Restoring Avoca Valley Stream

a community model

July 1998

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Avoca Valley Stream Care Group

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[1] Dialect: The dialectal "k" has generally been used throughout the document to replace the use of the more commonly found "ng", to denote southern dialect.

This community project started in 1996 and planning developed over two years. It is the first stage of a 10-year plan to restore the natural qualities of Avoca Valley Stream, in the eastern Port Hills adjacent to Christchurch. It owes its success to the members of a motivated local community, and their willingness to work together on issues and develop a vision for the future.

This package of information includes:

1. **the report**, which:
   - provides background to the project
   - outlines local community involvement, including the Stream Care Group
   - reviews how the Stream Care Group process worked
   - identifies community values and issues regarding the stream
   - shows the nature of the place under restoration
   - details planning and proposals of the project
   - develops guidelines for the restoration of streams
   - shows what results have been achieved
   - suggests a 10-year programme for further implementation of the project.
2. **stream restoration guidelines**
3. the **video**, which provides a 25-minute overview of:
   - the issues raised by the Stream Care Group
   - the vision of residents, the Stream Care Group and takata whenua
   - how the residents and the Stream Care Group worked together (the process)
   - conclusions/direction of where the project was heading in 1998.
4. a **streamside planting guide** brochure.

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Contents

Introduction

The restoration of Avoca Valley Stream is a community-led initiative to bring back more life to the stream. It comes under the umbrella of the Waterway Enhancement Programme of the Christchurch City Council. This programme is based around an active partnership between the Council and the people of the city, for the restoration and sustainable management of waterways. The Avoca Valley Stream package is a special project, supported by the Sustainable Management Fund of the MFE.

The community and Council are aiming to recreate an ecologically healthy and functioning stream environment. Where possible within the constraints of the stream's city context, natural processes, along with past stream and wetland patterns will be reinstated. Landforms and native vegetation natural to the area will be restored along the stream corridor, and wildlife encouraged to return. At the same time, the project will address issues such as erosion and flooding, along with provision for public use and recreation.

The initiative and involvement of the local community is integral to the success of the project, both for planning and implementation. Co-operation has enabled effective solutions to be reached, which is important because much of the land involved is privately owned.

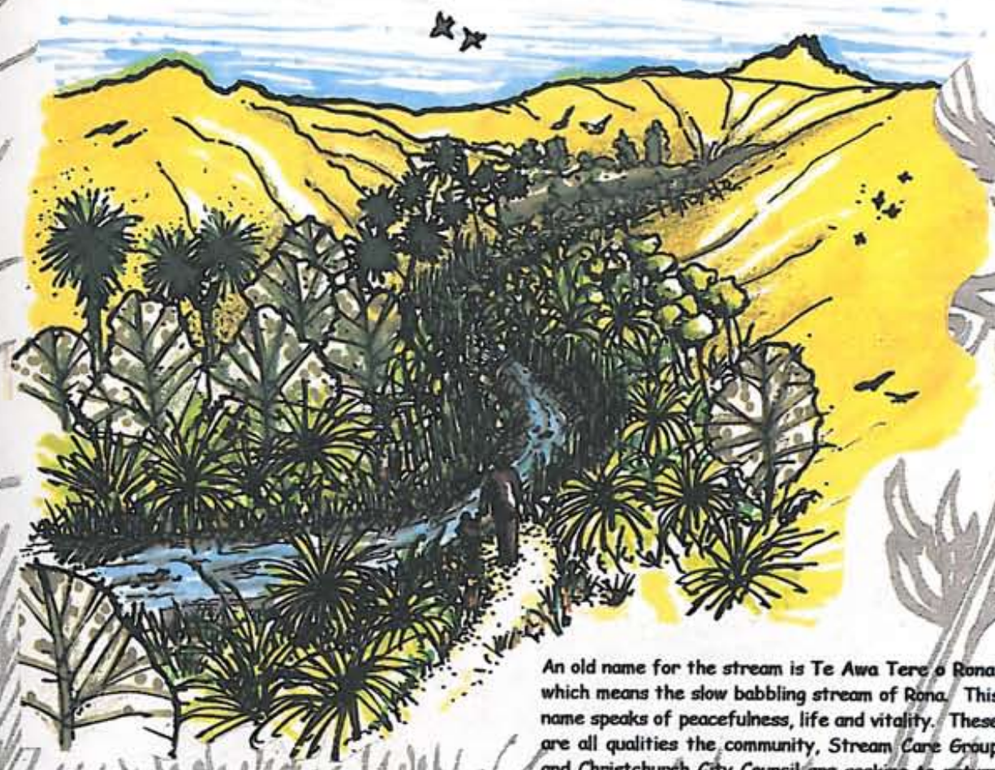
This report provides an overview of the planning process that was undertaken and the investigations carried out. The structure of the report reflects the process that was followed. The community was consulted from the outset, resulting in identification of the issues and values associated with the stream. Subsequently, the stream and catchment were examined, and solutions proposed by a Stream Care Group which developed as part of the project. The report documents the issues, along with proposed solutions and concept plans for the restoration of the stream. Given support and funding, it is proposed that these plans be implemented over the next 10 years.

Vision

The vision that has been developed by the local community and takata whenua for the Avoca Valley Stream includes:

- Returning the "life" of the stream
- Protecting and restoring the stream for future generations
- Planting native streamside vegetation
- Returning wildlife throughout the stream and catchment
- Visual enhancement of the stream environment
- Opportunities for public use and recreation
- Addressing issues and problems such as erosion, water quality and quantity, flooding and maintenance.

"We should turn it from a drain into a living thing. We should plant it all the way along its margins ... let's get more awareness of better management along this stream and valley. Lets get some trees planted, and bring back the wildlife." (Local resident, 1995)



An old name for the stream is Te Awa Tere o Rona, which means the slow babbling stream of Rona. This name speaks of peacefulness, life and vitality. These are all qualities the community, Stream Care Group and Christchurch City Council are seeking to return to the stream through this restoration project.

Waterway Restoration

Otautahi Christchurch lies on a multi-layered sequence of floodplain surfaces, created by a series of flood events burying the previous land surfaces. Over these surfaces a mosaic of vegetation would gradually establish, until the arrival of the next flood event which would bury any vegetation, and cause the cycle to begin again.

This vegetation cover depended upon the frequency of disturbance events (such as fires and floods), and the qualities of the soils. If given enough time without disturbance, the area would support kahikatea and totara-matai forests. By the time of European settlement, it was common for the vast swamplands to be dominated by fire resistant harakeke (NZ flax), ti kouka (cabbage tree) and raupo. Following European settlement in the mid 1800s, the Christchurch area was drained, creating a network of over 400km of open waterways. The objective was to drain water from city lands as quickly as possible.

Similarly, the Port Hills have been stripped of their natural forest cover by fire and over-grazing, resulting in the drying and siltation of many streams and a loss of stream "life" and vegetation.

The Water Services Unit of the Christchurch City Council is responsible for the management of these waterways, both in the city and on the city side of the Port Hills. In recent years the Council has changed its approach, moving away from piping and straightening. It is committed to the restoration, enhancement and sustainable management of waterways, and to promoting active involvement of local communities in planning, implementation and management.

Within this Unit, the Waterways and Wetlands team runs a Waterway Enhancement Programme, whose objectives are to:

- Protect and improve the natural character of waterways
- Restore natural waterway functioning
- Restore habitat for birds, fish and insects
- Create green linkages and corridors
- Restore waterways for their aesthetic, recreational and educational values, as well as for enjoyment by local communities (ie, amenity values)
- Retain a natural buffer between waterways and urban/rural development.

Throughout the Programme Council staff work closely with the local community, takata whenua, and interested groups. Residents and Council staff work as a team to develop a vision for the waterway and to plan, design and manage waterway restoration projects. When local communities are involved in the planning and management of their waterway, they develop a sense of ownership of the project. This helps with public acceptance, public input and future management. Once a plan is developed and agreed upon by those involved, the Council and community work together towards the implementation.

The Avoca Valley Stream Restoration Plan is one of several reports that have been developed by a team of residents, takata whenua, Council staff, landscape architects, an engineer, ecologists and others with special/technical expertise.

