



LANDCARE RESEARCH

SUBMISSION ON THE DRAFT
CENTRAL CITY PLAN



Landcare Research
Manaaki Whenua

LANDCARE RESEARCH SUBMISSION ON THE *DRAFT* CENTRAL CITY PLAN

ABOUT LANDCARE RESEARCH

Landcare Research is a Crown Research Institute driving innovation in New Zealand's management of terrestrial biodiversity and land resources. Landcare Research has science expertise in areas of specific relevance to the draft Central City Plan, particularly urban ecology, soils, low impact urban design, green technologies and sustainable business.

Greater Christchurch is the site of Landcare Research's corporate office and home to many of our staff. Our role as a submitter is therefore twofold: as a Crown Research Institute we provide feedback based on our areas of science expertise, and as a business employing over 250 highly skilled staff in Christchurch, we have invested in, and support, the long-term prosperity and knowledge economy of the City.

PUBLIC HEARINGS

Richard Gordon, CEO of Landcare Research, would welcome the opportunity to appear and be heard at the public hearings in the week beginning 3 October 2011. He will speak primarily in reference to the 'Green City' chapter of the draft Plan but will also make cross-cutting comments that apply to all chapters.

SUMMARY OF SUBMISSION

Landcare Research commends Christchurch City Council for the quality and vision of the draft Central City Plan. We would like to acknowledge the incredibly hard and creative work required to produce this draft within an extremely tight time frame.

We believe the Plan demonstrates a cohesive integration of cultural, social, ecological and economic goals. We are impressed by the Council's strong response to community input into the development of the Plan and we particularly support the Plan's intention to enhance the natural environment and use green technologies to provide long-term, integrated and sustainable outcomes for the city. We welcome the inclusion of Landcare Research in the implementation of the 'Greening the roof' project (p42 of the Plan) and we would welcome an opportunity to discuss how we can assist the Council with this project and others highlighted in this document.

We strongly support Te Ngāi Tūāhuriri Rūnanga as a co-designer to the City redevelopment, which will bring a distinct mātauranga Māori (Māori knowledge) approach to urban design.

Christchurch City is proposing an innovative city design. We support this and would like to stress the attention needed to successfully implement new design and technologies. Landcare Research recommends that the Council adopts the following six principles for enabling the long-term implementation of the Central City Plan:

1. Continue the collaborative and creative processes of engagement with the Christchurch community.
2. Build for 100 years; future-proof the city centre through green infrastructure and adaptive design, and through commitment to a learning city.
3. Embed a mātauranga Māori approach to the ongoing design processes.
4. Inspire business and community by implementing catalyst projects showcasing and marketing innovative urban solutions, such as green roofs, effective public transport, and a balance of eco-sanctuary parks and gardens.
5. Ensure design, construction and maintenance are incorporated into an integrated approach to implementing the Plan; evaluate designs for their ability to be maintained and bring together and build the capacity of the various people and organisations responsible for them.
6. Embed new design approaches in the City and Regional councils' implementation mechanisms (e.g. statutory and non-statutory plans, asset management plans, building and landscaping codes).

In accordance with these general principles, and from Landcare Research's areas of expertise, we recommend the following:

- That the biophysical character of the central city is linked, through features such as biodiversity corridors and habitat stepping stones, to ecological plans for the surrounding cityscape. This will maximise the environmental benefits delivered by the 'Green City' elements of the Plan (see the Biophysical Character of the Central City and Community Gardens and Central City Parks sections).

