building Platforms.

h) Maintenance and enhancement of the amenity values and significant elements of the semi rural character of the Peninsula.

i) The protection of existing infrastructure resources.

j) Establishment of a high standard of amenity throughout the Structure Plan Area. Aspects of urban form expected are as follows:-

   i) Neighbourhood and local centres comprising accessible, walkable, and convenient community facilities, commercial activities and mixed use developments.

   ii) A connected street network, providing footpaths, cycle routes and vehicular access to the Neighbourhood Centre and main transport routes.

   iii) Complementary, consistent and legible landscaping themes within the road reserve and open spaces throughout the Structure Plan Area.

   iv) Quality public open spaces in locations that provide opportunities for passive surveillance (e.g. generally adjacent to streets rather than backing onto residential sections).

   v) Development that addresses and engages the street and public realm through quality urban design at the interface.

   vi) Residential developments that maintain the appearance of a high quality area with a spacious character.

   vii) A network of connected reserves providing pedestrian and cycle routes and enhancement of significant streams where appropriate.

   viii) Provision of public access to and along the coast with quality reserve areas which recognise recreation and amenity values.

k) Absence of human health and safety effects attributable to horticultural or other chemical residues, or proximity to gas or electrical infrastructure.

l) Absence of instances of complaints relating to urban / rural interface nuisance and effects.

m) Environmental results as anticipated in the Hingaia Stormwater Catchment Management Plan and the Pararekau Island Stormwater Catchment Management Plan (referred to in Part 5B.3.2.2 of Section One), namely:

i) Maintenance of estuarine environments, particularly within ecologically valuable maritime marshes that adjoin the Hingaia Peninsula.

ii) Maintenance and enhancement of freshwater aquatic environments, including wetlands and significant streams.

iii) Prevention or mitigation of excessive erosion of stream channels and coastal margins.

iv) Mitigation of the risk to life and property from stormwater flows.

5B.3.2.9 PROCEDURES FOR MONITORING

In order to assess the suitability and effectiveness of the objectives, policies and methods for achieving the anticipated environmental results for the Hingaia Structure Plan Area, the Council will develop a monitoring programme which may include the following monitoring procedures:

a) Monitoring complaints and enforcement actions regarding the nuisance aspects of activities in residential, countryside living and mixed use areas;

b) Undertaking surveys of residents to ascertain the level of satisfaction with the facilities available in mixed use areas, choice of housing stock, the useability and quality of the public open space network, the level of amenity and environmental quality being achieved and the availability of transport options;

c) Monitoring resource consents in residential, countryside living and mixed use areas, including the number of applications granted consent, diversity of housing types, compliance with consent conditions, and the effectiveness of those conditions.

d) Undertaking safety audits of public spaces (e.g. residential streets, neighbourhood parks and walkways) and analysing crime and traffic accident statistics to assess the impacts of design and planning on the sense of personal safety people might experience in residential areas;

e) Undertaking streetscape assessments of the level of visual amenity being attained in residential areas.

f) Monitoring the level of uptake of vacant land and the density to which it is developed.

g) Monitoring the diversity of housing types by assessing building consents and census data.

h) Monitoring of water and sediment quality and the invertebrate community composition in streams and in the adjacent estuary.

i) Monitoring of stormwater treatment devices, including siltation measurements and sediment contamination analysis in ponds and wetlands.

j) Inspection of stream channels and pipe outfalls after major rainfall events, to assess any channel erosion and to estimate peak water levels.

k) Benchmarking and monitoring the rate of coastal erosion in identified areas.

l) Monitoring of public health records.

m) Monitoring of complaints to Council regarding cross boundary rural / urban nuisance issues.

5B.3.3 IMPLEMENTATION

The objectives and policies set out above will be implemented through the application of zones within the Structure Plan Area, with rules applying to the zones. Each of the zones may have more specific objectives and policies which apply in addition to those set out above. The zones within the Structure Plan Areas are as follows:

a) Residential 9 Zone (refer to Part 17.1 of Section Three): This zone provides for generally lower density residential development with a minimum average lot size of 600m^2. Multiple-unit developments at higher densities are enabled in appropriate locations. This zone is applied to land to the north and south of Hingaia Road.

b) Mixed Use 1 Zone (refer to Part 17.2 of Section Three): This is a Mixed Use Zone providing opportunities for retail, commercial, medium density residential development, and for community facilities. It is located in close proximity to the main transport route (Hingaia Road/State Highway 1).

c) Pararekau Island Countryside Living (refer to Part 17.3 of Section Three): This is a low density zone, providing for the establishment of up to 11 countryside residential lots on Pararekau Island, with Identified Building Platforms, giving particular recognition to the landscape characteristics of the coastal environment, existing open space, visual amenity values and archaeological values of the Island.

5B.3.4 RULES APPLYING TO ALL HINGAIA STRUCTURE PLAN ZONES

5B.3.4.1 SOIL INVESTIGATION

1. Prior to the development of land within the Hingaia Structure Plan Area, soil sampling and testing shall be undertaken to verify the presence (or otherwise) of contaminants associated with rural service activity, horticultural use or other potentially contaminating land uses and a report shall be provided to the satisfaction of the Council setting out the results of this sampling, together with recommendations as to (if required) appropriate remedial works.

2. Where the Council is satisfied that no remedial works are necessary, no further action shall be required in this regard. Council will confirm this in writing.

3. In instances where the Council is satisfied that remedial work may be required, then any activity or development on the site which would

otherwise be a Permitted or Controlled Activity will be a Restricted Discretionary Activity. Council will confirm this in writing.

4. Except as provided for by Section 95A(4) of the Resource Management Act 1991, such an application will be considered without notification or the need to obtain approval from affected persons.

5. Council has restricted the exercise of its discretion to the following matters and may impose conditions in relation to these.

   a) The nature, extent and implementation of remedial works proposed

   b) Mitigation measures necessary to deal with any potential adverse effects of undertaking these works

   c) Verification of effective completion of works.

6. In instances where the Council is satisfied that remedial work may be required, any activity or development which is otherwise provided for as a Restricted Discretionary Activity, Discretionary Activity or Non-Complying Activity will in addition to any other relevant criteria be assessed with regard to the matters set out in 5 above and conditions may be imposed in respect of these.

7. Council retains the discretion to waive the requirements above and may do so in instances where an investigation has been undertaken previously, and either the Council is satisfied that no remediation is necessary or any remediation required has or will be implemented.

Notes:

a) In instances where subdivision precedes development, the soil investigation report shall be submitted together with the application to subdivide. The requirement to undertake any recommended works (if required) will be imposed as a condition of the subdivision consent.

b) Consent from the Auckland Council may be required for earthworks, or for remediation of sites which are contaminated associated with remedial works.

Explanation

Investigations have identified a very limited risk to human health caused by contamination of soil by rural servicing activity; horticultural chemical residue and previous land fill activity. The Plan adopts a precautionary approach in respect of this risk and requires site specific investigation and rehabilitation as part of the subdivision and development process and prior to occupation by new residents.

5B.4 DRURY SOUTH STRUCTURE PLAN AREA

5B.4.1 STRATEGIC CONTEXT

The Drury South Structure Plan Area has been identified as a logical location in the southern sector for addressing part of the region wide shortage of land suitable for "Land Extensive Industrial Activities" (i.e. activities such as manufacturing, construction, wholesale trade, transport and storage, warehousing and distribution). The Auckland Regional Policy Statement states that such activities typically require:

- Large land parcels;
- Relatively low land costs per square metre;
- Preferably vacant land;
- Good transport access, especially road/motorway;
- A guaranteed and consistent energy supply;
- Distance from sensitive land uses; and
- Medium to high broadband capacity.

The Drury South Structure Plan Area has all these attributes and its development for such activities also addresses the need to protect the extraction potential of the regionally important aggregate resource of the Drury Quarry. It will do this by reducing the potential for conflicting land uses around the Quarry and its haul routes to the regional road network. The Drury South Structure Plan Area has been identified as an appropriate location to accommodate Land Extensive Industrial Activities and the projected growth in employees within the southern sector of the Auckland Region.

The structure plan also implements the former Papakura District Council's Economic Development Strategy which sought the development of a "heavy construction cluster" and "logistics hub" within the District. The development of the structure plan area for such activities is consistent with the Auckland Regional Growth Strategy in that it allows the relocation of Land Extensive Industrial Activities out of the centres and corridors within the Isthmus and the southern sector of the region. These centres and corridors have been identified for urban intensification and regeneration programmes but the presence of Land Extensive Industrial Activities and their associated effects is constraining this potential.

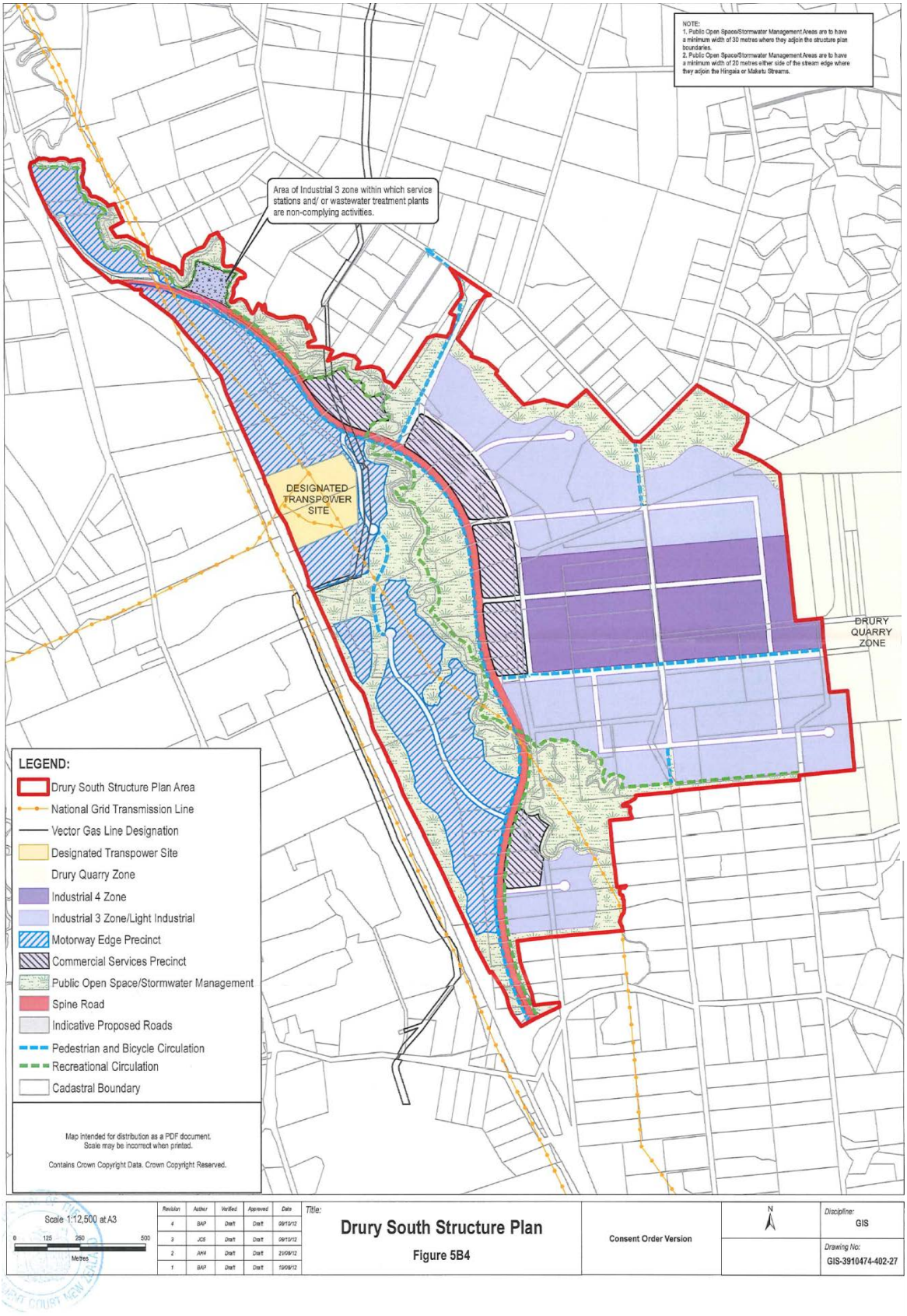
The structure plan area is strategically located to take advantage of its proximity to State Highway 1 and the North Island Main Trunk Railway which jointly provide the surface transport links between the Auckland Region and the rest of New Zealand including the Waikato and Bay of Plenty markets and the increasingly important Port at Tauranga. While not essential to industrial development within the structure plan area, there is the opportunity in the future to develop an inland port facility in the vicinity to service freight from industrial and rural activities in both the Franklin and Manurewa-Papakura Wards. The development of the structure plan area will make better use of Auckland's available transport capacity by encouraging counter peak traffic flows and has the potential to reduce the high number of car-based commuter trips leaving the Manurewa -Papakura and Franklin Wards through the creation of up to 6,900 new jobs locally. The structure plan area is also well located to take advantage

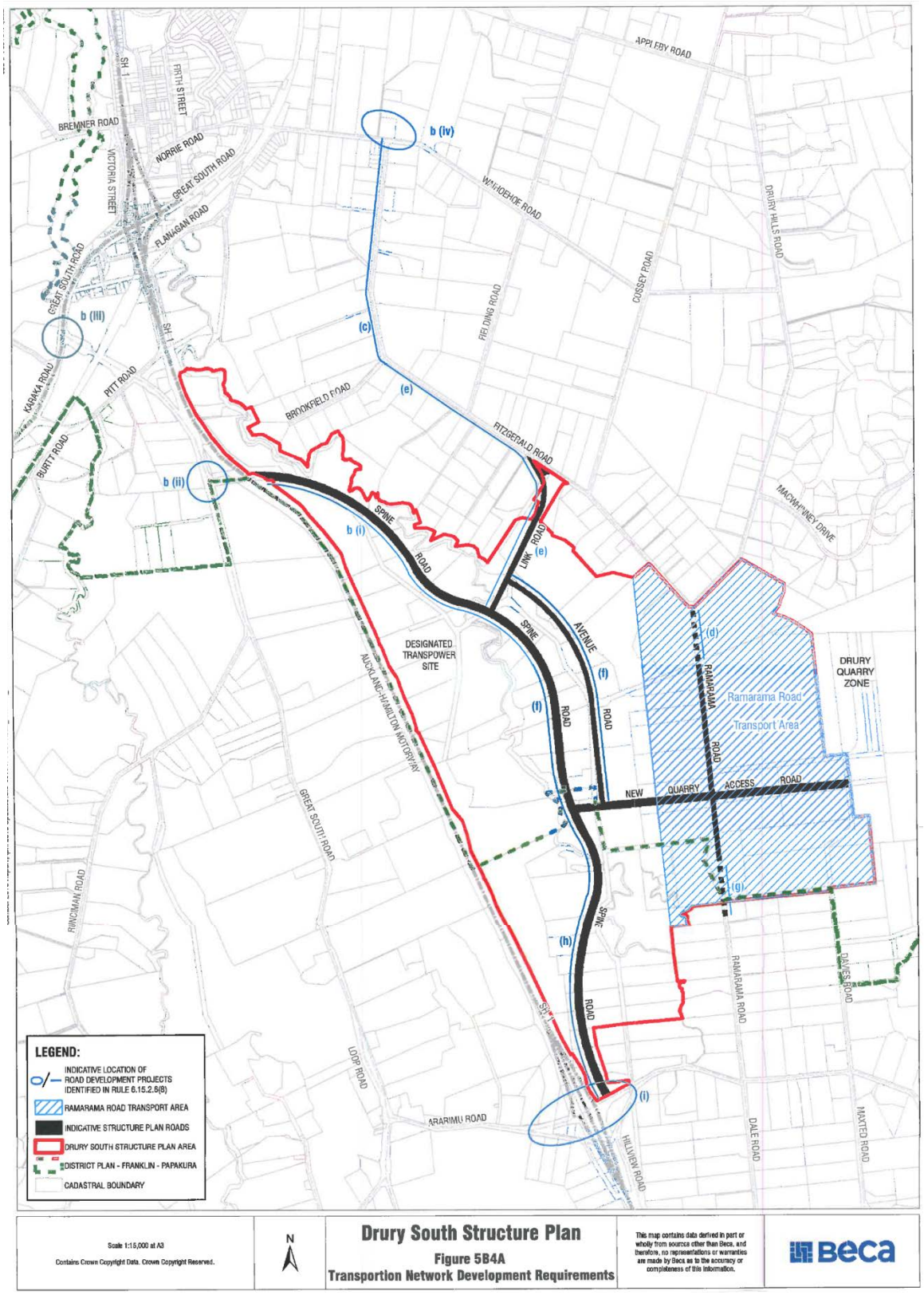
of the possible future regional arterial road link between Drury and the Manukau Central / East Tamaki industrial and residential nodes as well as other significant infrastructure such as the 220/110kV Transpower transmission network, the Counties Power high voltage supply network, the Vector high pressure gas pipeline, the Watercare Waikato River bulk water pipeline and the Telecom high speed broadband fibre optic cable.

A structure plan process for the Drury South area has been undertaken to identify the constraints and opportunities of the land and the objectives of the community and development sector and has established an overall framework for the planned growth and development of the area.

The Drury South Structure Plan Area is shown on Figure 5B.4. It is 361 hectares in area and is bounded by State Highway 1 in the west, the Drury Quarry and the Hunua foothills in the east and the rural areas of Fitzgerald Road in the north and Ararimu Road in the south. Most of the land within the structure plan area has a flat to subdued contour and is traversed by the Hingaia Stream and its tributaries including the Maketu Stream. Land which surrounds and defines the structure plan area has more pronounced topographical contours.

The structure plan area lies between the Drury and Ramarama interchanges on State Highway 1 and local traffic patterns are currently dominated by truck traffic accessing the Drury Quarry. The quarry activity is a key feature of land use activity in the area but there are a range of other rural and semi–urban activities of a reasonably intensive nature undertaken in the area including a chicken processing factory, horticultural glasshouses and pack houses/stores and a major Transpower switching yard.