Gradually, restoration projects such as Avoca are having a positive visible and ecological impact throughout the city. A local bird expert has observed:

"It is great to see a range of native bird species begin to move back onto river and pond habitats within urban Christchurch. In a small way the large piece of land we call urban Christchurch is once again becoming a functioning part of the regional ecosystem. . . . It is now less like a slice of England and more like a part of New Zealand again."
(Andrew Crossland, May 1996)

Aims of Project

The aim of the project is to develop a community-based model for the restoration and sustainable management of waterway ecosystems in New Zealand. The project chosen for funding was the Avoca Valley Stream, located in the eastern Port Hills adjacent to Christchurch City, near Hillsborough, Horotane and Heathcote. This stream was selected because it is:

- a degraded waterway ecosystem in need of restoration
- representative of many intermittent waterways on the rural/urban interface in the drier areas of New Zealand
- a typical, low-profile, little known, little seen, ephemeral waterway
- encompassing a range of landuses; including rural, horticultural, residential and industrial land, along with a public park and former dump site
- involving a range of land types and, hence, a range of underlying ecosystems (including Steep Hills, Gentle Slopes, Valley Floor and Estuarine Flats)
- raising a number of resource issues such as soil conservation, flooding, erosion, habitat loss and landuse impacts
- the focus of local residents who had recently created an informal Stream Care Group, enthusiastic about restoring the waterway and addressing associated issues.

The objectives of this restoration project are to:

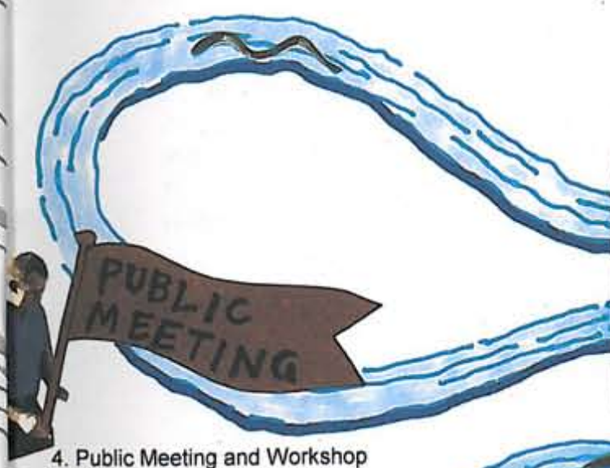
- Develop a community-based model for the restoration and sustainable management of waterway ecosystems
- Facilitate the active involvement of community, takata whenua, landowners and interest groups, to lead development of a community waterway restoration plan
- Establish effective community-based options for restoring waterway ecosystems
- Create innovative and effective design solutions
- Manage adverse environmental effects impacting on waterway ecosystems.

Process

In-depth Interviews with streamside property owners

2. Site Meetings with streamside property owners

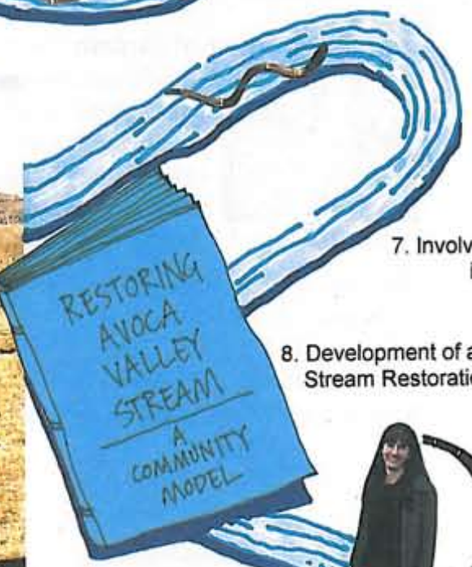
3. Formation of an informal Stream Care Group



4. Public Meeting and Workshop to discuss the future of the Avoca Valley Stream

5. On-going meetings of the Avoca Valley Stream Care Group

6. Takata whenua participation



7. Involvement of other individuals and organisations

8. Development of a Stream Restoration Plan

9. Completion of a Video showing the process of working together

Process of Community Involvement

A range of consultation was undertaken, to identify values, views, issues, opinions and ideas held by landowners, the community and takata whenua. Some of this consultation was already underway, and formed the basis for when the SMF project began in late 1996.

It should be noted that at the outset there was no established community organisation in the Avoca Valley. This meant the process here involved the establishment of a specific group to facilitate liaison. In other areas, established community structures (eg, a Residents Group) or hapu may provide a good point of contact with the local community.

1. Landowner Interviews

Consultation about the restoration of Avoca Valley Stream began in October 1995, when a Council staff member contacted the 26 streamside property owners and conducted a series of in-depth interviews with the majority of them. These interviews were conducted at the landowner's address, and consisted of a series of questions regarding the importance, character, issues, suggestions, plans and visions for the Avoca Valley Stream and its catchment.

2. Site Meetings

Throughout 1996 planners met with property owners to discuss a number of complex issues related to the Avoca Valley Stream (eg, tenure and access).

3. Development of Stream Care Group

An informal Stream Care Group developed during 1996, and was endorsed at a public workshop in early 1997. This Group included representation of the major property owners along the stream, the Ferrymead Pony Club (which leases Mary Duncan Park), the landscape planner, and, input and expertise from the Water Services, Parks, and City Design Units of the Christchurch City Council.

The Group met regularly throughout the project, and has been an essential component of the development of the stream restoration plan. It provided ongoing contact with the local community, and a forum for the discussion of issues relating to the stream and its restoration. The provision of information empowered the Stream Care Group, enabling members to see the possibilities and options for the

stream. The Group was then involved in the direction and decision-making for the project, contributing to planning and design proposals, which enabled effective solutions to be reached for a number of difficult problems.

A part of the Stream Care Group process was an Arbor Day planting event on June 7, 1997. This was the first stage of the implementation of the Avoca Valley Stream restoration project, involving the planting of local native trees, shrubs and grasses in a small community area, on generously provided private land alongside the stream in the upper valley.

The Group is particularly grateful to local resident, Lizzy Thompson, who provided her home as the venue for most meetings. A regular group of 8-10 people attended meetings, and anyone else interested was always welcome to attend.

4. Public Workshop

In February 1997, a public workshop regarding the Avoca Valley Stream was held in the Heathcote Community Centre. Organised and facilitated by the Stream Care Group, in association with Lucas Associates and the Christchurch City Council, the meeting was held to find out about the perceptions of the community in relation to the Avoca Valley Stream and catchment.

This workshop was widely advertised in local community newspapers, along with a letter-box drop to the local Avoca and Heathcote communities. The participants were "walked" along the stream via a slide show, and then invited to participate in small groups to discuss the assets, issues, opportunities and visions of the stream. The groups' views from this discussion has subsequently been incorporated into the design and planning for the stream's restoration. A brief summary sheet was distributed as a flier to the local community by letter-box drop.

6. Takata Whenua Consultation

Takata Whenua are being consulted by the Christchurch City Council, to incorporate their values into all stream enhancement projects. While no specific hui for Avoca Valley Stream was held with takata whenua, the project is being discussed with takata whenua in the context of a partnership management of Christchurch's waterways. Discussions are underway about this partnership, and it is possible that major hui may be held in late 1998 or in 1999 with regard to forming a management structure with the Council's Waterways and Wetlands Team.

For this project, Wahawaha Stirling, Rik Tau, Peter Ruka, Bill Karaitiana and Maruhaeremuri Stirling were consulted. All were supportive of the project, and of the general concepts of waterway enhancement and restoration, and provided a range of information. Bill Karaitiana undertook in-depth research, and provided a written report about his findings for the Avoca Valley Stream. He was an active participant throughout the project, and was interviewed on several occasions for the Avoca Valley Stream video.

7. Involvement of Other Organisations, Individuals and Expertise

Members of Lucas Associates are the key landscape planners involved in the project and with the Stream Care Group, and are responsible for the development of the restoration plan for the stream.

Ornithologist, Andrew Crossland, provided advice on birdlife in and around the waterway, along with specific advice on proposals for the estuarine flats, and wetlands in Mary Duncan Park.

Manaaki Whenua Landcare Research NEW ZEALAND LTD

Landcare Research scientists provided information on geomorphology and soils of the stream and catchment, along with advice on planting and vegetation associations.

NIWA Taihoro Nukurangi

NIWA (National Institute of Water and Atmospheric Research) developed an urban stream habitat assessment, which was carried out on the Avoca Valley Stream for two consecutive summers (1995/96 and 1996/97), and also surveyed the fish life of the stream. Mark Taylor (a freshwater fish ecologist) advised on the wetland proposal in Mary Duncan Park.

Canterbury Regional Council staff had several discussions about the Avoca Valley Stream and catchment with City Council staff over 1996-97, and participated in the public workshop.

Fish & Game

The Fish and Game Council provided general advice on trout habitat in the waterways of Christchurch.