- The Council continues strengthening the focus on reflecting mātauranga Māori within the built environment through the incorporation of cultural design elements, spaces and facilities within all civic spaces and buildings – including Cathedral Square, Market/Victoria Square, the Town Hall, the Library, the Convention Centre, and the Metro Sports Facility (see Tutohu Tangata Whenua section).
- The Council counters the argument that cost is a barrier to adopting a 'Green City' design with readily available research findings demonstrating that green technologies (such as eco streets and green roofs) can cost less than conventional design and deliver a range of additional benefits over the short and long term.
- The Council anticipates the appropriate long-term maintenance required by a 'Green City' and plans this from the design stage.
- 'Urban safaris' are conducted, showcasing established and new green technologies in the city-scape and highlighting design, implementation and maintenance successes and areas where improvements can increase efficiency and decrease cost; Landcare Research offers to lead these.
- Plantings take account of local land/drainage variations and soil patterns and thereby reduce the need for irrigation (see The Biophysical Character of the Central City, Eco streets, and Community Gardens and Central City Parks sections).
- Education is provided for those implementing and maintaining features of the Green City design so that they understand the functioning of features such as swales and rain gardens and manage them appropriately.
- Council city plans and asset management plans are reviewed where needed to implement the 'eco streets' concept, to ensure alignment with the new designs and to accommodate decentralised infrastructure systems.
- Ongoing education activities will be important to socialise new sustainability practices and behaviours among the people who live, work and visit the city centre. The Plan's emphasis on a Learning City and on the Arts provides multiple opportunities for doing this.
- Demonstration green roofs, in high use areas, should be used to inspire and educate business and community in green roof design and function.
- Current knowledge about the suitability of specific building types for green roofs should be considered when choosing which projects should proceed (see Greening the roof section).
- Implementation and monitoring plans should be devised prior to project commencement.
- Christchurch City Council should refer to best practice in public involvement in design and governance processes throughout the period of the Plan.
- Strong community engagement in the redevelopment of the city will ensure ongoing public commitment to the new vision for the city. Christchurch City Council should refer to the considerable research available on how to encourage and support community engagement and this should be used to inform each stage of the implementation of the Plan.
- The City Plan should be explicitly considered as a document that gives the community and businesses permission to be innovative and to do things differently to the ways they have been done in the past.

Landcare Research is committed to a sustainable and vibrant Christchurch and hopes our submission, experience and future research, analytical and integrative support will be of value in the further development of the Central City Plan.

BIOPHYSICAL CHARACTER OF THE CENTRAL CITY

The Central City has distinctive built and commercial features that set it apart from its surrounds and we acknowledge the need for a discrete plan for the Central City. However, we suggest the biophysical character of the Central City should be linked with that of the surrounding cityscape and wider region through more comprehensive ecologically integrated plans. Habitat stepping stones and corridors throughout the wider city should link with and complement the proposed eco streets (p41), Avon River Park (p31), smaller parks and gardens (pp35–40), green roofs and green walls (p42) of the Central City. These features will combine to encourage people, native birds and plants into and through the Central City. Features that are infrequently disturbed (such as roofs and unmown swales) should complement the more heavily used green spaces.

In the compact urban form proposed in the City Plan (p105), the green spaces on and between buildings are the key to providing healthy, people-friendly cities. The ecological linkages between areas need not have extensive space requirements but must be carefully placed and distinctive. An educational tool could be developed highlighting the ecologically-linked parks and features of the cityscape. We support the proposal of a City Sustainability Hub made by local NGOs (including Sustainable Otautahi Christchurch, Living Streets, and Greening the Rubble) and suggest that an educational tool about the ecological linkages through the City could usefully support, and be supported by, that hub.

Landcare Research strongly supports the compact urban form of the Plan both for its ability to create vibrancy and connectedness and its ability to reduce the City's ecological footprint on the region and beyond. Landcare Research also recommends considering the multi-functionality of ecological links to develop city and regional cycle and walkways.

Figure 1 illustrates some of the linkages that could be developed between the different areas and features in the wider cityscape.

HOW LANDCARE RESEARCH COULD HELP

- Advise on the **natural soil–landscape–ecology patterns** for Canterbury and New Zealand.
- Identify an optimum configuration of **habitat patches & linkages** that feed wildlife into the city through urban forests.
- Help develop an **ecological plan** connecting the Central City to the wider cityscape.
- Advise on ways to **restore native ecosystems**, both in areas where fragments remain and where they need to be established – along bare roads, riverbanks or individual retaining walls or roofs.
- Advise on the **integration of native plants and ecosystems with required function** (such as pollination, stormwater treatment, shelter).

