

Christchurch City Council

SEAFIELD PARK Management Plan 2010 DRAFT



[Other changes to this draft management plan arising from determinations of the Hearings Panel and which will be incorporated in the final plan but are not shown in this track-changed version are:

- The Māori names for “Brooklands Lagoon”, “Brooklands Spit” and “Styx River” are attached to result in a dual name in all incidences – that is, “Brooklands Lagoon/Te Riu o Te Aika Kawa”, “Brooklands Spit/Kairakei” and “Styx River/Puharakekenui”. Reference to the status of these place names is made at the beginning of the final plan.
- Pages numbers and references will be correct in the final plan document.
- All references to “draft” will be removed from the published document, along with any resource information text that relates to a draft document and not the final version.
- Except for initial and special occurrences, “Council” replaces “Christchurch City Council” in the final plan.
- Illustrations will be added to the final document.]

Acknowledgments

This draft plan is a new one, expanded on work undertaken by the Parks Unit in 1995. It has been prepared by the Christchurch City Council's Network Planning Team – Greenspace for the Council's Transport and Greenspace Unit, whose Regional Park's staff manage the Park for the City.

The principal in this plan's current development has been Parks and Waterways Planner Derek Roozen, who wishes to acknowledge the invaluable assistance of other staff. This includes Kay Holder (Regional Parks Team Manager), Rodney Chambers (Coastal Parks Area Head Ranger), Steve Leiataua (Spencer Park Ranger), Trevor Partridge (Botanist) and Andrew Crossland (Port Hills Ranger/Ornithologist).

Foreword

This draft management plan is a working document that sets out the Christchurch City Council's management objectives and policies for Seafield Park. It provides a framework within which management is carried out for this Park, and will be subject, once adopted as the operative plan, to review within ten years.

Seafield Park extends between the townships of Brooklands and Spencerville and alongside the western edge of Brooklands Lagoon¹. The aim for this draft management plan is for it to provide background information and give the reader an understanding of the issues and the proposed policies for the management of this Park.

Following public notification, receipt of submissions and hearing of submitters the Brooklands Lagoon Area Draft Parks Master and Management Plans Hearings Panel determined amendments to the draft plan and recommended the Council approve the draft plan as the operative Seafield Park Management Plan.

The draft plan is divided into two parts:

Part I: The Resource Section provides information on the Park and its values, and equips the reader with an understanding of the Park, its uses and the management issues relating to this resource.

Part II: The Policy Section presents objectives and management policies.

This draft plan is closely linked with the Draft Spencer Park Management Plan 2009, with which it 'shares' management direction of Seafield Park, and the Draft Brooklands Lagoon Area Parks Master Plan 2009, which addresses the long term planning direction for all the parks and public open space in the Brooklands Lagoon area.

As with the other draft plans, the Draft Seafield Park Management Plan 2009 sits within a comprehensive framework of regional and local strategies, plans and regulatory documents (see Part C of the Draft Brooklands Lagoon/Te Riu o Te Aika Kawa Area Parks Master Plan 2009 for a list of these).

¹ The part of the existing area of Seafield Park that is covered by the Draft Seafield Park Management Plan 2009 is that extending north of the Maori Reserve (Puharakekenui) to Harbour Road, with the majority of this area classified scenic reserve. It is proposed that the southern part of Seafield Park (that is, the part between the Maori Reserve and Heyders Road), which is all classified recreation reserve, is addressed in the Draft Spencer Park Management Plan 2009. Even though the southern part of the existing area of Seafield Park, and Brooklands Lagoon, are described and assessed in other draft plans (including the Draft Brooklands Lagoon Area Parks Master Plan 2009), they are still referred to in the Draft Seafield Park Management Plan 2009, where necessary, due to the strong inter-relationship between all these areas.

TABLE OF CONTENTS

1	OVERVIEW	1
	1.1 Location and Access.....	6
	1.2 Park Map	7
	1.3 Vision	8
2	GOALS, OBJECTIVES AND POLICIES	8
	2.1 Management Goals	8
	2.2 Primary Management Objectives	9
	2.3 ADMINISTRATION	9
	2.4 ACCESS AND RECREATION.....	10
	2.5 SOILS/LANDFORM	11
	2.6 VEGETATION.....	11
	2.7 WILDLIFE	12
	2.8 PROMOTION AND EDUCATION.....	13
	2.9 CULTURAL AND HERITAGE.....	13
3	ISSUES	14
	3.1 Administration.....	14
	3.2 Access and Recreation.....	15
	3.3 Vegetation.....	16
	3.4 Wildlife	17
	3.5 Promotion and Education	17
	3.6 Cultural and Heritage.....	18
	<u>3.6.1 Ngāi Tahu associations and values</u>	18
4	DEVELOPMENT PLAN	19
	4.1 Long-Term Council Community Plan (LTCCP) disclaimer.....	21
5	RESOURCE INFORMATION.....	21
	5.1 Purpose of the Park.....	21
	5.1.1 Background to Seafield Park area land tenure and status	22
	5.1.2 Land tenure	23
	5.1.3 Classification	24
	5.1.4 Legal status.....	25
	Table 1: North and Mid-Seafield Park reserve parcels.....	26
	Table 2: Other land.....	27
	5.1.5 Christchurch City Plan zones.....	28

5.2	Physical Description	30
5.2.1	Topography	32
5.2.2	Climate	32
5.2.3	Geology and Soils	33
5.3	Vegetation.....	34
5.3.1	Opportunities for the establishment of native vegetation.....	35
5.3.2	Erosion	39
5.4	Wildlife	40
5.4.1	Birdlife	40
	Table 3: Wetland/coastal bird species that use Brooklands Lagoon and its environs .	41
5.5	History.....	42
5.5.1	Before European settlement.....	42
5.5.2	After European arrival	43
	Table 4: History of the status of North and Mid-Seafield Park land parcels.....	44
5.6	Present and Proposed Use	46
5.6.1	Recreation.....	46
5.6.2	Outdoor Education	47
5.7	Access and Walkways.....	47
5.7.1	Access to Seafield Park	47
5.7.2	Brooklands Lagoon Walkway.....	49
5.8	Facilities and Services	49
5.8.1	Tracks	50
5.8.2	Bird observation facilities	50
6	POLICY FRAMEWORK	50
6.1	Relevant other plans, strategies and documents	51
6.2	Purpose of this plan	52
7	APPENDICES	52
7.1	Further reading	52

1 OVERVIEW

Seafield Park lies alongside the western edge of Brooklands Lagoon, which is a tidal estuary². It extends south of the mouth of the Waimakariri River, which is fourteen kilometres north-east of Christchurch. The estuary is aligned north-south, with an outlet to the sea at its northern end via the Waimakariri River. The Styx River enters the estuary from the west near the northern end of the estuary.

Long and narrow in shape, the current total area of Seafield Park is seventy hectares. The Park extends for three and a half kilometres between the Brooklands settlement to the north and Spencerville in the south. Between these two settlements, open rural land defines Seafield Park's western boundary.

Being on the edge of Brooklands Lagoon, much of Seafield Park has been formed by the natural forces of sea and wind, to produce a rugged and dynamic landscape of dunes and marshes. Since its purchase by the former Waimairi County Council for reserve purposes in 1981, this extensive, though fragmented, park has been retained in an undeveloped state, subjected to the effects of the estuary waters, the coastal climate, and the impacts of grazing and a limited number of recreational users.

Seafield Park offers an exciting opportunity for a park area that complements the ecologically significant Brooklands Lagoon and provides special recreational experiences. It is an extensive area of park that is of value to both wildlife and the people of, and visitors to, Christchurch.

Coastal Marine Area

Significant parts of three of the Seafield Park land parcels lie below the Mean High Water Springs mark and are therefore within the Coastal Marine Area. With the enactment of the Foreshore and Seabed Act 2004, these parts have been vested in the Crown and are now under the administration of the Department of Conservation, while the control of activities on the estuary water surface rests with Environment Canterbury. These areas are not directly covered by the Draft Seafield Park Management Plan 2009, but are addressed in the Draft Brooklands Lagoon Area Parks Master Plan 2009.

Brooklands Lagoon

As Seafield Park and Brooklands Lagoon are so closely linked, it is not possible to describe, discuss and manage one without giving consideration to management of the other. Discussion of, and recommendations for management of Brooklands Lagoon are, however, covered only in the draft Brooklands Lagoon Area Parks Master Plan 2009.

² For explanation of the nature of Brooklands Lagoon, refer to the Draft Brooklands Lagoon Area Parks Master Plan 2009.

As it occurs within the Coastal Marine Area, Brooklands Lagoon is administered by the Canterbury Regional Council and the Department of Conservation. Rules covering its management are contained within the Canterbury Regional Council's Regional Coastal Environment Plan, which identifies the Waimakariri River Mouth and Brooklands Lagoon as an area of 'Significant Conservation Value'.

Brooklands Lagoon has been described as being of national importance for its biological values (SSWI (1971)³, WERI (1980)⁴), especially for its bird habitats and salt marsh/salt meadow vegetation. It has also been identified in the Christchurch City Plan as an Ecological Heritage Site, in recognition of its high botanical values. Brooklands Lagoon and the Styx River mouth rate as an 'A' site (Site 5.01) (Meurk et. al. (1993)), and have been given the following scores for the five different criteria (with 5 being the best possible score):

Biodiversity (number of indigenous species)	4
Representativeness (of the original soil/vegetation)	4
Unusualness (the no. of rare or uncommon species)	5
Naturalness (the % cover of indigenous species)	5
Area	5

Note that although these descriptions were applied to the entire vegetation, much of which occurs below Mean High Water Springs, the Ecological Heritage Site comprises only areas above, and thereby would score lower.

Tangata whenua

In the area covered by the Draft Seafield Park Management Plan 2009, the tangata whenua ('people of the land') are Ngāi Tahu. The iwi of Ngāi Tahu comprises whanau who descend from both the northern ancestor, Tahu and the peoples who were here before the Ngāi Tahu southern migration - Ngāti Mamoe and before them Waitaha.

Te Rūnanga o Ngai Tahu (TRONT) was established by the Te Rūnanga o Ngāi Tahu Act 1996 as the legal identity of Ngāi Tahu to represent the tribal collective of Ngāi Tahu Whānui. Te Rūnanga o Ngāi Tahu is made up of eighteen Papatipu Rūnanga, who represent the whanau and hapū interests of particular areas. For matters of local significance and local resource management issues, TRONT require engagement with the local Papatipu Rūnanga.

Te Ngāi Tūāhuriri Rūnanga is the Papatipu Rūnanga for the area of Spencer Park/Seafield Park. In addition, the whanau of Kāti Urihia hapū of the Rūnanga

³ The SSWI database (Sites of Special Wildlife Interest) is a comprehensive listing of important wildlife habitat based on a nationwide survey by the former New Zealand Wildlife Service's Fauna Survey Unit between 1977 and 1985.

⁴ The WERI database (Wetlands of Ecological and Regional Interest) is an inventory of types of wetlands in New Zealand, and was first developed in the late 1980's, based on information collected during Wildlife Service surveys carried out over the 1970s and 1980s.

have some specific interests, including property rights in the nearby Puharakekenui Māori Reserve.

Seafield Park has remained in a relatively undeveloped state since its management was taken over from the Waimairi County Council by the Waimairi District Council in 1982. In 1989, with local authority amalgamation, management of the Park passed to the new Christchurch City Council.

Key management issues for Seafield Park are (for more detail see Section 3):

1. Separation of the existing Seafield Park area

Seafield Park is currently made up of six separate parts spread out over a three and a half kilometre length of land on the western side of Brooklands Lagoon, each part separated by private land, ~~Crown land~~ or legal road. In particular, there is a significant separation between the southern-most part, adjoining Heyders Road, and the rest to the north. This southern-most part is more linked with the recreation-focused, and facility-provisioned, area centred on the adjacent Spencer Park, than with the less developed and ecologically-focused part of Seafield Park. Consequently, all of that southern-most part of Seafield Park is now classified recreation reserve under the Reserves Act (most had been classified by resolution of the Waimairi District Council in 1989 and the remainder by resolution of the Christchurch City Council in June 2008). Most of the remainder of Seafield Park was classified as scenic reserve under the Reserves Act by the Christchurch City Council in June 2008 to reflect the primary purpose and use of the area for the protection of its natural and scenic values.

The close relationship between the southern-most part of Seafield Park and Spencer Park has resulted in the management of that part being addressed in the Draft Spencer Park Management Plan 2009. A portion is already covered by the Spencer Park Management Plan 1982. Also, to achieve better clarity of management and promotion of the Parks, it is proposed to consider renaming the southern-most part of Seafield Park as part of Spencer Park. This is raised in the Draft Brooklands Lagoon Area Parks Master Plan 2009.

2. Tenure of the Brooklands Lagoon margin

Seafield Park is located along the western boundary of the ecologically significant Brooklands Lagoon and provides an important buffer between the estuary and adjoining rural and residentially zoned land. However, the entire western estuary margin is not contained in the Park. Part is now vested with the Crown ~~Land-and~~ administered by the Department of Conservation, as is the bed of the estuary. The Canterbury Regional Council is responsible for activities on the water in the Coastal Marine Area, which includes the estuary. The Park here is now classified mostly as scenic reserve (subject to the Reserves Act 1977), and can be managed for the purposes covered by this classification (Section 19(1)(a)). As the ecology and landscape of the Park and the estuary, and its margins, function as a unit, irrespective of legal boundaries, all its areas need to be managed in an integrated way, with common objectives for environmental

protection. It is intended that the Draft Brooklands Lagoon Area Parks Master Plan 2009 will lead facilitation with the government agencies involved.

3. Access/Car parking

Access and car parking within Seafield Park needs further development that is appropriate for the reserve classification of the Park. Sites are identified where access and car parking are, and can be, provided.

4. Recreation

Recreational use of Seafield Park is currently limited, although there is much abuse of it through inappropriate use. Motorised recreational vehicles will not be permitted in the Park.

Walking links throughout, and beyond, Seafield Park are strongly promoted.

5. Vegetation

Seafield Park has areas of vegetation of botanical value dominated by native plants, and other areas that contain only exotic vegetation. The areas of greatest value are associated with the salt marsh of Brooklands Lagoon, but there are some areas of dune slack vegetation in places. The sand dunes, however, carry very few native plants and have low intrinsic botanical value.