Landscape Architect John Marsh re-developed the Management Plan for Mary Duncan Park (adjacent to the Avoca Valley Stream). This Management Plan includes two proposals developed with the Stream Care Group for the Avoca Valley Stream Restoration Plan:

1. A new pedestrian accessway and wetland (65 Avoca Valley Road);
2. Large wetlands at the front of Mary Duncan Park.

Feedback on Process

A review was held between a Council staff member and the Stream Care Group in early 1998, and some helpful feedback came from the Group on how the process had developed. People suggested the following things were important:

Communication

- Continually seek the community's ideas and feedback.
- Good communication, with a continuous flow of information and feedback, is vital for success.
- Feedback could be improved, eg, a regular newsletter to local residents, or passing on information by word of mouth.
- There is great potential for misunderstandings; highlighting the importance of good communication.

Progress

- The Group provided impetus for solving many historical and on-going issues in Avoca Valley.
- The progress in solving issues, along with site preparation, streamside plantings, and resource consent approval, is proof of the project's success.
- One person initially questioned why so many people needed to be involved in the process, but in the end believed the results were very good.
- Local people found it had been a huge learning curve. They did not realise the possibilities for the stream, such as creating ponds/wetlands and areas for wildlife.
- *"The test is to make the planning a reality, if nothing happens, all the meetings have not been worth it."*

Leadership

- Council staff suggested residents may have preferred a stronger local lead in the project, however one local suggested the Group relied upon and needed the expertise and experience of Council staff and planners.
- One person expected more active participation in decision-making from the Group, and was surprised by the Group's on-going enthusiasm and interest.

Future change

- Some people felt "vulnerable" throughout, because so much change was imminent, with big decisions needing to be made about the future.
- One Group member was initially interested only in how the project affected her property, but, upon attending meetings, found it was a good thing for the stream and valley.

Funding

- Some local people think the Avoca project is a waste of money.
- There are always negative comments, because many people do not like change, and others take time to accept change.
- Many people like to see positive change, but although they supported the project, did not personally have the time to put into meetings or helping out.

In summary, one person said that:

"There was lots of energy behind the project, and I can see it 'rolling on' and resulting in good things on the ground. There were so many issues, big and small, to work through. This involved lots of going backwards and forwards to sort out. But the Group has climbed over one hurdle after another ... It's gone well so far." 1998.

Process Guidelines

There are a number of lessons learnt from working together on this project. These come from the perspective of those coordinating the project, and are recorded for planners of similar projects in the future. Lessons learnt include:

Time commitment

- Do not underestimate the amount of time required for consultation and the involvement of the stakeholders.
- The time required to make progress on planning for the Avoca Valley Stream was more than many other stream restoration projects, because it is a "model" project.
- In order to make good progress on priority projects, a large investment of time is required from both the community and the Council(s).
- Not every community is prepared to put in voluntary time and effort to work together on issues. The reason why some communities are prepared to make the effort while others are not, is a key issue. (It is of interest to know what motivates a community.)

Involvement

- It is very important to involve <u>all</u> individuals and groups that will be concerned or affected.
- If there is an established community structure, this may provide good contact with the local community.

- People need to be given adequate time to make decisions regarding the future.
- People have differing time constraints and ways of contributing to a project. This means it is important to involve people in different ways - while some can attend meetings, others like to be involved in the "doing" (eg, planting).
- Some people, while less able to actually contribute to a project, are still supportive of what happens.
- Regular contact with the wider community is important.

Leadership

- Most communities have untapped potential for leadership. However, the Avoca community were often "shy" about their potential, needing reassurance they were able to make good decisions about the future.

- In the Avoca Valley, with no school or other community structure, there is no established community venue or social mechanism for people to get together or allocate roles (such as leadership).

Meetings

- Meetings of community groups are best when held locally, using a venue familiar and comfortable for participants.
- Meet at a time with which people are comfortable (we found a late afternoon early in the week to be best).
- A continuous open door policy is important for meetings, so that all people feel welcome to attend and contribute.
- An informal, non-hierarchical meeting style, to encourage everyone to participate.

Communication

- Provide good, up-to-date, clear information.
- People were keen to obtain more information. They enjoyed getting copies of draft plans, reports etc., even when it seemed like they were being overloaded.
- Continuous feedback, and the provision of information for the wider community (not just representatives) is important.
- The provision of information provides empowerment for local communities, eg. lists of local native plant species specific to each land type were provided for landowners throughout the catchment.
- Be aware that misunderstandings can happen easily - it is important to communicate well, and to clarify issues and rationales continually for possible solutions.
- The project coordinator or facilitator needs to be easily contactable.

Funding:

- Funding may always be an issue in projects such as these. Fair distribution of funds need careful consideration, as does on-going funding to implement plans, and for management (particularly during establishment years). A key issue for the Avoca project is how it will be funded over future years.

The Group is indebted to the Avoca Valley community and takata whenua who participated in this project with enthusiasm and wisdom. Its planning success is due to their motivation and commitment.

Community Views

Landowner Interviews - 1995

Character and Specialness

Of the 19 landowners interviewed, the majority had an appreciation of the stream's existence and its function of draining the valley. Most liked having the stream there, and the birds and other wildlife associated with it. Only two landowners did not see the stream as important.

The majority said the character of the Avoca Valley was rural or rural/horticultural, although one person saw a division between the residential area of the lower valley and horticultural areas above. Every person interviewed referred to the unique nature of Avoca Valley, aware that it was well placed, being rural and almost remote, yet only 10 minutes drive from the central city.

Although several people grew up in the area, most were attracted to Avoca by the rural lifestyle and horticultural opportunities. They said that the valley provided a unique, idyllic lifestyle, in clean air above the city's pollution and smog. Other benefits included the micro-climate for horticulture, opportunities for children to play in a rural setting and the warmer climate.

Landowners' Concerns

Concerns associated with the natural environment:

- *Protection of the stream's springs*
- *Protection of the cliffs and gullies*
- *Soil/catchment erosion, especially on the farm country*
- *Stream-bank erosion and deepening*
- *Need for better soil conservation, and management of the stream surrounds, to help reduce erosion*
- *Lack of permanent water in the stream*
- *Siltation of the stream (due to excessive runoff caused by past over-stocking)*
- *Flooding, flood mitigation, and flood flow capacity*
- *Lack of habitat - especially ponding, native bush in upper regions, and salt-marsh in lower regions*
- *Limitations on the "life" of the stream, as it does not have a year-round flow. Local evidence tells of a year-round flow in the past, and gradual (and significant) decline of water flows and life-force over recent years*
- *Lack of water will prevent the stream from becoming "pretty"*
- *Lack of wildlife over the whole length of the stream, including native birds, fish and insects*
- *Potential damage to the stream by cattle*
- *Rubbish in the stream*
- *Maintenance practices of the City Council*
- *The inadequate state of the roadside at the entrance to Mary Duncan Park.*

Concerns associated with the future of the local community:

- *Maintaining the privacy of the valley*
- *Loss of the valley's rural nature*
- *Clarification of land tenure, especially that associated with an existing paper road between Avoca Valley Road and Mary Duncan Park*
- *Lack of opportunities for recreation and public enjoyment*
- *Land zoning changes*
- *The uncertain future of the valley (in 20, 50, 100 years)*
- *Residential subdivisions and development in the valley changing it's character*
- *The questionable economic future of the market garden industry in Avoca Valley*
- *The uncertain future of the Pony Club lease of Mary Duncan Park*
- *Current and future industrial land development impacts.*

Landowner Suggestions

The most popular suggestion (made by 13 people) was that erosion in the stream and wider catchment could be greatly improved by planting vegetation, several suggesting that native species were preferred.

Other suggestions included:

- *Managing the stream and its surrounds at the upper reaches to retain soil*
- *Planting the main stream and its tributaries to stop further slips, and to stabilise the land and stream banks*
- *Investigating potential for a year-round stream flow*
- *Attracting wildlife through planting*
- *Controlling flooding*
- *Confining the stream to a single channel through the upper reaches*
- *Fencing off the stream from stock*
- *Removing debris from the stream*
- *Avoiding the use of chemicals and sprays*
- *Opening up the valley to walkers - eg, provision of a link to Rapaki Track*
- *Getting rid of the goats in the cliff area*
- *Weed control*
- *Gorse control*
- *Re-discovery of the Maori and European heritage of the stream and valley*
- *Re-discovery of the early Maori names for the valley*
- *All people working together to solve the various issues and problems.*

Three people stated firmly that nothing should be done to the stream.

