

WATERWAYS AND WETLANDS
NATURAL ASSET MANAGEMENT STRATEGY 1999



***“If the crown jewels of the landscape are stolen,
then, when the final history books are written,
it will be not just the thief who will be remembered and blamed,
but also the slumbering guard.”***

Jeremy Pursglove 1989



PREFACE

This document comprises two volumes that together define the strategy.

Volume 1 is entitled ‘Waterways and Wetlands Natural Asset Management Strategy 1999’. It outlines statutory obligations and is in support of relevant parts of Regional and City Plans, how the strategy approach was developed, and overall vision and specific visions and strategies for fourteen individual project areas that cover Christchurch District.

Volume 2 is entitled ‘Waterways and Wetlands Natural Asset Management Strategy, Implementation 2000’. It explains that the strategy’s context is not simply maintaining an asset to a pre-determined condition. It is essentially a means of satisfying a diversity of resource management objectives. The maps in Section One provide an indication of the nature and extent of the main issues.

This strategy was formally adopted by the Christchurch City Council in October 2000. The Council’s resolution is contained in the appendix to volume 2.

Volume 1
1999

The Essence of The Strategy

Recently the Christchurch City Council decided to take a values-based approach to the management of the natural and physical resources that make up Christchurch's system of waterways, wetlands and drainage. This approach has a two-fold benefit. Not only does it satisfy the Council's responsibility to maintain its assets in good condition and budget accordingly, it also provides a means by which the Council delivers on the resource management objectives and policies contained within its City Plan.

Examples now exist of how the Council's values-based approach has worked in practice. These include Corsers Stream, a naturalized waterway that links the Avon River and Travis Wetland as a green corridor with pedestrian access and which was less costly than the original piping scheme; Janet Stewart Reserve which is a Stewart family bequest to the people of Christchurch that has become a celebration of waterways and wetlands beside the Styx River; the wet-pond associated with the Wigram Retention Basin which not only traps contaminants from an industrial catchment, but also provides a wonderful habitat for birds and plants adding life to the landscape.

Planned with imagination and sensitivity along with community consultation, waterways and wetlands can do much to enrich Christchurch. The challenge is to progress from the past thinking of responding to needs only with engineering solutions, to one in which an investment is made in forethought and sustainability.

By understanding the natural processes linking land and water we are much more able to bring to life the values important to our community. These values have been specifically identified as ecology, landscape, recreation, heritage, culture and drainage.

The preparation of the strategy in consultation with elected representatives and Tangata Whenua is the beginning of a long process of realising the values in a way that is sustainable for present and future generations. Its success depends on full participation of the key partners and the interest and support of the key stakeholders identified in the strategy.

It is intended that this document be the foundation for a strategy that will continue to be developed through ongoing consultation and monitoring of progress.



***“Kia tiakina te mauri ora o nga
arawai repo,
Kia hapai ai te wairua whakaora
o nga tangata”***

***“Protect the mauri of the
resource and raise the spirit of
the people in the management
and guardianship of the
waterways and wetlands.”***

Bill Karaitiana and Maria Tait 1999

Statutes, Regional Plans and City Plan

In their broadest context, the waterways and wetlands of Christchurch are both a vital part of our natural environment and a drainage system. Under these circumstances two pieces of legislation are relevant:

The Local Government Amendment Act No 3 makes the requirement for Councils to maintain their assets in good repair and to budget accordingly. Asset management strategies and plans satisfy this requirement and the Office of the Auditor General has provided criteria for the acceptability of plans. A basic asset management plan should:

- Define the service levels
- Define the time frame
- Adequately describe the asset
- Include financial information
- Include sufficient information to enable decline in service potential of the asset to be recognized
- State assumptions and confidence levels.

The Resource Management Act 1991 promotes the sustainable management of natural and physical resources for the benefit of present and future generations. It defines the role of Regional and District Councils and provides for the preparation of Regional and District Plans. The sustainable management of the

natural and physical resources that make up the waterways, wetlands and drainage of Christchurch are specifically provided for in the objectives and policies of the City Plan and the 'Water' chapter of the Natural Resources Regional Plan (the latter is currently under preparation).

A compilation of City Plan objectives and policies relevant to waterways and wetlands and those pertaining to individual project areas are available on request.



“However closely we look, we usually only see a fraction of the world around us. We never see the thousands of years of interactions between water, land, plants and animals, and the generations of human beings that have created and shaped the landscape.”

Andrew Crossland and Susan Jane Owen 1992

The Asset

In the past, the waterways and wetlands of Christchurch provided the framework upon which the land drainage system was built. This natural component of the system has been highly modified but still retains enough of its origins to be regarded as much more than a stormwater utility. However, without a significant change in management philosophy, naturalness would continue to be lost as waterways degrade and become piped or channelled and wetlands drained and filled.

The nature and extent of the waterways and wetlands is described in the "Natural Asset Management Plan for Christchurch's Waterways and Wetlands " 1996. The document includes a comparison between reactive engineering solutions and proactive values based management, in economic, social and environmental terms.

The existing waterways and wetlands of Christchurch vary in condition from fully degraded to pristine, in roughly equal proportions. They are an important part of the City's natural environment. Their relationship to other components of the City could be conceptualized as follows:

<i>Buildings</i>	<i>Parks</i>	<i>Roads</i>
<i>Plains</i>	<i>Waterways & Wetlands</i>	<i>Port Hills</i>
		<i>Coast</i>

A complex set of interrelationships exist in which activity in one area affects other areas.

A separate asset management strategy has been prepared and adopted for the many hundreds of kilometres of pipes, utility waterways, pumping stations and other structures.

Level of Service

In developing its asset management strategies the Council has costed, and sought public opinion on, different "level of service" options.

Matters relating to frequency of street, private land and house flooding, maintenance standards, water quality and asset protection were considered. In general the pre-existing level of service was regarded as satisfactory. These aspects are mainly drainage related and are set out in detail in a companion document entitled "Waterways, Wetlands and Drainage Utilities Asset Management Plan dated October 1998. (Two asset management strategies are required, one for utilities and one for the natural system)

What the 'natural asset' strategy needs to achieve in relation to landscape, ecology, recreation, heritage and culture, is set out in broad terms within the resource management objectives and policies of the City Plan. (While these are often thought of as

being only implemented by rules, they are also reliant on a variety of other methods, such as the Strategic Open Space Plan, Neighbourhood Improvement Plans, the Manual for the Design of Waterways Wetlands and Drainage, and the works and services provided under Asset Management Strategies).

This strategy has taken the approach that all of the above are best expressed as concept plans within individual project areas.

Existing Natural Asset Management Plan and the Purpose of this Document

The Council began asset management planning in 1995. A “Natural Asset Management Plan for Christchurch’s Waterways and Wetlands” was produced in August 1996. This plan introduced the values based approach and the notion of investing in achieving sustainability over a defined period.

The two main activities identified for achieving sustainability were ‘restoration’ and ‘protection’. The Council accepted these principles and agreed to an additional \$0.5m per annum on top of the existing expenditure to provide mainly for asset protection.

The August 1996 plan provided an expenditure programme derived from an office based assessment of asset condition. Restoration and protection needs were based on broad categories of assets for the city as a whole (rivers, environmental

asset waterways (tributaries) and hillside waterways). It was recognised that further work was required to provide specific capital expenditure items derived from a more detailed assessment. Once again, this involved developing a new approach. The purpose of this report then is to define the work that needs to be done.



"Sometimes, if you stand on the bottom rail of a bridge and lean over to watch the river slipping slowly away beneath you, you will suddenly know everything there is to be known."

The Project Area Approach and the need for a 'Living Document'

Infrastructural assets such as sewerage and water supply networks lend themselves to objective methods of condition assessment and prioritising. Such methods have become well established and are soundly based.

A values based approach is difficult to formulate into an objective method because it becomes very complex and some decisions are subjective. In addition, the values that have been identified require that waterways and wetlands be considered in the context of their setting within a locality rather than as discrete elements. The great diversity of Christchurch's surface water environments is a further consideration. For example the Port Hills are different to Marshlands, which is different from the numerous spring fed tributaries of the Avon River.

As a first step to evolving a workable approach the District was divided into 'project areas' determined by:

- the nature of the land / water system
- land-use
- community

When this was done, the special attributes of the different areas began to emerge in greater detail. Specific issues of concern were also identified. Thus for each area, it was possible to

generate strategies that were highly relevant to a locality and its community.

In many instances it is possible to develop concept plans in order to illustrate how the protection and restoration of water environments can enrich areas where, for example:

- Redevelopment to higher densities is taking place
- Urban expansion provides opportunity for urban design to not only mitigate adverse effects but add special character and value.
- Problems of erosion, siltation and flooding can be addressed in a way that has multiple benefits.

Concept plans related to specific project areas have many advantages, including the following:

- Their preparation stimulates creativity
- They are more easily understood than budget line items
- They enable discussion on alternatives and the consequences of a 'do nothing' option
- They provide the basis for community input
- They can be used as a basis for monitoring and reporting progress

Concept plans need to be integrated with the activities of other Council Units, especially Parks and City Streets and with private developers. They should be prepared well ahead of time to

ensure that opportunities are not lost. This is especially important when land acquisition is the method of providing asset protection. (Rural as well as urban subdivision is occurring continually within the District and land acquisition can become impossible after subdivision to minimum lot size takes place).

Strategy Development Process

The following elements formed the process which was partly pre-determined and partly evolutionary.

- Discussions held regarding project area approach with key partners including Open Space Team and at the Parks / Waterways and Wetlands Project / Planning team meetings
- Assignment of study briefs to consultants for each of the 14 project areas (City design, Boffa Miskell and Woodward Clyde Ltd)
- In- House workshop sessions to which all key partners were invited (and which most attended) on each of the project areas following initial consultants' assessments. These sessions included Tangata Whenua liaison and research personnel.
- Presentations to Community Boards of draft strategies for each of the project areas that they have an interest in. Also included were imaginative concepts for water environments that reflected the special needs and characteristics of a

project area. Community boards have responded very positively.

- A hui at Tuahiwi marae for discussion and verification of a report prepared by ORA Environmental Services that presents Tangata Whenua values and heritage entitled: "Summary of Research Undertaken for Avon, Heathcote, Styx and Halswell Catchments".
- Presentation of the asset management approach to key stakeholders, ie. Tangata Whenua, Ministry for the Environment, Department of Conservation, property owner representatives, Canterbury Regional Council. This group responded positively and has agreed to provide oversight and direction as the strategy is implemented. (This relationship has already been agreed to by Council.)
- Expo and Seminar for Councillors and key partners 17 September 1999

Implementing the Strategy

The work required to satisfy the strategies for each project area has been identified and costed either in detail or as preliminary estimates.

Time frames are determined by issues such as:

- Land acquisition before subdivision. This includes land required for the Strategic Open Space Plan.
- Co-ordination with the work of other Council Units.
- Council commitments to local communities.
- Urban growth and development needs.

Under these circumstances priorities need to be continually reviewed and a degree of flexibility provided for.

In most cases a project will require detailed planning and investigation followed by specific approval by an appropriate committee. Priority thereafter will still be reviewed at each annual budget round. It is anticipated that the project area approach together with the development of concept plans will enable elected representatives to make judgements within a particular context, or 'vision', for a locality. The same would apply when reporting progress to community boards (3 times per year) and the Committee.

Funding

Funding is an important aspect of implementation. In new urban growth areas, cost sharing arrangements with and amongst subdividers is a well established procedure for the installation of utilities and parks that service a larger area. This approach will be pursued for significant waterways and wetlands but it will be necessary to sometimes make judgements as to what degree the associated green space is regarded as reserve contribution, or is

for the mitigation of stormwater quality and quantity effects. In areas where existing, older low density housing is progressively being replaced with higher density development there is a consequent loss of private green space and sometimes a need for compensatory neighbourhood spaces. Once again cost sharing can provide funds for water quality and quantity mitigation measures that are designed in a way that enrich the life and fabric of a neighbourhood.

Sponsorship of waterway restoration work in parks and schools and similar public areas is a possibility that should be explored.

The majority of funds will however, still come from rates. Given the more holistic, values based approach, it may be appropriate to review the rating area. The Land Drainage District is currently 65% of the Christchurch District area.

To provide expert overview on the effectiveness of the strategy the Council has agreed to its monitoring by a group of Key Stakeholders. This group has already met and has made a commitment to the task. There is also some advantage for them as they each have statutory responsibility for some aspects of water (refer to the Overall Vision).

The strategy covers a forty year period during which time sustainable management is achievable and affordable for waterways and wetlands within Christchurch District. This document represents the beginning of the strategy not the end.



“Water is the most critical resource issue of our lifetime and our children’s lifetime. The health of our waters is the principal measure of how we live on the land”

Luna Leopold

Overall Vision

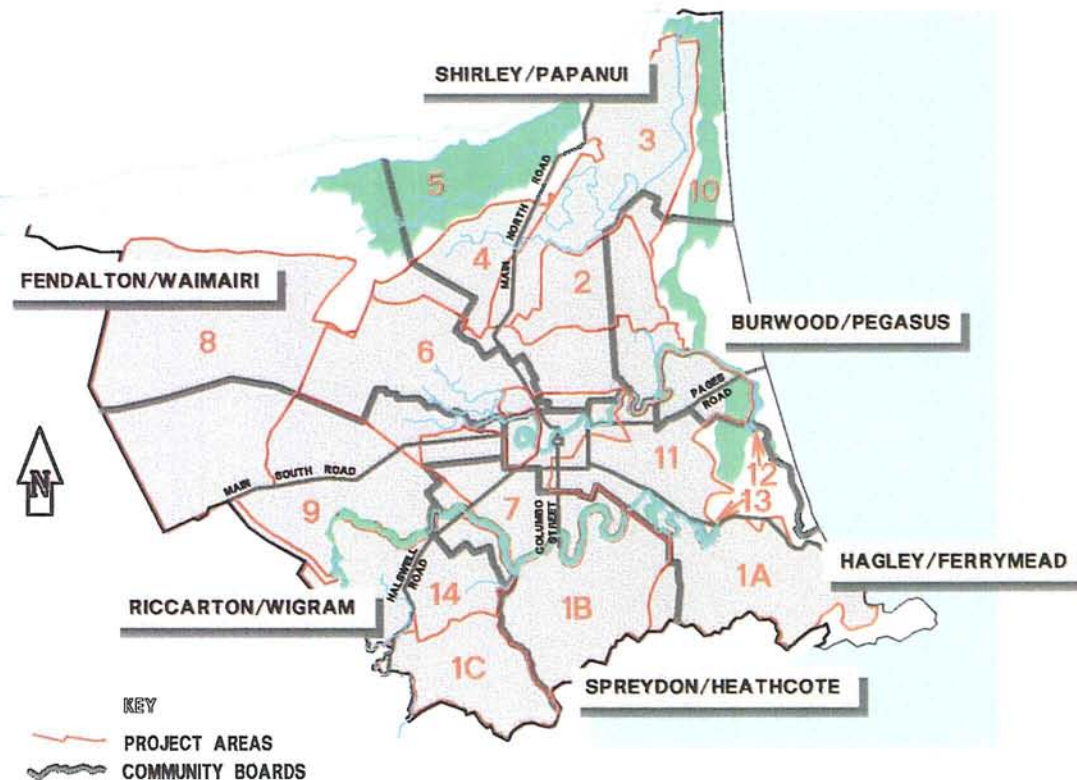
To achieve the sustainable management of the natural and physical resources that comprise the waterways, wetlands and drainage of Christchurch within the lifetime of the present generation.

The vision will be achieved by:

- Supporting the strategic objectives of the Christchurch City Council.
- Implementing the resource management objectives and policies of the City Plan.
- Realising the full potential that land and water together have for enriching the life and fabric of the community.
- Recognising the diversity of water environments within the City and expressing this through sensitive land use planning and development.
- Adoption of a values based management approach that takes account of landscape, ecology, recreation, heritage, culture and drainage.
- Expressing the strategy in a way that is relevant to local communities i.e by visionary concepts that are integrated with parks, streets and private development.
- Monitoring and reporting progress to elected representatives and community groups in the context of the visionary concept for an area
- Working in an integrated way within the Council and in partnership with other organisations outside Council
- Guidance from an overview group of key stakeholders comprising:
 - Tangata Whenua,
 - Ministry for the Environment,
 - Canterbury Regional Council
 - Department of Conservation
 - Property owner representatives
- Adapting the strategy in response to new knowledge and changed circumstances

Project Areas 1-14
Concept Plans & Strategies

WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY



PROJECT AREAS AND CATCHMENT RELATIONSHIPS

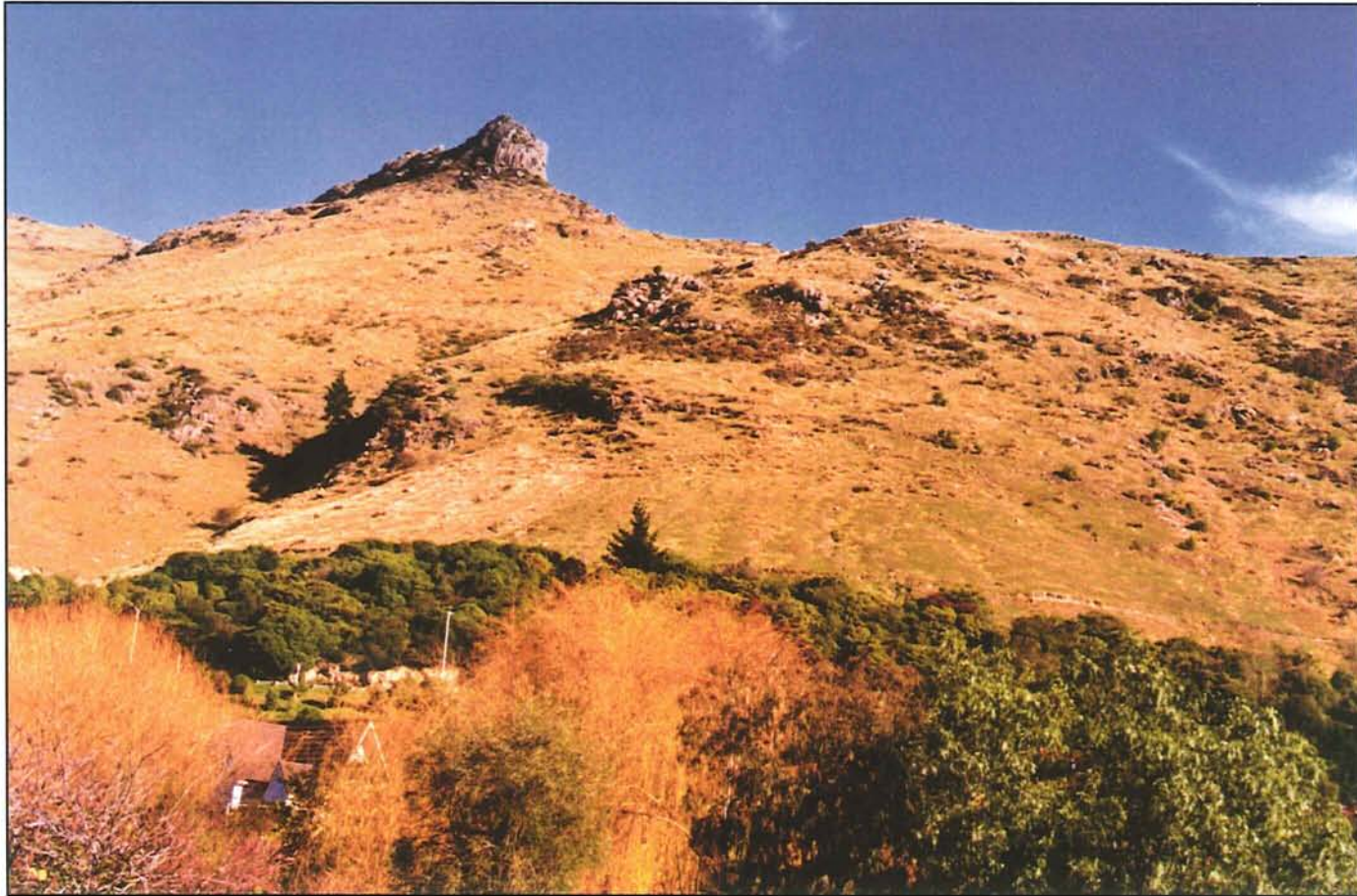
No	PROJECT AREA	CATCHMENT
1A	Port Hills - Estuary	Heathcote
1B	Port Hills - Heathcote	Heathcote
1C	Port Hills - Halswell	Heathcote
2	Marshland	Styx & Avon
3	Lower Styx	Styx
4	Upper Styx	Styx
5	Otukaikino	Waimakariri
6A	Avon Tributaries - Above Mona Vale	Avon
6B	Avon Tributaries - Dudley/St Albans	Avon
7	Central City Neighbourhoods	Avon & Heathcote
8	Water Races	
9	Halswell/Wigram Growth Area	Heathcote
10	Estuary to Lagoon Green Corridor	Styx & Avon
11	Linwood/Woolston	Avon & Heathcote
12	Avon River Corridor	Avon
13	Heathcote River	Heathcote
14	Cashmere Stream and Ponding Area	Heathcote

wwassetareal.dgn

PROJECT AREAS

PORT HILLS

PROJECT AREA 1





PORT HILLS

' Forested Valleys '

VISION

A breathing place of green gullies, clear water and open tussocklands.
A refuge for wildlife and an immediate space for people to enjoy.

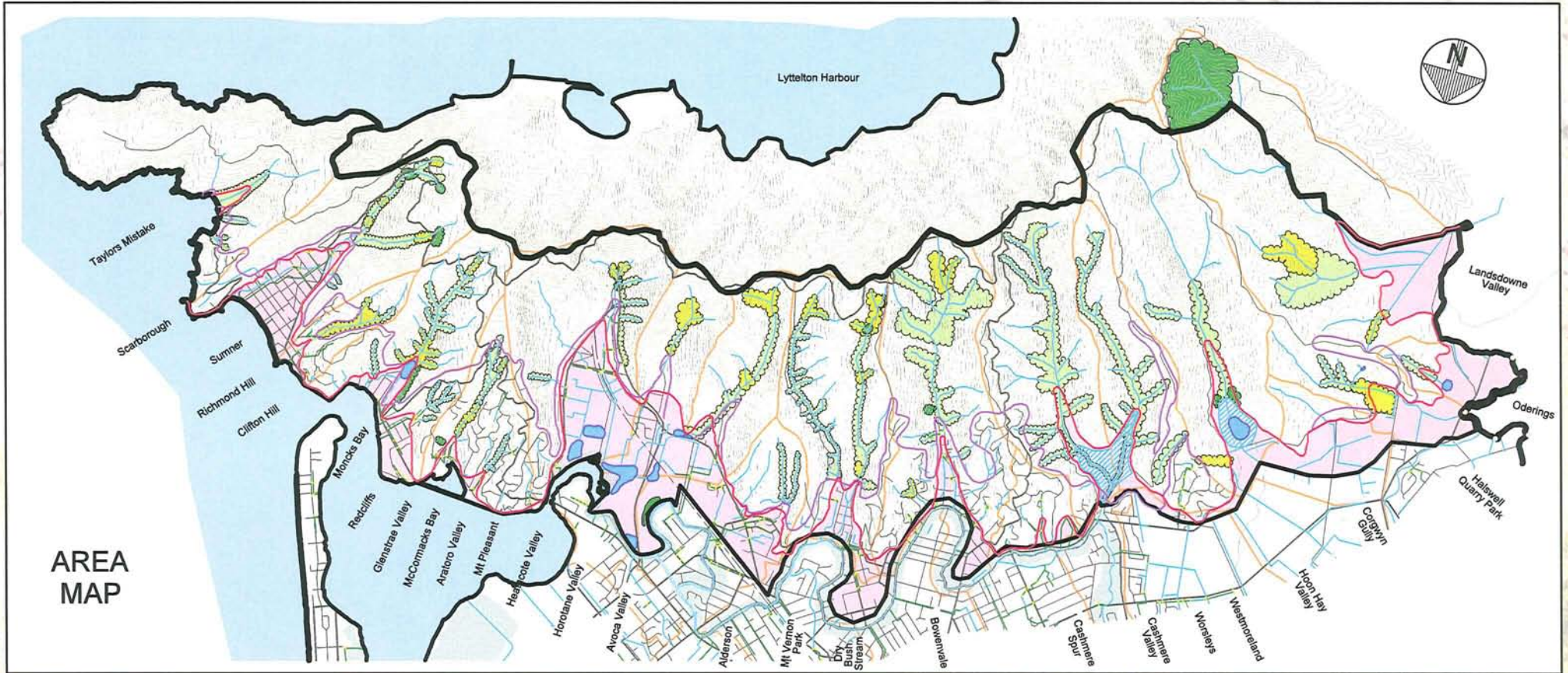
STRATEGIES

- ① Ensure soil conservation valley and side-gully restoration planting, and sustainable tussock grassland and stock management.
- ① Establish ecological and recreational linkages along waterway corridors and wetland systems.
- ① Map residential area flood hazards, and identify and protect secondary flow paths.
- ① Open and naturalise waterways in residential areas where possible (daylighting).
- ① Define and implement practices to attain sustainable greenfields residential development.
- ① Develop a sea level rise strategy.

WATERWAYS AND WETLANDS
ASSET MANAGEMENT STRATEGY 1999

PORT HILLS

PROJECT AREA 1



AREA
MAP



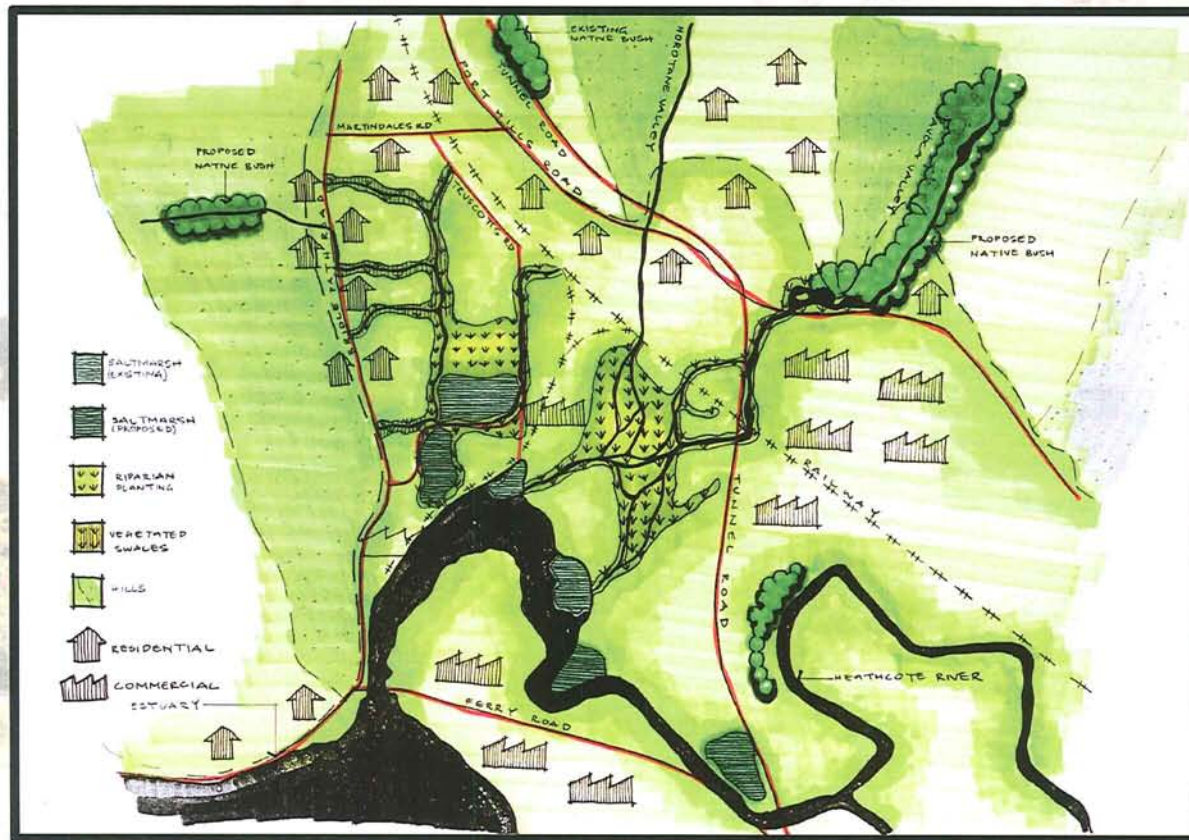
A Vision Heathcote Valley

Vegetation Management

- Restoration of valley and side-gullies for soil conservation
- Establish seed tree plots
- Ecological / recreation / education corridors up and between valleys
- Sustainable farm management
- Community involvement



Ecological / recreation corridors.



Residential Development

- Map flood hazards
- Identify and protect secondary flow paths
- Onsite stormwater management in new developments
- Cost share for stormwater management
- Investigate new stormwater management



Lower Heathcote Valley

WATERWAYS AND WETLANDS
ASSET MANAGEMENT STRATEGY 1999

PORT HILLS ESTUARY

PROJECT AREA 1A

A Vision Bowenvale Valley



Existing Vegetation

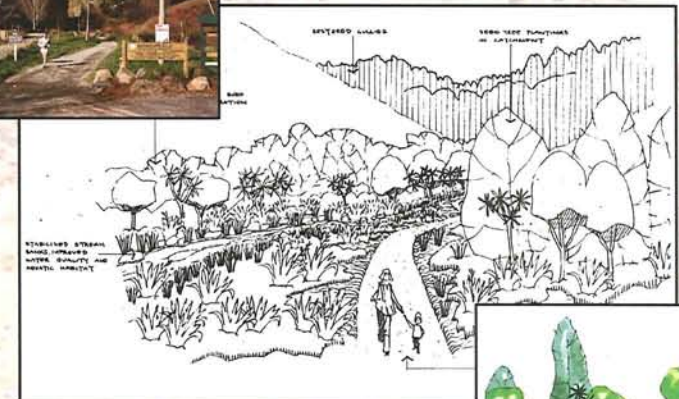


Future Vegetation

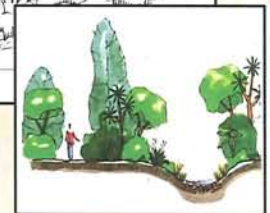


Vegetation Management

- Restoration of valley and side-gullies for soil conservation
- Establish seed tree plots
- Ecological / recreation / education corridors up and between valleys
- Sustainable farm management
- Community involvement

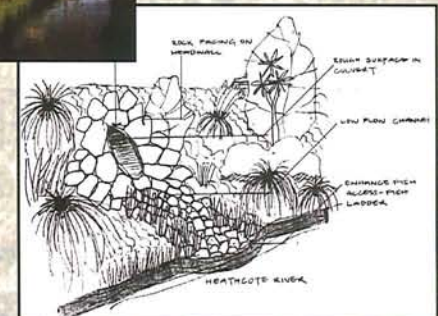


Ecological / Recreation Corridors
Bowenvale Reserve



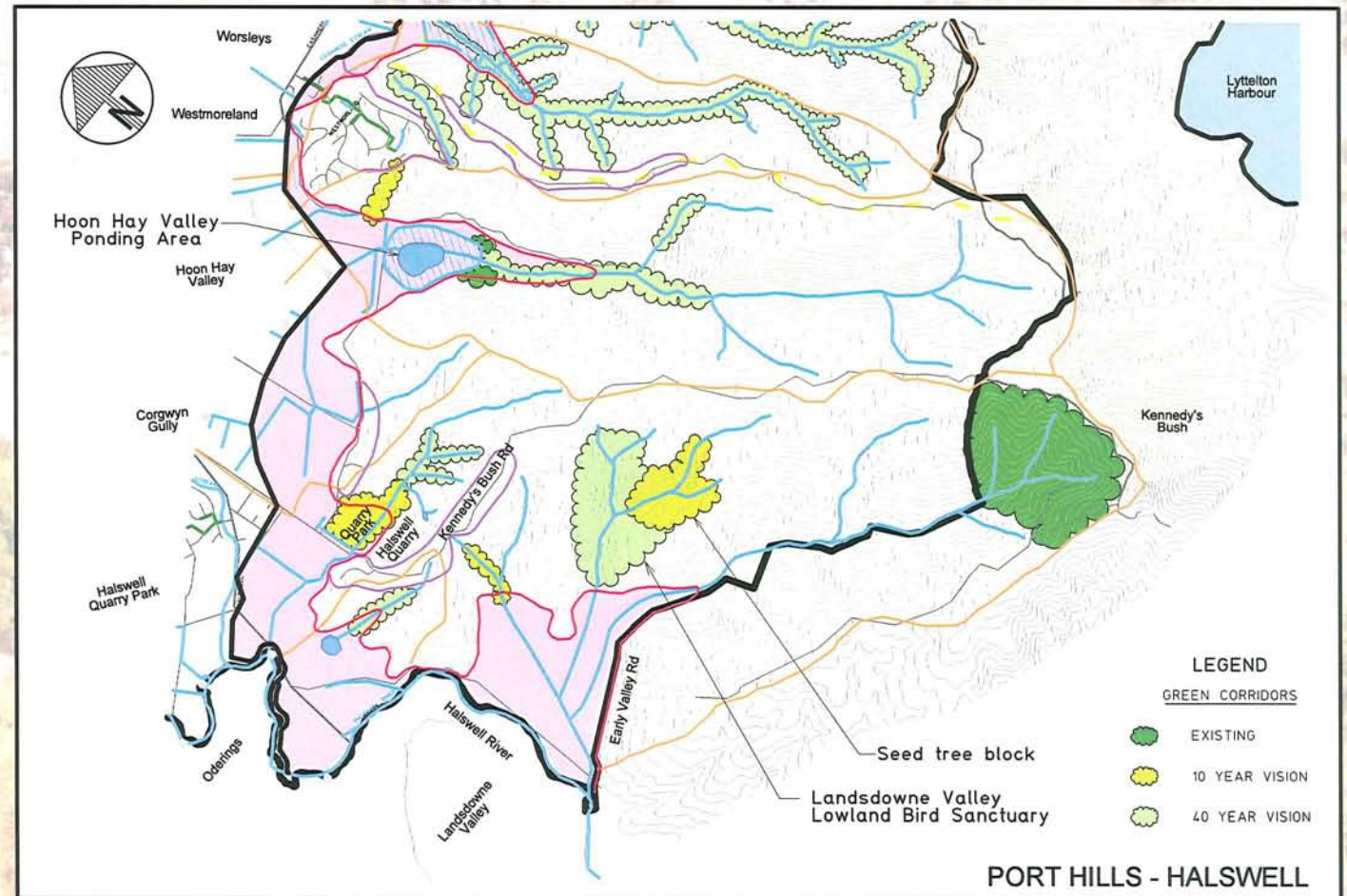
Residential Development

- Map flood hazards
- Identify and protect secondary flow paths
- Onsite stormwater management in new developments
- Cost share for stormwater management
- Investigate new stormwater management
- Waterway planting



Enhance Outlet at Heathcote River

PORT HILLS
HALSWELL
PROJECT AREA 1C



WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY 1999

MARSHLANDS WATERWAYS

PROJECT AREA 2

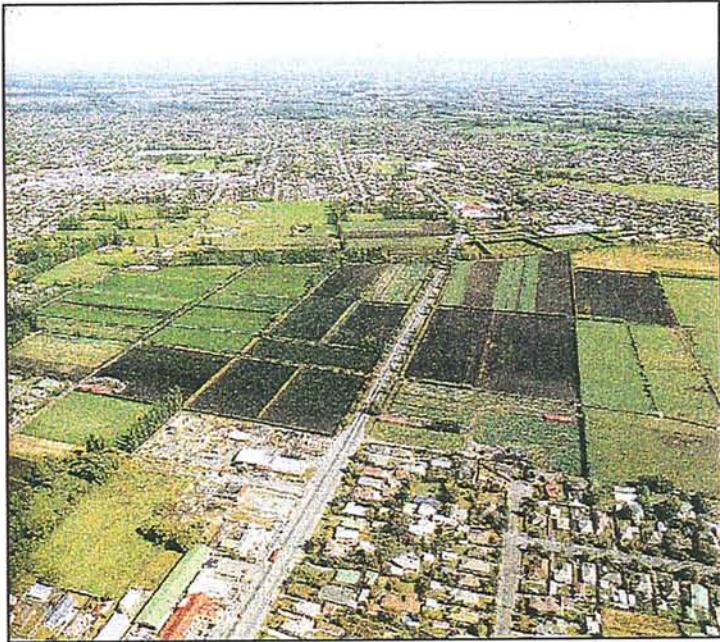




MARSHLANDS- *The Northern Gateway to Christchurch City.*

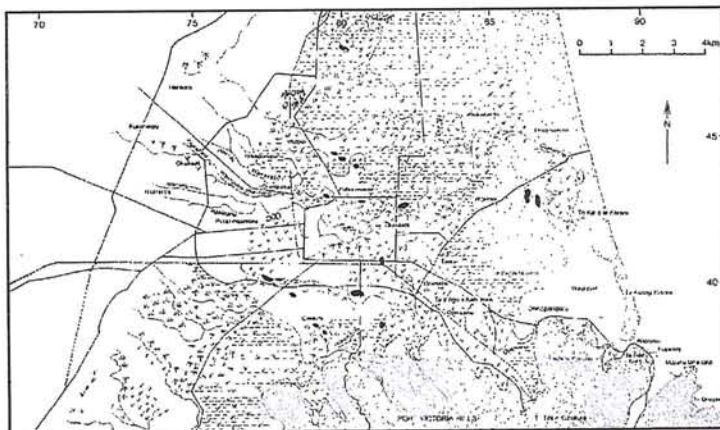
STRATEGIES

- To develop methods of renewal and maintenance that respond to changing landuse, contribute to the character and pre-existing values of the locality and are sustainable in the future.
- To contribute to a "Northern Gateway to Christchurch City" experience by means of design which reflects the special values and characteristics of Marshlands.
- To prepare catchment management concept plans in consultation with community groups, tangata whenua and key Council partners.
- To promote ecological linkages between significant habitat areas adjacent to the Styx River, Horseshoe Lake and Travis Swamp.
- To promote the further study of the "peat" lands and "flood basin" areas through research and consultation to ensure their wise use in the future.
- To advocate landuses and mitigation measures that protect the quality of receiving waters.
- To ensure that waterways are developed to reflect and enhance local indigenous ecosystems.
- To use natural techniques suited to local conditions when renewing waterways.
- To identify, protect and restore sites of importance to tangata whenua
- To create habitat and access for selected aquatic species and water fowl.
- To improve access to waterways when renewing via interpretation areas.
- To acknowledge the strategies as a means of implementing Community Board objectives.