NOTE:
1. Public Open Space/Stormwater Management Areas are to have a minimum width of 30 metres where they adjoin the structure plan boundaries.
2. Public Open Space/Stormwater Management Areas are to have a minimum width of 20 metres either side of the stream edge where they adjoin the Hingaia or Maketu Streams.
Area of Industrial 3 zone within which service stations and/ or wastewater treatment plants are non-complying activities.
DESIGNATED TRANSPOWER SITE
DRURY QUARRY ZONE
LEGEND:
Drury South Structure Plan Area
National Grid Transmission Line
Vector Gas Line Designation
Designated Transpower Site
Drury Quarry Zone
Industrial 4 Zone
Industrial 3 Zone/Light Industrial
Motorway Edge Precinct
Commercial Services Precinct
Public Open Space/Stormwater Management
Spine Road
Indicative Proposed Roads
Pedestrian and Bicycle Circulation
Recreational Circulation
Cadastral Boundary
Map intended for distribution as a PDF document.
Scale may be incorrect when printed.
Contains Crown Copyright Data. Crown Copyright Reserved.
Scale 1:12,500 at A3
0 125 250 500
Metres
Revision Author Verified Approved Date
4 BAP Draft Draft 09/10/12
3 JCB Draft Draft 09/10/12
2 AHI Draft Draft 21/09/12
1 BAP Draft Draft 19/09/12
Title:
Drury South Structure Plan
Figure 5B4
Consent Order Version
N
Discipline: GIS
Drawing No: GIS-3910474-402-27


APPLEBY ROAD
SH 1
FRITH STREET
BREMNER ROAD
VICTORIA STREET
NORRIE ROAD
GREAT SOUTH ROAD
FLANAGAN ROAD
b (iv)
WAIHOEHOE ROAD
DRURY HILLS ROAD
CUSSEY ROAD
FIELDING ROAD
b (iii)
(c)
KARAKA ROAD
PITT ROAD
BURTT ROAD
BROOKFIELD ROAD
(e)
FITZGERALD ROAD
b (ii)
b (i)
SPINE ROAD
LINK ROAD
MACWHINNEY DRIVE
DESIGNATED TRANSPOWER SITE
AVENUE
(f)
(d)
DRURY QUARRY ZONE
Ramarama Road Transport Area
RAMARAMA ROAD
NEW QUARRY ACCESS ROAD
(g)
AUCKLAND-HAMILTON MOTORWAY
GREAT SOUTH ROAD
RINCMAN ROAD
(h)
SPINE ROAD
RAMARAMA ROAD
DAVIES ROAD
LOOP ROAD
ARARIMU ROAD
(i)
HILLVIEW ROAD
DALE ROAD
MAXTED ROAD
LEGEND:
INDICATIVE LOCATION OF ROAD DEVELOPMENT PROJECTS IDENTIFIED IN RULE 6.15.2.5(8)
RAMARAMA ROAD TRANSPORT AREA
INDICATIVE STRUCTURE PLAN ROADS
DRURY SOUTH STRUCTURE PLAN AREA
DISTRICT PLAN - FRANKLIN - PAPAKURA
CADASTRAL BOUNDARY
Scale 1:15,000 at A3
Contains Crown Copyright Data. Crown Copyright Reserved.
N
Drury South Structure Plan
Figure 5B4A
Transportion Network Development Requirements
This map contains data derived in part or wholly from sources other than Beca, and therefore, no representations or warranties are made by Beca as to the accuracy or completeness of this information.
Beca

5B.4.2 ISSUES, OBJECTIVES, POLICIES AND EXPECTED ENVIRONMENTAL RESULTS FOR THE DRURY SOUTH STRUCTURE PLAN AREA

A number of resource management issues of particular relevance to the Drury South Structure Plan Area have been identified. These are set out below together with the objectives, policies, and a summary of methods that have been adopted to implement the objectives and policies. These methods include the rules of the industrial and reserve zones used to implement the Drury South Structure Plan.

5B.4.2.1 URBAN FORM AND CONTAINMENT

5B.4.2.1.1 Issue

The development of land for Land Extensive Industrial Activities can lead to further pressure for other forms of urban development including residential development and intensive commercial development such as that found in town centres. This has the potential to undermine regional objectives of achieving a compact and contained urban f orm and more intensive development in existing urban centres and corridors to support sustainable transport modes and travel patterns.

As the Drury South Structure Plan Area is a node of industrial development adjoining rural activities there is also a risk that the quality, function and integrity of the adjoining rural area could be undermined if defensible boundaries to the structure plan area are not defined and reinforced through physical as well as legal measures.

5B.4.2.1.2 Objective

To achieve the subdivision and development of the Drury South Structure Plan Area in a way which:

a) Accommodates projected employment growth and demand for land suitable for Land Extensive Industrial Activities in the southern sector of the Auckland region;

b) Maintains a compact and contained urban form;

c) Does not undermine the potential for urban intensification in existing urban centres and corridors; and

d) Maintains the quality, function and integrity of the adjoining rural environment.

5B.4.2.1.3 Policy

Subdivision and development within the Drury South Structure Plan Area shall:

a) Be designed and managed to accommodate Land Extensive Industrial Activities with limited provision for other commercial services that support those activities;

b) Be in general accordance with the Drury South Structure Plan (see Figure 5B.4) and be contained within the area shown on that plan; and

c) Be designed and managed so as to provide a significant permanent public open space buffer and defensible boundary between adjacent rural activity (including rural residential development) and Land Extensive Industrial Activities.

5B.4.2.1.4 Explanation

This objective and policy set is designed to ensure that the Drury South Structure Plan area is developed in a way which reflects its primary function to provide for Land Extensive Industrial Activities in the southern sector of the Auckland Region and to support the regional growth strategy of containment and intensification. It achieves this through restricting commercial services which support Land Extensive Industrial Activities to specific areas within the Structure Plan Area called Commercial Services Precincts rather than allowing them to disperse throughout the Light Industrial Zone. These activities are limited to the commercial services precincts to ensure that the amount of land available for Land Extensive Industrial Activities is maximised.

Land Extensive Industrial Activities require large areas of flat land and the extent of this flat land together with the major infrastructural barrier of the southern motorway defines the structure plan area with surrounding rural land being more elevated and dissected in terms of its topography. As well as these topographic constraints, the defensibility of the northern and southern boundaries of the structure plan area are further reinforced by permanent and substantial public open space buffers which will be required as a part of any subdivision consent.

5B.4.2.1.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation Section 5B.4.3;

b) Industrial Zone rules and assessment criteria which are specific to the Drury South Structure Plan area;

c) Reserve Zone rules;

d) Subdivision rules and assessment criteria.

STREAM ECOLOGY, NATURAL VEGETATION AND HABITATS

5B.4.2.2.1 Issue

The Drury South Structure Plan Area contains the Hingaia Stream and its tributaries including the Maketu Stream. The main stream stems are ecologically significant and are also flanked by some locally significant vegetation in places although this does not currently provide a continuous corridor.

Urban development has the potential to adversely affect water quality and instream ecological values through sediment discharges during the development

process, and through pollutant runoff from impervious surfaces arising from development. The loss of indigenous vegetation and habitats can also occur during the development process.

5B.4.2.2.2 Objective

To achieve development which maintains and enhances the stream ecology and the natural vegetation and habitat values of the Hingaia and Maketu Streams.

5B.4.2.2.3 Policy

Subdivision and development shall avoid, remedy or mitigate adverse effects on stream ecology and natural vegetation and habitats by:

a) Protecting and enhancing the significant streams and vegetation identified in the Drury South Structure Plan within reserves; and

b) Enhancing the biodiversity of ecological resources and linkages and restoring degraded ecosystems while reducing stream bank erosion through riparian planting along retained watercourses

5B.4.2.2.4 Explanation

This objective and policy set is designed to ensure that the Drury South Structure Plan area is developed and operated in a way which reflects the need to avoid, remedy or mitigate adverse effects on stream ecology and natural vegetation and habitats. The policies address the need to protect significant streams and vegetation so as to provide ecological linkages through the area and improve stream habitat quality through riparian planting programmes.

5B.4.2.2.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3;

b) Industrial Zone rules and assessment criteria which are specific to the Drury South Structure Plan Area;

c) Reserve Zone rules;

5B.4.2.3 CULTURAL HERITAGE VALUES

5B.4.2.3.1 Issue

The main watercourses of the Hingaia and the Maketu are culturally significant, for both their intrinsic qualities and as part of the original pathways between hill top pa and the Manukau Harbour.

While there are no known archaeological sites or waahi tapu within the Structure Plan Area itself, development of the structure plan area for industrial purposes has the potential to adversely affect the cultural heritage values of the Hingaia and the Maketu Streams if not carefully controlled.

5B.4.2.3.2 Objective

To maintain and enhance the cultural heritage values of the Drury South Structure Plan Area.

5B.4.2.3.3 Policy

The cultural heritage values of the Hingaia and Maketu streams are to be maintained and enhanced through the setting aside of reserve areas alongside the streams and through riparian planting and enhancement programmes designed to reflect the cultural linkages between historical hill top pa and coastal areas in a physical way.

5B.4.2.3.4 Explanation

This objective and policy set is designed to ensure that the Drury South Structure Plan area is developed in a way which recognises the outcomes of the evaluation and consultation undertaken in respect of existing cultural heritage values within the Structure Plan Area. Significant values were identified in relation to the protection and enhancement of the Hingaia and Maketu streams and their surrounds and these values have been recognised in the design of the Structure Plan Area in terms of the areas to be set aside for public open space and reserve purposes. The setting aside of public open space and reserves and the development of walkways, cycle paths and wetlands within the Structure Plan Area around these watercourses has the potential to re-establish and enhance the cultural linkages between historical hill top pa and coastal areas in a physical way. Further, there is the opportunity within the wetland and reserve areas that will need to be set aside from development for tangata whenua to exercise their kaitiakitanga responsibilities in relation to the Hingaia and the Maketu and for there to be some tangible recognition of the cultural value of the area to be established. It is important to work co-operatively with tangata whenua in developing ongoing enhancement and management programmes so as to ensure that tangata whenua can exercise their ongoing kaitiakitanga responsibilities in this area.

5B.4.2.3.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3;

b) Reserve Zone rules;

c) The development and implementation of reserve management plans to enhance the Hingaia and Maketu Streams and their surrounds;

d) Riparian ecological enhancement programmes to be established and implemented in conjunction with tangata whenua

e) Ensure any reserve management plans for the Hingaia and Maketu Streams incorporate historic and cultural values.

5B.4.2.4 LANDSCAPE, AIR QUALITY AND AMENITY VALUES

5B.4.2.4.1 Issue

Landscape change, air quality, noise, vibration and glare effects of industrial development, unless carefully managed, can have adverse effects on the landscape and amenity values of adjacent rural land and strategic roads.

5B.4.2.4.2 Objective

To maintain and enhance landscape and visual amenity values within the structure plan area and to protect the air quality, acoustic and other amenity values of surrounding rural areas.

5B.4.2.4.3 Policy

Landscape air quality and amenity values shall be maintained and, where appropriate, enhanced by:

a) Maintaining a sense of openness and naturalness on land adjacent to the Southern Motorway;

b) Maintaining visual and physical links to the rural setting within the Structure Plan Area;

c) Ensuring complementary, consistent and coherent landscaping themes are utilised throughout the Structure Plan Area;

d) Designing and constructing attractive wetland areas for stormwater treatment and detention that also provide reserve and visual amenity opportunities;

e) Providing public open space buffer areas between the land to be developed for business activities and surrounding rural land;

f) Providing adequate buffer separation distances for industrial activities that have the potential to generate air discharges which could have adverse effects on amenity values in surrounding rural zones;

g) Requiring resource consent for those activities that have the potential to generate air discharges which could have adverse effects on human health; and

h) Ensuring that the activities permitted in and performance standards applying to industrial areas adjacent to rural areas provide appropriate protection of amenity values (including noise, vibration and glare).

5B.4.2.4.4 Explanation

This objective and policy set recognises the importance of retaining the perception of openness and naturalness of the Structure Plan Area when viewed from the Southern Motorway through careful design and implementation of the structure plan framework and, at a more detailed level, the control of the design and appearance of buildings, site layout and landscaping particularly in areas alongside the Southern Motorway. The importance of protecting other amenity values of adjacent rural areas is also recognised.

Land within the Drury South Structure Plan Area is close to a large viewing audience using the Southern Motorway and a more dispersed viewing audience in the surrounding rural zones. Land within the structure plan area has relatively low visual and landscape amenity values as it is affected by electricity transmission lines and nearby existing quarrying activity. However, views to the Hunua foothills across open countryside from the Southern Motorway (State Highway 1) exist and there is a general perception of travelling through a rural area (albeit extensively modified by urban influences) when using the Southern Motorway. Industrial development within the Structure Plan Area, unless carefully managed, could adversely affect this perception and the area's landscape and natural heritage values.

Industrial development, unless carefully managed, can also have adverse effects on other amenity values of surrounding rural lands including noise, vibration and air quality effects from traffic, construction and industrial operations and glare from lighting and large expanses of roofing.

5B.4.2.4.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3;

b) Industrial Zone rules and assessment criteria which are specific to the Drury South Structure Plan area;

c) Reserve Zone rules;

d) Subdivision rules and assessment criteria which are specific to the Drury South Structure Plan area.

5B.4.2.5 QUALITY OF THE NEW URBAN ENVIRONMENT

5B.4.2.5.1 Issue

Industrial areas, if not carefully designed and managed, can result in low levels of amenity for users.

Industrial areas have, in the past, been characterised by environments which are difficult for pedestrians and cyclists to negotiate, and which exhibit low quality streetscapes. Such areas often lack of conveniently located, essential commercial service activities for employees and businesses such as food and beverage outlets, banks, post offices, childcare and medical centres. These activities are often dispersed throughout industrial areas in poorly chosen locations near incompatible activities and the end result is low levels of amenity for users.

5B.4.2.5.2 Objective

To facilitate the establishment of a convenient and well designed industrial area with good quality streetscapes and commercial service precincts.

5B.4.2.5.3 Policy

Subdivision and development within the Drury South Structure Plan Area shall:

a) Result in road and open space networks which exhibit a high degree of connectivity, safety and convenience;

b) Ensure buildings address and engage the street and public realm;

c) Provide high quality public open spaces in locations that result in opportunities for passive surveillance; and

d) Provide compact and contained commercial service precincts designed to exhibit a high standard of amenity and pedestrian safety and convenience, and located so as to be accessible to public transport.

5B.4.2.5.4 Explanation

This objective and policy set recognises that the quality, layout and design of an urban area can strongly influence the amenity, attractiveness and functioning of that area and the safety and wellbeing of people working in that area. The Drury South Structure Plan Area provides an opportunity for establishment of a new industrial area with high amenity values and compact and contained commercial service precincts that provide a high standard of amenity and pedestrian safety and convenience, and contribute to the creation of a positive sense of place and identity.

5B.4.2.5.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3;

b) Industrial Zone rules and assessment criteria which are specific to the Drury South Structure Plan area including special controls over the Commercial Services and Motorway Edge precincts;

c) Subdivision rules and assessment criteria which are specific to the Drury South Structure Plan area.

5B.4.2.6 TRANSPORT AND LAND USE INTEGRATION

5B.4.2.6.1 Issue

Land Extensive Industrial Activities conventionally generate low numbers of employees per hectare which can make the provision of economic passenger transport difficult to achieve. Industrial areas are also rarely designed to facilitate walking and cycling and have often been developed with an exclusive reliance on motor vehicles for employee commuting and freight movement.

5B.4.2.6.2 Objective

To create a pattern of development that provides for the safe and efficient movement of motor vehicles, cyclists and pedestrians and supports passenger transport modes.

5B.4.2.6.3 Policy

Integration between land use and transportation within the structure plan area shall be achieved by:

a) Locating higher employee generating activities in commercial services precincts close to potential public transport routes;

b) Designing the road network to service public transport modes and to enable all traffic to flow freely and safely including by restricting vehicular access onto the Spine Road;

c) Making special provision for cyclists on heavy traffic routes and providing cycle paths and pedestrian routes that are safe, direct, barrier free have smooth surfaces and which are overlooked by roads or land uses where passive surveillance is likely to occur; and

d) Ensuring subdivision and development is designed and managed to facilitate the provision of public transport and the use of energy efficient transport modes such as cycling, motorcycling and car/van pooling to the extent possible with Land Extensive Industrial Activities.

5B.4.2.6.4 Explanation

This objective and policy set is designed to ensure that the Drury South Structure Plan area is developed in a way which, to the extent possible in an area which caters for Land Extensive Industrial Activities, supports passenger transport and minimises private motor vehicle usage. Higher intensity uses are located close to the primary road network where they will support public transport modes and where, through clustering of like uses, higher amenity standards will be attained and reverse sensitivity effects on industry will be reduced.

5B.4.2.6.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3;

b) Industrial Zone rules and assessment criteria which are specific to the Drury South Structure Plan area including rule 6.15(15) specifying various Multimodal Transport Requirements and rule 6.15.2.6 requiring assessment of subdivision and development applications in terms of whether specified transportation network upgrading projects will be undertaken at certain development thresholds ;

c) Subdivision rules and assessment criteria which are specific to the Drury South Structure Plan area.

5B.4.2.7 INFRASTRUCTURE PROVISION

5B.4.2.7.1 Issue

Infrastructure networks within the Structure Plan Area such as the road, stormwater, wastewater, water supply and energy and communications networks are either not available or are currently inadequate to service industrial development. New and upgraded infrastructure will be required to be planned and constructed in time to service development within the Structure Plan Area.

Industrial development in the Structure Plan Area could also potentially exacerbate existing capacity and safety problems at specific locations in the external road network such as at the Quarry Road intersection with Great South Road.

5B.4.2.7.2 Objective

To ensure the timely and co-ordinated provision of robust and sustainable road, stormwater, wastewater, energy and communications infrastructure networks in the Structure Plan Area while ensuring any adverse effects on road or other infrastructure networks outside the structure plan area is avoided or mitigated.

5B.4.2.7.3 Policy

A robust and sustainable infrastructure network within the Drury South Structure Plan Area shall be achieved by ensuring that:

a) Stormwater, water, wastewater, communications and energy networks are adequately provided for and are available in a timely and co-ordinated manner to service industrial activity within the structure plan area;
b) Road network (including the state highway) improvements both within and outside the structure plan area are co-ordinated with development within the structure plan area;
c) A stormwater network incorporating streams, primary drainage network and overland flowpaths is implemented; and
d) Where practical, cost and energy efficient ways of providing infrastructure are utilised including stormwater and grey water reuse in industrial processes.

5B.4.2.7.4 Explanation

This objective and policy set is designed to ensure that the Drury South Structure Plan area is developed in a way which facilitates the timely and co-ordinated provision of road and other infrastructure networks both within and outside the structure plan area which are essential for servicing Land Extensive Industrial Activities.

At the time of preparing this plan change, there is no public water supply or wastewater network serving the Drury South Structure Plan Area. The Drury South Structure Plan Area is able to be serviced with potable water supply via an offtake to the Waikato pipeline. However, further investigations and refinement of design and further refinement of design assumptions are still required. To connect the Drury South Structure Plan area to a wastewater network will require significant wastewater infrastructure upgrades, including the construction of a lengthy wastewater rising main and/or a local wastewater treatment plant. A local wastewater treatment may therefore be the preferred short to medium term option. A network utility operator will need to approve the design and construction of the plant so as to ensure long term compatibility with its treatment network standards.

