Managing our plants and gardens

Auckland Botanic Gardens

Plant Collections Guidelines 2021

AUCKLAND BOTANIC GARDENS
Where ideas grow

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Images

This page: *Metrosideros excelsa* 'Glenbrook'

Cover page: clockwise from top left: *Aloe speciosa*, *Rosa* 'Frilly Jilly', Chatham Islands Nikau (Rhopalostylis sapida), *Leucospermum* 'Preciosa', *Lycopersicon esculentum* ('Sungold' tomato), and *Helenium* 'Waldstrand Copper'.

Auckland Botanic Gardens Plant Collections Guidelines 2021

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Plant collections guidelines

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Introduction

Purpose

“Delightful scientific shade, for knowledge as for pleasure made”.[1]

The purpose of the **Plant Collections Guidelines** (the Guidelines) is to provide principles and practices that guide the development, management, and enhancement of the Auckland Botanic Gardens (the Gardens) plant collections and amenity plantings and the botanic and horticultural services that support them. It provides direction for the documentation, curation, and maintenance of collections. It also defines the criteria for acceptance of plant introductions and removal of plants.

The Guidelines will enable all staff and stakeholders to share a common understanding of the role and purpose of the Gardens. They provide horticultural staff with relevant background information and guidance relative to their portfolios and will facilitate a relatively seamless induction for new horticultural and botanical staff.

By consistently following these Guidelines and procedures, we will protect and enhance the value that the plant collections provide for all areas of our work - recreation, health, education, conservation, and scientific research.

[1] The verse quoted at the Auckland Botanic Gardens official opening in 1982 remains just as relevant today.

Our vision and objectives

The vision[2] for the Gardens is:

> *A spectacular South Pacific Botanic Garden that is widely recognised for its outstanding plant collections, Auckland regional identity and the interest inspired in the community.*

This vision provides our inspiration and encapsulates our aspirations. There are four strands to the vision that were identified in the Master Plan (2010) as follows:

South Pacific: our unique character expressed through the design of the buildings, the content and layout of the plant collections and gathering areas, and our gardens and key messages.

Outstanding plant collections: these are primarily comprised of outstanding plants that have demonstrated through trials and observation that they are suitable for Auckland conditions. These comprehensive plant collections are places for the research, curation and documentation of plants, the conservation and protection of threatened species, and for conveying information that informs and inspires an interest in plants and gardening.

Auckland regional identity: the most visited and recognised public garden in the Auckland region, and the primary source of plant and garden information.

Interest inspired in the community: keen community interest in plants and gardens is stimulated by making learning interesting, fun, and relevant to people's lifestyles.

It is important that all involved with the Gardens share a common understanding of our vision, role, and purpose. This should be clearly articulated in the purpose of each plant collection.

Our core objective is to engage people with plants and gardens and to highlight their importance in everyday life. This is encapsulated in the strapline '*Where Ideas Grow*'.

We seek to influence the selection, use and care of plants in Auckland. Plants can play an important role in community health and well-being through improved nutrition and exercise and the simple pleasures that accrue from gardening.

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[2] Our vision is expressed in the Management Plan (2001)

Structure of the guidelines

Section One of the Guidelines sets out the Gardens role, direction and ‘big picture’ goals. It aligns with the Gardens Marketing and Engagement Strategy and is intended to provide an understanding of why the Gardens exist and what it delivers. This is informed by analysis of the role botanic gardens play internationally, and particularly how the Gardens can best serve the Auckland community. It outlines priorities in relation to research; conservation; education; health; and recreation.

Section Two presents the overall management and curation goals of the plant collections; amenity gardens; natural areas; trials and research collections; and stormwater plantings. Horticultural maintenance standards are also outlined in this section and Appendix 8.

Section Three follows, with a description of the processes and actions that are required for all plant introductions. This includes procedures for removing living plants and for transferring live material within NZ and overseas.

Section Four details plant record management and information held in the plant records database. It provides information about plant labels and signage.

Section Five presents the objectives and specific guidelines for each individual plant collections; amenity gardens; stormwater areas; and natural areas. As well as stating the relevant acquisition criteria, it includes actions around education; conservation; research; and cultivations for each garden, collection, or area.

Section Six describes the process for implementation and review of the Guidelines.

1 Section One: Role and Direction

1.1 Our Role

We provide beautiful gardens and visitor experiences that:

- Attract and engage the widest possible cross-section of the community.
- Enhance the lifestyles, health, and well-being of the community by connecting people with plants.
- Inspire ideas for garden design and plant content.
- Practise and promote sustainable horticultural practice.
- Use stories to foster greater understanding and appreciation of the value of plants to people and the role they play in our lives.
- Promote awareness of biodiversity and contribute to the conservation of threatened plants through holding documented collections, supporting habitat restoration, and raising awareness of the plight of plants and the natural environment.
- Contribute to the collective knowledge, conservation, and enjoyment of plants through trials and research programmes.

The Gardens are a small but important contributor to the Auckland Council's vision to be a "world-class" city by the provision of excellent plant collections and services that positively influence community knowledge, health, and wellbeing. Our primary role is to display documented collections of plants that support conservation and research and are creatively arranged to maximise visitor engagement and increase people's understanding of plants, gardening, and nature. This differentiates botanic gardens from public parks and display gardens.

The plant collections are supported by visitor services, education programmes and interpretation that highlight the importance of careful plant selection and creative garden design in an engaging manner aimed to change the way people think and feel about plants and to inspire ideas they can apply at home. We continue to develop innovative and flexible ways to deliver messages online.

The Gardens' role falls within five often overlapping categories: recreation, health, education, conservation, and research. The following sections provide a description of, and defines, the priorities for each of these categories.

Appendix 1 contains a chronology of the Gardens history.

1.2 Recreation

Most people visit the Gardens for recreation. It is a place to spend time with friends and family, relax, and enjoy, all important contributors to wellbeing.

Although recreation is the driver of most Garden visits, our high visitation provides an opportunity to engage large numbers of people with plants, gardens, and nature. The Gardens is full of great ideas that would benefit people if they understood and adopted them. Our challenge is to convey these ideas to visitors who are not actively seeking information in the hope they may implement one or more ideas at home.

Our recreation priority is to provide visitors with an enjoyable and uplifting experience by:

- Providing beautiful gardens and spaces that connect people of all ages, ethnicities and interests with plants and the role they play in our lives.
- Enabling people to engage with the natural environment.
- Positively contributing to the health and well-being of the people of Auckland by proactively encouraging active participation in gardening.

1.3 Health

Time spent in a garden is healthy, lowering stress, reducing blood pressure and relieving muscle tension. Vegetables are rich in disease-fighting antioxidants and phytochemicals and therefore lower the risk of serious diseases. Growing and eating home-grown produce improves nutrition, assists well-being and can be cheaper. There are many environmental benefits accrued from a garden as well. For example, photosynthesis improves air quality, and plants contribute to healthier office environments and they make cities more liveable.

Our health priorities are to:

- Increase community fitness and reduce stress levels through greater involvement in ‘active gardening’.
- Improve overall community health including reducing obesity related illnesses through encouraging greater growing and consumption of fruit and vegetables.
- Contribute to improved overall mental health through encouraging appreciation of flowers, plants, and gardens.

1.4 Education

Much of our educational delivery is primarily achieved through the labelled plant collections and associated interpretative signage that enables visitors to better

understand the plant collections. Knowledgeable field and visitor centre staff provide information to visitors. We also have two garden classrooms and a purpose-built edible teaching garden where we run environmental education programmes that are attended by around 8,000 school children per annum.

Our education priorities are to:

- Promote awareness of biodiversity and the importance of plants and their connection to people.
- Inspire interest in and understanding of plants through community and school education programmes.
- Positively influence the content and style of gardens and ecological plantings in the region through displaying recommended plants based on trials and evaluation in a manner.
- Provide gardens, indoor displays, information, and ideas that can be implemented in urban gardens, lifestyle blocks and restoration projects. This includes:
  - Advocating best horticultural practices that achieve productive sustainable outcomes.
  - Ideas on the content and creative design of gardens including effective plant combinations.
- Convey stories that highlight the importance of plants, connect people with nature, and highlight the traditional relationships between people and plants (ethnobotany).
- Promote effective environmental plant uses through displaying and interpreting Water Sensitive Design applications and revegetation programmes.
- Assist with the selection, sourcing, health, and identification of plants through provision of expert advice.

1.5 Conservation

An important function of the Gardens is to hold and protect plants that are threatened with extinction. Most are native to NZ, but we also grow plants that are threatened elsewhere in the world as well as collections of cultivars which are now uncommon in cultivation. Numerous significant cultivars once commonplace are in danger of being lost as commercial growers delete them from their range.

Growing threatened plants enables us to provide plant material for research, education, cultivation and perhaps reintroduction to the wild or into commercial horticulture (if appropriate). For native plants our goal is to conserve plant species with a particular emphasis on regionally and nationally threatened NZ native plants in the Auckland region through using our resources and horticultural expertise in relevant partnerships. Featuring threatened plants in creative garden displays plays a major role in raising public awareness of the precarious plight of many plants and their habitats.

The Auckland Council Indigenous Biodiversity Strategy (2012) and Te Mana o Te Taiao - Aotearoa New Zealand Biodiversity Strategy (2020) provide the framework for much of the Gardens conservation effort. The Gardens endeavours to support the objectives and key goals of these strategies by:

- Protecting nationally threatened species (where it has been identified that these species are best managed in the Auckland region) to prevent their national extinction. Examples include ex situ collections and the Threatened Native Plant Garden.
- Working in partnership with relevant agencies such as the Department of Conservation (DOC), Iwi and stakeholders to achieve strategic outcomes.
- Engaging with the community to promote their awareness and understanding of biodiversity and involving them in effective restoration projects such as volunteer planting days.

Our conservation priorities are to:

- Contribute to the conservation of threatened plants through holding documented collections, supporting habitat restoration, and raising awareness of the plight of plants and the natural environment.
- Support the Auckland Council Indigenous Biodiversity Strategy, Te Mana o Te Taiao - Aotearoa New Zealand Biodiversity Strategy (2020) and the Global Strategy for Plant Conservation appropriate to the Gardens objectives and resources.
- Hold documented ex situ collections of threatened NZ native plants.
- Conserve prioritised collections of exotic species and cultivars that may otherwise be lost.

- Highlight the plight and importance of plants and the natural environment to enable visitors to understand and value the role the Gardens plays in conservation.
- Motivate the community and others to take personal action to protect plants and the environment.

1.6 Research

The core scientific role of the Gardens is to research and document living plant collections to foster the conservation, understanding and enjoyment of plants. We proactively support research that contributes to better understanding horticultural practices and a sustainable approach to managing plants and gardens.

Research is often undertaken in collaboration with external partners and students. For example, we work with Crown Research Institutes on water sensitive design devices and biosecurity. We support research of scientists and students by the provision of plant material or as a host site for their work. Our plant breeding programmes have produced numerous cultivars widely grown in gardens here and overseas. We regularly undertake social science which informs the marketing and business planning processes and is the basis for growing our business.

Our research priorities are to:

- Contribute to the collective knowledge, conservation and enjoyment of plants and understanding of their relationship with people.
- Promote plants that are suitable for Auckland conditions by testing them in trials without applying pesticides.
- Contribute to sustainable horticultural practice at the Gardens such as increased understanding of plant and soil health, and alternatives to pesticides and turf such as wildflower meadows.
- Support conservation of threatened species and habitats.
- Contribute to our understanding of community attitudes, desires, and expectations through targeted market research.
- Trials may also focus on biosecurity outcomes, propagation, economic and ecological benefits, water sensitive design, pests and diseases, and other outcomes considered relevant to the Gardens.

1.7 Sustainable Horticulture

The Gardens has adopted a 'sustainable horticulture' approach which utilises practices that optimise the health of plants without reliance on fungicides and insecticides, (see Appendix 2). These practices promote abundant life in the plant collections and gardens including beneficial soil microorganisms whose competitive activities suppress harmful pathogens. Other contributing practices include using natural fertilisers that promote soil life, minimising irrigation and run-off, infrequent cultivation and applying liberal quantities of compost and organic mulch. Ideally, we aim to establish communities of plants that are self-sustaining with minimal intervention.

This approach is underpinned by extensive trial programmes that identify those plants that perform and remain healthy in Auckland conditions in a pesticide free regime.

We undertake a proactive role in environmental weed management and awareness campaigns. All plants in the collections are assessed for weed potential, and environmental weeds in gardens and natural areas are controlled. We also support appropriate research programmes that seek to reduce the impact of environmental weeds.

Other environmental outcomes are achieved through increasing habitat diversity and landscape enhancement. Mowing continues to be monitored with the aim of reducing labour and energy resources, promoting plant health by minimising compaction and enhancing wildlife habitat by allowing some areas to become wildflower meadows.

A focus is given to the role plants play in environmental enhancement, particularly to addressing the issue or urban stormwater using Water Sensitive Design[3] (WSD). A series of integrated systems protect and enhance waterways through treating stormwater before it enters the streams and lakes. Our stormwater management programme is further discussed in Section Two. We recognise that the Gardens have an important role to play in achieving wider conservation outcomes, such as improvements to water quality.

Preparing for the effects of climate change on Auckland's environments and gardening underpins this approach. Climate change has implications for the way we approach plant selection, conservation and biosecurity, garden practices, water, infrastructure and how we work and manage people (including staff, visitors and volunteers).

1.8 Asset Statement

Materials used for assets needs to be durable, functional, safe, and appropriate for the look and feel of each collection. Our preference is for locally sourced and sustainably

[3] This is also known as Low Impact Design or Integrated Stormwater Management.

harvested materials. When selecting products and materials consideration is given to environmental issues and the long-term implications of the choices we make. We are committed to sustainable water management though the use of green infrastructure (see Appendix 3).

Materials to be avoided:

- Hogan & other soft substrates such as compacted sandstone.
- Asphalt is suitable for roads but when used for pathways is aesthetically unappealing and implies to pedestrians that vehicles have priority. Chip seal is considered more appropriate for pathways but requires regular surface renewal).
- Pavers, primarily due to increased weed control requirements.
- Wooden boardwalks due to going maintenance requirements and slipperiness from mould and slime.
- Pathway surfaces that are easily marked or stained should be avoided e.g. white oxides in concrete.

For network pathways, consistency of materials improves visitor way finding. However bespoke solutions can be applied in some situations such as distinctive garden styles e.g. shell surfaces.

Sealants may be applied to improve safety, stain resistance and durability of pathways.

Signs should be placed in areas away from the path of mowers to reduce the chance of damage e.g. in garden beds where possible. If signs are placed in lawns, they need to be on a platform with a sufficiently wide mowing strip around them to prevent damage by mowers.

Shelters should reflect the style of the garden in which they are located. They should be constructed from robust materials with consideration of fire retardants and graffiti resistant treatments.

Seats will be placed in areas that are pleasant for visitors and enable access for maintenance. Around half the seats should be in the shade and seats in lawns must be on a platform with a sufficiently wide mowing strip around them to prevent mower damage. Where possible seats should have an attractive view. The number of seats should not dominate a garden. Only one style of garden seat for each garden is used.

Asset design must incorporate operational access for maintenance vehicles. Maintenance access must be visually inconspicuous and separated from pedestrian accessways where possible.

2 Section Two: Plants

2.1 Introduction

Plants are grouped to achieve different purposes. The content of plant collections may be based on geographic origin, genera, or plant type. This Section provides a description of each collection and the overall management goals.

2.2 Garden types and management goals

2.2.1 Plant collections

A plant collection is defined as being a group of plants grown, assembled, and displayed according to prescribed criteria and for a specific purpose. Documented plant collections are the essential component of a botanic garden. They underpin all our education, conservation and research programs and contribute greatly to a visitor's recreational enjoyment.

Plant collections that are attractively designed and well-presented attract greater attention from visitors who are more likely to apply new ideas in their own gardens. Attractive and appropriate plant combinations contribute significantly to the aesthetic appeal of a garden. This involves consideration of flower and foliage colour, texture, form, and size.

Plant collections must be aligned with the strategic direction of the Gardens. This needs to be clearly articulated in each plant collection statement. The management goals for our plant collections are:

1. Quality presentation through horticultural excellence (including design and management practice).
2. Appropriate content aligned to guidelines and collection statements.
3. Optimum plant health through sustainable practices including avoidance of pesticides.
4. Alignment of content with education, conservation, and research programmes.
5. Identification and display of high-performing plants through ongoing trials and evaluation.

A high level of horticultural expertise is required to effectively manage plant collections in a manner that achieves all these goals.

2.2.2 Amenity gardens

Amenity gardens showcase the plants we recommend for Auckland conditions. The content of all amenity gardens is based on plant recommendations from trials and aligned to its collection statement. The management goals for our amenity gardens are:

1. Demonstration of horticultural excellence.
2. Optimum plant health through sustainable practices including minimal pesticide use.
3. Attractive appearance compatible with the surroundings.
4. Minimal maintenance.
5. Where appropriate incorporate species of conservation significance or breeding populations of significant plants.

2.2.3 Natural areas

Natural areas at the Gardens include the Native Forest and revegetation plantings. The Native Forest is a 10-hectare natural remnant of broadleaf/podocarp forest contiguous with an additional 20 hectares of forest in Tōtara Park (managed by Auckland Council Parks). Tōtara Park forest is almost all that is left of the alluvial flat forests of the Hunua Ecological District, common in pre-human times. The Puhinui Stream follows close to the forest boundary. This forest is characterised by its mature podocarps and around 170 species of native vascular plants, including a few species which are uncommon to the Auckland region.

Mature native trees (predominantly *Podocarpus totara*) are distributed across the property and are a strong feature of the Gardens. They are of great value and their health must be protected by minimising root compaction, regular arboricultural inspections and remedial work, and when required mulching and fertilising. Revegetation plantings and maintenance of revegetation areas are intended to mainly support forest margins.

Plantings will reflect the natural forest margins and seed for revegetation plantings will be sourced as much as possible from the native forest at the Gardens or from Hunua Ecological District. The management goals for our natural areas are:

1. To conserve, enhance and restore the biodiversity of the Gardens native forest area, with a focus on threatened or uncommon indigenous species and habitats, to a self-sustaining natural level.
2. To support the recovery of native forest and remnant trees at the Gardens.
3. Control of weeds and animal pests.
4. To ensure ongoing health and safety of mature native specimen trees.

2.2.4 The Nursery

The Gardens onsite nursery produces plants for the Garden collections and for Parks revegetation on regional parks managed by Auckland Council. Plants for Garden collections are propagated from native and exotic plants growing at Auckland Botanic Gardens as well as purchased from external suppliers and held in the nursery until planting time. Revegetation plants are produced from seed collected from the wild at each park and sent to the nursery for propagation. Plants are dispatched, either directly at planting grade over a month-long period from ABG nursery to the planting site, or as trays of seedlings for bagging at park-based volunteer-run nurseries on parks.

The nursery is accredited under the NZPPI (New Zealand Plant Producers Incorporated) Nursery Biosecurity Scheme to reduce the risk as much as possible that native plants grown for revegetation could spread kauri dieback or other nursery-borne microorganisms that may adversely affect the sites where the plants are taken (Regional Parks) each year.

2.2.5 Trials and research collections

We assess all plants on an ongoing basis to determine those suitable for growing in Auckland conditions with the most outstanding designated as ‘Star Performers’. We have a designated trial ground at the Gardens where most trials are undertaken. However, by their nature trials are ongoing and plants throughout the Gardens are still considered under trial. Plants must earn their place and prove their merit. The type of information that is captured in trial assessments may include:

- Plant health without pesticide application
- Suitability for purpose (e.g. hedge or water sensitive design system)
- Overall performance (e.g. flowering time, maintenance requirements)
- Weed potential (e.g. plant fertility/sterility)
- Growing data (e.g. propagation requirements, time to flower from seed).

The management goals for our trial and research collections are to:

1. Inform the selection of plants we recommend through our engagement programme.
2. Influence the range of plants grown in the Auckland region.
3. Inform content in our own plant collections, amenity gardens and displays.

Refer to Appendix 4: Plant Evaluation, for information on assessment of Star Performers and Recommended Plants.

2.2.6 Plant breeding

Plant breeding of exotic and native plants is a legitimate activity of the Gardens. The main priority is production of new hybrids of outstanding performance that do not require applications of insecticide and fungicide.

Plant breeding at the Gardens is detailed in Appendix 5.

2.2.7 Stormwater plantings

The Gardens applies a stormwater management programme based on water sensitive design principles to protect and enhance the health of waterways and create habitat for native birds, insects, and reptiles. Our focus is the selection and subsequent evaluation of native plant species for suitability in water sensitive design systems. Our stormwater management programme is detailed in Appendix 3.

A series of connected stormwater treatment devices (a treatment train) have been deployed to optimise the environmental benefits underpinned by the water sensitive design philosophy. The accumulated benefits of these connected devices contribute significantly to the health of our waterways. The management goals for our stormwater management programme are:

1. To enhance waterway health at the Gardens.
2. Be a regional and national showcase for plant choices in stormwater treatment systems (water sensitive design).
3. Increase awareness of waterway health issues and solutions through interpretation and education programmes.
4. To enhance biodiversity benefits.
5. To enhance landscape and amenity values.

2.3 Curation of the plant collections

Optimising the effectiveness of plant collections requires expert curation which is the specialised care and management of plant collections. This includes making appropriate new plant introductions, accurate and timely documentation, seasonal planning, effective plant combinations and appropriate maintenance. The curation of some collections involves specialised conservation work and ongoing evaluation and research. The curation of a group of plants requires a thorough and expert understanding of their purpose, cultivation requirements, ecology, and taxonomy.

Effective curation also requires the ongoing monitoring of plants and occasional removal if they no longer justify the cost involved in their continued maintenance and are no longer contributing to the objectives of the Gardens and key outcomes of the collection.

There is a cost associated with the maintenance of each plant that is added to our collections. Royal Botanic Gardens, Edinburgh calculates this to be an average of GB£71 per plant per year (2013) (this equates to NZ$138). All plants at the Gardens should be monitored to ensure the value delivered justifies the cost. Removal of plants can be difficult for horticulturists, but it is essential to enable the introduction of new germplasm that may be of greater value.

2.4 Horticultural maintenance

Maintenance standards can vary according to the type and location of a plant collection or garden, but they should always meet the expectations of visitors and stakeholders. Plants should be healthy and well presented, and labels and signage readily accessible and unambiguous. Regular horticultural assessments are undertaken to evaluate standards and recommend remedial actions. Herbicides may be used for weed control where practical alternatives are unavailable. See Appendix 6: Herbicide Use.