***'Oh the town of Christchurch
Is an elegant mixture
Of road & pasture
And swamp & sand''.***

(Crosbie Ward : 1857).



MARSHLANDS WATERWAYS

NATURAL ASSET MANAGEMENT STRATEGY

INTRODUCTION

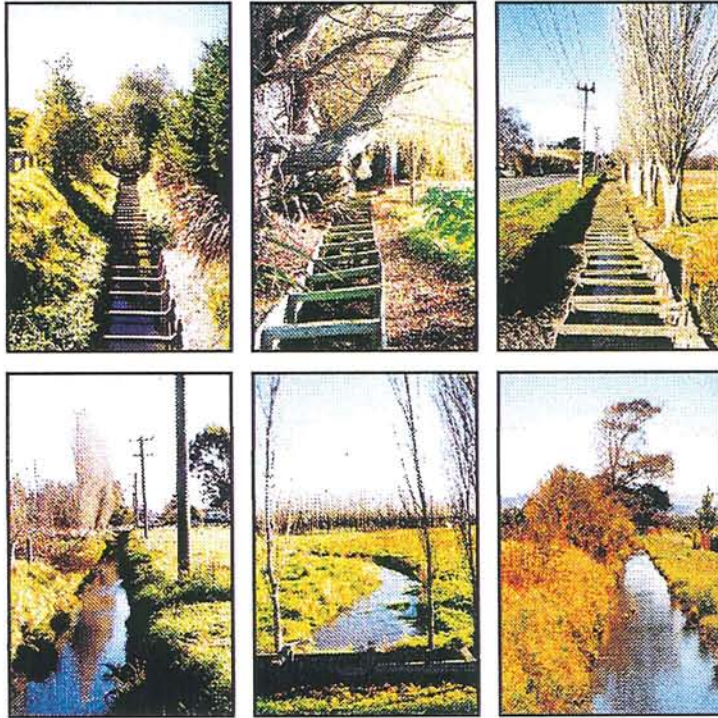
This document aims to provide a strategy for the future management of natural assets in Marshlands. Marshlands is an area that has exhibited a dramatic transformation like no other area in Christchurch. Zoned Rural 3 under the Proposed Christchurch City Plan, it's 1500ha have literally been "drained" of its life force, leaving behind a landscape that is uniform in character. The value man placed on its peat soils for land uses such as horticulture and farming far out-weighed its value as a natural sponge to frequent flooding. Therefore it was decided that an expensive network of timber-lined and concrete-lined drains should be installed to alleviate the damage caused by high groundwater levels on crops.

This strategy proposes that Marshlands be managed to improve the current drainage system in the horticultural areas, while providing for natural values and the needs of future generations as landuse changes. It proposes that ecological, recreational, landscape and cultural values complement the existing drainage regime so that a comprehensive Marshlands strategy is developed. It also highlights the proximity of Marshlands on the northern fringe of the city and the opportunity to hallmark Marshlands as its gateway.

The strategy is conceptually entitled: *The Northern Gateway to Christchurch City* - an opportunity to express the special characteristics of Marshlands through appropriate and sustainable landuse, by giving it an identity as the northern gateway to the city.

HISTORICAL BACKGROUND

Before Christchurch City was colonised by early European settlement, Maori lived and gathered food from many places around Christchurch, including Marshlands. Around this time, most of Marshlands was simply a large area of raupo swamp, flax and grass, abundant with pukeko and eel. The nearby sand dunes was probably where the first immigrants lived initially, until they drained the land for vegetable-growing and dairying. The inception of this primordial drainage system locked the waterways into a matrix of ground and sub-surface water drainage schemes designed with a single value in mind which, to this day still remains.



MARSHLANDS 1999

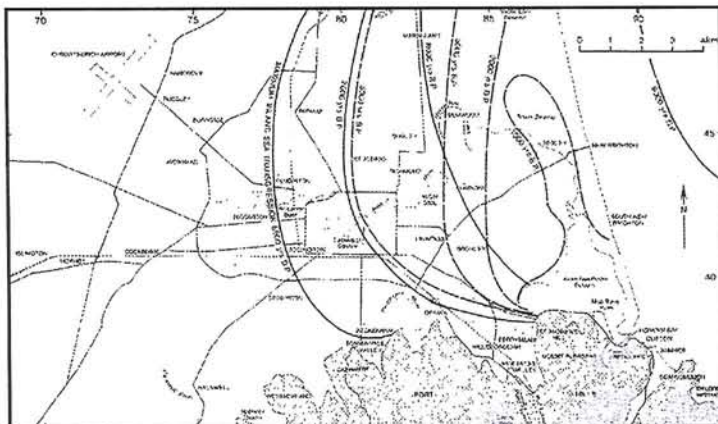
The evolution of Marshlands from boggy backswamp to profitable market garden was progressive. It required the inception of an effective drainage system which could transport ground and sub-surface water away from the area so that its land could be developed into a horticultural oasis. The network eventually developed was mostly adequate and today stands at over 30 kilometres in length. It passes through many types of soil and topography, and these are reflected in the type of treatment utilised.

There are basically three types of waterways in Marshlands. Timber-lining is most frequent, with approximately 16 kilometres in existence used primarily in areas where the soil is wet, susceptible to shrinkage or containment width is narrow. Concrete-lined waterways are few and far between, located generally where the waterway has steep banks. Open waterways are the closest thing to a natural asset waterway in Marshlands presently and these can be generally found in open spaces where the slope is moderately gentle.

The drainage system that exists today culminates to create a utility landscape in the tradition of the old 'Christchurch Drainage Board', providing appropriate levels of service for the horticultural sector and therefore, contributing significantly to the identity of Marshlands.

The low-lying peat lands of Cranford Basin and Walters Road are the epitome of pre-existing backswamps, natural flood basins and today, the heart of market gardening in Christchurch City. Its natural soil type 'peat' was a catalyst to influencing drainage of the swamp and eventually, a move to developing the land for horticulture. Many timber-lined waterways were installed in these two areas so that the natural wetland waters could be drained and cultivated. However, as the land was progressively drained, over time, the peat shrunk, and today the peat level in some places is almost 2m below the level it was 100 years earlier.

The old sand dune hills seen from Marshlands Road through to Burwood are evidence of a 3000-8000 year old postglacial marine progradational shoreline. Overall, the sand dunes are highly modified but they are still visible from a distance in some of the low lying areas of Marshlands. Despite the fact that almost no waterways run directly through the sand dune area, many waterways are present at the toe of the slope. As these areas become susceptible to the pressures of urban growth, the lower parts of the landscape (ie toe of the slope) will come under increasing demand as potential porous surface area in the dunes decreases.





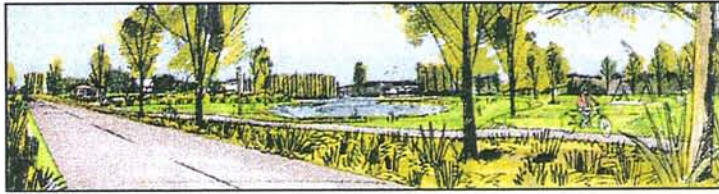
Marshlands is flanked on three sides by built-up urban areas; Burwood to the east, Mairehau/Shirley to the south and Papanui/Redwood to the west. The quality of receiving waterways in Marshlands is heavily influenced by the runoff passing directly through the outer suburbs as the catchments often interfinger these areas via an intricate network of underground pipes and channels. This often means that waterways on the neighbouring urban fringe often go unnoticed, their value fixed at that of Council drainage utility.

Future housing development on these outer areas is likely to occur within the next decade. As this progresses, a change in landuse will most likely see the loss of important soils, plants and habitat areas. It is therefore critical that a comprehensive development strategy be implemented to ensure sustainable development includes safeguarding the life-supporting capacity of ecosystems and the quality of the environment.

Over many years the pristine conditions that once existed have become highly modified. It's swamps were drained, pastures sown, exotics planted, roads, bridges and other buildings were constructed. The culmination of all these elements reflect the natural and cultural values that have all existed at some point in time and tell a story of the struggle between nature and culture in the development of Marshlands.

Now it is time to find a sustainable balance.....an equilibrium.





VISION FOR THE FUTURE - *The Northern Gateway to Christchurch City*

From the once pristine conditions of its former backswamp and coastal sand dune systems to its intensive horticulture, market gardening, pasture lands and suburban living, the marshlands area narrates an absorbing tale of its transformation from one extreme to the other.

The natural asset management strategy proposes that in the future, Marshlands be sensitively developed so that both nature and culture can co-exist in a harmonious and co-dependent relationship.

This strategy recognises the cultural and heritage values of both Maori and post-colonial migrants with particular reference to sites of significance to tangata whenua, post-colonial structures and natural landforms that still exist today.

Ecological values are restored in areas where they can provide a strong linkage between existing or proposed habitat areas. These are generally in areas where the water quality is close to pristine that is, sourced directly from naturally occurring spring-fed wells. These ecological corridors create an educational opportunity for the interaction between nature and culture. Recreational opportunities appropriate to the catchment are introduced to these areas so that a full understanding and appreciation of these dynamic systems can be utilised. Through careful design and consultation, the landscape values of the Marshlands area can be expressed in a way that is sensitive to each site yet will highlight its subtle differences. With the newly planned expressway proposed along Marshlands Road about to be confirmed, the opportunity to exploit this route and hallmark Marshlands as 'The Gateway to Christchurch City' is imminent. It is the opportunity to express ideas about heritage, ecology, recreation, landscape, culture and drainage, to all who pass through this gateway - our northern gateway to Christchurch City.

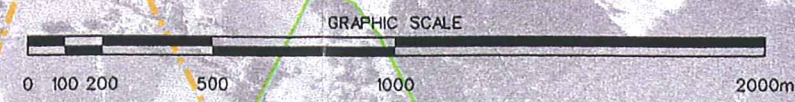
This Gateway will be an ideal vehicle for expressing the innate values special to Marshlands. Its future identity will give all who pass through it, their first impressions and some insight into Christchurch City.

MARSHLANDS

NORTHERN GATEWAY TO CHRISTCHURCH CITY

WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY 1999

Project Area 2



- Waterways
- Amenity corridor planting
- - - Heritage sites
- - - Ecological corridor
- - - Sites of importance to Tangata Whenua
- - - Walkways/cycleways



Viewpoint 1

The possibility of retaining an area of significant open space zoning will present an opportunity to protect existing natural springs within the Rhodes catchment. The development of a wetland would provide a habitat sanctuary for local fauna and migratory birds via an ecological corridor to the Styx River.



Viewpoint 6

The development of in-line storage systems as a preventative measure against downstream flooding will present an opportunity to develop an extensive network of boardwalks and habitat areas within localised wetlands. These ephemeral wetlands will link Horseshoe Lake to Travis Swamp and will strengthen the character of the Burwood growth area by enhancing its identity.



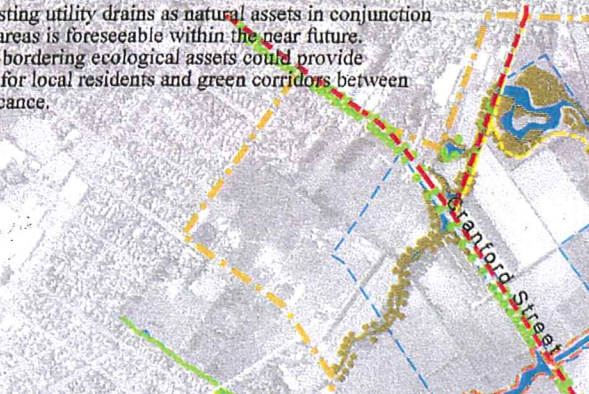
Viewpoint 2

The idea of enhancing existing utility drains as natural assets in conjunction with future urban growth areas is foreseeable within the near future. Walkways and cycleways bordering ecological assets could provide recreational opportunities for local residents and green corridors between areas of ecological significance.



Viewpoint 5

The development of Marshlands Road into an Expressway will hallmark Marshlands as the Northern Gateway to the City, and create an opportunity to show-off some of its special characteristics. These scenic corridors can be developed in conjunction with waterway enhancement projects to express the sustainable landscapes, developed in Marshlands.



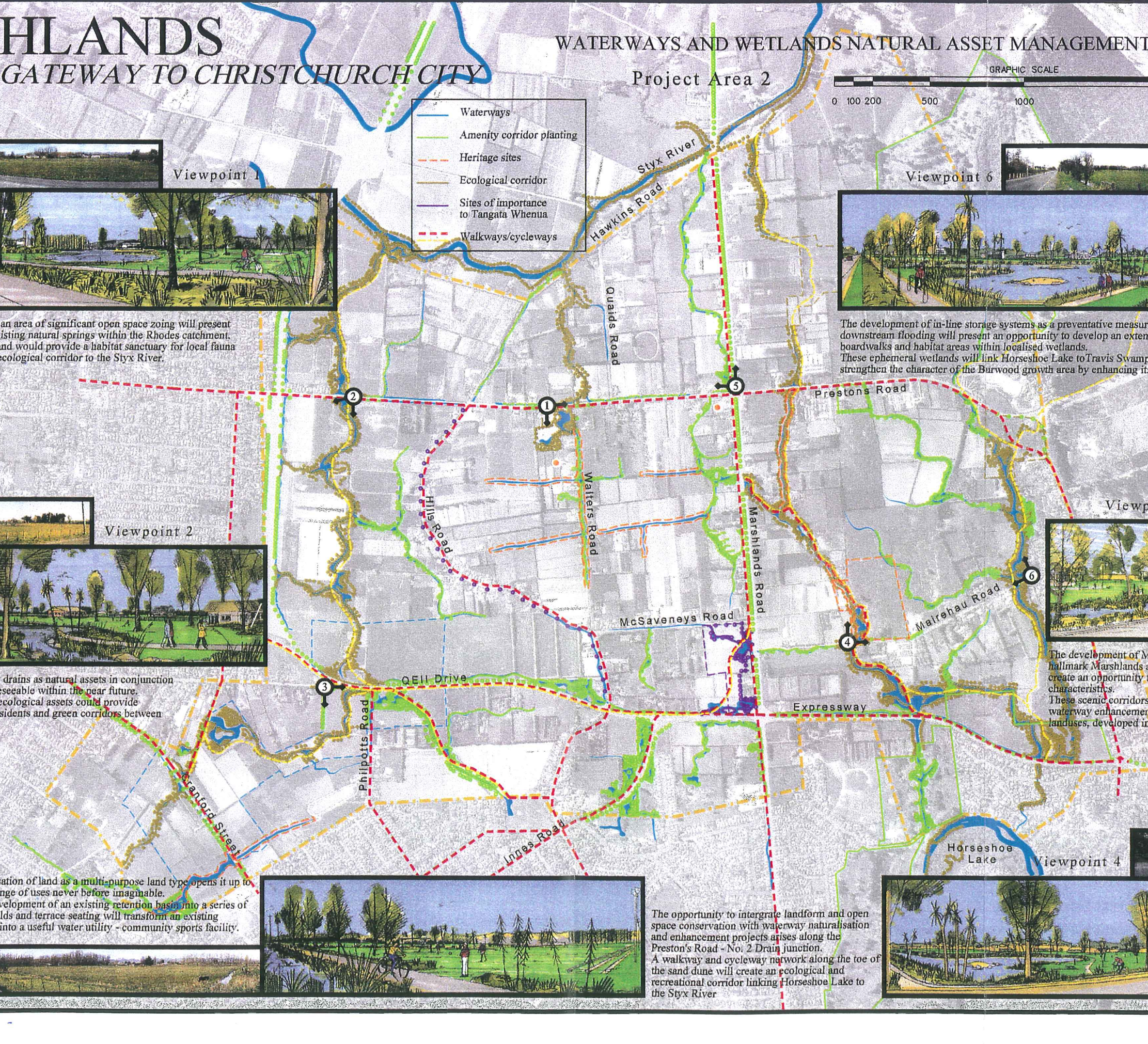
Viewpoint 3

The utilisation of land as a multi-purpose land type opens it up to a wide range of uses never before imaginable. The redevelopment of an existing retention basin into a series of sports fields and terrace seating will transform an existing paddock into a useful water utility - community sports facility.



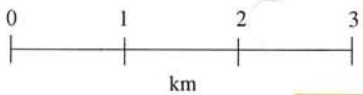
Viewpoint 4

The opportunity to integrate landform and open space conservation with waterway naturalisation and enhancement projects arises along the Preston's Road - No. 2 Drain junction. A walkway and cycleway network along the toe of the sand dune will create an ecological and recreational corridor linking Horseshoe Lake to the Styx River.





**Areas 3 & 4
Styx River**



Areas 3 & 4: Styx River



Saltmarsh

- Remnant saltmarsh and saltmarsh/freshwater ecosystems, in various stages of health.
- Underlying sand-dunes, running from north to south parallel to the coast, stop banks constructed by Regional Council.
- Important ecological, landscape, historic and cultural values which can be enhanced and restored.
- Possibility to re-introduce species and re-establish a more natural tidal regime.

Tidal Freshwater

- Area underlain by sand dunes and wetland pockets.
- Important ecological, cultural, heritage, landscape and recreational values present.
- Largely rural environment, under increasing pressure for urban development.
- Flood ponding area.
- Opportunities to develop all values exist in this area.

Styx Mill

- Very high ecological values and very high potential recreational values.
- Urban pressures are high.
- Some areas already protected but others need to be acquired and protected.
- A Plan has been completed for at least part of the area.

Urban

- Majority of the area is residential.
- Much piping but limited potential for daylighting due to age of development.
- Still potential to develop waterways and swales through public open lands, such as schools and sports fields.
- Still some high ecological and landscape values to be protected and enhanced in the lower reaches of this area.

Green Corridor

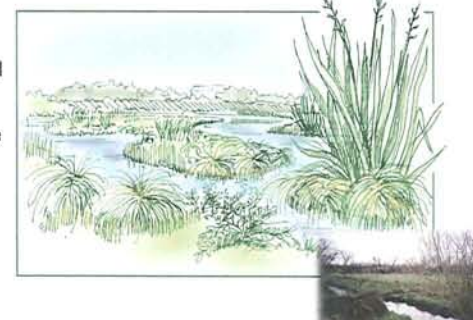
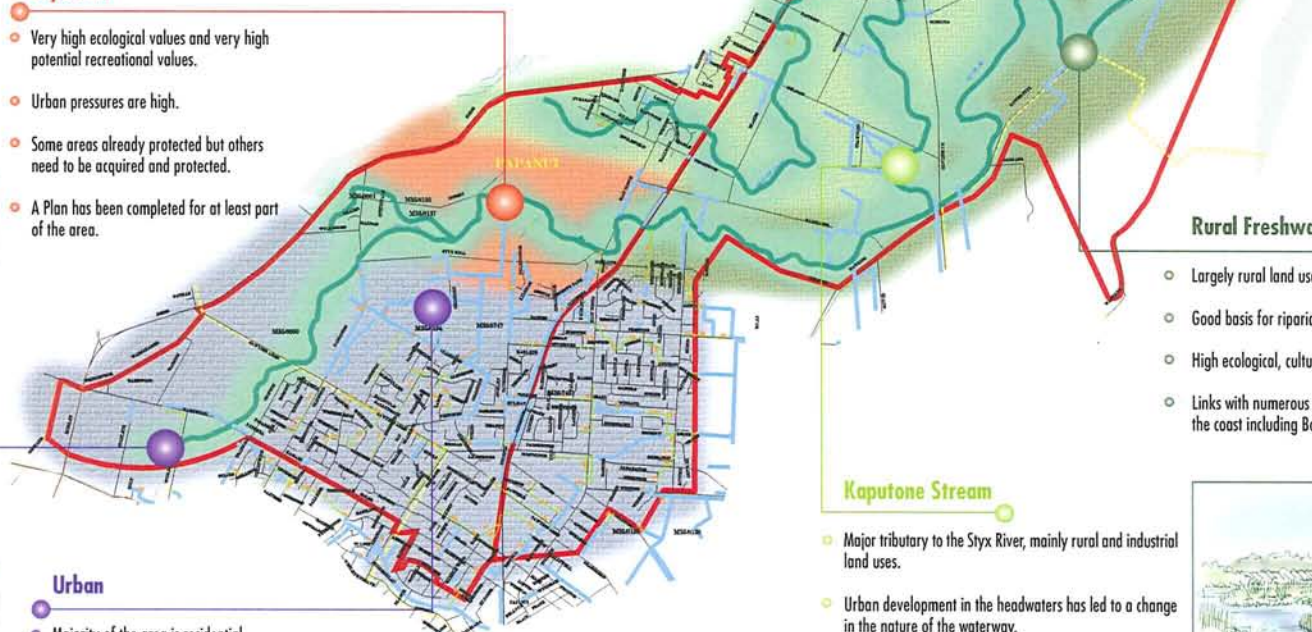
- Green corridor travelling down the Styx River and incorporating Kaputone Creek and other main tributaries.
- Links up to Brooklands Lagoon and the coastal environment, the Waimakariri River, Chaney's Forest, and the Otukaikino River, south into Marshlands and across into Bottle Lake Forest.
- Objective is to have a continuous band of open space along the length of the waterway.

Rural Freshwater

- Largely rural land use, however, pressure to subdivide increasing.
- Good basis for riparian marginal vegetation - incised waterway in parts.
- High ecological, cultural and landscape values.
- Links with numerous drains either to the west in the rural and or out towards the coast including Bottle Lake.

Kaputone Stream

- Major tributary to the Styx River, mainly rural and industrial land uses.
- Urban development in the headwaters has led to a change in the nature of the waterway.
- Water quality and potential mitigation measures are an important issue.
- Opportunities to work with industries to improve water quality and enhancement projects.



THE STYX CATCHMENT

Asset Management Strategy

"a place of wilderness and peace"

VISION STATEMENT

Retain and protect the natural and physical environments, which together contribute to the gentleness, peacefulness and wilderness of the Styx catchment, while providing for both rural and urban land uses.

STRATEGIES

- Recognise the potential for, and support the holistic management of urban and rural land uses and ecological values through the whole catchment.
- Support the community's on-going involvement in the Styx catchment, in order to achieve the long-term sustainable management of the area.
- Express the richness of both Maori and European cultural and historical values within the Styx River it's tributaries and associated landforms and wetlands.
- Acknowledge and protect the functioning of the floodplains and ecological values associated with the Styx catchment, at the same time as managing drainage needs.
- Restore the natural flow regime through detention in conjunction with water quality management and ecological restoration work.

THE STYX CATCHMENT

Asset Management Strategy

"a place of wilderness and peace"

STRATEGIES cont'd

- Recognise and mitigate the effects of rising sea-levels with regard to tide-gates operations and the coastal environment.
- Protect and restore, where practical, spring flows.
- Maintain Styx River flows through environmentally sensitive aquatic vegetation management.
- Identify water quality issues and develop mechanisms to restore and protect the quality of the resource.
- Protect and restore the range of habitats represented within the catchment, including the restoration of core habitats as refugia for riparian, wetland and aquatic ecosystems.
- Support the Open Space Strategy, which recognises the importance of the Styx River as a green corridor, and identify important sites in both urban and rural areas where protection is necessary.
- Restore natural values within the catchment, which have either significantly deteriorated, or been lost, for example, the saltmarsh ecosystem and the re-establishment of locally extinct species, such as NZ fernbird.
- Identify priority areas for acquisition within the catchment.
- To develop areas for recreational activities extending along the length of the waterway.

THE STYX CATCHMENT

Asset Management Strategy

“a place of wilderness and peace”

STRATEGIES cont'd

- To undertake investigations to understand the functioning of the catchment more clearly, including
 - The long-term effects of flood detention sites on natural values,
 - Undertake an aquatic invertebrate study of the Styx River and tributaries,
 - Identify the consequences and requirements for restoring the natural water flow regime within the Styx River, and
 - Undertake a study of the water quality in the Kaputone Stream.

WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY 1999

THE OTUKAIKINO RIVER



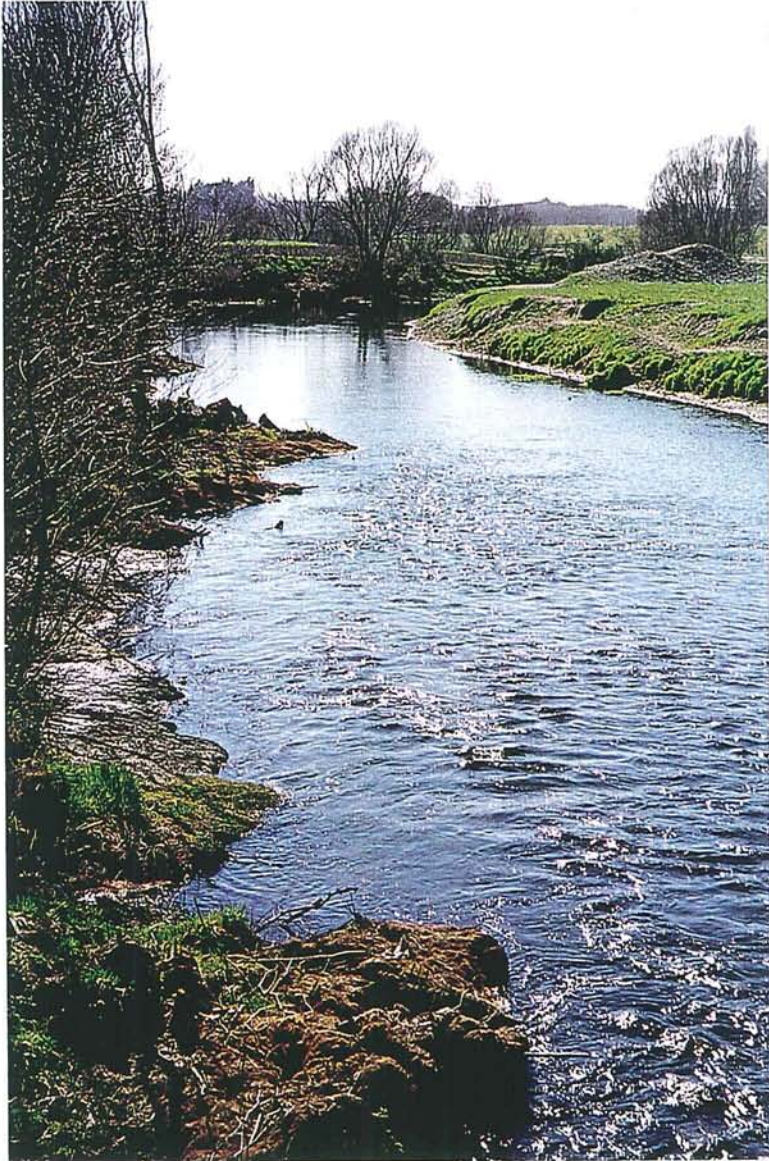
PROJECT AREA 5

Strategies

The Otukaikino River - *A spring-fed gem at the northern edge of the city.*

- To form a stakeholders consultation group
- To accurately map all streams, springs and wetlands.
- To assess the condition of all streams, springs and wetlands.
- To consider inclusion of waterways into the Christchurch drainage district.
- To jointly monitor with CRC water quality in all waterways.
- To prepare a river management plan in consultation with the key stakeholders - landowners, Clearwater Resort, the airport authority, lease holders, community groups, Tangata Whenua, Fish and Game, DOC, and Parks.
- To assist farmers with riparian management.
- To protect and enhance selected wetlands.
- To improve water quality in all waterways and to enhance riparian vegetation through the river management plan.
- To protect and enhance habitat for selected aquatic species including trout and salmon.
- To enhance public access for anglers, walkers, etc in selected areas along the river margins.
- To expand the 'Groynes' through land purchase.
- To undertake a feasibility study for an international rowing course
- To promote linkages with existing recreational areas.
- To link the strategies to the objectives and policies in the Christchurch City Plan.
- To promote the strategies as a means of implementing Community Board objectives.





OTUKAIKINO

NATURAL ASSET MANAGEMENT STRATEGY

INTRODUCTION

The Otukaikino system is a significant environmental asset at the northern edge of the city. It is not as generally well known to the public as the other river systems in Christchurch - the Styx, the Heathcote and the Avon.

In the past, perhaps because it is outside of the Christchurch Drainage District, its flow and water quality characteristics have not been studied and monitored to the same extent as other waterways in the city.

Recently, its water quality has been studied by CRC because the Otukaikino flows through the Groynes Recreation area, and in the past the waters had been used for contact recreation.

The Waterways and Wetlands' Natural Assets Management Strategy provides a vision and means for managing and developing this waterway system through a partnership approach. The goal is the enhancement of natural and recreational values while recognising private property interests.

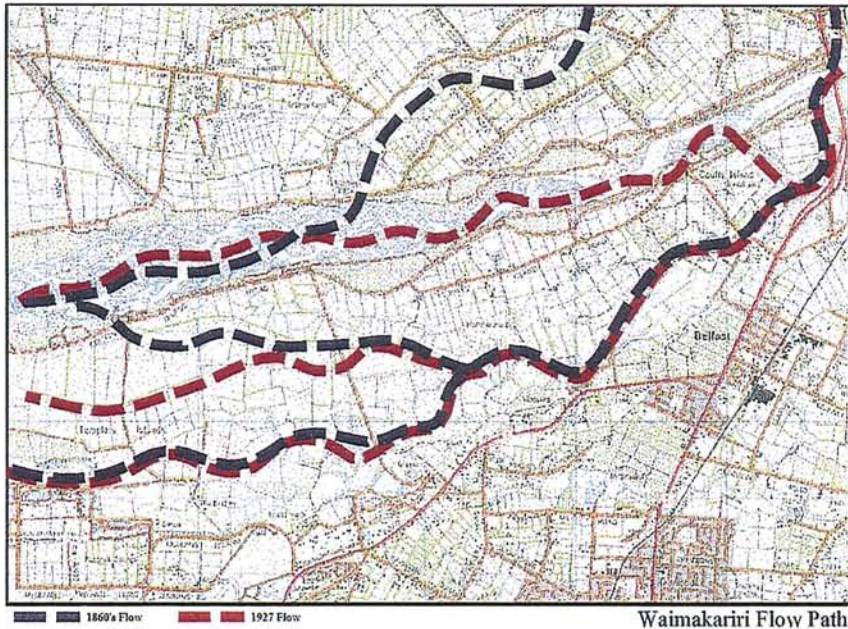
This document briefly describes the present system before outlining the vision, the strategies and the costings for achieving them.

HISTORICAL BACKGROUND

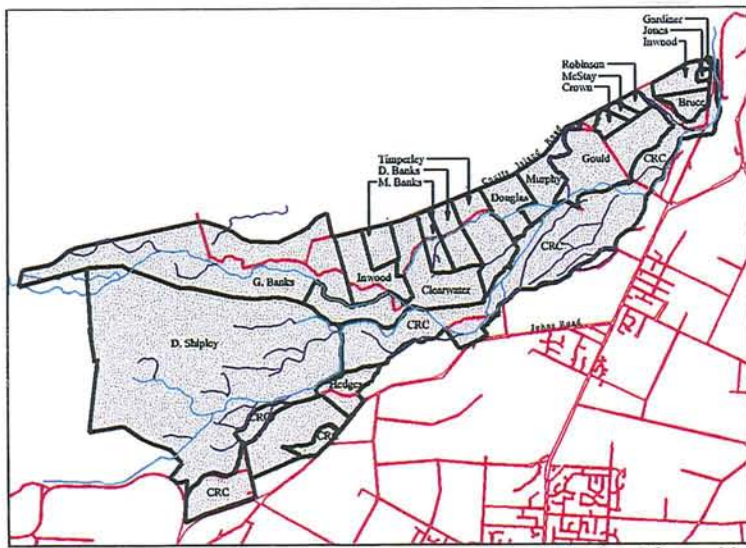
There is no literal transliteration of "Otukaikino". Waters of the Otukaikino were traditionally used for embalming by the Tangata whenua.

Early Europeans knew the Otukaikino as the South Branch of the Waimakariri River. Prior to 1928 the lower Waimakariri River was a complex of interlacing channels and islands which included Templars Island, MacLeans Island, and Coutts Island. Several channels flowed through the study area. In 1928 the Hays No.2 Scheme was constructed to 'civilise' the river to prevent flood overflows, and constrict and shorten the channel, to enable the river to pass its gravel load to the sea.

Hay's No.2 included the construction of an extensive stopbank and Groynes system and the bypassing of a tight loop in the river, (downstream of Dickeys Road) the excavation of Wrights Cut;



Waimakariri Flow Path



Land Ownership

and the construction of a crossbank. The construction of the cross bank closed the old south branch.

THE OTUKAIKINO TODAY

Today the Otukaikino is a system of spring-fed, low velocity streams and wetlands that flow through rural land; in the flood plain of the Waimakariri River.

The waters generally have low silt loadings, relatively low turbidity and relatively low seasonal fluctuations in water level.

In this study the system has been divided into three areas - **the lower system** (downstream of Dickeys Road); **the middle system**, which includes the areas that make up Clearwater Resort, the Groynes, St Helena Vineyard, the Belfast oxidation ponds and the Welles Dairy Farm; and **the upper system** which is upstream of the Clearwater Resort and includes a number of springs, waterway branches and wetland sites.