Landowner Visions

Revegetation:

- *The valley as a "lovely" area of native bush, where the soil is managed, slips are controlled with hillside management, and access isn't affected by flooding*
- *Enhancement of the stream by planting its banks and tributaries with plants (preferably natives)*
- *The valley planted from top to bottom, encouraging bellbird, fantail, tui, wood pigeon and water birds*
- *Everyone being responsible for planting native trees and shrubs along their stream boundary*

Stream form:

- *Regraded steep stream banks*
- *A defined channel where the stream comes from many sources*
- *Ponds and wetlands created*

Amenity:

- *The stream as a visual and environmental asset*
- *Creation of a walkway linking the Valley to Rapaki Track*

Management:

- *A stream that is more visibly cared for*
- *Rubbish in the stream cleaned up*
- *Use of spray discontinued, as residue from weedkillers and pesticides could run into the stream*
- *Good rock work along the stream*

Stock Access:

- *Stock fenced from the stream, for better stream management and clean, silt-free water*
- *Protection for stock from getting caught in the stream, with a preference for culverts which would also enable vehicle crossings*
- *Limited stream access for stock-water [with care!]*
- *Summer water storage, for year round water supply and potential irrigation for future plantations*

Future Options:

- *The valley's rural character maintained - subdivisions and development are not wanted*
- *Long-term recreational and residential development of the valley - there is good potential for quality development.*

Public Workshop - 1997

The following is a summary of the findings of the February 1997 public workshop; it was distributed as a flier, via letter-box drop, to the local community soon after:

Avoca Valley Stream
waterway restoration workshop

INTRODUCTION

The local Avoca Valley Stream Care Group recently helped Christchurch City Council organise a public workshop to explore the value, problems and opportunities of Avoca Valley Stream.

The Stream Care Group was formed last winter, and has regularly met with Water Services staff and their advisers to develop an understanding of the Stream. The Council is committed to helping with the restoration of the stream, and has Ministry for the Environment support for this as an example of community-led sustainable management.

The Council Parks Unit has recently been involved in developing plans for Mary Duncan Park, particularly in liaison with the lessee, the Ferrymead Pony Club, as the stream flows around the Park. The stream and Park planning discussions are now being coordinated.

The results of the community workshop, held on the evening of Monday 24 February, are being used to develop the restoration plan for the stream. This will be discussed with the community as it develops. In the interim, the workshop results are summarised as:

ASSETS & CONTRIBUTIONS OF THE STREAM

- visual - the view of the stream
- beauty - aesthetic value if enhanced
- valley feeling - tranquility
  - sights and sounds
  - escape from the city
  - peaceful atmosphere
  - a sense of the country very close to the city
- privacy
- tree line along stream through the valley
- variety of habitats for animals, birds & insects
- drainage of the valley
- water for stock
- public enjoyment eg recreation & walking
- place for kids to play, child's pathway
- "just a creek in the backyard , taken for granted"

ISSUES IDENTIFIED

- erosion of hill
- creek channelling
- scouring and encroachment of stream banks
- erosion at access bridges
- rock movement due to erosion
- flooding and flood flow capacity
- siltation, especially at the Port Hills Road drain
- access vs privacy
- public access - lacking throughout public and reserve land
- the paper road close to houses
- "ugly" areas, eg "drain" & tidal flats
- maintenance of water level in stream
- lack of permanent water habitat for birds
- lack of summer water
- lack of water for stock
- stock control
- conflict between people & wildlife
- tree planting, natives vs exotics, phasing out / get rid of / keep old trees
- care and fencing of future plantings
- need for weed control along middle stream
- hope for less maintenance & more appealing environment

- tidal effects
- litter
- safety, eg walkers in heavily vegetated areas
- impacts upon the Pony Club
- horse manure in stream
- Port Hills Road is very busy - lots of fast moving heavy traffic, noisy
- urban sprawl / industrial zoning / future development alongside
- funding / labour / compensation
- reassurance is wanted of a continuing commitment from the Council

- stabilisation of runnels under Mary Duncan Park pine plantations
- a cleaner stream
- more maintenance - weeds, no manure put in stream
- meet the needs of the people, eg walkers & Pony Club together
- get trucks off Port Hills Road to a diversion - not compatible with walkers
- ecological reserve development
- ecotourism

OPPORTUNITIES & VISIONS FOR THE FUTURE

- to beautify and protect for future generations
- plantings along the stream, including the upper catchment and tributaries
- attractively planted buffer zones for lower creek
- enhancement with streamside native vegetation
  - happy residents
  - provision of wildlife habitat
  - encourage native birdlife
  - reduce erosion
  - provide beautification
  - less flooding
- creation of a series of ponds and wetlands along the stream
- develop these for public reserve and wildlife
- return of the wildlife over the whole stream
- increase the public awareness of wildlife & waterlife
- walkway - along stream to Summit Road, to Rapaki track
- fulfilment of Mary Duncan's wishes - the park as a public place
- public access to Mary Duncan Park
- walking loop in Mary Duncan Park
- childrens play areas / picnic areas / recreation

UNRESOLVED

- public access through private land - Christchurch City Council realises that there is more work to do on issues of public access and is committed to working this through with landowners

CONCLUSION

- Not all residents could attend the workshop, and so more comments would be most welcome, so even if you weren't there, we would love to hear from you!

Rachel Barker C C C Water Services Unit, phone 3711 264
Gavin & Robin Odering phone 337 0668

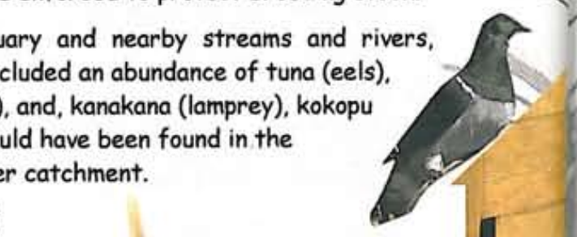
Takata Whenua

Waterways and wetlands, and the maintenance of water quality and quantity are all of extreme importance to takata whenua. Water was traditionally the centre of activity. It was important for transport and religion, supported fish and shellfish populations, and was used for recreation. Rik Tau has stated:

> *"Water, and the resources it supports, determines the siting of their kainga (villages), their identity, and the rhythm of their lives. Water is held in the highest esteem because the welfare of the life that it contains determine the welfare of the people reliant on those resources."*

As a result of this special relationship with water, local iwi developed a close relationship with Ihutai (the Avon-Heathcote Estuary), and its tributaries. The Avoca Valley Stream's proximity to the estuary meant it was an important area for mahika kai (traditional food gathering areas), particularly over the lower reaches. These traditional harvesting methods required a sophisticated understanding of breeding cycles, migration times and feeding habits for bird and fish species. Restrictions on times for collecting food were enforced to protect breeding stock.

A range of fish was taken from the estuary and nearby streams and rivers, including the Avoca Valley Stream. These included an abundance of tuna (eels), seasonal harvests of inanga (adult whitebait), and, kanakana (lamprey), kokopu (*Galaxias* spp.), and pipiki (minnow). Most would have been found in the Avoca Valley Stream, especially over the lower catchment.



The catchment would have provided gathering grounds for putangitangi (paradise shelduck), parera (grey duck), weka and kiwi. Patches of swamp forest and tall swampland associations were hunting grounds for kereru (NZ pigeon), while intertidal stream sections would have attracted shag and gull.

In these times, the Ngati Wheke of Rapaki used the Avoca Valley to travel between their harbour settlement and eeling grounds at Opawaho (Heathcote River). A number of artefacts have been found through -out, and large stone-lined holes (thought to be ovens) were found at the head of the valley, below Witch Hill at the top of the Port Hills.

Sources of Knowledge

Takata whenua Wahawaha Stirling, Rik Tau, Peter Ruka, Makere Schroeder, Bill Karaitiana and Maruhaeremuri Stirling were the primary sources of past knowledge and wisdom for this project. All were supportive of the restoration project, and the general concepts of waterway enhancement, mentioning a number of key goals:

- Restoration of the waterway's mauri (life-force), gradually lost over the years
- Restoration of the water quality and quantity of the stream
- Keeping the water clean
- Maintaining the foodchain
- Protection of the stream's springs
- The importance of the water quality of these springs
- Regaining mahika kai of the stream (especially the lower reaches), which has greatly declined over the years.

The use of raupo (in helping keep water clean) and wiwi was encouraged, and mention was made of the past loss of the wildlife and vegetation of the area. A number of key plants for replanting were identified: karamu, ti kouka (cabbage tree) and koromiko throughout the catchment, with houi (lacebark) and harakeke (NZ flax) near the spring sites. A caretaker role by Council and locals was encouraged, in relation to the maintenance and use of the stream.

Takata whenua have a very strong relationship with the land and it's creator, and have strong principles regarding the use and maintenance of the land. The Port Hills are very significant as an important place for prayer. They have long been a "holy place", and the Avoca Valley is a part of this network.