5B.4.2.7.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3;

b) Industrial Zone rules and assessment criteria which are specific to the Drury South Structure Plan area including rule 6.15.2.6 requiring assessment of subdivision and development applications in terms of whether specified transportation network upgrading projects will be undertaken at certain development thresholds;

c) Subdivision and development rules, standards and assessment criteria;

d) A funding agreement between developer(s) and the Council for the provision of infrastructure.

5B.4.2.8 FLOOD HAZARDS AND STORMWATER MANAGEMENT

5B.4.2.8.1 Issue

The lower part of the Hingaia Stream catchment has historically been subject to flooding during and after storm events. Part of the Structure Plan area is within the Hingaia Stream 100 year Average Recurrence Interval (ARI) floodplain. Unless mitigated by stormwater management measures, flooding is likely to increase in severity and frequency with increases in impervious surfaces associated with building and infrastructure development and from climate change. Such increased flooding will affect areas downstream of the Structure Plan Area and bank erosion problems may also become more accentuated with increased peak velocities resulting from increased imperviousness.

Additionally, there is a risk to surface and ground water quality unless stormwater runoff from impervious surfaces within industrial areas is managed through the use of on site containment and treatment methods and catchment based stormwater treatment ponds.

5B.4.2.8.2 Objective

1. To ensure that subdivision and development within the Drury South Structure Plan Area:

   a) Does not result in increased flood risk to habitable rooms for all flood events from the two year and up to the 100 year ARI flood event downstream and upstream of the Structure Plan Area

   b) Manages flood risk within the Structure Plan Area

   c) Surface and ground water quality are not adversely affected by stormwater runoff from the structure plan area.

5B.4.2.8.3 Policy

Increased flood risk to habitable rooms for all flood events from the two year and up to the 100 year ARI flood event

i) Upstream and downstream of the Structure Plan Area will be avoided;

ii) Within the Structure Plan Area will be managed; and

iii) Surface and ground water quality shall not be adversely affected by stormwater runoff from the structure plan area by ensuring that:

   a) Adequate provision is made within stormwater management areas in the structure plan area to detain the 100 year Average Recurrence Interval (ARI) event without adverse effect on the extent of flooding of upstream and downstream areas;

b) Earthworks to form the modified floodplain are undertaken to ensure flood effects on downstream or upstream areas are not exacerbated;

c) Location of buildings within the 100 year ARI modified floodplain is avoided;

d) Location of infrastructure within the 100 year modified ARI floodplain is avoided unless it can be designed to be resilient to flood related damage and does not exacerbate flood risks for upstream or downstream activities;

e) Overland flowpaths are identified in a stormwater management plan or network discharge consent and ensuring that that they remain unobstructed and able to convey surface water runoff safely into the reticulated stormwater network;

f) On site stormwater management and containment and the provision of catchment based stormwater treatment ponds avoids or mitigates any adverse effects on surface or ground water quality.

5B.4.2.8.4 Explanation

This objective and policy set is designed to ensure that the Drury South Structure Plan area is developed in a way which addresses the significant issues of avoiding and mitigating flood hazards and adverse effects on surface and ground water quality within the Structure Plan area both through the provision of infrastructure and through the implementation of district and regional plan controls.

Generally the natural drainage pattern within the Drury South Structure Plan Area is to be protected through the establishment of of stormwater management areas, These areas form the backbone of managing water quality, flooding, ecological protection and enhancement, and together with the riparian margins of the streams, from the provision of an open space network contributing to overall amenity.

Some existing streams will be piped and some diverted, as shown in the Structure Plan, as part of the conversion of the land from rural activities to industrial land uses. As a form of environmental compensation to off-set the loss of stream environments, there will be extensive replanting of riparian areas alongside the streams to be retained.

There will also be extensive re-contouring of much of the land to make it useable for land extensive industry activities, and this will result in a future flood hazard area (100 year ARI modified flood plain) that varies from the current location of the flood plain. The future (modified) flood hazard area land is largely contained within the stormwater management areas, along the water courses. The stormwater management areas will be required to be vested in Council at the time of subdivision or development. The exact boundaries of the stormwater management area will need to be determined through detailed survey and analysis at the time of subdivision.

5B.4.2.8.5 Methods

The following have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3 and district plan rules relating to the existing and future flood hazard map in the District Plan;

b) Rules relating to earthworks and flood hazards in relation to subdivision and development in the Industrial zones and in Section 3 Part 2 (Protection of the Urban Environment) of the District Plan;

c) Subdivision rules and assessment criteria;

d) Rules relating to discharge of contaminants to water and groundwater and the discharge of contaminants from industrial and trade processes within the *Auckland Regional Plan : Air, Land and Water.*

5B.4.2.9 EARTHWORKS

5B.4.2.9.1 Issue

In the Drury South Structure Plan Area, although the existing terrain is relatively flat, there will need to be a significant volume of earthworks as part of this development process due to the scale of the area and the requirement to produce large flat industrial development sites and avoid flood hazards while avoiding the need for later site specific earthworks and retaining walls. Apart from temporary visual effects, a significant volume of earthworks has the potential to result in adverse effects on water quality in the receiving environment unless appropriate sediment control methodologies are adopted. There are also small areas of soil that have been contaminated by past rural activities which will need to be carefully managed.

The earthworks required to prepare the land for Land Extensive Industrial Activities will necessarily require the diversion and piping of some of the minor watercourses traversing the structure plan area. Many of these have already been substantially modified by previous farming activity and provide only a degraded level of visual amenity and habitat. Nonetheless the diversion or piping of such watercourses will need to be mitigated by the landscape and ecological enhancement of the remaining significant natural watercourses (primarily the Hingaia Stream and the Maketu Stream) as well as those watercourses which have been diverted.

5B.4.2.9.2 Objective

That the adverse effects of earthworks are avoided, remedied or mitigated.

5B.4.2.9.3 Policy

Subdivision and development shall avoid, remedy or mitigate the adverse effects of earthworks by ensuring that:

a) Any re-contouring, filling or excavation works avoid or mitigate adverse effects on the visual quality of the landscape;

b) Damage, danger or nuisance to adjacent property is avoided or mitigated;

c) Any areas of contaminated soil are identified and remediated or removed;

d) Sediment discharge to surface water is adequately controlled and its adverse effects on water quality are mitigated in accordance with the *Auckland Regional Plan: Sediment Control*; and

e) Any diversion or piping of existing degraded or modified watercourses is mitigated by the ecological enhancement and landscape planting of existing natural and diverted watercourses within and immediately adjacent to the structure plan area;

f) Suitable earthworks protocols are in place in respect of discovery of unrecorded archaeological sites.

5B.4.2.9.4 Explanation

This objective and policy set is designed to recognise that extensive earthworks will be required to ensure that the Drury South Structure Plan area is developed in a way which is appropriate to accommodate the large flat, flood-free and well serviced sites that are required by Land Extensive Industrial Activities.

5B.4.2.9.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3 and district plan rules relating to the subdivision and development in the Industrial zones and in Section 3 Part 2 (Protection of the Urban Environment) of the District Plan;

b) Subdivision rules and assessment criteria;

c) Rules relating to the discharge of sediment from earthworks within the Auckland Regional Plan; Sediment Control;

d) Rules relating to the diversion and piping of watercourses within the Auckland Regional Plan : Air, Land and Water; and

e) Reserve Zone rules.

f) The need to apply for authority from the New Zealand Historic Places Trust to damage, destroy or modify any potential archaeological sites within the DSSP.

5B.4.2.10 REVERSE SENSITIVITY EFFECTS ON DRURY QUARRY, THE INDUSTRIAL 4 ZONE AND SURROUNDING RURAL ZONES AND SIGNIFICANT ELECTRICITY, GAS AND TELECOMMUNICATIONS INFRASTRUCTURE

5B.4.2.10.1 Issue

Quarrying and aggregate processing activity and the transportation of aggregate material from the existing Drury Quarry can result in adverse

environmental effects in terms of noise, vibration and air quality and similar effects may result from the Industrial 4 zone. Similarly, activities in the surrounding rural zones, such as intensive poultry and pig farming, can result in adverse environmental effects in terms of odour and other pollutants. The location of sensitive land uses such as residential and educational activities within the Structure Plan area will cause reverse sensitivity concerns and could restrict future quarry, industrial or rural operations and activities.

Development and subsequent land use in close proximity to the significant existing electrical, communications and natural gas infrastructure resources which traverse the Structure Plan area could adversely affect the efficient and safe operation of these resources.

5B.4.2.10.2 Objective

To ensure that development and subsequent land use within the Drury South Structure Plan Area does not result in reverse sensitivity effects on the operations of the Drury Quarry, activities within the Industrial 4 Zone or the surrounding rural zone or adverse effects on significant existing high voltage electricity, natural gas and communications infrastructure.

5B.4.2.10.3 Policy

Adverse effects on the Drury Quarry, the Industrial 4 Zone or the surrounding rural zone and significant electricity, gas and communications infrastructure are to be managed within the Drury South Structure Plan Area by:

a) Avoiding the establishment of sensitive residential land uses within the Stucture Plan Area and by locating potentially sensitive commercial services more than 500 metres from the Quarry zone boundary and more than 100 metres from the Industrial 4 zone or surrounding rural zone boundary;

b) Controlling activities potentially sensitive to traffic noise on the strategic freight network serving the Drury Quarry; and

c) Ensuring that development and subsequent land use is undertaken so as to minimise adverse effects on the efficient and safe operation of existing high voltage electrical transmission and distribution lines fibre optic cables and the Vector natural gas pipeline.

5B.4.2.10.4 Explanation

This objective and policy set is designed to address reverse sensitivity issues that might arise in relation to the Drury Quarry, the Industrial 4 zone or the surrounding rural zone and existing significant infrastructure in the form of the Transpower high voltage electricity lines, Counties Power's two 110kV sub-transmission lines, the NGC/Vector natural gas pipeline and Counties Power and Telecom fibre optic cables that traverse the Structure Plan area.

The Drury Quarry, which is one of the largest remaining aggregate resources in the Auckland Region, is located immediately to the east of the Drury South Structure Plan Area. Heavy transport haul routes from the Quarry to the primary road network traverse the Structure Plan Area. A significant central portion of the Structure Plan Area is designed to accommodate heavy industry. Additionally, the Drury South Structure Plan Area is surrounded by a rural zone which contains existing intensive farming operations and horticultural enterprises which emit contaminants to air. Further such operations could establish in the rural zone in future. The Quarry, industrial and rural activities and the existing high-voltage electricity, high-pressure gas and fibre optic telecommunications infrastructure are important to the future of the Region and it is critical to ensure that the Drury South Structure Plan area is developed in a way which avoids or minimises exposing these activities to reverse sensitivity effects.

In the case of the Quarry, the Industrial 4 zone and the rural zones, this is achieved by a structure plan and zoning rules or performance standards designed to separate sensitive activities from the Quarry and the rural zones. Some provision is made for more potentially sensitive business activities in the commercial services precincts within the Structure Plan area but these precincts are separated from the Quarry by over 500 metres and rules relating to those precincts require particularly sensitive business activities (premises selling food and beverages, health professional rooms and childcare centres) to be more than 100 metres from the nearest Industrial 4 or rural zone boundary. Additionally, business activities in the commercial services and motorway edge precincts which may be potentially sensitive to heavy traffic noise are controlled so that any reverse sensitivity effects are mitigated.

In the case of the infrastructure the gas pipeline is protected by an existing designation and the electricity and communications infrastructure is protected by rules within the industrial and subdivision provisions of the District Plan.

In the case of the high voltage electricity transmission lines which are part of the National Electricity Transmission Grid, Policies 10 and 11 of the National Policy Statement on Electricity Transmission seek to manage activities in proximity to transmission line in order to avoid reverse sensitivity effects on the electricity transmission network and to ensure that the operation, maintenance and development of the network is not compromised.

The New Zealand Electrical Code of Practice for Electrical Safe Distances 34:2001 (NZECP 34:2001) is also relevant. NZECP 34:2001 sets out the minimum safe separation distances to control the interface between overhead electric lines and the wider public environment to ensure public safety and to preserve the reliability of the electrical supply system for all consumers. The Code contains minimum safe distances from towers, poles and conductors for some activities, in particular buildings / structures, operation of mobile plant, earthworks and people. It is important that consideration is given to the requirements of NZECP 34:2001 at subdivision design stage, to ensure that any development and land use (including the operation of mobile plant, storage of materials and movement of large equipment around a site) on a site can be designed to comply with the mandatory requirements of NZECP:34:2001. The Electricity (Hazards from Trees) Regulations 2003 set out the mandatory requirements for vegetation grown around transmission lines. Any vegetation to be planted within the transmission corridors should be selected and/or

managed to ensure that it will not result in that vegetation breaching the Electricity (Hazards from Trees) Regulations 2003.

5B.4.2.10.5 Methods

The following methods have been adopted to implement this policy:

a) Structure plan implementation section 5B.4.3 and planning map showing the National Grid Electricity Transmission lines and the NGC/Vector gas pipeline designation;

b) Industrial Zone and subdivision and development rules and assessment criteria which are specific to the Drury South Structure Plan area.

5B.4.2.11 EXPECTED ENVIRONMENTAL RESULTS

The expected environmental results for the Drury South Structure Plan Area are as follows:

a) The establishment of a range of Land Extensive Industrial Activities within the structure plan area;

b) The creation of a significant number of new employment opportunities within the Structure Plan Area;

c) The maintenance and enhancement (as far as is practicable) of water quality and the habitat values of significant streams and permanent watercourses;

d) The establishment and maintenance of business areas with a high standard of amenity especially in the commercial services precincts and at the interface with adjoining rural areas and State Highway 1;

e) The maintenance/re-instatement and enhancement of significant cultural heritage and landscape values such as culturally and historically significant pathways through the area and culturally significant native plant species;

f) The ongoing efficient use of State Highway 1, the Drury Quarry and the strategic freight route serving the Quarry, the Industrial 4 Zone, the surrounding rural zone and existing electricity and gas transmission lines;

g) The avoidance of flood hazards; and

h) The maintenance of the amenity values of surrounding rural areas.

5B.4.2.12 PROCEDURES FOR MONITORING

In order to assess the suitability and effectiveness of the objectives, policies and methods for achieving the anticipated environmental results for the Drury South Structure Plan Area, the Council will develop a monitoring programme which will include the following monitoring procedures:

a) Monitoring complaints and enforcement actions regarding the nuisance aspects of activities in the structure plan area;

b) Monitoring resource consents in the structure plan area, including the number of applications granted consent, compliance with consent conditions, and the effectiveness of those conditions;

c) Undertaking safety audits of public spaces (e.g. streets, public reserves and walkways) and analysing crime and traffic accident statistics to assess the impacts of design and planning on the sense of personal safety people might experience in the structure plan area;

d) Undertaking streetscape assessments of the level of visual amenity being attained in the structure plan area;

e) Monitoring the rate and level of uptake of vacant land within the structure plan area;

5B.4.3 IMPLEMENTATION

The objectives and policies set out above will be implemented through the application of zones within the Structure Plan Area, with rules applying to the zones. Each of the zones contain further objectives and policies which apply in addition to those set out above. The zones within the Structure Plan Area are as follows:

a) **Industrial 3 Zone in the Papakura District Plan.**
This zone is applied to enable the creation of a buffer or transition area between the "heavier" Industrial 4 Zone and the rural and rural residential activities to the north of the Structure Plan area as well as those parts of the structure plan area which adjoin the Southern Motorway (State Highway 1). In addition, overlay controls and assessment criteria relating to site layout and landscape design and the external appearance of buildings are applied within the parts of the structure plan area which adjoin the Southern Motorway. These areas are identified on the structure plan and the planning maps as the Motorway Edge Precincts. The overlay controls are intended to maintain a sense of openness within the Motorway Edge Precinct.

Overlay controls on site layout and landscape design and the external appearance of buildings are also applied within the parts of the structure plan area which have been identified as Commercial Services Precinct. These are accessible, defined and compact areas within which all commercial services (e.g. banks, post offices, commercial offices, childcare and medical services) designed to support Land Extensive Industrial Activities are to be located rather than dispersing throughout the light industrial area. It is appropriate, due to the likely intensity of activity within those precincts that they be subject to controls to ensure a high amenity outcome.

b) **Industrial 4 Zone in the Papakura District Plan:**
This zone enables industrial activities which require physical separation from sensitive activities to be established within the Structure Plan Area and lies within a buffer created by the Industrial 3 zone. It also ensures that the type of industrial activity located closest to the Drury Quarry is

compatible with Quarry operations and does not generate any reverse sensitivity effects upon the Quarry.

c) **Reserve Zone in the Papakura District Plan:**
The Reserve Zone will be applied to the parts of the Structure Plan Area which are identified in the structure plan to be set aside for public open space and stormwater management purposes once these areas have been vested as Reserve at the time of subdivision and development or public acquisition of the land. In cases where land has already been vested as esplanade reserve or where road is to be closed and used for reserve purposes the Reserve zone has been applied as part of this Plan Change.

5B.4.4 GENERAL RULES

a) The subdivision rules for the Drury South Structure Plan Area are contained in Parts 6 and 9 of Section Three of the District Plan;

b) The land use rules for the Industrial 3 and 4 zones are contained in Part 6 of Section Three of the District Plan including specific land use rules for the Drury South Structure Plan Area;

c) The land use rules for the Reserves Zone are contained in Part 8 of Section Three of the District Plan;

d) In addition rules in the following parts of Section Three of the District Plan apply:

- Part 2 : Protection of the Urban Environment;
- Part 3: Heritage Protection and Management;
- Part 10: Development Impact Fees;
- Part 11: Network Utilities, Transport and Roading;
- Part 12: Applications, Monitoring and Designations;
- Part 13: Landscape Design;
- Part 14: Signs;
- Part 15: Parking and Loading of Vehicles.

5B.4.5 DESIGN ASSESSMENT CRITERIA

a) Applications for Restricted Discretionary Activity Resource Consent for subdivision will be assessed in terms of Rule 6.15.2.6 using the assessment criteria set out in Appendix 5B.4.A

b) Applications for controlled activity resource consent for buildings within the Commercial Service Precinct and the Motorway Edge Precinct as shown on the Drury South Structure Plan will be assessed in terms of Rule 6.15.1 using the assessment criteria set out in Appendix 5B.4.B

APPENDIX 5B.4.A: DRURY SOUTH STRUCTURE PLAN AREA – SUBDIVISION DESIGN ASSESSMENT CRITERIA

PURPOSE OF APPENDIX 5B.4.A

Within the Drury South Structure Plan area, applications for restricted discretionary activity subdivision consent will be assessed in terms of a series of matters to which the Council will restrict the exercise of its discretion. One of the matters which the Council will have regard to as set out in Rule 6.15.2.5 is:

> *The extent to which the subdivision design and layout complies with and gives effect to the objectives and policies identified on the Drury South Structure Plan in Part 5B.4 Section 1 of the District Plan and the assessment criteria set out in Appendix 5B.4.A*

In addition, the criteria will also be used in the consideration of discretionary applications for subdivision, as appropriate.