To increase the ecological values of Seafield Park, wetlands and associated bird roosting sites are being created in low-lying areas at Beacon St in association with The Lagoons residential subdivision. Also, planting is proposed in places in the Park. To be compatible with the ecological value of Brooklands Lagoon, only indigenous plant material is to be used (not including the Spencerville (southern-most) end of the existing Park area).

6. Wildlife

The Seafield Park landscape and habitat merges, towards the east, with the Brooklands Lagoon estuarine habitat. Although, technically, the eastern boundary of the Park is the Mean High Water Springs (MHWS) mark, representing the edge of the Coastal Marine Area, there is not always a clearly defined change on the ground between the Park and the estuary. Although there is, in many parts, a distinct change in landform – for example, from old sand dune topography to estuarine wetland – the whole (the Park, the estuary, Brooklands Spit, and more) provides an integrated environment for wildlife in the area, and particularly for birdlife. Although the estuary is the predominant location for birdlife, the adjacent areas, including Seafield Park, provide value, in terms of shelter, are sites for visitors to view birds, and are also where bird habitat can be expanded through the development of new estuarine wetlands, such as the Dartford/Beacon Street area.

It is important, though, to develop and manage Seafield Park so that public access is provided, but in a manner that does not impact on the wildlife and its

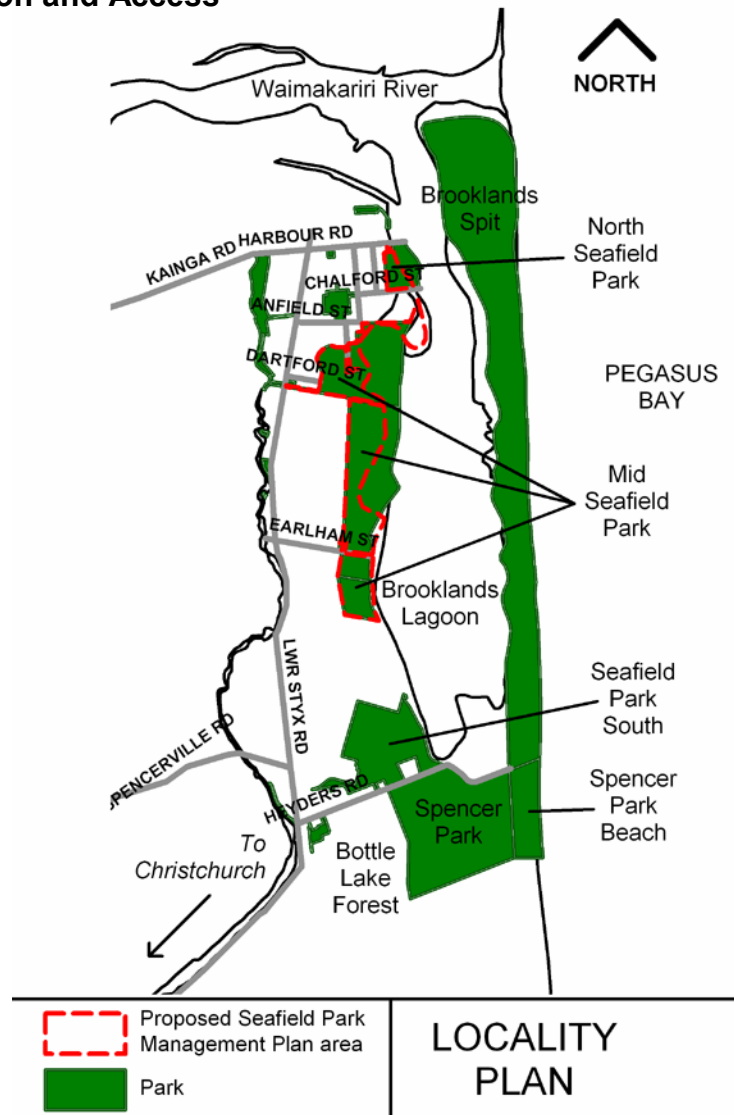
habitat. For example, inappropriate and damaging vehicles need to be prevented from accessing the Park and the estuary, and that message needs to be promoted through information, education and enforcement.

7. Culture/Heritage~~Cultural/Heritage~~ Values

There is a need to strike a balance between promoting the values of Seafield Park, along with facilitating public access to the Park for recreational and educational reasons, and ensuring the protection of sites of historic and cultural importance. Also, on the one hand, there is a lack of common public knowledge about such sites and values; on the other hand, it is necessary to ensure these sites and values are not impacted upon by public access, and that the wishes of those with a stake and interest in the sites and values are acknowledged and respected.

Furthermore, the values and sites of historical and cultural importance are not exclusive to Seafield Park, but extend over a range of environments and land tenure in the wider area centred on Brooklands Lagoon. Therefore, planning for the historical and cultural values and sites also needs to be undertaken in this wider context. For information pertaining to this, see the Draft Brooklands Lagoon Area Parks Master Plan 2009 ~~and, in particular, the Tangata Whenua section of that plan.~~

1.1 Location and Access



Seafield Park is a coastal scenic and natural area situated in the southern part of Pegasus Bay, approximately fourteen and a half kilometres north-east by road from Christchurch. It lies alongside the western edge of Brooklands Lagoon, which is a tidal estuary extending south from the mouth of the Waimakariri River.

The existing extent of Seafield Park is between Harbour Road in the north and Heyders Road in the south, a distance of approximately three and a half kilometres. The Park is split by legal road and private land along this extent, with there being three distinct blocks – North and Mid Seafield Parks, and South Seafield Park. South Seafield Park is covered in the Draft Spencer Park Management Plan 2009, and North and Mid Seafield Parks, extending north-south for a distance of approximately two and a quarter kilometres to a width averaging 300 metres, are covered by this draft management plan.

1.2 Park Map



1.3 Vision

A restored protected ecological area that serves as a terrestrial platform for the public to access in order to experience and enjoy the scenic, landscape and ecological values of the Brooklands Lagoon estuary and its margins, and also protects the underlying sand dune topography and acts as a protective buffer between the estuary and residential developments to the west.

2 GOALS, OBJECTIVES AND POLICIES

2.1 Management Goals

Section 3 of the Reserves Act 1977 refers to goals that are relevant to reserve management.

These goals are interpreted for the purposes of management of the northern and middle reaches of Seafield Park to include:

- Preserving and managing, for the benefit and enjoyment of the public, areas of New Zealand possessing recreational, wildlife, indigenous flora and fauna, geological, landscape amenity, cultural, scientific, educational and community values.
- Ensuring the survival, in their natural communities and habitats in reserves, of all indigenous species of flora and fauna, both those that are rare and those that are common place.
- Ensuring the preservation of representative samples of all classes of natural ecosystems and landscape, which, in aggregate, originally gave New Zealand its own recognizable character.
- Ensuring the preservation of access for the public to the coastal area.
- Ensuring the preservation of the natural character of the coastal environment.

2.2 Primary Management Objectives

In the context of the management goals outlined above, and evaluation of the resource, the following objective applies for the management of Seafield Park:

- To protect and enhance the scenic, ~~and~~-ecological and cultural values of Seafield Park to compliment Brooklands Lagoon's environmental values.
- To provide public access for recreation and enjoyment compatible with the protection of Seafield Park and Brooklands Lagoon's environmental and open space qualities.

2.3 ADMINISTRATION

POLICIES: **1** The part of Seafield Park that lies between Puharakekenui (Maori reserve), Heyders Road, Spencerville settlement and the southern end of Brooklands Lagoon shall be included in Spencer Park and managed according to the operative Spencer Park Management Plan.

Note: All further policy in this draft management plan refers to a Seafield Park area that excludes the area referred to in Policy (1). This area is forthwith covered in the Draft Spencer Park Management Plan 2009.

- 2** The unformed legal roads that extend into and through the Seafield Park area shall be stopped and incorporated into the Park.
- 3** The western boundary of Seafield Park, where it is not formally defined on a cadastral plan, shall be surveyed, following closure of the legal roads referred to in Policy 2 and their addition to the Park as scenic reserve.
- 4** Seafield Park shall be under the day to day management of the Spencer Park Ranger.
- 5** Should any land adjacent to Seafield Park be acquired by the Council for public open space purposes, this land shall be added to Seafield Park and classified Scenic Reserve under Section 19(1)(a) of the Reserves Act 1977.

2.4 ACCESS AND RECREATION

- POLICIES:**
- 6** Seafield Park shall be accessible to the public for outdoor recreation that has minimal impact on the sensitive estuarine and saltmarsh environment and causes minimal disturbance to the birdlife in Seafield Park and on Brooklands Lagoon.
 - 7** A number of Park entrances shall be maintained, and developed as necessary and appropriate, along the extent of Seafield Park to provide non-vehicular public access.
 - 8** All public entrances into Seafield Park shall be defined with appropriate signage.
 - 9** All tracks in Seafield Park shall be maintained to a suitable standard, and be appropriately marked and interpreted.
 - 10** All access points and tracks into Seafield Park shall be sited and managed so as to minimise erosion, damage to vegetation and disturbance to wildlife.
 - 11** All private entrances into Seafield Park shall be closed or used for permitted access only.
 - 12** Horses shall be permitted to be ridden in Seafield Park on designated horse tracks only.
 - 13** Mountain bikes shall be permitted to be ridden in Seafield Park on designated multi-use (walking and mountain bike) tracks only.

Note: The draft landscape concept in the Draft Brooklands Lagoon Area Master Plan 2009 shows a possible alignment of tracks in Seafield Park.
 - 14** Multi-use tracks in Seafield Park shall be located, designed, developed and maintained to be appropriate for the uses indicated in Policy 13.
 - 15** Consideration by users of multi-use tracks for other users of these tracks shall be encouraged and promoted through information and signage.
 - 16** Picnic tables shall be maintained in appropriate positions throughout Seafield Park.

- 17 All motorised vehicles, other than those authorised by the Council and necessary for management purposes, shall be banned from Seafield Park.
- 18 All formal accessways into Seafield Park shall be controlled to prevent access by motorised recreational vehicles.
- 19 Fencing of the Seafield Park boundaries shall be provided where it is appropriate and necessary to exclude four wheel drive vehicles, and not restrict access by horse riders and walkers to the Park.
- 20 The practice of launching boats and jet skis into Brooklands Lagoon from Seafield Park shall be prohibited.
- 21 The dumping of any material in Seafield Park shall be prohibited.
- 22 Electric fencing shall not be used to control stock in Seafield Park.

2.5 SOILS/LANDFORM

- POLICIES:** 23 The dune slacks shall be retained in their appropriate saline groundwater state.

2.6 VEGETATION

- POLICIES:** 24 Only locally appropriate native plant species shall be planted in Seafield Park.
- 24 The Seafield Park vegetation shall reflect the salinity gradient that exists along the length of Brooklands Lagoon.
- 25 The Seafield Park vegetation shall provide a buffer between the salt marsh vegetation in the estuary and the adjoining agricultural and residential zones.
- 26 All planting in Seafield Park shall reflect the species normally found in equivalent native plant-dominated habitats.
- 27 Gorse, broom and elder shall be managed to prevent further infestation by these species and shall be progressively replaced with native plant species.

- 28 Boxthorn shall be removed from the sand dunes.
- 29 Radiata pine and poplar trees shall be managed to restrict the spread of these invasive species.
- 30 Coastal ribbonwood (*Plagianthus divaricatus*) shall be planted around the margins of the dune slack and salt marsh.
- 31 Native coastal forest and shrubland shall be progressively established on existing pasture areas to enhance environmental and recreational values.

Note: The draft landscape concept in the Draft Brooklands Lagoon Area Parks Master Plan 2009 shows a potential future pattern of coastal forest and shrubland in Seafield Park.

- 32 The most fertile sites shall be selected for the establishment of nuclei of native forest plants throughout Seafield Park.
- 33 Rabbit proof fencing shall be used where rabbits and hares are likely to be a problem in the establishment of vegetation.
- 34 Planting of the Brooklands Lagoon margin shall comprise upper marsh and salt marsh edge species typical of such situations in Canterbury.
- 35 Grazing shall be used as a management tool, to be integrated with planted areas, in order to control the growth and spread of grass and weed species.

2.7 WILDLIFE

- POLICIES:**
- 36 Foot access shall be provided to sites for the viewing of birdlife in both Seafield Park and in the adjacent Brooklands Lagoon.
 - 37 A bird observation hide shall be constructed in the vicinity of Barkers Brook.

2.8 PROMOTION AND EDUCATION

- POLICIES:**
- 38** The value of Seafield Park for education about the ecology and wildlife of the Park and Brooklands Lagoon shall be recognised and promoted through tracks, signs, information boards, lookouts and involvement of community groups.
- 39** All walkway linkages within, and beyond Seafield Park, when they are fully developed, shall be promoted to the people of Christchurch and its visitors.

2.9 CULTURAL AND HERITAGE

- POLICIES:**
- 40** All sites of cultural and/or historical significance shall be allowed to be identified, recorded, researched, protected, and promoted and interpreted as appropriate and according to specialist advice, and in consultation with Te Ngāi Tūāhuriri Rūnanga and Te Hapū o Kāti Urihia Ahu Whenua Trust with respect to sites of importance to tangata whenua.
- 41** Recognise the manawhenua status of Te Ngāi Tūāhuriri in the management of Seafield Park, and protect and restore values significant to tangata whenua.
- 42** Consult with Te Ngāi Tūāhuriri Rūnanga and Te Hapū o Kāti Urihia Ahu Whenua Trust about appropriate ways of recognising their manawhenua and cultural values in all park management activities, including through indigenous and mahinga kai plantings, built amenities, interpretation and use of appropriate Māori names.
- 43** Adopt an Accidental Discovery Protocol (ADP), whereby, if any archaeological or cultural material or koiwi (human remains) is found during work programmes on the Park, work should be stopped and Te Ngāi Tūāhuriri Rūnanga, Te Hapū o Kāti Urihia Ahu Whenua Trust and the New Zealand Historic Places Trust contacted immediately for advice.

3 ISSUES

The goals, objectives and policies in Section 2 address how specific values in Seafield Park shall be protected and/or enhanced, and how identified issues shall be dealt with, through good and appropriate management of the Park.

These values and issues are categorised in sub-sections below that relate generally to the sub-sections of Section 2.