Three old names for the area were spoken of:

- Pari Rau o Marama - referring to the bluffs on the steep (west) side of the Avoca Valley, which look like grass skirts in the moonlight.
- Te Awa Tere o Rona - meaning the slow babbling stream of Rona (the place of lifting up), speaking of a peaceful, restful stream brimming with life and vitality.
- Nga Irika o Kahukura - referring to the stream as the tears (or flowing / falling waters) of Kahukura, the source of protocols, manifested as a rainbow.

A report was also commissioned on the ***"Matters of Resource Management Significance to Takata Whenua in regard to the Avoca Valley"***. This report identified four key sites, myths and legends regarding the Avoca Valley Stream catchment: Te Tihi o Kahukura, Te Heru o Kahukura, Te Poho o Tamatea-Pokai Whenua and O-Kete-Upoko. Flora and fauna were found to be important in the upper valley, and mahika kai over the lower stream, while general concepts were identified.

Takata Whenua Guidelines

The following guidelines have themes that are important to the Avoca project, but may help with principles for other stream restoration projects:

- Seek to restore the headwater springs in the Avoca and Heathcote Valleys over time for healing purposes
- Enhance and improve the water quality of these springs
- Use of the water from these springs, known as Te Puna o Harakeke, for the cleansing of houi (lacebark) while preparing garments (by the Rapaki people) may be important in future

Houi (Hoheria angustifolia, the narrow-leaved lacebark) was a traditional crop tree of this area, with groves in the upper valley near the springs. The cream, lace-like inner bark was carefully harvested in sections, cleansed using the springs, and used for weaving and garments.

- Replanting areas of harakeke (NZ flax) and houi (lacebark) near the spring sites
- Develop interpretation panels where appropriate - exposure to and interconnectedness of the elemental forms of water with valley streams through the development of interpretation (eg, panels or carved bollards), showing how the water systems of the flaming rocks of Tamatea Pokai Whenua are connected
- Expression of leadership, status and chieftainship through the creation of interpretation panels that illustrate the aforementioned events and people
- Manifestation of the holiness and reverence of the surrounding landmarks through improved understanding
- Grouping of the significant landmarks as Nga Taoka Toka Toru (The Three Significant Rocks), according to takata whenua
- Imagery of the flaming rocks of Tamatea Pokai Whenua in the shaping of the landscape, contained in sculpture

- Creation of an observation point with interpretation of history, to allow people to visualise a strategy for determining how one would use or change what is seen, and justify why these strategies were chosen or decisions made
- A pamphlet showing the significance of landscape names and linkages to papa pakihi (flat swamps), Opawaho (Heathcote River) and Ihutai (Avon-Heathcote Estuary)
- Enhancement of mahika kai of ducks and flounder on the lower stream
- Creation of a natural buffer between the stream and development in the lower reaches, and green corridors based upon the indigenous ecosystems approach
- Revegetation of the stream corridor
- Restoration of the mauri (life-force) of the waterway.
- Development of a symbolic design to assign to the waterway, by descendants of the local peoples. The mokihi, the traditional local raupo raft, has been suggested as symbolising the kaupapa of this project. The mokihi, the vehicle to convey the message.

A traditional mokihi

Source: *Prehistoric Rock Art of New Zealand.* Trotter, M. and McCulloch, B. (1981). p.76

Generic Guidelines

Previous research of takata whenua values suggests many of these may be met by:

- Maintaining clean, healthy water
- Creation of wetlands, for the regeneration of fish and plant communities, and to remedy the effects of the loss of life and mahika kai
- Enhancement of mahika kai in waterways, especially for eel, inanga (whitebait) and freshwater crayfish, and the naming of mahika kai sites
- Planting of indigenous plants along riparian corridors
- Removal of noxious weeds
- Stopping effluent discharges and leakages into waterways
- Stopping the reclamation of wetlands.

Landform Hydrology & Use

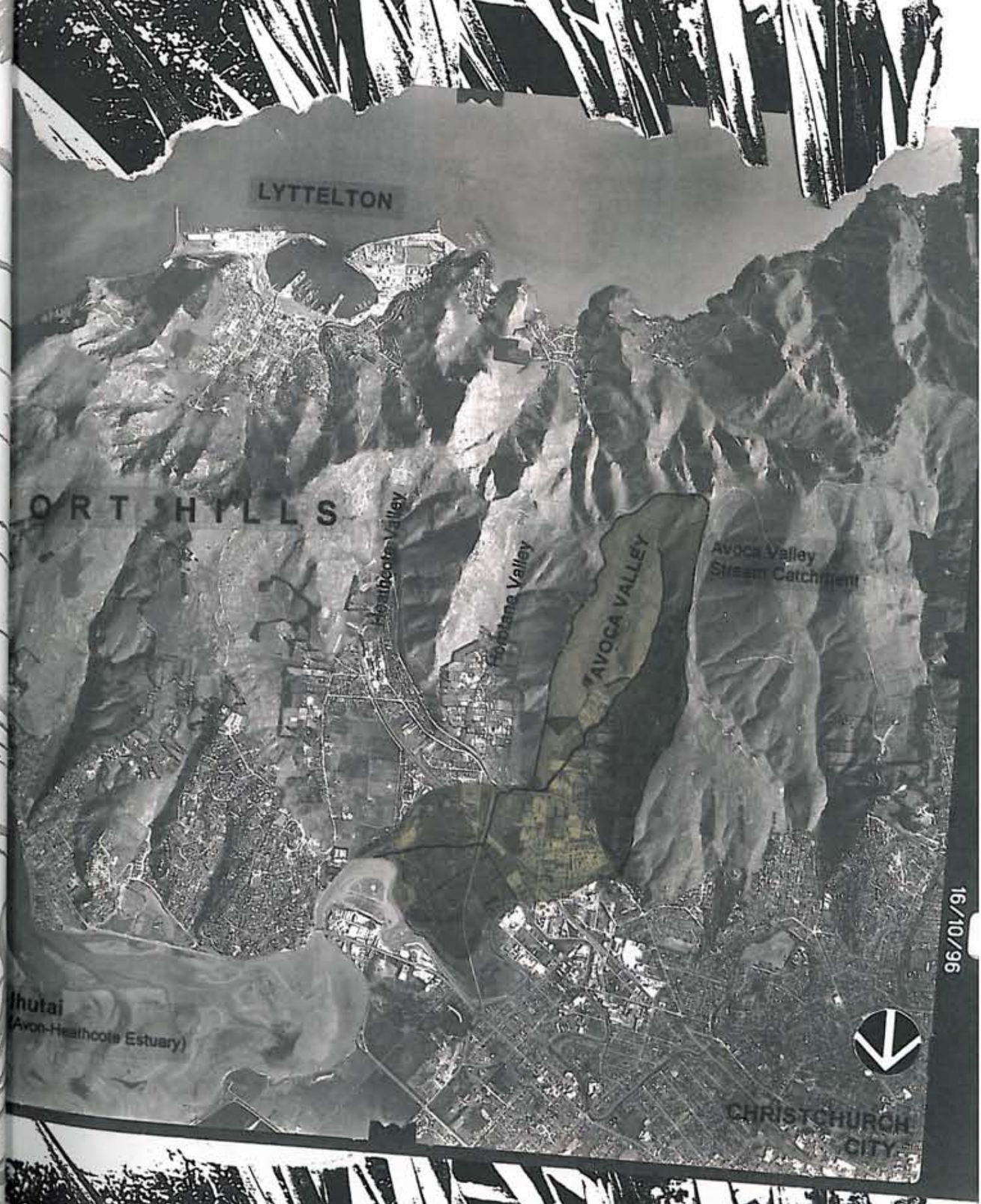
Context

The Avoca Valley Stream is a small ephemeral waterway situated in Christchurch, on the east coast of New Zealand's South Island. The stream originates near the top of the volcanic Port Hills, and flows down through the Avoca Valley to the flat, low lying Heathcote Valley floodplain. It empties into Opawaho (the Heathcote River), just before this enters Ihutai (the Avon-Heathcote Estuary). The stream is approximately four kilometres long, with a catchment area of 536ha, representing a complete "mountains to sea" link (crater rim to estuary).

The lower Avoca Valley Stream actually receives the flow from two similar hillside valleys - Avoca Valley and Horotane Valley. The Horotane Valley catchment above Tunnel Road comprises some 185ha of the total 536ha Avoca catchment area. About 202ha of the 244ha catchment within the actual Avoca Valley (ie, south of Port Hills Road), is rural land or within Mary Duncan Park.