This appendix sets out assessment criteria under a number of "Design Elements". Accompanying illustrations are intended to support the text and represent good design solutions, but are not intended to represent the only design solution. All illustrations are indicative only.

Each Design Element includes an explanation, which summarises the rationale for the particular Design Element and expands on the individual criteria. The explanation may be used as further guidance in interpreting the intention of the criteria and assessing the extent to which the proposal accords with them.

INFORMATION REQUIREMENTS

The applicant shall provide a written assessment describing how the criteria for each Design Element are addressed. Applicants will have to demonstrate that the provisions of the criteria have been acknowledged.

It is recognised that certain proposals will not achieve absolute accordance with all criteria. Where necessary, in regard to a criterion demonstrably not met, the applicant shall explain with reference to the explanation for the particular Design Element:

- Whether site constraints inhibit the ability to address the criterion, and/or;
- How the intention of the criterion is met by the proposal, and/or ;
- Whether the proposal represents a better design solution than that suggested by the criterion.

Planting plans and maintenance plans for recreation and esplanade reserves and stormwater management areas will need to be submitted with applications for subdivision consent and approved by the Council.

Design Element 1 – Road, Reserve and Access Networks:

1. Earthworks should be undertaken principally at the initial subdivision stage, and where appropriate the creation of reasonably flat sites should occur at the bulk earthworks stage (in order to avoid creating retaining walls at site development stage).

2. Road patterns should maximise convenient / direct access to the spine road and limit connection to existing rural roads (such as Ararimu Road) except where this relates to the wider essential network.

3. The road pattern should facilitate access to and accessibility within 'commercial service precincts'.

4. Road patterns should be logical and contribute to the legibility of and ease of wayfinding within the area *(refer Diagrams 1 and 2 for generic legibility and proposed street hierarchy)*.

5. Subdivision layout design should achieve protection and enhancement of all significant streams / tributaries to be retained and their riparian corridors (20m minimum either side from edge of stream) and concentrate open space as part of the riparian network *(refer Diagram 3)*.

6. Subdivision layout design should achieve an interconnected open space and movement network.

7. Safe pedestrian and cycle routes through the structure plan area should be integrated with the riparian, reserve and road design.

8. Equestrian bridle trails should be integrated with riparian reserve development and provide access to the large centrally located public open space / stormwater management area.

9. Layouts should retain mature trees within the riparian corridors, particularly those of indigenous species.

10. In Motorway Edge Precinct areas layouts should seek to retain as many existing established trees, particularly those of indigenous species, as possible.

11. In Motorway Edge Precinct areas access to sites off the spine road should be combined wherever practicable.

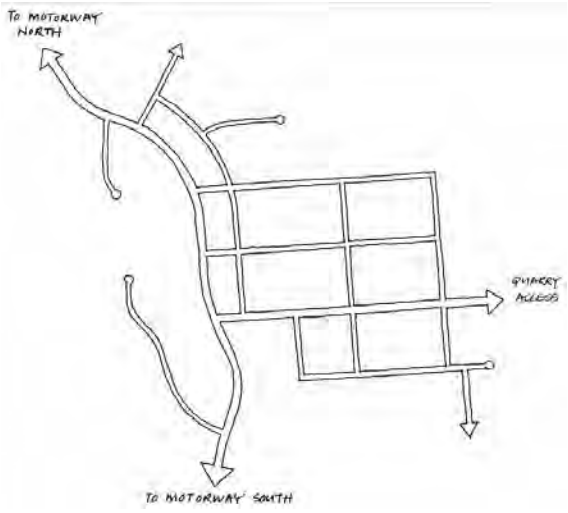


Diagram 1: Legible road hierarchy to assist wayfinding

Diagram 2: Road hierarchy

Explanation:

Design Element 1 pertains to the overall site topography and the general layout of the networks of roads, reserves and other access linkages that make up the public space of the industrial business zone. These should be considered in an integrated fashion together with the development blocks that they create.

The existing site topography within the proposed zone area is relatively flat although bulk earthworks including cut and fill will be required to establish levels for future development above the flood plain and appropriate falls across the land

The riparian corridors of the Hingaia and Maketu Streams and their significant tributaries will remain an important feature of the site topography once the zone is established. Vegetation associated with these corridors is also important to the structuring, screening and ecology of the area and its proposed activities.

The riparian corridors also provide a focus for future recreation and open space development and form part of the enhancement framework for the zone.

Diagram 3: Open space concentrated along Hingaia Maketu, Roslyn and Northern Diversion Stream corridors

The road network and hierarchy (refer Diagrams 1 and 2), as illustrated in the Drury South Structure Plan has been designed to efficiently direct traffic into and out of the zone connecting to the Southern Motorway (SH1) at both the Ramarama (south) and Drury (north) interchanges. The Ramarama interchange and Quarry Road / Great South Road through to the Drury Interchange will be upgraded to improve vehicle access and safety. The proposed spine road link is important to the legibility and traffic efficiency of the proposed zone area; this route will provide the primary connection into and out of the zone with other streets connected to the spine road through corridor.

The proposed street network has also been designed to limit the impact of vehicles destined for the new zoned area on existing rural residential and community roads such as the road accessing and adjacent to the Ramarama School. Implementation of the street network to achieve the beneficial improvements to heavy vehicle (including quarry truck) and other zone related traffic movement is imperative as a part of delivery of the zone.

By their nature the Commercial Services Precinct areas will require a finer grain street network with smaller street blocks, greater walkability, good service access and parking.

A legible road pattern (refer Diagram 1) is one that is easily understandable for the people that use it and that provides cues for first time users as well as those habitual users. Consistent road design and landscape themes can further emphasise the position of each street in the road hierarchy and in the pattern of streets in the wider area. Road patterns that are logical and easy to comprehend and navigate make an area feel more comfortable and help to provide a sense of identity.

Design Element 2 – Block Size, Lot Type and Orientation:

1. Blocks should be of a scale and shape to achieve a permeable street layout suited to the industrial landuse.

2. All lots should front onto and be accessed directly from a legal road. Rear lots are to be avoided *(refer Diagram 4)*.

3. Through lots (with dual road frontage) are permissible *(refer Diagram 4)*.

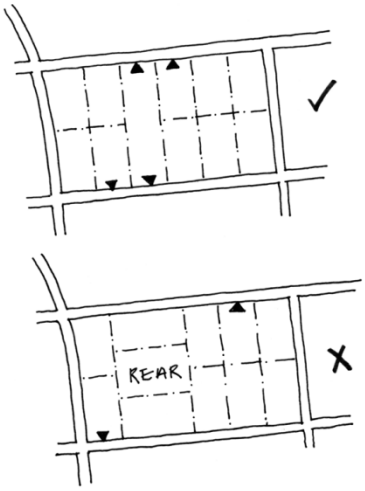


Diagram 4: All lots should front onto a legal road; through lots are permissible

Explanation:

Design Element 2 describes the principles for consideration in the layout of blocks and lots within the proposed business zone area.

Blocks within an industrial area can be larger than those within finer grain residential or Commercial Services areas. A good permeable and well connected street network is however still required to facilitate access, provide an appropriate street address and reduce traffic volumes on side streets.

Lots need to be of a size and shape to accommodate large scale, land extensive landuses and flexible to enable reasonable long term growth. At the same time rear lots are considered undesirable with a preference for development to address the street.

Design Element – Roads and Accessways:

1. In addition to transport engineering and Council's Code of Practice requirements, road cross sections should be appropriate to the nature of the function that they provide and also reflect urban design legibility considerations – i.e. wayfinding. Refer typical cross sections (Appendix 1) for road hierarchy comprising; Arterial (e.g. spine road extension); Link Road, new quarry access road (Parkway Road) (*refer also Diagram 2 for street hierarchy).*

2. Cyclists should be accommodated on the street carriageway or on a shared footpath/cycle route with wider dimension to accommodate both functions.

3. A consistent palette of traffic management tools should be used across the Drury South business zoned land. Traffic management devices such as chicanes, speed humps and other such restrictive management devices are not expected, however the use of thematic planting and measures such as localised narrowing to create thresholds or define changes in the street environment could be used.

4. All streets are required to accommodate strong avenue specimen tree planting. Refer Cross Sections Appendix 1. This planting is required to achieve the breaking up of the overall scale of the development particularly as seen from elevated locations, as well as to establish the enhanced amenity and character of the zone.

5. In addition to the street avenue planting a planted central median is (with and without specimen trees) also required on the roads identified as 'Arterial' (Spine and Link Roads) and 'Parkway' refer Appendix 1 Cross Sections.

Explanation:

Design Element 3 pertains to principles for the design of roads and other access routes within the zone. Road design should be appropriate to function and provide practical widths for vehicular access, including for emergency vehicles, parking, planting and services. Useful minimum dimensions are:

- Four traffic lanes on arterial road 15.2m
- Two traffic lanes on local road 8.2m
- Cycle lane 1.5m
- Parallel parking lane 2.5m
- Service/utilities strip 3.0m
- Footpath 1.5m to 3.0m

The use of parallel kerbside parking is efficient in using the road as circulation area and reducing the need for onsite visitor parking. Kerbside parking lanes may be defined and delineated with planting bays if desired as illustrated in the road Cross Sections Attachment1.

Pedestrian and cycle paths should generally be integrated with road and reserve design. Paths which are separated from vehicle routes should be designed for safety.

Design Element 4 – Reserves, Stormwater Management Areas and Riparian Planting:

1. Stormwater detention and treatment reserves should be located in general accordance with the locations shown in the Drury South Structure Plan and in accordance with the adopted Catchment Management Plan, the Council's code of practice and relevant regional technical publications. The Cross Sections (Attachment 2) illustrate the Typical Wetland Stormwater Pond and Typical Stream Corridor Cross Sections.

2. Stormwater ponds should be designed to fit in with the surrounding landscape and appear as an integrally designed infrastructural component of the overall setting.

3. Vegetated buffers, not less than 40m in total width for any retained permenant or diverted stream, should be provided on the margins of streams, ponds and wetlands and should:

- Include native species as identified in Attachment3
- Include native trees on the lower and upper banks of ponds predominantly to the north and west to provide shade.
- Provide a minimum of 10m of native planting either side of the stream corridor including shallow water rushes and sedges.
- Avoid vegetation that will exacerbate flooding and the blockage of water flood flows along the immediate riparian corridor.

The only exception to these requirements is the retained permanent stream in the northwest of the structure plan area (adjacent to the Transpower site) which will be subject to a minimum requirement of 10m of native planting either side of the stream corridor only.

Note: Attachment 5 sets out 'Stream and Wetland Rehabilitation Guidelines (June 2013) for the DSSP area.

4. Walkways / cycleways along riparian corridors and through buffer planting should be designed to minimise any impacts on ecological function and give due consideration to personal safety and CPTED principles (refer Attachment2).

5. Edge buffer reserves should be located in accordance with the Drury South Structure Plan, be a minimum of 30m in width and be planted in generally accordance with Diagram 5 below.

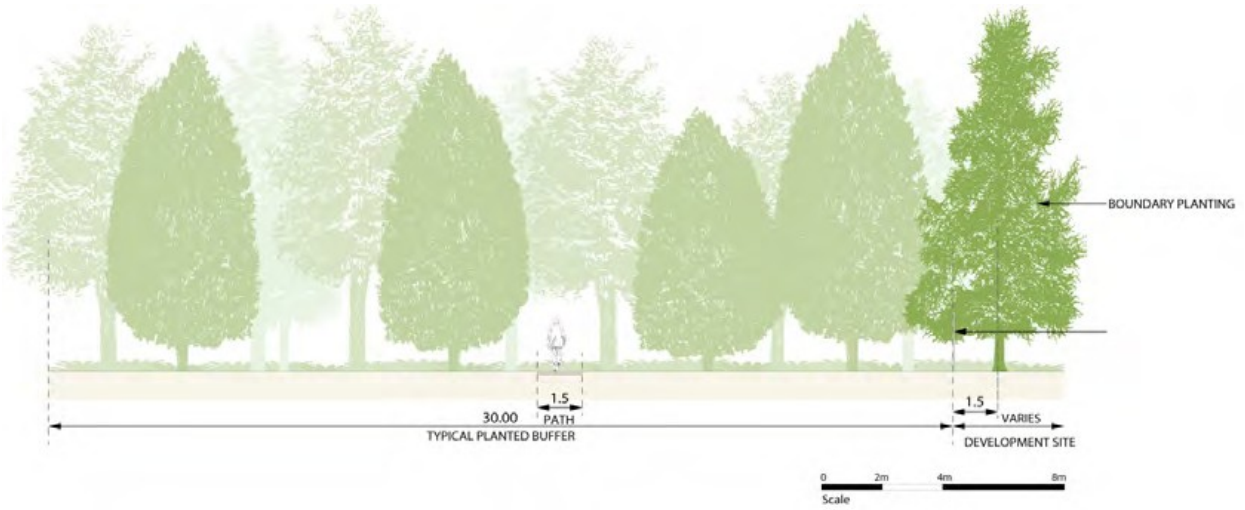


Diagram 5: Typical landscape buffer cross section

6. Suitable mechanisms to ensure the establishment and ongoing maintenance of landscaping of reserves and stormwater management areas until those areas are vested in the Council will be required to ensure the long term success of any landscaping.

Explanation:

Design Element 4 pertains to matters for consideration for locating, sizing and designing reserves stormwater management areas and riparian planting. These areas will be generally located in accordance with the locations shown in the Drury South Structure Plan; regard should also be given to Design Element 5 when designing reserves within the zone area.

The principal reserve network within the zone, as illustrated in the Drury South Structure Plan, is structured around riparian protection and enhancement as well as stormwater management including detention and treatment. The reserve network is however designed for multiple functions and values including passive and active recreation, pedestrian / cycle commuter access, ecological values, visual screening / separation and aesthetic amenity.

The zone also includes buffer reserves the main purpose of which is to physically and visually screen and separate adjacent existing land uses and residents from the zone. These reserves are planted to maintain a robust rural character with a woodlot/ shelter belt form of land management. Whilst providing multiple functions including walking / cycling, biodiversity and aesthetic values their primary function will remain as that of a buffer to landuses outside of the zone.

Design Element 5 – Reserve Interface Design:

1. Reserves intended for public recreation and use should be designed to be bounded by public roads as much as possible given topographical and natural feature constraints. (Note proposed buffer reserves are not intended to be bounded by public roads)

2. Where reserves or riparian buffer areas adjoin lots the boundary should be securely delineated and fenced to avoid encroachment (refer Diagram 5).

Explanation:

Reserves intended for public use that are well fronted by public roads are more secure because of the informal surveillance from the road and activities that interface with the road across the carriageway. Ideally not less than half the total length of legal boundary of any reserve should adjoin a legal road.

Design Element 5a – Earthworks and Retaining Walls

1. Changes of level adjoining streets and open space corridors should be achieved by gently battering and contouring land.

2. Where retaining walls are required, they should be screened from public view. This may be achieved by planting and breaking up the vertical extent of walls through physical stepping.

Additional Overlay Precinct Criteria

In the case of subdivision within the Motorway Edge Precincts and the Commercial Service Precincts the following criteria shall also apply and take precedence over the general assessment criteria for subdivision stated above, where this is inconsistency or conflict.

Additional Design Element 6: Subdivision within Motorway Edge Precinct

1. Earthworks should be designed to retain a more natural, undulating topography and character outside of building platforms and other areas required through function to retain a flat topography.

2. Intersections between public roads serving the precinct and the north south primary road (spine road corridor) should be minimised.

Additional Design Element 7: Subdivision within Commercial Services Precinct

1. Where through lots with dual street frontage are created, these should provide frontage to both street edges (i.e. no rear elevations to the street). The primary frontage should be to the spine road.

APPENDIX 5B.4B: DRURY SOUTH STRUTURE PLAN AREA – MOTORWAY EDGE PRECINCT AND COMMERCIAL SERVICES PRECINCT ASSESSMENT CRITERIA

PURPOSE OF APPENDIX 5B.4.B

In the Motorway Edge Precinct and Commercial Services Precinct within the Drury South Structure Plan area building design and appearance, landscape design and internal site layout are listed as controlled activities if they also comply with the standards and terms specified in 6.11.7.2.

Rule 6.15.1 sets out controlled activity assessment criteria for all controlled activities in the industrial zones and contains the following clause:

> *"In the case of the Motorway Edge Precinct and the Commercial Service Precinct within the Drury South Structure Plan Area (Part 5B.4 in Section One of the District Plan) the Council will, in addition to the criteria set out in (a) to (f) above, assess the application against the criteria set out for those precincts in Appendix 5B.4.B in Section One of the District Plan."*

In addition, these criteria will also be used as appropriate in the consideration of restricted discretionary and discretionary activity applications involving the construction or alteration of buildings.

This Appendix sets out assessment criteria under a number of "Design Elements" for both the Motorway Edge Precinct and the Commercial Services Precinct.

The criteria listed under each Design Element are intended to give flexibility, enabling site responsive designs, while ensuring that development provides a positive contribution to the amenity of the Drury South Structure Plan Area.

The criteria are intended to guide development rather than prescribe exact design and layout. Most criteria are illustrated. The illustrations are intended to support the text and are representative of good design solutions, but are not necessarily intended to represent the only design solution.

Each Design Element includes an explanation, which summarises the rationale for the particular Design Element and expands on the individual criteria. The explanation may be used as further guidance in interpreting the intention of the criteria and assessing the extent to which the proposal accords with them.

INFORMATION REQUIREMENTS

The applicant shall provide a written assessment describing how the criteria for each Design Element are addressed. Applicants will have to demonstrate that the provisions of the criteria have been acknowledged. It is recognised that certain proposals will not achieve absolute accordance with all criteria. Where necessary, in regard to a criterion demonstrably not met, the applicant shall explain with reference to the explanation for the particular Design Element:

- whether site constraints inhibit the ability to address the criterion, and/or;
- how the intention of the criterion is met by the proposal, and/or ;
- whether the proposal represents a better design solution than that suggested by the criterion.

Applicants will also be required to provide a Landscape Concept Plan with sufficient detail to ensure that the relevant assessment criteria are able to be considered, identifying hard and soft landscaping treatment, large grade specimen trees (species and planting size), groupings of ground covers and shrubs with species schedule.