The Gardens aim is for all plants to become self-sustaining once mature without requiring irrigation, except for seedlings and in circumstances where plant health may be compromised. See Appendix 7: Irrigation.

2.4.1 Maintenance standards

There are three maintenance standards identified for each for garden and collection Gardens are expected to be at or exceeding these standards (see Appendix 8):

1. Very high – high profile arrival areas (e.g. the main arrival area) are presented to an immaculate standard.
2. High – heavily used public areas are presented to a high standard.
3. Medium – areas of low public use are presented to a medium standard that is appropriate for the style of garden but still meets visitor expectations.

3 Section Three: Plant Introduction Procedures

3.1 Introduction

The following procedures maximise the opportunity to add interesting plants to the collections while minimising liability by strenuously avoiding the acquisition of inappropriate or potentially illegal plants. These procedures are required for all plant introductions and are applied when plants are proactively obtained and when unsolicited offers are received. It also outlines the procedures for removing living plants (de-accessioning) and for transferring live material overseas or within New Zealand.

3.2 Acquisition criteria

Any new plant must:

- Meet the accession criteria for one or more plant collections; or
- Be considered suitable for inclusion in amenity areas; or
- Be temporary display plants; or
- Be part of a conservation programme (e.g. Parks revegetation).

Plant acquisition must follow the Plant Selection Standard Operating Procedure (SOP). Before acceptance of new plants, they must be submitted to the Curator (or nominated representative) before attaining them (or accepting them, if they are unsolicited). The Curator (or their representative) will verify the material:

1. Meets the criteria for acquisitions in that collection
2. Is not already included in existing plant collections
3. Has not previously been discarded from the Gardens due to poor performance
4. Is not identified as a weed in the National Plant Pest Accord, or listed in the Regional Pest Management Plan
5. If collected from the wild has all necessary and valid permission.

If there is any suspicion of the identity of the plant or it is one not normally seen[4] or otherwise detected in NZ and it does not appear in the Plants Biosecurity Index (PBI) and/or the New Zealand Organism Register, refer to the ‘Elevated status procedure’. Note: Absence from the PBI alone does not trigger this. The process for accessioning plants is further described in Appendix 9.

[4] An organism “not normally seen or otherwise detected in New Zealand”, means one that was not present in New Zealand before 29 July 1998, and has not been lawfully imported after that date.

3.3 Sourcing plants or seed from overseas

Importation of plant germplasm from overseas is regulated by the Import Health Standards. Only species listed in the PBI with a valid seed for sowing import specification can be imported. If it does have not a valid seed for sowing import specification this means conditions for import have not been developed. In addition to this if a plant is listed under Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) its import must be accompanied by a valid CITES export permit issued by the country of export. Section 3.2 also applies to all overseas material.

The Gardens Curator (or their representative) will:

1. Verify if the plant is included on CITES schedules and that all relevant permits are obtained.[5]
2. Ascertain if it is included on the PBI as 'Basic' (able to be imported directly), in which case proceed with order.
3. Contact plantimports@mpi.govt.nz regarding any species proposed for import with a specification other than 'Basic'[6].

Ministry for Primary Industries (MPI) will be informed of any germplasm received unsolicited from overseas that does not meet the import health standard[7]. Unless MPI direct to the contrary this will be destroyed.

3.4 Elevated status procedure

This procedure is used if there are concerns about a plant's identity and/or legal status. Apply if:

- The plant is non-native and not normally seen or otherwise detected in New Zealand[8]
- Its identity is questionable or unknown
- We receive any information from reputable people or agencies that questions its legitimacy.

3.4.1 Researching plant status

The Gardens Curator will assess whether the importance of the acquisition outweighs the time required to ensure its identity and legality. Assessment will include:

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[5] Plants protected from trade are listed in Schedule 1, 2 or 3 in the Trade in Endangered Species Act (1989) and the process to obtain permits is outlined within this Act. Plants protected by CITES are listed within this Act.
[6] For more information on how to use the PBI see http://www.biosecurity.govt.nz/regs/imports/plants/seeds
[7] Contact MPI.
[8] It will not be on the PBI (or has a specification other than 'Basic') or the NZ Organism Register.

1. Confirming its identity
2. Ensuring synonyms of the plant are known
3. Discussion with plant suppliers on the original source of the plant
4. Research e.g. searching the PBI, the New Zealand Organisms Register as well as databases held by New Zealand herbaria and plant catalogues to investigate the first known dates the plant was recorded in New Zealand.

3.4.2 Approving/declining acquisition

Following research, the Gardens Curator in consultation with the Gardens Manager will decide whether or not to proceed with acquisition. The decision will be guided by the following principles:

- If there is anything to suggest the plant is a new organism imported without proper legal clearance, it will be rejected and MPI will be immediately informed.
- If the plant “appears to be” one “not normally seen” in NZ, MPI will be immediately informed (there is a duty to do so under the Biosecurity Act).
- If the Gardens Curator and Gardens Manager are satisfied that the plant was in NZ prior to 29 July 1998, it will be received, and all relevant data will be recorded in the Plant Records Database. This may include information provided by reputable experts on the period it is believed a plant has been in NZ.

A plant may fall into the third category based on the professional judgment of the Gardens Curator and Gardens Manager, whether or not there is documented “proof” that the plant was in NZ prior to 29 July 1998.

3.5 Collection of material from the wild

Wild-collected seed of plant species is preferred in all circumstances by botanic gardens. No wild population should be further threatened by collection of material for ex situ cultivation. Only as much seed as is required should be collected. As a rule of thumb, no more than 10% of any fruit from any one plant should be removed, and no more than 10% of plant material from any one plant removed. If an entire population is threatened with destruction more material, including whole plants, may be salvaged. Sampling must capture as much genetic variation of each wild population or populations as practicable. When the population contains more than 50 individuals, seed is sampled randomly from all accessible microclimates at the site and including as much morphological variation as is visible to the collector. Where populations are fewer than 50, seed is harvested from all fruiting plants. In addition:

- Germplasm collected from the wild must have appropriate permission (i.e., permits or written permission).
- Third parties donating wild-sourced plant material to the Gardens must meet the above criteria.
- Native plants introduced for revegetation at the Gardens to be sourced from within the Hunua Ecological District[9].
- Germplasm collected from the wild is to be accurately recorded and must be transferred to the Plant Records Database.

[9] The Botanic Gardens is located within the Hunua Ecological District but near the junction with both Manukau and Tāmaki Ecological Districts. In certain circumstances it may be acceptable, because of the proximity to these Districts, for material to be sourced from Tāmaki or Manukau on a case by case basis

3.6 Removal of plants

3.6.1 De-accession procedures

De-accessioning is the removal of living plants from the collections, and the process of amending the records of plants that are removed. Unless otherwise specified in Plant Collection Statements, plants will be removed if they are:

- Pest/disease-prone or poor performers
- Have lost relevance
- Surplus once a plant trial concludes. All cultivars surplus to our requirements to be offered to other parties before destruction unless the Gardens are under a legal obligation not to distribute that plant. Original donors of specific plants are to be given first right of refusal
- Showing potential to become weeds. Those identified as weeds will be contained and/or removed in collaboration with Auckland Council Biosecurity
- Plants in ecological collections of unknown origin will be progressively replaced with those of known provenance.

The final decision to de-accession a plant will be made by the Gardens Curator in consultation with Senior Gardeners. Plants of significance should not be removed, unless in extreme circumstances (e.g. death). These are defined as plants of special importance, such as threatened species or plants of historical interest, or unique character. Plants of conservation concern will be offered to other institutions. Cuttings of such plants must be confirmed to have taken before removing the parent plant.

3.6.2 Transfer of plant material overseas

Any transfer of material overseas must be completed in accordance with the Convention on Biological Diversity and an Outward Plant Distribution Form (Appendix 10) filled out. The Gardens will act in accordance with all relevant international agreements and laws governing trade including CITES legislation.

3.6.3 Transfer of plant material within New Zealand

All plant material for distribution within New Zealand, whether it is individual plants propagated at the Gardens or vegetative material collected from the Gardens, is recorded on an Outward Plant Distribution Form (Appendix 10) before it leaves the Gardens.

4 Section Four: Plant Documentation

4.1 Introduction

One of the defining features of a botanic garden is that plants are documented. This means that the plant records database holds pertinent information on all plants held at the Gardens, including their locations and where they were sourced.

4.2 Plant records

Accurate documentation of plant collections is fundamental to botanic gardens because without it a collection (or plants within a collection) has little horticultural, scientific or conservation value. Keeping accurate plant records enables relevant data to be recorded against individual accessions for reference purposes. A plant records database is used for this.

All incoming plant material to the Gardens, regardless of whether it is held permanently or for short timeframes, is recorded in some way. Perennial plants held in permanent collections are recorded in the accession book and the plant records database. Annuals and vegetables are only accessioned if they are wild-sourced or are part of a trial programme but are recorded in the seed or annual book. Plants for displays, parks revegetation or those held on behalf of others are recorded in separate books (the display, revegetation, annuals, and miscellaneous books respectively) but not entered on to the plant records database as they are not permanently held. Information held in these books is summarised in Appendix 11.

Cuttings taken or seed collected from plants already accessioned at the Gardens are recorded in the separate cutting and seed books and accessioned in the nursery prior to planting out.

Seed or plants may be held with agreements which restrict activities or further distribution without permission e.g. with MPI or Iwi. These agreements will be noted in the database.

A Plant Movement Record (PMR) is a method used to document the movement of a plant within the Gardens e.g. from the nursery to a garden or collection, or between collections. A PMR is either recorded directly to the database from a field notebook, using the form (Appendix 12) or the Floria App in the field.

4.2.1 Accession year

All germplasm is accessioned in the year that it is included in permanent collections or gardens. If a plant held temporarily is sought for permanent collection it is accessioned the year it is planted, not the year it was received. This situation may occur when plants used as display plants or those grown for other parties, such as Regional Parks, are taken for inclusion in plant collections. Relevant records including source and date received are to be researched using relevant books, such as the seed book, cutting book or display plants book, and all relevant data transferred to the plant records database.

4.3 Plants records database

The Gardens first electronic plant records database used the Inmagic program and was introduced in 1994. It superseded manual record keeping. BG-BASE was installed in 2008 and Iris-BG in 2019.

IrisBG is a modern and efficient professional software and database solution for botanical collections. We use a multi-user standard package as well as the mapping module, web explorer, data import function and two mobile device licences (Floria App). Database and software are provided by two companies, IrisBG and Botanical Software (Floria).

4.4 Plant labels and signage

4.4.1 Accession tags

Before a plant leaves the Nursery, aluminium accession tags are issued to each accession. The tags are a discreet but relatively secure long-term reference that records the accession number and plant name. Tags are issued for all trees, shrubs, large succulents, and trial plants. The number issued to perennials and bulbs is at the discretion of the Botanical Records and Conservation Specialist.

4.4.2 Plant labels

Plant labels are intended for visitor information, and for providing easy access to accession numbers. Labels are placed in front of every group of plants where they should be visible and clearly identify the plant. The aim is to have a plant label in front of almost every group of plants in collections and amenity gardens.

Generally, every group of plants in the plant collections will have a label (exceptions are noted in the individual Plant Collection Statements). For amenity areas, sufficient groups of plants will be labelled so that visitors can identify them. All individual specimen trees will be labelled. Fewer labels may be allocated to a group of trees of the same species.

Only two label sizes are used: 150 x 75mm and 120 x 60mm. Small labels are issued in plant collections where large numbers of small plants are located within a relatively small area, and for plants of low stature.

Plant label data is generated using the plant records database and sent electronically to the manufacturer. The label data is permanently embedded beneath an anodic layer on the aluminium by using this photo-imaging process.

The Gardens standard display plant label uses a six line format consisting of accession number; botanical name: genus, species, and where appropriate subspecies (subsp.), forma (f.), variety (var.), cultivar, synonym (syn.); vernacular (common name); natural geographical distribution and family (refer examples below).

Cultivar names shall follow the rules of nomenclature. However, when a trade name is in more common usage for marketing reasons this may be given prominence on the plant label (no quotation marks). The correct cultivar name must also be shown on the label.

All NZ native plants in plant collections are given a Māori common name and these take precedence over other common names.

5 Section Five: Plant Collection and Amenity Garden Statements

5.1 Introduction

The objectives for each garden and collection or area are derived from the vision and objectives for the Gardens, as well as the overall curation and management goals set out in Section Two.

5.2 Plant Collection Statements

The plant collection statements included in this section are:

5.2.1 Native Plant Identification Trail

Highlights the key identification characteristics of a selection of NZ native plants that are commonly encountered in northern forests.

Description

Contains a wide range of NZ native trees, shrubs, perennials, climbers, and ferns predominantly from northern NZ. Interesting and unusual forms of NZ natives, such as divaricating plants, and those with different juvenile and adult foliage are also displayed.

Objectives

- Enable visitors to identify a wide range of more commonly encountered native. plant species, especially those from northern regions.
- Display species and forms originating from northern offshore islands.
- Display and interpret divaricating plants.

Background

The Native Plant Identification Trail was planted in 1976 and was one of the first collections in the gardens to be established. Beds were planted by taxonomy e.g. a *Hebe* bed, a *Coprosma* bed etc. Cultivars were included. In 1989 a review of the collections determined that native plantings would represent various stages of succession that occur in nature. The beds now featuring divaricating plants were once scree beds established in 1987. The scree bed theme was disestablished in 2020.

Education

- Enable school groups and visitors to view and readily identify a range of native plants through highlighting their most readily observable characteristics.
- Provide interpretation of traditional Māori uses of native plants, the diversity of native plants and their adaptive features.

Conservation

- Incorporating appropriate ex situ collections of threatened flora.

Research

- Various ecological and botanical projects may utilise material from this Garden.

Acquisition criteria

- Primarily wild collected species of known recorded origin from Auckland and Northland ecological regions.
- Cultivars are not included (although historically they were included, cultivars are no longer acquired and will be removed progressively).
- Ensure there is more than one plant of each species, especially dioecious species.
- Continue to introduce understorey plants such as ferns which suit the shaded conditions.
- Self-seeded plants may be accessioned if they have special characteristics or have potential to become a feature of the collection.
- As feature plants reach maturity consider planting a younger specimen nearby to display the different stages of growth and enable interpretation of the diagnostic features.

Cultivation

- This garden is maintained to a medium standard.
- Apply organic mulch where natural leaf litter has not yet developed.
- Manage self-seeded plants by leaving those that support the education purpose of this garden and remove those that detract from accessioned plants or infrastructure such as signs or paths.
- Formative pruning may be necessary to enhance the natural shape of the tree or shrub, e.g. a kauri with a double leader.
- Avoid planting tall trees that at maturity will encroach on the specified allowable proximity to the power lines.
- Manage vegetation to allow feature plants to be displayed clearly.
- Label as many native plants as possible to facilitate identification by visitors.
- Interpretative signs must always be adjacent to a live healthy subject specimen.

5.2.2 Native Plant Ideas

Outstanding ornamental native plants attractively combined in creatively designed gardens.

Description

The garden contains native species and cultivars selected for proven performance in Auckland conditions that are available to home gardeners. It highlights effective ways of using native plants. They are grouped in various design themes including:

- Subtropical: Bold foliage and the lushness of many NZ plants.
- Coastal: Plants that tolerate salt-laden winds.
- Residential courtyard: Innovative ideas where space is limited.
- Collector's corner: Interesting and unusual plants.
- Textures: Diverse textures of foliage and form in effective combinations.
- Colour border: Graduated foliage colours from pink shades at one end to yellows at the other with groupings of other shades in between.
- Formal: Creative shapes and symmetry.

Objectives

- Inspire visitors to use native plants in innovative and attractive ways such as topiary, hedging and planting combinations that emphasise texture, form, and colour.
- Highlight the advantages of utilising native species and cultivars of exceptional performance.

Background

Native Plant Ideas was developed in 2004 in an area formerly occupied by the Perennial Garden. In 2019 development of the Pacific Pathway resulted in a new entrance location and new pathways.

Education

- Display plants and information that communicates to landscapers and home gardeners the importance of choosing appropriate plants for any given planting situation.
- To convey ideas for managing plants in a manner that controls their size and enhances their appearance.

Conservation

- Significant cultivars that may potentially become unavailable commercially may be conserved and where appropriate redistributed to commercial growers e.g. through the Growing Friends volunteer nursery.

Research

- Monitor, trial and record the performance of native plants in this collection and in supporting trial beds.
- Accessions of native plants without proven performance history should be evaluated in the trial beds before inclusion in the Collection.

Acquisition criteria

- Native species and cultivars of ornamental value that have proven performance in Auckland conditions and are available commercially to the public.
- Hybrid cultivars must contain at least 50% native plant genes in their pedigree to be included in this collection.

Cultivation

- This garden is maintained to a very high standard.
- Topiary should be regularly clipped, ideally immediately prior to periods of vigorous growth.
- Flowering plants should be pruned as soon as possible after flowering is completed.
- Some native plants with a short ornamental life should be replaced every few years.
- Plants grown primarily for their foliage should be pruned as required and fertilised to encourage new growth and retain colour.
- A layer of organic mulch should be maintained in most beds, fine bark around ‘Splayed’ sculpture and residential courtyard, shell in the coastal garden, and aggregate in the collector’s corner.

5.2.3 Threatened Native Plant Garden

Threatened native plants showcased in replica natural habitats in which they typically occur.

Description

A collection of threatened native plants, predominantly from northern NZ and including offshore islands featured in habitats representative of those they naturally occur in. Usually just one threatened species is highlighted per habitat with associated interpretation conveying its plight and other information. The threatened plants are associated with a range of non-threatened plants that typically occur in the same habitats.

The replica habitats include: Inland scrub forest, streamside, swamp, gumland, coastal scrub forest, offshore island, boulder beach, lava field, coastal rocky bluff and coastal wetland, saltmarsh, shell bank, forest dune and sand-dune.

Objectives

- Highlight the plight of northern NZ threatened native plants by showcasing them in replica habitats.
- Assist in the identification of threatened plants.
- Protect threatened plants in ex situ collections.
- Promote, where appropriate, the wider use of threatened plants in home gardens and amenity plantings.

Background

The Botanic Gardens Development Plan Working Party (July 1997) advocated that rare and endangered plants be cultivated in a special collection. The Government provided a grant of $100,000 towards this project in 1999. Construction began in May 2000 and the garden was opened in 2001 by Prime Minister the Rt. Hon. Helen Clark. In 2006 the saltmarsh, forest dune and sand-dune were completed. In 2020 the coastal wetland and saltmarsh habitats were merged.

Education

- Increase public awareness of threatened plant species and their habitats, reasons for their decline and opportunities for their recovery.
- Promote the wider use of threatened plants in gardens.
- Increase knowledge of propagation and cultivation techniques of threatened plants.

Conservation

- Provide opportunities for plant identification and seed harvesting processes for field training prior to threatened plant surveys.
- Maintain ex situ stock for reintroduction into the wild and for inclusion in a seed bank.

Research

- Support threatened plant research through supply of plant material and other resources.
- Support research into propagation and cultivation techniques relating to threatened plants.

Acquisition criteria

Regionally and nationally threatened plants, based on most recent lists, occurring naturally in the Auckland and Northland regions including offshore islands.

All threatened plants should ideally be of known recorded provenance. Material should be selected from sources where genetic purity is assured. Material collected from the wild should have associated field collection data recorded. Ideally associated taxa should also be of known origin with field collection data.

Cultivation

- This garden is maintained to a high standard.
- Plants should be manipulated to resemble as closely as possible their typical appearance in the wild. Conditions in natural environments are usually far harsher than the benevolent growing conditions in a garden where plant growth is often extremely vigorous. Therefore, plants may require regular hard pruning and/or division, avoidance of fertiliser and regular replacement.
- Highest priority must be given to conspicuously presenting the threatened plants as a feature of the habitat.
- Replica habitats should not lose their distinctive visual appearance through overcrowding by plants. This may involve a complete renovation of a habitat. Some support plants may need to be removed so that the special hard features of the habitats such as rocks are revealed.
- Mulches should be selected to represent each specific habitat.

5.2.4 Harakeke Collection

A comprehensive collection of all known *Phormium* cultivars traditionally used by Māori for their weaving and fibre qualities.

Description

An extensive collection of traditional harakeke cultivars excluding those infected by disease. Larger plantings are held of cultivars which are in greatest demand by weavers. Support plantings include other weaving plants and dye plants.

Objectives

- Grow and display traditional weaving cultivars of harakeke to create awareness of their economic and cultural importance to Māori and subsequently to European settlers.
- Create opportunities to learn how to harvest and weave harakeke and learn the protocols that apply.
- Make available material to groups wishing to use traditional harakeke in weaving, and for education and research.

Background

The collection commenced in 1989 with the donation of 23 weaving cultivars by the late Mr. Buckley Fyers of Tūākau. Divisions of a further 25 cultivars were obtained through Sue Scheele in 1996 that were from the Rene Orchiston collection at Landcare Research.

Education

- Create awareness of the diverse range of harakeke selected by Māori and to highlight their many uses.
- Practise and promote the traditional maintenance techniques and protocols, and to provide educational opportunities that highlight traditional harvesting techniques, weaving practices and muka extraction.

Conservation

- Conserve all known cultivars and enable distribution to others involved in their conservation and use.

Research

- Provide material for research into qualities and identities of various cultivars of harakeke.

Acquisition criteria

- All available named cultivars of *Phormium* traditionally used by Māori excluding those infected by yellow leaf virus.
- Other native plants used for weaving (e.g. pīngao) or as dyes for harakeke.

Cultivation

- This garden is maintained to a medium standard.
- Regular harvesting of foliage, in early winter, using traditional techniques occurs to promote production of vigorous new growth. When necessary all plants should be pruned annually. This involves the removal of older outer foliage, with the middle three-five leaves of every fan untouched.
- Older plants should be divided and replanted to rejuvenate them.
- A dense layer of organic mulch should be maintained, applied every second year.
- Organic fertilisers containing nitrogen and phosphorus should be applied as required to encourage foliage growth.
- Plants are not propagated from seed, and flower stalks are removed before the seed capsules form.

5.2.5 Leptospermum Cultivars

A diverse collection of *Leptospermum scoparium* (mānuka) cultivars.

Description

An array of Leptospermum cultivars selected for their ornamental value and suitability for garden uses such as hedges and specimens. Cultivars of historical significance are included.

Objectives

- Ongoing evaluation of horticultural merit.
- To convey the historical development of a native ornamental crop with international significance.
- Conserve cultivars that may otherwise be lost.