3.1 Administration

The part of Seafield Park nearest Heyders Road (that is, that lying between Puharakekenui (Maori reserve), Heyders Road, Spencerville settlement and the southern end of Brooklands Lagoon) is currently managed under the Spencer Park Management Plan 1982. Reasons for this area being formally included as part of Spencer Park are:

- As a level of public recreational facilities are provided in the area that is more consistent with a recreation reserve classification, the land parcels here have been classified recreation reserve under the Reserves Act 1977, as is all of Spencer Park, whereas the rest of Seafield Park is classified scenic reserve.
- It is separated from the rest of Seafield Park to the north by private land (Puharakekenui).
- It is physically, and by location, part of the Spencer Park outdoor recreational area centred on the arrival point on Heyders Road.
- For more clarity for promotion, identity, signage and interpretation, and less confusion, at the Spencer Park arrival point on Heyders Road.
- Botanical and wildlife values are very limited, being virtually confined to the estuary margin.
- The special identity, values and needs of the area can be promoted and managed for in the Draft Spencer Park Management Plan 2009, which is linked to the Draft Seafield Park Management Plan 2009 through the Draft Brooklands Lagoon Area Parks Master Plan 2009.

With the enactment of the Foreshore and Seabed Act 2004, parts of Seafield Park below Mean High Water Springs (MHWS) have been vested in the Crown. These parts are within the Coastal Marine Area.

Unformed extensions of Chalford and Earlham Streets bisect Seafield Park, and unformed legal road extends along the western boundary of the Park. With enactment of the Foreshore and Seabed Act 2004, sections of these lengths of legal road are vested in the Crown, and two sections have areas of accretion

added pursuant to Section 315(4) of the Local Government Act 1974 - *Every accretion to any road along the bank of a river or stream or along the mean high-water mark of the sea or along the margin of any lake caused by the action of the river or stream or of the sea or lake shall form part of the road.* The intention is to have the unformed legal roads that extend into, and through the Seafield Park area, stopped and incorporated into the Park.

3.2 Access and Recreation

The predominant public access and recreational activity in Seafield Park is intended to be confined to officially defined tracks.

The primary uses of multi-use tracks established in Seafield Park is expected to be for walking, running and mountain biking. Such combined use is considered appropriate for the Park, in that it reduces the number, and therefore impact, of tracks on the environment and wildlife present. In addition, the mostly open landscape nature of the Park lends itself to warn track users of approaching other track users. Good track siting, design and upkeep will assist in ensuring compatibility between users.

Consideration by users of multi-use tracks for other users of these tracks is encouraged and promoted through information and signage. This is based on the principle of relying on users to be considerate of other users of multi-use tracks and ensuring this can work through good promotion and provision of information.

There are a number of private entrances into the Park from private property and it is important that these accessways do not provide access for motorised recreational vehicles without authorisation.

The sensitive wetland areas of Seafield Park, and parts of Brooklands Lagoon, have been severely damaged in the past by recreational vehicles, and this unfortunately is continuing to the present day. The banning of motorised recreational vehicles, in particular, and the control of other vehicle access, will promote the recovery of vegetation.

The practice of launching boats and jet skis into Brooklands Lagoon from Seafield Park is very damaging to the edge of the estuary and needs to be discontinued. Also, boats and jet skis in the estuary disturb birdlife with the noise generated and from the wake created, and need to be controlled.

The dumping of large quantities of unwanted material, such as car parts, in Seafield Park and the adjacent Brooklands Lagoon area, with accompanying environmental damage caused by vehicles, continues to the present day. The Council will seek to take steps to stop this happening, take appropriate action whenever and wherever this occurs, and work with the other agencies responsible for the adjoining Brooklands Lagoon area, and nearby public areas, to prevent dumping occurring in those places. Provision of information and public education will be key tools employed to address this problem.

Electric fences to control stock will conflict with pedestrian use of the Park and therefore will not be employed.

3.3 Vegetation

Seafield Park incorporates a range of vegetation types, including wetland, dune, plantation and pasture, which will each require different types of management and planting. Large scale planting will be required to revegetate much of Seafield Park.

The planting of only locally appropriate native plant species in Seafield Park is consistent with the Park's predominant classification as Scenic Reserve, subject to Section 19(1)(a) of the Reserves Act 1977, which requires that "... *the indigenous flora and fauna, ... shall as far as possible be preserved, and ... exotic flora and fauna shall as far as possible be exterminated.*" This ensures that the native botanical value of Brooklands Lagoon, and its margin with Seafield Park, the parts of which that are above MHWS being part of Ecological Heritage Site 5.01, are protected and enhanced.

One of the features of Seafield Park is the variation in its habitats, and this is reflected in the vegetation types present.

Boxthorn, which is listed as a Restricted Pest⁵ in the Environment Canterbury Regional Pest Management Strategy 2005-15, is to be removed from the sand dunes.

Control of undesirable plants, such as the invasive species of radiata pine and poplar, can be achieved through implementation of the findings of a Christchurch City Council botanical report on weeds at Brooklands Lagoon⁶.

Native coastal forest and shrubland will be progressively established on existing pasture areas to enhance environmental and recreational values. Suitable species include ribbonwood (*Plagianthus regius*), ngaio (*Myoporum laetum*) and kowhai (*Sophora microphylla*).

The most fertile sites will be selected for the establishment of nuclei of native forest plants throughout Seafield Park. Forest establishment is a staged process. The approach of establishing nuclei of native forest species has already been carried out near the Spencerville end of Brooklands Lagoon. When established, the nuclei will provide a seed source for the natural distribution of native coastal forest species throughout the Park. This is a very effective way of doing things, but it does slow the rate of establishment on the toughest sites.

Planting of the Brooklands Lagoon margin will comprise upper marsh and salt marsh edge species typical of such situations in Canterbury. Species planted can

⁵ These are plants for which it is considered that maintaining a ban on their sale, propagation and distribution would be useful in preventing their establishment in Canterbury or in containing their spread to the wild.

⁶ Prepared in 1999. Updated by a further report in 2004.

include *Coprosma propinqua*, *C. crassifolia*, *Plagianthus divaricatus*, flax and cabbage tree. Brooklands Lagoon is one of the last refuges of manuka (*Leptospermum scoparium*) on the plains in Christchurch and this should be trialed as well.

3.4 Wildlife

The adjacent Brooklands Lagoon provides the fourth most extensive area of nesting ground for wetland/coastal birds in coastal Canterbury, after Lake Ellesmere, the Ashley-Saltwater Creek Estuary and Lake Ki-Wainono on the coast south of Timaru.

In terms of species richness, the Brooklands Lagoon area probably has the fifth highest ranking in Canterbury, behind Lake Ellesmere, the Avon-Heathcote Estuary and Bromley Oxidation Ponds, Lake Ki-Wainono and the Ashley-Saltwater Creek Estuary. The number of bird species recorded at Brooklands Lagoon (one hundred) is comparable with, or higher than, most other New Zealand estuarine systems.

As for total wetland/coastal bird abundance, the recent creation of a large extent of shallow pond/mudflat/marsh habitat at the Kaiapoi Oxidation Ponds (on the north bank of the Waimakariri River), and new saltmarsh development in the Dartford/Beacon Street area, has boosted the regional ranking of the Brooklands Lagoon complex. It now probably ranks fifth within the Canterbury Region, behind Lake Ellesmere, the Avon-Heathcote Estuary and Bromley Oxidation Ponds, Lake Ki-Wainono and Lake Forsyth.

The Barkers Brook area in Mid Seafield Park is an important roosting ground for birds, and a hide in this part of Seafield Park will provide spectacular bird watching.

A key value of Seafield Park, therefore, is the provision of access by the public to sites for viewing of birdlife, both within the Park (such as at the new saltmarsh/wetland development off Beacon Street in the future) and in the adjacent estuary of Brooklands Lagoon.

An issue, though, is that this public access has meant that Seafield Park has been one of the conduits of inappropriate vehicle access to the estuary, which has resulted in damage to habitat there. To prevent this happening necessitates appropriate development and management of the Park, effective information and education, and, finally, enforcement if that is required. The classified status of scenic reserve for the Park justifies and warrants such measures being taken.

3.5 Promotion and Education

Seafield Park, and the Brooklands Lagoon estuary that it adjoins, contain a wealth of values, including estuarine saltmarsh habitat, dune topography, a highly scenic coastal landscape and a significant and diverse population of

birdlife. Some of this area is subject largely to natural processes of change, such as in the estuary proper, but the area is also subject to impacts of inappropriate use, such as illegal access by motor vehicles to the dune and saltmarsh areas.

Objectives for management of the area include protecting the existing values, minimising adverse impacts, enhancing and adding to ecological habitat, and providing for appropriate public access. To achieve these objectives, it is considered that fostering the public's knowledge and understanding of the values present will play a big part. Thereby, promotion of the values of, and recreational opportunities in, the area needs to be facilitated through provision of good information, such as via interpretation signs, maps and brochures. Secondly, the excellent opportunity for groups, such as schools, to visit and learn about coastal ecology and wildlife should be encouraged.

3.6 Cultural and Heritage

There is a history of physical change and human influence in the area that is centred on Brooklands Lagoon, and this is something that can be promoted, and visitors educated about, as suggested to in the section above. There is a need for more to be done in this area, including facilitating research, providing on-site interpretation and developing educational resources. Seafield Park can serve as a platform to access, as appropriate, and learn about cultural and heritage sites in the wider area. Examples of facilities to permit this include tracks and interpretation signs. It is important, though, that access to, and information about, such sites does not compromise their protection, and reflects and respects the wishes of the groups who have knowledge of, and a stake and interest in, the cultural and heritage values present at these sites.

3.6.1 Ngāi Tahu associations and values

Ngāi Tahu values are strongly connected to land, water and the natural environment, and are strongly linked to whakapapa relationships and historical associations. Values held for this area include wāhi tapu and wāhi taonga sites, the Puharakekenui Māori Reserve, ecological and mahinga kai values of the estuary and river and lands, the mauri of the area and the ecological integrity and quality of the land and water.

Ngāi Tahu have associations with the Spencer Park/Seafield Park area that date from Waitaha times. Whanau of Ngāi Tūāhuriri trace their whakapapa (ancestry) to tupuna (ancestors) that had associations with the area, primarily through Urihia, son of Turakautahi (a son of Tuahuriri) and Hinekakai. Another tūpuna, a descendant of Urihia, is Te Aika. The traditional name of Brooklands Lagoon - Te Riu o Te Aika Kawa ("the area of Te Aika protocols or authority") - reflects the strong relationship of Te Aika and his descendants with this coastal estuary and the Styx River.

The location of Puharakekenui Māori Reserve between the lagoon and the Styx River signals the strong turangawaewae (place of the people of the land) for the original grantees of the reserve - the tūpuna of the Te Aika, Whitau Kahaki, Te Hua, Rehu and Tarapuhi whanau - and their strong relationship with the resources of the area. The reserve was granted to acknowledge the loss of land and access to resources suffered by their tupuna who had established their traditional claim.

Brooklands Lagoon/Te Riu o Te Aika Kawa and the Styx River were highly valued for mahinga kai (gathering of food and other resources), including tuna, kanakana, koura and flax. The traditional relationships were, expressed through occupation, use and naming of areas.

Today the Ngāi Tahu people of this area - Te Ngāi Tūāhuriri Rūnanga and the hapū of Kāti Urihia - continue to hold strong values for the area, its land, waters and the natural environment, as well as for their whakapapa (ancestral) connections to their tūpuna, cultural heritage and special sites. They continue to carry out their traditional cultural and spiritual practices in this area, including gathering of mahinga kai.

The current owners of Puharakekenui Reserve also hold specific cultural and legal rights in relation to this land, and these are managed through a Maori land trust called - Te Hapū o Kāti Urihia Ahu Whenua Trust.

The Brooklands Lagoon/Te Riu o Te Aika Kawa Area Parks Master Plan, with which this reserve management plan is associated, is significant for Ngāi Tahu in that it addresses the potential effects on tangata whenua values from use and development of the area, including Spencer Park/Seafield Park. Ngāi Tahu supports the broader integrated management and protection and enhancement approach toward ecological and cultural values of the Brooklands Lagoon/Te Riu o Te Aika Kawa area taken in the draft master plan. The draft master plan should be referred to for more information on Ngāi Tahu values and specific planning proposals that address tangata whenua issues and values in this area.

4 DEVELOPMENT PLAN

Seafield Park (that is, for the purposes of this draft management plan, the northern and middle reaches of the existing Seafield Park area, because the southern part of the Park adjacent to Heyders Road is covered instead in the Draft Spencer Park Management Plan 2009) is predominantly a relatively undeveloped area with estuary margin and sand dune ecological values, albeit modified to some extent through farming practices, unauthorised vehicle encroachment and illegal dumping. Existing development is confined to a

number of Park entrances and a walkway. Currently occurring (at the time of the preparation of the draft plan prior to commencement of public consultation in 2009) development is taking place in the mid reaches of the Park adjacent to a new residential subdivision off Beacon Street (to the west of Area D on the plan on Page 252). This entails the creation of a new inter-tidal wetland complex that also serves the function of treating the stormwater discharge from the new subdivision. This is in an area that had been previously used for farm pasture.

The whole of the northern and mid reaches of Seafield Park, with the exception of a block running off Dartford Street (Area E on the plan on Page 252). This area, minus that transferred to ~~the Crown-land~~, is classified as a Recreation Reserve under Section 17 of the Reserves Act 1977), is now classified under Section 19(1)(a) of the Reserves Act 1977 as Scenic Reserve. This means that the Park here is protected and preserved in perpetuity for its qualities of scenic interest, beauty, natural features and landscape for the benefit, enjoyment and use of the public. A requirement of this classification is that the indigenous⁷ flora and fauna of this part of the Park shall, as far as possible, be preserved and exotic flora and fauna, as far as possible, exterminated. An implication extrapolated from this is that only indigenous plant species should be planted in the Park. Also, with regards the removal of exotic flora and fauna from the Park, this may be impractical, and even undesirable, with some of the species present; for example, marram grass.