MOTORWAY EDGE PRECINCT DESIGN ASSESSMENT CRITERIA

The following criteria shall apply to building design and appearance, landscape design and internal site layout within the Motorway Edge Precinct where activities are listed as controlled activities.

Design Element – Internal Private Access Roads:

1. Specimen tree planting should be provided on all public and internal private access roads within the Motorway Edge Precinct.

Design Element – Existing Vegetation:

1. Where ever possible layouts should retain and protect existing mature trees, particularly those of indigenous species, where these contribute to the site character and amenity.

Design Element – Planting:

1. Planting should be designed to have a large scale landscape effect and combine native as well as appropriate exotic species to provide seasonal change and quality amenity.

2. Where reserve land adjoins the motorway boundary planting that creates a continuous visual barrier to eastward views from the SH1 (Southern Motorway) corridor should be avoided, however landscape design should emphasise the current sequence of intermittent views to the Hunua Ranges from the SH1 corridor and the pattern of variable depth of such views.

3. Where industrial sites adjoin the motorway boundary, a detailed rule applies requiring a double row of Leyland Cypress to create the appearance of a rural shelterbelt providing a continuous visual barrier defining the curve in the motorway alignment.

Design Element – Buildings:

1. Buildings should be located with design consideration for their visibility and reduced visual impact as viewed from the SH1, (Southern Motorway) corridor and the desirability of maintaining a sense of openness as seen from the motorway.

2. The visual mass of larger buildings should be minimised by employing the following methods:
    - Utilising subdued, recessive colours;
    - Providing variation in materials and finish for facades viewed from the motorway;
    - Creating variation of roof profiles with consideration given to the overall roofscape viewed from the motorway;
    - All rooftop servicing and plant should be designed as an integral part of the roofscape with particular consideration given to the view from the motorway.

Design Element – Parking Areas:

1. Parking areas should be designed to incorporate trees to break up the scale of hard surface areas.

2. Adoption of the Fully Planted Permeable Carpark Design Layout (refer Diagram 6) style of parking is advocated within the Motorway Edge Precinct.

Design Element – Internal Site layout:

1. Storage and waste management activities should be located and / or designed to be screened from view of the State Highway.

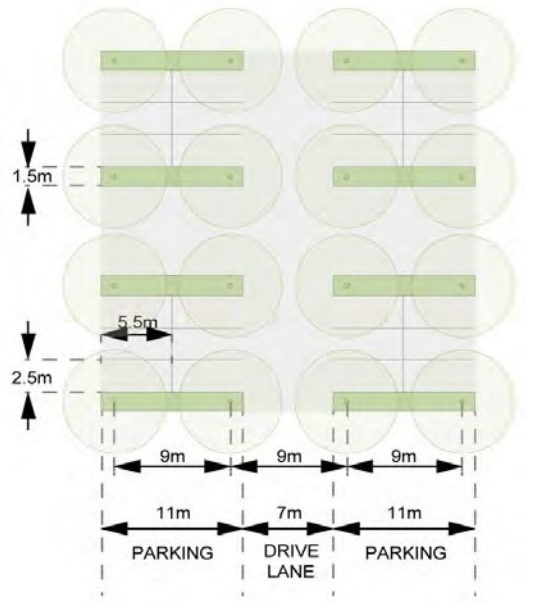


Diagram 6: Fully planted permeable carpark design layout - detail

COMMERCIAL SERVICES PRECINCT DESIGN ASSESSMENT CRITERIA

The following criteria shall apply to building design and appearance, landscape design and internal site layout within the Commercial Services Precinct where activities are listed as controlled activities.

Design Element – Block Size, Lot Type and Orientation:

1. Buildings on corner lots should be designed to provide for a quality architectural response to the corner. Appropriate design responses would be provision of additional height at the corner, windows and activities addressing both street frontages (avoidance of blank walls to one or both sides of the corner). Service activities such as loading docks or storage yards should not be located on corners or any site frontage.

Design Element – Street Interface Design:

1. Built development should front the street with a quality recognisable pedestrian entry to the street.

2. Parking should be provided on the road network adjacent to Commercial Service Precinct areas with on site parking layouts designed in accordance with the typical layout identified (refer Attachment 4).

Design Element – Signage:

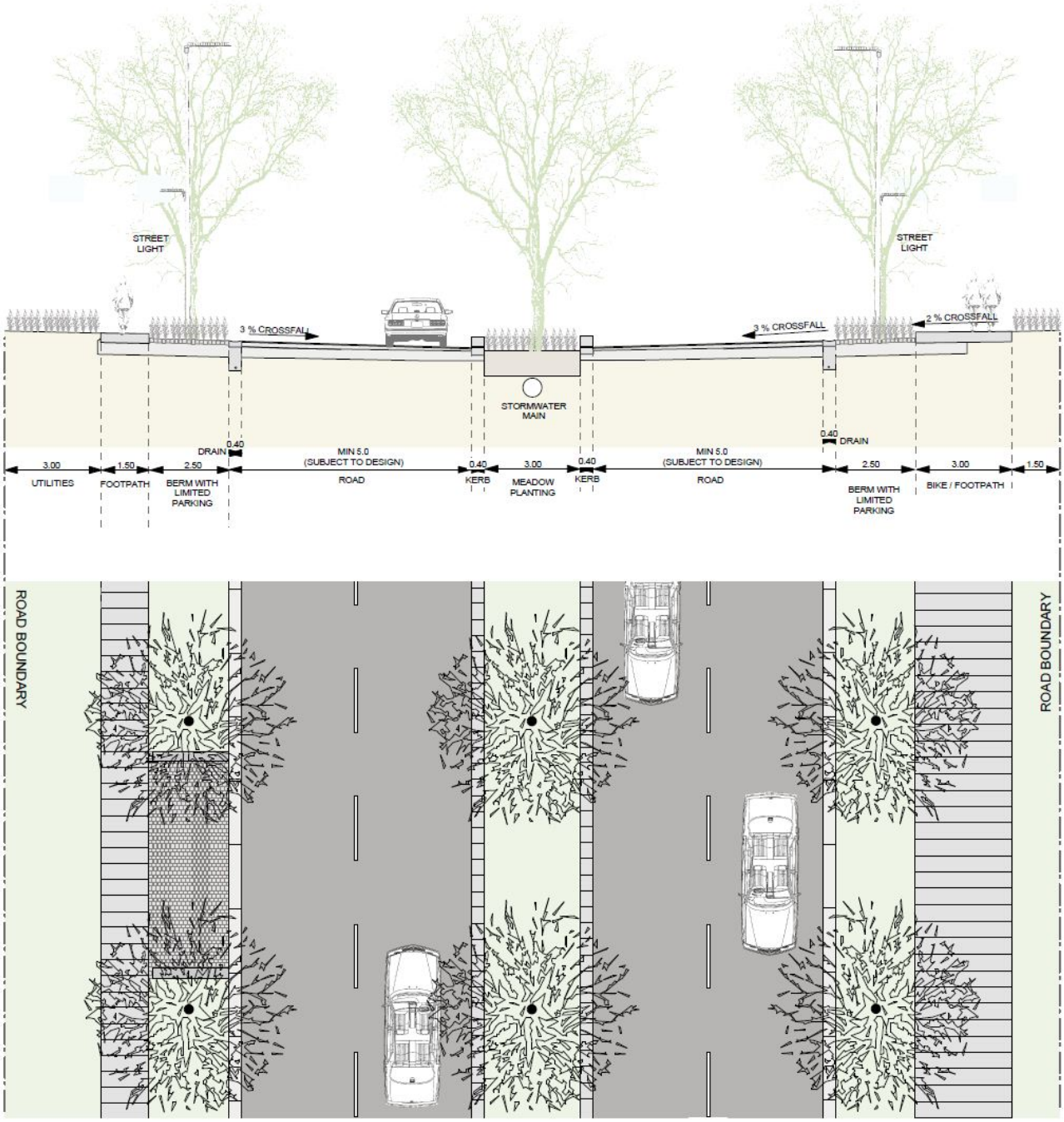
1. Signage for each Commercial Services Precinct development should be coordinated including the physical location of signs, their type face, style and content with a maximum of two signs per business, one located to address the street frontage and one to identify the building entry (a third sign is permissible where the service access is separate from building entry or there are multiple entries).

Design Element – Service Areas:

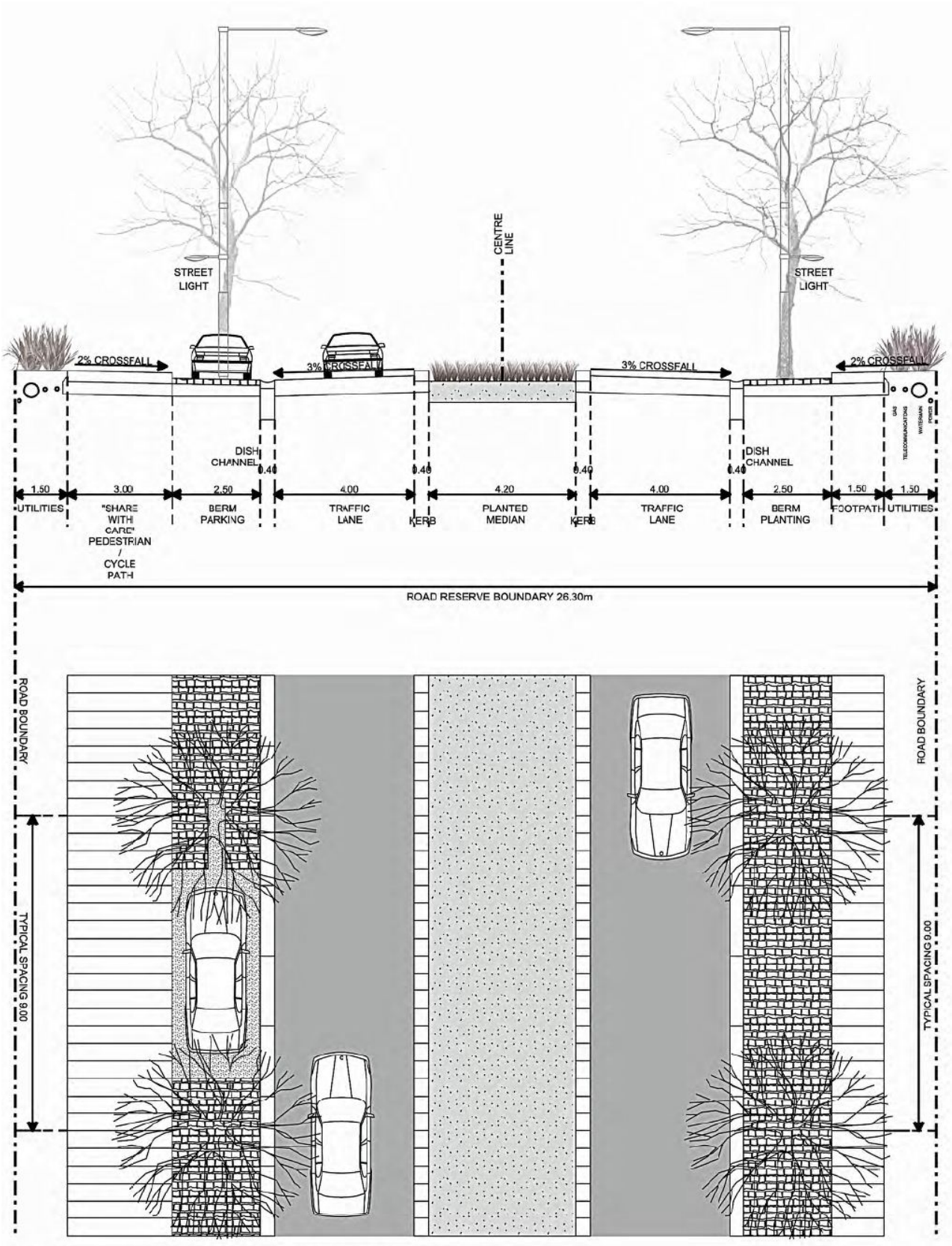
1. Service areas should be located so as to avoid observation from a public road with access either from a service lane, incorporation within the main building or full screening of service / storage and dock areas.

Attachment 1

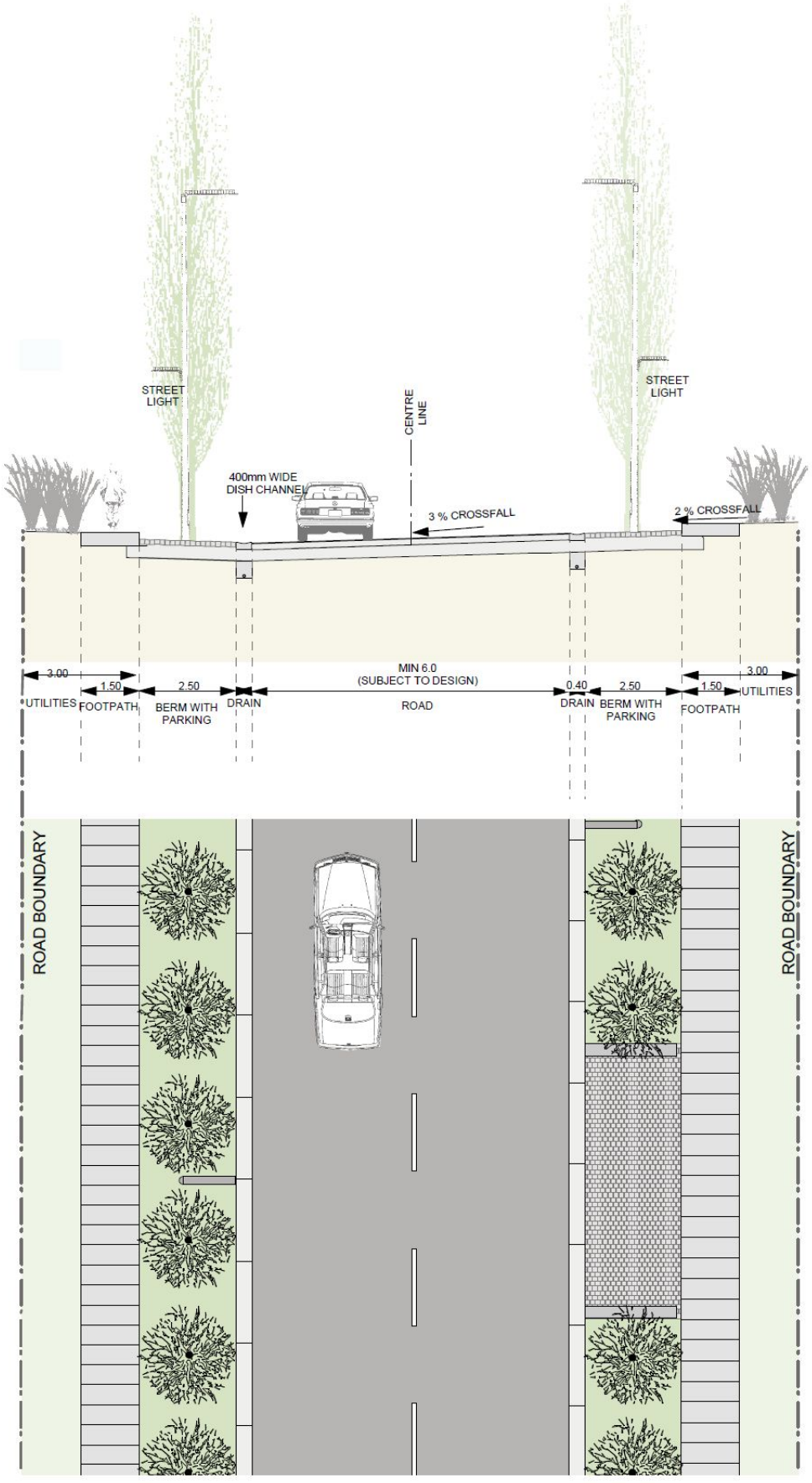
Typical Road Cross Sections



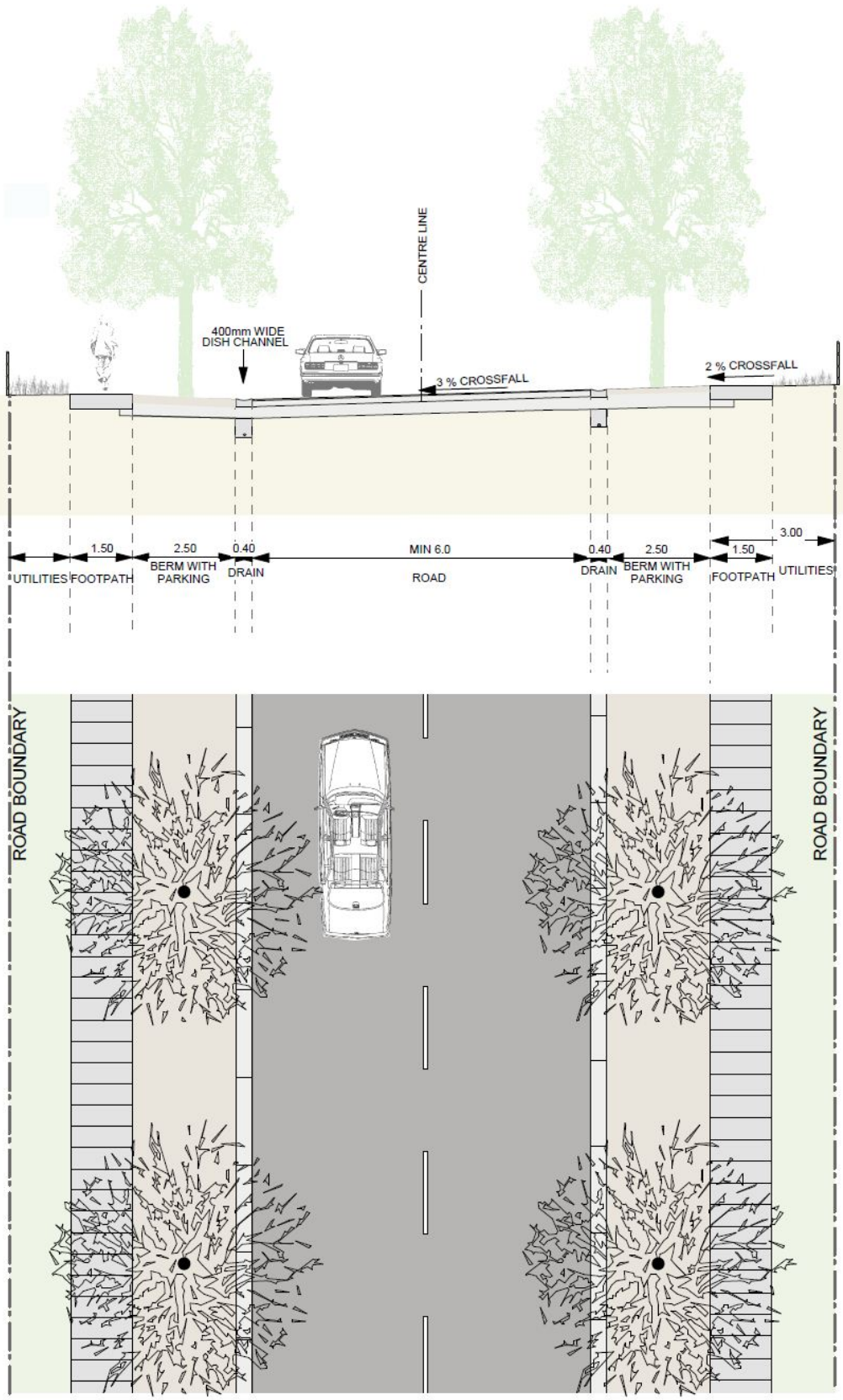
INDICATIVE ARTERIAL CROSS SECTION
(Spine Road)