Background

The original layout of the garden included the parents of modern cultivars to enable visitors to see the progressive development of an ornamental crop by comparing characters visible in the parents and the crosses. The plants in this collection were utilised in the breeding programme at the Gardens that produced the ‘Wiri’ cultivar series.

Education

- Convey the diversity of mānuka from the wild and how that can be harnessed for plant breeding.
- Show ornamental characteristics of native plant cultivars to enable informed plant selection.

Conservation

- Conserve cultivars that may otherwise be lost including the significant parents of modern cultivars.

Research

- Plant evaluation is ongoing and more research on plant breeding is possible.

Acquisition Criteria

- A wide diversity of mānuka should be collected e.g. as insurance against the arrival of a virulent disease such as myrtle rust.
- Continue to collect interesting forms of mānuka from the wild that have plant breeding or garden potential.
- Acquire new cultivars that have known performance as they become commercially available including selected exotic cultivars.

Cultivation

- This garden is maintained to a medium standard.
- Pruning should be undertaken immediately after flowering to retain a manageable size to display next season's flowers.
- Plants need to be renewed as they age, and their amenity value declines. Cuttings should be propagated well in advance of the requirement for replacement plants. Cuttings are best taken in February.
- Remove cultivars of insufficient garden merit unless they have historical significance.

5.2.6 Pohutukawa Collection

The Gardens holds an extensive range of pohutukawa (*Metrosideros excelsa*) cultivars selected for superior ornamental characteristics (Star Performers).

Description

Pohutukawa cultivars are mainly planted in the Southern Lawn near the Pohutukawa Walk and in the Native Plant Identification Trail. Features considered when selecting cultivars include the size and form of the tree, foliage quality and flowering quantity, consistency, and colour. Star Performers should flower abundantly every summer, and their flowers should comprise abundant stamens of vibrant colour. For home gardens and street trees cultivars those that are upright and not too large are preferable.

Objectives

- Promote the use of superior cultivars in amenity plantings, street tree selections and for home gardens.

Background

The first pohutukawa selections were introduced to the Gardens in the late seventies by regional parks manager Bert Blumhardt who was the responsible for the diversity of pohutukawa of variable flower colours planted at Long Bay, Wenderholm, Āwhitu, Ōmana and other regional parks. Other early introductions were mainly cultivars obtained from Duncan & Davies Nursery, many with the prefix ‘Māori’ in their cultivar name. These selections were made on Duncan & Davies behalf by Felix Jury in the Waitara area. In more recent years most of the cultivars introduced have been selections made by Graeme Platt. Most of these are proving to be significantly superior to earlier introductions. Several cultivars were moved from the southern lawn to the Pacific Pathway in January 2019.

Education

- Display a selection of superior pohutukawa cultivars.
- Highlight the diversity of characteristics within the genus.
- Demonstrate how different cultivars can be utilised in various situations.

Conservation

- Retain cultivars of merit that are no longer commercially produced.

Research

- Evaluate the performance and flowering consistency of all cultivars.
- Contribute to monitoring and assessing the effects of Myrtle Rust on different cultivars.

Acquisition criteria

Cultivars that exhibit the following characteristics will be considered for introduction:

- Superior or significantly different flower colour
- Consistency of flower production (if known)
- Small or upright stature.

Cultivars that have failed to produce the above characteristics after a reasonable period should be culled, and the reasons recorded in the Plant Records Database.

Cultivation

- All trees in this collection will be mapped using GPS.
- Allow sufficient planting distance to enable the cultivar to assume its natural form at maturity.
- Apply organic mulch after planting and refresh regularly.
- Trees planted in groups of three can be culled to one of superior form.

5.2.7 Conifers

A display of ornamental conifers suitable for warm northern climates.

Description

A selection of conifer cultivars usually associated with colder climates that perform well in northern gardens. Several conifer species have been progressively added to the collection.

Objectives

- To assist visitors to select conifers by displaying a recommended selection of species and cultivars suitable for Auckland conditions.
- Showcase some primitive non-flowering plants.
- Create the feel of an exotic coniferous forest.

Background

A trial planting of conifers suited to Auckland was planted in 1976 (near the Nursery) and those deemed suitable were moved to the current site in 1981. The collection was renovated in 1998 with the removal of several which were performing poorly and the introduction of replacements. Bark pathways were established at this time to improve access into the beds. Part of the Geoff Etherington Aloe collection was moved into the conifer area adjacent to the rock garden in 2019, requiring some removals of conifers.

Education

- Assist visitors to better understand conifers and their cultural requirements, and to facilitate gardeners to make better informed purchasing decisions.
- Communicate suitable plant associations for conifers.

Conservation

- There are several threatened conifers in this collection including *Fitzroya cupressoides*, *Cupressus guadalupensis*, *Picea brachytyla*, *Picea omorika*, and *Sequoia sempervirens*.

Research

- Evaluate the performance of conifers as the basis for recommendations to home gardeners and for amenity use.

Acquisition criteria

- Only conifer cultivars and species that have demonstrated suitability for growing in Auckland conditions should be introduced.
- Small palette of associated plants based on natural plant associations can be included such as azaleas and *Berberis*.

Cultivation

- This garden is maintained to a high horticultural standard.
- All conifers should be monitored for outbreaks of pests and diseases such as canker. Remedial treatment should be biological (mites and thrips) or cultural (pruning etc.). Remove seriously unhealthy specimens and any that are past their ornamental life.
- Most conifers require free-draining loam soils to thrive although there are exceptions. Heavy soils can be improved with the incorporation of compost or other organic matter prior to planting.
- Occasional heavy applications of organic mulch are beneficial.
- Remedial pruning should focus on removing dead wood to prevent disease. Do not prune conifers back to bare wood as this will not usually regenerate.
- Formative pruning of tree species is important to ensure they are structurally sound and attractive when they mature.

5.2.8 Podocarp Valley

A grove of *Agathis* and *Podocarpus* on the banks of a gully.

Description

A small eclectic collection of coniferous trees.

Objectives

- Showcase a small collection of primitive trees with known origins.
- Screen the neighbouring residential area.

Background

The *Podocarpus* in this collection were donated by Dr John B. Hair of DSIR in Christchurch in 1976 after his research on the chromosomes of conifers was completed. They were held by Hunua (ARA) Nursery and were accessioned at the Gardens in 1985. Support plantings are mainly southern African plants (as this is the adjacent collection) including restios. Native trees are also used to screen the neighbouring residential subdivision.

Education

- Interpretation on the significance of these primitive trees, and cultural and amenity use of restios.

Conservation

- Maintain the wild collected podocarps held in very few ex situ collections worldwide, including *Podocarpus longefoliolatus* which is threatened.

Research

Acquisition criteria

- No more podocarps or *Agathis* will be planted.
- Support plantings should be south African species. Banks under the trees are potentially a suitable site for *Clivia*.

Cultivation

- This garden is maintained to a medium horticultural standard.
- The site can be weedy due to its proximity to neighbouring properties.
- Mulch at least every two years. Use coarse mulch on steeper slopes.
- Propagate podocarps if they are in poor health or before removal.

5.2.9 Rock Garden

An eclectic collection of interesting uncommon plants for the enthusiast with emphasis on small perennials, shrubs, bulbs, and succulents, many featuring special adaptations.

Description

Sunny, north- eastern facing aspect, with raised beds retained by basalt boulders that provide unique microclimates suitable for a diversity of smaller plants with varied growing requirements. It features a comprehensive collection of predominately small plants that are not usually found elsewhere in the Gardens. The Rock Garden is planted and arranged to best showcase these interesting miniature and dwarf plants. They are planted according to the cultural requirements of the species in an aesthetic layout and to provide year-round seasonal highlights.

Objectives

- Stimulate interest in unusual smaller plants and their adaptations.
- Demonstrate the different cultural requirements of these plants and how they may be utilised in smaller gardens.
- Conserve unusual plants that are seldomly commercially available.

Background

The garden was developed in 1982. Originally this garden was a repository for the many special plants, especially smaller species, that were not appropriate for other collections.

Education

- Display and interpret an array of small plants with special adaptations and cultural requirements suited to rock garden conditions.
- Convey to visitors the special value, uses and attributes of these uncommon small plants.

Conservation

- Curate valuable plants that may no longer be commercially available.
- Propagate uncommon plants, and where appropriate disseminate plant material.

Trials and research

To trial and assess plants for their specific cultural requirements including drought-resistance.

Acquisition criteria

- Interesting and uncommon plants, particularly xerophytes and geophytes, appropriate for use in a rock garden e.g. cacti, succulents, bulbs, small shrubs, rare and unusual perennials, or plants that are not otherwise represented elsewhere at the Gardens.
- There is a focus on small and unusual bulbs and succulents suitable for self-spreading within a garden bed to create a natural look.

Cultivation

- This garden is maintained to a high standard.
- Special attention is given to locating plants in microclimates that provide suitable growing conditions for the plant, and to preparing the planting site appropriately.
- Microclimates may need to be modified to suit the plant e.g. with additional rocks, adding compost or free-draining media such as pumice sand. Placing gritty material around bulbs when planting can assist them survive wet conditions during dormancy.
- A reserve collection of bulbs held in the nursery is available to replenish plantings.
- Larger spreading shrubs must be managed or removed to protect less robust plants.
- Propagate short-lived or vulnerable plants as necessary to ensure replacements are available before they are in decline or lost.
- Scoria mulch is predominantly used as it is compatible with the basalt boulders and is beneficial to many of the plants.

5.2.10 Rock Garden Americas

Cacti and succulents from the Americas are featured to highlight their form, diversity, and special adaptations.

Description

A dry rocky slope featuring many architecturally striking plants from South, Central and North America. Succulents predominate, particularly *Agave* and *Yucca* species. Cacti and a few bulbs also feature.

Objectives

- Showcase a variety of succulent plants from the Americas appropriate for Auckland.
- Display and interpret the adaptations of cacti and succulents.

Background

In 1997 the Americas Garden was developed to showcase an array of plants from the Americas. The site was selected for its sloping contour which assists drainage, relatively sunny aspect, and location between the Rock Garden and Southern African Collection that also both feature succulents.

Education

- Showcase the adaptations of plants from the Americas, their use in landscaping and gardens as well as their traditional uses.

Conservation

- Curate plants that may no longer be commercially available.
- Maintain plants of conservation significance.

Research

- Analyse suitability of these plants for living roofs and dry gardens

Acquisition criteria

- Cacti and succulents of American origin.
- A small selection of plants native to the Americas compatible with xerophytic habitats with priority given to species.
- Known hallucinogenic plants will be avoided.

Cultivation

- This garden is maintained to a high standard.
- Special attention is given to locating plants in microclimates that provide suitable growing conditions for the plant, and to preparing the planting site appropriately.
- Microclimates may need to be modified to suit the plant e.g. with additional rocks, adding compost or free-draining media such as pumice sand. Placing gritty material around bulbs when planting can assist them to survive wet conditions during dormancy.
- Scoria mulch is predominantly used as it is compatible with the basalt boulders and is beneficial to many of the plants.

5.2.11 Southern African Garden

A wide range of southern African plants conveying their beauty, diversity, adaptations, use and contribution to Auckland gardens.

Description

A geographic plant collection containing a wide representation of southern African plants, particularly Cape flora but including some plants from other parts of South Africa including trees, shrubs, bulbs, succulents, and annuals. There are significant plantings of Proteaceae, Asteraceae, aloes, other succulents, restios and bulbs suitable for growing outdoors in the Auckland region.

Objectives

- Encourage the use of these plants in Auckland gardens.
- Foster greater understanding of plants from Africa.
- Demonstrate their cultural requirements.
- Create the 'feel' of Africa through plant arrangement and hard landscape elements.

Background

This collection was established in 1981 to display southern African plants best suited to Auckland's climate and conditions. Emphasis was placed on plants from the South Western Cape region, one of the world's largest floral kingdoms, and one with winter rainfall similar to Auckland.

Education

- Inform the public and school groups about southern African plants.
- Advise on the selection and cultivation of suitable plants for various situations and uses.

Conservation

- Curate valuable plants that may no longer be commercially available.
- Populations of species from wild-collected seed will be maintained for continued horticultural use.

Research

- Maintain accurate records of plant performance, including flowering records, for the purpose of recommending plants suitable for Auckland.
- Many serious environmental weeds are from South Africa. Plants that show weed potential (e.g. persistently seeding out) should be further monitored and researched. Those which are identified as potential weeds should be recorded with a specimen submitted to Auckland Museum's herbarium (AK), reported to

Auckland Council Biosecurity, removed from public view, and further researched.

- Encourage breeding of Proteaceae to capture their beauty and usefulness in hybrids that are reliable in gardens.

Acquisition criteria

- Predominantly southern African plants from the winter rainfall Cape region, but also summer rainfall regions and Madagascar.
- Plants considered a low weed risk.
- Species (preference for wild collected) to be preferred for succulents, bulbs, wildflowers, shrubs, and trees.
- Proteaceae should be represented by a range of species and cultivars that have demonstrated reliable performance.
- Select bulbs that are likely to naturalise in the garden, without becoming weeds
- Perennials (including *Clivia*) may be represented by species and cultivars with horticultural merit.

Cultivation

- This garden is maintained to a high standard.
- Reserve collections of some geophytes and xerophytes are held in the Gardens nursery.
- Propagate short-lived or vulnerable plants as necessary to ensure replacements are available before they are in decline or lost.
- Origin of wild-collected, seed grown plants should be recorded on the plant records database.
- Proteaceae and most succulents should be planted in sunny open locations with free-draining soil.
- Fertilisers should be used sparingly if at all. Avoid applying phosphates to Proteaceae.
- Microclimates may need to be modified to suit the plant e.g. with additional rocks, adding compost or free-draining media such as pumice sand. Placing gritty material around bulbs when planting can assist them to survive wet conditions during dormancy.

5.2.12 Spring Blossom Valley

Predominantly spring-flowering trees with associated shrubs, bulbs, and perennials.

Description

A selection of plants that flower abundantly in Spring and perform well in Auckland. They are planted on the banks of a small stream. Generally, plants requiring shelter and/or shade have been planted on the lower slopes near the stream, and wind and sun-tolerant plants are planted on higher slopes. Several rhododendrons selected for proven performance in Auckland are planted on the upper slopes near the Camellia Collection. The western side of the Loop Rd features a large planting of *Prunus* 'Awanui' with *Narcissus* planted underneath.

Objectives

- Engage visitors with a variety of spring-flowering plants that grow well in Auckland, to convey appropriate cultural needs and encourage their use in home gardens
- Provide a spectacular display of flowers and nectar-feeding birds during spring.

Background

The first plantings were made in 1983 to create a spectacular spring-flowering garden typical of cooler climates. Over time plant content has changed as poor performers are replaced with plants considered more suitable for Auckland.

Education

- Encourage home gardeners to obtain recommended spring flowering trees and avoid those best suited to cooler less humid climates.
- Encourage people to attract birds into their gardens.
- Demonstrate best horticultural practices such as pruning techniques and timing.

Conservation

- Curate cultivars of merit, and rare trees, which may become lost in commercial horticulture.

Research

- Monitor, trial, and record the performance of a wide variety of spring-flowering plants.

- Trial *Rhododendron* cultivars for their suitability for Auckland.

Acquisition criteria

- Spring-flowering trees, shrubs, bulbs, and perennials that are most likely to perform well in Auckland.
- Annuals are inappropriate for this collection.
- Avoid duplication of plants held in other collections such as the Camellia Collection and Magnolias.

Cultivation

- This garden is maintained to a medium standard.
- Most spring-flowering plants prefer free-draining loam soils to thrive. Heavy soils can be improved with the incorporation of compost or other organic matter prior to planting.
- Annual applications of organic mulch are beneficial to this collection.
- Plant shade-loving subjects on lower slopes near the stream, and sun and wind-tolerant subjects on the more exposed upper slopes.
- Rosaceae such as *Prunus* should be pruned in summer after flowering or otherwise following fruiting as winter pruning can result in disease infections such as silver leaf.

5.2.13 Camellia Collection

A diversity of camellias emphasizing species and hybrids derived from the small-leaved species, with representations of other well-known groups such as japonicas, sasanquas and reticulatas.

Description

Every available *Camellia* species is held, including a significant collection of yellow-flowered plants. The collection of hybrids based on the small-leaved species is also comprehensive, although poor performers are culled. Representative collections of *C. japonica* (japonicas) and autumn flowering *C. sasanqua* (sasanqua) cultivars has been selected to convey the diversity and uses of these popular groups. A smaller collection of *C. reticulata* (reticulata) cultivars is included. Support plantings of woody and herbaceous plants are mainly of eastern Asian origin. Large plantings of *Clivia* are included as although not of Asian origin they are of special interest to many people in Asia.

Objectives

- Inspire visitors through displays that highlight the beauty, diversity and usefulness of the genus *Camellia* and other plants of eastern Asiatic origin.
- Assist visitors to make informed plant selections (including resistance to petal blight) when selecting camellias for their own use and to convey appropriate cultural needs.
- Increase visitor understanding of the genus through interpreting medicinal and culinary properties and by conveying other interesting facts and stories.
- Promote awareness of species and small-leaved hybrids and their range of uses for home gardeners.
- Encourage careful selection of japonica, reticulata and sasanqua cultivars based on proven performance in Auckland.

Background

When the collection was planted in 1985 the intention was to display a comprehensive collection of species and hybrids based on small-leaved species, with representative collections of what were regarded as the best japonica and reticulata cultivars. Sasanqua cultivars were subsequently added. The original collection was donated and arranged by Neville Haydon. The Camellia Collection holds every available *Camellia* species in New Zealand.

Education

- Increase public appreciation and awareness of this remarkably diverse genus that provides gardeners with many opportunities (hedging, espaliers, containers, ground covers, fragrance etc.).

- Create awareness of petal blight and recommend resistant forms.
- Create awareness of the medicinal and culinary properties of *Camellia*, and especially the impact of tea on social history.

Conservation

This collection holds every species available in NZ and propagation material can be made available to growers and researchers. Cultivars which have been, or may become, lost in commercial horticulture will be maintained.

Research

- Records to be maintained of plant performance, flowering, and health in relation to petal blight to make decisions about plants to cull and acquire.
- Support, and potentially undertake, breeding programmes to develop disease-resistant cultivars.
- Rhododendron trials are assessed primarily for thrip resistance and tolerance of Auckland growing conditions.

Acquisition criteria

- Obtain all available *Camellia* species and small-leafed hybrids.
- Increase collections of autumn flowering camellia that are more likely to escape the effects of petal blight due to their early flowering.
- Cultivars with special qualities and of exceptional performance only will be acquired.
- Other trees should be selected based on the following criteria: Asian origin and ecologically compatible with camellias; species are generally preferred over cultivars. Trees should not be repeated in other parts of the Gardens.

Cultivation

- This garden is maintained to a medium standard.
- Annual applications of organic mulch are particularly beneficial to camellias, benefitting soil health, soil moisture retention and weed suppression.
- Ideally pruning is undertaken immediately after flowering and before new vegetative growth emerges.
- Before pruning camellias, it is important to understand their context and ultimate intended size and form of the specimen when it reaches maturity. Some are left to develop naturally as trees. The size of others is managed in a manner that considers the natural mature form of the specimen. Often this involves annually thinning a plant, so it appears open and retains its natural form.
- Supporting vegetation such as taller trees and vigorous shrubs will be pruned or removed to retain ideal conditions for camellias to thrive.

5.2.14 Magnolias

A diverse representation of Magnoliaceae with emphasis on *Magnolia* species and cultivars including a comprehensive collection of NZ-bred varieties.

Description

Predominantly a collection of evergreen and deciduous magnolias from Asia and North America and including other Magnoliaceae. Associated plantings are mainly plants of eastern Asian origin. One area, adjacent to the Camellia Collection, contains dense plantings of magnolias with other plants of all sizes which create a woodland ambience. The second area to the north has been planted with large single specimen trees in a lawn setting.

Objectives

- A premier Gardens destination that peaks in winter and spring but has year-round appeal.
- Display and promote a diversity of magnolias that are suitable for growing in Auckland, and to highlight the range of exceptional hybrids developed in NZ.
- Encourage visitors to use magnolias and associated plants in their own gardens.

Background

Since 1985 a comprehensive collection of all available magnolias and their close relatives has been assembled, with a focus on hybrids bred in New Zealand. The Magnolia Garden holds every available *Magnolia* species and cultivar. Some of these may be duplicated in other collections. Cultivars that perform poorly may be culled unless of historical significance.

Education

- Convey the primitive origins of magnolias.
- Highlight the many uses of magnolias in different situations and emphasise the need for careful plant selection.

Conservation

- Curate a comprehensive collection of NZ-raised hybrids deemed to have garden merit.
- Ensure magnolia species listed as threatened and high performing cultivars no longer available commercially are conserved.

Research

- Evaluate the performance of magnolias as the basis for recommendations to home gardeners, streetscapes and for amenity use.
- Evaluate newly introduced *Magnolia* hybrids.
- Undertake breeding programmes as appropriate.

Acquisition criteria

- Every available new *Magnolia* hybrid bred in NZ should be obtained.
- Introductions of other *Magnolia* hybrids should be limited to those that have demonstrated ornamental potential elsewhere.
- Every available *Magnolia* species should be obtained where possible.
- Smaller stature magnolias should be obtained as a priority.
- As required obtain woodland plants that do well in Auckland conditions as support plantings.

Cultivation

- This garden is maintained to a medium standard.
- Magnolias require free-draining loam soils to thrive. Heavy soils can be improved with the incorporation of compost or other organic matter prior to planting.
- Annual applications of organic mulch are of particular benefit to this collection.
- Remedial pruning, undertaken routinely, should focus on removing dead wood to prevent disease and enhancing canopy structure.
- Formative pruning is important to ensure trees are structurally sound and attractive when they mature.
- Generally, three plants of each accession are planted. Only the single best specimen is retained long-term.

5.2.15 Gondwana Arboretum

Trees and plants closely connected to the ancient flora of Gondwana grouped according to modern geographical distribution.

Description

Predominantly coniferous trees collected from Southern Hemisphere countries formerly part of Gondwana that have close ancestral connections to plants which grew in that great pre-historical continent. Associated plants, such as cycads and ferns, are also included. These geographic regions are:

1. New Zealand
2. Australia
3. New Caledonia
4. Norfolk Island and Lord Howe Island
5. Papua New Guinea, and West Papua
6. Polynesia, Melanesia, and Micronesia
7. South America
8. Malaysia, Vietnam, Indonesia, Borneo, and the Philippines
9. India
10. South Africa

Plants are chosen from eras before flowering plants evolved i.e. the Palaeozoic (mosses, liverworts, and ferns) and Mesozoic (gymnosperms including conifers, cycads, *Gnetophytes* and *Ginkgo*). Gymnosperms include Araucariaceae (*Agathis*, *Araucaria* and *Wollemi*) and Podocarpaceae.