ISSUES

1 Future and Existing Land Use

The study area is likely to remain as predominantly open space for the following reasons:

- i. the land is in the Waimakariri River Flood Plain
- ii. there are airport protection measures in the District Plan that make residential buildings non-permitted activities in certain areas within the study area.
- iii. large chunks of the land are owned by the CRC for flood protection purposes
- iv. Clearwater Golf Resort is under construction
- v. The Groynes and Lake Rotokohatu are significant recreational areas.

2 Water Quality

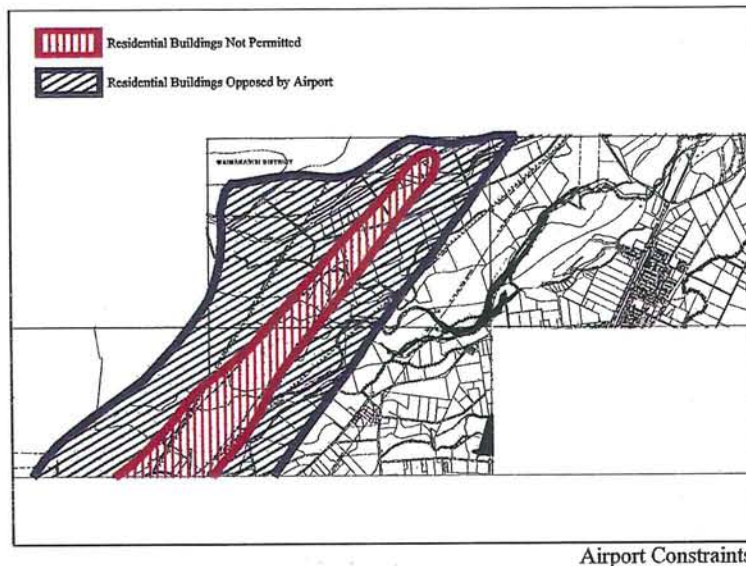
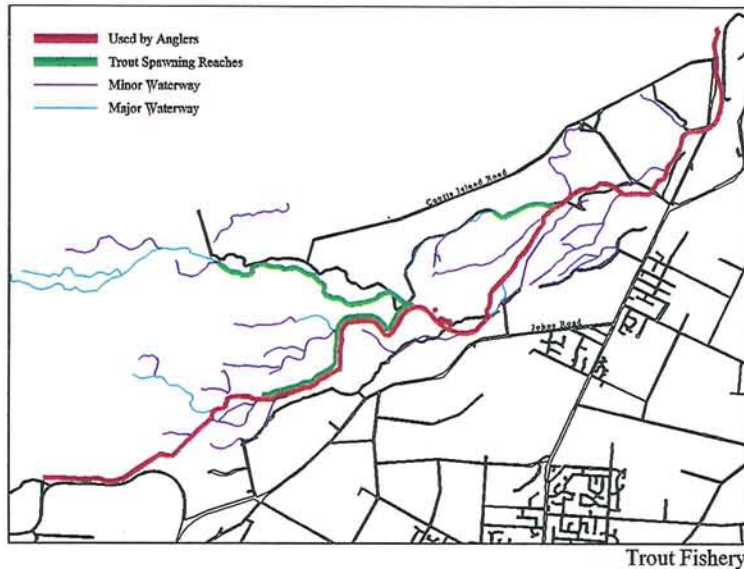
The water quality in the waterways is declining; quite possibly as a result of livestock access to the waterways.

3 Landowners

There are a relatively small number of landowners in the study area.

4 Waterway Data

The system is not well understood and there is a need for more studies as a pre-requisite for considering future management options.



5 Mapping

The alignment of streams and waterways is not accurately mapped on the district plan maps.

6 Fishery

The existing brown trout fishery is widely valued and used by anglers. There is also a growing salmon population in the waterways as a result of the fish released for 'take-your-kid fishing'. There is a small native fish population.

7 Existing Recreation Facilities

There are a number of popular existing recreational features including Lake Rotokohatu, the Groynes and the Waimairi Walkway.

8 Recreation Potential

The groundwater resource is a potential recreation resource for new recreation activities such as competitive rowing, waterskiing, canoeing. There is interest among the sports bodies to develop these facilities in this area.

9 The Groynes

The Groynes is approaching the limits of its carrying capacity and Parks are looking to increase the size of the facility.

10 Airport Interests

The airport is concerned about landuse and landscape changes in the vicinity of the flight path that may increase potential for birdstrike from waterfowl and other birds attracted to the waterways.

11 The Christchurch Drainage District

The Otukaikino system is outside the Christchurch Drainage area.

THE VISION

To take a strategic and long term view of the special natural and recreational characteristics that exist in the Otukaikino system through a public and private partnership

The Otukaikino River

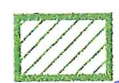
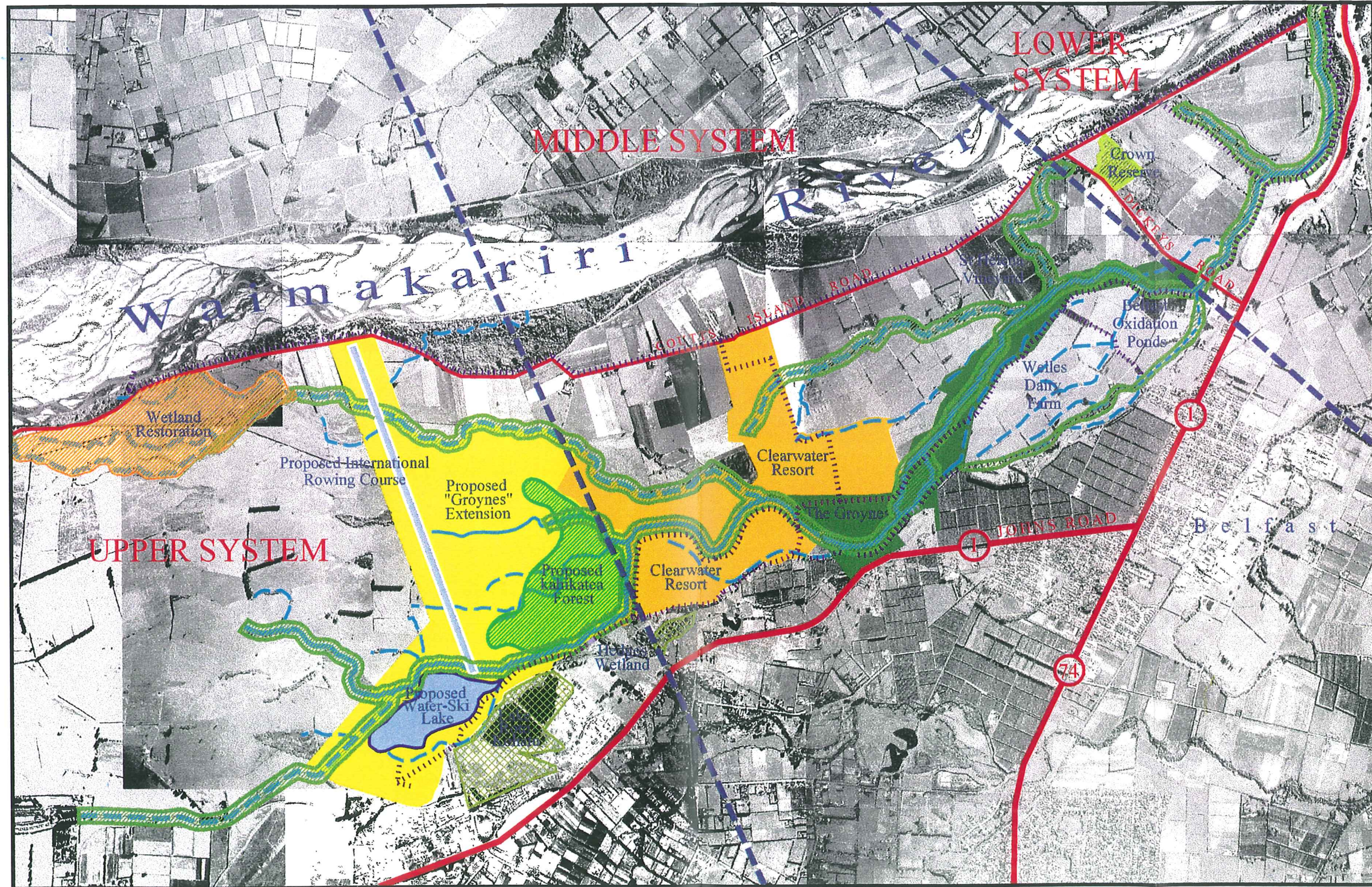
Project Area 5

Waterways and Wetlands
Natural Asset Management Strategy 1999

A SPRING FED GEM

AT THE NORTHERN EDGE OF THE CITY

0 1 2km



Riparian Restoration



Existing and Proposed
walkway system



Environmental Asset Waterways



Upstream or Downstream Waterways

THE AVON TRIBUTARIES



WATERWAYS & WETLANDS ASSET MANAGEMENT STRATEGY, 1999

THE AVON TRIBUTARIES

Waterways and Wetlands Asset Management Strategy 1999

Vision

Living in Harmony with natural waterways

Strategies

- Recognise that the numerous spring-fed tributaries of the Avon River are an essential part of the character of Christchurch
- Recognise that significant lengths of waterway are degraded and that restoration is necessary for the benefit of present and future generations
- Sustain spring flows through restoration, groundwater management and monitoring
- Maintain aquatic habitats by protection from sedimentation and over-widening of low flow channels and restoration of water's edge plant species
- Promote the multiple benefits of canopy trees alongside waterways (including shade for aquatic habitats and birds)
- Promote the protection and restoration of riparian planting to satisfy ecological and human wellbeing values
- Demonstrate all the potential values of waterways and wetlands by enhancing stream flows, aquatic habitats and riparian environments within public areas, eg parks, streets, schools, university and shopping areas
- Promote understanding of ecological and wildlife values for amateur naturalists and residents by on-site talks and demonstrations
- Support the establishment of neighbourhood stream care groups and school ecological monitoring groups

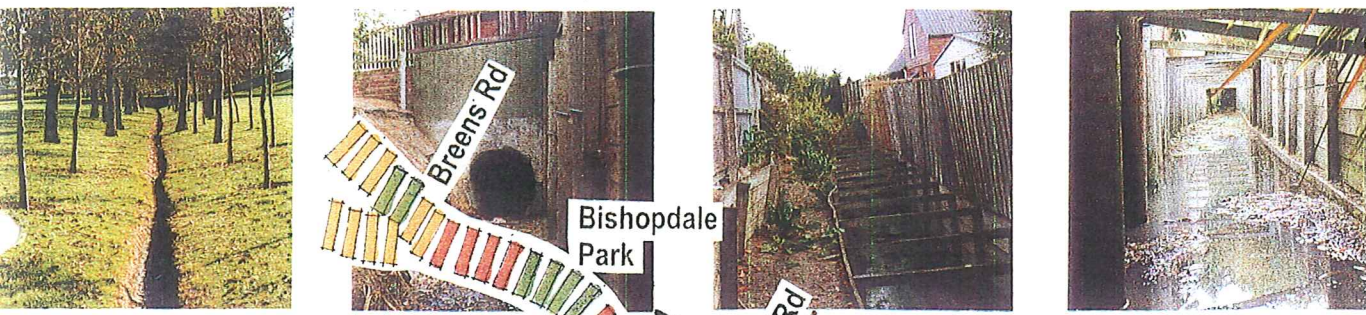
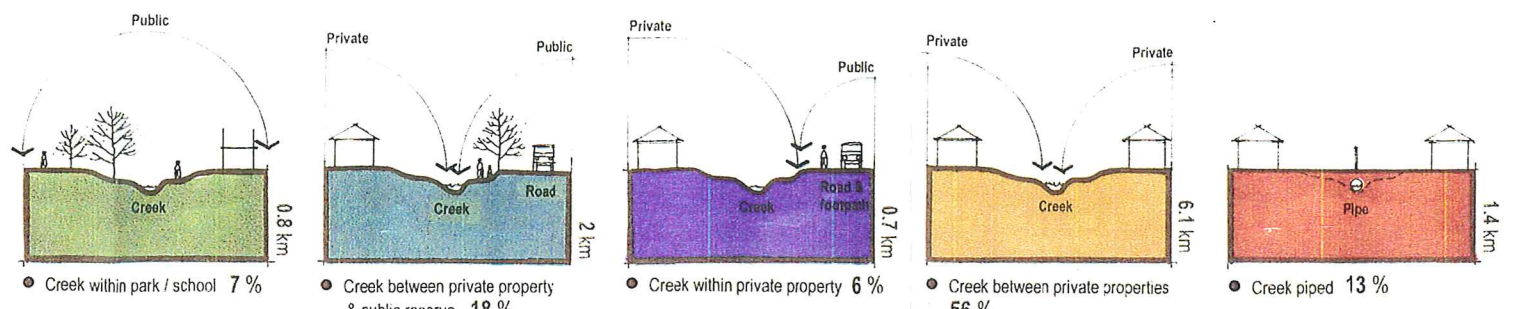
- Establish partnerships with neighbourhood groups of residential property owners for waterways and wetlands restoration and protection
- Protect restoration work within private property where there is significant Council funding by appropriate legal means (eg voluntary esplanade strips without public access)
- Increase visibility of waterways at road boundaries and crossings
- Erect signs and interpretation boards that enhance knowledge of the names of waterways and their attributes, especially in conjunction with streamside walking routes
- Acknowledge the strategy as a means of implementing Community Board objectives

The Strategy is to be regarded as one of the methods of achieving the City Plan Objectives and Policies to the relevant Project Area. Key

Sections include:

- 1 Tangata Whenua and their resources
- 2 Natural environment—natural features and habitat natural hazards coastal environment
- 3 City Identity—form
- 4 Recreation and open space—provision and diversity

The Strategy is to be implemented by making appropriate budgets for: protection, restoration, maintenance and management



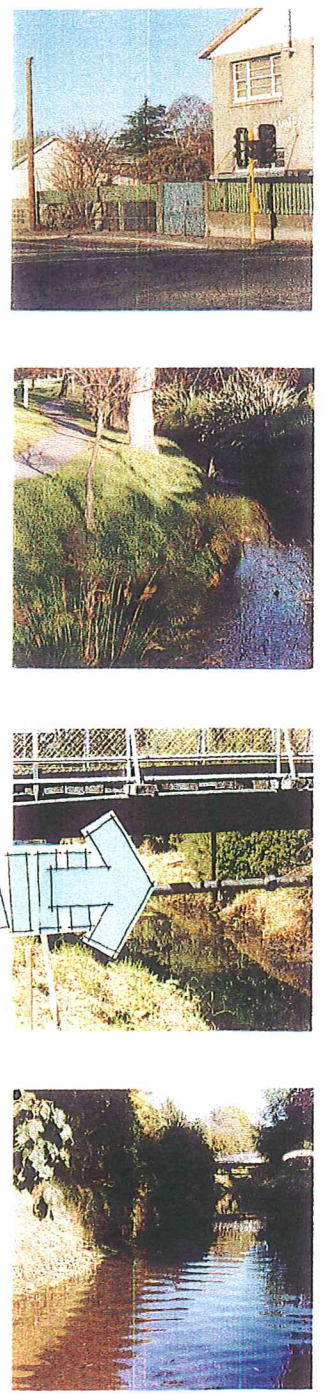
Character

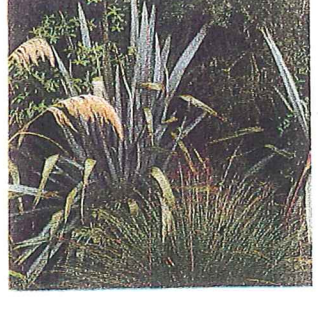
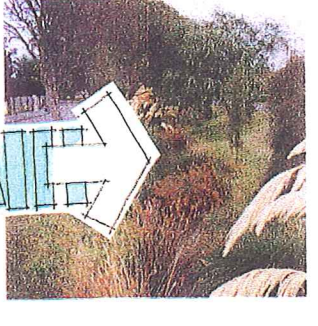
Weeds **Garden waste** **Private ownership** **Buildings** **Slumping**

High banks **Existing projects** **Sitation** **Collapsing walls** **Subdivision** **Erosion** **Limited public visibility** **Piping** **Fences** **Steep banks**

Pollution **Poor baseflow**

Map labels: Breens Rd, Greers Rd, Matsons Ave, St. James Park, Papanui drain, Papanui Rd, Philpotts Rd, Cranford St, Kellys Rd Diversion, Philpotts Rd, Chch Park, Aylesford St, Shirley Stream, Hills Rd, Banks Ave, Avon River, Petrie St, St. Albans Creek.





Reserves
Education
Maintenance
Restoration
Setback

Land Purchase

Recreation

Protection

Heritage

Cost share

Drainage

Street Treatments

Cultural

Landscape

Ecology

Partnership

Innovation
Realignment

Management
Interpretation



CCC Waterways & Wetlands
Asset Management Strategy
Avon Tributaries

Prepared by Jeff Weston & Wayne Rimmer for CCC Waterways & Wetlands
July 1999

Dudley Creek

CENTRAL CITY NEIGHBOURHOODS



Project Area Seven

WATERWAYS AND WETLANDS ASSET MANAGEMENT STRATEGY

CENTRAL CITY NEIGHBOURHOODS

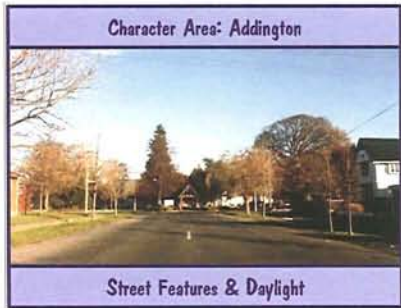
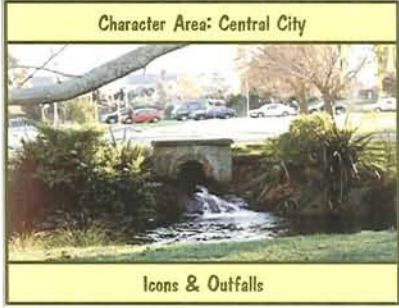
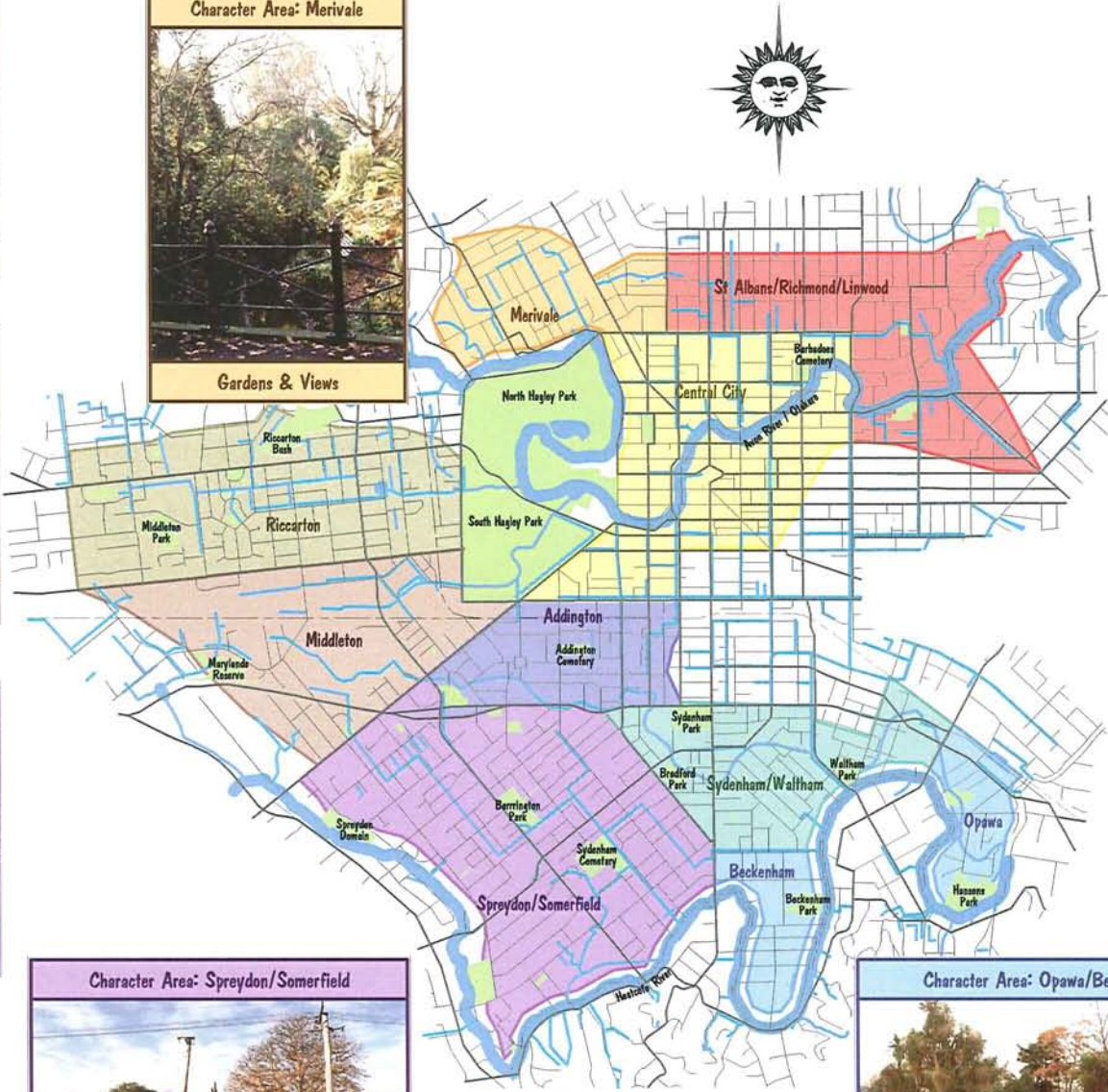
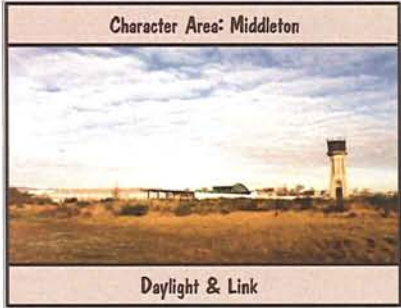
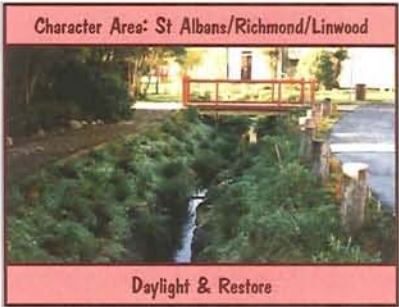
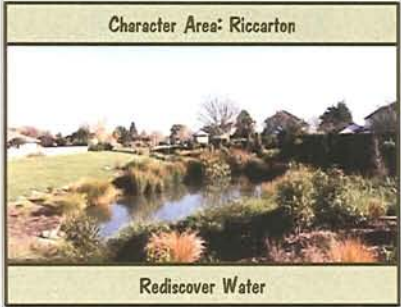
VISION: To create delightful and interesting neighbourhood green space in high density living areas through the imaginative design of stormwater management systems in an integrated way with streets and parks.

- STRATEGIES:**
- ① Provide mitigation for the adverse effects of increased urban runoff from high density development in an environmentally sensitive way.
 - ① Compensate for the loss of private green space that occurs in high density living areas by contributing to urban renewal projects.
 - ① Improve community understanding and involvement with the waterway network by the use of icons, artworks and interpretation.
 - ① Acknowledge the strategies as a means of implementing Community Board objectives.
 - ① Work in an integrated way with Parks Unit, City Streets and the Urban Design Team.
 - ① Establish recreational opportunities, access and linkages along waterway corridors and to streets and parks.
 - ① Enhance and add meaning to urban neighbourhoods by opening views to waterways and incorporating heritage values in design.
 - ① To create imaginative concepts for high density neighbourhood that form the basis for collaborative effort by the Council Units and developers.
 - ① Reflect and reinforce unique neighbourhood character through restoration, protection and 'daylighting' of drainage utilities.
 - ① Restore natural values to urban waterways and promote ecological linkages.
 - ① Integrate waterways and swales into streetscapes and gardens.
 - ① Establish attractive ponds to mitigate potential flooding.
 - ① Protect and where possible restore baseflows.

CITY PLAN OBJECTIVES

The Draft Strategy is to be regarded as one of the methods of achieving the City Plan Objectives and Policies relevant to the Project Area. Key sections include:

1. Natural Environment - Water; - Natural features and habitats; - Environmental awareness.
2. City Identity - Form; - Amenity; - Heritage protection.
3. Tangata Whenua - Maori and their resources.
4. Utilities - Adverse environmental effects.
5. Subdivision and Development - Protection of natural features; - Amenities values; - Anticipated land uses.
6. Recreation and Open Space - Provision and diversity; - Efficient and effective use; - Design Appearance.



LEGEND

	Major Roads
	Railway
	Open Waterways
	Piped Waterways
	Reserves/Conservation Areas/ Significant Green or Open Space

WATERWAYS AND WETLANDS ASSET MANAGEMENT STRATEGY

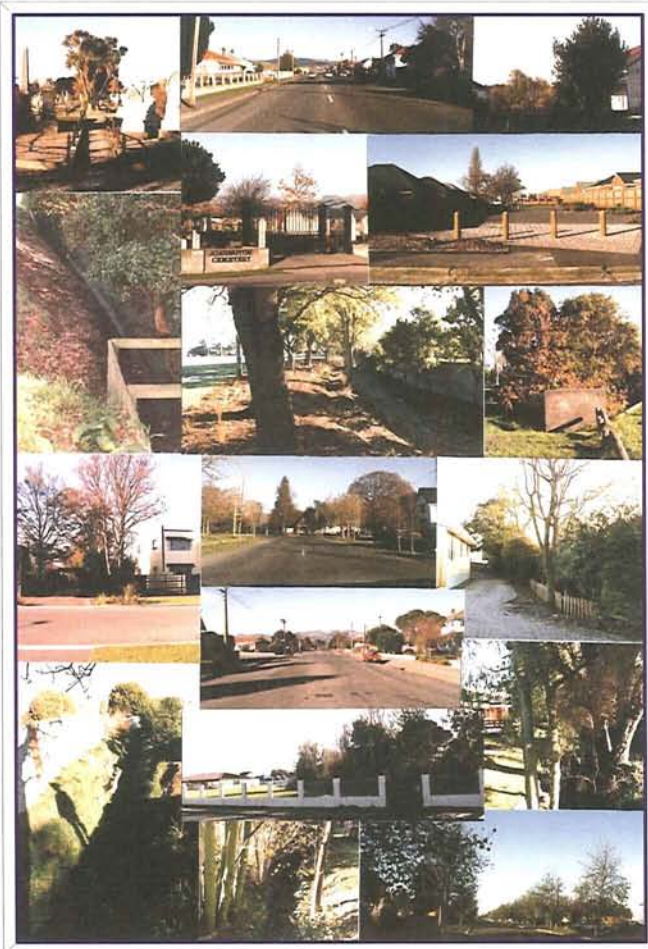
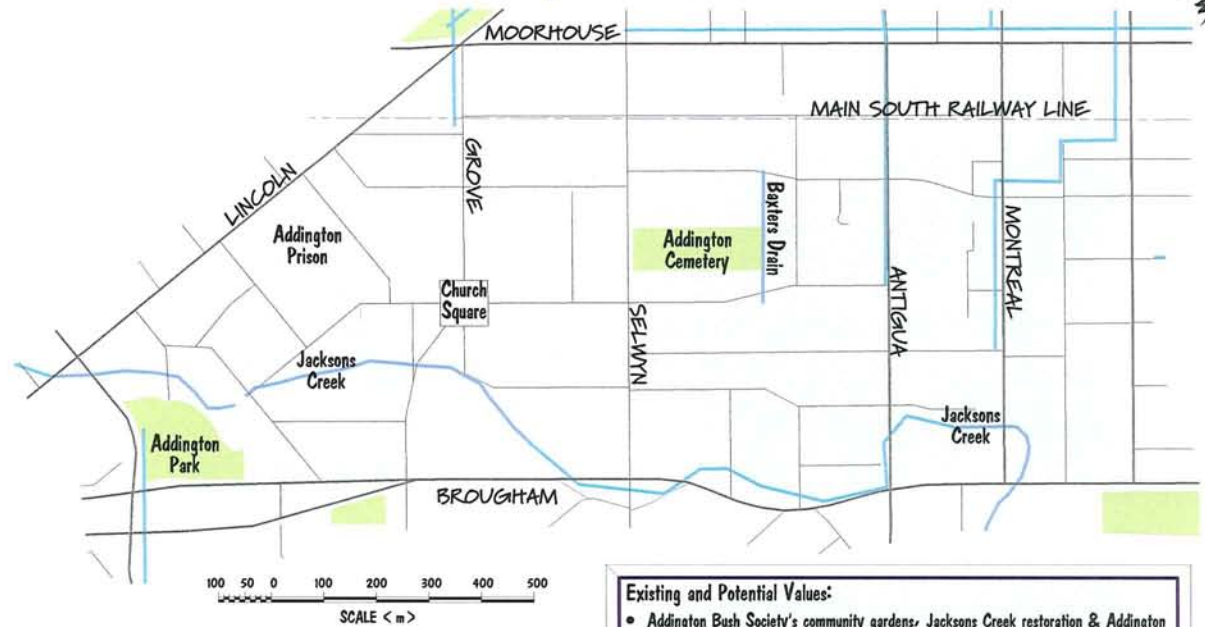
PROJECT AREA 7 CENTRAL CITY NEIGHBOURHOODS

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DRAWING NUMBER: L4308 SCALE: 1:120,000 AT A1
INDEXED: LPO3701 SHEET: 1 OF 1
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CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

ADDINGTON

NEIGHBOURHOOD



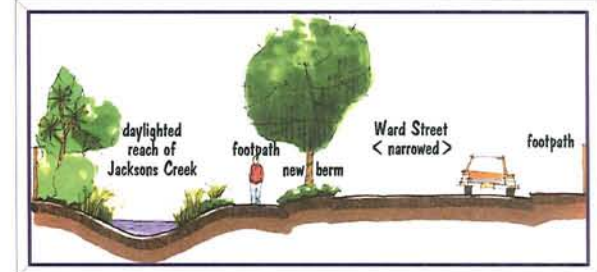
CHARACTER



VISION: DAYLIGHT & STREET FEATURES

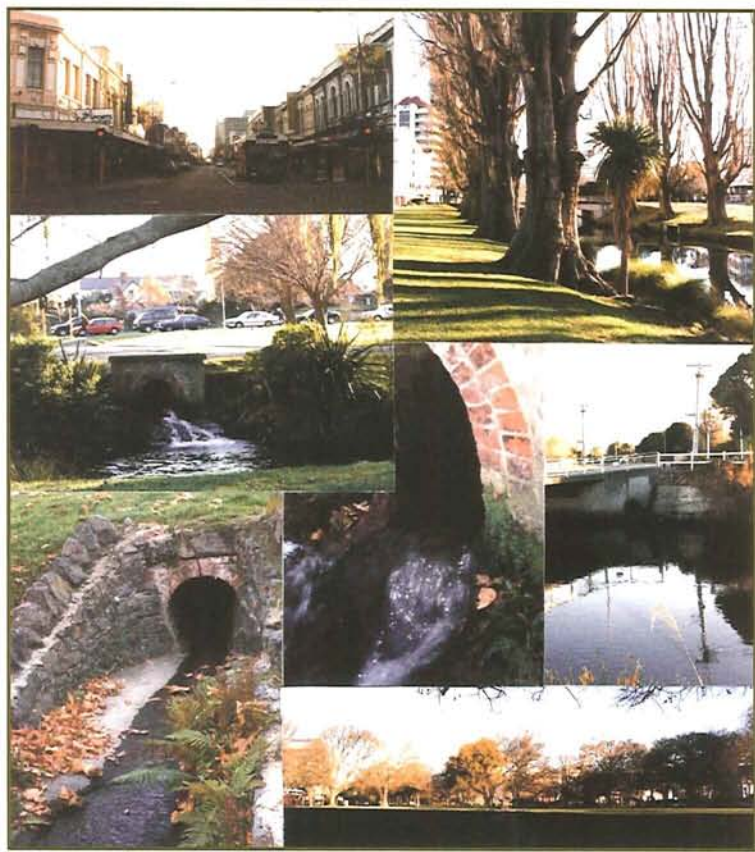
Existing and Potential Values:

- Addington Bush Society's community gardens, Jacksons Creek restoration & Addington Park ribbonwoods have ecological, landscape & passive recreation value. Develop Baxters Drain to incorporate cemetery into new park at Braddon Street.
- Use heritage features at Church Square, Addington Cemetery & Addington Prison, to influence design of waterway structures & elements.
- Work with community groups to restore & educate about waterways.
- Investigate a SAM along the Jacksons Creek corridor. Maintain views & establish path along the creek especially by pensioner housing & Salvation Army property.
- Investigate 'daylighting' waterways & integrating with streetscape to provide views & public access.
- Consider recharge of low flows in waterways.
- Retain open waterways, create roadside swales & investigate 'daylighting' of piped systems & recharge of open waterways.



CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

CENTRAL CITY



CHARACTER

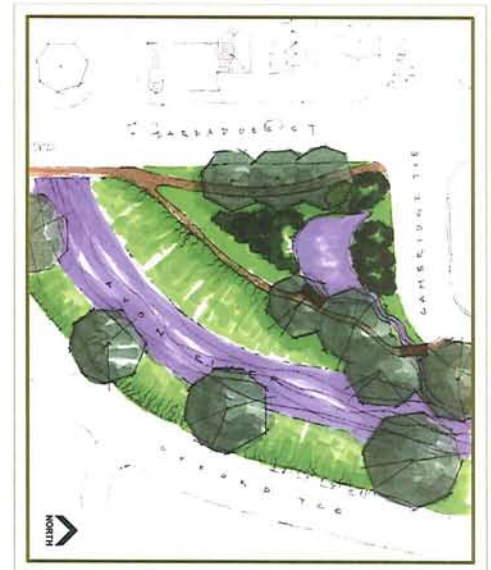
NEIGHBOURHOOD



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Existing and Potential Values:

- Ecological values confined to river corridor.
- Highlight drainage system through visual cues, eg durable & artistic works beside sumps - fish symbol.
- Highlight brick barrels & interpret as historic part of drainage system.
- Enhance stormwater outfalls.
- Investigate options for 'daylighting' piped systems with regard to life of structures.