INDICATIVE PARKWAY CROSS SECTION
(New Quarry Access Road)



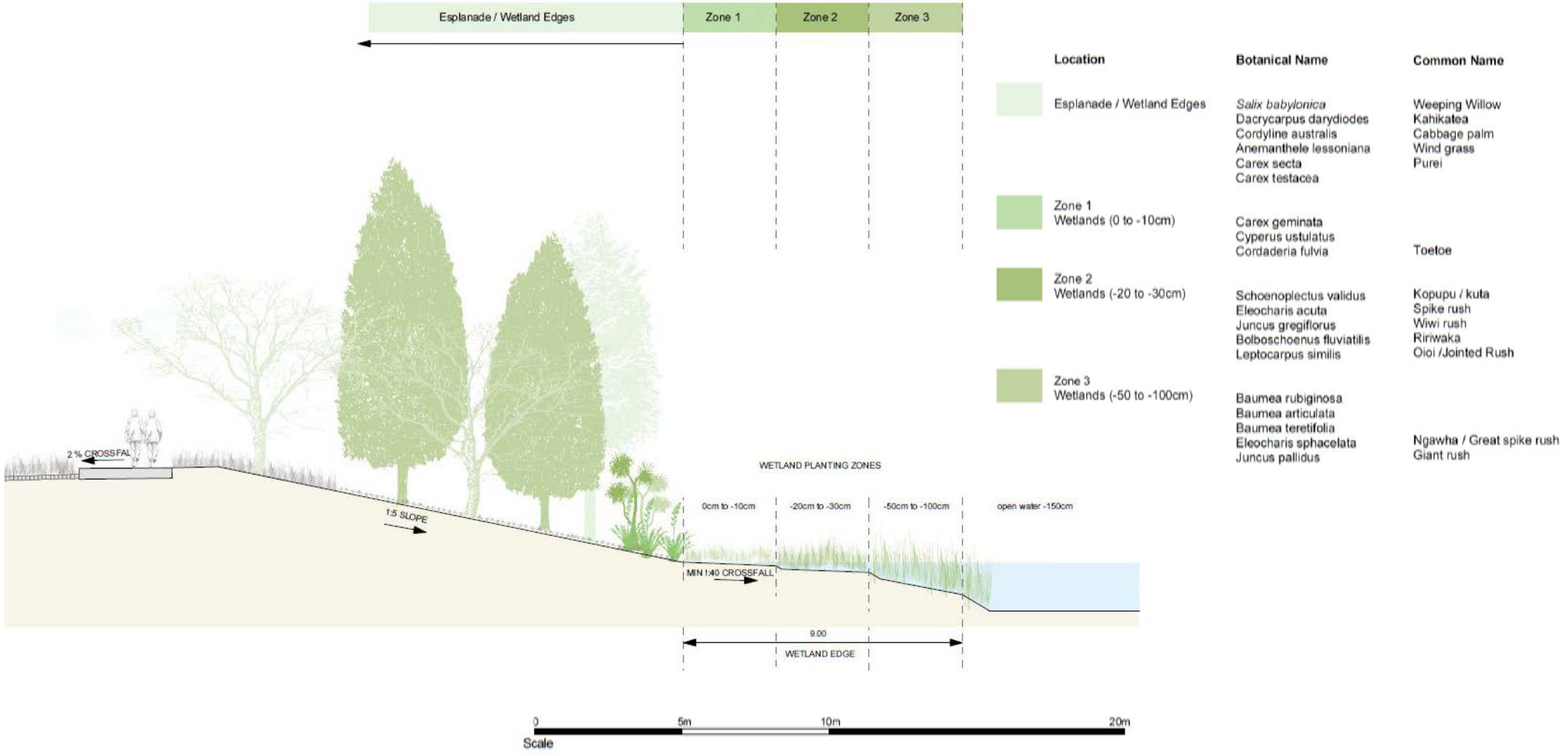
INDICATIVE ROAD CROSS SECTION



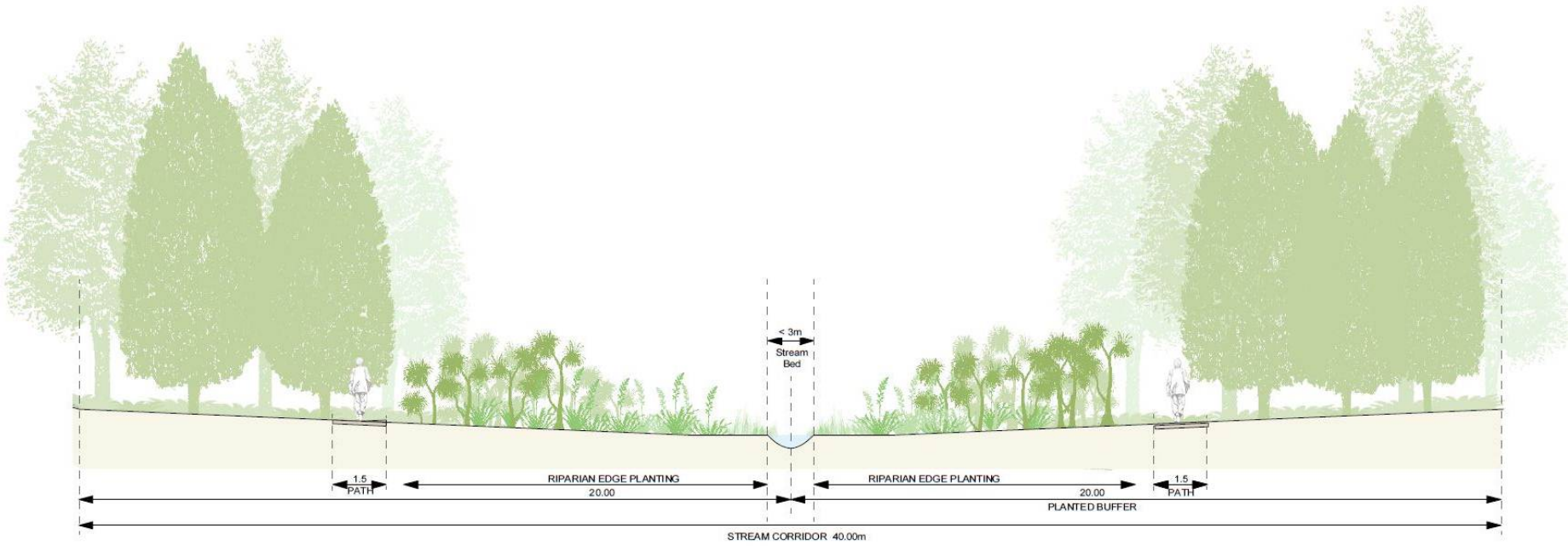
INDICATIVE MOTORWAY EDGE PRECINCT ROAD CROSS SECTION

Attachment 2

Typical Wetland Stormwater Pond and Typical Stream Corridor Cross Sections



INDICATIVE WETLAND EDGE DETAIL



INDICATIVE 40m RIPARIAN BUFFER FOR STREAM BEDS LESS THAN 3m WIDE

0 2.5m 5m 10m
Scale

TYPICAL ONE SIDED RIPARIAN BUFFER FOR STREAM BEDS LESS THAN 3m WIDE

INDICATIVE ONE SIDED RIPARIAN BUFFER FOR STREAM BEDS 3m AND GREATER

Attachment 3

Drury South Structure Plan

Indigenous Species Plant List

Note: The species underlined are recognised as being rare/uncommon in the Auckland region.

Wetland Species	
Schoenoplectus tabernaemontani also Eleocharis sphacelata	Multiple Māori names include kukuta and kutakuta.
Carex virgata and Carex secta	Pukio
Baumea articulata	Jointed twig-rush
Typha orientalis	Raupo
Myriophyllum robustum	Stout water milfoil
Baumea tenax	
Isachne glabosa	Swamp grass
Phormiun tenax	Particularly the variety known to Maori as 'Muka" - soft for weaving

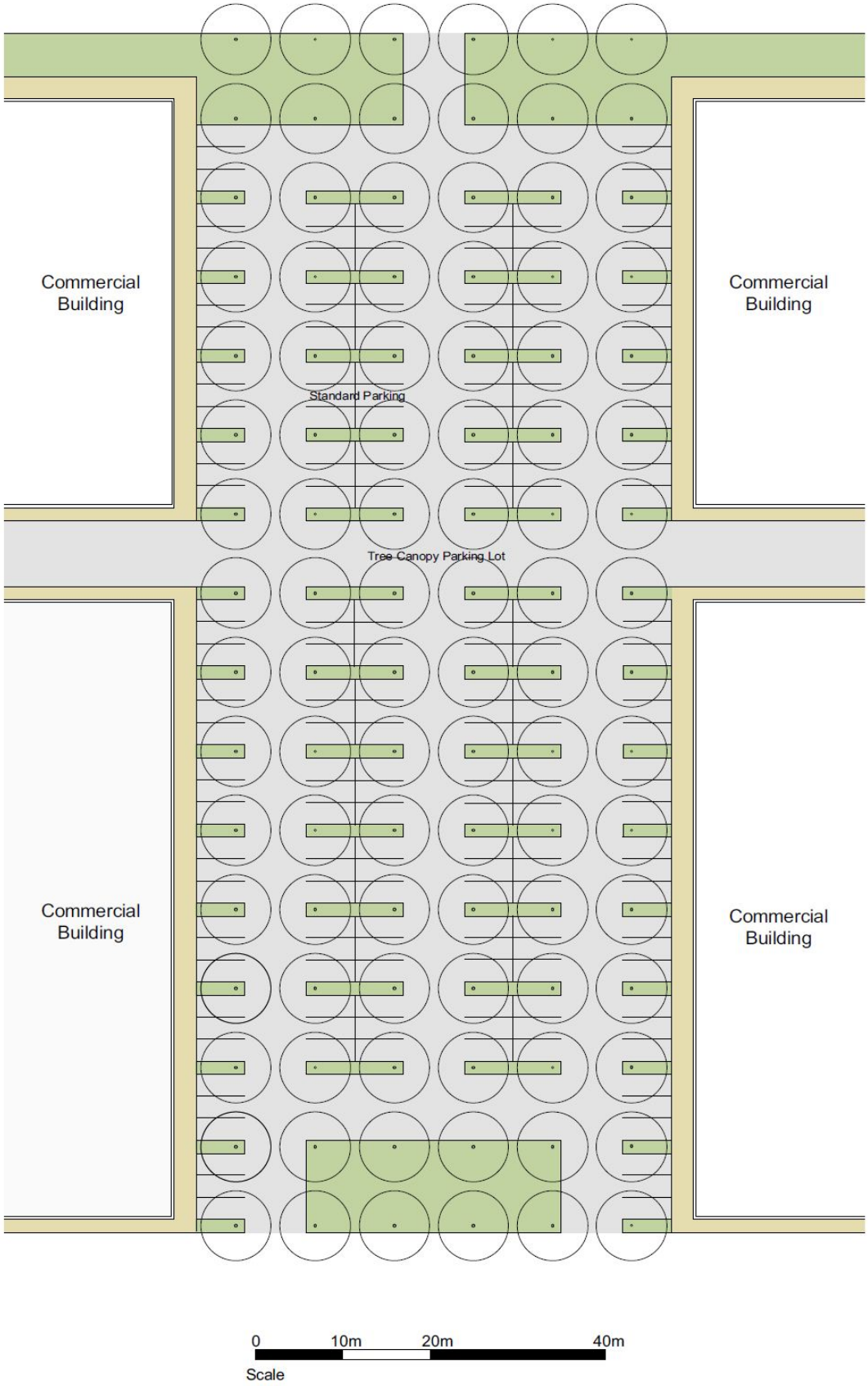
Riparian Marginal Species	
Freycinetia baueriana	Kie kei
Alectryon excelsa	Titoki
Vitex lucens	Puriri
Prumnopitys taxifolia	Matai
Sophora microphlla	Kowhai
Rhopalostylis sapida	Nikau
Hoheria populnea	Lacebark
Corynocarpus laevigatus	Karaka
Plagianthus betulinus	Manatu
Pennantia corymbosa	Kaikomako
Hedycarya arborea	Pigeonwood
Aristotelia serrata	Makomako

Kunzea ericoides	Kanuka
Cordyline australis	Ti whanake
Dysoxylum spectabile	Kohekohe
Coprosma grandifolia	Kanono
Streblus banksii	Towai
Streblus microphylla	Turepo
Myrsine divaricata	Weeping matipo
Marratia salicina	King fern

Swamp Forest Species	
Syzygium maire	Maire, tawake
Laurelia novae-zelandiae	Pukatea
Carpodetus serratus	Putaputaweta
Phormium tenax	Harakeke
Coprosma tenuicaulis	Hukihuki
Dacrycarpus dacrydioides	Kahikatea
Blechnum novae-zelandiae	Swamp kiokio
Cortaderia fulvida	Toetoe
Astelia grandis	Swamp astelia
Schefflera digitata	Pate
Podocarpus totara	Totara

Attachment 4

Typical Commercial Services Precinct Access and Car Park Layout



TYPICAL COMMERCIAL LAYOUT

Attachment 5

Drury South Structure Plan: Stream and Wetland Rehabilitation Guidelines (June 2013)

Drury South Structure Plan

Stream and Wetland Rehabilitation Guidelines

June 2013

Table of Contents

1.0 Introduction

1.1 Purpose of this Document

The Drury South Structure Plan (DSSP) Stream and Wetland Rehabilitation Guidelines provide a summary of proposed stream and wetland works associated with the DSSP project. This includes all stream corridors to be removed, realigned, or restored, and wetlands created associated with stormwater management. The purpose of this document is to achieve the following:

1. To provide technical input to the planning process (to be read in conjunction with the Ecological and Landscape Assessments, Assessment of Environmental Effects (AEE) and Infrastructure Assessment report (IAR).

2. To provide the project team with a set of principles for treatment of riparian (stream and wetland) areas within the DSSP area.

1.2 Proposed Stream and Wetland Rehabilitation Works

In line with the proposed Drury South Structure Plan, the existing Hingaia and Maketu streams will be protected and enhanced by corridors of riparian restoration 40 metres in width (20m on each bank). Dense riparian planting will also occur along SH1 in association with the Roslyn Stream realignment and along the northern boundary of the site in association with a newly formed northern stream realignment.

Some streams and farm drains within the DSSP area will be filled. Piped infrastructure or vegetated swales will direct these modified catchments to the Hingaia Stream. These systems, as well as stormwater runoff from business activities will be treated for water quality in extensive wetland areas associated with the Hingaia stream corridor. These wetland areas will function for stormwater quality and quantity, ecosystem function and values, landscape amenity, natural character, and recreation.

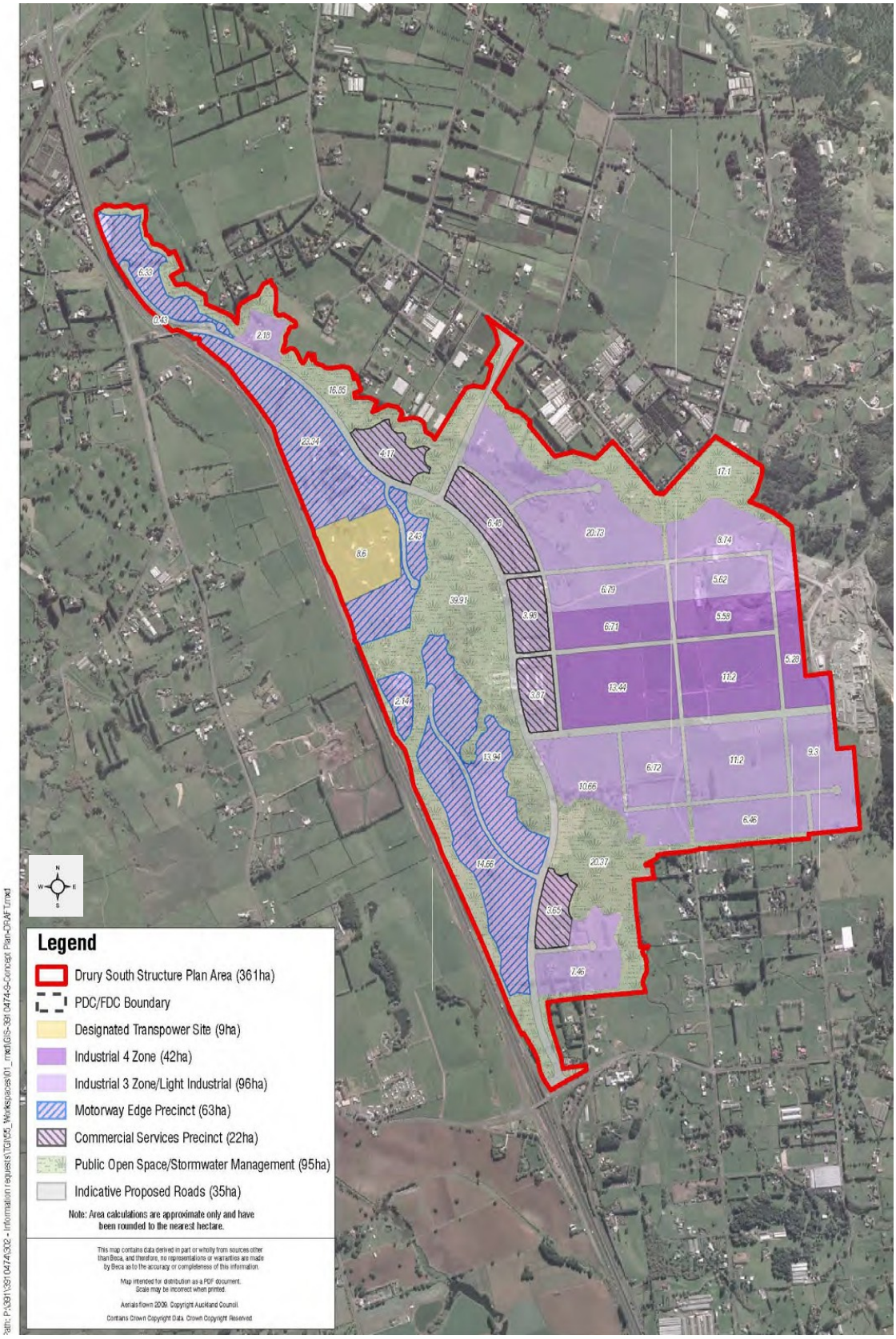


FIGURE 1: DSSP Concept Plan – December 2010 (Source: BECA Ltd)

2.0 Streams of the Project Area

2.1 Existing Streams and Proposed Mitigation

The Hingaia Stream flows through the DSSP area from south to north before continuing through the Drury Township to discharge to Drury Creek and eventually the Pahurehure Inlet to the Manukau Harbour. The Maketu Stream flows into the site at the south eastern corner of the DSSP area, and joins with the Hingaia Stream. The Roslyn Stream flows from the west under the State Highway and joins a further tributory to the Hingaia Stream. The remainder of streams traversing the site do not have officially recorded names, are smaller, highly modified, and in some cases have been piped.