Objectives

- Provide a destination of international significance featuring majestic trees that capture the feeling of primeval forests.
- Inspire visitors with stories about the unique plant communities of Gondwana.

Background

A feasibility study for a Gondwana Arboretum was undertaken in 1993. In 1998 a project team was established to develop the vision, primary goals, and objectives for the arboretum. Since 1998 the focus has been to source Southern Hemisphere trees (mainly gymnosperms) descended from species that occurred in Gondwana. Graeme Platt has been the main donor and advisor. Planting commenced with the Australian component in 1999 and continues today.

Education

- Convey understandings of the flora of Gondwana and the relationships of its plants with other life-forms such as dinosaurs.
- Enhance knowledge of NZ's geological and botanical evolution.
- Interpret cultural and traditional uses.

Conservation

- Hold collections of plants threatened in the wild or not readily available and where feasible to assemble breeding populations.
- Participate in projects to source germplasm of threatened Araucariaceae species from other countries including the Pacific Islands in partnership with indigenous communities.

Research

- Research and source other appropriate plants including understorey species that have their ancestral origins in Gondwana for possible inclusion in the arboretum.
- Facilitate research into the evolution and taxonomy of podocarps and Araucariaceae.
- Investigate techniques for successful cultivation of difficult species.

Acquisition criteria

- Species that have their ancestral origins in Gondwana. Preferably these should be of known recorded provenance.

Cultivation

- This area is maintained to a medium standard.
- The arboretum will contain minimal infrastructure and hard surfaces to retain natural ambiance.
- Framed vistas and areas of open space will be maintained. When planting trees consult the master plan to ensure view shafts are not obscured.
- Some turf will be mowed more frequently to enable public access and use while others that are less heavily used by visitors will be occasionally cut. Grass must not be allowed to grow to a level where it presents a fire risk.
- Some areas may be allowed to become wildflower meadows.
- Trees are planted in large numbers to enable the removal of inferior trees.
- Formative pruning should be undertaken to ensure the optimum natural structure is ensured.
- In some cases, removing lower branches may be undertaken to permit access to the trees. Ideally some species should be allowed to grow naturally.

- Organic mulching is necessary to promote healthy root systems and keep mowers outside of the root zone.

5.2.16 Rose Garden

Themed displays of high-performance roses that remain healthy without spraying with adjacent trial beds.

Description

The Rose Garden displays all major rose types provided they perform well and remain disease-resistant in Auckland conditions without pesticide applications that are available to the public. It comprises five distinctly themed display gardens and a trial area where roses are grown and assessed for their suitability for inclusion in the main displays and in lists of recommended roses. Plants other than roses are included in the Rose Garden to provide design ideas and to reduce incidence of pests and diseases.

Historic Rose Garden

Species roses and heritage roses including some that were introduced in colonial times as well as some English roses that complement the old-fashioned look and feel. These are mixed with perennials, annuals, and shrubs in a cottage garden style evocative of an early settler's garden.

Reflective Rose Garden

A formal display garden containing mainly climbing and floribunda roses with some shrub roses. Roses are grouped according to flower colour from pastels to bright shades.

New Zealand Rose Garden

A mix of recommended garden roses intermingled with predominantly NZ native plants that showcase the beauty of both. Some other exotic plants are included with self-sown violas and aquilegias for seasonal colour.

Pergola Garden

Colourful displays of modern and heritage roses complemented by shrubs, perennials, and annuals in an informal cottage garden style.

The Rose Gallery

Groups of roses that have performed best in our trials. Supported by low maintenance plants, particularly groundcovers, which do not compete with roses.

Trial beds

In this bed roses are tested for their performance in Auckland conditions. Roses are evaluated for their performance and overall health over a minimum of 12 months but longer if necessary. Emphasis is placed on the evaluation of modern cultivars with some species and heritage types also included. Those that perform well and remain healthy generally graduate to the Rose Gallery (or other suitable location in the Rose Garden). Poor performers are culled. The main assessment criterion is disease resistance, however other characteristics are considered.

Objectives

- Provide a premier attraction that is visually stunning and the leading rose destination in Auckland.
- Inspire people to grow roses that remain healthy without pesticide applications.
- Encourage visitors to make their own rose selections based on personal preferences from an array of proven performers.
- Information on best practice cultivation techniques is also available.
- Inspire creative use of roses through combinations with other plants that provide planting ideas for visitors.

Background

The original rose garden (the Rose Display/Trial) was established in 1981 near where the Visitor Centre now stands. The garden was a partnership with Rose Introducers of New Zealand (RINZ) and commenced in 1989. This was a monoculture of modern newly released cultivars owned by RINZ that were regularly sprayed throughout the growing season. Rose numbers ultimately exceeded 6,000. In 2000, the decision was taken to drastically reduce and ultimately eliminate the use of insecticides and fungicides. RINZ withdrew from their partnership the same year.

The current Rose Garden was designed in 2001 and redevelopment commenced that year with the Historic Rose Garden and the New Zealand Rose Garden. In 2002, the Stage 1 Trial was established, and the Pergola Garden was redesigned. In 2003, the Reflective Rose Garden was established, followed by the Stage 2 Trial in 2005. Part of the NZ Rose Garden was redeveloped in 2019 to include raised planters. In 2020 the Stage 2 trials were renamed the Rose Gallery to display the best roses from trials.

Education

- Enable gardeners to successfully grow roses without chemical applications by appropriate plant selection and provision of expert advice.

- Interpreting the history, cultural heritage values and stories of roses.

Conservation

- Curate roses of special significance that may potentially become unavailable commercially.

Research

- Evaluation of roses for their resistance to pests and diseases and consistent overall garden performance.

Acquisition criteria

General

- All new rose accessions that have not previously been evaluated at the Gardens should initially be included in the trial beds.
- When selecting cultivars for a trial, preference should be given to those considered most likely to perform to a high standard e.g. from breeders that focus on high health plants.
- New introductions into the main display gardens must be of cultivars that performed to a high standard in the trial beds. The exception is climbing roses that have demonstrated their performance elsewhere are planted into appropriate display beds.

Historic Rose Garden

- Roses of old-fashioned appearance.
- Special consideration is given to roses of historical significance to NZ.
- Support plantings are cottage garden plants such perennials, annuals and shrubs that contribute to the old-fashioned feel of this garden.

Reflective Rose Garden

- Complementary plantings can include hedging, ground covers and small specimen trees.

New Zealand Rose Garden

- Complementary plantings include a range of ornamental NZ native plants with attractive foliage, texture and form that complement and combine well with roses.
- A small selection of exotic shrubs and tree ferns as well as self-seeding annuals and perennials may be included primarily for their floral qualities.

Pergola Garden

- Support plantings comprise predominantly small trees, shrubs, perennials, and annuals appropriate to an informal cottage garden.

The Rose Gallery

- Rose cultivars that have excelled in the trials

Cultivation

- This garden is maintained to a very high standard.
- Rose health should be maintained to an acceptable standard through selecting disease-resistant plants and applying best cultural practices such as companion planting and beneficial insects, and allowing sufficient plant spacing to ensure air circulation.
- Pest and disease controls are preferably manual or cultural methods (e.g. pruning of affected material).
- Miticides, insecticides and fungicides are not used.
- A dense layer of organic mulch should be maintained.
- Regular fertiliser applications, particularly in spring e.g. natural fertilisers, potash and lime every few years.
- When replacing roses replenish with compost and/or sheep pellets, and soil if necessary.
- Assessment of rose performance is ongoing and includes monitoring the performance of cultivars in the display beds. Rose cultivars will be culled if considered too disease prone, or if they are regarded as having insufficient ornamental merit.
- Repeat flowering roses such as most modern cultivars should be pruned in winter.
- Once-flowering heritage roses, ramblers and climbers ideally should be pruned in summer after flowering.

5.2.17 Palm Garden

A diverse range of palms highlighting their beauty and landscape value with associated ornamental subtropical plantings.

Description

Extensive plantings of palms of ornamental or other merit carefully located within the microclimates that best meet their requirements. Associated plantings are mainly subtropical plants that complement the appearance of the palms. A significant collection of *Clivia* species and cultivars are located in dry shaded areas beneath trees.

Objectives

- Convey the diversity, geographic distribution, uses and variability of palms.
- Influence the range of palms grown in home gardens and in amenity situations in Auckland.
- Demonstrate the cultural requirements of palms.

Background

First plantings were made in September 1992 based on recommendations by the New Zealand Palm Society. In 1996 the initial plantings were reviewed and updated plans for future plantings prepared.

Education

- To inspire visitors to make carefully considered planting decisions based on observations of the palms on display.
- Create awareness of the diversity of palms and interpret their many uses and stories.

Conservation

- The collection includes palm species of threatened conservation status.

Research

- Ongoing evaluation of the palms and associated plants in this collection informs the Gardens recommendations and determines if they remain on display or are removed.
- The collection will be made available for research into the potential weed impact of some palms.
- Cultural practices that optimise palm health are evaluated.

Acquisition criteria

- Palms should have ornamental or other value (fruit, fibre etc.), and be considered likely to perform well in Auckland's climate.
- Species considered likely to become weedy or in any way excessively invasive should be avoided.
- Species with fierce spines should be avoided unless the reasons for inclusion are compelling.
- *Clivia* planting should feature all available species and notable cultivars including seed lines from reputable breeders.
- Subtropical plants are selected for their luxuriant growth and flamboyant flowers.

Cultivation

- This garden is maintained to a medium horticultural standard.
- Tender plants unlikely to withstand winter frosts when mature should not be planted in the open.
- Staking should only be undertaken when required at planting time. Ties should prevent trees blowing over but not unduly restrict swaying.
- A dense layer of organic mulch should be maintained.
- Rocks may be placed around the root zones of heat-loving species.
- Shade-loving species should be planted beneath trees.
- Frost protection may be required for newly planted palms and subtropical.
- Calcium magnesium carbonate may be applied to remedy ailments such as growth deformity. Applications must be informed by soil testing.
- No tall trees planted that will at maturity encroach on the specified allowable proximity to the power lines.
- Palms that exhibit undesirable traits such as weed potential will be removed, unless under special circumstances, such as high conservation value or if they are subjects of research.

5.2.18 Urban Trees

Ornamental trees recommended for residential gardens (from small urban sections to lifestyle blocks) with associated plantings of recommended ground covers.

Description

The principle function is to display as either lawn specimens or in garden beds small trees recommended for residential properties. Typically, the trees chosen are of manageable size, their root systems are not too vigorous or invasive, and they do not exhibit other undesirable traits. They also must have ornamental characteristics, although some produce edible fruits or nuts. Also featured are a selection of recommended ground cover plants that effectively and economically provide low maintenance solutions beneath trees or in the open. These are planted in large groups to demonstrate their effectiveness.

Objectives

- Positively influence the range of trees utilised in Auckland gardens, particularly in situations where space is limited.
- Encourage the use of attractive low maintenance groundcovers.

Background

Planting began on Arbor Day 1981. The original objective was to feature recommended trees for Auckland home gardens. The original ground cover collection, planted in 1980, was relocated to this site in 1990.

Education

- The main educational objective is to inspire visitors to make carefully considered tree planting decisions based on observations of the trees on display.
- Demonstrate practices such as planting, formative pruning, staking, fertilising etc.

Conservation

Threatened trees, if commercially available, may be included.

Research

- Ongoing evaluation of the trees in this collection informs the Gardens recommendations and determines if they remain on display or are removed if no longer considered appropriate.
- A small number of in-garden trials may occur if labelled ‘under evaluation’.

Acquisition criteria

- Ornamental trees of proven performance and low maintenance in Auckland conditions. Usefully productive trees may be included such as those with edible fruit.
- Trees should be commercially available or promoted through the Growing Friends.
- Trees should not grow too tall or wide at maturity, or their size must be readily managed by judicious pruning. Tall narrow trees are often more readily accommodated than very wide specimens.
- Root systems must not be too invasive, and they should be considered unlikely to cause structural damage to residential buildings, drains and sewers.
- Plants should not be likely to poison people or cause allergies with normal contact.
- Preferably ground covers will smother the planted area when mature (though not be too rampant), preventing establishment of weeds. They should have longevity and require little attention.

Cultivation

- This garden is maintained to a high standard.
- Pruning should be undertaken as appropriate to manage tree size and shape, and to encourage floral displays or fruit production.
- Staking should only be undertaken when required at planting time. Ties should prevent trees blowing over but not unduly restrict swaying.
- Renew ground covers before they become unsightly or are no longer effectively performing their function.
- Remove heavy loads of smothering leaf litter on ground covers, and consider leaf fall when planting new deciduous trees so they are not a nuisance.
- A dense layer of organic mulch should be maintained.

5.2.19 Perennial Garden

Perennials of outstanding performance and appearance are arranged in drifts using creative combinations of colour, texture, and form.

Description

A large colourful display garden at its peak during summer that features perennials selected for outstanding performance in Auckland conditions. Some woody plants may be included for structure, height, and permanence.

Large drifts provide impact and scale. Repeated plantings of a few key perennials provide harmony throughout the garden. Colour schemes focus on creative combinations of colour (foliage and flower), texture and form. Fine and large foliage is contrasted for visual effect.

The garden is composed of beds which highlight combinations, blended harmoniously, based on the colour wheel:

1. Cool: Blue and silver (monochromatic or shades of one colour).
2. Bold: Yellows, reds, and purples (complementary combing colours that are opposite in the colour wheel).
3. Pastel: Light coloured shades e.g. pinks and lemon yellow (analogous theme using three colours adjacent in the colour wheel).

Objectives

- Highlight the range of perennials that perform to a high standard in Auckland's warm humid climate.
- Provide cultivation information specific to Auckland conditions.
- Promote ideas on plant combinations using themed colour groupings and foliage textures.
- Provide visitors with a spectacular floral display.

Background

The original garden was established in 1983. Previously it was widely considered that perennials were not generally suited to Auckland's warm humid climate, and that they were best grown in cooler southern climates. Plant selection was determined by trials. In 2004 the garden was redesigned and reduced to accommodate Native Plant Ideas to the north. In 2019 the garden was reduced to accommodate the Pacific Pathway and an event garden ('The Glade').

Education

- Inspire the use of perennials that perform well in Auckland.
- Demonstrate appropriate horticultural techniques e.g. timing of activities for a warm climate.
- Show effective combinations of colour and texture.

Conservation

Perennial plants of high garden merit which may no longer be commercially available will be promoted to growers or otherwise made available e.g. through the Growing Friends.

Research

- Use the Trial Garden to determine their suitability for inclusion in display beds.
- Support research into the ecological benefits of perennial plants.
- Trialling known or new cultivation techniques e.g. to improve plant performance or display.

Acquisition criteria

- Obtain varieties for trials that are calculated to have reasonable potential to succeed in Auckland conditions.
- Only perennials regarded as Star Performers and Recommended plants, which have demonstrated they are outstanding in trials, should be included in the main display beds.
- As a general rule no additional trees or other woody plants will be added.

Cultivation

- This garden is maintained to a very high standard.
- Divide most deciduous herbaceous perennials in autumn or early winter.
- Some perennials that feature flowers or seed heads into winter should not be cut back or divided until their display is over.
- Evergreen perennials prone to root damage when soils are wet in winter should not be pruned until spring (e.g. *Penstemon*, lavender, *Artemisia*).
- Plant frost-prone perennials in late spring after the last frost.
- Plan the following seasons plant combinations in February each year when plants are at their peak and then prepare propagation lists.
- Continually review plant content in the display beds and incorporate new varieties into the collection based on trial results.

Staking must occur at or near planting time to ensure the plants are not damaged and grow around the stakes to conceal them. Generally, stakes should be two-thirds the height of the plant. Use stakes and twine of inconspicuous colours. For perennials that

are propagated every year the accession number is not printed on the plant label but printed on a sticker attached to the back of the label.

5.2.20 Edible Garden

A series of themed gardens displaying a diverse range of interesting and productive edible plants.

Description

A wide range of recommended edible plants that are seasonally appropriate, suitable for Auckland's conditions and generally available to the public presented in a series of display gardens. All gardens are managed using organic practices.

Each garden has a design theme which will appeal to a range of different interests and tastes. The design styles range from very formal in the Walled Garden to semi-formal in the Culinary Courtyard with a relaxed 'Kiwiana' style in the Kiwi Backyard. The content of each garden room is clearly interpreted. Currently the Edible Garden has five components:

Walled Garden

A formal potager-style garden designed in the English tradition within formal brick walls. The walls provide a range of different microclimates from cool and shady to hot and sunny that extend the seasons enabling earlier and more diverse crops to be grown. This garden is maintained to a very high horticultural standard.

Culinary Courtyard

A semi-formal enclosed garden of Tudoresque design displaying attractive and useful culinary plants. There include a mix of vegetables with perennial and annual herbs, edible flowers, topiary trees, climbing edibles and fruiting plants. The garden changes seasonally and annuals are replanted to reflect what is best to grow at that time of year. A feature of this garden is the floral colour and attractive plant combinations. This garden is maintained to a very high horticultural standard.

Kiwi Backyard

A relaxed informal garden containing a mix of edibles, a subtropical food forest, raised vegetable planter boxes and composting ideas. Includes a rustic garden shed filled with traditional tools used in bygone days. This garden is maintained to a high horticultural standard.

Orchard

A small selection of high performing fruit trees selected for their health and productivity in Auckland conditions. The orchard is maintained to a high standard.

Rain Garden

A rain garden containing edible plants that treat stormwater emanating from the Edible Garden catchment. This garden is maintained to a medium standard.

Objectives

- Inspire a broad cross-section of the community to grow their own edible plants, including some unusual edibles.
- Promote edible gardening through attractively themed garden styles and plant combinations.
- Provide information and seasonal advice about successful organic growing of edible plants.

Background

The original Edible Garden was established in 1995 and extended in 1999. In 2007 the Edible Garden was redesigned to engage visitors more effectively. Completion dates: Culinary Courtyard (2008), Kiwi Backyard (2009) and Walled Garden, Orchard and Rain Garden (2010). In 2020 the tōtara hedge surrounding the Culinary Courtyard was removed due to the death of many specimens.

Education

- Influence the range of plants that visitors grow particularly vegetables and fruit trees.
- Promote best cultural practices based on organic principles including propagation, harvesting, planting, and pruning advice.
- Provide ideas that enable disabled and elderly people to continue gardening.
- Entice novice gardeners and children into edible gardening whilst remaining relevant to expert gardeners.
- Highlight the health, economic and well-being benefits of edible gardening.
- Provide food to the café from the Edible Garden.

Conservation

- Contribute to the conservation of heirloom varieties of edible plants through documentation, propagation, seed storage and appropriate dissemination.

Research

- Evaluate plant performance (in garden) to inform future plant selection and public recommendations.
- Rain garden plants are under trial for their suitability for stormwater treatment.
- Specific trials of some crops as resources allow.

Acquisition criteria

- Ensure edible plants displayed are suitable for Auckland and reflect the diversity of community interests.
- Walled Garden: predominantly seasonal vegetables (heirloom/heritage and F1 hybrids) and a smaller selection of perennial edibles. Avoid plants covering brick edges such as vigorous trailing plants.
- Culinary Courtyard: mostly herbs and vegetables, with some shrubs and small trees and other fruit trees.
- Kiwi Backyard: broad selection of food plants and seasonal vegetables suited to home gardens.
- Orchard: contains fruit trees selected for their overall performance in Auckland conditions including productivity, health, and suitability for an urban garden.
- Rain Garden: plants are selected for their tolerance of extreme conditions from saturated to dry and their ability to perform the functions of rain garden plants.

Cultivation

- Applied organic principles including soil management through composting, vermicast, liquid manures and green crops, supported by companion planting, crop rotation and permaculture practices are used.
- Generally annual plants are not accessioned (except for historically significant varieties/trials/wild-collected seed etc.). Perennials used as annuals are not accessioned. All other perennial plants are accessioned.
- Summer edibles should mainly be planted from late October. Most winter edibles should be planted before soils cool, preferably by May.
- Planting, division and pruning of frost-tender subtropical plants should not take place until after all chance of frosts have passed.
- Staking must be appropriate for the garden theme. It must occur at or near planting time to ensure the plants are not damaged. Generally, stakes should be two-thirds the height of the plant. Use stakes and twine of an inconspicuous colour.
- Espaliered trees must be pruned to ensure an attractive display.

5.2.21 Herb Garden

A comprehensive collection of herbal plants that conveys their value, many uses and historical significance.

Description

A diverse array of herbals grouped according to their main usage and accompanied by interpretation. The current themes are:

- Culinary[10]/beverage including edible flowers
- Medicinal
- Cosmetics and perfume
- Dyes
- Everlasting flowers including potpourri
- Insect repellent
- Shakespearean
- Herbal hedgerow

Objectives

- Inform visitors about the use and growing of herbs and their historical role in providing the many necessities of life.
- Present an attractive herb garden influenced by traditional design that provides visitors with ideas for herb garden layout and effective herbal groupings.
- Highlight the numerous herbal properties and interpret uses.
- Reflect the interests of the ethnically diverse Auckland community.

Background

The Herb Garden was planted in 1979, one of the first plant collections established at the Gardens. The early planning and development of the Herb Garden was completed in partnership with the Auckland Herb Society. The Herb Garden was extended in 1983, and again in 1985. The shelter was built in 1986.

Education

- Educate visitors including children and students about the herbal properties of plants, their uses, preparation, and cultivation requirements.
- Show the traditional significance of herb gardens from medieval times.
- Inspiration for herb garden designs and plant layout.

Conservation

[10] A culinary herb in this case excludes vegetables which are displayed in the Edible Garden.

- Maintain a comprehensive repository of herbal plants that includes many species and cultivars seldom commercially available, and to make these herbs available as appropriate.

Research

- Support projects researching herbs and their uses.

Acquisition criteria

- Herbal plants appropriate to the above themes that include annuals, biennials, succulents, bulbs, perennials, shrubs, and trees.
- Plants regarded as vegetables are more appropriately used in the Edible Garden.
- Some plants listed as weeds with proven herbal efficacy may be displayed to show their usefulness but will not be disseminated or allowed to naturally spread.