As a consequence of the high, or potentially high (for the parts requiring restoration), ecological and scenic values in and adjacent (that is, Brooklands Lagoon and its margins) to Seafield Park, the focus for the development and management of the Park is on protection, restoration and enhancement of those values, for their intrinsic worth and for the public's benefit. This is supported, and reinforced, by the Park's status as scenic reserve, zoning as Conservation 1A in the Christchurch City Plan and being part of an ecological heritage site. This means that management and any development of, and provision of facilities in, the Park must be consistent with this focus. Therefore, development that occurs will be, for example, about restoring or enhancing indigenous habitat that is consistent with what occurs, or is likely to have occurred, at the site, and will have minimal impact on wildlife. Indigenous plantings, wetland recreation, and facilities to provide for appropriate activities, such as entrance amenity areas, signage, tracks and observation platforms, are examples of 'complying' developments.

An important thing to note here, with respect to habitat protection, enhancement and restoration, is that the ecological environment of Seafield Park merges with that of the Brooklands Lagoon estuary on the Park's eastern side. This is despite a legal property boundary with the Coastal Marine Area (represented by the Mean High Water Springs, but yet to be formally located via survey on the ground). What this means is that efforts to protect, enhance and restore the

⁷ Having originated in and being produced, growing, living, or occurring naturally in a particular region or environment (From: Merriam-Webster Online Dictionary. <http://www.merriam-webster.com/dictionary>), or shared between two countries (in the New Zealand context (pers. com. Partridge, T. (2009)).

environment in Seafield Park should not stop at the boundary, nor be in isolation to what happens in the estuary – there must be an integrated and strategic approach taken for the whole area, with the Council working with the agencies with responsibilities for values and activities in the Coastal Marine Area (Department of Conservation and Environment Canterbury). This approach is promoted in the Draft Brooklands Lagoon Area Master Plan 2009.

It is intended that the vehicle for raising potential developments is the draft landscape concept for Mid Seafield Park⁸ in Part C of the draft master plan. This raises, describes and gives a rough order of costs that would be additional to any existing applicable funding in the Christchurch City Council's Long-Term Council Community Plan.

4.1 Long-Term Council Community Plan (LTCCP) disclaimer

Each of the potential costs indicated as part of the above-mentioned draft landscape concept have been raised for consideration for inclusion in a future edition of the Christchurch City Council's Long-Term Council Community Plan, but there is no certainty that they will be approved for inclusion. If not, they will not be funded. They are included in the Draft Brooklands Lagoon Area Parks Master Plan 2009 to give an indication of the potential level of costs of proposed development in the Mid Seafield Park area.

5 RESOURCE INFORMATION

5.1 Purpose of the Park

The North and Mid Seafield Park areas have many features and attributes that make them special places for the public to visit, and there is excellent potential for the number of these features and attributes to be increased and for them to be enhanced. They include:

- Provision of public access points to, and routes through, a significant proportion of the length of the western margins of Brooklands Lagoon, which is a high value area for ecological, scenic, educational and passive recreational reasons, as listed below.
- The Park serving as a natural buffer between residential development in the west and the high value natural estuarine environment of Brooklands Lagoon to the east.

⁸ The draft landscape concept in the draft master plan does not include North Seafield Park, lying to the south of Harbour Road, because no significant spatial landscape development, such as wetland creation or planting, is proposed in this area.

- Protection of existing features, such as old sand dune topography, water channel and estuary and saltmarsh margins. Enhancement of the natural environment by restoring it to close to what it originally was, such as through wetland creation and planting of indigenous coastal marsh, shrub and tree species.
- Promoting a zone of recreational opportunities that focuses on confined corridors of access and activity (that is, along defined unsealed tracks for walking, horse riding and mountain biking) that have minimal impact on the surrounding environment, a low level of development and provision of facilities, other than those necessary to inform and are appropriate for an environment that is primarily undeveloped and of high ecological value (for example, bird observation platforms).
- A venue to observe and learn about the ecology in a natural estuarine environment, including of New Zealand coastal vegetation and birdlife.

5.1.1 Background to Seafield Park area land tenure and status

The area that is today North and Mid Seafield Parks was part of a major cattle and dairy station along the east coast called ‘The Sand Hills Run’ that operated from approximately 1850. In 1878, the dunes were invested with the Christchurch City Council under the Waste Lands Act 1858. This included the area that is Seafield Park today.

Subdivision for the settlement of Brooklands began in 1921. The main street was named, by competition, as “Seafield Ave”. Although this was later changed to Lower Styx Road, the original name lived on, firstly, in the unformed legal road along the western edge of Brooklands Lagoon, as Seafield Esplanade, and then as the name of the adjacent Park.

The changes to the mouth of the Waimakariri River since then have resulted in much of this unformed legal road and significant portions of the adjacent parcels of land⁹, including the areas held by the Christchurch City Council as part of Seafield Park, now lying in the Brooklands Lagoon estuary. These parts are in the area below the mean high spring tide mark (Mean High Water Springs (MHWS)) that is called the Coastal Marine Area, for which Environment Canterbury and the Department of Conservation have roles in protection of values and control of activities. With the enactment of the Foreshore and Seabed Act in 2004, the parts of unformed legal road and the parcels of land held as Park by the Council were transferred to the Crown (and thereby under the administration of the Department of Conservation). Therefore, these parts are not part of Seafield Park and, technically, are not covered by this draft management plan. Eventually, the actual western parcel boundaries of the Park will be confirmed on the ground through survey.

⁹ In the case of one parcel (see Area B on the map on Page 22), this is the majority of the area.

On 16 August 2007, the Christchurch City Council resolved to classify, under the Reserves Act 1977, the parcels of land making up North and Mid Seafield Parks as Scenic Reserve¹⁰. The grounds for classifying these reserve parcels as scenic reserve are that this classification best reflects the status and values of this area. The area is zoned in the Christchurch City Plan as Conservation 1A. This zoning covers areas of scenic, ecological or heritage significance. In the case of the area centred on Brooklands Lagoon, this zoning covers the coastal dune system and part of the margins of Brooklands Lagoon, including saline wetlands. In addition, most of the area lies in Ecological Heritage Site 5.01 (Styx River mouth, Brooklands), which covers wetland and riparian areas containing salt marsh vegetation that is specifically noted for its ecological heritage value. This reserve classification does not apply to the parts that have been transferred to the Crown-land.

In two places along the western margin of Brooklands Lagoon, there has been accretion alongside the unformed legal road (that is, the area accreted lies above MHWS). Subject to the Local Government Act 1974, these areas are thereby added to the legal road. It is planned to propose to add these legal road areas lying above MHWS to Seafield Park and seek to classify them as scenic reserve.

5.1.2 Land tenure

Seafield Park is made up of a number of parcels of land, mostly in freehold title held by, and previously vested as reserves for recreation purposes (with the exception of two vested for environment and habitat protection purposes and one for road purposes) in, the Christchurch City Council.

The day to day management of the park is undertaken by the Transport and Greenspace Unit, with on site management undertaken by the Spencer Park Ranger.

The titles making up Seafield Park are listed in Section 5.1.3. Note that the legal areas are larger than the actual areas, due to the parts of the titles below Mean High Water Springs (that is, within what is called the Coastal Marine Area) transferring to the Crown with the enactment of the Foreshore and Seabed Act 2004 .

A previous ten metre esplanade reserve, which extended between Seafield Park and Brooklands Lagoon, is now unformed legal road, with a significant part transferred to the Crown, due to it being in the Coastal Marine Area. Conversely, two areas of accretion along side legal road (that is, areas that are now above Mean High Water Springs) are added to that legal road, pursuant to Section 315(4) of the Local Government Act 1974.¹¹

¹⁰ With the exception of two parcels, for separate reasons, as explained in Section 5.1.2.

¹¹ Section 13, Foreshore and Seabed Act 2004:

Public foreshore and seabed vested in the Crown—

5.1.3 Classification

All of the land parcels, except for one that is already classified as Recreation Reserve (see below), that comprise the part of the existing Seafield Park area north of the Maori Reserve, and proposed to be covered by this draft management plan, are now classified as Scenic Reserve, subject to Section 19(1)(a) of the Reserves Act 1977.

The land parcels of the part of the existing Seafield Park area south of the Maori Reserve, and proposed to be covered by the Spencer Park Management Plan, are classified as Recreation Reserve, subject to Section 17 of the Reserves Act 1977.

One parcel of Seafield Park land (labelled E on the plan below) is classified as Recreation Reserve under the Reserves Act 1977. It is proposed to change the classification of this reserve to Scenic Reserve to conform to the existing scenic reserve status of the rest of the Park north of the Maori reserve.

Subsection (1) On and from the commencement of this section, the full legal and beneficial ownership of the public foreshore and seabed is vested in the Crown, so that the public foreshore and seabed is held by the Crown as its absolute property.

(Note: The Foreshore and Seabird Act 2004 does not remove provisions under the Local Government Act 1974 for accretions of land in the Coastal Marine Area (CMA); that is, below Mean High Water Springs (MHWS); to be added to land that is under the control of the local authority. In this case, this is legal road administered by the Christchurch City Council.)

Section 315, Local Government Act 1974:

Interpretation—

Subsection (4) Every accretion to any road along the bank of a river or stream or along the mean high-water mark of the sea or along the margin of any lake caused by the action of the river or stream or of the sea or lake shall form part of the road

5.1.4 Legal status

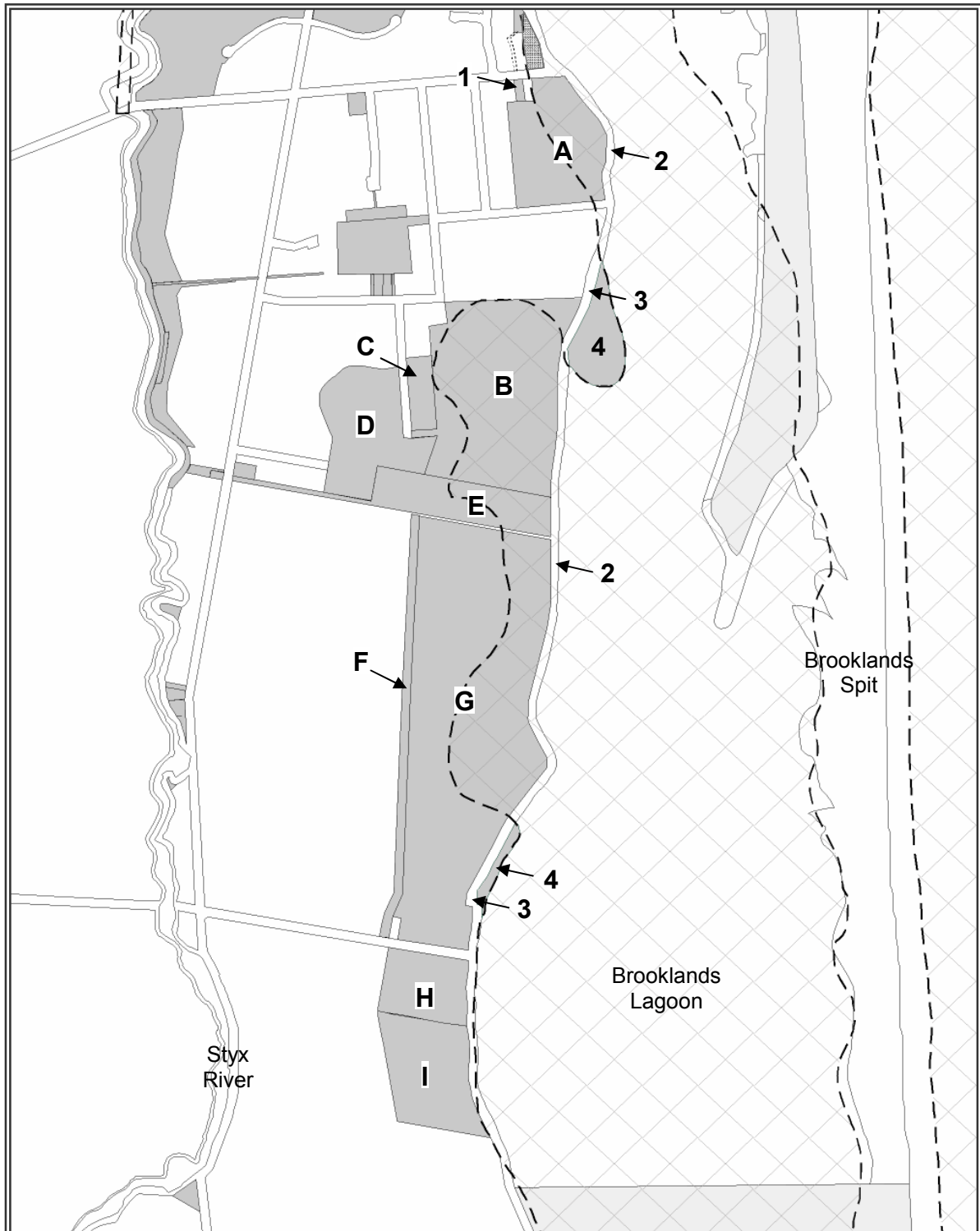


Table 1 describes the various parcels of land that are, minus the portions that are transferred to the Crown land, legally part of Seafield Park, are classified reserves under the Reserves Act 1977 and are covered by this draft management plan. Table 2 lists those areas that are legally not part of Seafield Park, but are proposed eventually to be, and also other adjacent areas with changed status and tenure.

Table 1: North and Mid-Seafield Park reserve parcels¹²

Map Ref.	Legal Description	Status/Tenure	Area (hectares)	Reserves Act 1977 Classification
A	Part Lot 2 Deposited Plan 27026	Fee simple title held by the Christchurch City Council.	5.4076 minus approx 2.6056	Scenic Reserve ¹³
B	Part Lot 1 Deposited Plan 44685	Fee simple title held by the Christchurch City Council.	12.5000 minus approx 10.2133	Scenic Reserve
C	Lot 8 Deposited Plan 342547	Fee simple title held by the Christchurch City Council.	0.9581	Scenic Reserve
D	Lot 10 Deposited Plan 342547	Fee simple title held by the Christchurch City Council.	5.1840	Scenic Reserve
E	Part Reserve 3748	Vested in the Christchurch City Council, in trust, for the purpose of a recreation reserve (Gaz 1990 p143).	4.0469 minus approx 1.5085	Recreation Reserve
F	Lot 9 Deposited Plan 44428	Fee simple title held by the Christchurch City Council.	1.9500	Scenic Reserve
G	Part Lot 1 Deposited Plan 44428	Fee simple title held by the Christchurch City Council.	24.7960 minus approx 8.5971	Scenic Reserve
H	Lot 8 Deposited Plan 44428	Fee simple title held by the Christchurch City Council.	2.9550	Scenic Reserve
I	Lot 2 Deposited Plan 52199	Fee simple title held by the Christchurch City Council.	4.8413	Scenic Reserve
Total:			62.6389 minus approx 22.9245 equals approx 39.7144	

¹² South Seafield Park reserve parcels are covered in the Draft Spencer Park Management Plan 2009, although there is some general description in this plan (the Draft Seafield Park Management Plan 2009) of the area covered by these reserve parcels. The North and Mid-Seafield Park reserve parcels listed in this table are shown in Figure 1.