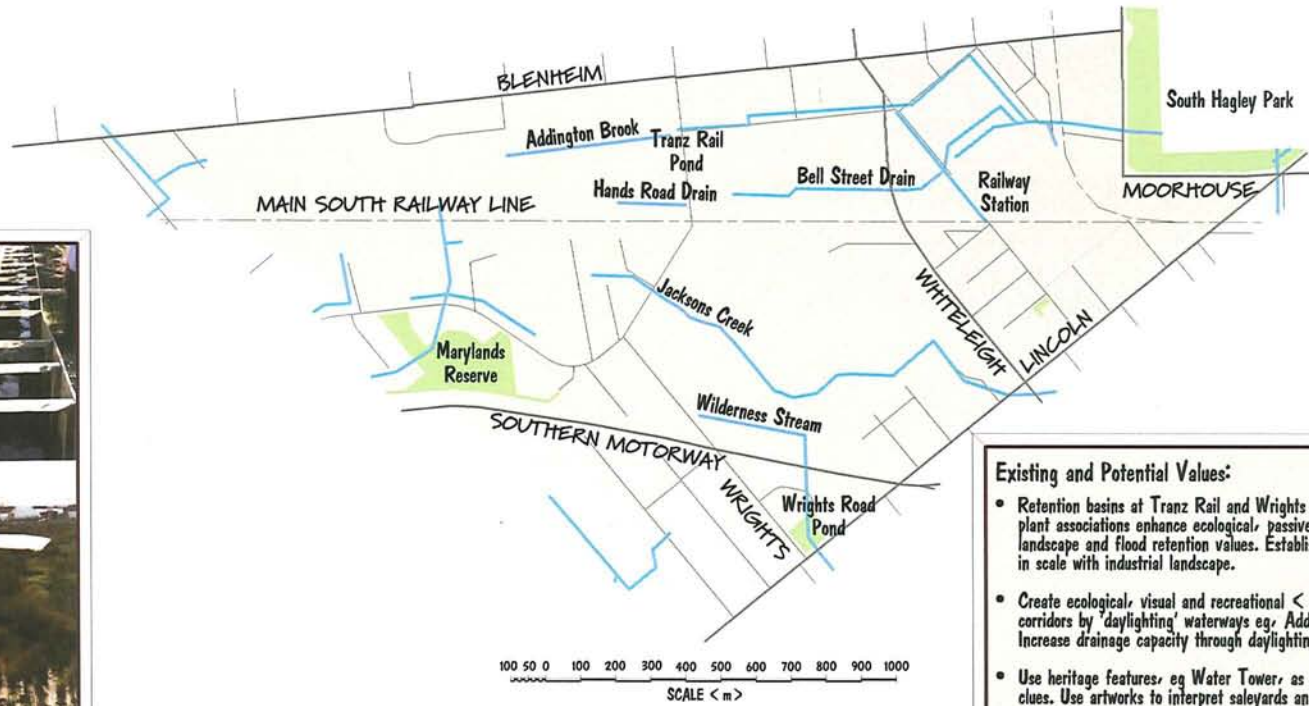


VISION: ICONS & OUTFALLS

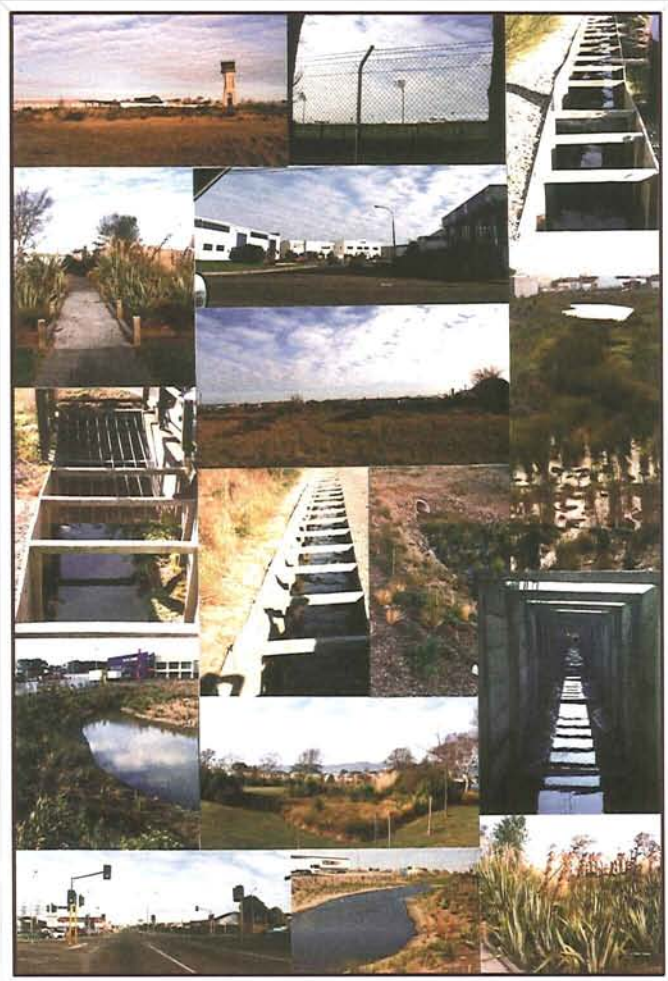
CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

MIDDLETON

NEIGHBOURHOOD



- Existing and Potential Values:**
- Retention basins at Tranz Rail and Wrights Road with native plant associations enhance ecological, passive recreation, landscape and flood retention values. Establish vegetated areas in scale with industrial landscape.
 - Create ecological, visual and recreational < walkways, cycleways > corridors by 'daylighting' waterways eg, Addington Drain. Increase drainage capacity through daylighting.
 - Use heritage features, eg Water Tower, as waterway design clues. Use artworks to interpret saleyards and railway.



CHARACTER

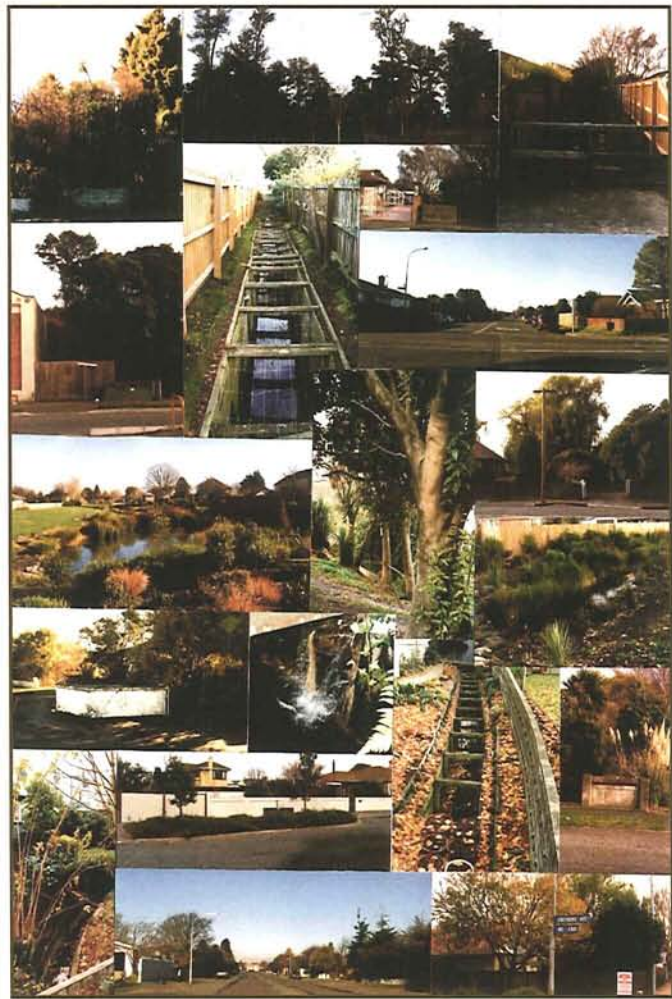


VISION: DAYLIGHT & LINK

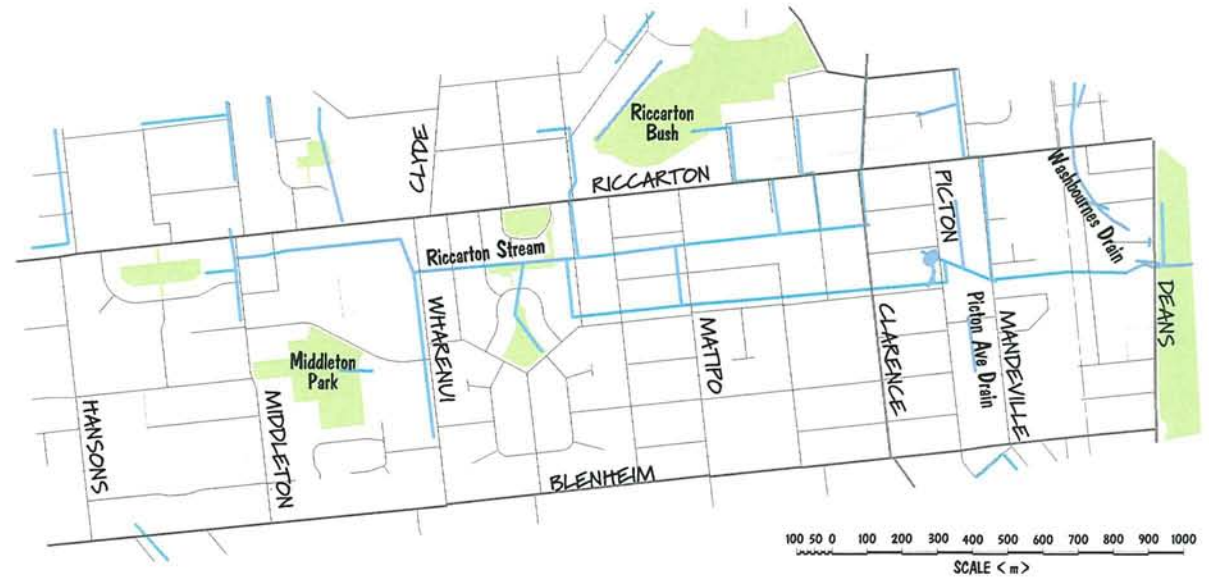
CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

RICCARTON

NEIGHBOURHOOD



CHARACTER



Existing and Potential Values:

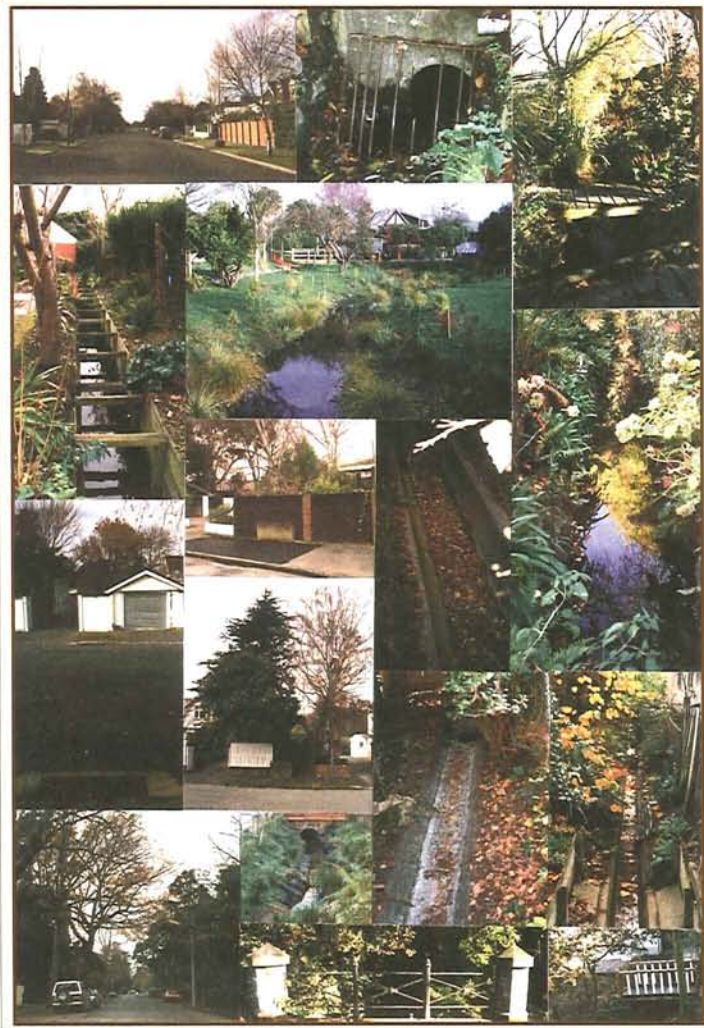
- Riccarton Bush < remnant podocarp swamp forest > & Paeroa Reserve < wetland restoration, duck habitat > have high ecological values. The open reaches of Riccarton Stream & Picton Street Drain have potential aquatic values. Some protected trees, eg, cabbage trees on Washbournes Drain.
- Enhancement of Riccarton Stream < good baseflows > by 'daylighting', planting & creating cascades will create a neighbourhood feature. Consider artworks & education potential of this & other waterways.
- Develop visual & physical linkages with waterway corridors, eg Dilworth Street.
- Maintain future options to 'daylight' timber drains to increase sustainability. Investigate use of retention ponds to increase capacity.



VISION: REDISCOVER WATER

CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

MERIVALE



CHARACTER

NEIGHBOURHOOD



Existing and Potential Values:

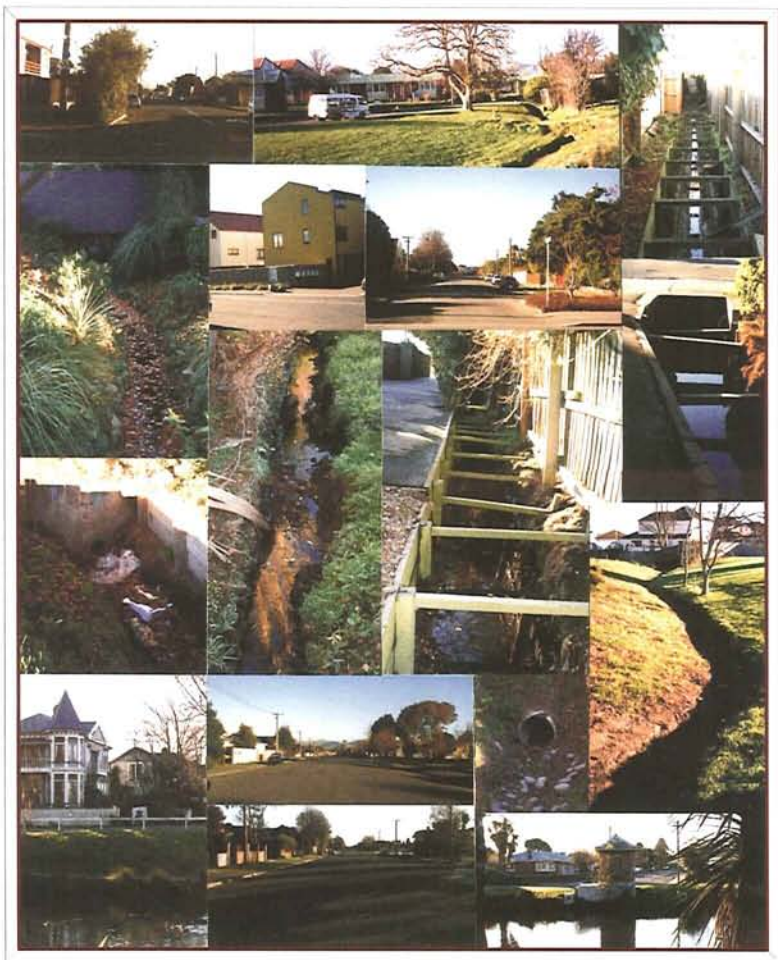
- Protect & restore good baseflows & water quality. Protect & increase capacity where necessary. Protect old waterway channels & identify springs.
- Established gardens provide bird habitat; plant additional native trees for winter food. Plant riparian margins to highlight waterways & provide habitat while maintaining views to water. Encourage ponds on private land.
- Opportunities to 'daylight' < open-up > piped systems with potential for high visibility, accessible & ecologically linked systems. Integrate waterways into streetscape and gardens.
- Use artworks < sculpture, murals > to highlight land drainage system.
- Reflect 'English' character in structures & planting. Interpret historic features, eg Old Mill Race.
- Encourage community involvement in stream restoration. Provide access to waterways along streets & reserves.



VISION: GARDENS & VIEWS

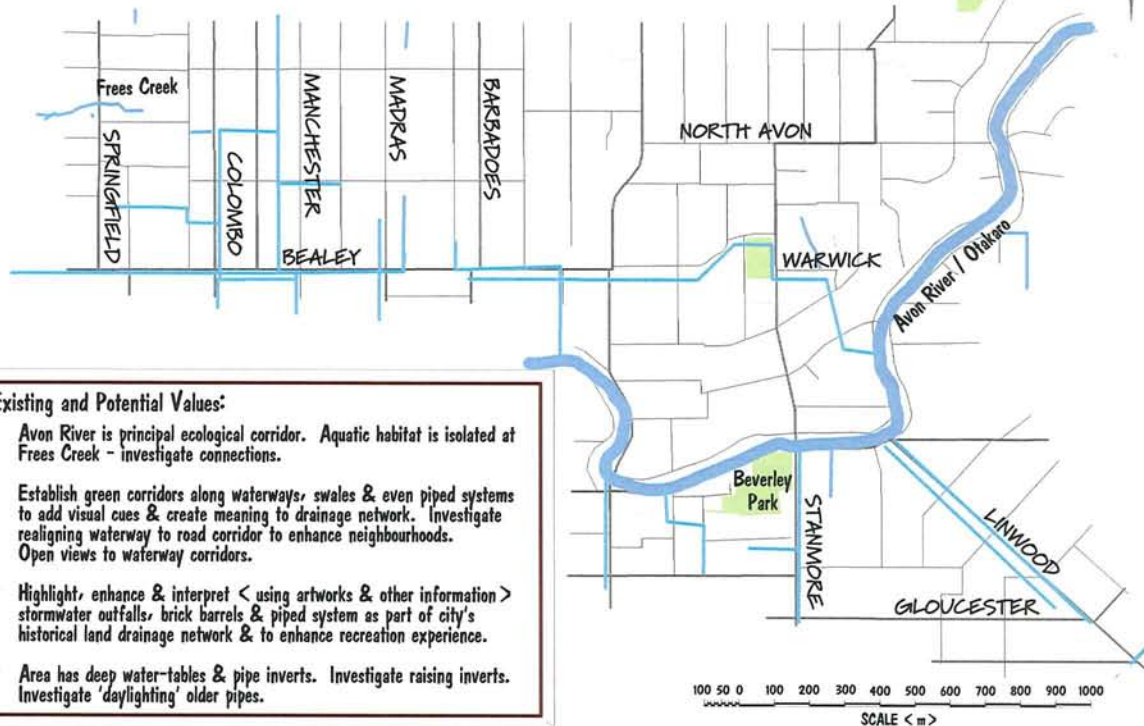
**CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7**

ST ALBANS/RICHMOND/LINWOOD



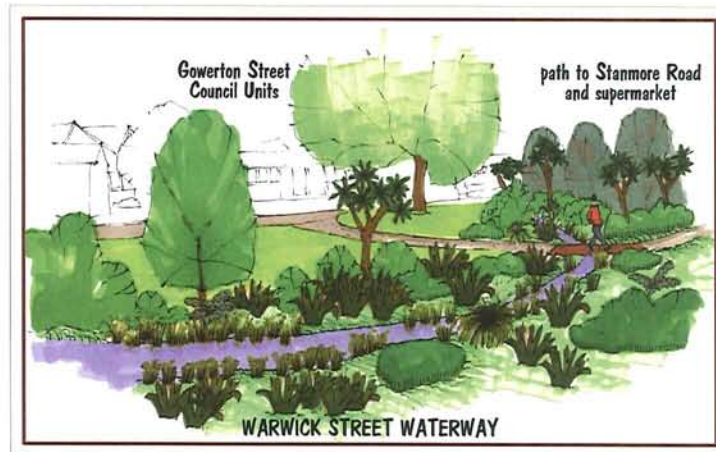
CHARACTER

NEIGHBOURHOOD



Existing and Potential Values:

- Avon River is principal ecological corridor. Aquatic habitat is isolated at Frees Creek - investigate connections.
- Establish green corridors along waterways, swales & even piped systems to add visual cues & create meaning to drainage network. Investigate realigning waterway to road corridor to enhance neighbourhoods. Open views to waterway corridors.
- Highlight, enhance & interpret < using artworks & other information > stormwater outfalls, brick barrels & piped system as part of city's historical land drainage network & to enhance recreation experience.
- Area has deep water-tables & pipe inverts. Investigate raising inverts. Investigate 'daylighting' older pipes.

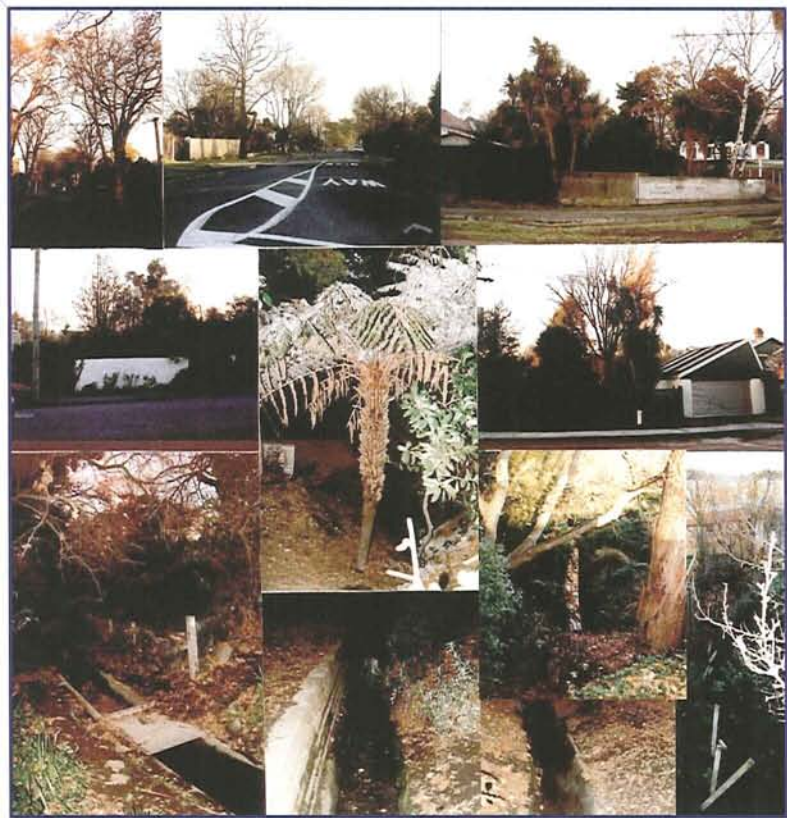


VISION: DAYLIGHT & RESTORE

CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

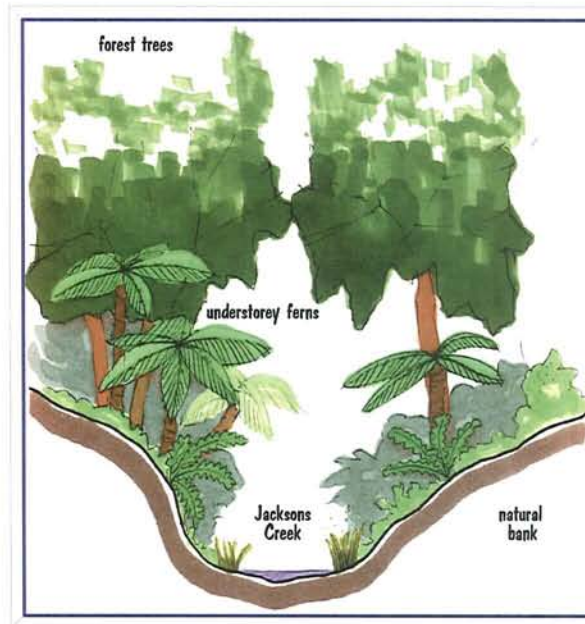
OPAWA/BECKENHAM

NEIGHBOURHOOD



Existing and Potential Values:

- Open, deep waterways with good baseflows. Exotic plants dominate in private gardens. Isolated native trees & shrub associations on private properties. Potential to restore green links via open waterways.
- Protect & enhance natural topography of Jacksons Creek. Jacksons Creek has habitat potential, particularly throughout its lower reaches near the Heathcote. Protect natural banks to channel of Jacksons Creek.
- Most waterways & land drainage systems unseen. Potential to open views & possibly access to waterways. Potential to add meaning to drainage network via corridors of native plants.
- Retain future options to 'daylight' piped network & reinforce waterway linkages.

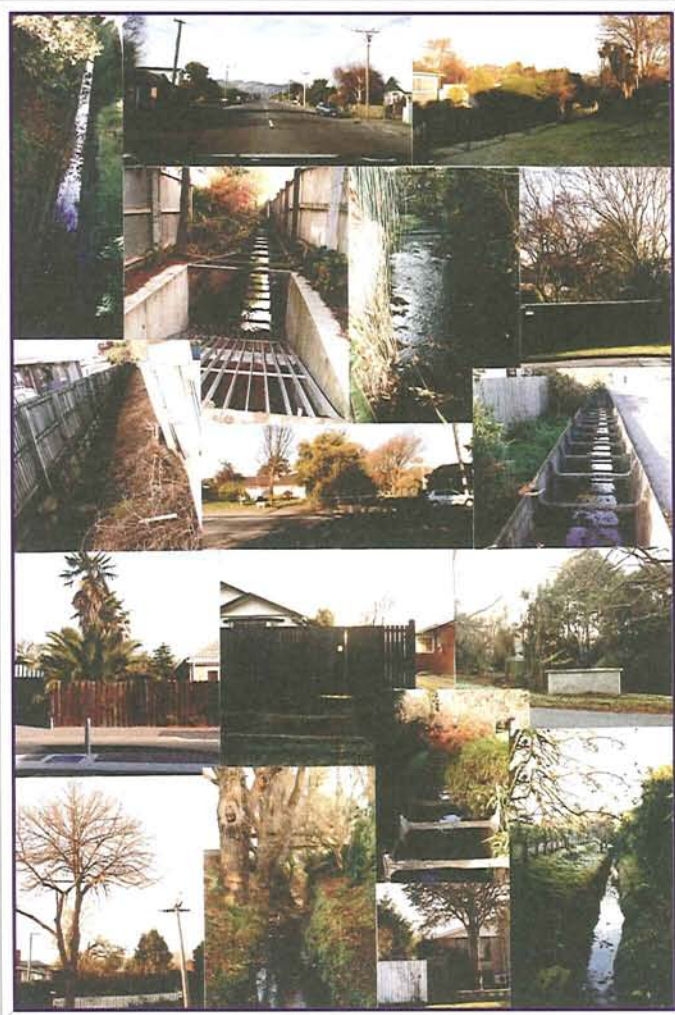


CHARACTER

VISION: DEEP CREEK NATURAL RIBBON

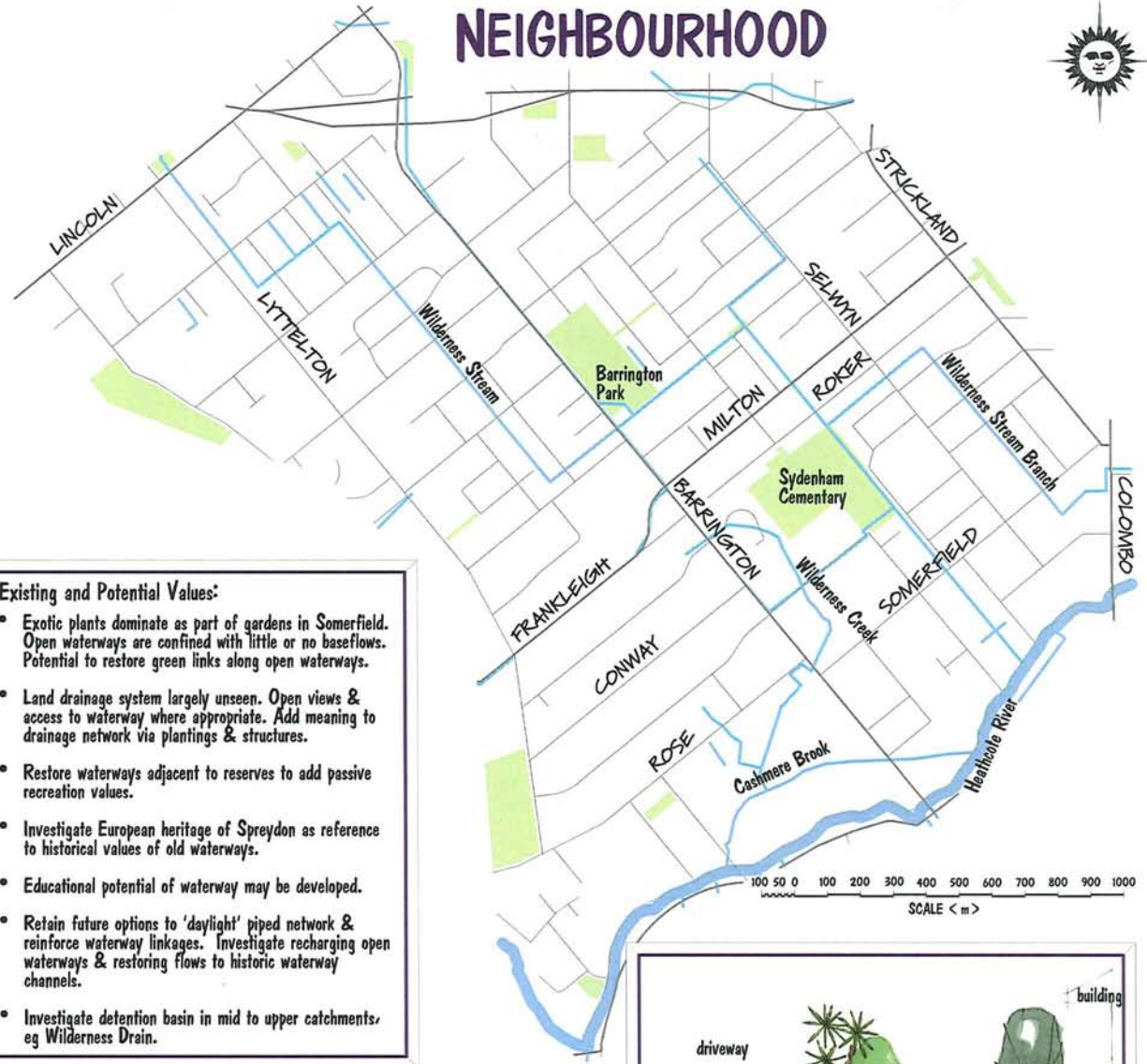
CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

SPREYDON/SOMERFIELD



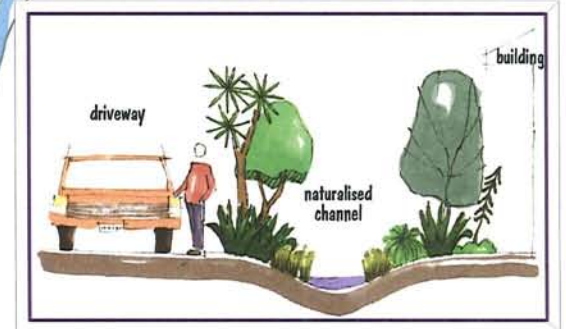
CHARACTER

NEIGHBOURHOOD



Existing and Potential Values:

- Exotic plants dominate as part of gardens in Somerfield. Open waterways are confined with little or no baseflows. Potential to restore green links along open waterways.
- Land drainage system largely unseen. Open views & access to waterway where appropriate. Add meaning to drainage network via plantings & structures.
- Restore waterways adjacent to reserves to add passive recreation values.
- Investigate European heritage of Spreydon as reference to historical values of old waterways.
- Educational potential of waterway may be developed.
- Retain future options to 'daylight' piped network & reinforce waterway linkages. Investigate recharging open waterways & restoring flows to historic waterway channels.
- Investigate detention basin in mid to upper catchments, eg Wilderness Drain.



VISION: THE THIN GREEN LINE

CENTRAL CITY NEIGHBOURHOODS
PROJECT AREA 7

SYDENHAM/WALTHAM

NEIGHBOURHOOD



CHARACTER

Existing and Potential Values:

- Medium to high density living, lower value properties increasing multi-unit developments. Many small sections with few trees & greenery.
- Traffic calming options for narrow streets may include waterways.
- Waterways not visible except through reserve eg. Cameron Reserve & Bradford Park. Open views to waterway corridor.
- Open meandering middle reaches of Jacksons Creek has potential for protection.
- Vacant land behind Nazareth House has been identified < A Crossland > as an ideal site for a pond to attract migrating birds.



VISION: BIRD CORRIDOR AND POND

A photograph of a rural landscape. In the foreground, there is a wooden fence on the left and a large, dark, dense tree in the center. The ground is covered in grass and some low-lying plants. In the background, there is a wide, flat field under a bright sky. The text "Area 8" and "Paparua Water Races" is overlaid in a green, bold, sans-serif font.

Area 8
Paparua Water Races

PAPARUA STOCKWATER RACES

Asset Management Strategy

"form follows function"

VISION STATEMENT

While preserving the utility and heritage values of the stockwater race system, manage the sustainable future of the races, recognising and planning for changing land and water use patterns.

STRATEGIES

- The Strategy is to be implemented by making appropriate budgets for, protection, restoration, maintenance and management.
- Investigate opportunities to use existing water races to restore flows to dry and ephemeral stream channels in the Styx, Avon, Heathcote and Halswell River Catchments.
- Investigate opportunities to create and maintain new wetland areas by converting discharge basins into retention ponds.
- Support the 'Savannah' dry grassland concept - emphasising the role that water races could play in adding value to this plan.
- Highlight and improve the recreational, landscape, ecological and historical values of the water races while maintaining their utility function.

PAPARUA STOCKWATER RACES

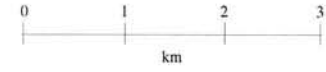
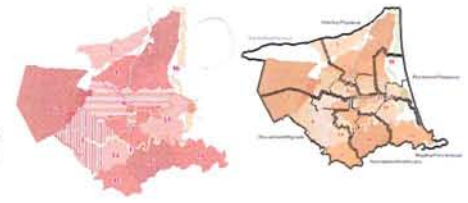
Asset Management Strategy

"form follows function"

STRATEGIES cont'd

- Highlight the entrances to the City by providing safe, green riparian corridors along main roadways, e.g., State Highway 73.
- Develop a safe and green linkage, encompassing selected water races, between areas where future urban growth is likely, e.g., Marshs Road.
- Investigate options for alternative uses of the water races in areas where their utility function is less important e.g., life-style blocks and PPCS.
- Work with existing landowners to promote sustainable management by developing plans which incorporate existing waterways into private and public land developments.

Area 8: Paparua Water Races

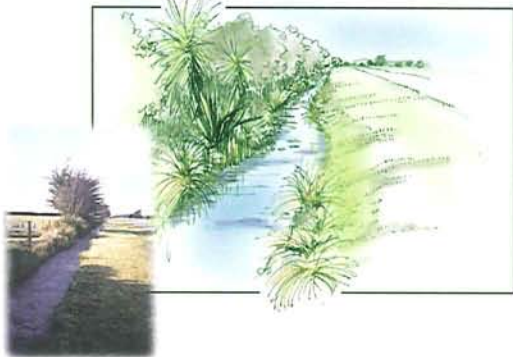


Dry Grassland Concept

- Supporting existing Dry Grassland Concept.
- Creating open areas of water and supporting remaining identified ecological habitats.
- Use water races as a link between different areas, walkways and cycle-ways, the Waimakariri River, Orana Park, the Groynes.