Cultivation

- This garden is maintained to a high horticultural standard.
- Vigorous herbs require regular division or propagation of replacement plants.
- Organic matter such as compost and green crops should be added to the soil regularly e.g. prior to planting and when dividing clumps.
- First crops of summer annuals are planted in late September.
- Where appropriate a second summer sowing/planting is done in January.
- Winter annuals are planted by the end of April.
- Any herbs regarded as weeds will not be disseminated or spread.

5.2.22 Salvia Collection

A comprehensive range of salvias suitable for northern NZ highlighting their beauty, herbal use, and garden value.

Description

An array of salvias representing the diversity of the genus and its cultivars selected for their suitability in Auckland. This collection is one of two National Reference Collections of Salvia in NZ, the other being at Marshwood Garden in Invercargill.

Objectives

- Inspire the use of salvias as ornamentals.
- Highlight that many salvias provide peak floral displays in summer and autumn when little other colour is common in Auckland gardens.
- Promote the drought tolerance of many salvias.
- Convey the diversity, geographic distribution, and variability of the genus.
- Promote the outstanding garden and landscape value of many salvias and their ecological significance e.g. in attracting pollinators.
- Convey the ethnobotanical uses of salvias including culinary and beverage.

Background

The Salvia Collection was established in late 1987 following an approach from the Herb Federation of New Zealand who, at the time, promoted National Reference Collections. They advocated all species and most cultivars of *Salvia* be included whether they had herbal uses or not. The Salvia Collection moved to the current site in October 1990. The area was reduced in 2015 with many species relocated to alternative appropriate sites within the Gardens.

Education

- Provide information on the cultural requirements of salvias.
- Convey the herbal properties of salvias, how they are used and prepared.
- Demonstrate best practices that optimise the appearance and productivity of salvias.

Conservation

- Maintain a comprehensive repository of salvias that includes many species and cultivars seldom commercially available, and to make these available as appropriate

Research

- Support projects researching the herbal uses, ecological value, and taxonomy of salvias.

Acquisition criteria

- Primarily perennial salvias with optional annuals.
- Priority should be given to wild-sourced annual species.
- Collect all perennial salvias considered likely to perform well in Auckland conditions and those considered likely to have ornamental or other value and are unlikely to have weedy potential. Salvias that subsequently demonstrate little value, or become weeds, should be discarded.
- Plant material exchanges are encouraged, particularly with Marshwood Garden.

Cultivation

- This garden is maintained to a high horticultural standard.
- Vigorous salvias require regular division or propagation of replacement plants e.g. renewal of plants through lifting and dividing every two or three years.
- Organic matter such as compost should be incorporated into the soil prior to planting and when dividing clumps.
- Organic mulch is applied once a year to most salvias.
- Staking is required for many taller salvias.
- Early flowering salvias are cut back after flowering to encourage a second bloom.
- *Salvia* species adapted to very dry habitats require free draining soil.
- It is not generally necessary to water salvias.

5.2.23 Tree collection

Specimen Trees

The Gardens holds a carefully selected range of trees that are suitable for growing in Auckland. Much emphasis is on those suitable for urban situations, but the collection also includes larger specimens suitable for parks and lifestyle blocks.

Description

The array of trees includes those assessed as being suitable for a range of different situations and purposes in Auckland. Features considered when forming the collection include health, ornamental characterises such as foliage, blossoms and bark, and structural integrity of a tree.

Trees are located throughout most of the Gardens, particularly in lawns. Elsewhere they are selected and utilised according to the theme of the area.

Objectives

- Inspire the use of carefully selected trees as ornamentals and for fruit production.
- Demonstrate 'best practice' management of trees.
- Provide information on the best trees for revegetation purposes.
- Provision of shade for visitors

Background

The Norfolk pines (*Araucaria heterophylla*) in the Founders Lawn were the first trees officially planted at the Gardens. Most early tree planting took place in the southern parts of the Gardens as those were the first areas developed.

Education

- Provide information on the cultural requirements, diversity, and geographical distribution of trees.
- Demonstrate how to best select and utilise trees in different situations and for various purposes.
- Show ecological and social value of trees to urban settings.

Conservation

- Ensure trees of ornamental or other value that may be otherwise lost in cultivation are retained and as required propagated and disseminated.

Research

- Support projects researching the cultivation, disease susceptibility, use and taxonomy of trees.

Acquisition criteria

- All trees must fit the accession criteria for the collection, garden, or other area.
- Trees must have demonstrated suitability for growing in Auckland.
- Always check the performance of any tree we have previously held.
- Source plants that have an appropriate structure (defect free) and are not root bound, woody or in poor condition.

Cultivation

- All trees in this collection will be mapped using GPS.
- Planting in autumn or early winter when soils are moist is recommended. Bare rooted specimens are planted in winter.
- Allow sufficient planting distance to enable trees to assume their natural form at maturity.
- Use entirely organic mulch (except for succulent trees) after planting and refresh regularly.
- Formative pruning is vital for young trees so that they are structurally sound at maturity.
- Trees should all be surveyed regularly for structural integrity to minimise risk and inform remedial pruning programmes.

5.2.24 Orchard

A carefully selected collection of fruit trees that produce well and remain healthy in Auckland conditions. The understorey of the orchard is a mixture of wildflowers and bulbs.

Description

The orchard holds a collection of fruit trees chosen for their suitability for home gardens, lifestyle blocks, and schools that do not require spraying. It is set in a naturalised landscape beneficial to wildlife including pollinators.

Objectives

- Provide a prolonged harvest of fruit and nuts.
- Display fruit and nut trees that will perform well in Auckland conditions (disease-resistant varieties).
- Provide educational opportunities for students and visitors.
- Showcase recommended fruit trees that are readily available in the nursery trade for home gardeners and schools to source.
- Provide habitat for pollinators by encouraging a diversity of wildflowers.
- Encourage the use of selected edibles as ornamentals.

Background

Experts in each fruit were consulted on the best varieties to grow. The orchard was planted in winter 2011. Thorough soil preparation was required at the site.

Education

- Adjacent to the Potter Children's Garden to connect students with fruit trees and encourage schools to plant orchards with a recommended selection of varieties.

Conservation

- Cultivars with historical significance no longer commercially available may be included (e.g. 'Hobbs Late' peach). Propagating material should be made available to commercial growers.

Research

- Crop volumes and periods should be recorded.
- Pruning trials.
- The development of the wildflower meadow should be monitored and operate as a 'research by management' project.

Acquisition criteria

- Only add varieties that have demonstrated they are outstanding performers and producers in Auckland conditions.
- All varieties should be commercially available or made accessible if not.

Cultivation

- This garden is maintained to a medium horticultural standard
- Pruning to allow children to view and harvest fruit.
- Timing of pruning is important (summer, after fruiting, for stone fruit).
- Manage the lawn/meadow so vigorous species do not dominate.
- Differential mowing is used to define a path and allow the bulbs to complete their natural life cycle.
- Annual fertilising specific to each fruit type.
- Show different pruning and training techniques e.g. multi-leader pyramid and espalier for apples.
- Organic mulching is very beneficial for fruit trees. For young trees higher nutrient compost-based mulch is useful.

5.2.25 Aloe Collection

A comprehensive range of Aloe representing the wild range of this group.

Description

A collection of species from southern Africa to Saudi Arabia that range from tiny grass like forms to trees. They represent coastal and inland forms, a range of geological substrates and varying rainfalls. The collection is planted in two locations: African species are in the African Garden; those suitable for outdoors (but not from Africa) are in the Rock Garden.

Objectives

- Inspire their use as ornamentals useful for their drought tolerance.
- Promoting the value of brightly coloured winter-flowering species providing food for nectar feeding birds.
- Display the vast diversity of the Genus.
- To enable them to be used for research purposes.
- Perpetuate rare species.
- Maintain a pair of every species at minimum, where obtainable.

Background

Aloes have been a collection priority at ABG since the advent of the Rock and African Gardens. In 2015 three hundred additional species were acquired from Geoff Etherington of Wakefield, Nelson.

Education

- Promote the adaptations, diversity, and cultural requirements of Aloe.
- Provide information on the uses of Aloe such as in medicine, cosmetics, and traditional uses etc.

Conservation

- Maintain a comprehensive repository of Aloe, particularly species, seldom commercially available and to make these available as appropriate.
- Where possible pairs are planted in close proximity to facilitate cross pollination and propagation of pure species.
- Note on the database the threat status of all species in the collection and prioritise production of new plants of these species.
- For those species where only one plant is held priority will be given to propagating them as insurance but also to distribute.

Research

- How single plants can be propagated or manipulated to produce viable seeds.
- Support projects researching the uses, ecological value, and taxonomy of Aloe.
- General propagation e.g. vegetative reproduction.
- Determine their environmental tolerance for growing outdoors in Auckland.

Acquisition criteria

- Any Aloe not currently in the collection.
- All threatened Aloe currently in collection as one individual
- Hybrids of ornamental merit.

Cultivation

- This garden is maintained to a high horticultural standard.
- When plants are damaged or unwell, they must be rescued.
- It is not generally necessary to water Aloes outdoors, unless they are under stress
- Plants are recorded with GPS coordinates.
- Aloe are dead headed (unless seed is being collected).
- Some species benefit from occasional removal of spent leaves.

5.2.26 Clivia Collection

A comprehensive range of *Clivia* species, interspecific hybrids and cultivars that highlights their diversity and garden value.

Description

An array of clivias highlighting the diversity of the genus and their suitability for Auckland. The collection includes all available species, a comprehensive collection of interspecific hybrids and a wide array of cultivars selected for their beauty and suitability for Auckland garden conditions.

The largest displays are in the Palm Garden and Camellia Garden, with significant smaller displays in the Auckland Border, Urban Trees and African Gardens.

Objectives

- Inspire their use as ornamentals by displaying a diverse array of outstanding clivias.
- Promote their tolerance of dry shade and exceptional value in such situations.
- Demonstrate that different clivias provide peak floral displays in different seasons.
- Highlight the development of clivias, particularly the breeding work that has been undertaken in NZ.
- Conserve species collection especially those threatened in the wild.

Background

The first *Clivia* cultivar introduced to ABG was an undistinguished form of *C. miniata* with apricot flowers and narrow pointed leaves. This was the only widely available cultivar at that time. It was erroneously known and distributed as *C. nobilis*. In the eighty's Dr Max Goodey provided the Gardens with seed of *C. miniata* he had obtained originally from Hamburg, Germany. The seedlings were planted in the Auckland Border and proved to be larger flowered, richer in colour, with larger bolder foliage and overall, more ornamental. Another planting of these early seedlings is to be found at Ayrlies. The Gardens collection today contains numerous cultivars donated by breeders and collectors including Dr. Keith Hammett and Terry Hatch as well as Botanic Gardens bred clivia. A significant collection was donated by Alick McLeman in 2014.

Education

- Provide information on the use & cultural requirements of clivias.
- Convey the diversity and geographical distribution of clivias.
- Demonstrate how to best utilise clivias.

Conservation

Maintain a repository of *Clivia* species. Ensure that interspecific hybrids and cultivars of special significance are preserved. This includes those that played a significant role in the breeding of modern cultivars.

Research

- Support projects researching taxonomy of clivias.
- Undertake a modest breeding programme focussed on developing new hybrids with unique characteristics that make outstanding garden subjects in Auckland.

Acquisition criteria

- Obtain all available *Clivia* species including new wild-sourced accessions of those already in ABG collections.
- Collect only cultivars that have distinct characteristics or appearance.
- Collect and trial all new interspecific hybrids.

Cultivation

- As clivias are distributed across several areas the maintenance standards of that garden or plant collection applies.
- Keep in groups identifiable by breeder with database informing exact locations
- Most clivias thrive in dry shady places. *C. mirabilis* requires more light than most species.
- Mulching with organic matter after planting is beneficial. This should be repeated every few years.
- Organic matter such as compost should be incorporated into the soil prior to planting and when dividing clumps.
- Clivias may require lifting and dividing every few years sometimes up to 5+ years in garden situations. In some low-maintenance situations they may remain undivided for 20+ years.
- It is not generally necessary to water clivias once they have become established.

5.3 Amenity garden statements

Amenity gardens are defined as those where the primary purpose is aesthetic or functional. Plant content in many of the gardens in this section are documented in the Plant Records Database however some (such as mass native plantings) are not.

The amenity garden statements included in this section are:

5.3.1 Visitor Centre/Huakaiwaka Gardens

Native and subtropical plants with seasonal colour to convey a sense of the South Pacific as part of the arrival experience.

Description

This is a display garden designed to optimise visitor arrival experience and therefore it is not a focus for education, conservation, and research. Distinctive NZ native and subtropical plants are used to convey a sense of place and complement the architecture and materials of the Visitor Centre (Huakaiwaka). Pohutukawa are used as the signature tree on the sunny northern side of the visitor centre, with nikau fulfilling this role on the cooler southern side. Annuals and perennials are used to provide seasonal colour.

An avenue of pohutukawa along Pohutukawa Walk draws visitors into the plant collections with plantings of native and subtropical plants and seasonal displays of annuals on the western side of the pathway. The eastern side of Pohutukawa Walk connects visitors with the park-like open spaces towards the lakes and allows access to these areas.

Objectives

- Welcome visitors to the Auckland Botanic Gardens and convey a sense of the character of Auckland's planted landscape.
- Draw people into the Visitor Centre/Huakaiwaka down the Pohutukawa walk and into the plant collections using bold eye-catching floral displays.
- Showcase a selection of outstanding annuals that provide seasonal colour.

Background

The Visitor Centre Gardens officially opened in April 2005. Originally the northern side of the building was planted with mainly subtropical plants to create a 'Pacific' feel with NZ native plants on the southern side. A few existing *Liquidambar* and *Quercus palustris* were retained around the visitor centre.

Education

Conservation

Research

Bedding trials should be conducted elsewhere to inform future plant displays.

Acquisition criteria

- New introductions should focus on NZ natives and subtropical plants of excellent performance and colourful or strongly textured plants of high visual appeal.
- Only high-performing annuals based on trials of plant performance in Auckland should be displayed. Selection criteria includes long-flowering season, pest and disease resistance and low maintenance requirements. Annuals that require excessive grooming such as deadheading should be avoided.

Cultivation

- This garden is maintained to a very high standard.
- Summer annuals should be planted late October/early November.
- Annuals should be planted on the brink of flowering.
- Winter annuals should be planted in April to ensure sufficient vegetative growth before soils cool.
- Planting, division and pruning of frost-tender subtropical plants should not take place until after all chance of frosts has passed.
- The waka plantings should comprise high performing annuals. Other plant types can be utilised provided displays remain bold to maintain some balance and scale with the visually powerful Visitor Centre.

5.3.2 Pacific Pathway

Plantings that contrast the form and texture of primarily native plants.

Description

Nikau and pohutukawa are the signature specimen trees. Plantings alongside the pathways comprise an array of high performing low maintenance plants. In some cases, the planting will reflect the content of the adjacent collection.

The nodes are places for pause and reflection and help visitors navigate to collections. The gardens represent coastal rocky bluffs containing predominantly coastal native plants.

Objectives

- To keep pedestrians to the pathway between the nodes
- Provide an attractive amenity planting that reflects an Auckland style
- Minimise maintenance
- Provide for occasional viewshafts
- Highlight outstanding native plants including some more unusual types

Background

Pacific Pathway was formed in 2019 based on concepts in the Botanic Gardens Masterplan (2010). It was funded through growth funding.

Education

- Creating awareness of outstanding native plants and effective combinations.
- Influencing urban landscape design through plant selection and combinations.

Conservation

- Some threatened plants are included that reflect natural Auckland habitats.

Research

- Ongoing evaluation of plant performance

Acquisition criteria

- Plants that perform well in Auckland conditions
- Permanent plantings that look good all year round
- For the nodes use coastal native plants
- Low maintenance plants

Cultivation

- This garden is maintained to a very high standard.
- Generally, plants will not be labelled but plants of high public interest in pathway plantings can be.

5.3.3 Auckland Border

Plantings that showcase a range of plants recommended for public places and contribute to the sense of arriving in a South Pacific garden.

Description

Currently contains an eclectic collection of plants selected for their suitability for Auckland gardens. The garden forms an attractive backdrop to the car park and screens it from the adjacent road. Over time this garden will transition to reflect the objectives of the Car Park Garden. Ultimately plants are to be showcased in relatively large groups to provide visual impact.

Objectives

- Showcase a range of plants suited to Auckland public spaces such as streetscapes, town centres, civic gardens, etc.
- Influence the palette of plants utilised by commercial developers, Auckland Transport and Auckland Council.

Background

When planted in 1975-76 this was one of the most visited plant collections at the Gardens. The original intent was to feature plants that had been awarded the ‘Award of Garden Excellence’ by the Royal NZ Institute of Horticulture (RNZIH). It was soon recognised that many plants in receipt of this national award were not well suited to Auckland conditions, and the criteria changed to local suitability. As new developments in the gardens took place the focus of visitors shifted to beyond the Visitor Centre/Huakaiwaka, and away from the car park plantings.

Education

- Provide ideas and information for plantings in public places by displaying recommended plants.

Conservation

- Holding some ex situ collections of threatened plants that may be part of recovery programmes.

Research

Acquisition criteria

- Primarily ornamental plants of proven performance that convey a sense of the South Pacific such as subtropicals and some native plants.
- Trees will be suitable for civic spaces e.g. root systems not invasive, not too large, or wide, moderate leaf drop, not brittle or prone to dropping limbs or falling over.
- Preferably ground covers will smother the planted area when mature, preventing establishment of weeds. They should also require little other regular attention.
- Threatened plants are used when recommended by recovery projects.

Cultivation

- This garden is maintained to a high horticultural standard.
- Pruning should maximise floral display and manage plant size.

5.3.4 Car Park Gardens

Bold groups of predominantly native plants selected for low maintenance, resilience, and attractive appearance year-round.

Description

Simple mass plantings of mainly coastal native shrubs, grasses and herbaceous plants displayed in beds and some specimen trees. These gardens include the roundabout at the entrance to the gardens and both main carparks.

Objectives

- Provide visitors with a sense of arriving in a garden that reflects the plants, diversity, and lushness of the South Pacific's largest city.
- Plantings should be predominantly green and calming, preparing the visitor for the experiences that follow.
- Display collections of threatened plants and as appropriate to store germplasm as an insurance against losses in the wild.
- Inspire and promote better amenity plantings in public places by displaying a range of recommended native plants.
- Showcase effective storm water design e.g. rain gardens and swales

Background

The first plantings of the main carpark were mainly exotic plants in June 1976. The objective was to create a low maintenance car park planting that would be a model for other such plantings in the region. This objective remains but in recent times the planting has been modified to express a South Pacific feeling that conveys to visitors a sense of arriving in an Auckland garden. This theme has been replicated in the newly developed overflow carpark in 2018.

Education

- Provide ideas and information for plantings in public places by displaying recommended native plants.
- Provide recommended solutions including plant selection for stormwater management.

Conservation

- Holding ex situ collections of threatened plants that may be part of recovery programmes.

Research

- Ongoing evaluations of plant content in rain garden.

Acquisition criteria

- Primarily ornamental native plants of proven performance in similar situations, with an emphasis on coastal species.
- Plants will be chosen based on their ability to tolerate hot, dry, and windy conditions, frequent trampling, and longevity.
- Preferably ground covers will smother the planted area when mature, preventing establishment of weeds. They should also require little other regular attention.
- Threatened plants are used when recommended by recovery projects and considered suitable for car park conditions.
- Rain garden and swale plants are predominantly native sand-dune and dune forest species that tolerate good drainage and occasional flooding.

Cultivation

- These gardens are the first encountered by many visitors on arrival and must therefore be maintained to a high standard.
- Pruning should maximise floral display, manage plant size and shape.
- A dense layer of organic mulch should be maintained year-round.
- It may be necessary to remove fallen leaves from ground covers.
- Use only one type of groundcover in the roundabout.

5.3.5 Potter Children's Garden

A garden for children of all ages to enjoy and be inspired by plants and their ecological relationships, diversity, and adaptations.

Description

A garden for both education and recreation where children can explore and have fun while learning about plants, nature, and sustainability. Ecological, cultural, and environmental themes underpin all aspects including garden design, art content, interpretation, and educational objectives. Power generation devices convey sustainable methods of generating energy, and components for treating stormwater based on water sensitive design demonstrate how plants can be applied for environmental benefits.

The garden is an important part of the gardens strategy for attracting families and encouraging repeat visitation. It has two components open to the public, and one used exclusively for teaching.

Native section

This explores the relationship between kererū and pūriri. Children learn about plants, birds, and insects in a fun environment. Planting themes include coastal, forest, wetland, edible and maze.

Habitat garden

Four distinct stylised habitats explore the adaptations plants have made to different environmental situations. These range from extremely dry (desert) to permanently wet (bog), with a tropical forest and a meadow.

Children's edible garden

This is a model sustainable edible garden primarily used by students attending learning through experience programmes and is not open to the public.

Objectives

- Provide a place of fun and learning about plants and the environment.
- Increase the numbers of young visitors by providing a free destination that is appealing to the whole family.
- Assist with the delivery of environmental school programmes.

- Highlight alternative energy generation devices and the role of plants in stormwater treatment systems.

Background

The children's garden signalled a change in garden planning at the gardens by tailoring development to primarily meet the needs and interests of the community, especially young people. The Native Section was opened in 2005 by HRH The Prince of Wales and the Habitat section opened in 2010. Most of the funding was provided by the Potter Masonic Trust.

Education

- Deliver school programmes aligned to the objectives of the NZ curriculum. These programmes focus on plants, habitats and the relationships between plants and animals.
- Interactive interpretation enables passive learning opportunities about plants, their relationships with other organisms and importance to life.
- Ideas for gardens and sustainability are provided to inform schools.

Conservation

- Threatened plants may be included in plantings from time to time.

Research

- Many different stormwater treatment systems and plants are being trialled in this garden. Living roof plants are a focus for research.

Acquisition criteria

- Native plants are to be used in the Native Section except for the edible raised bed where exotics and native edible plants may be used to connect children with food plants.
- Plants must be sufficiently resilient to withstand high visitor impacts e.g. being trampled.
- Plants must relate directly to the themes of the area they are to be planted in and contribute to the educational objectives of the garden.
- Habitat Section: predominantly cacti and succulents in Desert Garden, bulbs, annuals, and perennials in the Meadow Garden, subtropicals and bromeliads in the Jungle and moisture-loving plants in the Bog Garden.
- Plants known for causing allergies and/or poisoning are excluded.