¹³ All of the classifications as scenic reserve in Seafield Park are under Section 19(1)(a) of the Reserves Act 1977.

Table 2: Other land¹⁴

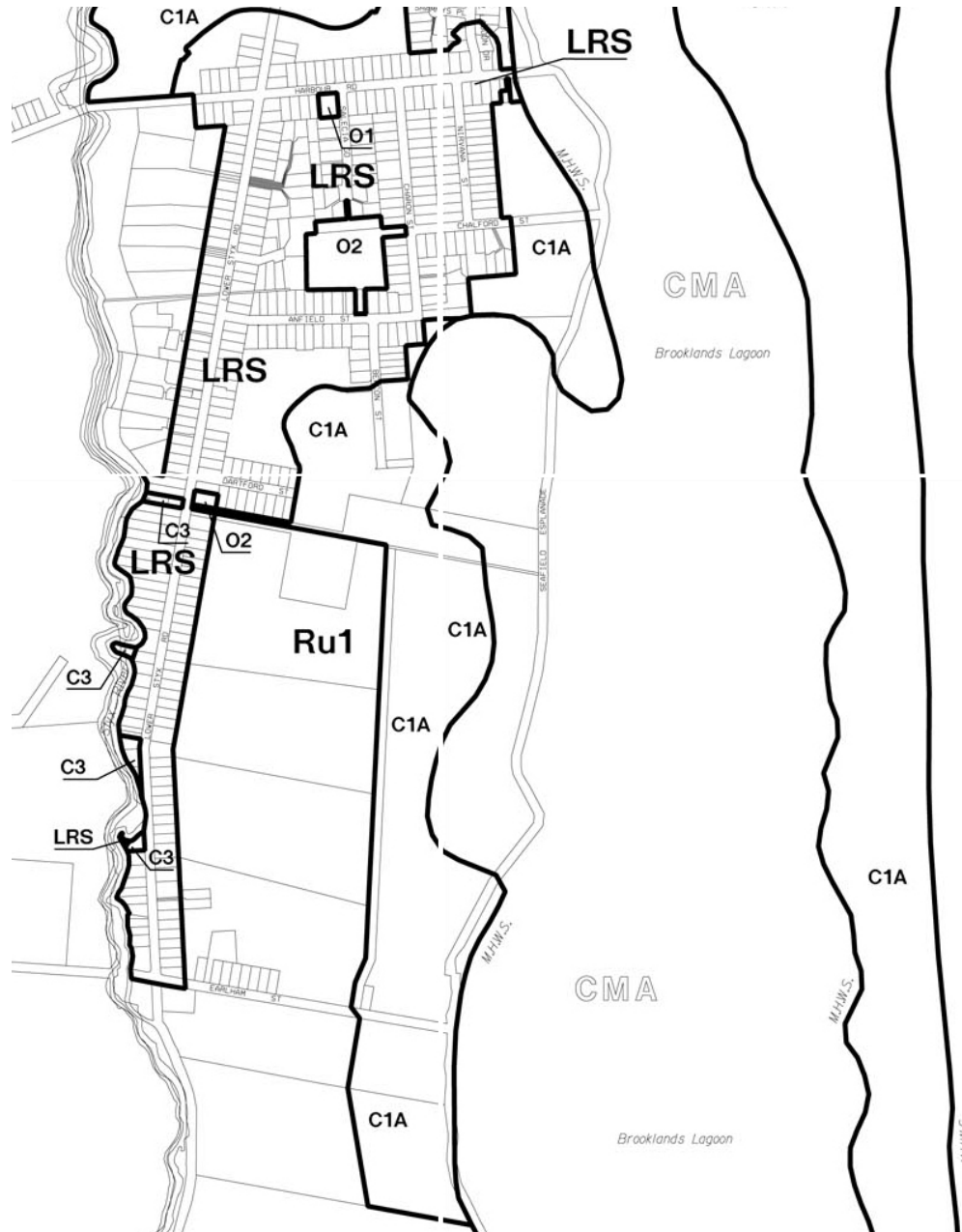
Map Ref.	Legal Description	Status/ Tenure	Area (hectares)	Reserves Act 1977 Classification
1	Lot 14 Deposited Plan 7667	Fee simple title held by the Christchurch City Council.	0.1012	Not classified. Propose for the Council to declare by resolution, under Section 14(1) of the Reserves Act 1977, that this land parcel is classified scenic reserve, and is added to Seafield Park.
2	Unformed legal road transferred to the Crown land	Crown land Foreshore in the Coastal Marine Area administered by the Department of Conservation, with Environment Canterbury controlling activities.	Not calculated	Transferred to the Crown land pursuant to Section 13(1) of the Foreshore and Seabed Act 2004. Propose for the Council to resurvey Seafield Park's eastern boundaries, with removal of mapped boundaries of previous unformed legal road.
3	Unformed legal road	Administered by the Christchurch City Council.	2.1594	The parts passing through or adjacent to Seafield Park are not formed. Propose for the Council to stop these parts, add these to the adjacent Park parcels as part classified scenic reserve.
4	Accretion added to legal road	Administered by the Christchurch City Council.	2.6706	An area of accretion alongside legal road. When land along the Mean High Water Springs (MHWS) of the sea adjoins a legal road the accretion is deemed to be legal road pursuant to Section 315(4) of the Local Government Act 1974 ¹⁵ .
		Proposed to be added to Seafield Park:	4.0312	

¹⁴ This is land that is, and was, legally not part of Seafield Park and, in the case of those areas of land above Mean High Water Springs, is proposed to be added to the Park.

¹⁵ The Foreshore and Seabird Act 2004 does not remove provisions under the Local Government Act 1974 for accretions of land in the Coastal Marine Area (CMA) (that is, below MHWS) to be added to land that is under control of the local authority.

5.1.5 Christchurch City Plan zones

Seafield Park is zoned Conservation 1A (Coastal margins) in the Christchurch City Plan to reflect its extensive natural character.



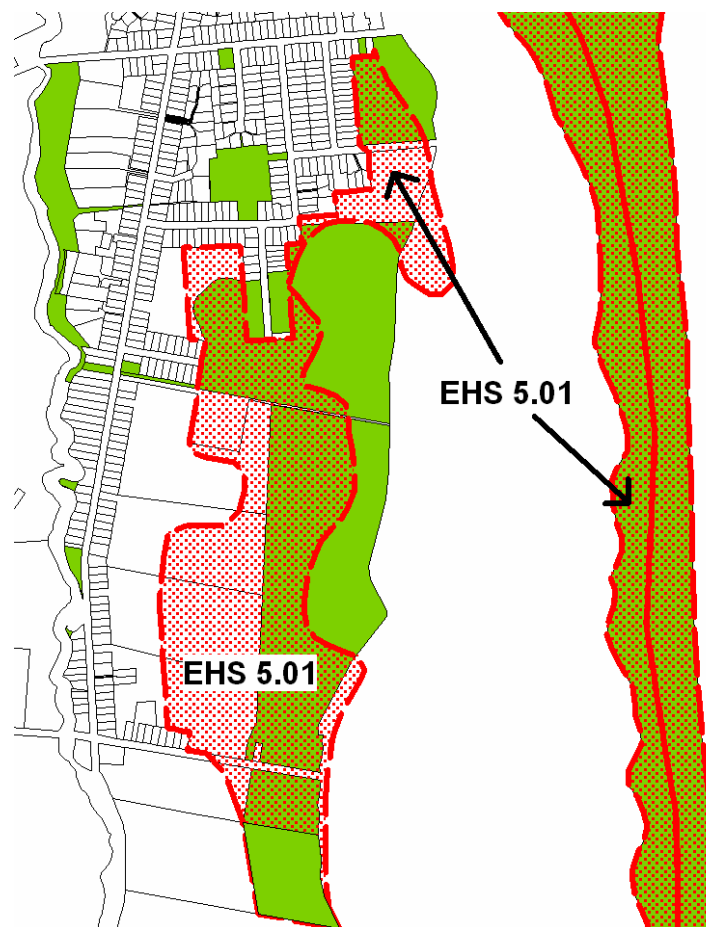
The Conservation 1A Zone comprises public land of particular scenic, natural, habitat and ecological values.

It extends inland from the Mean High Water Springs (the landward boundary of the Coastal Marine Area) to provide a buffer between coastal processes and urban development. The zone includes the coastal dune system. The amount of coastal margin available is constrained by existing urban settlement.

Brooklands Lagoon itself is within the Coastal Marine Area and therefore activities taking place on it are the responsibility of Environment Canterbury.

The dashed line on the plan is the approximate line of Mean High Water Springs (MHWS)¹⁶.

Much of the land in this zone is ecologically fragile. The zone aims to recognise and protect areas of significant natural flora and fauna and prevent these areas being subject to the adverse effects of inappropriate use or development, particularly disturbance, of the land surface and of vegetation. A large proportion of the zone has been identified as an ecological heritage site (5.01).



The coastal environment is dynamic, with the seaward boundary subject to constant change. Any activities located within this area are at risk from the natural hazards associated with these changes.

The coastal margin is also becoming increasingly appreciated for recreation, which is usually informal and passive. Management of this area must take into account the potential effects of human activities on these easily damaged areas.

¹⁶ The inland boundary of the Coastal Marine Area (CMA), which equates to an approximate line representing the average Spring high tide mark.

In addition to recreational and ecological values, many sites in the coastal margin are also important for scenic, educational and heritage reasons. Activities within the coastal area must be sympathetic with its natural character. Land in this zone is, like that in the Conservation 1 Zone, of important heritage and resource value to the mana whenua.

Environmental Results Anticipated

- (a) Protection of the integrity, functioning and resilience of the coastal margin.
- (b) Conservation and enhancement of significant areas in the coastal area and, in particular, the protection of areas identified for their ecological heritage value.
- (c) Management of land resources in the zone to ensure the natural character of the coastal environment remains substantially unchanged.
- (d) Recognition of coastal hazards, particularly sea and wind erosion, and provision for avoiding or mitigating such effects.
- (e) Maintenance and enhancement of public access to the coast, but minimising vehicle usage within the zone.

5.2 Physical Description

Seafield Park comprises four distinct areas which are separated by blocks of private land. The northern portion of Seafield Park, north of Chalford Street, is the smallest at approximately 2.8 hectares (excluding the part of the lot transferred to the Crown ~~land~~ and the entranceway of Harbour Road). The topography of this area largely consists of undulating sand dunes, and the lower end of this reserve is salt marsh that is inundated at high tide. The dune vegetation is mostly marram grass. Tracks made by local residents to gain access to the estuary cross the dunes.

To the south of this reserve is a large tidal wetland of high ecological value. This wetland is composed largely of salt marsh mudflats that are separated from the estuary by a ridge of tree covered sand dunes. Water enters the saltmarsh from the estuary via a series of inlets located at the southern end. However, not all of this significant wetland lies within Seafield Park, as the northern part is privately owned.

The southern part of the tidal wetland, which includes the inlet area, is contained within Seafield Park. This area is predominantly salt marsh and at high tide all but the spit and a narrow strip of sand dune along the western boundary are inundated by the tide. The water flows into this extensive marsh via a series of dendritic channels that weave their way into the stands of sea rush (*Juncus kraussii*). The sea rush stands have suffered where recreational users have driven vehicles through this extremely wet and muddy area. The

result is a series of well defined tracks that are accessible by foot at low tide, but are subject to ponding, which further stresses the sea rush. Along the western boundary, the dune hinterland vegetation is predominantly marram grass and lupin.

South and west of this mudflat area is a part of the Park that has an access strip extending from Lower Styx Road. Originally purchased under the Waimakariri Harbour Board Act 1946, this area was once intended to site a Harbour Board building, but has remained in an undeveloped state until very recently (2008) when it was developed into a salt water wetland by the construction of an opening to the estuary of Brooklands Lagoon. This was undertaken in conjunction with The Lagoons subdivision adjacent in a co-operative effort between Christchurch City Council and Fowler Developments. This has allowed the low-lying Council owned land to be 'terraformed' into a series of channels and roosting islands for wading birds. These islands are constructed so that high tides will not quite flood them, but the water salinity will be high enough for weedy species to be replaced by plants of the saltmarsh. The channels are especially wide around the edge to create a 'moat' that discourages people and predators from crossing to the islands. This wetland construction mirrors similar roosting island saline wetlands at Bexley and Charlesworth and provides the Brooklands Lagoon birdlife with a sanctuary, the kind of which has been lost around most of the estuary there.

South of this, Seafield Park extends south for almost another 700 metres along the western edge of Brooklands Lagoon. This section of the reserve has a mix of sand dunes and embayments of salt marsh, which provides a buffer between the estuary and the adjoining farmland. It is also the most remote part of Seafield Park and, consequently, a bird roost that lies in the estuary at the end of Barkers Brook is visited by a variety of seabirds.

The northern end of this section is predominantly dry and defined by large sand dunes. This area is intersected by Barkers Brook, a modified channel which extends to the estuary. The walkway crosses this via a bridge.

South of Barkers Brook, the sand dunes become lower. A large stand of white poplar extends along the western side here, and another smaller stand occurs near the estuary edge. There is a loop track that leads through the poplars to the estuary margin, and then turns south to rejoin the main track south of the poplar stand.

South of this third section of Seafield Park is the Maori Reserve 'Puharakekenui'. This area is extensively grazed. A bird hide, constructed by the Royal Forest and Bird Protection Society, sits near the edge of the estuary here (there are also two raised viewing platforms further south at the edge of the southernmost part of the existing Park). Access to the hide is gained via the Brooklands Lagoon Walkway from Heyders Road. Of significance for this area is the unprotected nature of the low dune hummocks as a result of stock grazing on the thin soils present. This is particularly evident along the edge of the estuary where the tops of the dunes have been blown out.