The Avoca Valley Stream is not a high profile stream, but a typical "backyard" stream. Because of this, many people are likely to be unaware the stream exists. Avoca Valley itself is also a secret from much of Christchurch. It is a rural enclave, hidden away and almost remote, yet only a 10 minute drive from the central city.

Whilst the catchment is topographically prone to flooding (as a consequence of a large low lying floodplain), hydrologically it does not produce a high volume of runoff. Most of the catchment is undeveloped and therefore pervious to rainfall, with very high losses to infiltration and storage. This tends to "dampen" down the more frequent rainfall events, but does lead to a considerable increase in flow for less frequent events, where prolonged rainfall uses up available storage.



Avoca Valley Stream

Context

notes

Between Mary Duncan Park and Opawaho (Heathcote River), the Avoca Valley Stream has been extensively modified. Originally it would have meandered widely here, but has been straightened and confined to a small channel.

The stream would have begun to meander in the **Valley Floor** graduating to a series of large oxbows and switchbacks over the **Estuarine Flats** of the lower floodplain. Evidence of this is the flattening stream gradient and softening soils as you move down the stream. Shown is an **indicative** former profile for the Avoca Valley Stream.

Description

Steep Hills

The steep land around the top of the Avoca Valley catchment consists of a layer of loess over volcanic basalt, with numerous rocky outcrops and large rocky bluffs. As a result the soils are very thin and bony. The land type is currently dominated by pasture grasses, with remnant short tussock, and most of the land is used as grazing land for cattle.

The Avoca Valley Stream originates near the Summit Road, below Witch Hill at the top of the valley where springs exist. The elevation above mean sea level here is about 420m.

The stream in this land type is largely natural and relatively unmodified, being:

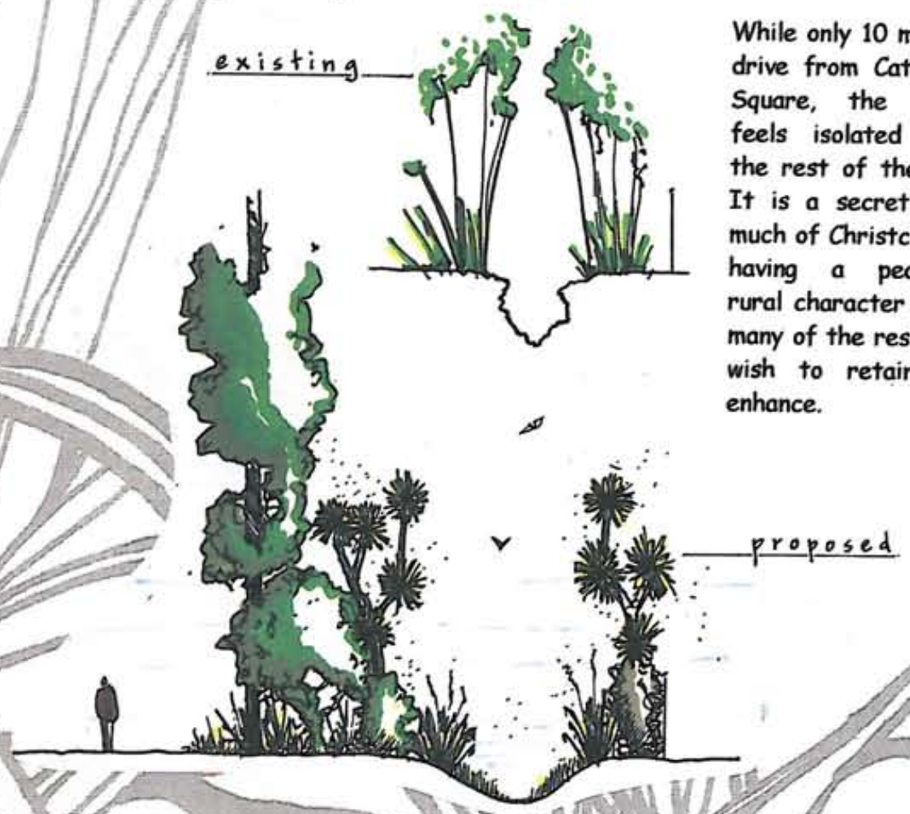
- The least meandering - following a direct course down the valley
- Less than two metres wide
- Very steep - average stream-bed gradient is 1 in 3
- Dry much of the year
- Predominantly fed by runoff from the hills, therefore dependent upon wet weather for flows (the springs would have formerly contributed more flow)
- Rocky, due to the underlying, very hard, volcanic rock, which forms a pool and riffle stream-bed sequence
- Flood events are generally confined to the channel.

There is substantial erosion over these steep lands, due in part to previous over-grazing and the consequent reduction in vegetation cover. With little vegetation to hold or slow stormwater runoff, rainfall runs out of the system in a matter of hours. Stormwater runoff carries sediment from the eroding land into the stream and to the lower catchment, resulting in problems with sedimentation. Greater vegetative cover (both throughout the catchment and alongside the stream), would help reduce this erosion, by slowing runoff, holding soils and filtering sediment.

Locals can remember a time when there was a constant flow, however these memories may be linked to the 1970s decade when Christchurch experienced a prolonged period of wetter years.

The Valley Floor is the most populated land type along the Avoca Valley Stream, with a number of different land uses. It is dominated by horticulture, with glasshouses on the flat land, and market gardens (predominantly celery) on the slopes. Housing associated with the horticultural activity and private residences exist along this reach, while Mary Duncan Park, a public reserve currently leased by the Ferrymead Pony Club, also borders the lower stream in this land type.

This area has been identified as at risk from 50 year return period floods. While the stream-bed is relatively steep, the channel is small, and flood waters could overlap the banks in places. This would result in a fast flowing overland flow through the area developed with glasshouses, before it rejoined the waterway at Port Hills Road. Waterway widening would reduce this risk, and be in sympathy with the restoration works proposed (as shown below). Where this is not possible, low stop-banking would help to reduce the risk.



While only 10 minutes drive from Cathedral Square, the valley feels isolated from the rest of the city. It is a secret from much of Christchurch, having a peaceful, rural character which many of the residents wish to retain and enhance.

Estuarine Flats

The lower portion of the Avoca Valley Stream, from immediately above Port Hills Road (beside Mary Duncan Park) to Opawaho (Heathcote River), involves the Estuarine Flats land type. The land here is predominantly open, flat and low lying, including large areas of seasonally wet land. The soils consist of estuarine silts and sands alternating with layers of greywacke gravels. These flats were once part of a huge swamp, but are now predominantly in pasture and used as grazing land for horses. The area also includes the old Heathcote County Council rubbish tip which lies immediately adjacent to Opawaho. This site has been filled to a level a few metres above the surrounding land.

The stream throughout the Estuarine flats has been completely modified, being confined to a straight drainage channel. It would have meandered widely with large oxbows and convulutions, but is now typically:

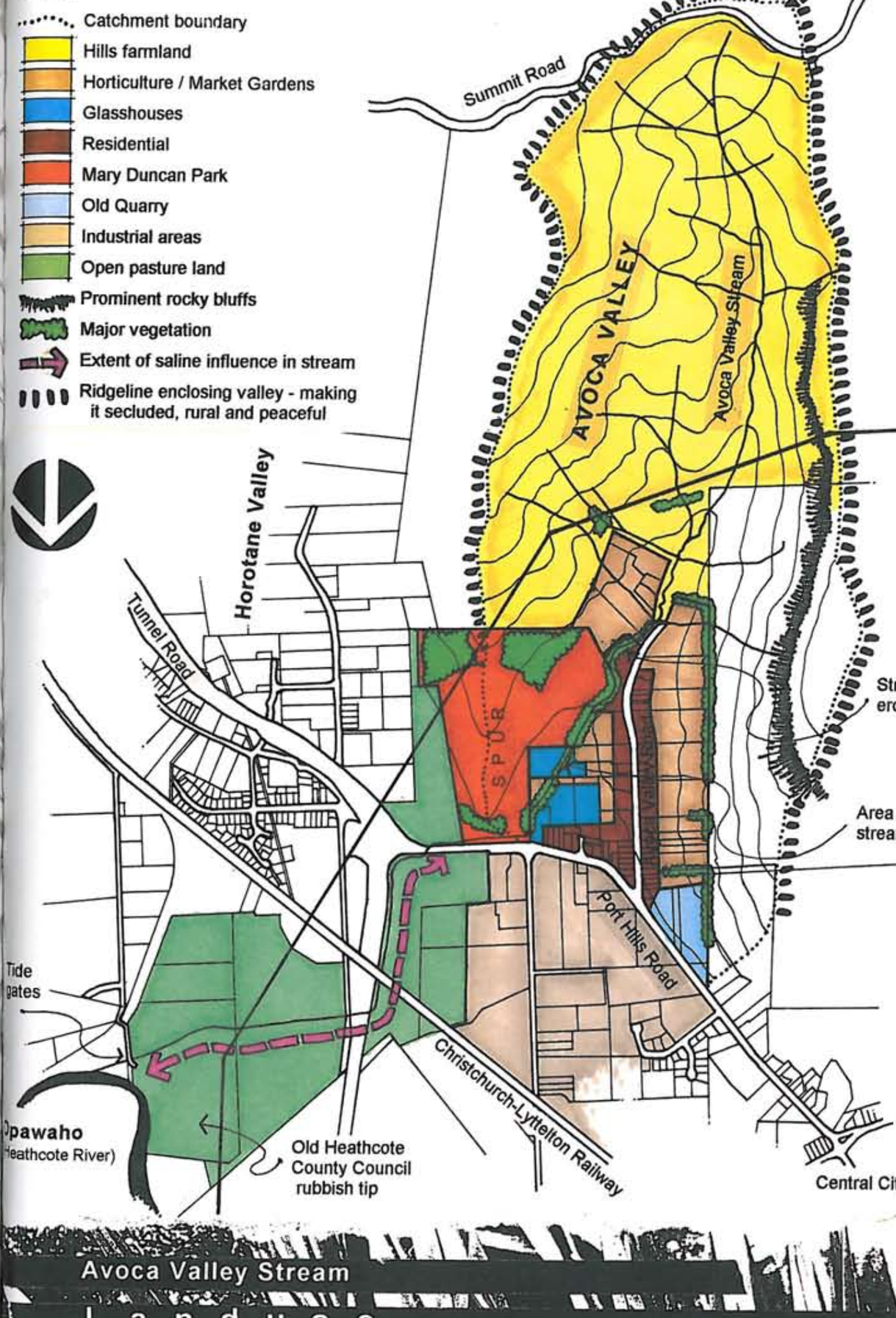
- A straight excavated channel approximately two metres wide
- Very flat, with less than a metre fall over the last kilometre before Opawaho (Heathcote River)
- Confined by stop-banks
- A permanent water body which rises and falls with the tides
- Maintained by groundwater, tidal backflow from Opawaho and Ihutai (Avon-Heathcote Estuary), and the high water-table
- Saline as far as Port Hills Road
- Prone to flooding for storm events greater than a 5 year return period.

There are tide gates at the stream's outfall to Opawaho to reduce tidal backflow, although their effectiveness is questionable. The permanent slow moving water body results in siltation of the channel, particularly at the Port Hills Road culvert where the relatively non-tidal stream waters meet the tidally influenced waters. Between Tunnel Road and Opawaho, two other major drains enter the Avoca Valley Stream system carrying stormwater flows from the Horotane Valley drainage system.

The low lying land in this land type is particularly vulnerable to flooding from storm flows in the stream, and high tide events. Stop-banking the network of drains, along with the tide gates, has helped reduce flooding. Because the land is low lying and relies on the maintenance of these flood protection devices, it will always be at risk from flooding and potential sea level rise unless filled to a suitable level.

Given the areas original state as saline wetlands, the current low level status of landuse offers an excellent opportunity to restore the wetlands and abandon the ongoing maintenance of drainage systems. This restoration to a wetland of much of the lower catchment would need to go hand in hand with "bunding" or filling of the remaining land zoned for development for residential or industrial purposes.

The small part of this land type between Mary Duncan Park and Port Hills Road (above the Port Hills Road culvert) is also prone to flooding (up to 0.5m), even with 5 year return period storm events. This flooding rises to a 1m depth for 50 year return period events, which can result in water flowing over Port Hills Road from Mary Duncan Park.



Avoca Valley Stream

Landuse

History

The Ngati Wheke people of Rapaki used the Avoca Valley to travel between their harbour settlement and eeling grounds at Opawaho (Heathcote River), while the lower Avoca catchment was an important area for mahika kai.

European interest in the Valley began in 1857, when a house was built on the spur between the Avoca and Horotane valleys. During 1864 and 1865, part of the valley was used for Volunteers camps. One of these included a "sham fight", which turned into a genuine fracas with a number of authentic casualties. This incident is remembered as the "Battle of Hillsborough". More of the valley was purchased during the 1870s, and a musterer's cottage built on the right flank. After 1909, the Avoca Valley went on the market.

Between 1910 and 1918 there was a boom in New Zealand fruit growing. In the Port Hills region, the Heathcote, Horotane and Avoca valleys participated in this rapid orchard expansion, being admirably suited to the growing of stone fruit. In Heathcote, stone fruit and grapes were grown, while Horotane was a planned settlement, started just before World War 1 when the valley was subdivided and sold as orchards.

The Avoca Valley was then surveyed and roaded, and subdivided and sold in 1918. Relatively little fruit was planted there, with the exception of one good-sized orchard and small plantings of plums and apricots, as well as some market gardens.

Parts of the Avoca Valley were first farmed in 1919. However, much of the best land was taken up by the Duncan estate which was never subdivided or sold. This estate was gifted to the Christchurch City Council, in 1932, as a public reserve (Mary Duncan Park). There was speculation the tunnel road would pass up Avoca Valley and burrow through under Witch Hill, however this idea was later abandoned.

Since then, the number of residential properties in the lower vallley has increased (to approximately 45), and the steeper land is used exclusively as farmland. Cultivations have shrunk in favour of smaller, more intensively worked holdings, with a number of celery growers, some market gardens, and a nursery. From 1962 Mary Duncan Park has been leased by the Ferrymead Pony Club, who use it for horse riding, competitions and grazing.

Biodiversity

The Avoca Valley has an ecologically depleted stream corridor. In the past it would have been home to all manner of plants and animals, however, like many such streams, its ecological health has diminished over the years. The fish are largely absent, invertebrate numbers are low, bird numbers are down, and almost all of the indigenous vegetative cover is gone.

The goal of this project is to restore the Avoca Valley Stream to a richer and more natural state. However, the stream environment has been heavily modified, and restoration will only ever re-establish some aspects of the original state of the stream.

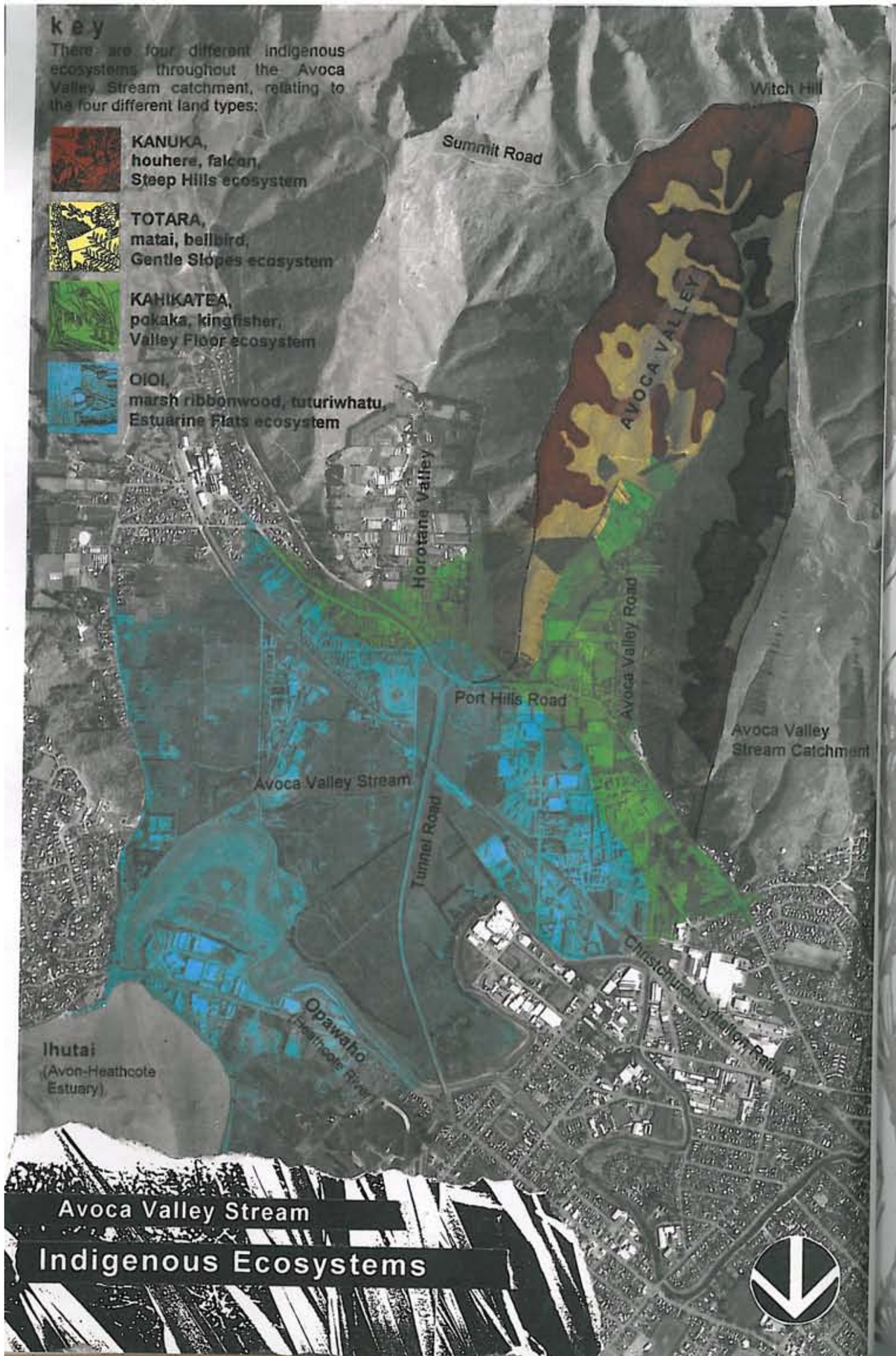
When aiming for ecological restoration to create a healthy stream, designers need to consider the vegetation, birdlife, lizards, fish and invertebrates. Long established residents and local ecological experts should be consulted, in order to understand the dynamics to maximise the potential for an area. By investigating the current situation, along with the plants and animals that used to occur here, and the landform and soil patterns, a vision for potential restoration emerges.