Cultivation

- This garden is maintained to a high horticultural standard.
- Accession tags and plant labels are only used for plants of special interest including threatened plants, those which are rare in horticulture or which are likely to be propagated from in the future.
- Summer annuals should be planted from late October/early November.
- Winter annuals should be planted in April to ensure sufficient vegetative growth before soils cool.
- Autumn is the main planting and fertilising time for living roofs.
- Ensure living roofs do not dry out over summer.
- Do not plant, divide or prune frost-tender subtropical plants until likelihood of frost has passed in spring.
- Maintenance of living roofs requires compliance with safety specifications.

5.3.6 Lakes

Lakeside plantings enhance the aesthetics, habitat values and water quality of the two main ornamental lakes.

Description

The large scale of the two ornamental lakes requires a bold planting response. Large sweeps of predominantly native plant species have been utilised in association with a few exotics. These are selected for their ability to grow in riparian planting zones, drought, and clay soils and for their aesthetic appearance e.g. weeping forms, autumn colour.

Objectives

- Provide a beautiful ornamental setting for the lakes.
- Improve waterway health through filtration of stormwater, reducing water temperatures, improvement of dissolved oxygen levels and reduce nutrient enrichment.
- Create habitat more suited to native waterfowl e.g. dabchicks, and to discourage mallard ducks which prefer open areas such as grassland.

Background

The original plantings were relatively small and were designed entirely for ornamentation. The plantings gradually expanded retaining access to the water's edge for visitors. In 2010 extensive riparian plantings were planted. The Peace Garden, a small viewing area on the north side of the upper lake, is included within the lakeside plantings. Grass carp were introduced to the lake in 2019 to control levels of oxygen weed.

Education

- Highlight the ecological benefits of riparian plantings on water quality and the negative impacts of duck feeding.

Conservation

The lower lake supports at least one pair of threatened NZ dabchicks each season that fledge 2 or 3 chicks. Dabchicks feed in deep open water and build nests (a loose pile of waterlogged vegetation with a shallow depression) on floating rafts of vegetation at the margins of lakes, or on a ledge at the water's edge.

Research

Acquisition criteria

- Plant species are preferably native New Zealand plants selected from recommended riparian plant lists.
- Any exotic species planted will be accessioned, mass native plantings are not.

Cultivation

- This garden is maintained to a medium horticultural standard.
- To retain the integrity of the dams it is important to avoid planting them with trees with extensive vigorous root systems.
- Keep mowed grasses out of the waterways (grass clippings add to nutrient loading).
- Mulching is restricted to the outer edges of planting not adjacent to water. No fertiliser is used.
- Avoid pruning of willows or large scale vegetation disturbance during dabchick nesting period (July-October).

5.3.7 Women's Suffrage Garden

A tranquil spot for reflection commemorating the NZ suffrage movement.

Description

North of the Rock Garden is the Women's Suffrage Garden. This garden commemorates the women's suffrage movement in NZ and features a hedge of *Camellia japonica* 'Kate Sheppard'.

Objectives

- Provide a peaceful sheltered space for recreation and small events.

Background

The garden was suggested by the National Council of Women (Auckland) as part of the 1993 celebrations commemorating the centenary of NZ women receiving the vote. *Camellia japonica* 'Kate Sheppard' honours the most prominent leader of the suffrage campaign. White camellias were presented to politicians who supported women being granted the right to vote, in 1893.

Education

Conservation

Research

- The commemorative *Camellia japonica* 'Kate Sheppard' is highly susceptible to petal blight. Seek another white-flowered cultivar which is resistant to replace it.

Acquisition criteria

- Plants of high ornamental value including seasonal displays in the central circular garden.

Cultivation

- This garden is maintained to a high standard.
- Regular replacement of annuals.
- Camellia hedge trimmed annually after flowering.

5.3.8 South and Central Lawns

Collection of trees which frame the open green space and provide shade for visitors.

Description

The pohutukawa collection on the South Lawn represents the best cultivars for ornamental uses. Other trees include *Pinus* species, *Syncarpia gummifera, Ficus, Eucalyptus, Angophora,* and a grove of tōtara. A native screen on the east of the Central Lawn forms a shelterbelt for the orchard and other plantings to the east.

Objectives

- Provide open space for recreational uses as well as shaded areas for picnicking and leisure.
- Showcase trees of special significance.
- Expand the palette of pohutukawa cultivars for landscape purposes.

Background

The first tree plantings took place at the time the lakes were formed and were initially mainly deciduous trees. Subsequent plantings have focused on evergreen trees that tolerate the windy conditions.

Education

- Promote the best pohutukawa to the landscape and nursery industry.

Conservation

Research

- Monitoring pohutukawa, in particular annual flowering consistency.

Acquisition criteria

- All trees selected must tolerate exposure to prevailing south-westerly wind.
- All trees should have special significance.
- All pohutukawa are selected based on observations of mature trees both cultivated and wild.

Cultivation

- This collection is maintained to a high horticultural standard.
- No trees should obscure the view from the Visitor Centre to the forest (Master Plan 2010).
- Consideration should be given to replacement planting, especially for the provision of shade for visitors, in advance of the removal of a senescent tree.
- Pohutukawa have often been planted in groups of three with the intention to retain the single best specimen.
- The lawn soil is compacted, and it is important to prepare the soil well for specimen trees.

5.3.9 Logan Campbell Building

Plantings that complement the domestic scale building and show planting ideas for the various microclimates form full sun to deep shade.

Description

Currently a mix of subtropicals, other ornamentals and native plants selected for their suitability for Auckland gardens.

Objectives

- Showcase a range of attractive low maintenance plants suited to residential gardens.
- Highlight plants suited to dry shady places.

Background

The garden was opened in 1983. Gradual changes have occurred over time.

Education

- Convey planting ideas for dry shady situations.

Conservation

Research

Acquisition criteria

- A diversity of ornamental plants of proven performance that mainly tolerate shade.
- Select ground covers which will cover the planted area when mature, preventing establishment of weeds. They should also require little other regular attention.

Cultivation

- This garden is maintained to a high horticultural standard.
- Pruning should maximise floral display, manage plant size and allow pedestrian access.
- A dense layer of organic mulch should be maintained year-round.

5.3.10 Friends Building

Plantings that complement the Friends Building and tie in with the Car Park Garden and the Auckland Border.

Description

Currently a mix of subtropicals and native plants selected for their suitability for Auckland gardens.

Objectives

- Showcase a range of attractive low maintenance plants suited to Auckland public buildings and civic gardens.

Background

First planted immediately after the Friends Building was constructed.

Education

Conservation

Research

Acquisition criteria

- Primarily ornamental plants of proven performance that convey a sense of the South Pacific such as subtropicals and some native plants.
- Trees will be suitable for civic spaces e.g. root systems not invasive, not too large or wide, moderate leaf drop, not brittle or prone to dropping limbs or falling over.
- Preferably ground covers will smother the planted area when mature, preventing establishment of weeds. They should also require little other regular attention.

Cultivation

- This garden is maintained to a high horticultural standard.
- Pruning should maximise floral display, manage plant size and shape.
- A dense layer of organic mulch should be maintained year-round.

5.3.11 Bund

A densely vegetated boundary planting of predominantly native woody plants providing visual screening from the Southern Motorway and shelter from wind.

Description

Contains mainly woody native plants including pohutukawa and kowhai seedlings raised from known parents with horticultural merit. Some palms have been established on the bund near the Palm Garden, and *Araucariaceae* planted adjacent to the Gondwana Arboretum.

Objectives

- Visually screen the motorway.
- Provide a sheltered environment protected from prevailing westerly winds for the Palm Garden and Gondwana Arboretum.
- Trial seedling plants for their ornamental characteristics.
- Establish groups of selected species for seed production.

Background

The bund was formed during earthworks in 1994 to widen the Southern Motorway. The earth bund significantly reduces the noise levels in gardens to the west. It was planted progressively after its construction. The northernmost section of the bund was sold for a water-treatment wetland (in 2015) for the motorway widening project (2017-2019) which also reduced the width of the bund along most of the length of the Gardens boundary.

Education

- Provide agencies such as Auckland Transport with information on a range of native plants suitable for amenity use in exposed roadside situations.

Conservation

- As opportunities arise establish ex situ plantings of threatened native plants.
- Two notable historic trees (oak and plane tree), near the former flour mill site, must be retained (and are recommended for addition to the tree schedule, pending assessment).

Research

- Monitoring of the performance of *Metrosideros* and *Sophora* seedlings.

Acquisition criteria

- Generally woody native species that tolerate wind exposure.
- Opportunities to add plants with more than functional suitability should be sought. This includes: Parent blocks for conservation and amenity purposes; threatened plants and cultivars of woody plants for trial and evaluation purposes.

Cultivation

- This area is maintained to a medium standard.
- The performance of all plants should be monitored. Remedial action such as pruning should be applied to plants in decline, or they should be replaced if necessary.
- Protect high-value trees by judicious pruning or removing vigorous adjacent nursery plants.
- Formative pruning of high-value tree species is important to ensure they are structurally sound and attractive when they mature.
- The two billboard signs must always be visible from the motorway by pruning or use of lower status plants
- Weeds easily invade the bund from the motorway corridor and annual weed surveys are required.

5.3.12 Plant Trials

Groups of plants selected as trial subjects to evaluate their garden merit or for other research purposes.

Objectives

To ascertain the best plants for cultivation in Auckland conditions.

Background

The original site was established and planted in 1982 when it was known as the Generic Collection. Subsequently it was renamed Shrub Trials, and now Plant Trials to reflect its diverse content. Trials may also occur in the Nursery or other garden locations.

Trials have mainly focused on ornamental crops, although trials of edible plants and those of potential ecological benefit have also been undertaken.

From the early 1981 until 2014 three Plant Evaluation Panels independently evaluated shrubs, perennials, and native plants. The findings and recommendations of these panels were compiled in Plant Advisory Leaflets. These were withdrawn in 2014 and a programme was initiated to present such information in more engaging and contemporary ways (including online).

Education

- Demonstrate plant trials as the basis for plant choices for the Gardens and recommendations to the public.
- Provide a learning opportunity for students and apprentices in plant trial and evaluation techniques.

Research

- Research and trial crops are approved by an internal staff committee (the Research Executive) based on recommendations from staff and external experts.

Acquisition criteria

Acquisition criteria and research protocols can be found in Plant Evaluations (Appendix 4).

Cultivation

- This garden is maintained to a medium horticultural standard.
- Poor performers should generally be culled, particularly those afflicted with disease that may spread.
- Some trial plants of poor performance may be retained for research or other purposes.
- Specialised cultivation techniques may be required according to research directives.
- Plants should be mapped in addition to normal accession and labelling protocols.
- Summer annuals should be planted from late October/early November.
- Winter annuals should be planted in April to ensure sufficient vegetative growth before soil cools.
- Perennials should be planted by October.

5.3.13 The Glade

Lush strongly textured Auckland garden using predominantly subtropical plants.

Description

Small sheltered retreat designed to look good all year round as a backdrop for weddings and other events. Seasonal planting provides colour interest. The colour palette is kept sufficiently neutral so themed decorations are possible. Designed to accommodate up to 160 guests at a function.

Objectives

- A garden for all user groups.
- Create a romantic ambience appropriate for weddings.
- Maintain intimate feel to the garden by ensuring plants create the feeling of a room with limited views in or out.
- Ensure plantings are attractive for as many months of the year as possible.
- Generate revenue.

Background

The formation of the Pacific Pathway in 2019 enabled the establishment of this garden.

Education

- Provide ideas for plant choices and combinations in urban gardens.

Conservation

- N/a

Research

- N/a

Acquisition criteria

- Plants that perform well in Auckland conditions.
- Plants that give a subtropical feel or provide textural contrast.
- Permanent plantings that look good all year round.
- Seasonal plantings must be compatible with the overall design intent.

Cultivation

- This garden is maintained to a very high standard.

- Seasonal plantings will be rotated to minimise empty beds.
- Ensure some seasonal plant highlights at all times of the year.
- Advanced grade annual replacements will be used.
- Generally, plants will not be labelled.

5.4 Stormwater area statements

5.4.1 Sustainable water treatment systems

Integrated stormwater treatment systems which improve waterway health and raise the profile of this approach.

Description

Systems such as a rain garden, planter boxes, swales, wetland, rainwater tanks, forebay, living roofs, impermeable surfaces, a tree pit and planting around waterways are used to show home gardeners, planners and developers how to protect natural waterways using plants. Plants reduce flood risk and soil erosion as well as removing contaminants such as heavy metals, sediments, and nutrients. They also improve habitat quality and add landscape and aesthetic value.

Objectives

- Trial and promote the best plants for each system based on their functionality and aesthetic contribution.
- Improve waterway health through integrated storm water treatment systems based on a full catchment approach.

Background

In 2008 analysis was undertaken into the deteriorating health of the Gardens lakes. This led to a stormwater master plan written by specialists. The various systems have been developed since this time.

Education

- Raise awareness with visitors and provide educational opportunities for students.
- Directly influence the approach of industry decision makers to sustainable water management.
- Influence wider Auckland Council practices in stormwater management.

Conservation

- Protect natural systems that stormwater from the Gardens flows into such as streams, wetlands, and the sea by improving water quality of surface and groundwater on site.
- Provide ecological benefits for terrestrial and aquatic biodiversity.

Research

- Evaluate the effectiveness of plants for form, function, longevity, and aesthetic appeal in stormwater treatment systems.
- Establish partnerships with researchers involved in stormwater management.

Acquisition criteria

A different palette of plants suit different treatment systems. Each palette should be selected for its functionality, ecological contribution, landscape enhancement and minimal maintenance requirements.

Cultivation

Swales

- Plant choices must reflect two separate habitats – swale sides and base.
- Swale base plants must evenly filter water flow without blocking it, they should form dense root mats that stabilise the base, so a channel does not form. They must also tolerate long periods of waterlogging and occasional drought.
- Swale banks require plants that tolerate dry conditions with less frequent waterlogging.
- Swales may need sediment removal and/or plant replacement from time to time to ensure flow times through the swale are enough to treat water but not too long to suppress flows.

Rain Garden

- Plants must tolerate waterlogging for periods of up to 24 hours but mostly tolerate long periods of drought.
- Specialised mulches are used at planting time, but not usually subsequently.
- Plants are not fertilised or watered.
- Plant cover needs to be maintained over the surface area.

Living Roofs

- Roofs may be irrigated during droughts.
- Plants are selected that are naturally adapted to dry places, where their roots are constricted. These are often from coastal sites, rocky bluffs or epiphytic habitats.

Riparian

- Plant selection is guided by Council recommended best practice (such as TP 148[11]) but use of taller species must not obscure view shafts.
- Mulching is restricted to the outer edges of planting not adjacent to water.
- No fertiliser is used.

[11] ARC. 2001. Riparian Zone Management Strategy for the Auckland Region. Auckland Regional Council Technical Publication 148

5.5 Natural area statements

5.5.1 Native forest

A remnant of lowland broadleaf/podocarp forest characteristic of natural vegetation of the Manukau area.

Description

A 10-hectare natural remnant broadleaf/podocarp forest contiguous with the forest of Tōtara Park (20 hectare) managed by Local and Sports Parks. Together these remnants represent almost all that is left of the alluvial flat forests of the Hunua Ecological District, common in pre-human times. This forest is characterised by mature podocarps and c.170 native vascular plants including some uncommon in the Auckland region. The Puhinui Stream follows close to the forest boundary.

Objectives

- Conserve and enhance the biodiversity values of the forest.
- Provide for recreational use through a network of paths.
- Utilise the forest as an educational resource.

Background

Anecdotal evidence suggests that in the latter half of the 19th century logging modified this area. Stock grazed the forest in relatively recent times, with the Garden's portion fenced off in 1976.

Education

- Enable school groups and visitors to experience natural native bush and become familiar with a range of native plants and plant communities.

Conservation

- Protect the high conservation values of this forest remnant in an ecological district that has lost most of its lowland vegetation.
- Riparian planting protects the margins of the forest and creates a corridor to link with downstream plantings.
- Collect seed of priority species, such as podocarps, for the New Zealand Indigenous Flora Seed Bank.

Research

- Support biodiversity monitoring (e.g. vegetation, birds, fish, stream health), including visitor impacts, to detect trends in biodiversity values.

Acquisition criteria

- Seed sourced for revegetation of the forest should ideally be sourced locally or from similar habitats in the Hunua, Manukau or Tāmaki Ecological Districts.

Cultivation

- Weeds and animal pests (rats and possums) are controlled in partnership with pest management programmes in adjacent areas.
- Young riparian plantings should be weeded to release plants.

6 Section Six: Implementation and Review

The Plant Collection Guidelines will be reviewed every three years. Garden statements may be reviewed at any time and added to the published version when it is reprinted. This ensures we are continually assessing and improving on all aspects of the gardens and collections.

Each review will include an assessment of the overall curation and management goals for plant collections, as well as the specific objectives for each garden or collection.

7 Appendices

7.1 Appendix 1: Auckland Botanic Gardens History 1976-2015

1926	Sites for a botanic garden in Auckland investigated
1960s	Sites of proposed university at Tāmaki, Cornwall Park and Cascades Park were investigated as potential botanic garden sites.
1963	Auckland Regional Authority (ARA) formed.
1964	ARA embarks on Regional Parks programme.
1964	ARA approached on behalf of several organisations with a proposal to consider 200 acres (80 hectares) of the Nathan Estate at Manurewa as a possible site for a botanic garden.
1964	The Department of Scientific and Industrial Research investigates the site and reports that it is eminently suitable for a botanic garden.
1965	ARA opens its first coastal Regional Park, Wenderholm.
1966	In March, the Auckland Horticultural Council and the Royal NZ Institute of Horticulture jointly ask the ARA to purchase the Manurewa site before it is subdivided.
1967	In May, the ARA agrees to purchase 42 hectares (104 acres) at a cost of $200,000. Manukau City Council (MCC) agrees to purchase adjoining 40 hectares.
1973	On 19 February ARA chairman Mr Tom Pearce turns the first sod at the new site.
1975	First plantings made in Auckland Border, and trees and hedges planted nearby.
1976	Nursery Building constructed.
1976	Native Forest fenced off from stock (fences removed from 1999 once livestock gone).
1981	Earthworks for the two ornamental lakes were completed late in the year. The lakes filled over the following summer months.

1982 ARA purchases further 20.5 hectares from MCC at a cost of $725,000, and accepts from MCC a gift of a further 2.2 hectares to provide a northern frontage off Orams Road.

1982 On 23 February Auckland Regional Botanic Gardens is officially opened to the public by the Governor General Hon. Sir David Beattie. Visitor numbers in the first year are 98,000.

1982 The Information Centre (later renamed Visitor Centre) is opened (February).

1983 Classroom donated by Ministry of Education.

1983 Logan Campbell Lecture Building opened on 25 February.

1983 Friends of the Auckland Botanic Garden established.

1983 Pergola in Formal Garden constructed, flagpole erected, footbridges across stream in Spring Blossom Valley installed, Suffrage Garden built with support from Soroptimist group.

1986 Carrington Horticultural Classroom (now Unitec Classroom) arrives.

1987 Kiosk constructed.

1989 In April, recommendations contained in the Working Party Review report (excluding recommendation 44) adopted by Regional Parks Committee. The committee resolved to support the progressive development of the Gardens to a full cultural facility in the role of a regional botanic garden.

1990 First covered courtyard erected.

1990 First judging of the Rose Introducers of New Zealand (RINZ) Rose Display/Trial.

1992 Friends Horticultural Reference Library opened on 24 April.

1992 Hugh Redgrove Memorial Arbour dedicated on 26 April.

1995 On 25 May the Management Plan is adopted by Regional Parks Committee. Subsequently a Supplementary Plan containing plans and proposals for future developments was produced but not adopted.

1997 Working Party is established to produce a Development Plan (June).

1998	February: Proposals contained in the Development Plan presented to Parks Committee, and the report is received.
1999	A prospectus was published which outlines a view of the future direction for the Gardens.
2000	The decision is taken to reduce and ultimately cease applications of pesticides at the Gardens.
2000	RINZ terminate their arrangement with the Gardens.
2000	Salvia Collection relocated to site adjacent to nursery.
2001	Significant changes to the layout, content and management of the Rose Garden commence. The Heritage Rose Garden and The New Zealand Rose Garden are developed.
2001	On 29 September the Prime Minister the Rt. Hon. Helen Clark officially opens the Threatened Native Plant Garden.
2001	New criteria for evaluating roses set in and the first rose trial beds are established.
2002	The ‘Waka’ is formally opened as the main entry to the Threatened Native Plant Garden. This is the first major Gardens public artwork acquisition.
2002	Green-flowered mistletoe raised from seed from Miranda flowers at the Gardens (September) for the first time in cultivation. The project to protect this threatened species commenced in partnership with the Department of Conservation (DOC) in 1999.
2003	South African Garden redesigned and a major revamp undertaken.
2003	The Reflective Rose Garden established.
2004	The Threatened Native Plant Garden receives an Award of Excellence from the International Federation of Landscape Architects (IFLA).
2004	Parks Committee adopts the Botanic Garden sub-branding on 1 December. The name changes to Auckland Botanic Gardens (formerly Auckland Regional Botanic Gardens) and the strapline ‘Where Ideas Grow’ is adopted.
2004	Perennial Garden redeveloped and adjacent Native Plant Ideas developed. (Replacing the former Native Cultivar Garden).

2004 Rose trial beds (stage two) are formed.

2005 The Potter Children's Garden was formally opened on Thursday 10 March by The Prince of Wales.

2005 The new Visitor Centre Huakaiwaka opened by Prime Minister the Rt. Hon. Helen Clark on Saturday 9 April. In September Huakaiwaka receives the Creative Places Award for Best Built Environment. The Pohutukawa Walk is installed.

2006 The Gardens website goes live in April.

Construction of the final three habitats in the Threatened Native Plant Garden (saltmarsh, sand-dune & shell-bank).

2007 The Gardens marks 25 years since opening to the public with celebrations on 24 February.

The final Ellerslie Flower Show is held at the Gardens (November).

The inaugural Sculpture in the Gardens runs for three months from 3 November until 31 January 2008 (sponsored by Stoneleigh).

Star Performer criteria described to identify outstanding garden plants for home gardeners.

2008 The Gardens master planning process formally commences.

Auckland Botanic Gardens Lake Management and Low Impact Design – Discussion and Recommendations and *Low Impact Design Solutions for Auckland Botanic Gardens* published

Two ornamental lakes drained and dredged and stormwater forebay constructed.