To the south of 'Puharakekenui' lies the fourth existing Seafield Park component (which is proposed to be described in the Draft Spencer Park Management Plan 2009, rather than this plan). Contrasting in character with the other portions of Seafield Park, which are strongly influenced by the estuary, the character of the southern portion of Seafield Park is influenced by the adjoining Spencer Park. The most notable feature of this part of Seafield Park is the dominance of established pines which extend throughout this area.

Near Heyders Road is an animal enclosure. A range of animals, including rare breeds of goats, sheep and pigs, are kept in this enclosure for viewing by the public for a nominal entry fee. Birds, including peacocks, can be heard for some distance from the enclosure.

5.2.1 Topography

Seafield Park lies on the western edge of Brooklands Lagoon. It occupies a series of dune ridges, formed during rapid accretion phases of the Pegasus Bay coastline. The active dune system is Brooklands Spit, and Brooklands Lagoon occupies the first hollow. The majority of Seafield Park is on the second dune ridge, this being mostly stable, but highly variable in height. A second hollow occurs behind this and parts of Seafield Park include this hollow such as at 'The Lagoons residential development' where the hollow is being turned into a tidal wetland. Lower Styx Road runs along the third ridge, and the third hollow carries the Styx River. In some areas, sand has blown from the second ridge to the third, fragmenting the second hollow between.

As a result of being sited on this dune complex, the topography of low ridges and dune slacks (hollows) results in different soil patterns and soil moisture regimes, and thus vegetation. In the dune slacks, soil salinity plays a major role as well.

5.2.2 Climate

The climate of Seafield Park and the surrounding area is, like the rest of Canterbury, dominated by the passage of low or high pressure systems from the west. However, there is a marked oceanic influence, with the frequent development of coastal cloud under the dominant easterly and north easterly winds, resulting in lower temperatures and a slight increase in summer rainfall. The average rainfall is 620 mm, falling on approximately 114 days of the year. In summer, this tends to be insufficient, causing the soil to dry out, whereas, in winter, the ground water level causes severe water logging in the inter-dune hollows. Hot drying north-westerly winds occur in spring to autumn, and cold rain-bearing southerlies can occur in all seasons. The high dunes to the south-east in the vicinity of Spencer Park provide some shelter at the southern end.

5.2.3 Geology and Soils

Brooklands Lagoon, and its surrounds, are part of a sand-dune complex that extend twelve kilometres inland near the base of the Port Hills and five kilometres inland at Brooklands. The surface sands are derived from the greywacke rocks of the mountains, brought down by the Waimakariri River and other rivers and deposited in Pegasus Bay by wind and wave action. Sand is also added into Pegasus Bay from the Rakaia River and is carried around Banks Peninsula. This results in a large increase in coastal sand supply, which is unusual for New Zealand. Due to changes in sea levels during the glacial and interglacial periods, the underlying deposits are a mixture of marine, estuarine and alluvial deposits.

Banks Peninsula provides shelter from long shore currents, allowing deposition of sediment in its lee by the circulating currents of Pegasus Bay. The Ellesmere, Avon-Heathcote, and previous, estuaries in the Brooklands area have also been formed by similar deposition and coastal progradation.

On the present coast, the Brooklands sands are, on average, twenty metres deep, beneath which are water-bearing gravels providing artesian water. Overlying the fine sands in the estuary are river-deposited silts and muds, largely of recent origin and due to deforestation and consequent erosion of headwater catchments. These silts are more fertile than the surrounding sands and are responsible for the high biomass production found in both the Avon-Heathcote Estuary and Brooklands Lagoon. Knox et al. (1978) found that parts of the estuary floor, particularly in the south and east, were covered by a layer of recent Aeolian (wind blown) sand from the beach and dunes, carried there during easterly storms. Recent observation suggests that these trends are still continuing, aiding a rapid infilling on the eastern side and extension of sea rush and three-square across the sandy mud-flats. The effects have probably been accentuated by the opening to the Waimakariri River having moved north, thus reducing flushing of the estuary at the Spencerville end. Cross-sections measured at the northern end show the spit being under-cut, confirming that erosion is occurring there.

Seafield Park, on the western margin of Brooklands Lagoon, is part of the underlying Kairaki sand complex, with very shallow, one to two centimetre deep, top soils on the ridges and deeper silt/organic soils in the hollows. The soil and the existing cover is not enough to protect the dunes from wind and/or water erosion in the event of significant changes in use or natural conditions.

The land adjacent to the estuary has been described as Class VII and VIII under the Land Use Capability Classification¹⁷, which is land that is severely limited, with low productivity and high erosion risk. The soils are based on the Kairaki sand complex, and are thin, grey-brown and structure-less with low nutrient status and low organic matter content. The soil does not possess a distinct topsoil. Sand grains are held together by plant roots and, if this protection is removed, the sands erode rapidly.

The ridges are free draining and contrast with the poorly drained sand flats where there is some tendency for peat accumulation and some clay formation from the leaching of colloids.

5.3 Vegetation

The vegetative cover of the non-tidal portion of Seafield Park is primarily comprised of introduced dune and pasture species, with most of the native vegetation of the area having been destroyed during the first years of European settlement. The pre-Polynesian vegetation is likely to have been quite different, but fires were used to clear land and the vegetation seen by the first European settlers would have been very different from that which greeted the first Maori. However, there are still significant areas of indigenous vegetation within the Park worthy of preservation. These are mainly confined to the tidal areas of the Park (although these areas have been vested in the Crown with the enactment of the Foreshore and Seabed Act in 2004) and to wetland pockets in the rough scrubland beyond. However, the tidal remnants are being further threatened by the advances of the introduced rush *Schoenoplectus pungens*.

Seafield Park includes a number of different associations - dunes, hinterland and patches of saline wetland. The estuary margin extends in some places into the areas that were previously Seafield Park, and these areas are dominated by rush-type species such as *J. kraussii* (sea rush), *Schoenoplectus caldwellii*, *S. pungens* (three-square), and *Apodasmia similis* (oioi). These each tend to form monocultures with infrequent additional species. Additional species are usually small herbaceous ones, such as *Sarcocornia quinqueflora* (glasswort), *Selliera radicans* (remuremu), *Mimulus repens* (native musk) and *Samolus repens* (native primrose). The only shrub is *Plagianthus divaricatus* (coastal ribbonwood).

¹⁷ New Zealand land resource surveys were originally carried out to assist the National Water and Soil Conservation Organisation to fulfill its responsibilities for soil conservation and erosion control. After two to three decades of catchment scale land use capability mapping, it became apparent that a nationally coherent approach was required for physical land resource mapping. The Land Use Capability Classification System was designed to assist practitioners to better target and communicate soil conservation and erosion control work. Today, Landcare Research is the custodian of the New Zealand Land Resource Inventory, which contains the Land Use Capability (LUC) or land class (e.g. Class I, Class II,) assessment for each of the areas described.

The dunes in Seafield Park have similar species to Brooklands Spit, such as marram grass and lupin, although the density is generally greater on the dunes. There are however far fewer pines on the Seafield Park side

At the southern end of the Park, the Forest and Bird track has a range of species adjacent that are predominantly introduced. The beginning of the track has abundant marram with some lupin, broom, gorse, sweet brier, blackberry, and grasses and herbs. Of these, only *Acaena anserinifolia* is native. Also, a few clumps of native flax and *Carex geminata* are growing in some of the damp hollows. The only known patch of four-square (*Lepidosperma australe*) occurs between the two viewing platforms at the estuary edge. Trees that have been planted include poplars and pines. Other tree species include elder and apple and beneath are scattered ferns, but most are exotic.

The hinterland behind the dunes) also contains a large number of introduced agricultural species and associated weeds. A substantial area to the north of the Maori Reserve contained extensive stands of gorse and broom in the 1980s, but these have been considerably reduced.

In some places conditions are quite damp, comprising some areas where fresh-water ponds, and others that are brackish or salty. In fresh water rushes such as *Juncus edgariae* and *Carex geminata* dominate, while in saline areas, *Cotula coronopifolia*, orache (*Atriplex prostrata*), and *Plantago coronopus* are most common. The composition of these wet hollows comprises a mixture of native and exotic species.

5.3.1 Opportunities for the establishment of native vegetation

The following assessment of the prospect of establishment of further native vegetation in Seafield Park has been prepared by Dr Trevor Partridge, in his capacity as Botanist with the Christchurch City Council, as part of the development of this draft management plan.

The majority of the area that is legally part of North and Mid Seafield Park is now classified (by Council resolution on 10 July 2008) as Scenic Reserve under Section 19(1)(a) of the Reserves Act 1977, with an implication of this classification being that the indigenous flora and fauna present shall as far as possible be preserved, and exotic flora and fauna as far as possible be exterminated (extract from Section 19(2)(a) of the Act). This means that only native plants shall be planted in these parts of the existing area of Seafield Park.

A draft landscape development concept, and an associated suggested rough order of costs of implementation, has been prepared for Mid Seafield Park and is included in Part C of the Draft Brooklands Lagoon Area Parks Master Plan 2009. This proposes a possible pattern of planting and development to restore and/or recreate a natural landscape and habitat close to what is likely have to have existed originally in that, or a similar, site in the coastal environment.

Existing vegetation

Three distinct ecosystems exist within the tidal part of Brooklands Lagoon has recently been described in detail by Worner and Partridge (2008), and are based on gradients in salinity and sediment type with vegetation patterns reflecting this. At the Spencerville end, the sediment is predominantly fine and salinity is relatively low. The dominant vegetation there is *Apodasmia similis*, and even raupo (*Typha orientalis*), a species indicative of very little salt, is found right at the southern-most end. At the Brooklands end, the sediment is sand, and the vegetation here is a turf of glasswort (*Sarcocornia quinqueflora*). Around the mouth of the Styx River, the saltmarsh has been impounded by stopbanks, arresting the normal successional patterns at the *Apodasmia* and *Plagianthus regius* stage, with the vegetation being essentially 'moribund'.

This distinct gradient in Brooklands Lagoon occurs because water both enters and exists through the single opening at the Brooklands end, where the estuary opens into the Waimakariri River, rather than the former opening half way down the spit. This is also causing the estuary to rapidly infill with silt. There is little scour in the estuary, either from streams flowing into it or by tidal waters, especially at the Spencerville end. Also important is the truncation of the distinct vegetation sequence from the mudflats to surrounding land. This is typical of salt marshes, where the uppermost vegetation zones are destroyed by conversion to agriculture. In some cases the abrupt change to sand dunes leaves little opportunity for this zone to be present, but in other cases it now exists as a zone dominated by the weedy grass tall fescue (*Schedonorus arundinaceus*).

The sand dunes of Seafield Park are dominated by marram (*Ammophila arenaria*) where active, and by pasture where stabilised. Instability on these dunes, far separated from the sea by Brooklands Lagoon, is maintained by high grazing levels. Blowouts can even occur. Stability is maintained by shelter and good farming practices. Amongst the dunes are low lying areas, frequently described as slacks. Dune slacks occur where inter-dune hollows reach the water table and species indicative of brackish conditions occur. However, these areas at Seafield Park may have another origin, as witnessed by their shapes. They may represent former arms of the estuary that have been cut off by sand.

The remaining areas of Seafield Park are pasture or scrub. Scrub species are predominantly gorse (*Ulex europaeus*) or broom (*Cytisus scoparius*), with some boxthorn (*Lycium ferocissimum*) on sandier areas. Scattered plants of elder (*Sambucus nigra*) are also present. In recent years, the area of scrub has been reduced through clearing (in Spencer Park, where grazing has not taken place, the areas of scrub are tall and in decline, mostly being overtopped by taller trees). Pasture is mostly dominated by dryland pasture plants, except where wet. Fresh water seeps are rare and contain patches of rushes (*Juncus effusus*, *J. articulatus*). The margins of Barkers Brook also have these species. Ponds within the area are artificial and contain fresh water.

Trees have been planted along much of Seafield Park. Two species dominate - radiata pine (*Pinus radiata*) and poplar (*Populus alba*). Poplar occurs predominantly at Spencer Park where large patches have created open groves with little beneath. Pines also occur here as both large stands and isolated individuals. Smaller stands and individuals also occur elsewhere in Seafield Park. At the Brooklands end, there are again larger plantings on the dunes, as well as a line across the bay of salt marsh on soil raised up for this purpose. These trees show poor growth and health because of the salt.

Options for planting native vegetation on the Brooklands Lagoon margin

The only part of the Brooklands Lagoon margin that would need enhancement planting is the uppermost marsh zone that has been damaged by grazing and is now dominated by tall fescue. It should be noted that if the Seafield Park land is retired from grazing this tall fescue will grow rapidly to dominate this zone. The species that will establish best here is coastal ribbonwood (*Plagianthus divaricatus*). This plant will eventually overtop the tall fescue and allow other salt marsh plants such as *Apodasmia similis* to enter. Unfortunately, seedlings of coastal ribbonwood are very palatable to stock, so it is not feasible to plant while stock are grazing and the tall fescue is low.

The other option for the estuary margin vegetation is at the created wetlands adjacent to The Lagoons subdivision following re-connection to tidal inflow from Brooklands Lagoon. Planting and natural spread of native species is already occurring there, this work being undertaken by the Christchurch City Council in conjunction with the developer.

Sand dunes

The natural state of the inland sand dunes is towards stability. Therefore, there is no real opportunity for the establishment of active dune species such as pingao (*Desmochoenus spiralis*). Instead, these dunes are ideal for the establishment of native stable sand scrub species, which are predominantly kanuka (*Kunzea ericoides*) and *Oryzopsis leptophylla*. Areas of marram should be left to stabilise and planting should only take place once this species has disappeared and a fertile soil has established. These marram-dominated dunes could be used as open areas from where views could be had. However, within time they will stabilise in a non-grazing sheltered regime and eventually become either suitable for planting or become colonised from adjacent plantings.