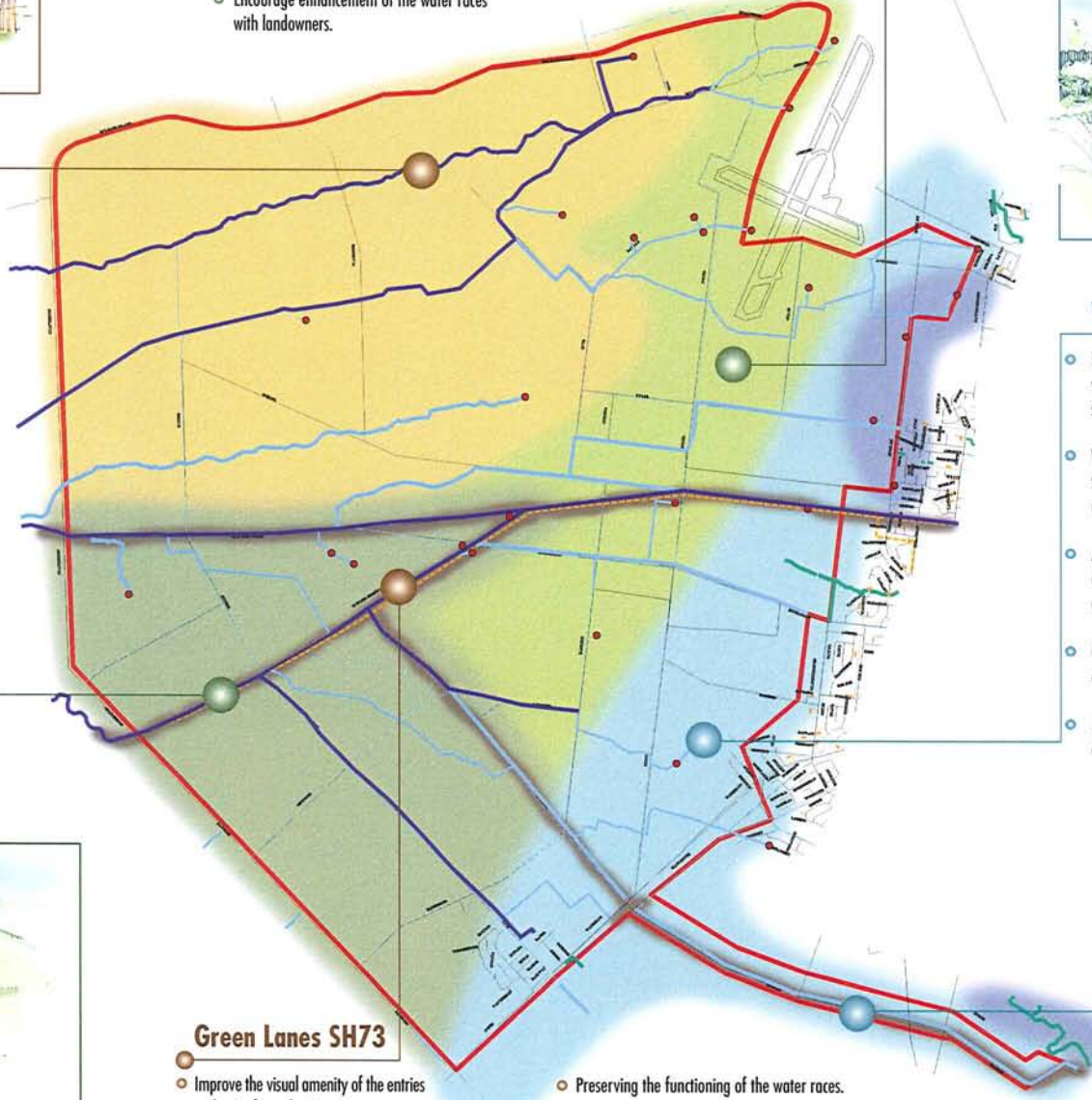
Life style areas

- Changes of land use likely to occur, due to smaller lot sizes.
- Areas where stock watering via water races is likely to be reduced in future.
- Potential to acquire land and races before major development occurs.
- Integrated development of water races into new land development.



General Enhancement Area

- Danger of bird strike in the flight path of the Airport.
- Encourage enhancement of the water races with landowners.
- Improve marginal vegetation on one side, to improve stream values.

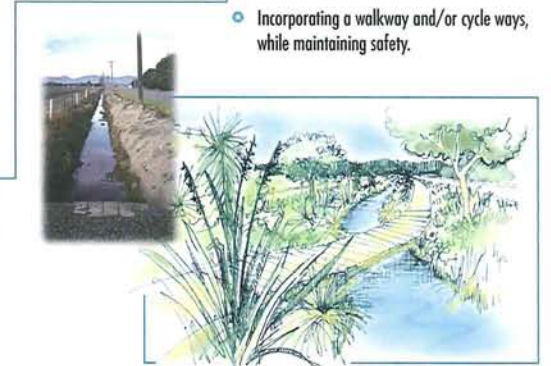


Wet Belt

- Identified by discharge points of water races and dry beds of spring-fed streams.
- Water races are rarely used for stock therefore there is potential for enhancement.
- Augmentation of spring-fed streams to enhance landscape, recreation, historic and ecological values.
- Creation of dry-wetlands at other discharge points.
- Incorporating water races in future developments.

Green Lanes Marshes Road

- Improving the amenity values of the road.
- Providing a corridor between areas where future urban growth is likely.
- Enhancing and modifying the course and extent of the water race where it no longer is required by stock.
- Enhancing ecological values of the area.
- Incorporating a walkway and/or cycle ways, while maintaining safety.



Green Lanes SH73

- Improve the visual amenity of the entries and exits from the City.
- Improvement in the ecological values along the water races.
- Preserving the functioning of the water races.
- Creating an interesting vista along the main roads, with views of the water races, the plains and hills in the distance.

HALSWELL / WIGRAM GROWTH AREA PROJECT AREA 9



Halswell / Wigram
Growth Area

PROJECT AREA 9



CHARACTER AREAS



Paparoa Stream



Musgroves Shingle Pit exposed groundwater bird habitat



Haytons Drain



Wigram East Detention Basin bird habitat



Curletts Drain



Paparoa Drain



Curletts Road Waterway



Industrial Landuse - Hornby



Heritage farm buildings at St John of God



Dry Stoney grassland



Heathcote River at St John of God



Dunbars Drain



Knights Stream from Sabys Road



Older (1940's) Residential character along Dunbars Rd.



Nottingham Stream hidden in residential development



Rural pastureland with springs
Quaiffes Road



Recent (1980's) Residential character near Westlakeabit



Rural character showing
View of Port Hills

Character Zones

- Industrial Zones
- Riccarton Raceway
- Older Developed Residential Zone
- Future Urban Zones
- Curletts Reserve / Wigram East Detention Basin
- Rural Farmland Dry Stoney Soils
- Rural Farmland Wet Soils / Springs
- Project Area boundary
- Proposed New Southern Motorway
- Natural Waterways
- Utility Waterways
- Springs

HALSWELL / WIGRAM GROWTH AREA

"Welling up of groundwater - Halswell and Heathcote River Headwaters"

VISION

To claim, restore and emphasise waterways and wetlands in a way that accommodates and also mitigates the effects of existing and future urban development, while adding value to quality of life.

STRATEGIES

- Develop partnerships with key stakeholders, including landowners, developers. Takata whenua and the community, to raise the profile, protect and restore waterways and wetlands.
- Explore imaginative solutions for street design and streetscape that give effect to the Heathcote River Floodplain Management Strategy through stormwater detention, water quality treatment and soakage to ground.
- Where space and ground conditions allow, develop mechanisms within existing waterways to reduce peak flows and allow future downsizing of existing pipe systems through detention, retention and soakage.
- Develop and encourage sustainable rural management practices for open space areas adjacent to riparian buffer strips.
- Protect and highlight natural heritage features such as river terraces, channels, swales, and local soil types, and also to capitalise on opportunities offered by diused gravel pits and high groundwater.
- Emphasize the characters of the area through use of appropriate plant associations around waterways and wetlands, while maintaining views to the Port Hills and Alps.
- Establish ecological corridors along waterways and wetlands through appropriate planting and improve public access and recreational opportunities.
- Increase the diversity and abundance of terrestrial, wetland and migratory birds.
- Protect springs, wetlands and other sites of significance in the area to Takata whenua.
- Acknowledge the strategy as a means of implementing Community Board objectives.

The Strategy is to be regarded as one of the methods of achieving the City Plan Objectives and Policies to the relevant Project Area.

Key Sections include:

1. Tangata whenua - Maori and their resources
2. Natural environment - natural features and habitat natural hazards coastal environment
3. City Identity - form
4. Recreation and open space - provision and diversity

The Strategy is to be implemented by making appropriate budgets for: protection, restoration, maintenance and management.

Halswell / Wigram
Growth Area
&
Cashmere Stream
Ponding Areas



PROJECT
AREAS
9 & 14



CONCEPT VISION

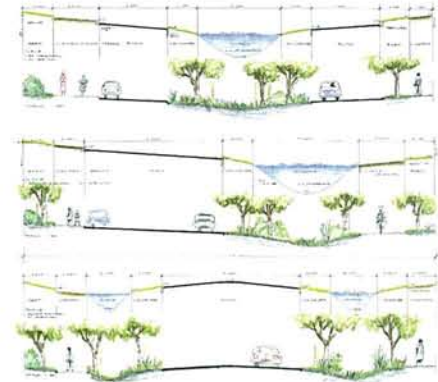
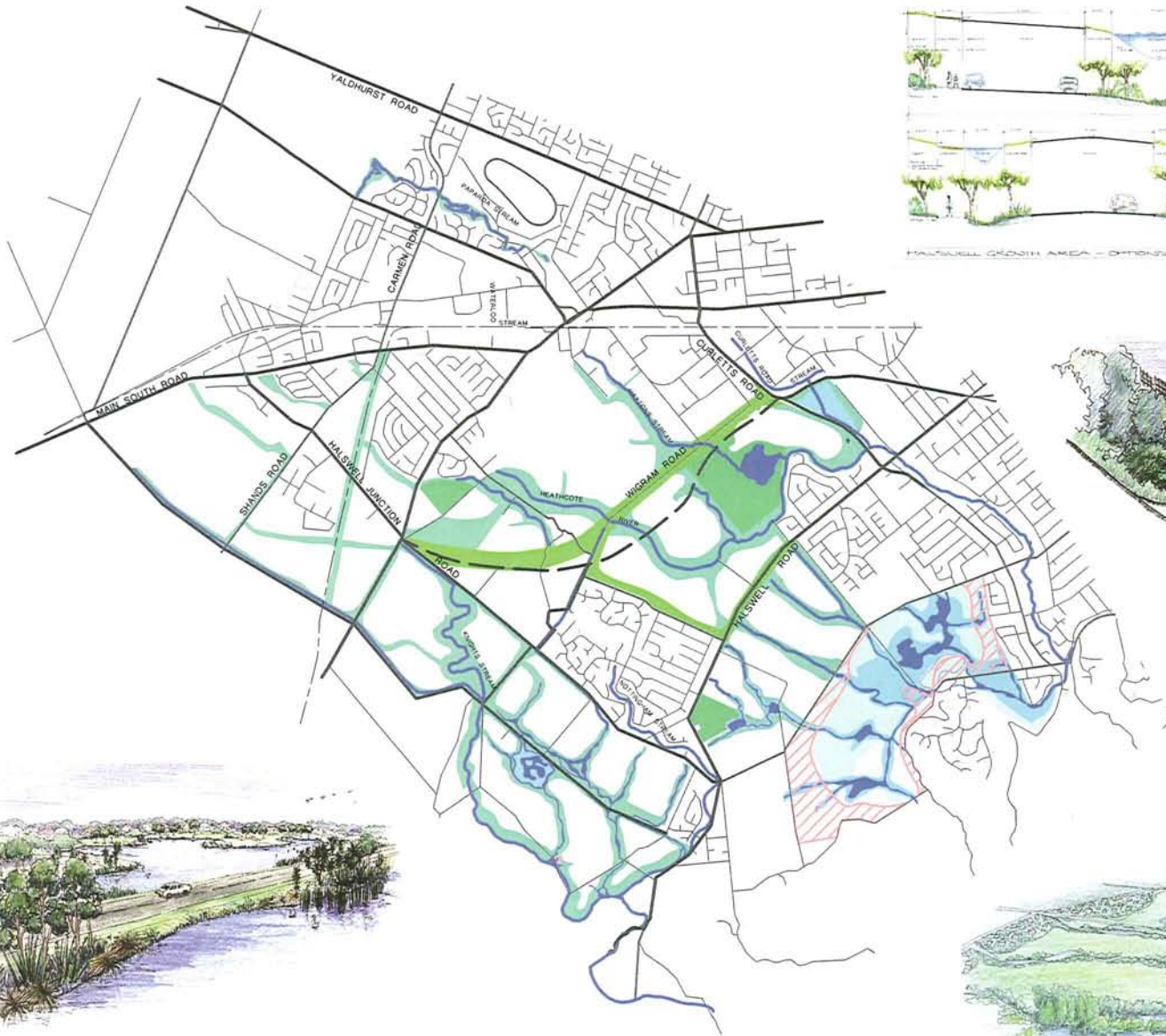
Halswell / Wigram Growth Area
&
Cashmere Stream Ponding Areas

Vision: Protect & Enhance Ponding and
Create Green Corridors

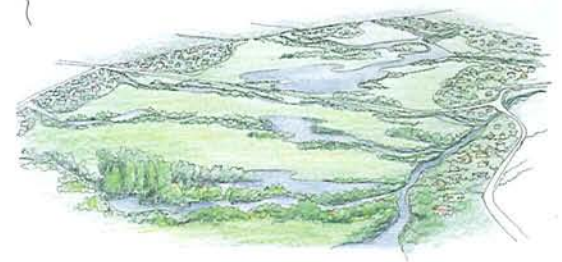
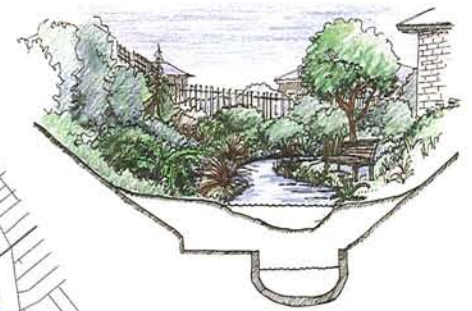
- Protect natural springs.
- Reduce the need for maintenance and renewal of drainage network.
- Provide stormwater storage/flood mitigation.
- Provide stormwater treatment to improve water quality.
- Highlight with vegetation natural features such as old river terraces, waterways and wetlands.
- Provide significant habitat for wildlife.
- Provide important recreational opportunities such as walking and cycle tracks.
- Channel important views to the Port Hills and Alps.
- Buffer industrial zone

Legend

- Waterway & Wetlands
- Epheneral Wetland / Ponding Area
- Rural Buffer / Extreme Event Ponding Area
- Existing Major Reserves
- Arterial Road Buffer Zones
- Green Corridors - Many Associated with Ponding Areas and Restored / Developed Utility Waterways
- Project Area boundary
- Proposed New Southern Motorway

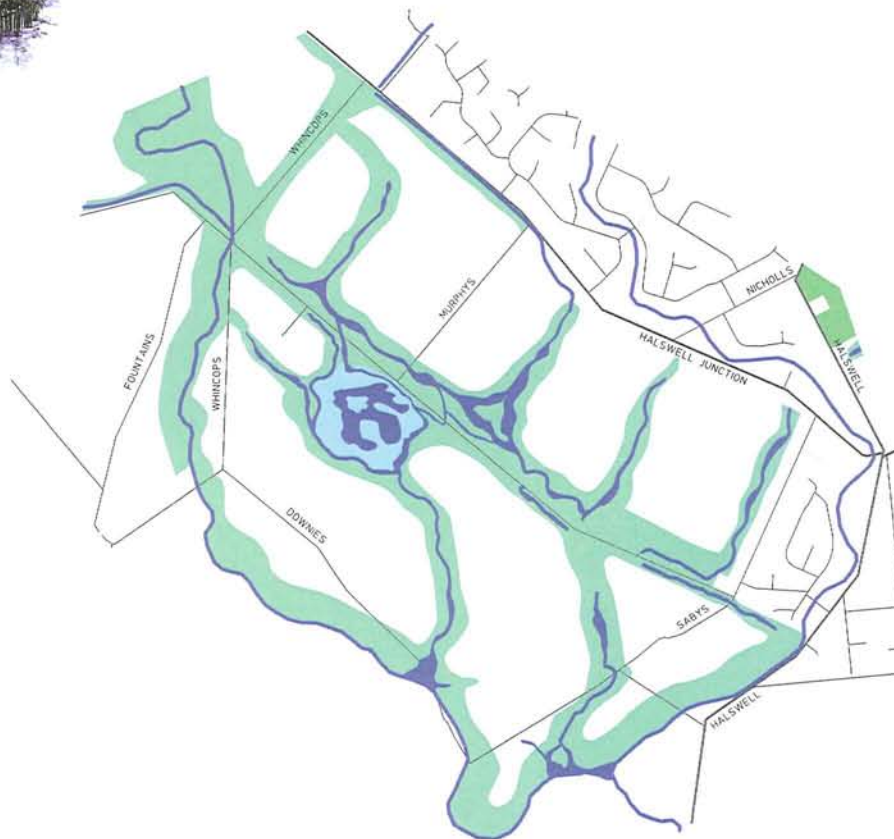
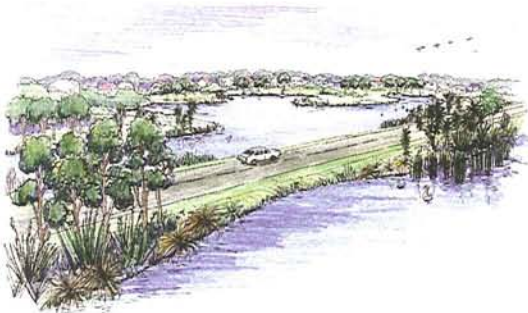


HALSWELL GROWTH AREA - OPTIONS FOR ROADWAY TERRACE SCALES








A VISION HALSWELL / WIGRAM GROWTH AREA



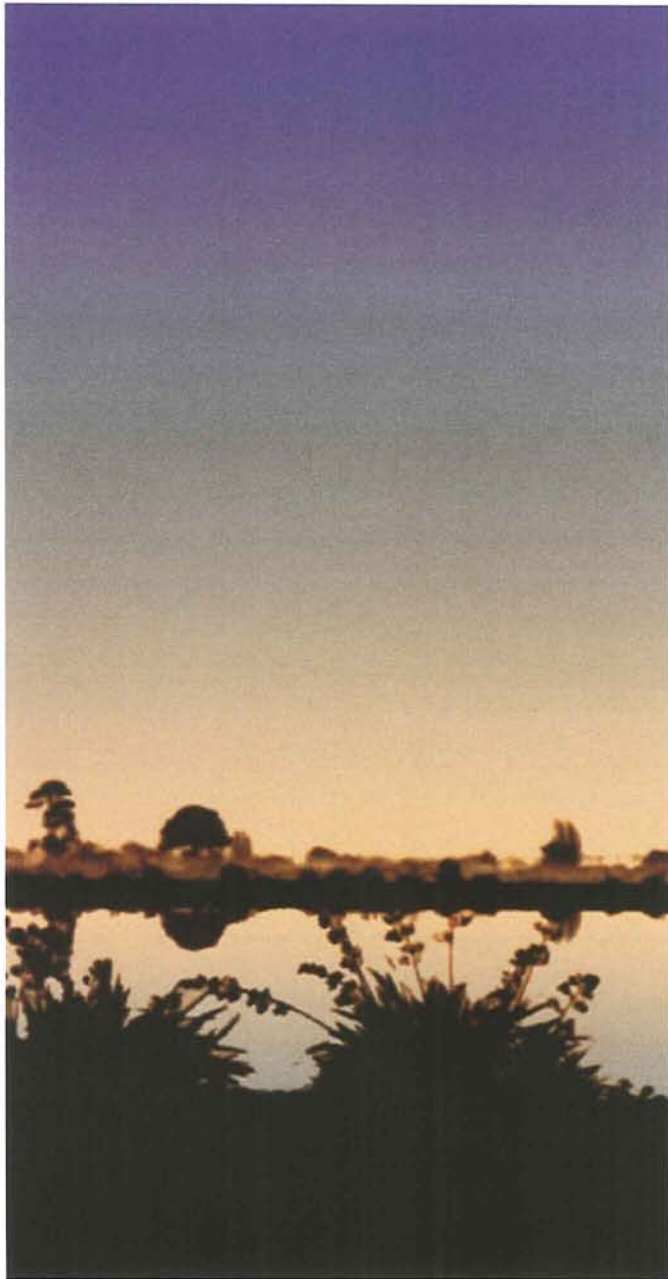
Legend

-  Waterway & Wetlands
-  Ephemeral Wetland / Ponding Area
-  Green Corridors - Many Associated with Ponding Areas and Restored / Developed Utility Waterways

Quaiffes Road

Vision: Protect & Make a Feature of Springs by Increasing Ponding in the Area

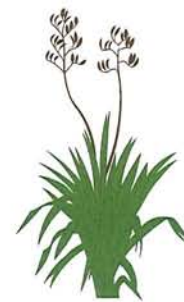
- Naturalise and vegetate existing drains - to create ribbons of waterway.
- Use naturalised waterways to provide flood storage and stormwater runoff treatment.
- Fill selected areas for tourist and residential development.
- Maintain road access via a causeway through wetland environment.
- Vegetate and manage wetland environment for wildlife values - birds and fish.
- Encourage sustainable rural activities adjacent.



ESTUARY TO LAGOON

GREEN CORRIDOR

Project Area Ten



STRATEGY - ESTUARY TO LAGOON

VISION

To understand the dynamics of coastal processes & the spatial requirements of the natural functions of waterways wetlands.

STRATEGIES

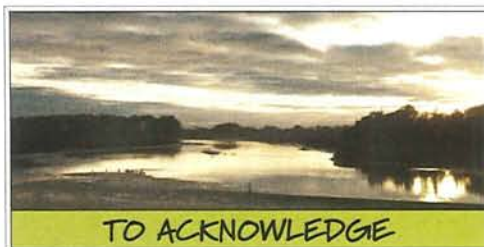
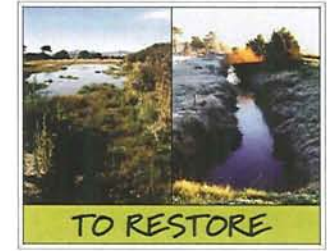
- ① To protect indigenous plant communities & wildlife.
- ② To acknowledge the special qualities of the area for the physical & spiritual wellbeing of the people of Christchurch.
- ③ To restore the mauri of Ihutai by 2010 for the purpose of wildlife, recreation & traditional food gathering.
- ④ To recognise land & water relationships by retaining space for natural processes to develop.
- ⑤ To understand & promote the natural processes through education & interpretation of the area.
- ⑥ To manage the area, by Water Services & Parks Unit working together with other Council Units & the communities of Christchurch.
- ⑦ To acknowledge the strategies as a means of implementing Community Board objectives.

The Draft Strategy is to be regarded as one of the methods of achieving the City Plan Objectives and Policies relevant to the Project Area. Key sections include:

1. Tangata Whenua Maori and Their Resources
2. Natural Environment Natural Features and Habitat Natural Hazards Coastal Environment
3. City Identity Form
4. Recreation and Open Space Provision and Diversity

The Draft Strategy is to be implemented by making appropriate budgets for:

- ★ Protection
- ★ Restoration
- ★ Maintenance
- ★ Management



**WATERWAYS AND WETLANDS
ASSET MANAGEMENT STRATEGY 1999
ESTUARY TO LAGOON
GREEN CORRIDOR**

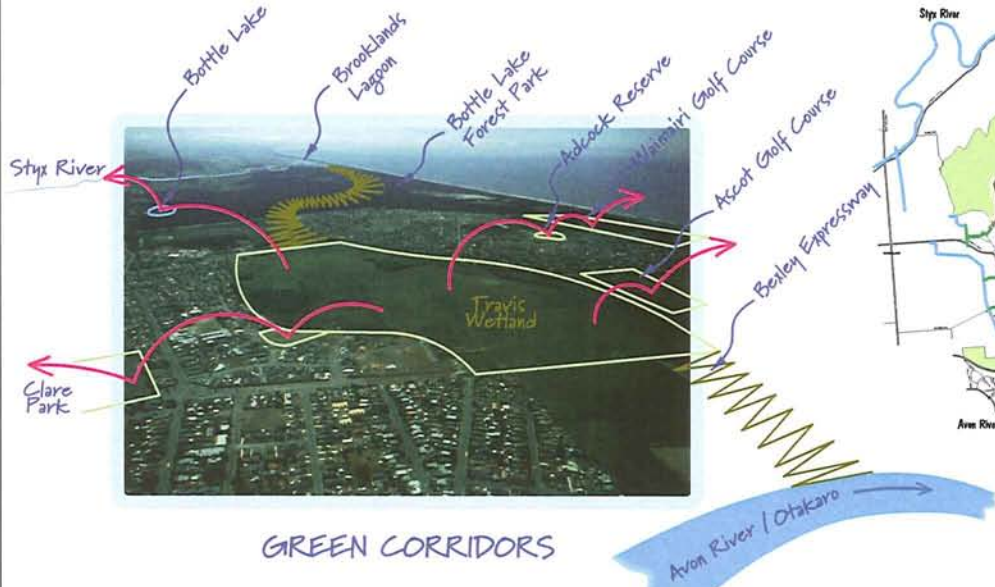


PROJECT AREA 10



CHARACTER

- WIDE OPEN SPACES
- EXPANSIVE VIEWS
- SHORT GRASSLANDS/TUSSOCK BACKDROP OF PLANTATIONS
- LANDSCAPE OF HORIZONTAL LINES
- WATER



GREEN CORRIDORS



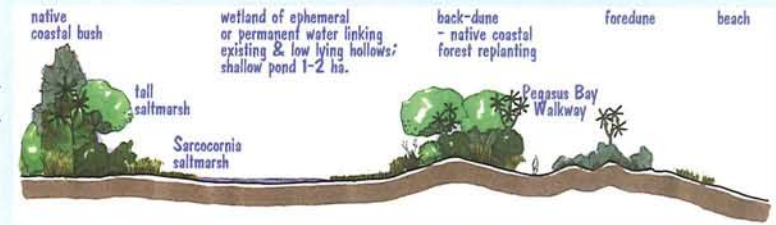
RURU ROAD WETLAND PROPOSAL



BROOKLANDS LAGOON - LOOKING NORTH



BROOKLANDS LAGOON - LOOKING SOUTH

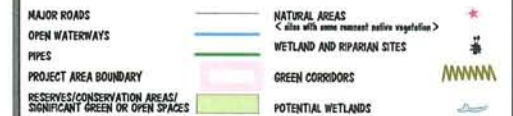


BACK-DUNE SWAMP BOTTLE LAKE FOREST PARK

ISSUES & OPPORTUNITIES

- ACCESS
- ADEQUATE SPACE
- RISING SEA LEVELS/SHALLOW GROUNDWATER
- NATURAL PROCESSES
- WILDLIFE AND HABITAT PROTECTION
- STORMWATER RETENTION & OUTFALL
- GROUNDWATER CONTAMINATION
- PEOPLE VERSUS NATURE
- BUFFER ZONES
- ALLOWING CHANGE

LEGEND



DRAWING NUMBER: L4308
INDEXED: LPO37202
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SCALE - 1:40,000 AT A1
SHEET: 1 OF 2
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A photograph of a park area. On the left, a stream flows through a dense line of trees. In the center, a large, leafy tree stands on a grassy area. In the background, a paved road with a few cars and a building with a gabled roof is visible. The text 'Area 11' and 'Linwood - Woolston' is overlaid in green with a white outline.

Area 11
Linwood - Woolston

LINWOOD-WOOLSTON

Asset Management Strategy

"recovery and revitalisation"

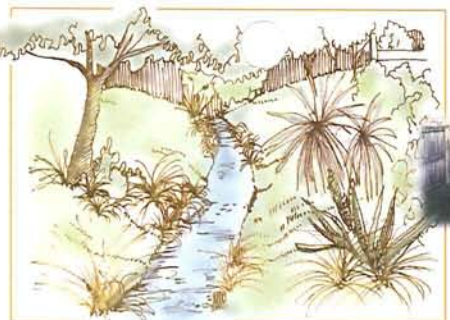
VISION STATEMENT

Improving the living environment by imaginative and innovative ways of responding to problems associated with impervious soils, high groundwater levels and old landfills.

STRATEGIES

- Undertaking investigations that provide a greater understanding of the influence that groundwater has on on living environments and how these can be managed through waterways and wetlands.
- Support the Estuary Green Edge Project.
- Managing the Linwood Canal and its margins for its ecological and open space values.
- Achieving the water quality objectives of the Regional and City Councils.
- Managing the water quality and quantity effects of high density urban landuse using innovative methods that add amenity value to neighbourhoods.
- Adding amenity value to existing utility waterways to make them more acceptable within living environments and also to avoid high cost piping solutions.

Area 11: Linwood - Woolston



Avon South Bank

- Land susceptible to flooding - sea level rise, tidal effects and storm events need to be considered.
- Potential to continue enhancement projects linking to Avon River and Estuary Green Edge.

Estuary Green Edge

- Land and water interface.
- High ecological, landscape and recreational values.
- Mitigate effects of past land uses e.g., land filling, waste water treatment.
- Creating a buffer between development and the coastal environment.

Headwaters

- Functionality of original drains has changed because of falling groundwater levels.
- Important to enhance quality of the urban environment and create open space.
- Lack of baseflow and narrow corridors constrains enhancement opportunities.
- Opportunities for enhancement with drought tolerant wetland species merging into private open space and public spaces.

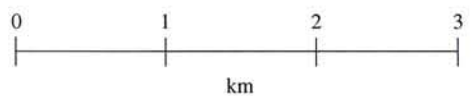
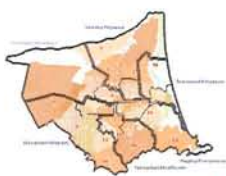
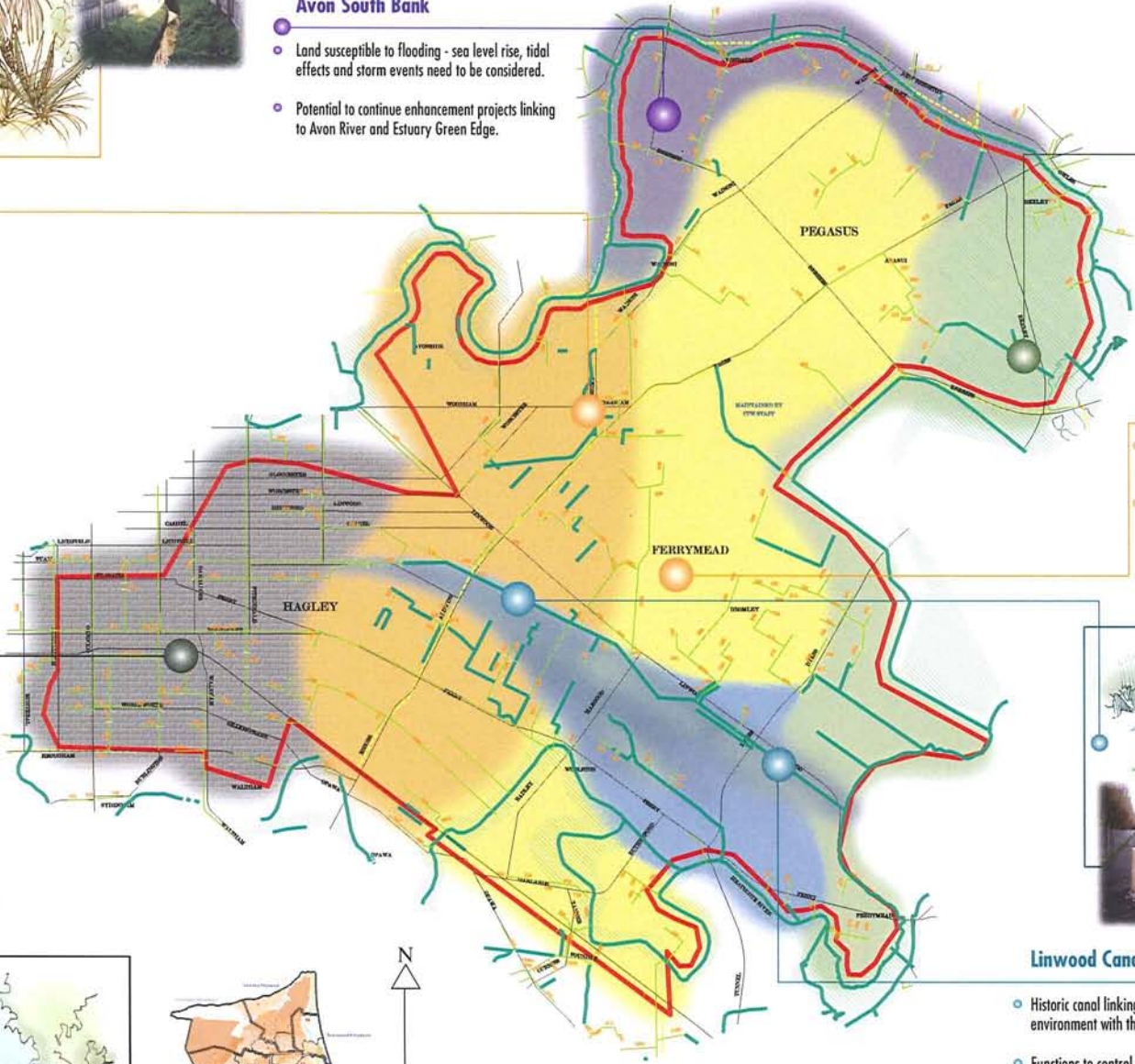
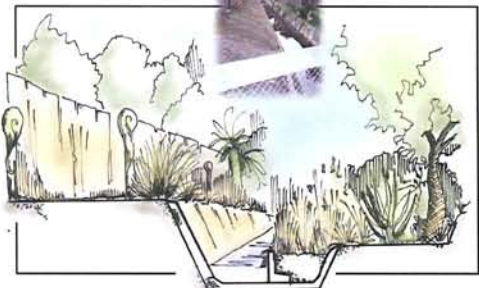
Central Zone

- Variety of groundwater conditions and past and present land uses.
- High groundwater conditions in the vicinity of Bromley Cemetery.
- Low amenity values in predominantly industrial areas.
- Potential to restore inter-dune wetlands and create recreational opportunities on residential fringes.
- Potential to enhance Cuthberts Green waterway.

City

- Increasing infill development leading to loss of open space and stormwater effects.
- Limited opportunities for daylighting.
- Need to identify stormwater retention areas.
- Important to identify linkages to the Heathcote River and existing open spaces.

Upper Linwood Canal Enhancement Example



Linwood Canal

- Historic canal linking estuarine environment with the inner city.
- Functions to control stormwater and groundwater.
- Confined corridor in the upper reaches challenges enhancement opportunities.
- Ecological, amenity, recreation and historic values need to be enhanced.



WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY 1999

THE AVON RIVER *OTAKARORO*

PROJECT AREA 12



THE AVON RIVER / OTĀKARORO - A story of the city told through the river.

STRATEGIES

- To ensure that structural river works of the central city area reflect and enhance the heritage and setting of the urban surrounds.
- To integrate the river corridor into the management of Hagley Park
- To identify, protect and restore sites of importance to Tangata Whenua
- To strengthen and promote linkages with green space adjacent to the river
- To use natural techniques suited to local conditions when renewing river bank stabilisation.
- To implement flood management, mitigation and maintenance where necessary.
- To control weed growth and siltation of the river bed where required.
- To improve and maintain water quality and collection of river debris.
- To improve access to the river with beaches, steps, ramps and jetties
- To ensure that river management provides for recreation and tourism values
- To create habitat for selected aquatic species and water fowl
- To prepare river management concept plans in consultation with community groups, Tangata Whenua and Council key partners.
- To acknowledge the strategies as a means of implementing Community Board objectives.
- To manage the river as an icon of the city for the appreciation of visitors and local residents.

WATERWAYS AND WETLANDS ASSET MANAGEMENT STRATEGY, 1999

THE AVON RIVER - OTAKARORO

INTRODUCTION

The Avon River is an extremely important environmental asset that and a part of the history, ecology and identity of Christchurch city. The Waterways and Wetlands Natural Assets Management Strategy proposes that the River be managed to highlight heritage and cultural values within the inner city while providing for natural values in the Lower Avon. It is proposed that ecological values be incorporated throughout the river with particular emphasis in areas of ecological significance. Neighbourhoods between the inner city and estuary provide a transitional riverscape to be managed to create a strong natural aspect while providing for heritage and cultural values, and recreation. The strategy is conceptually entitled; *The River Story* - a story of the natural and cultural history of Christchurch through the Avon River.

Before explaining the management strategy further some brief historical background and description of the current condition and character of the river is outlined.

HISTORICAL BACKGROUND

Before European settlement of Christchurch, the Avon River was named *Otakaroro* by the tangata whenua. Translated this means *waterway of the seagull* and placing particular significance on the estuarine section of the river. The river was very important to tangata whenua for trading and gathering mahinga kai. At this time the river had a strong natural character with dense margin planting of flax, raupo, sedges and *Carex* and a surrounding landscape of undulating river terraces and grasslands.

With European settlement and the imposition of the city grid, the natural meandering flow of the river was locked into the street grid of the city. The River was an important natural feature that provided a water supply, city drainage, recreation, transport, and a landscape corridor adding significantly to the amenity of the city. The river was used as means of transporting goods and passengers via paddle steamers from the estuary to 'The Bricks' near Barbadoes Street. The Avon River provided for summer swimming until early this century and has continued from the very early settlement period to accommodate recreational boating. The historic water gardens at Mona Vale and the picturesque character of Hagley Park reflect the early settlers desire to establish a city of gardens. The Avon River has contributed significantly to achieving the goal of being *The Garden City*.