Major revamp of the Edible Garden into a series of themed rooms. The Culinary Courtyard, Rain Garden and Orchard were planted.

2009 The Kiwi Backyard is constructed in the Edible Garden.

The Proteaceae section of the Southern African garden is redeveloped.

Star Performer logo first printed on interpretive signs and labels in the garden.

2010	Annual visitation to the Gardens reaches 969,000 for 2009/10 (around double the 485,000 visits recorded in 2004/05).
	The Gardens Master Plan is formally adopted by ARC Parks & Heritage Committee on 3 February.
	The third and fourth stages of the Edible Garden redevelopment completed.
	The second stage of Potter Children's Garden was officially opened on 18 November by His Excellency Rt. Hon. Sir Anand Satyanand, Governor General of NZ.
	Installation in Potter Children's Garden of two living roofs, two stormwater planter boxes, permeable pavers, an infiltration trench, and a vegetated swale.
	Stormwater forebay constructed and planted.
2011	Riparian plantings of 6,000 native plants around the lakes.
	Interpretation of the various stormwater devices and their collective benefits undertaken.
	Orchards planted adjacent to the Potter Children's Garden and in the Edible Garden.
2012	Rain Garden installed in the main car park to collect and treat stormwater run-off, and a stormwater wetland formed and planted with native wetland species north of the Potter Children's Garden.
	Renovated library foyer opened.
2013	New pathway and retaining wall installed on the opposite side of the lake from the Reflective Rose Garden.
2014	Hugh Redgrove Memorial Arbor replaced.
	Fred Graham sculpture (Manu Tōrino) at the entrance of the Native Plant Identification Trail installed.
2015	The Neville Haydon Pavilion was revamped and named to honour Neville Haydon's contribution to the Camellia Garden.
	Fred Grahams 'Web' sculpture installed at the entry to the Native Plant Identification Trail.

	Memorandum of understanding is signed between Auckland Council and NZTA on the southern corridor motorway widening project adjacent to the Gardens.
2016	Aloe collection acquired from Geoff Etherington of Nelson.
2018	New overflow carpark completed increasing the number of carparks at the Garden by 177.
	Books in the Friends Horticultural Library added to the Auckland Council library catalogue system.
2019	Grass carp introduced to the lower lake and rose garden pond in January.
	Iris-BG botanic gardens records database installed.
	Hugh Redgrove Arbor reinstated at new entrance to Perennial Garden.
	Pacific Pathway (stage one to the depot entry) opened Labour weekend.
	Covered courtyards demolished.
	The Glade and renovated Perennial Garden established.
2020	The Nursery achieved accreditation in the new NZPPI Nursery Biosecurity Programme.
	Two glasshouses in the nursery demolished and replaced with one larger greenhouse.

7.2 Appendix 2: Pesticide Minimisation

Description

The Gardens aim is to manage plant health without pesticides. Insecticides and fungicides can only be considered where an acceptable solution is available that specifically targets the issue without negatively impacting on other organisms. Typically, these are likely to be products with 'organic' certification.

Objectives

- Display healthy plants and gardens in a low toxicity environment with minimal pesticide applications.
- Positively influence the range of plants grown and horticultural practices applied by private and public gardeners, contractors, and other Council departments.

Background

Since 2000 the Gardens has undertaken a pesticide minimisation programme. The immediate implications for the Rose Garden were significant with many rose cultivars becoming unhealthy. However, the excellent health of our roses today is testament to the success of the spray-free regime.

Since the advent of the pesticide minimisation programme the content of many gardens and plant collections has changed as high performing plants that remain healthy without pesticide intervention in trials have replaced unhealthy plants.

Method

Prevention measures

- Plant introductions based on trials that identify high performance plants that remain healthy without chemical interventions.
- Where possible avoid monocultures (a diversity of plant types reduces pest and disease outbreak and spread).
- Utilisation of fertilisers that promote soil biota. Conversely avoid those that may damage soil life.
- Apply 'best practice' horticultural techniques e.g. minimal cultivation, regular applications of organic compost/mulch, planting, pruning and division at seasonally optimal times.
- Calculate plant spacing to enable plants to reach maturity without overcrowding and to allow adequate air circulation.

- Utilise crop rotations to break disease cycles.
- Avoid susceptible crops in known diseased soil locations.
- Pesticide interventions should only be considered as a final resort in special circumstances where all risks and benefits have been considered.

Pesticide intervention criteria:

Applications of pesticide may be used in situations where:

- The wider impacts are minimal (e.g. no destruction of beneficial organisms) and where impacts are clearly outweighed by the benefits.
- A new pest or disease incursion may be eradicated.
- Seedlings or other young plants may suffer damage which at this vulnerable stage is considered unacceptable.
- Under the advice of a biosecurity authority as part of a national or regional programme e.g. myrtle rust response.

7.3 Appendix 3: Stormwater Management

Introduction

The Gardens manages stormwater through water sensitive design (WSD) principles[12] to protect and enhance the health of waterways. A series of connected stormwater treatment devices (a treatment train) have been deployed to optimize the environmental benefits underpinned by the WSD philosophy. The accumulated benefits of these connected devices contribute significantly to the health of waterways.

Water sensitive design contributes to the broader objective to maximise environmental benefits and foster abundant life throughout the Gardens ecosystems. The content and arrangement of plantings in WSD systems can produce multiple benefits including stormwater management, ecological enhancement, and landscape benefits.

Background

Water sensitive design was introduced to the Gardens in 2007 to restore the declining health of waterways, particularly the lakes. The Gardens has two large ornamental lakes that receive stormwater from a 12.3 hectares catchment area. 8.3 hectares of this catchment is urban residential. Overflow from the lakes then enters the Puhinui Stream that eventually enters the Manukau Harbour.

The impetus to install WSD devices at the Gardens resulted from water quality testing undertaken on the lakes during 2006 and 2007 that indicated *Escherichia coli* levels and nutrient levels were at unacceptably high levels. Further analysis found the high *E. coli* was largely a result of the large waterfowl population located at the Gardens.

High nutrient levels were found to originate mainly from human influences such as fertiliser usage from off-site and on-site catchment areas. The Nursery covers an area of 6000m^2 and was identified as the major source of nutrient enrichment.

A stormwater management plan[13] set a roadmap for WSD solutions on site and public engagement and interpretation was guided by an expert report.[14]

During 2008, the lakes were drained and dredged. This involved the removal of 4000m^3 of sediment and the invasive water weed *Egeria densa* (oxygen weed). The installation of the first of a series of WSD stormwater treatment devices commenced in 2008.

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[12] WSD is termed Low Impact Design (LID) or Integrated Stormwater management (ISM) by some NZ agencies.
[13] Shaver, E. 2008. Auckland Botanic Gardens Lake Management and Low Impact Design – Discussion and Recommendations. Unpublished report.
[14] Puddephatt, J. 2008. Low Impact Design Solutions for Auckland Botanic Gardens'. Unpublished report.

Biodiversity benefits and landscape values

The value of plant content has broadened beyond just the attributes that contribute to waterway protection. Biodiversity benefits can be achieved through plantings that provide habitat for a diversity of wildlife. Well considered plant selection can deliver year-round food supply and habitat to invertebrates, birds, and lizards.

Community acceptance of WSD systems is enhanced when the feature is visually appealing. Attractive plants used in creative combinations of form, texture, tone, and colour contribute considerably to the aesthetic appeal.

Plant selection and evaluation

The focus for the Gardens is the selection and subsequent evaluation of native plant species for suitability in WSD systems to confidently recommend them for wider use in stormwater treatment across the region.

The Gardens undertakes plant selection and trial programmes to identify and recommend plants with the required attributes.

Plant selection has largely been based on observation of plants in their wild habitats. These selections are informed by understanding the various characteristics plants must have to be successful in a particular application. Species selection is influenced by factors such as the type of system and the depth and composition of any substrate. It is desirable that plantings become self-maintaining once mature. The Gardens avoids utilizing any plants listed in the Auckland Regional Pest Management Plan (2020).

Education and interpretation

To engage both visitors and students, the Gardens showcases a comprehensive range of devices in an integrated manner with interpretation that explains how they work and the resultant environmental benefits. Target audiences are public and private agencies that may utilize such systems as well as public and school children.

A printed guide has been produced to enable visitors to better understand the function and connectedness of the various devices.

Stormwater management devices

Nursery retention tank

A retention tank was installed at the lower end of the nursery in 1998 to capture and enable recycling of all run-off. Drainage was installed throughout the 6000m^2 nursery to channel irrigation and stormwater into the retention tank. The nutrient-rich water is then recycled to irrigate the nursery plants. During peak flows, the retention tank overflows into an adjacent vegetated swale. The retention tank (and connected WSD devices) reduces the quantity of nutrient enriched water that reaches natural waterways. The captured water is recycled over nursery crops, enhancing their growth, and reducing dependence on town water supply.

Vegetated swale

The first vegetated swale installed was a wetland swale which treats stormwater run-off from the nursery and other catchments before it enters the lakes. Stormwater passes through plantings that slow water speed (by their dense root and shoot systems) with the prime aim of reducing nutrient loadings. Previously stormwater with high nutrient loadings was piped directly into the lakes contributing to algal blooms and other water health issues.

NZ native plants are used, selected for their ability to cope with periodic flooding as well as occasional drought and filter water without blocking it (e.g. oioi or *Apodasmia similis)* are most suitable for the swale base. Clumping plants such as *Phormium* should be avoided as they block water movement causing scouring of the swale base. Plant content is a significant influence on ‘residence time’ or the period stormwater remains within a swale. The swale is designed to have a residence time of around 9 minutes determined by several factors including the design of the swale, its gradient, and the plant content. The longer the residence time the greater the impact on hydrology flow (how much moisture loss occurs through evaporation and infiltration between entering and leaving the swale). Slower flows also contribute to greater precipitation of sediments, metals, organics, and nutrients.

The ‘roughness coefficient’ is a key aspect of effectiveness of plants in a vegetated swale. It refers to the extent to which a plant slows the water flow. Oioi has a reed-like texture that filters water evenly and a very high roughness coefficient. Although the base of the swale often waterlogs it also sometimes becomes very dry. Plants in the swale base should have an extensive surface root system to resist erosion. Although the banks seldom become waterlogged, they are more prone to becoming dry.

Sediment forebay

The Gardens sediment forebay (35m long x 4m wide x 1m deep) was constructed and planted in 2010. This sediment forebay receives run-off from the vegetated swale and from neighbouring residential areas, an adjacent grassed overflow car park and other

surrounding impervious surfaces. It reduces stormwater flows and allows sediment and silt to drop out of suspension prior to it reaching the lakes and other natural waterways. It has been engineered to allow ready access for removal of the sediment that builds up on the base of the forebay. It is anticipated that sediment removal will occur every 5 – 10 years.

Rain garden

A rain garden was installed in the main Gardens car park in 2012 to treat stormwater from around 3600m^2 of impermeable asphalt. The car park rain garden achieves 70% removal of Total Suspended Solids (TSS). TP10 states 75% TSS as the required outcome. It is common that retrofitted devices deliver lower outcomes than new devices, but the result at the Gardens is still a considerable improvement on the situation before installation of the rain garden.

The use of a free-draining media in the rain garden influenced plant selection. It was decided that native coastal species would be more likely to flourish than wetland species based on the observation that although the rain garden periodically floods the surplus water drains rapidly through the free-draining media. During periods of dry weather, the rain garden media becomes dry, more suited to coastal species.

Stormwater tree pit

The stormwater tree pit (marketed by Stormwater360 as UrbanGreen BioFilter) is a modular device that combines biological and engineered media filtration to remove pollutants. It is visually attractive and treats stormwater from 700m^2 of impermeable surface. Newer versions will apparently treat runoff from a 1000m^2 catchment.

Stormwater planter boxes

The Gardens has installed two stormwater planter boxes in the Potter Children's Garden. Both are plumbed to receive run-off from the rooftop of the adjacent environmental education centre. One uses exotic plants, predominantly *Hemerocallis*. The other is planted with a combination of oioi and the ground-hugging remuremu *(Selliera radicans),* both native species that have performed well. This planter box is also used as an educational resource.

Stormwater wetland

A stormwater wetland was installed at the lower northern end of the Potter Children's Garden as the final stormwater treatment device for all the stormwater emanating from this garden. The purpose of the wetland is to hold and eventually absorb the run-off

from the Potter Children's Garden, and to cleanse the water in the manner of natural wetlands. Plants can assist with reduction of nutrients and heavy metals, filtering out of sediment particles, decreasing erosion and provision of food supply and habitat for wildlife.

The stormwater wetland was formed by encircling a reasonably level grassed area with an earth bund originally about 1 metre high. The inner area experiences frequent and rapid inundation following heavy rainfall and has remained moist even during drought conditions. A wide diversity of NZ native species was planted that occur naturally in damp places such as streamside's and in wetlands.

Riparian plantings

Riparian plantings were undertaken around the two main lakes to improve water quality, increase habitat and improve amenity. The plantings also provide visitors with model examples of native riparian plantings, and associated interpretation explains the environmental and ecological benefits, such as reduction of water temperature, improved oxygen levels that reduce aquatic weeds and algal blooms, improved habitat diversity near the water's edge for aquatic invertebrates and fish. Riparian plantings also reduce nutrient levels by removing nutrients before they enter the water, and they reduce sedimentation and increase water clarity. In 2019 grass carp were introduced to further supress dense oxygen weed growth. In the Gardens situation the use of eco-sourced native plants is considered of lesser importance than ensuring the plantings were appropriate for an amenity garden. The plantings were designed to enhance the appearance of the lakes, merge with the surrounding plant collections and to ensure protection of important vistas, particularly from the Visitor Centre.

Living (green) roofs

Living roofs play contribute to stormwater management by absorbing up to 70 percent of rainwater, they have effective insulation properties, enhance air quality, and they can provide wildlife habitat for birds, reptiles, and invertebrates. They can also be extremely attractive. Living roofs are generally categorized as:

- Intensive living roofs comprise deep substrates (200mm+).
- Extensive living roofs utilize shallow layers of substrate (20mm – 150mm) which suit smaller low-growing drought-resistant plants.

Two extensive living roofs were developed in the Potter Children's Garden in 2010:

- A gently sloping roof (measuring 2.5m x 8m) at the main entrance featuring exotic plant species including a range of small succulents, bromeliads, winter growing bulbs and grasses.
- A larger and steeper roof on the children's toilet with a slightly deeper substrate at around 120mm planted with NZ native plant species.

7.4 Appendix 4: Plant Evaluation

All the plants we cultivate are assessed to ascertain the best performers in Auckland conditions. The Plant Trials area is utilised to evaluate specific crops. Some trial crops may be planted elsewhere, and the content of all other plant collections is under ongoing evaluation.

The aim of ongoing plant evaluation is to:

- Ascertain the best plants for growing in Auckland conditions to feature in main displays (poor performers are culled unless special considerations require them to be retained).
- Ascertain the value of certain plants in ecological and environmental applications
- Influence the range of plants grown by private gardeners, landscapers and in public places.
- Identify plants that may be used in breeding programmes.

Trial Planning

All trials must be approved by the Research Executive who will consider the purpose of the proposed trial and the estimated value of the outcomes.

When researching the content of proposed trials contact known experts for advice on the crop, or alternatively refer to publications by credible experts.

All plants must be accessioned, and they must be checked against the accessions criteria before plants are order and purchased.

Every plant trial must have a Trial Plan with clearly stated objectives and methodology. This plan must contain the purpose & expected outcomes, the assessment criteria including evaluation priorities, responsibilities, data collection requirements and reporting.

Specific crop requirements must be detailed e.g. soil type, sun or shade requirements, fertiliser, pruning regime, plant spacing, and any other special treatments or requirements.

Data Collection

Data to be recorded includes propagation records, planting time, methods & treatments, flowering period, flower and foliage characteristics, plant size, form & vigour, and overall health.

Other data can be added, and in some cases deleted such as flowering records for foliage crops and edibles.

At the conclusion of each trial all relevant data must be entered into the plants records database.

Evaluations

Formal evaluations will be scheduled periodically during each trial to coincide with peak flowering and at other strategically timed dates. This results in a horticultural merit rating.

Evaluations will be based primarily on performance data, but there is an element of subjectivity by an evaluation panel when reaching their final determinations. This subjectivity will mainly apply when rating aesthetic qualities of a trial subject, and it will also apply when taste testing edibles or assessing perfume.

When assessing subjective characteristics, it is important to record (as much as possible) the reasons for reaching any conclusions or recommendations. It is also important to recognise that taste varies widely, and a plant that is unappealing to some will be admired by others.

A Field Data Collection Template specific to each trial will be prepared that will include the various criteria prioritised for the crop in the Trial Plan. This is likely to include flowering period and quantity, foliage, form, health, and overall appearance. Characteristics specific to each crop will also be considered such as self-grooming, colour fade and attractiveness to insects.

A points-based rating system will be utilised. Individual plants that score above an agreed threshold will be considered for inclusion in the Gardens main displays. The overall ratings also inform the Gardens ‘Star Performer’ programme, and the plant recommendations made available through various media.

Star Performer

A Star Performer is a plant of proven excellence, in suitable conditions in Auckland. Star performers are outstanding plants with a 9 or 10 horticultural merit rating from trials/evaluations and receive a sticker on the plant label or branding on collateral. A star performer is also a recommended plant.

Recommended Plants

Recommended plants have consistently performed to high standards in suitable conditions in Auckland. Recommended plants are those that have scored a horticultural merit rating of an 8 or higher in trials/evaluations. They are recommended to the public and included in garden displays but are not identified on plant labels.

Reporting

Findings of plant evaluations will be prepared at the conclusion of each trial or garden evaluation. Trial reports will be made available to various publications including the Friends Newsletter, and papers may be published in scientific journals.

Results are made available to the Visitor Services team to inform education and communication programmes and added to the web-based Plant Advice database.

7.5 Appendix 5: Plant Breeding

Description

Plant breeding at the Gardens has traditionally focussed on producing new hybrids of high health and performance in plant groups where obvious shortages exist and where commercial breeders are not active.

Objectives

The purpose of plant breeding programmes at the Gardens is to:

- Produce new cultivars of improved performance with emphasis on plant health.
- Improve the quality of garden displays at the Gardens.
- Deliver outcomes of benefit to the gardening community.
- Focus on crops not receiving attention from commercial breeders.

Background

The Gardens has conducted extensive native plant breeding programmes. Most plant breeding activity took place between 1982 and the mid-nineties when it was largely curtailed due to insufficient resources. The programme focussed mainly on producing new cultivars of *Hebe* and *Leptospermum scoparium*. One of the primary objectives was to produce *Hebe* cultivars resistant to diseases in Auckland's warm humid climate. Most cultivars that emanated from this programme have 'Wiri' in their cultivar name. Active breeding programmes have also been undertaken with exotic plant groups including *Dahlia*, *Canna*, *Magnolia* and *Clivia*. The *Dahlia* breeding programme was a partnership with Dr Keith Hammett that included the utilisation as parents of several species not included in the pedigree of modern hybrids.

Education

Awareness of the role the Gardens have played in plant breeding.

Conservation

Retain significant germplasm involved in breeding programmes.

Research

- Document all data associated with every trial.
- Each cross is allocated a code. Seedling individuals selected from the cross are allocated a new individual code.
- We will explore genetic barriers to desirable crosses and seek solutions.

Acquisition criteria

Only use parent material that exhibits superior genetic attributes.

7.6 Appendix 6: Herbicide use

Our aim is to achieve acceptable maintenance standards with minimal herbicide use. Where herbicides are utilised the least toxic effective product will be used.

Where possible physical weed removal is preferred, and most garden beds are weeded using manual techniques.

Minimising Weeds

- Herbicides are applied during periods of active plant growth to maximise their effectiveness.
- Physical barriers are used to reduce weed germination including using mulch and making good plant choices to maximise soil coverage and out-complete weeds.
- Check for weeds during quarantine period of incoming plants.
- Prevent weeds from seeding.
- When planning all new developments weed maintenance requirements will be minimised (weed growth is often prolific between pavers, unlike concrete paving).
- When utilising herbicides that translocate through roots avoid applying in the vicinity of trees.

When herbicides are required all Council policies for weed control are followed. Herbicides are a valuable tool to provide acceptable horticultural standards for a public garden.

Non-target impacts are minimised by:

- Timing of application e.g. not in rain or strong winds, and outside of school holidays and peak visitor times.
- Applications at low pressure and maximum droplet size.
- Using selective herbicides.
- Correct choice of chemicals near waterways.
- Targeted application such as cutting and painting or spot spraying rather than broadcast application.
- Low toxicity or organic herbicides are used in places where they are effective. (generally, not effective on perennial weeds).
- Herbicides can only be applied by operators with Growsafe certification and inducted with the SOP and Material Data Safety Sheet (MDSS) for the specific herbicide type.

Note: We are committed to reducing herbicide use through researching alternative technologies and methods.

General Weed Control

Glyphosate is the primary chemical used for spot spraying weeds. Procedures include:

- Carefully direct spray at target weed species.
- Avoid, where possible, applications to cultivated areas (to minimise damage to desirable plant species and prevent impact on soil biota).
- Ensure area being sprayed is isolated or clear signage installed to keep public out.
- Follow all label instructions.

Desiccant sprays

Plant extract (fatty acid) sprays are useful for quick knockdown of seedling weeds, particularly in cultivated areas where glyphosate is considered inacceptable. However, it is relatively ineffective and costly when used on perennials weeds.

Weed control in turf

Wherever possible we aim to avoid the use of selective herbicides. In some situations, these may be resorted to where alternative controls of particularly undesirable weeds are not available. Onehunga weed and Cape daisy are two weeds that should be contained to minimise their detrimental impact on visitor experience.

Procedure

- Select the lowest toxicity chemical that will effectively control the weed species.
- Ensure all procedures to prevent public risk are followed.
- Avoid tree driplines when using root absorbed chemicals.
- Apply to actively growing weeds in windless conditions when rainfall is not forecast for the next 24 hours.

Approval process – turf weed control

- Follow all label instructions. Proposal prepared detailing all operational practices prepared including specific chemical, timing, and procedures.
- Health and safety plan prepared detailing public exclusion area and period, warning signage and communications plan.
- Contractor's health and safety plan specific to the project received. Contractors inducted into ABG health and safety plan and SOP.
- All above documentation submitted to Manager for final approval.

7.7 Appendix 7: Irrigation

The Gardens objective is to enable all plants to become self-sustaining once established. This includes the ability of established plants to remain healthy even during dry periods without resorting to irrigation except in extreme situations. Our aim is minimal irrigation, with interventions only applied when low soil moisture levels may result in impaired plant health or death.