Fresh water wetlands

These are presently not a feature of Seafield Park, so, if desired, wetlands beyond the influence of Brooklands Lagoon would have to be constructed within the present pasture zone. A number of rules would need to be followed if these are to be successful. Firstly, such wetlands need to be protected from salt water influence (otherwise they fall within the estuary margin vegetation types). Intrusion of salt water can come from two origins - overflow from Brooklands Lagoon and from groundwater. The first can be avoided by

ensuring a barrier between the constructed wetland and the estuary - the sand dunes provide the first barrier for this. To avoid groundwater salinity, artificial wetlands should be as far from the estuary as possible. Also, if there is groundwater salt intrusion, the depth of the wetland should be shallow. However, a shallow wetland will be less diverse and difficult to maintain. This problem could be assessed by establishing a salinity profile in areas where wetlands are proposed by sampling ground waters. An option, if there is saline ground water salt, is to construct perched wetlands with a sealed base. However, at close to sea level, this creates difficulties of getting water supply to raised areas. Therefore the opportunities to create freshwater wetlands close to Brooklands Lagoon are extremely limited.

Forest

Most of the pasture areas are suitable for the establishment of native coastal forest. It is clear, though, that extensive plantings of native trees is impossible with a limited budget. At the Spencer Park end of Seafield Park, plantings have already established to create nuclei of native trees. This is the obvious strategy, although it slows the process of establishment of native forest considerably. A number of rules need to be followed. Firstly, the best sites need to be chosen for establishment of these nuclei. They need to be the most fertile sites. Doing this will speed up growth, and the time taken to achieve seeding, as well as maximizing the resulting seed crop. Another rule is to utilise shade provided by exotic trees. This will result in better establishment, although there is still the problem of removing the shade trees later on. The third rule is to protect plantings from grazing, especially from the many rabbits and hares that inhabit the area. Rabbit proof fencing is necessary to protect young trees, as has been the case near Spencer Park.

Also important is the question of choice of species. Already observed in the plantings established are inappropriate native species, such as northern New Zealand species such as karo (*Pittosporum crassifolium*). The species most suitable for this habitat are those that occur in lowland coastal forest, now best represented in the Canterbury region on the lower coastal faces of Banks Peninsula. The three large trees there are ribbonwood (*Plagianthus regius*), ngaio (*Myoporum laetum*) and kowhai (*Sophora microphylla*). Fortunately, these hardy species are amongst the fastest growing of New Zealand's native trees and provide ideal conditions for the establishment of a wide variety of smaller trees, shrubs and climbers, as well as forest-floor herbs.

Weeds

Many of the pasture weeds present in Seafield Park are benign and will disappear as part of the process of establishment of native communities. Some action may need to be taken in regard to the following, though:

- Gorse and broom

Once dominant on the low sand hills, these have been controlled to the extent that they are minor localised pests. They do, however, need to be

kept under control. They also constitute a fire risk. To stop re-establishment, any cleared parts of these plants should not be burned.

- Pines

The large stands should be left, until they need to be felled, and then removed wholesale. Isolated individuals should be removed, unless needed for shelter. The row of pines across the salt marsh at Brooklands will need to be removed.

- Boxthorn

This should be removed from the dunes.

- *Juncus effusus*

This species will establish round the margins of fresh water wetlands. It is, unfortunately, difficult to distinguish from some native rushes, so, if it is to be removed, it will have to be removed on a plant by plant basis.

- Tall fescue

This will dominate brackish areas released from grazing. It is best treated by planting native species as described.

5.3.2 Erosion

Some concern has been expressed regarding the cutting back of banks at the Brooklands end of Seafield Park. This is part of the natural processes of coastal marsh systems and should not require any action, as it is usually cyclic. Of much greater concern is the process of lagoon infilling, especially as there is little that can be done without taking drastic measures. However, more detailed studies undertaken in 2008 demonstrate that the spread of three-square (*Schoenoplectus pungens*), which is seen as a consequence of the infilling, is not a straightforward increase in cover. Instead there has been a shift in where this plant occurs from the eastern side of the estuary (along the spit edge) to the western side. As most visitors access the western side, this is interpreted as an infilling of the estuary, rather than just an infilling at this area. On the eastern side, large areas of three-square have disappeared, even in the last four years, leaving flat unvegetated islands that erode around the margins. This means that sedimentation may not be as bad as often considered, and that three-square is responding to channel movements and localised increases in sediment. Over the whole southern end of the estuary there therefore seems to be a balance of erosion and sedimentation, matched by three-square decline and spread in a highly dynamic ecosystem.

5.4 Wildlife

The most obvious and significant wildlife in the Seafield Park area is the birdlife that occupies the Brooklands Lagoon environment. Some of these may appear within or in the vicinity of Seafield Park, and certainly can be viewed from the Park. The focus of description in this section of the draft management plan, therefore, is on this group of wildlife, but this does not discount in any way the range of vertebrate and invertebrate species present in the Park, some of which may be important and others undesired.

5.4.1 Birdlife

Most of the following information in birdlife is taken from an unpublished Christchurch City Council report, prepared in August 2008¹⁸, on what is referred to as the Brooklands Lagoon wetland complex.

The Brooklands Lagoon wetland complex comprises Brooklands Lagoon, Brooklands Spit, inland saltmarsh and dune environments on the estuary's western margin, the lower Styx River ponding area, the Styx River mouth marshes, Kainga Road salt meadow, the Waimakariri River mouth and the Kaiapoi Oxidation Ponds. It is considered one of the largest coastal wetland complexes in Canterbury.

Since the 1850s, some 100 species of bird have been recorded using Brooklands Lagoon and its immediate environs. This avifauna comprises 43 resident species, 23 seasonal visitors, 26 vagrants and eight species now locally extinct.

Forty four bird species occur year round on the estuary and its environs, with 37 species breeding locally. Many of the other species are migrants, coming from other parts of New Zealand, or as far away as the arctic regions of Siberia and Alaska.

Sixty nine species (69% of the total) are classified as wetland/coastal birds and numbers of these peak at over 6000 in late summer/autumn.

Table 3 lists 26 wetland/coastal bird species that use Brooklands Lagoon and its environs in numbers of national (N), regional (R) or local (L) significance (defined as being of significance if the numbers of the species is greater than 5% of local or regional, or greater than 1% of national, populations).

Many rare species are also recorded on the estuary, including sightings in the last few years of such species as Hudsonian Godwit, Asiatic Whimbrel, Ruff, Black Stilt, Little Tern, Arctic Skua, Chestnut-breasted Shelduck, Long-tailed Cuckoo and Australasian Crested Grebe.

¹⁸ Crossland A. C. (2008).

The Brooklands Lagoon complex is the second largest wetland area within the 'urban' part of Christchurch City (that is, excluding Banks Peninsula) and, in terms of bird abundance and species richness, is the second most important local site for wetland/coastal birdlife (Innes et al. 1991). In both rankings, Brooklands is second only to the Avon-Heathcote Estuary/Bromley Oxidation Ponds and ahead of such other sites as Travis Wetland, Styx Mill Basin, Horseshoe Lake and Peacock Springs.

Table 3: Wetland/coastal bird species that use Brooklands Lagoon and its environs¹⁹

New Zealand Shoveler	N
Grey Teal	N
New Zealand Scaup	N
South Island Pied Oystercatcher	R
Bar-tailed Godwit	R
Pied Stilt	R
Paradise Shelduck	R
Pied Cormorant	R
White-faced Heron	R
Royal Spoonbill	R
Caspian Tern	R
White-fronted Tern	R
Black-fronted Tern	R
Black-billed Gull	R
New Zealand Kingfisher	R
Variable Oystercatcher	L
Banded Dotterel	L
Black Swan	L
Canada Goose	L
Mallard	L
Black Cormorant	L
Little Cormorant	L
Spotted Shag	L
Pukeko	L
Red-billed Gull	L
Black-backed Gull	L

The Brooklands Lagoon wetland complex is an important wintering site and migration stop for wetland/coastal birdlife that breed on the Waimakariri River bed, as well as in other parts of Canterbury and the eastern South Island. It is also an important breeding ground in its own right. Important bird nesting areas include Brooklands Spit, the saltmarsh margins and the Kaiapoi Oxidation Ponds.

¹⁹ In numbers of national (N), regional (R) or local (L) significance.

5.5 History

5.5.1 Before European settlement

According to oral histories, the area between Lake Ellesmere (Waihora) and the Waimakariri River (known as the Courtenay River in the early years of European settlement) has been occupied by a series of peoples for over one thousand years. From the earliest, almost mythical, Rapawai, the occupancy groups were, successively, the Waitaha, the Kati Mamoe and, lastly, the Kai Tahu (a confederation of related hapu brought together formally in the mid-nineteenth century). Each successive group became the Tangata Whenua by conquest, inter-marriage and treaty (Note: The rights of previous occupants are not entirely voided by successor groups). The basis of occupation was the right to use and dispose of resources on a seasonal basis. Only a few of the occupation sites can be regarded as permanent.

The lower Waimakariri River was a major food gathering area for the Kaiapoī population and for related groups to the south. A major seasonal fishing camp was sited adjacent to the present western margin of Brooklands Lagoon at Puharakekenui. The Puharakekenui site was the formal basis for the establishment of Maori Reserve here and is the last remnant of Maori land in the area.

Perhaps more than the loss of land, the South Island peoples have aggrieved over the destruction of Mahinga Kai (food sources) by pollution, siltation and loss of access.

Ngāi Tahu use of the Waimakariri River was banned by legislation in the mid to early 1880s. One Kai Tahu, Pita Matu, had earlier stated, in concern over access, to the 1876 Royal Commission, “... *Waimakariri is the only river that fish can be got in and we are now banned from going there.*” (Tau et. al. (1990), pp. 5, 18).

Ngai Tahu, and their component Hapu, were fined for catching trout in their weir and, by 1890, regulations under the Fisheries Conservation Act prohibited the setting of nets near the Waimakariri River mouth.

For an account of the history and values of Ngāi Tahu for the wider area centred on Brooklands Lagoon, including the Seafield Park area, see the Tangata Whenua section of the Draft Brooklands Lagoon Area Parks Master Plan 2009.

5.5.2 After European arrival

European settlement in Canterbury as a whole began in the late 1840s. From approximately 1850, the coastal land south of the Waimakariri River to the city was taken up in two major runs – ‘Smart and Turner’ (Run No. 103) to the west (lying between the Styx and Waimakariri Rivers) and ‘The Sandhills Run (or Chisnall)’ (Run No. 72) along the east coast between the Waimakariri and Avon Rivers). Both were worked as cattle and dairy stations, except for the extreme eastern edge which was grazed by sheep. The break-up of these runs began in the early 1860s and was completed by the turn of the century. By the late 1870s, the native scrubland had been cleared, and the pingao and spinifex grass that once carpeted the extensive dunes was stripped by rabbits, sheep and cattle, resulting in increased instability involving blowouts and wandering parabolic dunes.

In 1878, the dunes were invested with the Christchurch City Council under the Waste Lands Act 1858. Part of this grazed land was intended for sanitary and tree planting purposes and some was leased for grazing. The lease was later withdrawn and the land planted with trees. Because of the continuing instability, a foredune was constructed between 1932 and 1940. The technique of using parallel fences is still used to stabilise blowouts. The long periods of dune instability dating back to the 1860s ended with the widespread planting of marram grass and tree lupin on both coastal and migrating dunes.

Subdivision for the settlement of Brooklands began in 1921. The area was already a popular holiday resort and venue for picnics and excursions, and boasted “... *unusual opportunities for the motor boat, swimming and fishing enthusiasts* ...”, as a large advertisement in The Press proclaimed. Eighty quarter-acre sections were offered and a large portion of these were sold. A competition for the naming of the main street was held, with the triumphant appellation being “Seafield Ave”, followed by “Seafield Road” as a close second (interestingly, an annotated photo dating from 1950 shows this road as Brooklands Road, and also calls the estuary the “Waimakariri Tidal Lagoon”). Although the name of the main street was later changed to Lower Styx Road, the original name lived on in the unformed legal road along the western edge of the lagoon - firstly, as Seafield Esplanade and, now, in the name of the Park itself.

However, changes to the mouth of the Waimakariri River radically altered these plans. The site for the main esplanade road now lies in the centre of Brooklands Lagoon and several sections are mudflats.

Table 4: History of the status of North and Mid-Seafield Park land parcels²⁰

Map Ref.	Legal Description	History of Status	Original Parcel Area (hectares)	Remaining Park Area (hectares)²¹
A	Lot 2 Deposited Plan 27026	Classified as scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Reserve for Recreation in the Waimairi County Council, subject to the Reserves Act 1977.	5.4076	2.8020
B	Lot 1 Deposited Plan 44685	Classified as scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Recreation Reserve in the Waimairi County Council.	12.5000	2.2867
C	Lot 8 Deposited Plan 342547	Classified as a scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Local Purpose (Environment and Habitat Protection) Reserve in the Christchurch City Council, subject to the Reserves Act 1977.	0.9581	0.9581
D	Lot 10 Deposited Plan 342547	Classified as a scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Local Purpose (Environment and Habitat Protection) Reserve in the Christchurch City Council, subject to the Reserves Act 1977.	5.1840	5.1840

²⁰ This covers only those parcels of land that are legally part of North and Mid Seafield Parks.

²¹ After part of some land parcels was transferred to Crown land with enactment of the Foreshore and Seabed Act 2004.

Seafield Park Management Plan 2010 DRAFT

Map Ref.	Legal Description	History of Status	Original Parcel Area (hectares)	Remaining Park Area (hectares)
E	Reserve 3748	The earlier vesting of this land parcel in the Waimakariri District Council was cancelled and it was changed from being a reserve for a site for harbour board buildings to being a Recreation Reserve classified under the Reserves Act 1977 and vested in the Christchurch City Council, in trust, for the purpose of a recreation reserve (Gaz 1990 p143). Propose for the Christchurch City Council to declare by resolution, under Section 14(1) of the Reserves Act 1977, that the classification of this reserve is changed to scenic reserve.	4.0469	2.5384
F	Lot 9 Deposited Plan 44428	Classified as scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Local Purpose (Road) Reserve in the Waimairi County.	1.9500	1.9500
G	Lot 1 Deposited Plan 44428	Classified as scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16 subsection (2A) of the Act. Fee simple title, originally vested on deposit as a Recreation Reserve in the Waimairi County Council.	24.7960	16.1989
H	Lot 8 Deposited Plan 44428	Classified as scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Recreation Reserve in the Waimairi County/District Council.	2.9550	2.9550
I	Lot 2 Deposited Plan 52199	Classified as scenic reserve (Section 19(1)(a) of the Reserves Act 1977) by resolution of the Christchurch City Council on 10 July 2008, pursuant to Section 16(2A) of the Act. Fee simple title, originally vested on deposit as a Recreation Reserve in the Waimairi County/District Council.	4.8413	4.8413
Total:			62.6389	39.7144

5.6 Present and Proposed Use

Seafield Park is primarily used by the public as an access corridor for informal recreational activity, which is about walking, bird watching and horse riding, but, unfortunately, has also included some undesirable pursuits, such as the illegal driving of motorised vehicles on to the Brooklands Lagoon saltmarshes. The appropriate activities are confined to the walking track that runs the length of the Park - the Brooklands Lagoon Walkway, and the several Park entrance accessway leading to this track.