RECOMMENDATIONS

- Take a whole-cityscape approach to ecological design, linking different areas through strategically planned corridors, habitat stepping stones, eco streets and other connections to create maximum human and ecosystem benefits at little additional cost.
- Develop an educational tool highlighting the ecological linkages through the city.
- Consider the multi-functionality of ecological links to develop city and regional cycle and walkways.
- Reflect the varied soil pattern of the Central City and wider cityscape in native and exotic plantings in feature areas. See Community Gardens and Central City Parks for more information on soil patterns.

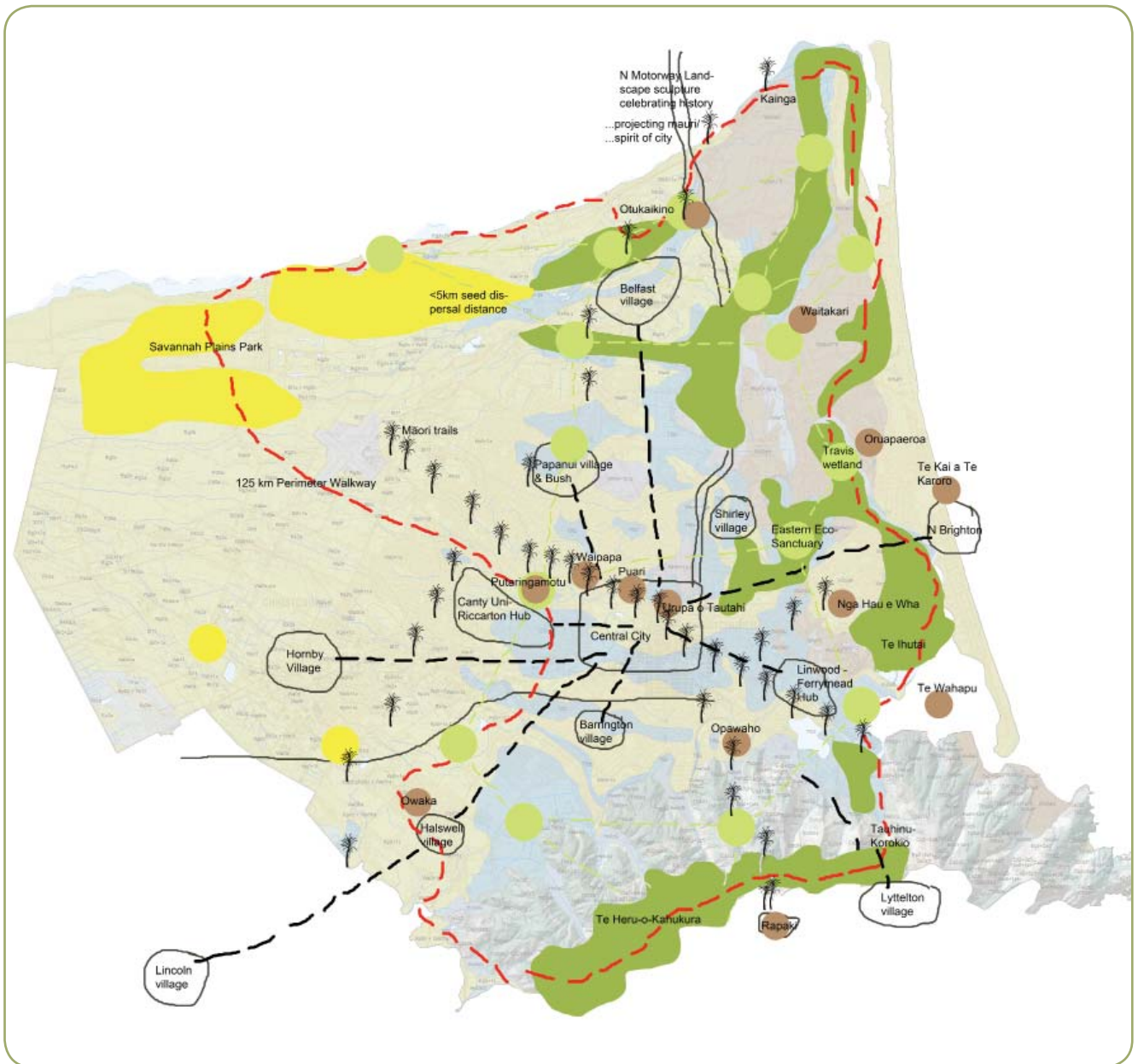


Fig.1¹. Christchurch City Centre within its wider landscape. The riverside park and eco streets become the heart of greater Christchurch, linked by walking tracks / cycleways (red lines), ecological corridors (dark green) and habitat stepping stones (pale green patches). This combines to encourage people, native birds and plants into and through the central city from suburban villages and hubs (black circles). Brown patches represent sites of special cultural significance. Cabbage tree (ti kouka) symbols mark traditional Māori routes through the city – centred here on the ancient tree at Burnside High School.

¹ Meurk C, Buck R, Lynn I, Allen W, Stevenson A, Thompson J, Viegas A 2011. 160 Gloucester Street: 48 Hr Design Challenge: Creative Christchurch Futures. Available from: http://www.landcareresearch.co.nz/research/sustainable/rebuilding_chch_index.asp.

TUTOHU TANGATA WHENUA

Landcare Research supports the process of Christchurch City Council working in partnership with Ngāi Tahu – Te Ngāi Tūāhuriri Rūnanga as Treaty partners and co-designers in the development of projects within the draft Plan. We support the plan's innovative view of intertwining mātauranga Māori, particularly Ngāi Tahu cultural identity, throughout the redevelopment plan. Identification of specific values important to Ngāi Tahu that will provide a compass or a set of validating principles is important to help guide the redevelopment plan. We acknowledge that Ngāi Tahu have willingly shared and articulated the following principles:

- Whakapapa/manawhenua/rangātiratanga (genealogy/authority/leadership)
- Kaitiakitanga (stewardship)
- Whakapapa/mātauranga (genealogy/knowledge)
- Whanaungatanga/maanakitanga (making connections and caring for people)
- Tohungatanga (includes wise and considered evaluations and decisions)

The challenge for most organisations is how to apply a set of principles in practice. Landcare Research believes the Plan adequately applies and implements Ngāi Tahu values and principles through the following:

- A specific tangata whenua map layer showing significant sites and waahi tapu within the city as well as the inclusion of Ngāi Tahu historic activities from post-contact to the present
- Specific recognition, projects and targets around the Papawai Ōtakaro/Avon River Park project
- Specific recognition for cultural and natural heritage in the future development of Cathedral Square (p35), Central City Parks (p39), Central City Greenway (p39) and other 'Green City' projects. We support Ngāi Tahu – Te Ngāi Tūāhuriri Rūnanga in seeking to maintain an adequate balance of indigenous and exotic plantings throughout the city – both in size, scale and species numbers
- Specific cultural and natural heritage targets and recognition in 'Distinctive City' projects, precincts and neighbourhoods

HOW LANDCARE RESEARCH COULD HELP

- Work with Ngāi Tahu to develop processes for the incorporation of Mātauranga Māori into urban planning.
- Help facilitate the processes required for efficiently integrating Ngāi Tahu values into the city plan.

- Specific provision for the concept of an ātea space and other Māori and Polynesian design influences in the development of a Metro Sports Facility (p69), Performing Arts Venue (p72), Public Art Network (p73) and Central Playground (p74)
- Specific provision for incorporating and celebrating Ngāi Tahu culture and identity in bringing back tourists and commercial development into the city, such as via the redevelopment of the Convention Centre, Visitors Centre, markets and other buildings.

Landcare Research commends Christchurch City Council for the inclusion of these elements in the Plan and supports it in the further development of these.