Vegetation

Natural Cover

The first step in planning for restoration is to find out what vegetation occurred at the site in the past. This vegetation expresses the identity of the area, and is likely to succeed again in that location. The vegetation cover of an area can be predicted from the underlying soil types, because these integrate climatic and land characteristics, which help determine the distinctive range of native plants able to be supported. These plant/soil associations show the vegetation that nature intended; the native plants that "belong" to an area.

These associations have been developed for the Christchurch area (including the Port Hills), in conjunction with a geomorphologist and ecologist. They were developed by extrapolating data from surviving remnants, historic accounts and pollen records, and are depicted as underlying indigenous ecosystems. There are four indigenous ecosystems throughout the Avoca Valley Stream catchment - one for each land type (mapped overleaf). There is a corresponding plant card for each ecosystem (refer to appendices), which gives a list of the local, native plant species belonging to that area, suitable for restoration, revegetation, and general local use.



If left to develop undisturbed, the Avoca Valley Stream catchment would, in time, be clothed in the plant associations indicated by this approach. This includes dry forest over the Port Hills containing podocarps such as totara and matai. By planting in accord with this "ecosystems framework", it is possible to restore a small part of the natural vegetation of Avoca Valley. These plants will provide habitat and food for local wildlife, encourage the return of other wildlife, and help restore some of the valley's diminished biodiversity. Such restoration will also contribute to the rebirth of the valley's identity, celebrating the uniqueness of this place.

1840s Cover

For some of New Zealand, broad 1840 vegetation maps have been developed. In Christchurch these are the "Black Maps", compiled by surveyors in the 1850s. They give a fairly detailed guide to the vegetative cover of the time.

The following "Black Map", dated 1856, encompasses most of the Avoca Valley Stream catchment. It indicates extensive low lying swampy areas throughout the lower catchment. However, it is important to note that these maps are simply a snapshot in time. The vegetation in 1856 was already extensively modified, in response to disturbance from fires and floods. This is why species such as harakeke (NZ flax) and ti kouka (cabbage tree), which are fire resilient, were so dominant.

"Black Map"

Source: *The Estuary: Where Our Rivers Meet The Sea: Christchurch's Avon-Heathcote Estuary.* Parks Unit, Christchurch City Council (1992).

Current Vegetation

Steep Hills and Gentle Slopes Ecosystems

Throughout the ecosystems of the upper catchment, there is a limited amount and diversity of native vegetation. Used extensively for grazing cattle, these slopes are covered with degraded short-tussock grassland, similar to that covering much of the Port Hills, with occasional patches of unpalatable rushes and *Muehlenbeckia*.
The lack of catchment and streamside vegetation increases the rates of runoff and erosion, resulting in rain water washing quickly out of the valley. A greater vegetative cover would slow the passage of water, helping reduce erosion, holding water in the Valley for longer and enriching the land.
There is evidence of more streamside vegetation here in the not too distant past. Local resident Murray Odering can remember when *"the stream was lined with flax bushes from the upper reaches of the valley to the current horticultural area"*. Iwi also talk of areas of harakeke (NZ flax), as well as groves of houi (lacebark) at the top of the valley near the spring sites.

Valley Floor Ecosystem

Along the valley floor, the stream is now lined by mature exotic trees such as willow, along with the native pohuehue vine and other introduced species such as hemlock. These form dense thickets of vegetation, especially alongside Mary Duncan Park. The park itself is predominantly pasture land. It includes two large pine plantations, and a woodland of mature exotic trees (including oak, macrocarpa, sycamore).
The area below the Mary Duncan Park spur (alongside Port Hills Road) was originally quite marshy, but has been filled with soil and rubble in recent years. In the neighbouring property, highly modified swampy areas remain. These have been colonised by a number of locally rare and uncommon plant species.

Estuarine Flats Ecosystem

On the former estuarine flats below Port Hills Road, the vegetation is limited to pasture grasses and some other herbs, along with a group of stunted macrocarpa, providing good habitat for local wildlife. Peter Ruka spoke of areas of pukio *(Carex secta; C. virgata)*, along with the gathering of dry raupo leaves and plucking of stems here in the past. Native plantings were undertaken in the old Heathcote County Council rubbish tip, but encountered establishment difficulties because of the hard compacted ground, methane, and cattle invasions.
Still evident in the low lying land between Tunnel Road and Opawaho (Heathcote River), are the natural patterns and depressions of the salt-meadow and salt-marsh wetlands that once occurred here. The stream has subsequently been channelised and confined - draining these wetlands, although there is good potential for their restoration.

Vegetation Guidelines

- To restore some natural character to a stream, re-align and shape the banks, then establish native vegetation along streamsides
- Keep grazing animals, buildings and lawn mowers well back from the edge of the stream - have a vegetated strip some 10 to 20 m wide (or more) along each side of the stream as an ecological buffer, providing habitat and filtering runoff
- Explore the different types of sites along the stream, the wetter and drier sites, the sites sometimes or often flooded, the stable sites and the mobile
- Find out what native vegetation naturally belonged in each type of site. Refer to native plant lists for the local area (appended), consult local ecologists, and study any native remnants to assess the location, grouping and mixing of different species.
- Select species according to their position on the stream profile - from those on sunny and exposed banks, to the shady and moist banks, the stream bed or damp patches
- Expand the streamside plantings to link up with remnant native vegetation, to enhance the habitat value and diversity of the stream corridor
- Re-establish buffer vegetation around and under fragile native forest remnants
- Carefully phase out non-local cover and re-establish native plants. However, make use of existing exotic and non-local vegetation that may be beneficial to wildlife and that may provide shelter for re-establishing the local native plants during a transition period
- Don't make the stream corridor a haven for weeds! - remove potentially invasive exotic and non-local vegetation that might spread along the stream such as willow, *Cotoneaster*, *Buddleia*, old mans beard (see weed lists appended)
- Develop a staged planting plan so that sections are undertaken separately. Focus effort - don't try and cover an area too big to plant densely or to look after adequately. Better the smaller area done well than a large area that is sparsely planted and weed-ridden
- Develop a phasing plan so that light-loving plants are established in the open, and shade-loving plants are put in under existing cover or planted several years later once the first plantings have established a canopy
- Plant densely for total dense cover and good weed suppression - low cover plants (sedges, rushes, ferns) at about half metre spacings (4 per. sq. m.); shrubs at about 1 metre spacings (1 per. sq. m.); small-growing trees at 2 to 5 metre spacings; and, large-growing trees at some 6 to 10 m. spacings, with shrub and lower cover massed between
- In summer, plant right into the stream bed with the native sedges, raupo, etc. that belong
- Order "eco-sourced" plants, those propagated from seed from naturally occurring local native species. Preferably order the plants 2 years in advance of the proposed planting. Preferably have the plants contract grown for the job