THE AVON RIVER TODAY

From the historic water gardens of Mona Vale to the estuarine natural character of the lower Avon various management approaches have been applied to the river without an overall cohesive strategy. Important inner city cultural landscapes such as the Mona Vale Gardens and Hagley Park have in many instances been treated with purely practical bank treatments such as wooden board and post retaining, and with little consideration for landscape significance and quality. Another example is the use of concrete block river bank retaining in many stretches of the river within the inner city. Traditional bluestone retaining walls in this section of the river, many of which still remain, are more visually pleasing and appropriate in relation to the historic bluestone architecture. Above the banks areas of lawn and large trees (many being notable historic trees) create a picturesque landscape in the tradition of the european parkland. This historic landscape character provides a setting for many historic bulidings lining the river.

Beyond the inner city the river extends through the suburbs. The river is a neighbourhood amenity shared by residents and used by many as a walking, cycling and driving route. The river itself provides for water recreation such as kayaking and rowing. There are currently some boat ramps and jetties facilitating these activities. Parts of the river in this section show signs of bank erosion. Where trees and planting occur bank stability is significantly improved.

In the Lower Avon, tidal influences are apparent with tidal fluctuation and progressive vegetation change. Bank treatments include walls of riverstone gabions, some graded banks, and in the estuarine area salt marshs and bare stopbanks. Despite the gabions, parts of the Lower Avon retain a degree of natural character. This is particularly apparent near the estuary.

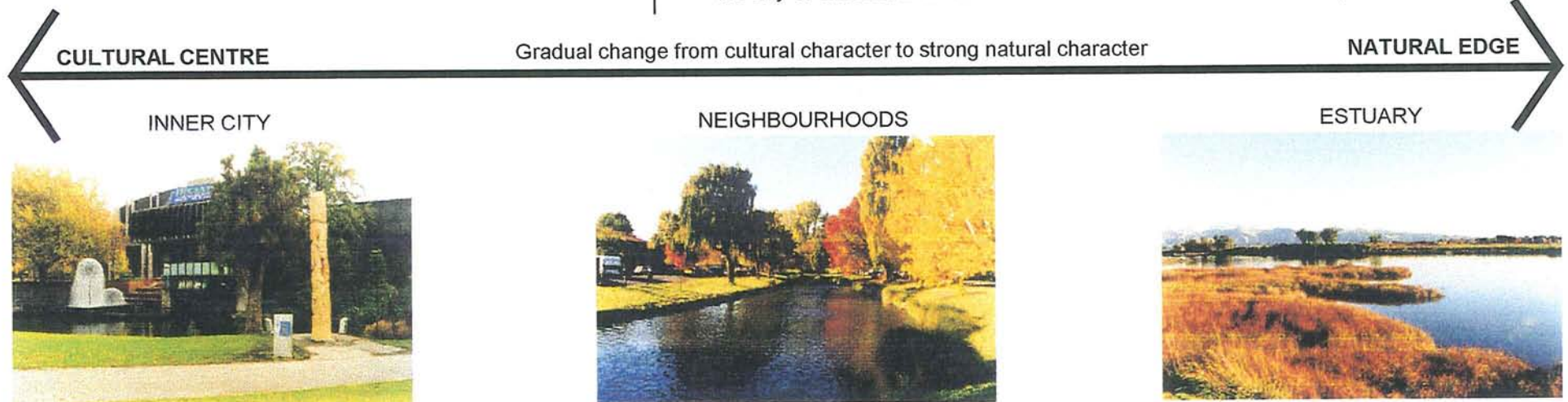
Over many years the natural character of the Avon has become highly modified by the construction of bridges, roads, bank treatment, planting of exotic species and the construction of buildings and other structures. These elements reflect the cultural values of the past and tell a story of both the natural and cultural development of the River, and to some extent the city as a whole.

VISION FOR THE FUTURE - *The River Story*

FROM THE CULTURAL HEART OF THE CITY TO THE NATURAL COASTAL SALT MARSH, THE AVON RIVER TELLS A FASCINATING STORY OF THE HISTORY OF CHRISTCHURCH. THE FUTURE MANAGEMENT OF THE AVON RIVER CAN CONTINUE TO ENHANCE THE STORY AND PROVIDE FOR THE RECREATION OF LOCAL RESIDENTS AND VISITORS TO THE CITY.

The asset management strategy for the future development of the Avon River proposes that from Mona Vale to the estuary the river is managed to highlight the change from the inner city cultural landscapes to the natural edge of the estuary. This strategy emphasises the heritage and cultural values of both colonial and maori history and culture, particularly within the inner city. Natural values are given greatest emphasis in the lower Avon while retaining a degree of ecological restoration throughout the entire river. Recreation values are retained and enhanced particularly in the neighbourhood section of the river. Through careful consideration and design, and in partnership with tangata whenua, the landscape values can be managed in a way that expresses and highlights the narrative of the river. That is, the story the river tells us about the past, present and future of Christchurch *Otautahi*. The fluidity of the river through different landscapes makes it an ideal vehicle for expressing ideas about our history, culture, memory, and our relationship to the natural environment.

The Avon River is an outstanding feature and icon of the City of Christchurch. It is integral to the identity of Christchurch as *The Garden City*. The importance of the Avon River to the city of Christchurch warrants continued investment in this unique asset.



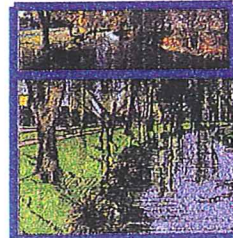
THE AVON RIVER OTAKARORO

The River Story

From the cultural heart of the city to the natural coastal salt marsh, the Avon River tells a fascinating story of the history of Christchurch. The future management of the Avon River can continue to enhance the story and provide for the recreation of local residents and visitors to the city.



Enhance waterways as part of a heritage landscape management plan for Mona Vale.



Tree planting and margin planting that integrates the river into the landscape character of Hagley Park along the Hagley Park/Park Terrace section of the Avon River.



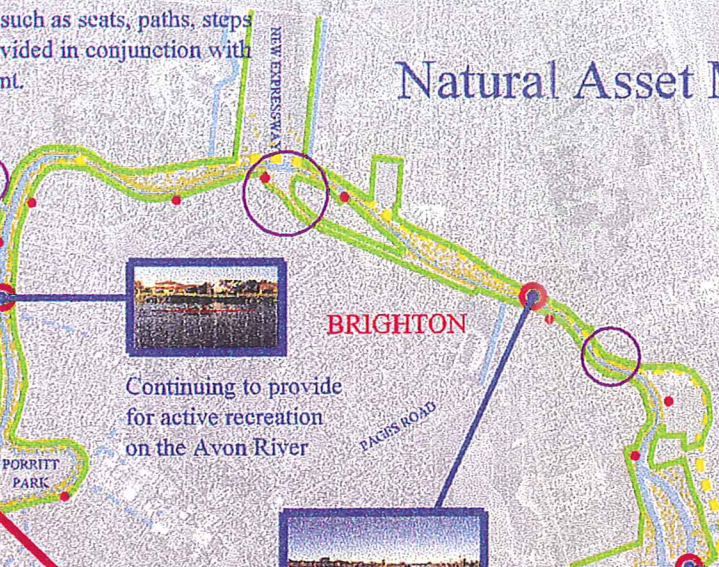
Restore heritage stone walls and replace existing concrete block walls with bluestone walls with capping and planting pockets.



Community facilities such as seats, paths, steps to the water edge, provided in conjunction with landscape enhancement.



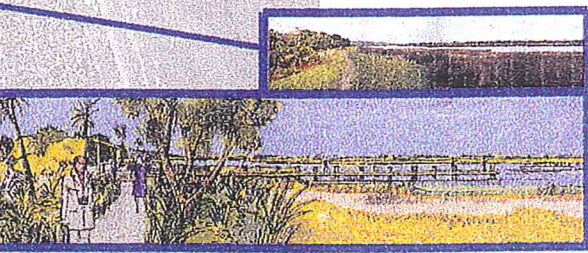
Potential for riverbank promenade in conjunction with streetscape/cafe development along Oxford Terrace



Continuing to provide for active recreation on the Avon River



Naturalised bank treatments with new planting and public walkway.

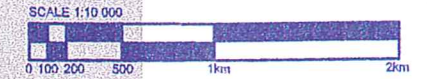


Ecological restoration and extension of the salt marsh character of the Lower Avon. Stopbank planned and new jetty constructed.

Waterways and Wetlands

Natural Asset Management Strategy 1999

Project Area 12



- Planting
- Community Nodes
- Identified heritage Areas
- Drive, Walk & Cycleways
- Landscape Corridor
- Waterway
- Identified sites of significance to tangata whenua.

WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY 1999

THE HEATHCOTE RIVER *OPAWAHO*

PROJECT AREA 13



HEATHCOTE RIVER / *OPAWAHO* - Neighbourhood River Park

STRATEGIES

- To prepare concept plans for the River Park in conjunction with Council key partners, neighbourhood improvement plans, and through consultation with individual neighbourhoods.
- To widen the river corridor by street design, tree planting and the incorporation of open green spaces.
- To develop partnerships with schools to provide access, education and recreation opportunities.
- To create habitat for selected aquatic fauna.
- To work in partnership with Tangata Whenua to identify, protect and restore sites of importance.
- To create linkages such as cycleways and walkways to the Port Hills, surrounding neighbourhoods and other green spaces.
- To improve accessibility to the river with steps, landings, canoe ramps, etc.
- To seek additional green space in land prone to flooding, through purchase and partnerships with private development.
- To improve the serenity and safety of river-side recreation areas by road narrowing or closure.
- To provide distinctive focal points within individual neighbourhoods with destination sites, recreation opportunities, art works, restored heritage structures, cafes and community shopping centres.
- To over time replace culvert and pipe outlets and hard structures with natural contours, planting and stone protection.
- To implement flood management and mitigation measures where necessary.



THE HEATHCOTE RIVER - OPAWAHO

INTRODUCTION

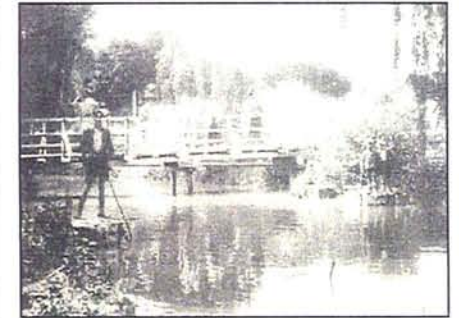
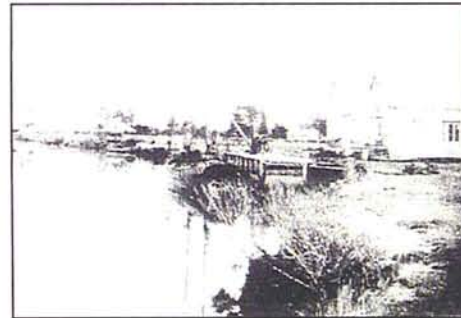
The Heathcote River is endowed with many heritage, cultural, ecological and recreational attributes which add to community and neighbourhood appreciation of this natural asset within the city. The Heathcote River management strategy aims to provide a vision and means for managing and developing the river as a neighbourhood river park. This concept builds on the existing neighbourhood character of the river and the past initiatives of the Waterways and Wetlands team.

The following document briefing outlines some historical significance of the river, the current character and condition of the river, and presents the vision of the Heathcote River as a *Neighbourhood River Park*. Costs and priorities for achieving this goal are outlined as part of the Heathcote Asset Management Strategy.

HISTORICAL BACKGROUND

Before European settlement of Christchurch, the Heathcote River was named Opawaho by the tangata whenua. Translated this means *the outpost* referring to the pa site at Opawa. The river had a strong natural character with dense margins of flax and raupo. The estuary was an important area for mahinga kai. The river corridor was important as a route to Te Waihora (Lake Ellesmere). The spring fed upper headwaters is an important place of learning representing *Kahukura*.

The Lower Heathcote is historically significant to the European settlement of Christchurch. During the mid 19th century, cargo would arrive at Ferrymead from Lyttelton, be unloaded onto rail trucks, or continue onto Steam Wharf. Smaller vessels would be towed upstream to Christchurch Quay. The lower river at this time was scattered with wharves and jetty structures. Industry, such as the Brickworks and the Malthouse, established along the river. As Christchurch grew the suburb of Beckenham was early to establish within the Beckenham loop. Elegant Victorian villas were built giving this area strong sense of neighbourhood history.





THE HEATHCOTE RIVER TODAY

The upper catchment of the Heathcote River is characterised by ephemeral swales passing through areas of pasture. Remnant river terraces are apparent with occasional patches of native margin plants in ponding areas. This area is currently under pressure from residential subdivision and will inevitably become part of the suburban landscape in the future. The river is fed by springs of clear clean water. It passes through the historic grounds of *St John of God* becoming part of the historic church gardens.

As the river passes through Spreydon, public access is restricted to adjacent parks. Gardens back onto the river with a variety of structures retaining the banks. The river corridor is extremely confined in this section.

Further downstream the river follows Cashmere Road. Over-wide roads frame the river confining the green space corridor. River banks are steep making access to the water's edge difficult. The river banks are undermined in places due to steep banks and lack of bank planting. In this section schools and hospitals adjoin the river and residents enjoy vistas to the water. Many residents cycle, walk and use the river for water recreation.

Parts of this section of the river have been prone to flooding in the past.



The lower section of the river is effected by tidal and saline influences. Heavy industry is present and signs of past degradation of the river with landfills and reclamation of the banks are apparent. Ecological values and heritage values are significant within the estuary and lower Heathcote River, but have been greatly impacted by human influences.





VISION FOR THE FUTURE - *Heathcote Neighbourhood River Park*

THE HEATHCOTE RIVER MEANDERS THROUGH MANY NEIGHBOURHOODS IN CHRISTCHURCH. IT PASSES THROUGH SCHOOLS, HOSPITALS, SPORTSFIELDS AND AREAS OF ECOLOGICAL IMPORTANCE. THE NEIGHBOURHOOD RIVER PARK CONCEPT AIMS TO DEVELOP THE RIVER AS A FOCUS FOR COMMUNITY RECREATION, EDUCATION, RELAXATION AND AS AN ATTRACTIVE ENVIRONMENT FOR WALKING AND CYCLING THROUGH THE CITY. THE HEATHCOTE RIVER CAN BE FURTHER DEVELOPED TO REINFORCE COMMUNITY VALUES AND NEIGHBOURHOOD IDENTITY.

We believe the Heathcote River can be managed to strengthen physical and community connections to the river through close consultation with neighbourhoods. Options to achieve this include; extending the green space of the river by narrowing or closing roads where feasible, creating community nodes with artworks, outdoor furniture, and other facilities, and highlighting areas of particular ecological, heritage and cultural significance that are special within each neighbourhood. Working in close partnership with tangata whenua schools, hospitals and neighbourhood groups to support community pride and ownership of the river.

Purchasing of land prone to flooding would enable the river corridor and the river park to be extended. Walkways and cycleways could be developed further to encourage recreational sightseeing along the river. Facilities for encouraging further use of the river for canoeing, rowing, whitebaiting and possibly swimming in the upper spring fed catchment could be created.

From open sportsfields in the upper catchment to ecological restoration of the lower salt marsh area with heritage interpretation and walks, the Heathcote River provides many opportunities for greater interaction between people and the natural environment of the river.



The Heathcote River *Opawaho*

Neighbourhood River Park

The Heathcote River meanders through many neighbourhoods in Christchurch. It passes schools, hospitals, sportsfields and areas of ecological importance. The 'Neighbourhood River Park' concept aims to develop the river as a focus for community recreation, education, relaxation and as an attractive environment for walking and cycling through the city. The Heathcote River can be further developed to reinforce community values and a sense of neighbourhood identity.

-  Landscape Corridor
-  Identified sites of significance to tangata whenua.
-  Waterways
-  Community Nodes
-  Walkway and cycle routes
-  Identified heritage areas

Waterways and Wetlands Natural Asset Management Strategy, 1999.

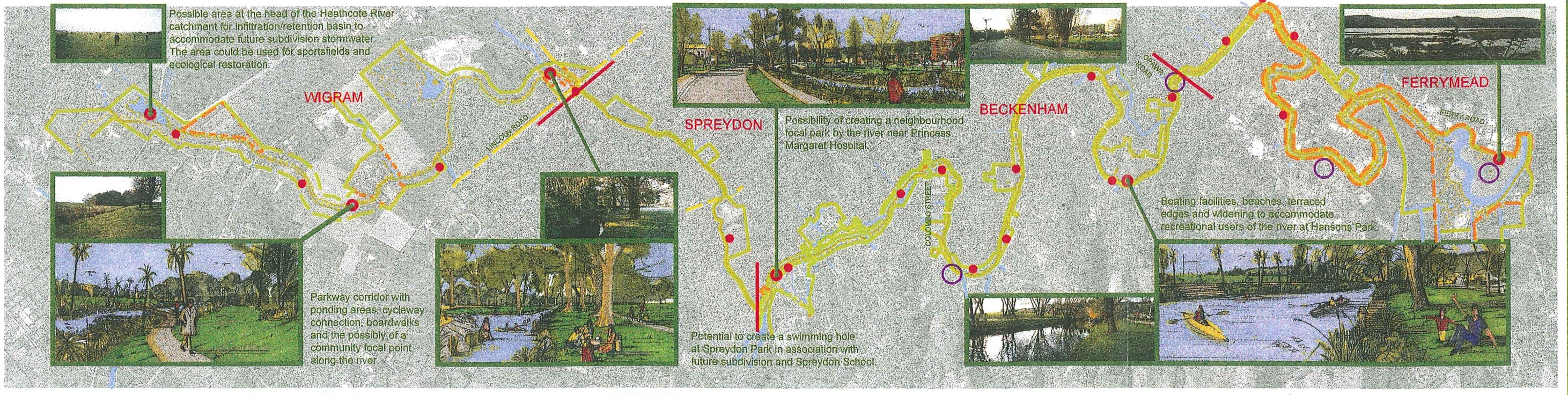
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Project Area 13



Salt marsh restoration, active and passive recreation and heritage walkway extended with interpretation.



CASHMERE STREAM AND PONDING AREAS

PROJECT AREA 14



CASHMERE STREAM AND PONDING AREAS

"Ephemeral Wetlands"

VISION

To achieve enduring protection of natural ponding areas to provide for flood mitigation for peripheral urban development, which will allow the restoration of core ecological habitat zones within a rural buffer.

STRATEGIES

- Implement the recommended management measures identified in the Heathcote River Floodplain Management Strategy.
- Review landuse zoning for all natural ponding areas, to better protect against incremental filling, subdivision and development.
- Work with landowners and developers to effect land protection through purchase, partnerships, and the identification of compensatory development zones.
- Establish ecological corridors along waterway and wetlands through appropriate planting and improve public access for recreation.
- Achieve a continuous green corridor along Cashmere Stream, with public access for recreation.
- Increase the diversity and abundance of terrestrial, wetland and migratory birds.
- Protect and restore native fish habitat.
- Protect springs, wetlands and other sites in the area of significance to takaka whenua.
- Define and implement practices to attain sustainable greenfields residential development which provide for flood detention within waterways either on or off site.
- Develop and encourage sustainable rural management practices for open space areas adjacent to riparian buffer strips.
- Acknowledging the strategy as a means of implementing Community Board objectives.

The Strategy is to be regarded as one of the methods of achieving the City Plan Objectives and Policies to the relevant Project Area.

Key Sections include:

1. Tangata whenua - Maori and their resources
2. Natural environment - natural features and habitat natural hazards coastal environment
3. City Identity - form
4. Recreation and open space - provision and diversity

The Strategy is to be implemented by making appropriate budgets for: protection, restoration, maintenance and management.

WATERWAYS AND WETLANDS
ASSET MANAGEMENT STRATEGY 1999

Cashmere Stream and
Ponding Areas



PROJECT AREA 14



CHARACTER AREAS



Dunbars Stream



Henderson's Basin and
Sherrings Stream



Drain along Sparks road



Henderson's Road and
Branch Stream



Henderson's Basin
Wet Grass Lands



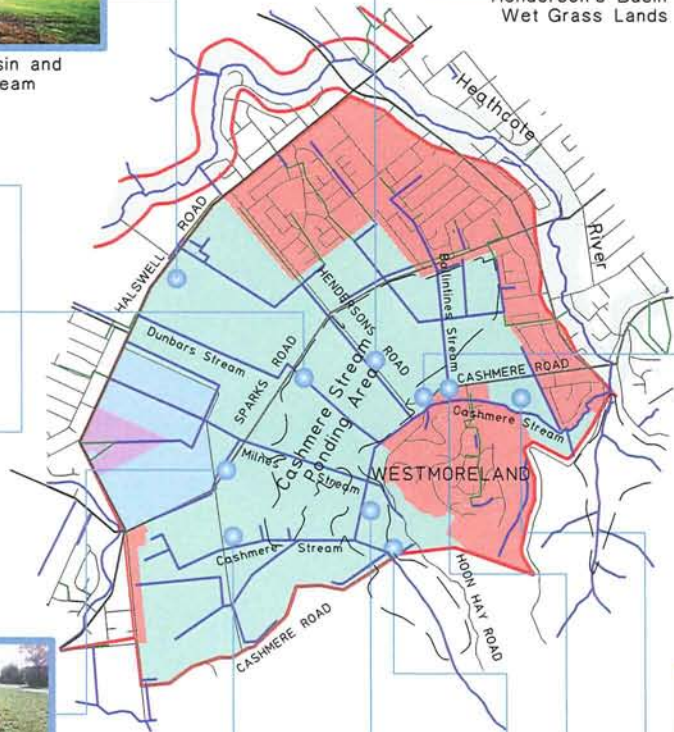
Henderson's Basin Flooding July 1994



View from Westmoreland over
Cashmere / Worsley's Basin



Dunbars Stream



Cashmere Stream near
Henderson's Road



Cracraft Historic Drain



Cashmere Stream



Channelised Drain alongside
Sparks road



Local Drain off
Cashmere Road



Hoon Hay Valley Stream



Ballintines Stream alongside
Brookford Place



Headwaters of Cashmere Stream

Character Zones

- Older Developed Residential Zone
- Future Urban Zones
- Halswell Domain
- Rural Farmland Wet Soils / Springs
- Project Area boundary
- Existing Waterways
- Natural Ponding Areas
- Springs

Halswell / Wigram
Growth Area
&
Cashmere Stream
Ponding Areas



PROJECT
AREAS
9 & 14



CONCEPT VISION

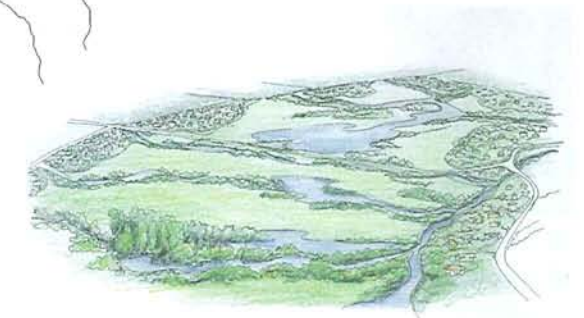
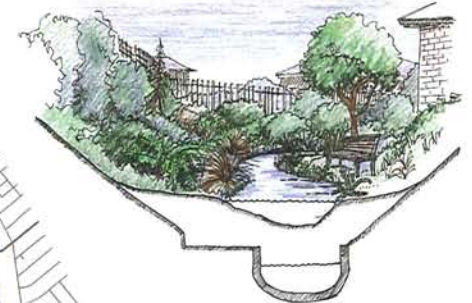
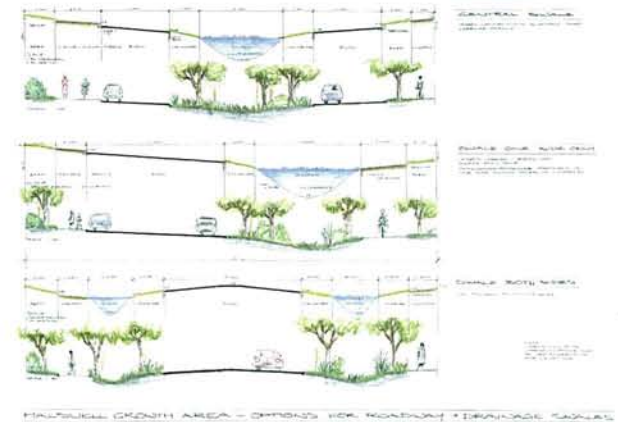
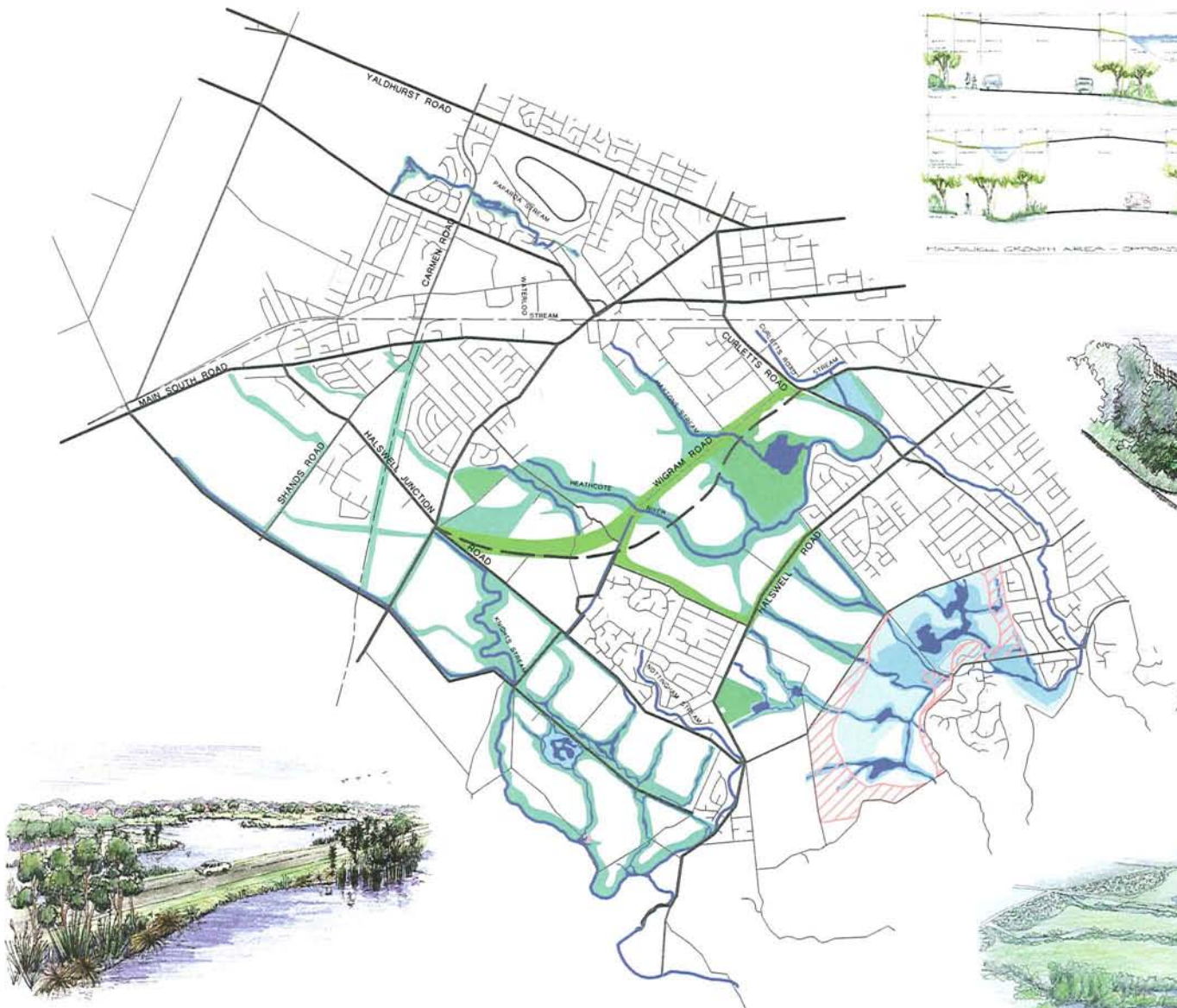
Halswell / Wigram Growth Area
&
Cashmere Stream Ponding Areas

Vision: Protect & Enhance Ponding and
Create Green Corridors

- Protect natural springs.
- Reduce the need for maintenance and renewal of drainage network.
- Provide stormwater storage/flood mitigation.
- Provide stormwater treatment to improve water quality.
- Highlight with vegetation natural features such as old river terraces, waterways and wetlands.
- Provide significant habitat for wildlife.
- Provide important recreational opportunities such as walking and cycle tracks.
- Channel important views to the Port Hills and Alps.
- Buffer industrial zone

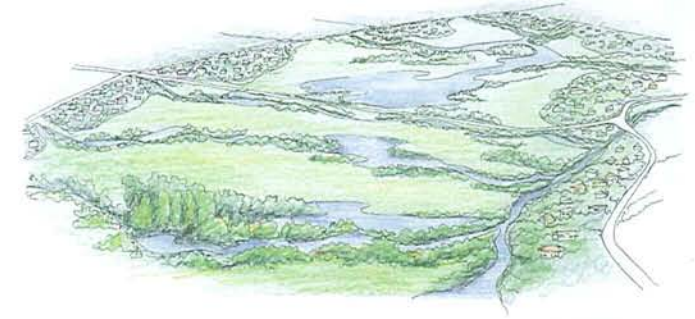
Legend

- Waterway & Wetlands
- Epheneral Wetland / Ponding Area
- Rural Buffer / Extreme Event Ponding Area
- Existing Major Reserves
- Arterial Road Buffer Zones
- Green Corridors - Many Associated with Ponding Areas and Restored / Developed Utility Waterways
- Project Area boundary
- Proposed New Southern Motorway





A VISION HENDERSONS BASIN



Legend

-  Waterway & Wetlands
-  Ephemeral Wetland / Ponding Area
-  Rural Buffer / Extreme Event Ponding Area
-  Existing Major Reserves
-  Possible Future Residential Areas
-  Green Corridors - Many Associated with Ponding Areas and Restored / Developed Utility Waterways
-  Project Area boundary

Cashmere Stream Ponding Area

Vision: Protect & Enhance Natural Ponding in Area

- Naturalise and vegetate existing drains to augment ponding.
- Protect existing springs.
- Manage wetland area and naturalise drains for wildlife values - birds and fish.
- Develop core habitat areas.
- Develop recreational opportunities such as walkways/cycleways.
- Fill selected sites for sustainable residential development.

Volume II
October 2000

STRUCTURE

SECTION ONE

Context

- Urban growth
- Flooding
- Birdlife
- Water ecology
- City Plan Objectives

SECTION TWO

Strategy Summary

- Management philosophy
- Consultation
- Investment priorities and criteria
- Budget requirements and financial management

SECTION THREE

Alignment with Council's Future Directions

- Community governance
- Sustainable City

SECTION FOUR

Conclusions

APPENDIX

(Including the council's resolution adopting the strategy)

URBAN GROWTH

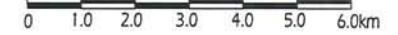
The Waterways & Wetlands Asset Management Strategy provides the opportunity for enhanced natural and urban environments through creative approaches to surface water management and the avoidance, mitigation and remedy of existing and future adverse effects. Measures include:

- Restoration and protection of natural waterways
- Restoration of natural springs, wetlands and ponds
- Creating new wetlands and ponds within parklands
- Converting utility waterways into environmental assets within 'green corridors'
- Sculptured soakage ponds in groundwater recharge areas





The achievement of good results requires planning and design in partnership with landowners and local communities. The preparation of area development plans and cost contribution schemes is important.



Urban Growth

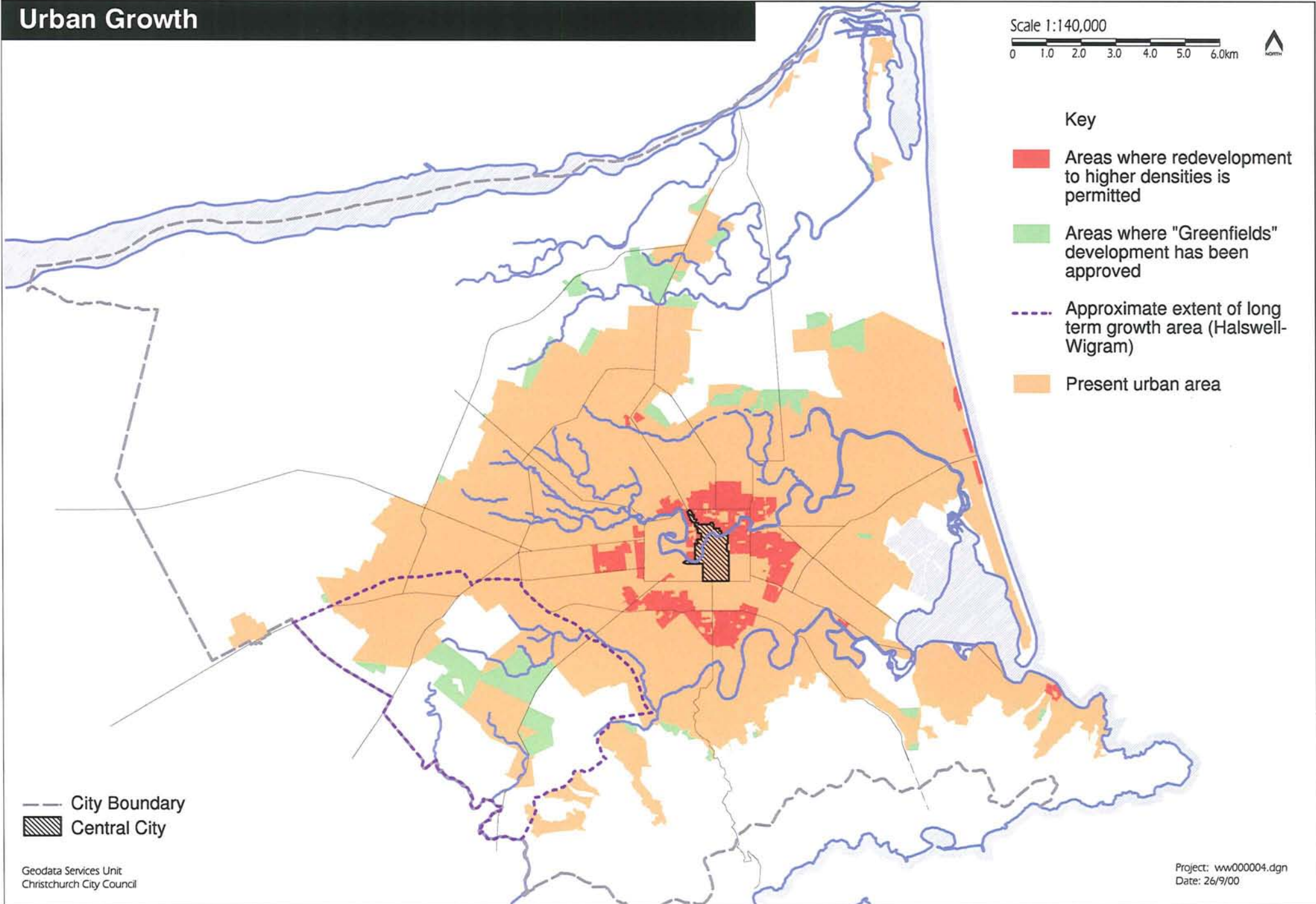
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Key

-  Areas where redevelopment to higher densities is permitted
-  Areas where "Greenfields" development has been approved
-  Approximate extent of long term growth area (Halswell-Wigram)
-  Present urban area

-  City Boundary
-  Central City



FLOODING

The Waterways and Wetlands Asset Management Strategy reflects the following strategic directions set by both City and Regional Councils. Where appropriate, the projects identified in the Asset Management Strategy incorporate measures necessary to satisfy flood-plain management.