RECOMMENDATIONS

- Strengthen the focus on reflecting mātauranga Māori within the built environment through the incorporation of cultural design elements, spaces and facilities within all civic spaces and buildings, including Cathedral Square, Market/Victoria Square, the Town Hall, the Library, the Convention Centre, and the Metro Sports Facility.
- Continue to work with Ngāi Tahu to integrate and incorporate the principles they have shared, through implementation of the Central City Plan.

ECO STREETS

We fully support the new city standard of eco streets (p41). Eco streets with rain gardens and swales are the most publicly visible sign of a people-friendly, healthy, ecosystem-serviced city. Eco streets are effective because people experience their streets on a daily basis, and streets are the main source of stormwater contaminants (including visible litter), reflected heat and traffic-related tension. When street trees and swales are incorporated, eco streets become the most cost-effective method of reducing contaminated stormwater runoff and airborne pollution. Rain gardens with trees make streets liveable through: providing cooling shade in summer, filtering and reducing wind, providing a human scale to buildings, separating cars and people where needed, or slowing down traffic in shared spaces.

Streets are the prime location for local signature plantings and signs. Attention to design detail and supervision of construction of rain gardens and swales is key to ensuring effective performance and minimising maintenance costs. There has been a culture of distrusting indigenous trees in urban environments, but this is gradually breaking down as there are now numerous examples of these being planted in cities around New Zealand, including Christchurch where tōtara, beech, kānuka and lancewood have proven successful.

RECOMMENDATIONS

- Provide education for those implementing and maintaining the eco street designs so that they understand the key features controlling the function of swales and rain gardens and manage them appropriately.
- Counter the common argument that cost is a barrier to adopting a 'Green City' design with readily available research findings demonstrating that green technologies (such as eco streets and green roofs) can cost less than conventional design and deliver a range of additional benefits.
- Take account of local land variations and soil patterns when designing plantings for eco streets (see Community gardens and Central City parks section for more details).
- Explore a greater range of native trees for use in city landscaping and streets. Forward planning for such trees requires that plant nurseries be contracted to produce a steady supply of larger grown NZ trees for parks, streets and landscaping.
- Review existing Council plans to ensure alignment with the new eco street designs.



Fig. 2 (Left) Sculpture, children's play 'activities for all ages', (CCC p28) and oioi can be used in areas designed to rapidly infiltrate water (crossed by boardwalks). (Centre) Plant species for Christchurch Central City. (Right) Rain gardens provide separation from shared road space and complement seating in public spaces.

¹ Meurk C, Buck R, Lynn I, Allen W, Stevenson A, Thompson J, Viegas A 2011. 160 Gloucester Street: 48 Hr Design Challenge: Creative Christchurch Futures. Available from: http://www.landcareresearch.co.nz/research/sustainablesoc/rebuilding_chch_index.asp.

- Ensure asset management plans accommodate decentralised infrastructure systems.
- Consider the new practices required from the people who live, work and visit the city centre, and provide ongoing education activities to enculturate these.



This rain garden maximises root space to allow unimpeded tree growth while having high access via a wooden (=permeable) boardwalk.

HOW LANDCARE RESEARCH COULD HELP

- Assist in reviewing the brief and designs for eco streets using knowledge and experience of low impact design research.
- Provide lists of plant species, their tolerances, characteristics and natural 'groupings' and maintenance needs to guide landscape architects – (including rare native plants suited to the dry plains, dunes & riverbeds, tram tracks, roofs, walls & pavement cracks).
- Identify key design/installation features to guide stormwater engineers and landscape architects, including workshops, field trips, or urban safaris showing mature and new installations of eco streets – pointing out the design successes and areas where improvements can increase efficiency and decrease cost (especially maintenance). Auckland displays some ultra-urban eco streets and Christchurch can demonstrate excellent examples of lower-density eco-streets.
- Identify local substrates and rejuvenation times for engineered rain gardens that are resilient and remove selected contaminants – and will sustain the selected plant associations.
- Identify areas where stormwater can be used to recharge groundwater, and where the soils are not suitable (often in areas that have been filled or altered during building construction).
- Provide environmental contaminants assessment and advice to assist with the management and remediation of land affected by previous urban uses.
- Assist with life-cycle-cost estimates and sensitivity using COST-NZ (for raingardens, adaption swales and tree pits).