An assessment of the existing surface water network and receiving environment has been carried out as part of the Hingaia Stream ICMP. This included a stream ecology study, "The Hingaia Catchment Environmental Assessment, Golder Associates, August 2009". This study included field survey of streams within the DSSP area with respect to water quality, and aquatic flora and fauna. Each stream potentially affected by the DSSP has been evaluated by the 'stream ecological valuation' method (SEV) in accordance with the technical publication ARC TP302:2008.

Existing watercourses and modified farm drains between Stevensons Quarry and SH1 will need to be filled or re-aligned to accommodate the DSSP earthworks footprint. This includes intermittent and permanent streams (refer Figure 2). Many of the existing overland flow paths are farm drains, constructed for active drainage. All streams to be affected by the proposed DSSP have been heavily modified by farming or roading operations, including dredging, spraying, straightening, and ongoing impact by stock. In general all of these streams have low to moderate functional values for stream ecology.

Proposed mitigation for stream loss includes the restoration of riparian zones along the length of the Hingaia and Maketu Streams within the DSSP Area. This includes a 40m wide planted riparian buffer along all streams. In addition, streams to be re-aligned will have an appropriate stream profile and riparian planting to provide for sustainable stream function.

One of many existing intermittent farm drains showing evidence of earthworks, spraying and access by stock

LOCATION A (FIGURE 2) – The northern stream is directed along Quarry Road in a highly constrained and modified environment, with low ecological values

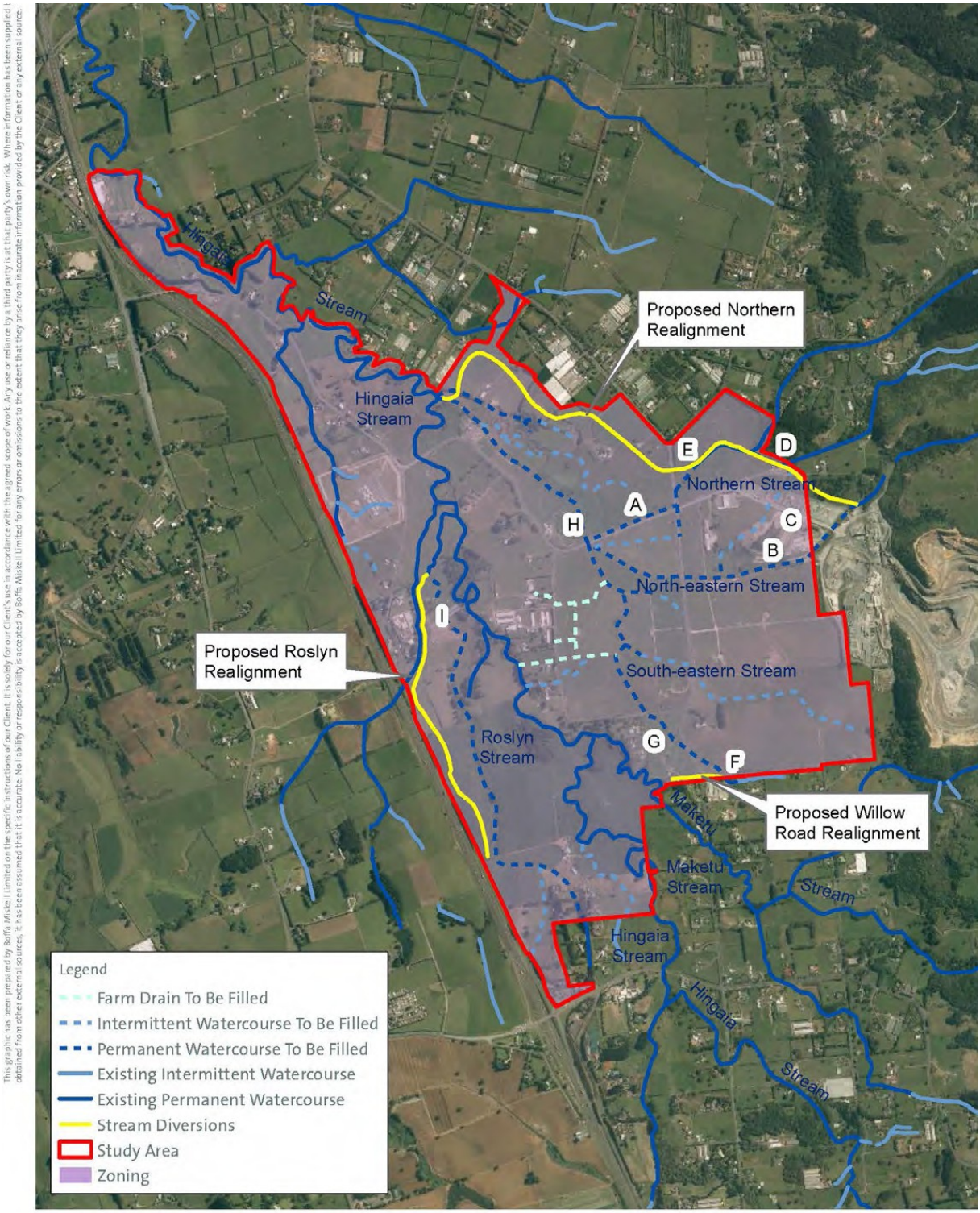


FIGURE 2: DSSP Existing and Proposed Water Courses (Source: BECA Ltd)

2.1.1 Northern Streams

A tributary to the northeast of Stevenson Quarry is currently dammed in its headwaters for quarry operations before being reticulated to a channel (refer Figure 2, Location B below). The northeastern stream also receives stormwater from the quarry via adjacent treatment facilities (Location C). As part of the works to accommodate the DSSP, the upper catchment of this stream will be directed to the existing northern stream corridor (Location D).

This northern stream will be rehabilitated with an enhanced stream profile, and restored streambank and floodplain vegetation. The northern re-alignment will be 1,800m in length, comprising 1,500m of new channel and 300m of rehabilitated channel.

LOCATION B (FIG 2) – The north-eastern channel flowing through mixed exotic vegetation

LOCATION C (FIG 2) – The north-eastern channel directed alongside the quarry settlement ponds

LOCATION D (FIG 2) – The existing northern stream channel will be enhanced to receive the re-aligned north-eastern tributary

LOCATION E (FIG 2) – The northern stream at the base of the northern escarpment will be rehabilitated as part of the proposed works

2.1.2 Southern Streams

The streams to be filled between the quarry and the Hingaia Stream are relatively small, with low gradient catchments that do not extend beyond the project area. A stream from the southeast of the site (refer Figure 2 and Photos Location F and G) conveys a number of intermittent stream tributaries from the centre of the project area, before joining with the existing northern stream and northeastern tributary previously mentioned (Location H). The southeastern stream and its tributaries have no vegetation cover beyond aquatic macrophytes and pasture species. These watercourses have been heavily modified by pastoral land use.

LOCATION F (FIG) 2 – The southeastern stream ponding behind a road culvert, 50 metres downstream of the proposed Willow Road Re-alignment

LOCATION G (FIG 2) – The southeastern stream wends through the middle of the project area before combining with the northern stream

At least 230 metres of the headwaters of the southeastern stream will be retained, enhanced, and linked westward to the Maketu Stream via an 180m section of new channel (the Willow Road Re-alignment). This realignment will be planted with a riparian buffer. The remaining watercourses between the Hingaia Stream and quarry will be filled.

2.1.3 Eastern Streams

The Roslyn Stream (Location I) to the west of the Hingaia Stream will be re-aligned toward the SH1 corridor. The current stream is an open farm channel with low summer flows and dense growth of the exotic reed sweet grass (Glyceria maxima). The re-alignment will include filling of 450m of the upper reach of this stream, and formation of 1,600m of newly aligned channel. The realigned channel will be formed with an appropriate profile and rehabilitated for enhanced ecological function, with a 20 metre wide riparian corridor on both sides.

LOCATION H (FIG 2) – The channel flowing to the Hingaia, containing the combined flows of the south-eastern, northern, and north-eastern streams following a rain event

LOCATION I (FIG 2) – The Roslyn Stream (mid-ground), a farm channel with lowflows, is to be realigned and rehabilitated

2.2 Existing Streambank Erosion

Stream bank erosion has been identified in the ICMP studies as an existing issue at a number of locations. The Hingaia Stream is subject to extensive bank erosion, identified near the Quarry Road bridge on the Hingaia Stream and near Davies Road Bridge on the Maketu Stream.

Stormwater wetlands prior to the Hingaia channel are proposed for the DSSP in order to detain any additional flows that may adversely impact stream erosion (refer Section 3.5). Riparian vegetation is proposed along the Maketu and Hingaia and for all re-aligned stream channels to stabilise banks in the short term and reach a sustainable stream equilibrium in the long term.

A lack of riparian vegetation and active erosion along the Hingaia channel

The Maketu channel with erosion scour at the outside bank

2.3 Existing Aquatic Ecology

As part of the Hingaia Stream ICMP, Golder and Associates undertook SEV surveys of representative stream reaches (Golder 2009). Most of the stream environments in the project area had poor functional values due to extensive modification by agriculture.

The Hingaia ICMP surveyed thirteen sites within the DSSP Area. The best quality site was on the Maketu Stream, with higher scores across all functional categories. Another site, located on the lower Hingaia Stream, also scored relatively high. The best value site for the tributaries was located on the northeastern quarry stream. Full descriptions of functional ecology values can be found in the DSSP Assessment of Ecological Effects (Boffa Miskell 2010).

A total of 6 species of fish were recorded across the project area. Shortfin eels were the most common species, with occurrences of longfin eel, common bully, inanga and cran's bully. Five of the seven tributary sites had no fish, or mosquitofish only. The mosquitofish is an exotic pest fish classified as 'Unwanted' under Biosecurity legislation. These sites had very low fish community values.

Macroinvertebrate communities indicated low environmental quality at most sites. Except for the northeastern stream, tributary sites were characterised by worms, dipteran flies, leaches, and flatworms, suggesting nutrient enrichment and fine sediment. The Maketu site had a notable portion of mayflies (Zephlebia spp.), possibly due to better water quality (e.g lower water temperature).

3.0 Stream and Wetland Rehabilitation

3.1 Rehabilitation Principles

The following rehabilitation principles are intended to inform the rehabilitation of streams and wetlands in the DSSP area. The principles have been prepared by an inter-disciplinary project team, including landscape architects, planners, ecologists, and engineers. Principles seek to enhance the landscape and ecology values of the riparian systems, while providing appropriate design responses for hydraulic flow and stormwater management.

3.1.1 Landscape Values

There is significant opportunity to improve the natural character values within the DSSP area. Stream and wetland environments will also be integrated within a wider open space network, providing opportunities for enhanced recreation and landscape buffers. The following landscape principles apply to proposed stream and wetland rehabilitation:

- Contribute to landscape amenity values
- Provide vegetated buffers to specific land use activities as appropriate
- Integrate stream and wetland rehabilitation with streetscape and open space planning
- Provide for visual and physical access to rehabilitated natural areas
- Optimise natural character values through the planting of representative native communities
- Provide a diversity of natural habitats and plant communities to achieve a variety of landscape and spatial character, and to demonstrate a legible sequence of habitat types.
- Structure riparian vegetation to screen/define undesirable views, offer broad views to wetland environments, and frame distant views to eastern Hunua hills from SH1
- Apply appropriate standards for CPTED and IPTED for public or maintenance access
- Place pedestrian bridges as necessary to ensure landscape connections, and investigate opportunities to use existing stream spans (infrastructure) for this function
- Identify opportunities to involve the community in stream restoration planting
- Liaise with relevant representatives and apply appropriate protocols for any archaeological sites or heritage elements associated with rehabilitation works
- Enhance Cultural Value through the re-establishment of indigenous species and investigating cultural harvest opportunities

3.1.2 Ecological Functions

Enhancing ecological functions within the DSSP area will require a combined response to aquatic and terrestrial environments, in order to restore target species, representative habitats, and ecological processes. The following ecology principles apply to stream and wetland rehabilitation:

- Plant stream margins, banks and floodplain areas to achieve not less than 40m total width (10m min width either side of stream corridor)
- Utilise species sourced from the Manukau Ecological District that are representative of natural vegetation communities as predicted by LENZ
- Restore representative in-stream heterogeneity, providing for pool, riffle, run and cascade sequences as appropriate.
- Provide fish passage to the extent possible, including bullies and inanga to within their natural range
- Preserve groundwater influence and inundation regimes for existing floodplain forest in proposed stream corridors
- Provide appropriate transitional edge vegetation to remnant mature vegetation
- Optimise site coalescence between remnant vegetation areas along the Hingaia Stream
- Provide for breeding populations of water and wetland birds species
- Provide for appropriate staging and construction techniques to avoid potential impacts to downstream environments and in-stream aquatic habitat.

3.1.3 Hydrology and Hydraulics (H&H)

Stream and wetland rehabilitation will provide opportunities for water quality treatment for the DSSP, and appropriate hydraulic flows, and hydrologic capacity for the catchment. The following H&H principles apply to the rehabilitation areas:

- Use biotechnical stream stabilisation to restore a sustainable streambank morphology
- Apply a cross sectional profile that resembles a natural staged channel, including a permanent flow channel, a stream channel based on a bankfull (approximate two year average recurrence interval (ARI)), and associated floodplains and berms to hold the one hundred year ARI.
- Provide for an appropriate stream meander patterns for the floodplain extent, longitudinal stream profile, flow velocities, and expected bankfull event.
- Provide for hydraulic connections and fish passage to stormwater wetlands wherever extended detention is not required
- Place all forebay devices for stormwater wetlands outside of the 5 year ARI flood extent.

FIGURE 3: DSSP Concept Planting plan. (Source Boffa Miskell and Source Design)

3.2 Open Space Network

The stream and wetland rehabilitation concepts (refer Figure 3) integrate with a broader open space network to optimise specific requirements for public use and access, to ensure diverse representative habitats, and to enhance environmental services for the DSSP.

The open space network reinforces existing features and patterns of the project area. The Hingaia Stream corridor will be reinforced by wide riparian margins of representative planting of early successional forest, as well as kahikatea floodplain forest. In the north a substantial open space buffer is set aside to reinforce the natural escarpment separating the DSSP basin from the Fitzgerald Road ridgeline. This occurs in conjunction with the northern stream realignment and associated riparian rehabilitation works. In the south west of the project area, riparian planting along the re-aligned Roslyn stream will form a landscape buffer to SH1.

Larger remnants of existing vegetation will be coalesced along the Hingaia Stream. Planting in association with stormwater wetland areas will further buffer and augment the conservation values of these remnants.

3.3 Stream Rehabilitation

The land use change associated with the DSSP provides a significant opportunity to restore the Hingaia Stream, a low gradient moderate order stream, which retains remnant kahikatea floodplain forest. The project also provides the opportunity to coalesce modified drainage channels across the site into a larger order stream channel and floodplain, with supporting streambank and floodplain vegetation. Stream rehabilitation proposals are the result of an iterative design process between ecologists, landscape architects, and engineers to optimise the principles of these guidelines.

3.3.1 Hingaia Stream

The Hingaia Stream is a significant watercourse, with a wide, actively meandering channel across the floodplain. The stream currently runs through pastoral and agricultural land uses, and receives runoff from existing farm drains in the project area. The rehabilitation of the Hingaia stream is a key objective of the DSSP, with a 40 metre vegetated buffer proposed along the corridor where it corresponds with the project area. The width of the riparian buffer would extend to accomodate a stormwater treatment swale proposed along a northern reach, and stormwater wetlands proposed within the Hingaia Stream's extended floodplain.

The rehabilitation of the Hingaia Stream will include:

1. The coalescence of the floodplain forest remnants (including significant natural areas) already occurring within Hingaia floodplain
2. The restoration planting of stream banks along the length of the stream within the Project Area, with the potential for specific interventions to restore the stream profile at erosion hot spots
3. The planting of banks and proposed riparian buffers with simple lowland plant communities with the expectation that these communities will secede with time to include more diverse species
4. Planting of feature areas of flax-cabbage tree and broadleaf species on extended floodplains
5. Hydrological connections and fish passage to stormwater wetlands where practical

3.3.2 Stream Realignments

A number of farm drains and watercourses will be replaced with overland flow paths and reticulated networks associated with the proposed development. In addition, some headwaters will be realigned to newly formed watercourses along the boundaries of the DSSP area. The Hingaia and the Maketu Streams will not be altered beyond restoration activities.

A detailed description of the potential effects on stream ecology and the proposed mitigation measures is presented in Boffa Miskell, 2010, "Drury South Business Project Assessment of Ecological Effects Associated with the Proposed Plan Change". These guidelines inform the potential design response to optimise the flood management function of the rehabilitated streams, and their landscape and ecology values.

3.3.2.1 Design Parameters

The profile of each re-aligned stream channel is based on the cross-sectional area to accommodate a 1.5 to 2 year average recurrence interval (ARI). This flow is traditionally associated with a 'bank-full' event with active stream erosion and re-deposition.

The morphology of realigned streams is also based on their substrate, longitudinal gradient, and association with their floodplain. These functions can be used to prescribe channel sinuosity and width to depth ratio (Rosgen 1994). The bankfull width is used as a function to predict the stream meander wavelength and the radius of curvature for bends (Leopold 2003 and Thorne et al 2003). Refer to Figure 4 below.

Proposed stream morphology is intended to minimise friction within the channel to prevent active erosion, and also to provide a floodplain width that can accommodate the stream in equilibrium.