Irrigation is likely to be necessary for newly planted subjects. Annuals, vegetables, and some perennials may require regular irrigation if they are to flower and perform at their best, particularly in summer. Irrigation levels will be calculated to meet but not exceed the crops requirements.

Guidelines

- Ensure careful plant selection with emphasis where practical on subjects that tolerate soil moisture fluctuations.
- Plant frost-hardy perennial plants in autumn to enable establishment during wet winter and spring before typical dry summer periods occur.
- Mulch with organic matter immediately after planting, with regular replenishment of mulch levels.
- Ensure ample irrigation is applied to thoroughly moisten the entire root zone. This applies also to all crops from trees to annual displays and edible plants.
- Repeat irrigation only once soil moisture levels have dropped to a threshold that is impacting on the health and turgidity of plants or crop.
- Avoid over-irrigation which can lead to dependency on regular applications of water. Monitor soil moisture levels to assess irrigation requirements.

Other considerations

Irrigation should be targeted specifically to the crops that require it, avoiding other crops and non-cultivated areas.

Irrigation equipment including hoses must not present a health and safety hazard to staff or visitors.

It is important to avoid irrigation spray impacting on visitors. Irrigation falling on pathways and other non-cultivated areas creates an unfavourable impression with visitors.

Where possible apply irrigation directly to soil where it efficiently reaches the root zone without wetting foliage. Irrigation on the foliage of some crops such as roses can promote disease issues.

If irrigation must be applied to foliage apply in the morning so it dries as quickly as possible. Avoid applications late in the day resulting in wet foliage overnight.

7.8 Appendix 8: Horticultural Maintenance Standards

Very high	High	Medium
Weeds should be removed as soon as practicable and before they become noticeable to visitors.	Some weeds tolerable but they should be removed while small.	Weeds must be removed before they set seed.
Edges should be boxed (preferably with corten steel) and regularly trimmed	Edges boxed and trimmed at least monthly.	Edges do not require boxing and can be controlled with herbicides.
Plants that require seasonal pruning should be pruned for shape and to prolong flowering.	Plants that require seasonal pruning should be pruned for shape and to prolong flowering.	Where practicable pruning should be undertaken, especially to manage the shape and form of plants.
Stakes and ties on tall perennials should not be conspicuous to visitors.	Staking undertaken mainly to support newly planted trees.	Staking undertaken mainly to support newly planted trees.
Not suitable for in garden trials. Only star performers and recommended (8 or higher) plants used.	Mostly star performers and recommended (8 or higher) used; in-garden trials permitted with an “under evaluation” sticker.	Star performers and recommended (8 or higher) plants preferred; in-garden trials permitted.
No dead or dying plants present; no gaps (plants replaced as soon as possible).	Dead or dying plants removed as soon as possible. Replacement plantings to be made in the appropriate season (usually autumn).	Dead or dying plants removed as soon as possible. Replacement plantings to be made in the appropriate season (usually autumn).

7.9 Appendix 9: Process for accessioning plants at the Gardens

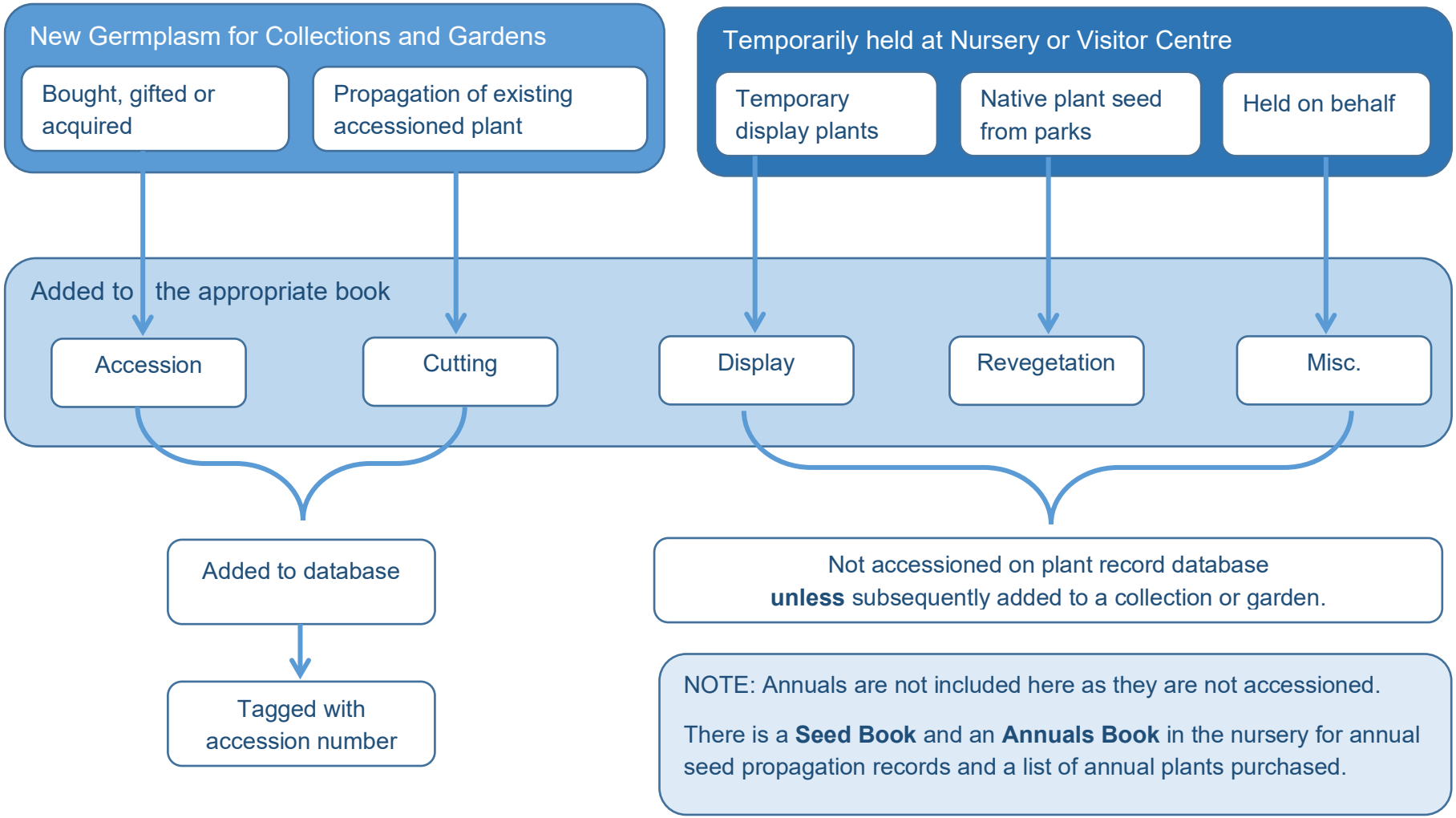
Copies of all plant orders are sent to the Botanical Records and Conservation Specialist and the Nursery.

Plants are either held temporarily or permanently at the Gardens. Only plants which are part of permanent collections, usually planted in the collections and gardens (but some are also held permanently in the Nursery), are entered onto the records database, and assigned tags.

Plants for displays, revegetation, annual plants and those held on behalf of someone else (or another organisation e.g. DOC) are not recorded on the records database (but will be recorded manually in some form of accession book: display; seed; cutting; revegetation; annuals; or miscellaneous).

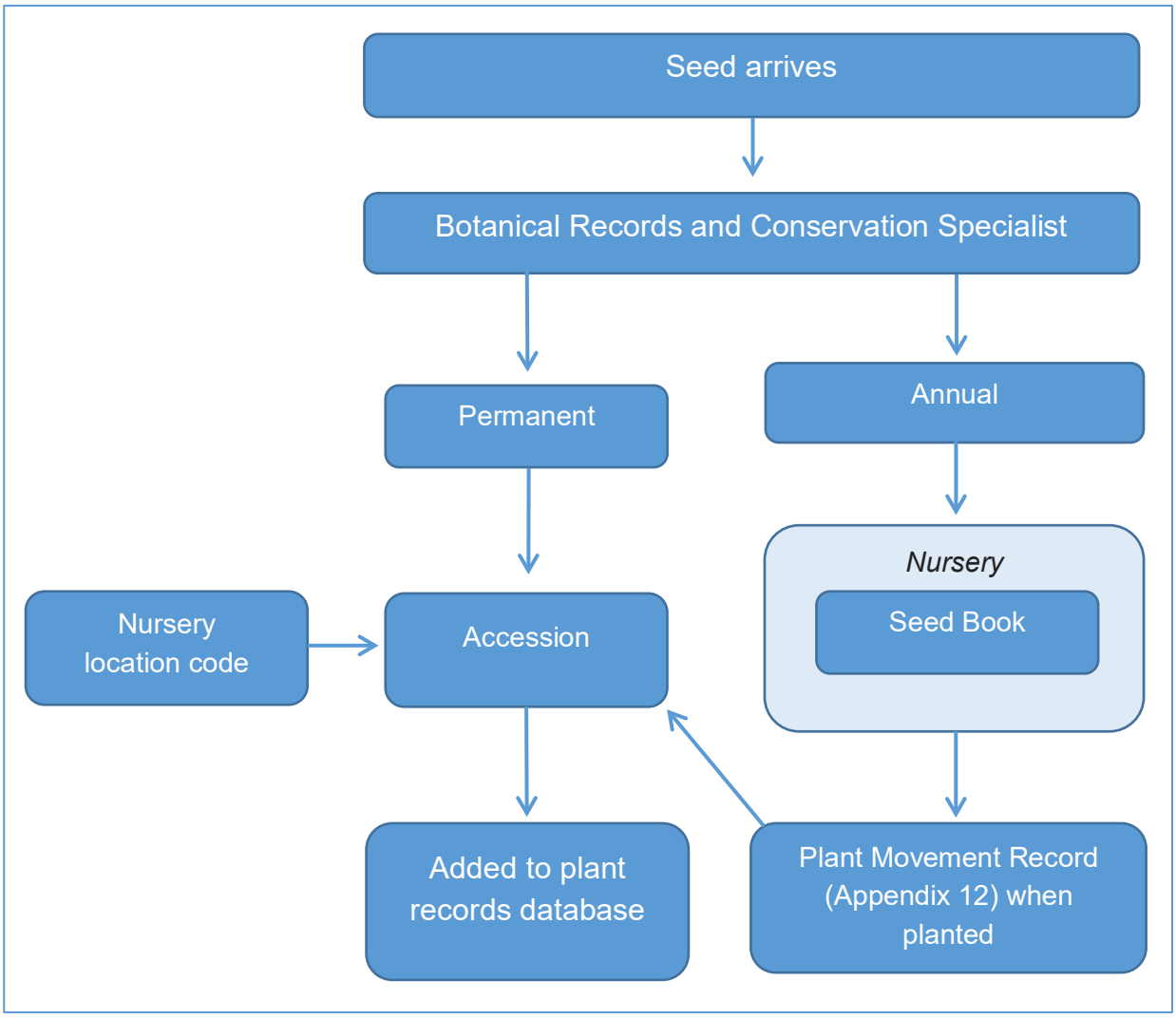
The accession book is used to populate the records database, is held by the Botanical Records and Conservation Specialist. All other books (display; seed; cutting; revegetation; annuals; or miscellaneous) are held by the nursery. The process for accessioning plants is set out in the figure on the following page.

Plant accession process at Auckland Botanic Gardens

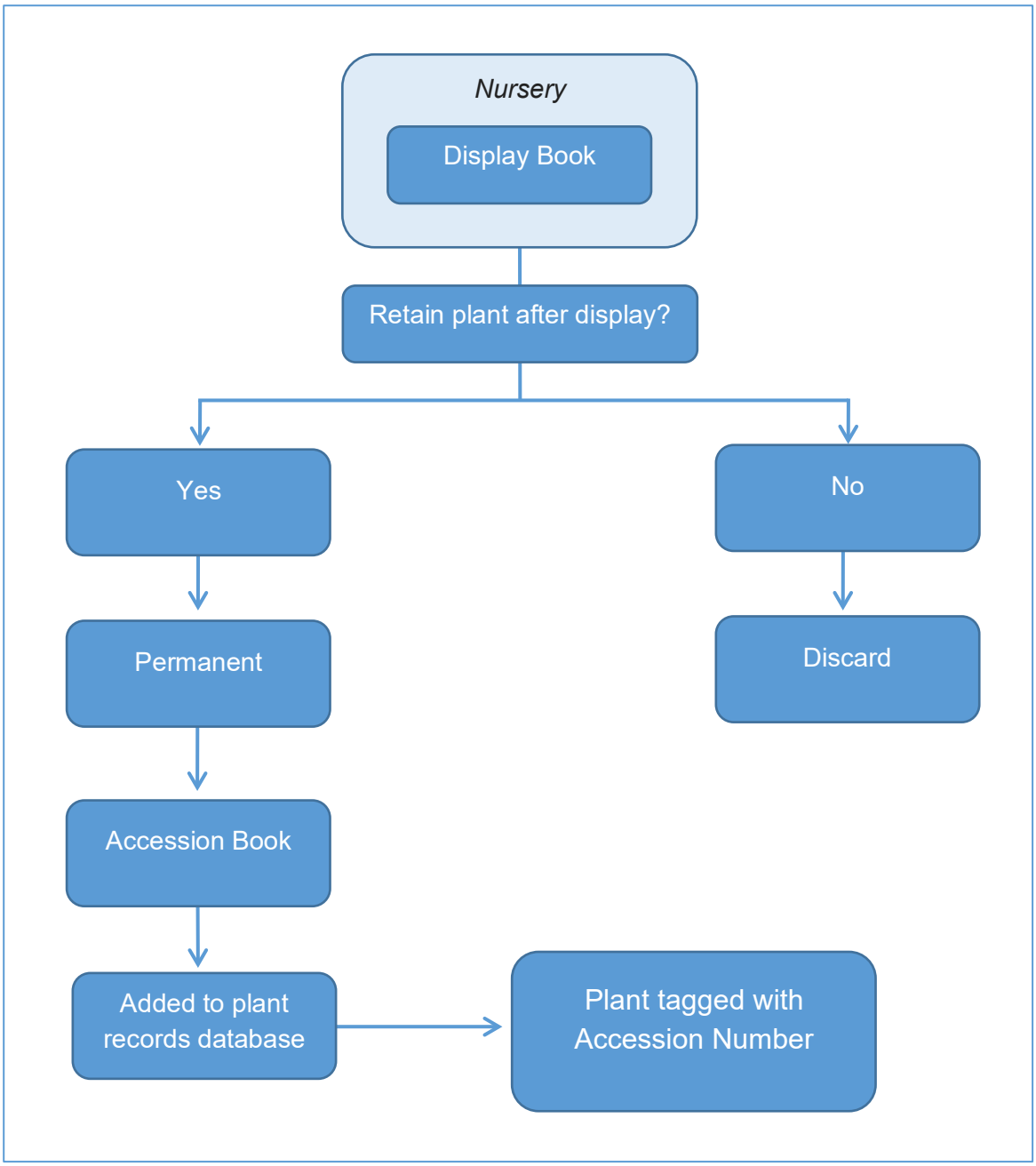


Accession process for seeds

1. Incoming seed ordered from external suppliers is physically received and sent to the Botanical Records and Conservation Specialist.
2. Seed is accessioned (where appropriate i.e., not annual plants, plants held on behalf or for revegetation) and tags made.
3. The Botanical Records and Conservation Specialist transfers the seed to the Nursery.
4. The collection curator completes the Seed Request Propagation Form and submits to the Nursery.
5. The Nursery propagates or stores seeds and records data into Seed Book.
6. The Botanical Records and Conservation Specialist or Collection Curator transfers the relevant data from the Seed Book to the database.
7. The Nursery then informs Collection Curator/Gardener when plants are ready for planting.
8. If additional tags are required, an order is placed with the Botanical Records and Conservation Specialist.



Accession process for display plants



7.10 Appendix 10: Outward Plant Distribution Form

Auckland Botanic Gardens
Where ideas grow

Outward Plant Distribution Form

1. In response to the Convention on Biological Diversity, the Auckland Botanic Gardens supplies plant material, including seeds, on condition that:

    a. The plant material is used for the common good in areas of Research, Education, Conservation and the development of Botanic Gardens.

    b. If the recipient seeks to commercialise the genetic material, its products or resources derived from it, then written permission must be sought from the Auckland Botanic Gardens. Such commercialisation will be subject to the conditions of a separate agreement.

    c. The genetic material, its products or resources deriving from it are not passed on to a third party for commercialisation without written permission from the Auckland Botanic Gardens

2. It is a condition of supply that any publications resulting from the use of plant material should acknowledge the Auckland Botanic Gardens as supplier. A copy of any publication, report or data gained from the material must be lodged with the Auckland Botanic Gardens

I agree to comply with the conditions above

Name _____ Date _____

Organisation _____

Address _____

Signed _____

Return these forms to: -
Botanical Records & Conservation Specialist
Auckland Botanic Gardens
102 Hill Road
Manurewa
Auckland 2105

Date	Plant Name	Accession Number	Propagule	Quantity	Purpose

Examples of ‘Purpose’ – breeding/hybridisation, research/study, conservation, commercial sale/resale, education

7.11 Appendix 11: Information stored in accession books

There are several different accession books to ensure accurate record keeping they include:

- Accession Book
- Display plant Book
- Seed Book
- Cutting Book
- Revegetation Book
- Miscellaneous Book

Each book records relevant data when applicable including:

- Accession number and parent accession number, if applicable.
- Date
- Plant name
- Quantity of plants/cuttings/seeds/divisions
- Type of material/propagule type (seed, cuttings or whole plants)
- Size/grade (plus age if known)
- Tag/label
- Donor source (name and contact details of supplier)
- Provenance and collection/introduction data
- Historical data: record all available background information including, where appropriate when introduced into New Zealand, who made the original introduction, collection notes etc.[15].

Accession Book (plant collections and amenity gardens)

The following is to be recorded in the Accession Book on arrival at the Gardens:

- New introductions intended for permanent inclusion for the plant collections or amenity gardens.
- New plant material yet to be confirmed for eventual inclusion into plant collections.
- Germplasm intended for eventual redistribution to other parties, excluding revegetation plants.

[15] Information should be recorded here if:
1. the species is not included on the MPI Plants Biosecurity Index; or
2. the species is not normally seen or otherwise detected in New Zealand; or
3. if there is any other potential for the identity/origin of a species to be in question.

- When redistribution occurs the plants records database will be updated to include recipient name and address, quantity of plants, and other relevant information.

The following data is recorded in the Accession Book:

1. Accession number
2. Date
3. Entry name
4. Propagule type
5. Quantity of plants/cuttings/seeds/divisions
6. Size/grade (plus age if known)
7. Tag (ticked when tag made)
8. Donor source (name and contact details of supplier)
9. Provenance
10. Historical data: record all available background information including, where appropriate when introduced into NZ, who made the original introduction, collection notes etc.

The Outward Plant Distribution Form (Appendix 10) must be completed by recipients of the Gardens germplasm. Plants that should not be accessioned include:

- Annuals and vegetables (exceptions include wild sourced annuals, annuals in trial programmes and annuals where data is collected and recorded against the accession)
- Native plants produced for revegetation of natural areas.

All accessions book data to be recorded in the plant records database by the Botanical Records and Conservation Specialist. All germplasm is to be accessioned in the year in which it is determined that it will be included in the permanent plant collections or amenity gardens.

Note: They are not to be retrospectively accessioned in the year when they are originally received. For example, former display plants will be accessioned in the year they are planted, not the year they were received for the display). This situation may occur when plants formerly used as display plants or those grown for other parties such as Regional Parks are taken for inclusion in plant collections. Relevant records including source and date received to be researched using relevant books such as Seed Book, Cutting Book or Display Plants Book, and all relevant data transferred to plant records database.

Display Plants Book

Plants introduced for displays or other temporary purposes must be recorded in this book. The following data is recorded into the Display Plants Book:

1. Date
2. Entry name
3. Quantity
4. Donor source (name and contact details of supplier)
5. Provenance and collection/introduction data (as above).

If display plants are subsequently included in plant collections or amenity gardens they must be accessioned.

Seed Book

All plants raised from seed must be recorded in the Seed Book. The following data is recorded into the Seed Book:

1. Accession number and parent accession number, if applicable
2. Date
3. Entry name
4. Quantity of seeds
5. Tag/label (ticked when tag/label made)
6. Donor source (name and contact details of supplier)
7. Provenance and collection/introduction data (as above).

Seed Book data is transferred to plant records database for any germplasm that is to be included in the plant collections or amenity gardens.

Cutting Book

All material introduced for vegetative propagation must be included in this book. This includes cutting material and grafting propagule (scions, rootstock and budwood). The following data is recorded into the Cutting Book:

1. Accession number and parent accession number, if applicable
2. Date
3. Entry name

4. Number of cuttings
5. Type of material
6. Tag/label (ticked when tag/label made)
7. Donor source (name and contact details of supplier)
8. Provenance and collection/introduction data (as above)

The Cutting Book data is transferred to the plant records database for any germplasm that is to be included in the plant collections or amenity gardens.

Revegetation Book

All seed received from Regional Parks must be recorded in this book. The following data is recorded into the Revegetation Book:

1. Propagation number
2. Seed source and intended destination
3. Date seed received

All usual propagation records.

Annuals Book

All annual whole plants purchased must be recorded in this book. The following data is recorded into the Annual Book:

1. Plant Name
2. Plant Source
3. Date received
4. Number of plants purchased.

Miscellaneous Book

Plants recorded here include plants produced for other agencies (e.g. DOC and Auckland Council).

The following data is recorded into the Miscellaneous Book:

1. Propagation number
2. Seed source and intended recipient
3. Date seed received
4. Distribution details (date, number, etc.)
5. All usual propagation records.

7.12 Appendix 12: Plant movement record form

Auckland Botanic Gardens
Plant Movement Record Form

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Acc no.	Plant name	Location code	Planted date	No.	Size	Death date	Trnsf	Tag req.	Labl req	No. rem.	Comments

Collection curator:

Name:.....

Date: / /

Records office

Date received:.....

Date processed:.....

Processed by:.....

Auckland Botanic Gardens

Plant Collections Guidelines 2021

7.13 Appendix 13: Map of the Auckland Botanic Gardens

Auckland Botanic Gardens
102 Hill Road
Manurewa, Auckland

09 267 1457 |
botanic.gardens@aucklandcouncil.govt.nz

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