Strategic planning in relation to flooding in Christchurch comprises:

- Styx and Heathcote River Floodplain Management Strategies: A mix of measures implemented via city and regional plans, public works and consent conditions
- Avon River Floodplain Management Strategies: In preparation
- Waimakariri floodplain management: Currently under review, to be implemented via city and regional plans
- Sea Level Rise Report: A City Council document that predicts effects and indicates policy direction
- Flood awareness maps: A record of all known flood prone areas

Protection of groundwater quality:




- City Plan resource management objectives
- Transitional regional plan policies
- Water chapter of the Natural Resources Regional Plan (in preparation)



Flood Plains

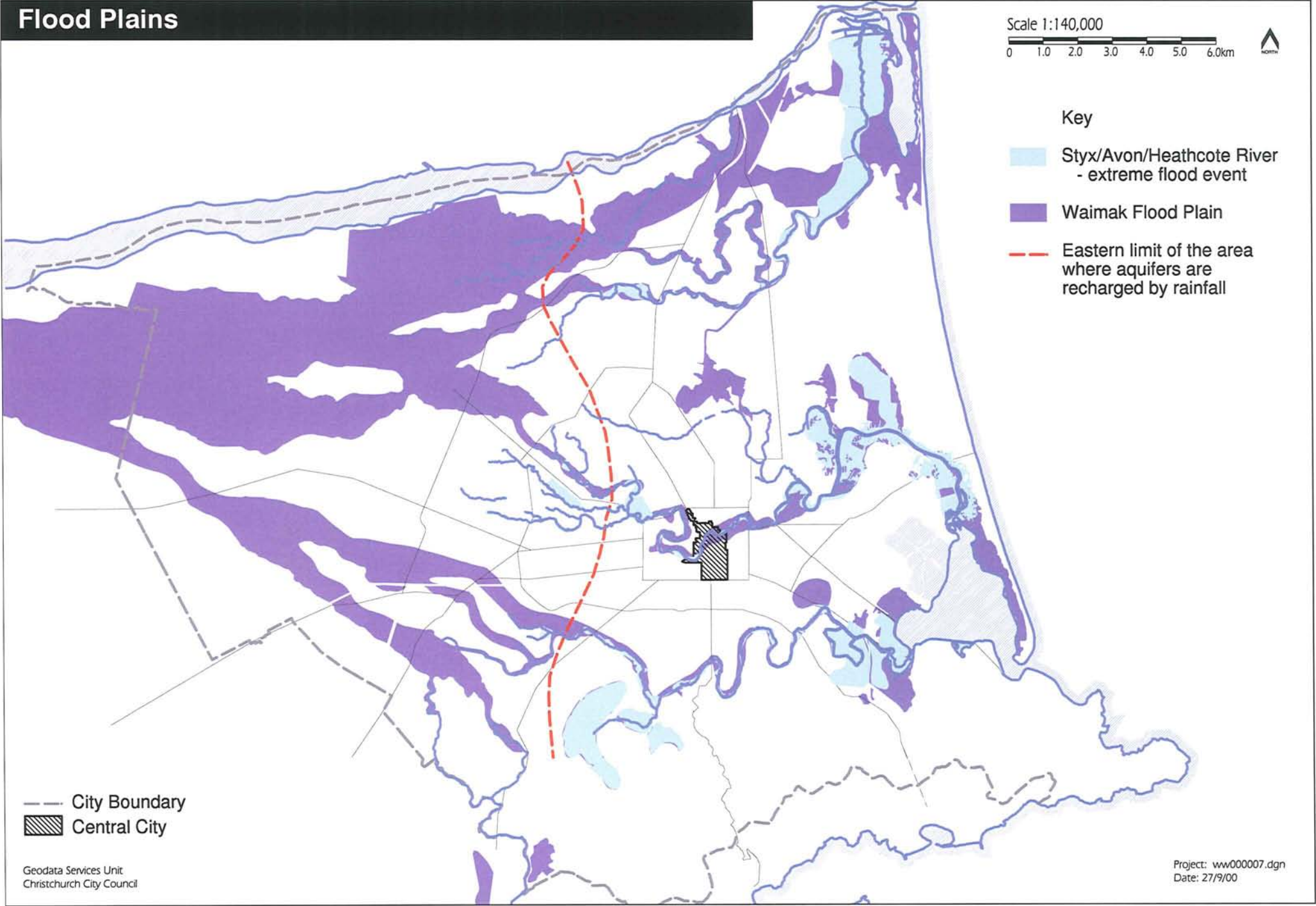
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Key

-  Styx/Avon/Heathcote River - extreme flood event
-  Waimak Flood Plain
-  Eastern limit of the area where aquifers are recharged by rainfall

-  City Boundary
-  Central City





BIRDLIFE

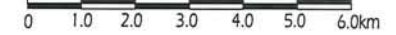
Christchurch has a wonderful diversity of bird life. The local environment is an important part of an avian ecology that extends well beyond our shores. Our waterways and wetlands provide habitat and pathways. Together with private gardens and parklands are an important part of this ecology.

The Asset Management Strategy recognises avian ecology by strengthening protection and providing new opportunities for birdlife and their enjoyment by people.

Promising increases in bird numbers have already been experienced, especially a beautiful small black duck called the New Zealand Scaup, other locally rare species can also be helped.

Bird Movements

Scale 1:140,000



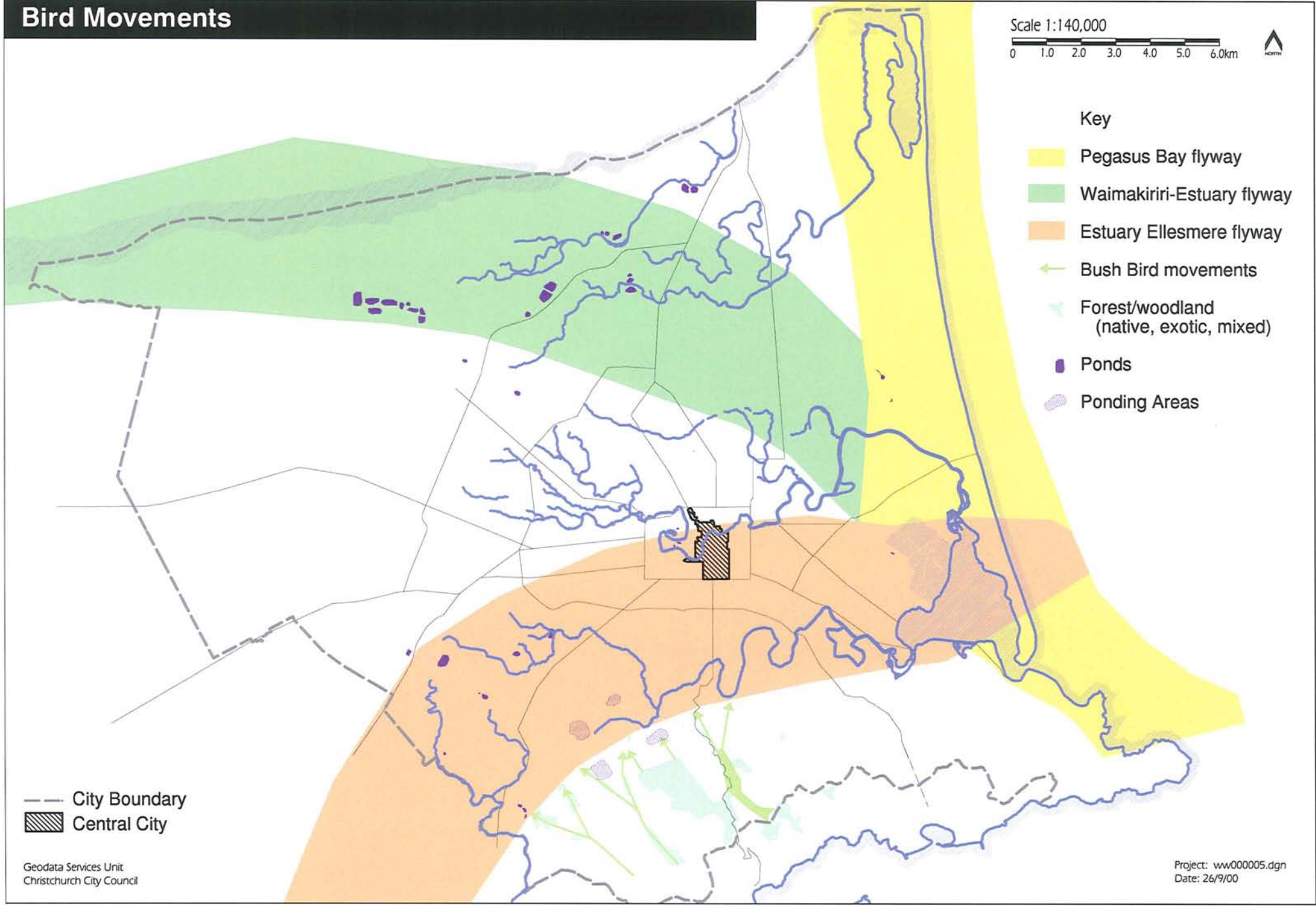
Key

- Pegasus Bay flyway
- Waimakiriri-Estuary flyway
- Estuary Ellesmere flyway
- Bush Bird movements
- Forest/woodland (native, exotic, mixed)
- Ponds
- Ponding Areas

- City Boundary
- Central City

Geodata Services Unit
Christchurch City Council

Project: ww000005.dgn
Date: 26/9/00



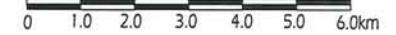
WATER ECOLOGY

The waterways and wetlands of Christchurch historically supported a rich diversity of in-stream, wetland and riparian life. It was an ecology that sustained Maori for 800 years both physically and spiritually. Specific sites have been identified that are ecologically significant and/or have cultural importance to Tangata Whenua. The Asset Management Strategy supports and strengthens these values in accord with City Plan resource management objectives.



A related issue that requires further study is contaminated stormwater. The strategy does provide for stormwater treatment as opportunities arise, but the issue is one that needs a strategy of its own. It should include a variety of measures such as education and removal at source.



Water Ecology

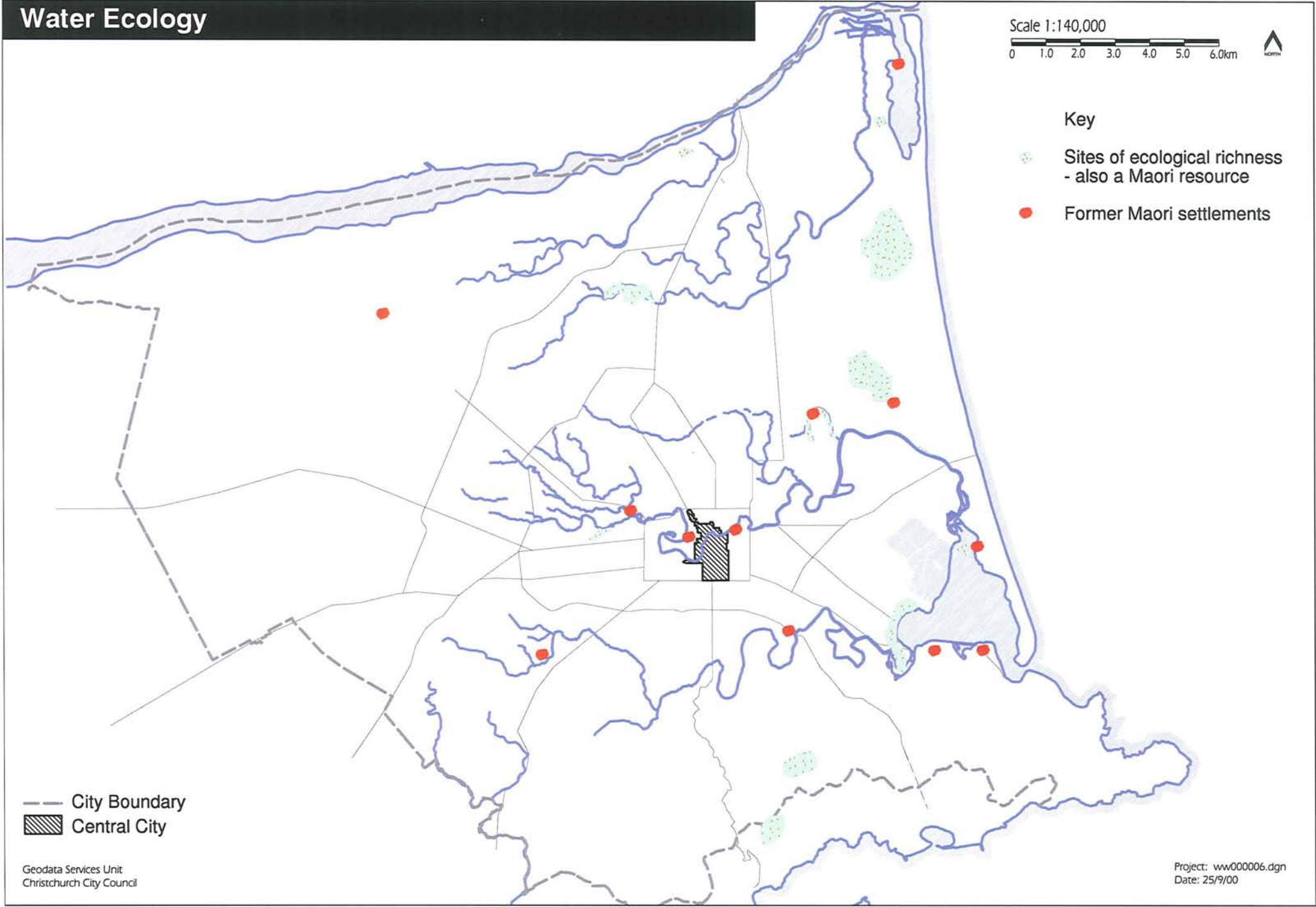
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Key

-  Sites of ecological richness - also a Maori resource
-  Former Maori settlements

-  City Boundary
-  Central City



CITY PLAN OBJECTIVES

The City Plan contains numerous objectives related to the wise management of Christchurch's surface and groundwater resources. These have been included in the Volume 1: **WATERWAYS AND WETLANDS NATURAL ASSET MANAGEMENT STRATEGY 1999**. The sections within Volume 2 of the City Plan that contain the objectives that are integrated into the strategy are as follows:

Sections

- 1.0 Planning a Sustainable Christchurch
- 2.0 Natural Environment
- 4.0 City Identity
- 5.0 Tangata Whenua
- 6.0 Urban Growth
- 10.0 Subdivision and Development
- 14.0 Recreation and Open Space
- 15.0 Methods of Implementation

SECTION 2

STRATEGY SUMMARY

Management Philosophy

Consultation

Investment Priorities and Criteria

Budget Requirements and Financial Management

Strategic Open Space

MANAGEMENT PHILOSOPHY

The broad objective is the sustainable management of the natural and physical resources that make up Christchurch's system of waterways, wetlands and drainage.

The main requirements of the strategy are:

1. to satisfy the Council's resource management policies and objectives
2. to satisfy the long-term financial planning and hence asset management requirements of the Local Government Amendment Act No 3
3. to present the strategy in a form that can be understood and responded to by the community

A companion document (volume 1) entitled "A NATURAL ASSET MANAGEMENT STRATEGY FOR WATERWAYS & WETLANDS 1999" sets out visions, strategies and illustrated examples of results that could be expected.

CONSULTATION

Consultation has been an integral part of the strategy preparation. Further development and review of the adopted strategy will also involve consultation. The preparation process has included:

- a Council/community workshop to describe the results expected from Council management of waterways and wetlands
- within the Council organisation, inter-unit seminars
- presentation of the strategy to Parks and Recreation Committee
- seminars with Community Boards
- seminars with the Parks and Recreation Committee on project areas
- two seminars with Key Stakeholders following Council agreement to establish this group

Further consultation is proposed as part of the strategy, ie

- consultation with local communities through community advocates as part of *“Seeking Community Views”* and the development of community plans
- periodic review of the performance of the strategy by Key Stakeholders

INVESTMENT PRIORITIES AND CRITERIA

In its broadest context, the Council's expenditure on waterways and wetlands could be regarded as an investment in sustainability, ie avoiding costly utility solutions and providing space for natural and naturalised systems to function with minimum intervention.

The investments need to be made under a variety of circumstances. With new development and redevelopment the opportunity arises for the Council and private enterprise to work in partnership to achieve excellent results with long-term benefit. In these cases priorities are often determined by the developer's perception of market needs.

Investment by the Council within existing urban areas can be stimulated by, for example, community demand for neighbourhood improvements, or joint property owner/council funded stream restoration.

The greatest opportunity for securing space for a well managed surface water system, lies in rural areas that are likely to be developed in the longer term. However, rural subdivision to minimum lot size is occurring continuously. Negotiations for land therefore need to occur before subdivision consents are granted. The recent Strategic Open Space report also addresses this aspect. The various forms of investment demands are tabulated below.

Nature of Investment	Fund Source			How achieved
	Parks & Waterways Unit Budget	Source other than CCC	Private Enterprise	
<i>Green Fields Urban Development:</i>				
Protection	partly		partly	A combination of strategic land purchase by the Council, affects mitigation by developers and reserve contributions
Restoration	whole or part		partly	Mitigation, or remedy need. Cost share agreement if appropriate
<i>Redevelopment to higher densities (eg L₁ to L₃):</i>				
Protection	partly	partly	partly	Integrated urban design projects that incorporate public and private investment in "Creating Liveable Streets/Neighbourhoods through agreements and/or requirements related to mitigation of effects
Restoration	partly	-	partly	
<i>Large industrial and commercial developments (eg TransRail depot):</i>	partly	-	partly	A contribution or cost share requirement for avoidance, mitigation and remedy of adverse effects
<i>Strategic river corridors, tributary waterways and wetlands:</i>				
Protection	mostly		partly	Acquisition of esplanade reserve or strips prior to subdivision. Sometimes land can be set aside by a developer as part of environmental compensation for a non complying subdivision. (eg. partly within a floodplain)
Restoration	partly		partly	A continuation of public and private investment in ecology, landscape, recreation and other values.
<i>Waterway enhancement within 'Public' land:</i>				
Restoration	mainly	partly	partly	Restoration of areas accessible to the public (eg Heathcote River). Sometimes in conjunction with schools, shopping centres and clubs
<i>Waterway enhancement within private property:</i>				
Restoration	50%		50%	A priority-based programme of mutual benefit but with the investment protected by means of a voluntary esplanade strip without public access
Protection	mainly		partly	

The projects identified in the strategy will be subject to a process that has in-built investment criteria as follows:

- Strategic analysis - The investment should be part of a vision of the future
- Affordability - The total cost of the strategy needs to be within total council expenditure parameters determined by loan and rate take limits, other asset management strategies and major projects
- Acceptability - The investment should be acceptable to private enterprise, local committees, key stakeholders and other units of the Council's organisation
- Programming - The investment has to withstand the scrutiny of 5 and 10-year capital expenditure programme reviews
- Approval - Approvals are required for items such as land purchase and consent applications

The strategy identifies a total of 300 projects spread within 14 project areas. The nature of the projects, their cost and timing have been determined by staff guided by many considerations. These considerations include the priorities and criteria discussed in the foregoing, together with feedback from committee and community board members. The total cost has been reduced by approximately \$50million by this process.

In time, the strategy will be reviewed and refined. The project programme it contains can be regarded as a step between the vision and approved capital expenditure programming. In other words, the strategy is a starting point for budget preparation, not an end point.

BUDGET REQUIREMENTS & FINANCIAL MANAGEMENT

- The total expenditure over forty years period is \$160 million
- The average annual rate of expenditure is slightly less than the current budget allocation of \$4.2million per year.
- The reasons for the high early expenditures are mainly the need to satisfy long term urban growth and purchase of waterway corridors prior to rural subdivision particularly in the Halswell-Wigram Growth Area.

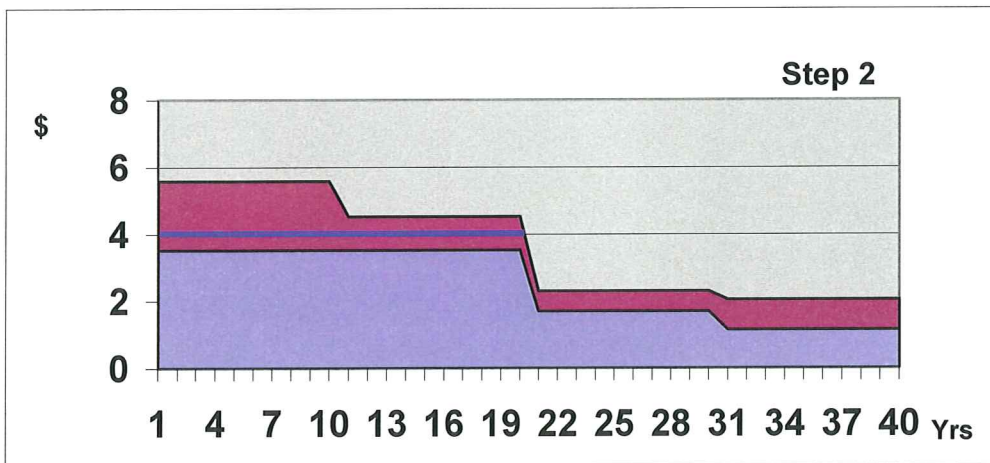
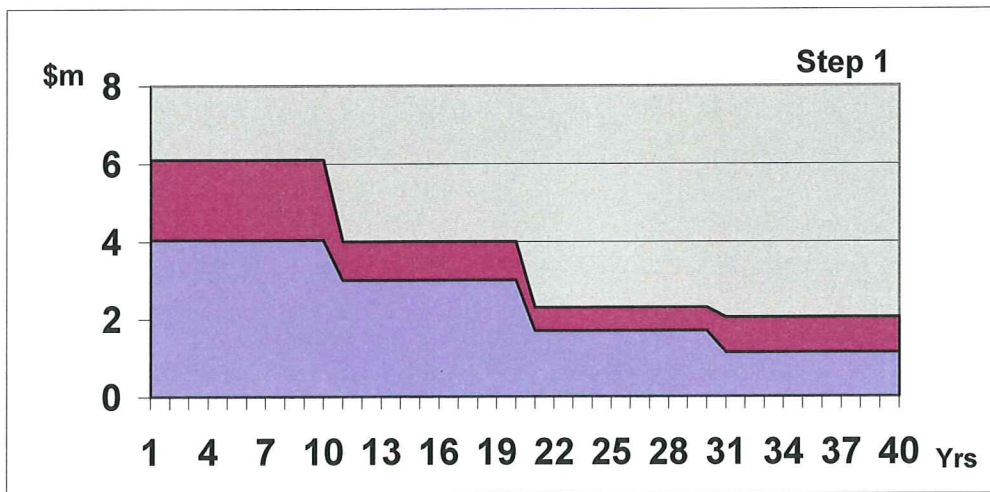
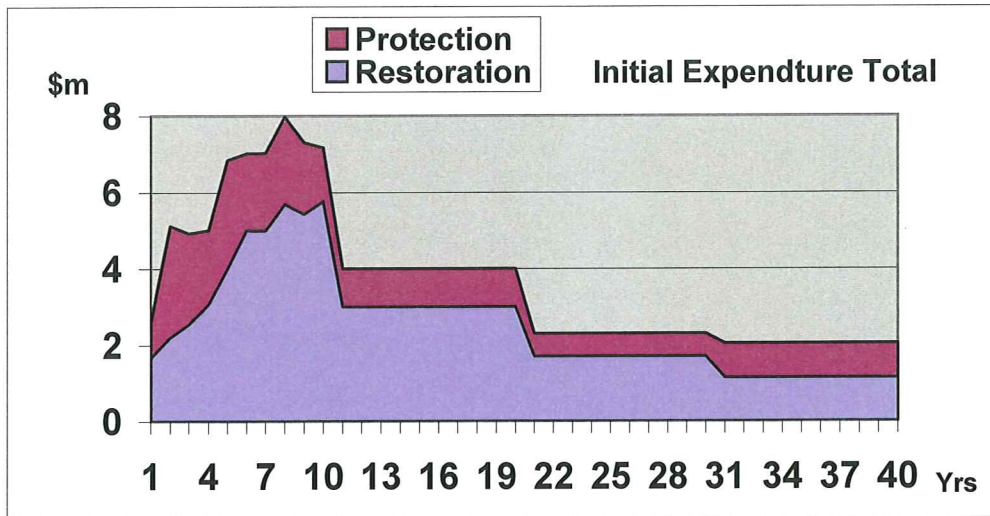
Modification To Expenditure Pattern (refer following graphs)

Step one: Smooth out costs for the first ten years.

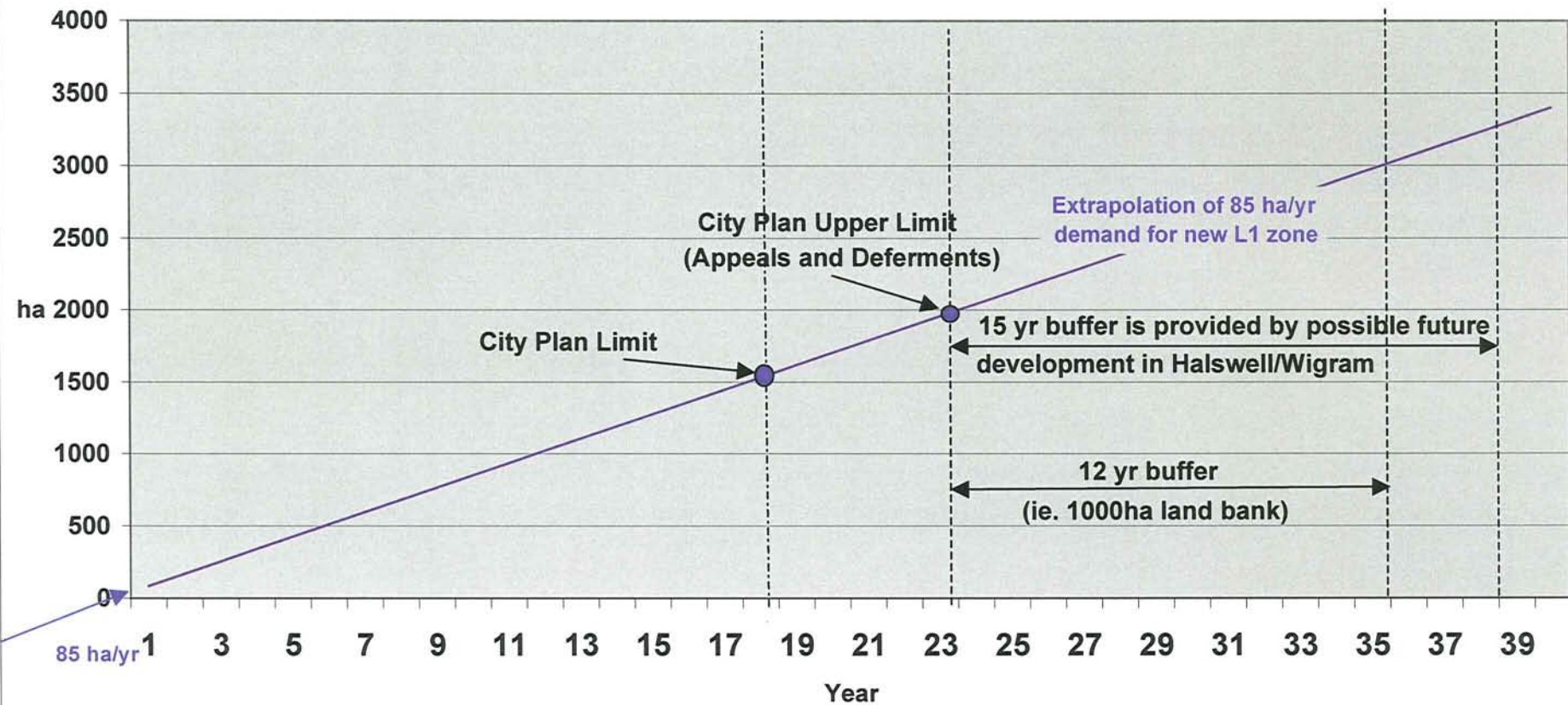
Step two: Accept that protection costs can not be easily deferred, smooth out restoration costs over 20 years.
and **Accept that expenditure above the average currently allocated is an investment in sustainability and added value that must be made early while the opportunity exists.**

The investment will result in lower annual costs in the later years as the framework for sustainable waterways and wetlands will be established for the following 30 years (refer land uptake graph).

Net Waterways & Wetlands Expenditure



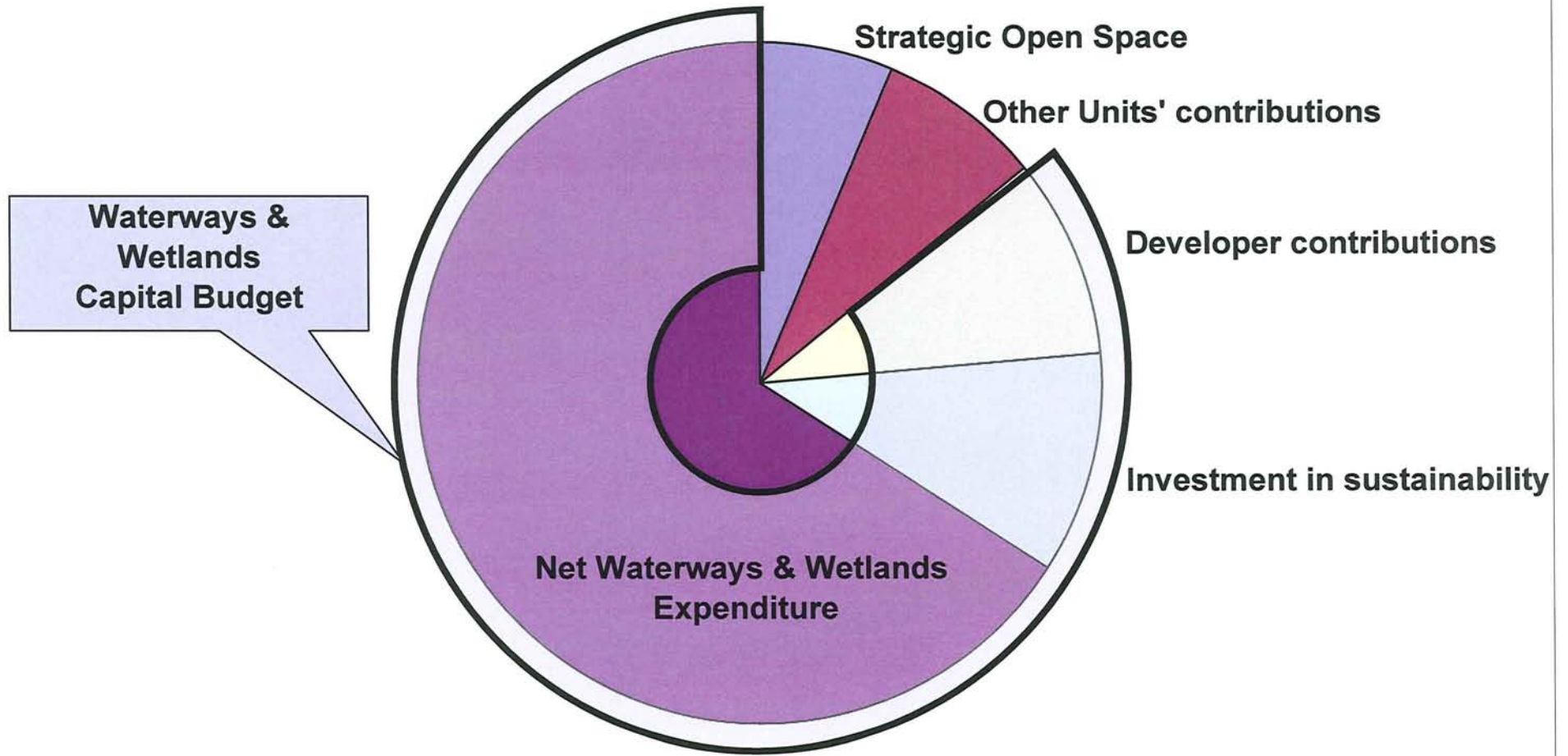
Uptake of greenfield and vacant sites



FUNDING DISTRIBUTION

- The greatest proportion of the strategy cost can be funded from the waterways and wetlands capital expenditure budget.
- Development Contributions are often a reimbursement to the Council for a scheme covering several properties. These transactions need to be specifically provided for as a capital asset expenditure but having no financial cost to the Council.
- Contributions from other units is based on the existing convention on cost sharing but need to be confirmed at the time all capital budgets are reviewed.
- The investment in sustainability requires additional capital budget allocation of approximately \$1.4 million per annum (next ten years only, followed by a reduction in budget). It could be funded by:
 - Orion money
 - Increase loan limit
 - Deferral of some capital expenditure by other units as part of the budget review process
 - Reducing restoration costs further by:
 - Private sector contributions
 - Voluntary Co2 reduction through tree planting (UK Example)
 - Central government work schemes
 - Spread acquisition over a longer period by eg. City Plan designations, conditions of purchase
 - Implementing a catchment wide mitigation contribution to developers

Funding Pie Chart



STRATEGIC OPEN SPACE

Recently, a seminar was held for Councillors on the long term needs of the City in relation to the larger, more strategic areas of open space. These areas included the Port Hills, the coastal margins, Waimakariri and Otukaikino Corridor and areas of the plains west of the City. Also considered important were the Styx River Corridor, Natural Ponding Areas in the Upper Heathcote Catchment and numerous springs forming the headwaters of the Halswell River.

The possibility of creating public open space within these areas has yet to be discussed. However, as a first step, the water related areas mentioned above have been included in the strategy, but with costs excluded. The costs total \$12 million.

It is anticipated that future discussion will need to take place before any ongoing financial commitment is made by the Council to Strategic Open Space.

SECTION 3

FUTURE COUNCIL DIRECTIONS

**Community Governance
Sustainable City**

COMMUNITY GOVERNANCE

The project area approach taken by the strategy enables it to be relevant to local communities. The visions and strategies for each area, together with the project concepts, would form the starting point for “*Seeking Community Views*”. In this way natural assets can be managed to enhance and strengthen the character of our living environments.

The strategy has generally been warmly received by Community Boards. The next step is to invite and facilitate community involvement through the Council’s Community Advocates. In time it seems likely that all public open space, including road reserves, will be planned in a way that is sensitive to the history and culture of the local people and contributes to a shared long term vision.

SUSTAINABLE CITY

The stated purpose of the Resource Management Act is *“to promote the sustainable management of the natural and physical resources”*. As an instrument of the Act, the City Plan sets out the resource management objectives on a variety of issues including the City’s surface and groundwater resources. The objectives are intended to be achieved partly by rules in the Plan and partly by other methods.

The Christchurch City Council as an organisation is now beginning to give greater emphasis to other methods, eg. developing practical ways of achieving sustainability.

The sustainable management of the natural and physical resources that make up Christchurch ‘s system of waterways and wetlands can be expressed simply in two ways:

“Working with nature rather than against her”, and

“Managing the system for all its values”

Future generations can expect to fund a significant programme of pipe replacement and rehabilitation, Illustrated on the following graph taken from the utilities Asset Management Strategy.

A values based approach has begun to reduce the rate of pipe installation in favour of a multi- benefit approach at a lesser cost.