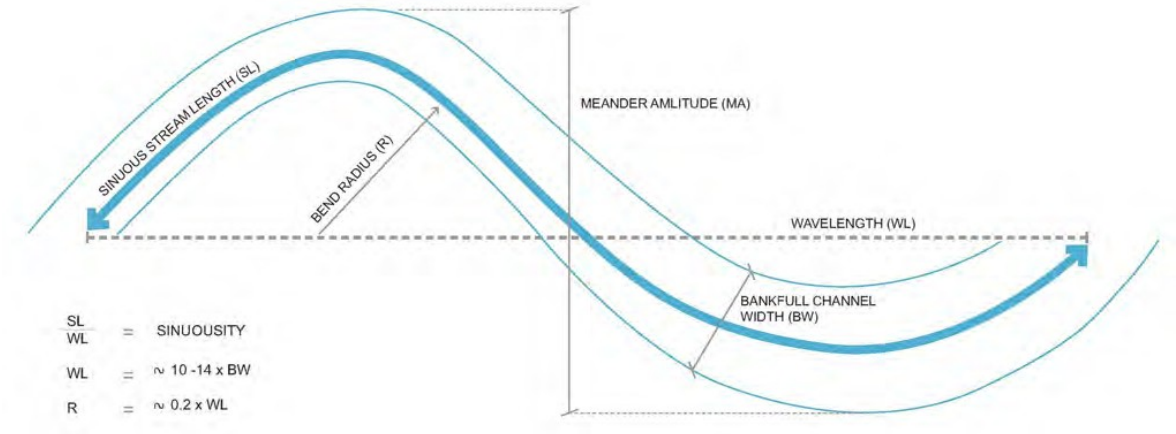


FIGURE 4: (above) The indicative relationship between channel width, and meander pattern

BELOW: A natural meander occurring as an overland flow event during flood conditions in the project area

3.3.2.2 Construction

Construction of the realigned channels is intended to occur off-line where possible, or to be staged to avoid potential impacts to downstream environments and in-stream aquatic habitat. Material selection is expected to be inert and where possible to be the equivalent of materials expected in these stream environments in their natural state.

It will be possible to utilize 'natural' materials through the application of biotechnical construction, which utilises a combination of persistent and biodegradable materials to retain channel shape until plants can establish. In general biotechnical responses for stream stabilisation can include:

- Stream profiling to respond to specific flow events
- Floodplains to dissipate flood velocities
- Stabilised bank toe and outside bends with hard materials such as rock, root vanes etc
- Directing flows and forming riffles through rock vanes
- Reinforcement of stream banks through planting established in erosion control blankets
- Stabilising the crown of banks with appropriate vegetation
- Provision of appropriate pool-riffle-run sequences.
- Grade control structures that accommodate fish passage
- Specific biotechnical treatments to accommodate 'nick' erosion points and stormwater outlets

3.3.2.3 Planting

Plant species selection will provide ecological functional values and representative plant communities. Stream planting objectives may include:

- Shade for temperature moderation
- Weed suppression
- Slope stabilization
- Tolerance to inundation
- Growth form to accomodate/obstruct views
- Stature to accomodate hydraulic flow rates
- Inherent aesthetic or spatial qualities of single plants or grouping of vegetation.

Based on LENZ predicted natural vegetation layers, representative plant communities for the DSSP area include lowland alluvial floodplain species, generally consisting of kahikatea forest. Other communities include tawa and pukatea, while matai, rimu and totara are generally restricted to better-drained soils. Titoki and puriri are locally abundant, with the potential for other broadleaf such as taraire, occurrence of kauri on the flanks of the basin, and occasional rimu and pukatea.

The project area extending into the flanks of the project basin and the hills beyond would be expected to support kauri, kahikatea, rimu and/or totara emergent over a diverse canopy dominated by varying mixtures of taraire and kohekohe Other widespread tree species might include hinau, pukatea, rewarewa, and miro. Puriri is locally abundant at lower elevations, particularly on alluvial surfaces and tanekaha would be locally abundant, particularly on disturbed sites.

Where basalt occurs at the surface of the project area there may occur unique basalt forest environments, with an expected predominance of mahoe, karaka, kohekohe, totara, puriri, and titoki.

Until climax communities establish, it is expected that large areas of the riparian corridors will be planted with early succession and hardy species, such as riparian shrubs, kanuka, and totara to rapidly establish cover and to act as a nurse crop for later succession species. It is expected that certain low vegetation types will be applicable in places along the riparian corridors to accommodate hydraulic flows, to preserve view shafts, and provide useable open space areas. Such planting may involve mown grass areas, sedge-rushlands, and flax-cabbage tree communities.

3.3.3 Northern Stream

A stream is proposed along the northern boundary of the DSSP area at the base of the northern escarpment. An existing section of this northern stream receives flows from three tributaries. A fourth tributary, previously described as the 'northeastern stream' (refer Section 2.1.1 and Figure 2) will also be directed to this channel from the quarry zone. The northern stream will accommodate the flow from these four tributaries, as well as localised catchments before discharging to the Hingaia Stream west of the proposed Link Road.

A typical northern stream cross section is shown in Figure 5, where a 'bankfull' channel represents the 1.5 year ARI event, and the associated floodplain conveys a 100 year ARI event with 500mm freeboard to the proposed development. Detailed design will provide pool-riffle and run sequences with adapted profiles. Biotechnical construction techniques will form narrower riffle sections, shallower point bars, and steeper outside bends.

The proposed sinuosity of the northern stream is relatively high, close to 1.5 times the wavelength (refer Figure 7). This is appropriate, based on the cross section of the bankfull channel (with a low width to depth ratio) the longitudinal profile of the floodplain (a relatively flat lowland environment), and the general character of the bed materials and banks (being generally resistant but somewhat erodible).

The sinuosity is expected to reduce the longitudinal profile of the channel, reduce erosion of stream banks, provide strong connections to floodplain environments, and increase the overall length and diversity of stream habitat. Some stream reaches have constrained floodplains, where riffle sequences with local rock may be appropriate.

The northern re-alignment follows the northern boundary to combine stream environments with adjacent open space and to form a buffer to adjacent land use. The stream corridor and floodplain will be densely vegetated as indicated in figure 7. Planting will be dominated by early succession kanuka-totara forest. Kahikatea forest planting is proposed beside the Link Road entrance to act as a natural threshold at the DSSP entrance. Pockets of broadleaf forest are proposed to add diversity to the northern riparian corridor. Low areas of sedge-rushlands, grass areas, and flax-cabbage tree associations could provide views into the stream corridor from select locations.

3.3.4 Roslyn Stream Realignment

There is an existing watercourse running south to north through Roslyn Farm at the southwest corner of the project area, which picks up flow from two culverts. Site assessment also revealed an existing spring feeding the stream. This stream will be realigned for part of its length whilst retaining links the to existing spring and culvert inflows, the realigned corridor will provide a stronger vegetated element to adjacent to SH1 (refer Section 2.1.3 and Figure 2).

A typical Roslyn Stream diversion cross section is shown in Figure 6, where a dedicated 'bankfull' channel contains the 1.5 year ARI event, and the associated floodplain conveys a 100 year ARI event with 500mm freeboard to the proposed development. The Roslyn channel has a wide stream base with a lower depth to create a combined wetland/overland-flow-path appropriate for the small catchment, the low longitudinal gradient, and a strong groundwater influence.

Because the Roslyn channel is a lower energy environment than the northern re-alignment, with less likelihood of erosion, it is reasonable to expect a less sinuous character. Therefore a low sinuosity of 1.1 times the wavelength has been applied.

Planting along the Roslyn stream is proposed to be a combination of sedge-rushland planting and large swathes of flax-cabbage tree associations to create a wide wetland environment. Kanuka-totara forest may occur in existing knoll areas beside SH1 to frame views to the eastern Hunva foothills. Kanuka forest may continue along mid reaches of the stream and groups of kahikatea may occur alongside of a stormwater wetland to frame views from boardwalk locations and to shade permanent water features.

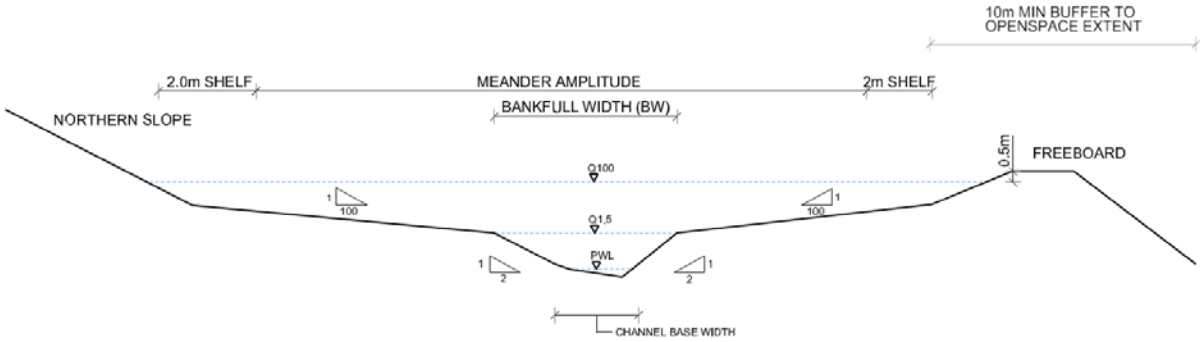


FIGURE 5: Typical section of the northern realignment in terms of flooding profiles

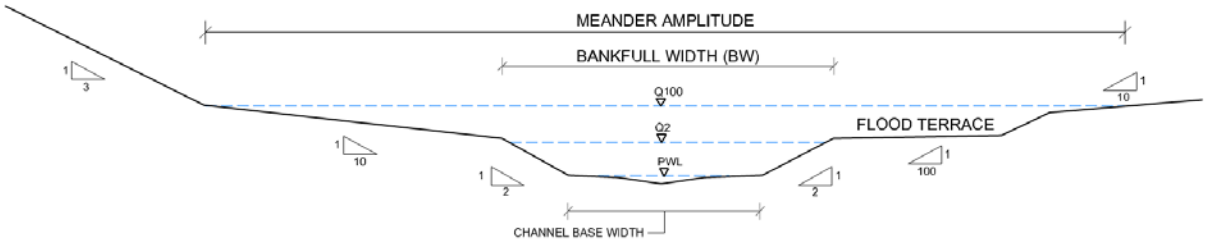


FIGURE 6: Typical section of the Roslyn Stream realignment in terms of flooding profiles

3.3.5 Willow Road Realignment

There is a small roadside drain running east to west along Willow Road. The stream currently crosses Willow Road through a culvert near the intersection with Ramarama Road and continues north through the proposed DSSP area, eventually joining the Hingaia Stream. As discussed previously, this stream is heavily modified by pastoral land use and is largely unvegetated. It is proposed to divert this roadside drain directly west to the Maketu Stream along a vegetated riparian corridor that provides for a 1.5 year stream profile and accommodates a 100 year ARI event.

FIGURE 7:Proposed DRAFTplanting plan for the Northern Re-alignment

FIGURE 8: Proposed DRAFT planting plan for the Roslyn Realignment

3.4 Riparian Revegetation Guidelines

3.4.1 Introduction

Riparian revegetation is proposed for the main stems of the Hingaia and Maketu Streams. In addition the Northern and Roslyn realignments will also be restored with riparian vegetation (as depicted in Figures 7 – 8). The progressive planting of these realignments as well as the present grasslands alongside the Hingaia and Maketu Streams will ultimately provide a greater extent of riparian bush, increasing the habitat opportunities and potential carrying capacity of the DSSP area as well as providing vegetated riparian corridors within the local landscape.

The following revegetation guidelines outline an accepted industry-wide approach to large scale revegetation programmes that should inform the development of the final detailed planting plans for the DSSP riparian margins.

3.4.2 General Procedure

The general procedure for the proposed revegetation plantings should be as set out below.

- Slope stabilization
- Seed should be sourced as is available from the Manukau Ecological District. However, notwithstanding the desire to use only genetic material sourced from this specific area in the revegetation programme, additional source material from the wider Auckland Ecological Region may be used.
- Planting of species into existing pasture should require pre-planting repeat herbicide applications to reduce the potential for grasses to compete with the seedlings planted.
- Blanket spraying in close proximity to the existing native bush areas needs to be avoided or very carefully managed so as to avoid by-kill. Herbicide should be carefully applied at least 2 weeks before planting.
- Where the earth has been previously compacted the areas to be revegetated should have a single treatment of earth tilling, in order to loosen the sub-soil and encourage successful rooting.
- Planting should be undertaken in favourable conditions, at the earliest opportunity during the planting season, preferably over the autumn months.
- The revegetation plantings should be supplemented with weed and browsing pest control to allow good establishment of the planted material. Ongoing weed control should be carried out until canopy closure is sufficient to suppress weed growth. Browsing pest control may be required over the longer term in order to allow the revegetated areas to progress in good health. However, once pest numbers are reduced to a minimal level, continued control should require a reduced effort.
- All planting and maintenance operations should be carried out by an approved contractor, experienced in native revegetation planting programmes.

3.4.3 Plant Material

- The plant material needs to be of the specified size and condition. All plants will have well developed root systems and a well-shaped stem and head free of disfigurements or injury, pests and disease.
- The plant material should have been sufficiently “hardened off” at the nursery prior to being passed on to the planting contractors.

3.4.4 Planting Methods

- Planting should follow an approved planting plan, indicating set-out, species, size, density and spacing.
- A dual system of planting is proposed, involving the establishment of a nurse crop of hardy pioneer species such as kanuka. These will be enriched with appropriate native tree species when the nurse crop has sufficiently established, which should be at approximately 3 years age.
- Nurse plant stock should be set out at appropriate spacing and percentages, and according to each species niche preferences.
- Once a good cover of the nurse plantings is established, enrichment plantings should be implemented. Enrichment species trees should be distributed (at wider centres) amongst nurse planting and according to site preferences in copses/groves spread further apart in subsequent seasons.
- The enrichment plantings may include the pruning or removal of modest numbers of nurse shrubs in order to create the necessary light wells.
- Plants should be set out and appropriately spaced in an informal manner avoiding straight lines and regular geometric patterns, while ensuring an even cover across the planting area. Species should be distributed at appropriate percentages and according to each species niche preferences, microclimate and ground conditions.
- Planting holes should be dug out to spade depth and seedlings located next to pre-dug holes in the correct species mix. Actual planting should be by hand only. The base of the planting hole should be filled evenly without compaction to a level where the top of the plant rootball is level with surrounding ground. The plant should be plumb and orientated so that the weathered face of the main stem faces north. When the backfilling is complete the plant should be gently firmed in. All plants should be encouraged to grow to maturity as naturally as possible to achieve their desired character and form, through sound management practices including weeding, and other accepted horticultural practises.
- Slow release fertiliser should be used within the proposed planting operation, with at least one tablet of 20-4-4 (N-P-K) that is designed to last at least 12 months (preferably 24 months). The controlled release fertilizer tablets need to be inserted into each planting hole approximately half way up the backfill material, ensuring placement of the fertiliser on the upper slope side of each plant
- Approved chipped tree mulch or post-peeling bark mulch could be spread around the base of individual plants used in the mass revegetation plantings, but only in areas outside of the floodplain (to avoid mulch being washed away in floods).

3.5 Stormwater Management

Stormwater design is discussed in greater detail in the DSSP Infrastructure Assessment Report (BECA 2010). The general approach is to utilise the large floodplains associated with the Hingaia Stream to accommodate stormwater wetlands. Each wetland would include a forebay and accommodate the water quality volume. There is also allowance for extended detention to limit potential effects of stormwater volumes on downstream erosion.

Wetlands have been placed above the stream invert to not unduly effect groundwater levels, and forebays have been placed above the 5 year flooding event to prevent re-suspension of contaminants stored in these areas.

Safety considerations have allowed for benching around the perimeter of each wetland and a reverse bench along each embankment. Appropriate maintenance access will be provided to forebays and to the base of wetlands for restorative maintenance if required.

Biotechnical approaches similar to those described for stream realignment works will be considered during detailed design, with specific consideration for the formation of access and outlets to the Hingaia, with fish passage possibile to wetlands that are not required to detain extended detention volumes.

Planting would be exclusively sedges, rushes, and small riparian shrubs around wetlands for water quality treatment, to stabilise the wetland profile, and to allow ease of maintenance. Trees and taller shrubs would be expected at the edges of wetlands, at their interface with stream environments, and around the northern edges of forebays for shade.

3.5.1 Stormwater Wetland One

Stormwater Wetland One has been designed as a landscape amenity feature through an iterative design process between landscape architects, engineers, and ecologists. This has driven the design of forebays, the shape and extent of the permanent pools and wetland planting, the integration of multiple public access structures, and a pedestrian circulation path that crosses the Hingaia stream corridor (refer figure 9). Wetland One has been tiered to suit the local topography and the bathymetric design directs flows along three separate treatment paths.

3.5.2 Northern Swale

A swale is proposed for stormwater management along the western edge of the lower Hingaia Stream. The total width of the swale and vegetated buffer contributes an additional 25m of vegetation to the riparian buffer. The length of swale is significantly longer than required for water quality and is expected to exceed regulatory expectations at the entry point to the Hingaia.

Planting will be selected with the ability to sustain temporary ponding and saturated soils, and will allow appropriate hydraulic flows and residence time.

FIGURE 9: Proposed Planting Plan for Stormwater Wetland One

4.0 Summary

The DSSP area is traversed by the main stems of the Hingaia and Markeu Streams and several other permanent and intermittent streams and farm drains. Watercourses other than the Hingaia and Maketu Streams will be modified or re-aligned in order to facilitate the proposed land use. Stormwater management will also lead to the creation of additional naturalised wetland areas in association with the Hingaia Stream corridor.

All streams affected by the proposed DSSP have been previously modified by farming or roading operations, including dredging, spraying, straightening, and ongoing impact by stock. Stream bank erosion has been identified in the Hingaia ICMP as an existing issue at a number of locations. In general all of these streams have low to moderate functional values for stream ecology. Five of the seven tributaries to the Hingaia were observed as having very low to absent fish community values.

The DSSP Stream and Wetland Rehabilitation Guidelines establish a set of principles to enhance the landscape and ecology values of riparian systems in the DSSP area. The document is intended to provide technical input to the planning process and to provide guidance to ongoing more detailed design and implementation. The guidelines apply an inter-disciplinary approach to riparian rehabilitation.

Stream rehabilitation is proposed for the length of the Hingaia and Maketu Streams within the DSSP Area, including a 40m wide planted riparian buffer along the streams. In addition, streams to be re-aligned will have appropriate stream profiles and riparian planting to provide for sustainable stream function. Riparian rehabilitation will contribute to a wider open space network and enhanced natural character.

5.0 References

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