Besides walking, bird watching and horse riding, access to Seafield Park is important to the public for related and largely compatible passive pursuits, befitting the high natural, “wild”, landscape, scenic and ecological (for example, saltmarsh and bird habitat) values of the Park and the adjacent Brooklands Lagoon. These include exercising (such as running and walking dogs), quiet contemplation/experience of nature, and outdoor education.

It is proposed to improve on, and add to, the track access in Seafield Park so as to, firstly, continue to provide non-conflicting access for walkers and horse riders, and, secondly, to offer and service, for example, future access by mountain bikers. Other intended facilities to encourage appropriate use of the Park are entrance areas, with accompanying amenities such as car parking, directional signage, information and interpretation boards, plus toilets at one site. Another proposed facility, to enhance the ability for visitors to observe wildlife, is a bird observation hide near Barkers Brook.

These proposals are raised in a landscape development concept and associated indicative costing in Part C of the Draft Brooklands Lagoon Area Parks Master Plan 2009.

5.6.1 Recreation

Currently the hinterland area (comprising some of the dune hummock terrain (other dune areas, especially the taller dunes to the north, are just wildlands with no grazing)) is used for rough grazing, horse riding and to provide limited access to Brooklands Lagoon. The walkway provides a means for visitors to undertake walking, photography and bird watching. Others come to Seafield Park for a wilderness experience, with visits being highest over the summer period.

Other visitors to the Park include school and church groups visiting Brooklands Lagoon and the sand dunes in the coastal zone. Many of these parties start from Spencer Park and focus on the area at the southern end of the existing extent of Seafield Park. The viewing platforms and information board at this southern end of the existing Park give visitors the opportunity to view the estuary and also benefit from some background information. There is a high level of use, especially over weekends and public holidays.

Some of these activities, on a day to day, and seasonal, basis affect the bird population. For much of the year, the southern end of the estuary is generally peaceful, with only the occasional walker or bird watcher causing a mild disturbance. During the duck shooting season, however, much of the area north of the southern reaches of the estuary is shot over.

In Seafield Park, north of the Maori Reserve, motorcycles and four wheel drive vehicles are problems.

5.6.2 Outdoor Education

There is good reason to promote the Seafield Park Scenic Reserve as a platform for people to learn about the ecological values of, and the environmental processes and changes occurring in, the Park and the adjacent Brooklands Lagoon estuary. With increasing public knowledge of these things about the Park, this will serve to foster a greater appreciation of the need to protect the Park's values into the future.

As mentioned in the sub-section above, there is a level of education happening in Spencer Park and South Seafield Park, with the arrival of school, and other, groups there. What is needed is to encourage these groups to move further north or make North and Mid-Seafield Parks a first-arrival destination. This can be aided with the development of suitable arrival facilities, including interpretation boards, car parking and toilets, at the various entrance points to the Park.

5.7 Access and Walkways

5.7.1 Access to Seafield Park

Access to the various parts of Seafield Park is via eight narrow entrances, which are not well positioned, are some distance apart and, in some cases, not actually formed. These are listed from south to north.

Heyders Road Access

The southern access to the existing Seafield Park is off Heyders Road, but it is difficult for visitors to easily identify a main entranceway for the Park, due to there being essentially four entrances to the Park off this road:

- Access to the relatively new addition to the Park extending into the most recent addition to the Spencerville settlement.
- Entrance to a former youth camp facility now held by the Council.
- Seafield Horse Park entrance.

- Start of the walking track alongside the western side of Brooklands Lagoon, and entrance to the animal enclosure and the Adrenalin Forest adventure ropes course, with accompanying vehicle parking area.

Hibburt Park, held and operated by the Associated Churches of Christ as a youth camp, also fronts Heyders Road.

Confusion about the access to this end of Seafield Park is compounded by the plethora of separate signs for Seafield Park, Brooklands Lagoon, Spencer Park and the Spencer Beach Holiday Park, and the lack of an integrated arrival sign facility.

Earlham Street Access

North of the Maori Reserve, Earlham Street (a rough vehicle track is provided) gives access from the Lower Styx Road to the Park.

Recreation Reserve Access

Future public access could be provided via the strip of land that extends from the Lower Styx Road immediately to the south of the Brooklands Playcentre Reserve and then expands in width towards Brooklands Lagoon. This land is classified Recreation Reserve and does not currently provide public access.

Dartford Street Access

Dartford Street lies just to the north of the afore-mentioned recreation reserve. It provides access to The Lagoons wetland development in Seafield Park.

Beacon Street Access

Provides access off Anfield Street lying to the north. Beacon Street is formed to the Park boundary.

Anfield Street Access

An accessway off the right-angled bend in Anfield Street gives access to the remaining areas of Seafield Park after transfer of much to the Crown ~~land~~ in this area, plus access to the Coastal Marine Area itself.

Chalford Street Access

The Chalford Street entranceway provides access to the northern-most part of Mid- Seafield Park. It is next to the entrance to the Christchurch Water Sports Club land.

Harbour Road Access

The northern-most access to Seafield Park is provided from Harbour Road via an ex-residential property, now in the ownership of the Council. The building on the property has been removed and the site landscaped. This land has no reserve status and is not formally part of Seafield Park. It is proposed that the

Council declare this land parcel to be classified as Scenic Reserve and have it added to the Park.

5.7.2 Brooklands Lagoon Walkway

Two viewing platforms located at Brooklands Lagoon's southern end, and an observation hide on the edge of the Maori Reserve, give excellent views of the estuary and its wildlife.

The Brooklands Lagoon Walkway, which passes through the existing part of Seafield Park at the southern end near Heyders Road, was originally developed with funds from the Royal Forest and Bird Protection Society. The walkway comprises an easy, well formed track, with steps and bark-laid stretches and takes about fifteen minutes to walk one way. It starts near Heyders Road and skirts the western margin of the estuary, meandering through scrub, pine, and poplar groves. The track is defined by blue markers and ends at the bird watching hide located on the edge of the Maori Reserve. A return loop to Spencer Park provides an alternative route back through pine plantation.

There is now a well formed track that continues from here all the way to Harbour Road.

5.8 Facilities and Services

North and Mid Seafield Parks are predominantly natural areas, with the potential for their further restoration and development in order to enhance the ecological values present, and adjoin the regionally and nationally important coastal estuarine ecosystem of Brooklands Lagoon. This is reflected in the classification of this part of the existing Seafield Park area as scenic reserve. Consequently, there is not the expectation that any significant level of built facilities to aid recreation, such as play equipment and barbeques, and services, such as a shop and telephone, will be present. This is in contrast to Spencer Park and South Seafield Park, whose status as recreation reserves, make it appropriate that a higher level of facilities and services are provided.

Having said that, it is important to provide a certain level of facilities and services in North and Mid Seafield Parks that allow the public to have safe and convenient access to the tracks, such as directional signage, interpretation boards, limited unsealed parking areas and the occasional bird observation hide/platform. Also, for comfort, facilities, such as toilets, at least one Park entrance area and seats/shelters at viewing points along the track, could be installed at sites, provided they designed in sympathy to, and are not obtrusive on, the environment, as well as not being located at every site.

Specific facilities include:

5.8.1 Tracks

The Brooklands Lagoon Walkway runs the length of the Park, with a number of points of access from several Park entrances. This caters for walking and horse riding. It is proposed to develop, in parts, separate tracks dedicated for walking/mountain biking and horse riding, respectively.

5.8.2 Bird observation facilities

There is an existing bird observation hide on the Brooklands Lagoon margin, just south of Mid Seafield Park and adjacent to the Maori Reserve (Puharakekenui), and another is proposed for near Barkers Brook further north. There are also two bird observation towers at the southern end of the estuary (covered in the Draft Spencer Park Management Plan 2009).

6 POLICY FRAMEWORK

The jurisdiction of the Draft Seafield Park Management Plan 2009 relates to proposed management policy for the defined existing parcels of North and Mid Seafield Parks, minus the portions of some of those parcels that have been transferred to the Crown ~~land~~. There is also other Christchurch City Council administered land adjacent to Seafield Park that is legally not part of the Park, although it is proposed to add some of this land to the Park, including the northern entrance to the Park, unformed legal road and accretion to legal road. This is addressed in this draft plan.

The draft plan, though, exists in a framework of other plans, strategies and documents that cover specific matters over the wider geographical area that includes the Seafield Park area. These include those listed on the next page.

6.1 Relevant other plans, strategies and documents

<u>Document</u>	<u>Relation to the Draft Seafield Park Management Plan 2009</u>
Draft Spencer Park Management Plan 2009	Covers Spencer Park, Spencer Park Beach and the southern part of Seafield Park (the northern and mid-reaches of Seafield Park are covered by the Draft Seafield Park Management Plan 2009).
Draft Brooklands Lagoon/Te Riu o Te Aika Kawa Area Parks Master Plan 2009	An “umbrella” plan that addresses the wider area centred on Brooklands Lagoon, and includes North and Mid Seafield Parks. This plan raises landscape development concepts/ proposed projects for consideration for inclusion in a future Long-Term Council Community Plan, and specific planning proposals, including for the Mid Seafield Park area.
Reserves Act 1977	The statutory basis for the management of and planning for Seafield Park.
Coastal Parks Strategy 2000-2010	Extended the period for implementation for works in the coastal parks proposed in the Christchurch Beaches and Coastal Parks Management Plan 1995.
City of Christchurch District Plan	Sets the status of the Seafield Park area, through zoning and identification of values present, such as Ecological Heritage Sites. Promotes the sustainable management of resources in the area.
Long-Term Council Community Plan (LTCCP)	The LTCCP 2009-19 has a capital works programme that include some works in the Seafield Park area. Additional costs for works in the Mid Seafield Park area have been raised for consideration in a future LTCCP.
Christchurch Biodiversity Strategy (Christchurch City Council); Canterbury Region Biodiversity Strategy (Environment Canterbury)	Support the retention of indigenous biodiversity in the area.
Christchurch City Council Bylaws	Regulate and control activities in the district, including use of dogs and parks.

<p><u>Draft Public Open Space Strategy 2010-2040</u></p>	<p><u>Provides a framework to guide the provision and development of all public open space within Christchurch and Banks Peninsula for the next 30 years. Promotes increased opportunities for the public to experience and access many of the city's outstanding natural and cultural landscapes, coastline, views and indigenous biodiversity.</u></p>
<p>Regional Coastal Environment Plan for the Canterbury Region 2005</p>	<p>Promotes the sustainable management of the natural and physical resources of the Coastal Marine Area and the coastal environment and its integrated management. Sets out the issues relating to protection and enhancement of the coast, water quality, controls on activities and structures and coastal hazards.</p>

6.2 Purpose of this plan

To enable the Christchurch City Council, as the administering body for the North and Mid Seafield Park scenic (and one recreation) reserves classified under the Reserves Act 1977, and to have in place an up-to-date management plan prepared according to Section 41 of that Act.

7 APPENDICES

7.1 Further reading

[A comprehensive list of publications giving information for the wider area centred on Brooklands Lagoon can be inspected from Page 125 of the Draft Brooklands Lagoon Area Parks Master Plan 2009]

Rob Greenaway & Associates (2005). *Spencer Park / Brooklands Lagoon area Recreation Survey 2004*. Report to the Christchurch City Council. Rob Greenaway & Associates.

McCoombs, K. (1999). *Weeds at Brooklands Lagoon, May 1999*. Report: CCCECO 99/09. Greenspace Unit, Christchurch City Council.

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- Crossland, A. C. (2008). *Brooklands Lagoon Wetland Complex: An overview of the site's importance to birdlife with habitat management recommendations*. Unpublished report for the Transport and Greenspace Unit, City Environment Group, Christchurch City Council.
- Christchurch City Council (2000). *Resource Information for the Christchurch Coastal Zone*. Produced and published by Coast Care, Parks Unit, Christchurch City Council.
- Partridge, T. R. (2007). *Vegetation of properties at 944, 968, 994 and 1000 Lower Styx Road*. Draft Report for the Transport and Greenspace Unit, Christchurch City Council.
- Crossland, A. C. (2002). *An Assessment of Impacts on Wildlife and Habitat for Resource Consent Application by W. J and H. M Bourke, 944 Lower Styx Road, Brooklands, Christchurch*. Unpublished report for the Environmental Services Unit, Christchurch City Council.
- Crossland, A. C. (1998). *Brooklands Area, Proposed Urban Development: Wildlife Considerations*. Unpublished report for the Water Services Unit, Christchurch City Council.
- Meurk, C. D. (1998). *Brooklands Subdivision Proposal Areas – Their Natural Vegetation Values*. Unpublished report for the Water Services Unit, Christchurch City Council.
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- Innes, K., Harris, R. and Crossland, A. C. (1991). *Resource Inventory of Brooklands Lagoon and Seafield Park*. Unpublished report for the Parks Unit, Christchurch City Council.
- Christchurch City Council (2008). *Christchurch City Biodiversity Strategy 2008-2035*. Christchurch City Council.
- Meurk, C. (2003). *Significant site proposed for addition to Seafield Park*. Report: CCCECO 04/02. Greenspace Unit, Christchurch City Council.
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Liley, F., Lord, J. and Innes, K. (1989). *The vegetation of Brooklands Lagoon and its conservation value*. Canterbury Botanical Society Journal 23:57-62.

Tau et. al. (1990)

Worner, G., Partridge, T. (2008). *Salt marsh vegetation at Brooklands Lagoon*. Christchurch City Council Ecology Report CCCECO 08/14.