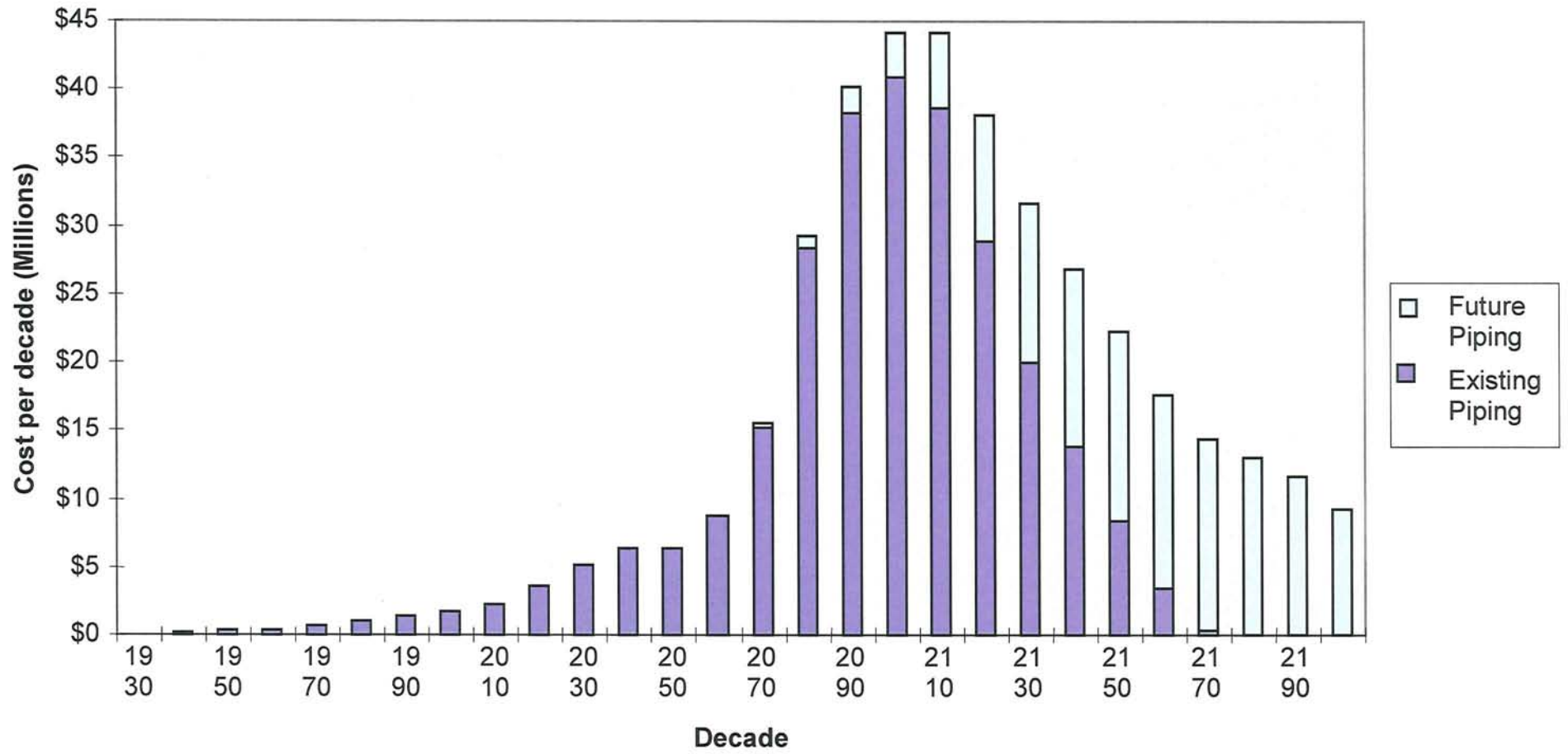
The next diagram is a conceptual comparison which provides a prospect of sustainability.

The last diagram tabulates multi-benefit examples.

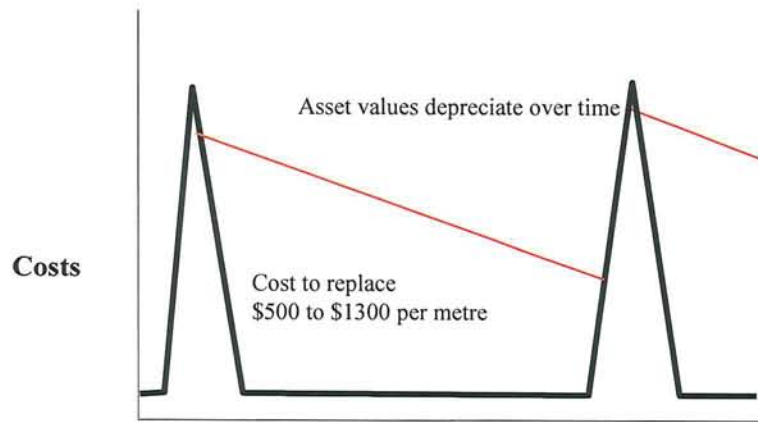
A key sustainability issue both globally and locally is biodiversity. Waterways and wetland management can play a significant role in this area.

The values based approach will assist with triple bottom line reporting in the future.

Projected cost of pipe renewals, Christchurch City

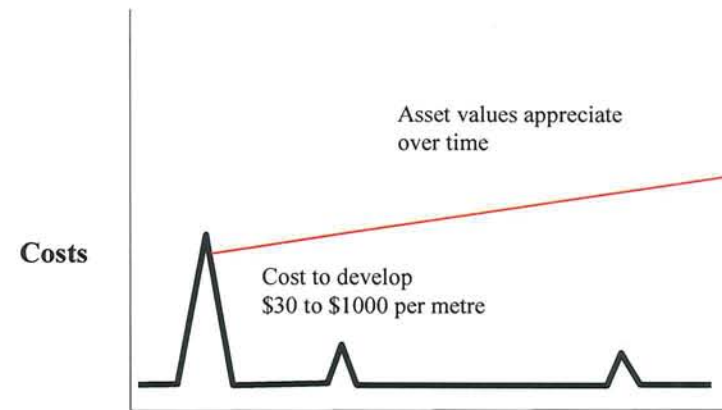


Costs of piping



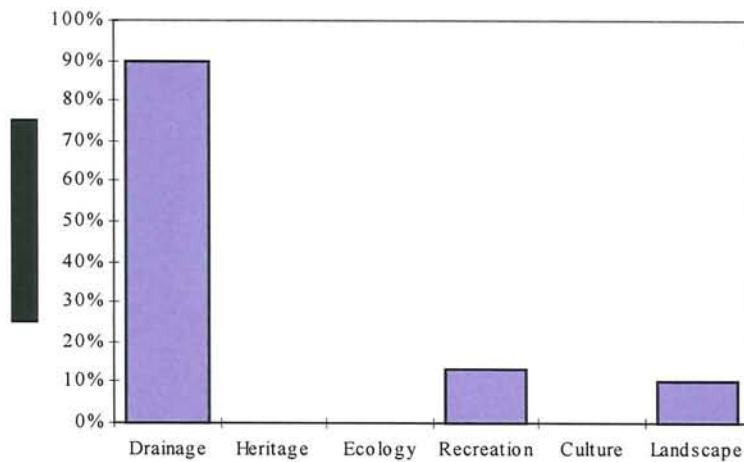
Replacement needed about every 150 years

Costs of 'natural treatment'

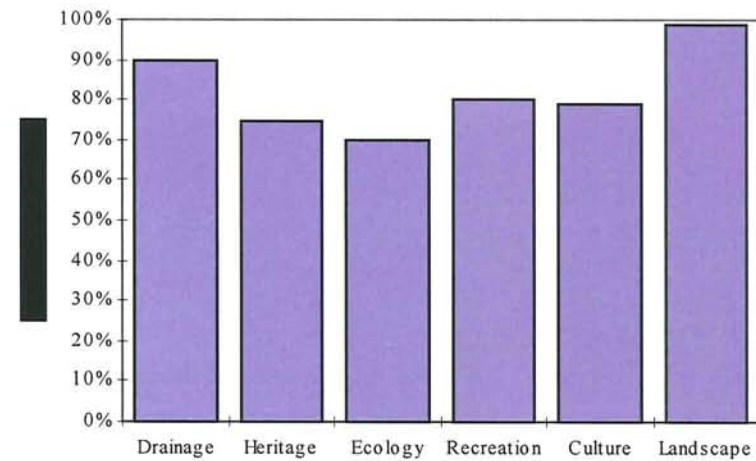


Replacement may never be needed

Values realised for piping



Values realised for natural channels

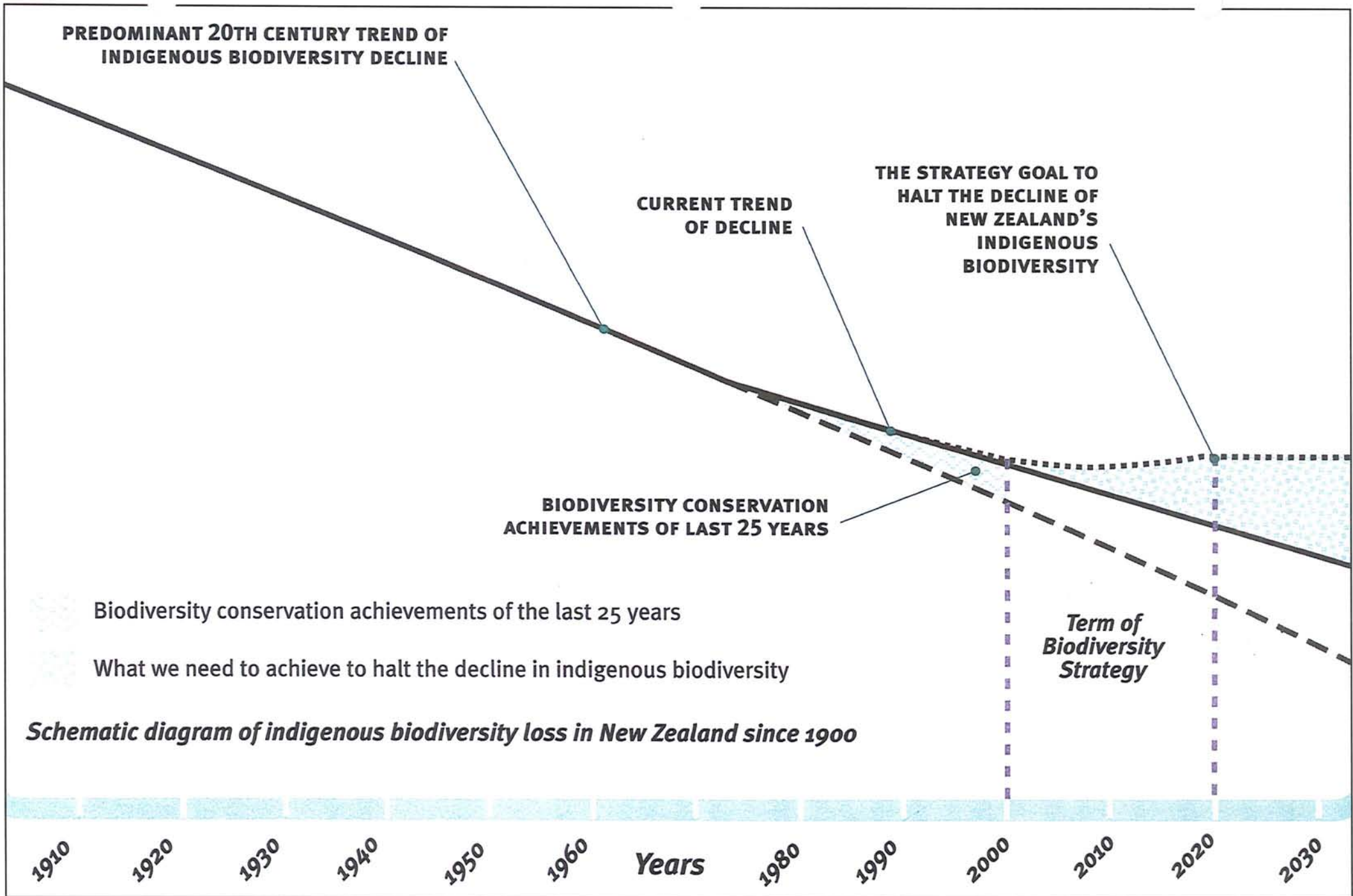


Examples of Multiple Benefits of Waterways and Wetlands Sustainable Management Philosophy

	Ecology			Landscape	Recreation		Heritage	Culture	Drainage
	PS	C	F		CR	O			
Activity									
<u>Created as part of new subdivision</u>									
- Vegetated roadside swales		√	√	√					√
- Wetpond / wetland	√	√	√	√					√
- Dry pond		√	√	√				p	√
- Soakage Pond		√	√	√				p	√
- Waterway	√	√	√	√	p	√	p	p	√
- Waterway within private property	√	√	√	p				p	√
<u>Waterway Restoration</u>									
- Modify low flow channels to restore flow velocity and depth and create habitat diversity	√		√	√	p	√			
- Plant banks for stability and shelter for instream life	√	√	√	√		√			
- Ephemeral waterways have seasonal wetness only and provide for specifically adapted or opportunist plants and animals									
<u>Redevelopment to higher densities within existing urban areas</u> (Under these circumstances there is the opportunity for development levies, cost sharing and integrated design).									
- Use of road reserves for water quality and quantity controls in a way that enhances streetscape		√	√	√	p	√		p	√
- Purchase of private land to create green space and water management features	√	√	√	√		√	p	p	√
- Onsite mitigation by large developments, eg., Tranzrail depot	√	√	√	√		√	p	p	√
<u>Targeted Locations</u>									
- Tributary systems with specific or high contaminant levels, or high ecological potential, eg., Haytons Drain, Hendersons Basin	√	√	√	√	p	√	p	p	√
<u>Promotion of "good housekeeping" practices by industrial, commercial and residential property owners.</u>									
- Trade waste inspectors		√						√	
- Publicity		√						√	
- Education programmes		√						√	
<u>Research</u>	p	p	p	p	p	p	p	p	p
<u>Port Hills Revegetation</u>		√	√	√		√	p	p	√
<u>Maintenance Dredging</u>		√			p				√
KEY	PS = Physical state			F = Flood attenuation		O = Other			
	p = possibly			C = Contamination		CR = Contact Recreation			

BIODIVERSITY

- Council is legally obliged to protect and restore the unique biodiversity under its territorial jurisdiction.
- The history of ongoing attrition of this biodiversity, and its degradation to a state beneath its viable critical mass, must be addressed under the provisions of the RMA (remedying past, present, future and cumulative effects)
- Natural Asset Management is one Council-led initiative for providing strategic effect to the necessity to remedy these past effects by rebuilding natural habitats and landscape integrity and restoring ecosystems and their interdependent plant and animal populations across the City
- By implementing these strategies, monitoring their success and adjusting plans and management accordingly, biodiversity declines can be stabilised and locally extinct organisms re-introduced into sustainable habitats
- These strategies will need to be implemented and monitored in partnership with key stakeholders



CONCLUSIONS

A process has now been completed that has determined the nature, present condition and desired future conditions of the waterways and wetlands of Christchurch. The strategy takes a creative, visionary approach to waterway and wetland long term management in a way that maximizes potential benefits. It satisfies the Council's resource management and financial planning responsibilities.

It is an investment in sustainability with long term environmental, social and economic benefits. Part of the investment needs to occur before subdivision and development and additional funding in the first ten years is necessary.

It is an alternative to a reactive utilitarian approach. This latter approach is a default option that occurs when advance planning is not done. It would have few benefits and would be a burden to future generations.

The strategy will be a challenge to put into practice. It requires financial planning, review and refinements and further consultation as well as alignment with the Council's future direction.

Part of the strategy should be to seek local community responses to the visions and strategies for each project area. Consultation on specific projects, especially those involving land purchase, needs to be carefully managed. In this regard, projects identified in the strategy represent concepts but not commitments.

Land acquisition that forms part of strategic open space should be pursued as a funding issue separate from the Asset Management Strategy.

APPENDIX

- 1. Council's Resolution**
- 2. Project Area and Project Area Leaders Sheet**
Waterways and Wetlands Natural Asset Management Strategy
- 3. Waterways and Wetlands Key Stakeholders list**
- 4. Auditor General's Criteria for Acceptability of Asset Management Plans**
From Association of Local Government Engineers
- 5. The Importance of "Futuring" – Dr Morgan Williams**
Article from Planning Quarterly September 2000
- 6. Project Cost Sheets**

The Council Resolution October 2000

The Council resolved to adopt the following recommendations by the Parks and Recreation Committee October 2000:

1. That this report, together with the companion document entitled "Waterways and Wetlands Natural Asset Management Strategy 1999", be adopted with the following conditions:
 - (a) That it be subject to review at three-yearly intervals
 - (b) That a copy of the report be forwarded to the Annual Plan Working Party; the City Manager; Directors of Finance, Policy and Operations with the request that:
 - (i) The investment in sustainability and multiple values be noted
 - (ii) *Deleted*
 - (iii) The anticipated reduction in costs in the longer term be noted
 - (c) That the Strategic Open Space component of the Strategy be pursued separately
 - (d) That the opportunity for contribution per lot for catchment-wide mitigation be investigated
 - (e) That Public response to the suite of projects identified in the strategy for each area be sought consistent with "Seeking Community Views"
 - (f) That the projects identified do not necessarily represent a commitment by the Council to proceed with the project
2. That the Waterways and Wetlands Asset Management Strategy conform with the approved city-wide planting strategy.

The Council also resolved that:

The Resource Management Committee be asked to investigate measures, such as rules for setbacks, under the Resource Management Act that would reduce or delay the need to purchase land.


Waterways & Wetlands

Project Area Leaders (PALS)


Asset Management Strategy




Ken Couling
5: Otukaikino




Derek Rid
8: Stock Water Races



Maruf Hossain
6: Avon Tributaries



Robert Watts
7: Central City
9: Halswell - Wigram




Tony Oliver
14: Cashmere Ponding Areas




Christine Heremaia
3&4: Lower & Upper Styx




Chris Rance
2: Marshland




Kim Morland
10: Estuary to Lagoon Green Corridor



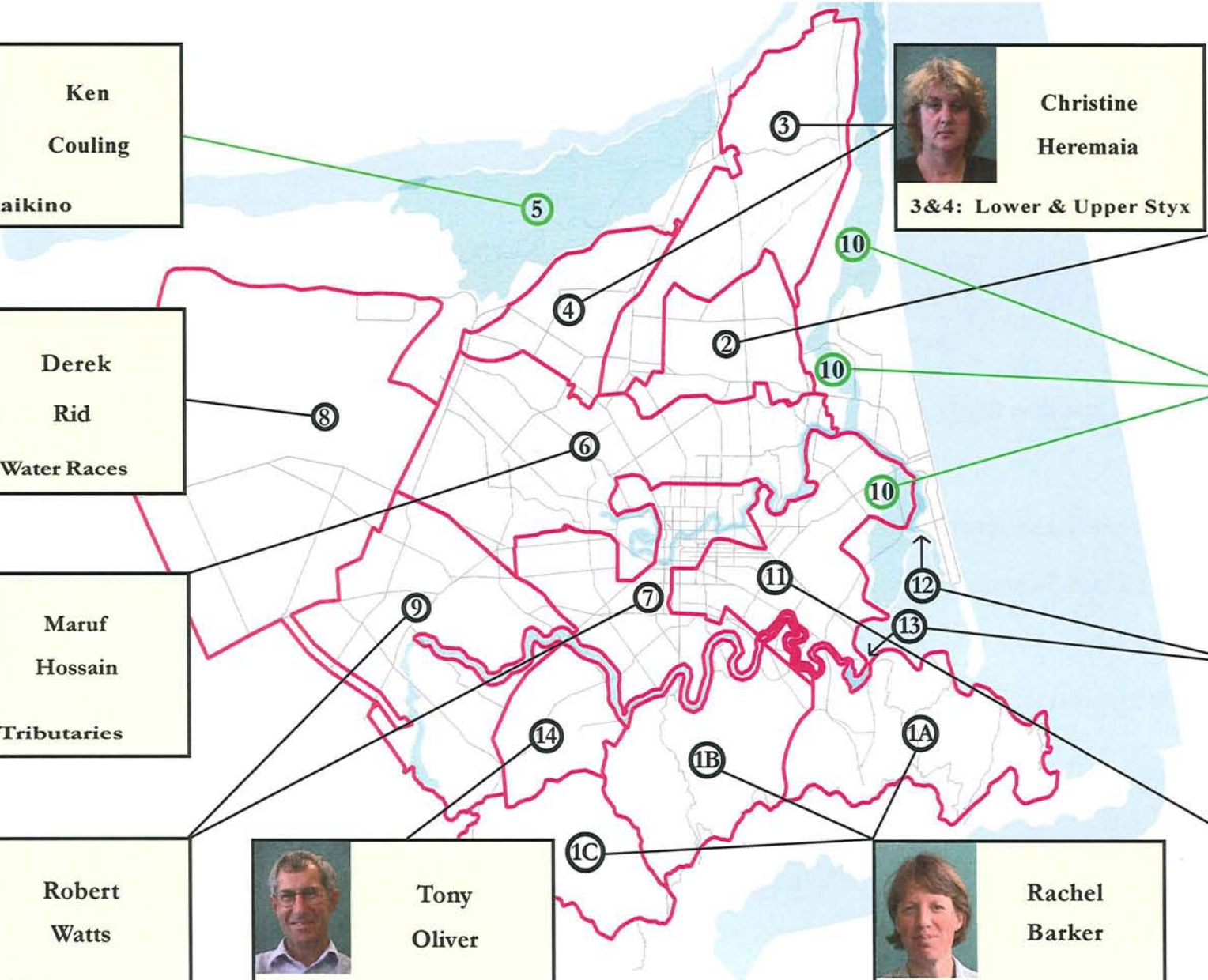
Paul Dickson
12: Avon River Corridor
13: Heathcote River Corridor



Rachel Barker
1A, 1B, 1C: Port Hills



Bob Hopkins
11: Linwood - Woolston



Waterways and Wetlands Asset Management Strategy

A 40-year vision to achieve sustainable management of the waterways and wetlands asset using a values based approach.

Principal values are Landscape, Ecology, Recreation, Culture, Heritage and Drainage.

The Role of PALS

- To implement the Asset Management Strategy within their project area.
- To develop a relationship with Key Partners, Community Boards, Committee members and local resident groups.
- To be familiar with the issues and available information on the values of the area.
- Be pro-active with Key Partners especially Parks and City Streets in achieving an integrated management approach.
- Develop the vision, strategy, issues and costs for the area with the Parks and Recreation Committee at seminars during 2000.
- Provide input to the City Plan and resource consent applications.

The bottom line is PALS oversee all activities related to the Waterways and Wetlands Asset Management Strategy within their project area.

	Project Area	PAL	Contact	Seminar Date
1	Port Hills	Rachel Barker	371-1264	-
2	Marshland	Chris Rance	371-1391	Wed 14 June
3/4	Lower & Upper Styx	Christine Heremaia	371-1270	Wed 30 August
5	Otukaikino	Ken Couling	371-1388	Wed 14 June
6	Avon Tributaries	Maruf Hossain	371-1396	Mon 24 July
7	Central City Neighbourhoods	Robert Watts	371-1393	-
8	Stock Water Races	Derek Rid	371-1398	Mon 24 July
9	Halswell/Wigram	Robert Watts	371-1393	Fri 5 May
10	Estuary-Lagoon G/Corridor	Kim Morland	371-1936	Mon 20 March
11	Linwood-Woolston	Bob Hopkins	371-1485	Mon 24 July
12	Avon River Corridor	Paul Dickson	371-1392	-
13	Heathcote River Corridor	Paul Dickson	371-1392	Mon 20 March
14	Cashmere Ponding Areas	Tony Oliver	371-1394	Fri 5 May

Each Parks and Recreation Committee seminar will run 12-2pm. There will be a summary session Fri 6 October, 2000.

AMS Manager: Robert Watts - 371 1393

AMS Co-ordinator: Eric Banks - 371 1285

WATERWAYS AND WETLANDS KEY STAKEHOLDERS

Successful integrated and sustainable management of Christchurch's waterways and wetlands depends on the involvement and support of stakeholders.

Stakeholders include:

- **Takata whenua** (as Treaty of Waitangi partners and to recognise the importance of, and provide for, the relationship of Maori, their culture and traditions with ancestral lands, waters, sites, wahi tapu and taoka)
- **Private property owners** (many waterways pass through private property)
- **Canterbury Regional Council** (as water quality and quantity managers under the Resource Management Act)
- **Ministry for the Environment** (as promoters of sustainable management as set out in the Resource Management Act)
- **Department of Conservation** (as advocates and advisers on environmental matters)

Auditor General's Criteria for Acceptability of Asset Management Plans

[from Assoc. Local Govt Engineers]

The Office of the Auditor General has established the following criteria for acceptability of AM plans for infrastructural assets.

A Basic AMP should:

(a) Define the service levels

A management plan should define the level of service or performance required of the asset, even if these are existing service levels.

Service levels are defined as 'defined service quality for an activity against which service performance may be measured.' Service levels can relate to:

- quality;
- quantity;
- reliability;
- responsiveness;
- environmental impact; and
- cost.

(b) Define the timeframe

Define the length of time the asset network will be able to deliver the required service, e.g. indefinite life (asset in perpetuity) or a defined lifecycle.

(c) Adequately describe the asset

- Physical identification - identifier numbers, location, description, construction material, year built (or estimate);
- Financial information - original cost (if known), replacement cost, estimate of residual useful life, depreciated replacement cost; and
- The AMP should include the ability to aggregate and disaggregate both physical and financial information.

(d) Include financial information

- The asset management plan must include financial forecasts, for at least the ensuing 10 years of expected network expenditure;

- The forecasts should be costed out in a way that clearly reflects the translation of physical aspects of the planned maintenance into financial terms;
- Estimated costs must:
 - be based on known and provable unit costs;
 - be logically and clearly compiled and available as evidence;
 - be updated annually;
 - be recorded in present day costs;
 - be easily assimilated into financial recording systems; and
 - provide a clear link to the 10 year forecasts as required by the long-term financial strategy.

(e) Include sufficient information to enable the decline in service potential of the asset to be recognised

- Service potential describes the output or service capacity of an asset and is determined by quantity and quality of output and estimates of useful life;
- Declines in service potential must be recognised as an expense in yearly Statements of Financial Performance;
- The AMP should show how declines in service potential of an asset will be measured;
- All categories of maintenance, renewals and capital (or various terminology such as restoration, rehabilitation, rehabilitative etc.) should be:
 - defined; and
 - stated as their effect on service potential.

(f) State assumptions and confidence levels

The Basic AMP should:

- List all assumptions and provisions under which the plan is prepared;
- Indicate the degree of confidence of the reliability of data underpinning the AMP:
 - e.g. - data on condition of assets;
 - data on performance of assets;
 - accuracy of asset inventory; and
 - demand / growth forecasts.
- Confirm the remaining useful lives of assets, and if significantly different from the 'Base Lives' as per Section 4.52 of the Infrastructure Asset Management Manual, provide a rationale for the difference.

- On the basis of the preceding assumptions and confidence of underlying data, provide a level of precision, or confidence, on the forecasts of renewal and maintenance expenditure for the asset network.

(g) Outline an improvement programme

All 'basic' AMPs should state what needs to be done to improve asset management processes and techniques.

Improvement programmes should outline:

- What are the weak areas;
- How will these be addressed;
- The timeframe over which the improvements will take place; and
- The resources (human and financial) needed.

(h) Be prepared by qualified persons

The asset management plan must be prepared by a suitably qualified person, for example an engineer specialising in the relevant activity. If the plans are prepared by persons not suitably qualified, the plans should be independently assessed by a qualified person.

Similarly, financial estimates should be prepared, is possible, by the person responsible for preparing or monitoring the plan.

This process should be peer reviewed, or prepared in conjunction with, a suitably qualified person or company.

(i) Be a firm commitment by the Council

The management plan must be approved and adopted by the governing body, Board or Council. This includes approval of the improvement element of the plan.

(j) Be regularly reviewed

It is expected that 'Basic' plans will be significantly revised in the light of the improvement programme. Therefore, in the first few years reviews are likely to result in revisions.

If the confidence factors in the 'Basic' plan are low, we would expect that this revision be done within 12 - 18 months of the initial plan. This will in turn result in obligations under the Local Government Amendment Act, where a long-term financial strategy should be immediately updated to reflect more certainty on costs or underlying data.

BY DR J MORGAN WILLIAMS PARLIAMENTARY COMMISSIONER FOR THE ENVIRONMENT

THE IMPORTANCE OF “FUTURING”

DEVELOPING VISIONS AND LONG-TERM STRATEGIES.

The advent of the new millennium has provoked and stimulated debate on some fundamental issues including the constitution of Government in New Zealand, the role of regional development, how we should fund retirement income and the role of planning in the development of New Zealand.

As part of the *Planning Quarterly* series of invited views on the future of planning, I want to focus on a critical component of the planning process – “futuring”, the act of developing visions and long-term strategies. It is my view that planning in New Zealand does not give sufficient attention to “futuring”, strategic planning and the development of visions at all levels.

WHAT DOES “FUTURING” INVOLVE?

A common fallacy is that “futuring” is about predicting the future. This is not so; it is not akin to predicting the winner of a horse race. “Futuring” is primarily about developing and reviewing scenarios or forecasts of a number of alternative futures based on a very diverse range of information. Envisioning what our future might hold – a preferred future – plays a very important part in making it happen. The science fiction of one generation can, and does, become the reality of the next. Film images and fictional writings provide inspiration for turning dreams into reality.

One of the greatest benefits of scenario development, as part of “futuring”, is that it encourages us to take the longer view – avoiding the “short-termism” that has plagued New Zealand for over a decade. Many aspects of our future communities are shaped by past and current social, technological and institutional developments. There is plenty of evidence that the “tools” we create at one point in history end

up shaping our whole lives and where we live in the future. Two obvious examples are the car and the silicon chip. Both have had, and will continue to have, a major effect on the geography of our cities and the way people interact in cities. The car has increased our mobility, thereby enabling us to socialise and transact business beyond the village boundary but the environmental costs have been enormous. The silicon chip provides a means of redressing the balance through enabling the convergence of information and communication technologies. Global positioning systems (GPS) and computer technologies are already capable of locating vehicles in time and space. This technology will ultimately shape the way we pay for the right to be mobile; it will change our values and beliefs about that right – the unknown is when!

Other components of “futuring” include surveying various sectors in society and business to determine views on preferred futures and using various modelling techniques to simulate future scenarios. Particular defining experiences of a generation (e.g. a war) have a major influence on how futures are shaped. Consider the generational differences emerging in the current debate about New Zealand’s future defence force’s equipment and armament needs!

THE DEVELOPMENT OF NATIONAL SCENARIOS

At the national level, the development of alternative scenarios for the future can stimulate dialogue about the kind of nation that we want, and the longer-term effects of today’s choices, consumption patterns and behaviour. This kind of “futuring” has recently been undertaken in Australia (see Boxes 1 and 2).

There has been limited attention given to such “futuring” in New Zealand compared with other nations. The Commission for the Future developed some scenarios in the early 1980s but there was no subsequent monitoring and updating – necessary components of the “futuring” process. Recently the Foresight process organised by the Ministry of Research, Science and

Technology was an effort to use “futuring” approaches to guide research investment.

NEW ZEALAND URBAN VISIONS

Like the development of national scenarios, the development of urban visions and scenarios that recognise and address sustainable development has been limited in New Zealand (PCE 1998). One of the few community examples was the development of Wellington’s “Our City Our Future” community strategy and vision. More urban visioning appears to be restricted by:

- our limited capability to develop well-crafted scenarios of plausible futures;
- virtually no capacity to develop sustainability models that can incorporate social, economic and cultural (institutional decision-making) elements; and
- limited recognition that such a lack of capability is a major strategic weakness for New Zealand.

The general lack of forward planning, despite recent amendments to the Local Government Act 1974 (LGA), and not having a clear vision for the future is a major risk for New Zealand cities. Mechanisms for planning are currently available through the LGA and Resource Management Act 1991 (RMA), but there is a need to develop a much wider spectrum of policy instruments for developing visions, and the strategies and approaches needed to achieve them.

In the peri-urban context, the future of the Waitakere Ranges has recently been brought to my attention. There are a large number of organisations, groups and people that have an interest in the resources of the Ranges. Their separate needs, aspirations and concerns results in considerable debate as to how best to manage the resources. Without some overarching strategic vision beyond what is required under the RMA, there is a danger of the parties getting locked into arguments over resource allocation, use and protection processes. Meanwhile the quality of the environment, and of ecosystem services it delivers, diminishes. In this example all parties need to lift their sights, to focus on the qualities they want in their Ranges’ environment in the future. This requires a visioning process.

In areas like the Waitakere Ranges a visioning process would need to:

- recognise that people and communities are an integral part of the environment;

- recognise that the environment includes natural, historic and cultural heritage;
- be supported with clearly stated goals;
- be supported by a wide array of mechanisms for implementation (including economic instruments, community funded education programmes as well as RMA rules and regulations).

The product of such a process will not be a detailed prescription but a shared view of how the environment of the area might evolve during the lifetime of this and future generations. The resultant vision will need to be regularly reassessed as people's needs and aspirations change and new information on ecological systems becomes known. The task of developing the vision will require genuine and extensive consultation. Time is required for mutual learning and understanding. An open-hearted willingness to put aside some issues from the past, support research and to share information is essential.

COMPUTER MODELLING

The use of computer models and simulations will be an important part of the "futuring" debate in New Zealand. Computer models can:

- help users set up "what if" scenarios and display the results;
- help the user to compare different scenarios for spatial areas;
- show all the model logic and assumptions and input data to users; and
- display a wide range of factors through visual dimensions.

Computer programmes that can convert planning controls into multimedia, interactive displays are available now. These programmes allow users to visualise the results of different sets of land use controls, for example, what would happen if the community chose large setbacks, wide streets, and no trees. These capabilities present data in ways that allow people to really appreciate what plans, and various changes to them would look like on the ground. "Seeing" what the future might look like is for many people an essential part of understanding options. Many of us are "picture" people hence the power of television and film. Interactive imaging of futures' scenarios will be an increasingly important strategic tool of tomorrow.

IN CONCLUSION

The modern world is characterised by increasing change and uncertainty. Developing visions of preferred futures enables

CSIRO RESOURCE FUTURES PROGRAMME, AUSTRALIA

The CSIRO Resource Futures Programme develops and tests future options for the use and management of Australia's environmental resource sectors at regional and continental scales, and for medium and long term timeframes (CSIRO 1999). The Programme is examining key policy issues including greenhouse effects, land degradation, biodiversity, population and lifestyle/ affluence issues, technology impacts and ecosystem toxification.

The research will help identify the consequences of alternative scenarios for

Australia, what these mean for its natural resources, and identify options and strategies capable of realising national objectives for natural resources, the environment and society. These issues are addressed using an experienced trans-disciplinary team of researchers with backgrounds in geography, ecology, economics, geology, and geographic information systems. Within the Programme, the Resource Accounting and Economic Instruments Project addresses issues concerned with patterns of economic activity, environmental quality and resource productivity.

FUTURE MAKERS, FUTURE TAKERS, AUSTRALIA

In March 1999 Dr Doug Cocks, a member of the CSIRO Resource Futures team, released the findings of a research project that explored three alternative development routes for Australia for the future. The purpose of the project was to stimulate debate about present day choices and assist future policy development looking out to the year 2050 (Cocks 1999).

The project explored how three hypothetical political strategies and three alternative development routes could give different outcomes for Australia's future. The project examined whether Australia:

- should be going down an economic prosperity path using a strategy of self-regulated markets and small government? or,
- should be following a conservative

development path of active intervention by a strong central government? or;

- should be following a post-materialism path, putting a cap on development and the economy, and building political and business structures which are based on stakeholder participation and collaboration.

The three scenarios were an attempt to avoid the "short-termism" that often emerges when examining pathways for a nation's future. In particular, there was a need to consider the consequences of continuing Australia's relatively rapid population growth. Likewise, were the Australian Government's decisions going to have the effect of ensuring sustainability and profitability in industries such as mining, forestry, and agriculture in fifty years time?

communities and New Zealand as a whole to respond to this turbulence in ways that minimise economic, social and environmental harm. If New Zealand planners want to have a useful role in this process they need to put much more effort into developing scenarios for the future. These scenarios are needed to overcome short-term decision-making or lack of integration. Other countries are showing the way and New Zealand can also make progress in this area.

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