GREENING THE ROOF

Landcare Research supports the adoption of green roofs (p42) in the Central City as a key way of achieving a cooler, healthier city and protecting the Avon's waters and small streams from peak stormwater runoff (in places where there is little space at street level). The public buildings where green roofs will have the greatest benefits are the hospital (p111), Library (p76), EPI-Centre (p24) and car parks (p99).

Landcare Research, with the University of Auckland, has developed guidelines for light-weight green roofs for Auckland. This work was based on a five-year research programme that quantified benefits for stormwater reduction and peak flow control and developed a resilient substrate and a shortlist of suitable native plants (for Auckland). Similar experience exists in Canterbury and has been tested in the Botanic Gardens. This work would serve as a good foundation for the development of guidelines and resources (such as seminars) specifically for Christchurch. Input should be sought from local ecologists (particularly Colin Meurk) and green roofers (including Rhys Taylor and Di Lucas). Links with the School of Engineering at Canterbury University will help local researchers to establish effective monitoring and research projects with local students.

Joint research with UniTech (Auckland) and Entecol (Nelson) is trialling methods to conserve native lizards and insects on living roofs; green roofs can be safe places to have beehives in cities (helping redress the decline in pollinators and spreading the flowering season, as green roof plants tend to flower earlier than on the ground as the roofs are warmer).

Green roofs (alongside eco streets, parks and gardens) help to provide the increased green spaces which Christchurch residents have overwhelmingly asked for, insulating buildings and cooling heat-spots in built-up areas, and enhancing habitat which could attract more native animals and birds into the city. The value of green urban design increases over time by helping to maintain the ecosystem services upon which we depend and by increasing resilience and adaptability against a changing climate and diminishing global resources.

RECOMMENDATIONS

- Install demonstration green roofs to inspire and educate business and community in green roof design and function.



New Zealand green roofs (from left to right) increasing in cost, weight, soil depth, plant height, water requirement and maintenance. (Left to Right) A lightweight green roof of 100-mm-deep 'soil' with succulents (not irrigated) to irrigated 300-mm-deep 'soil' (garden) to 500-mm-deep 'soil' (where small trees are placed).

- Situate demonstration green roofs in the Botanic Gardens and on the route between the Ellerslie Flower Show displays and the Central City (experience elsewhere has shown that good siting of demonstration roofs enhances impact).
- Counter the common argument that cost is a barrier to adopting a 'Green City' design with readily available research findings demonstrating that green technologies (such as eco streets and green roofs) can cost less than conventional design and deliver a range of additional benefits.
- The remodelled hospital (p111) would receive specific benefits from green roofs. Overseas research indicates views over green space, including roofs, speed patient recovery, decreasing patient stay duration. (This is the main reason for the construction of green roofs on hospitals in the US and Switzerland.)
- The expanded Central Library (p76) and EPI-Centre (p24) would also be prime candidates for green roofs as both have a key role in education – the EPI-Centre to 'highlight innovative responses by architects and landscape architects showcasing local research and best practice'. In the library's case the roof could provide an outdoor secure area to relax with a book.
- Living roofs are particularly valuable in dense urban apartment living areas and workplaces (p105) as roof space has sunshine and privacy not available on the ground.
- The performing arts centre and theatre (p72) would benefit from green roofs through advantages for insulation of sound in and out.
- In the short term the Council car parks (p99) have considerable scope for green walls or screens on each level and a partial green roof given their high bearing loads.
- The installation of a green roof on the proposed new Metro sports facility (p69) is probably not economical as large roof spans will be required and these are expensive to construct to take the weight required for a living roof.
- A living roof removes water – so where water cisterns or tanks for water supply are wanted, the area of green roof needs to take into account the reduction in water yield.

- Most living roofs will need irrigation if they are to be 'green' and attractive during summer but design using appropriate species for differing depths of substrate is feasible.
- Green roofs can be used to grow urban vegetables, but this requires strong structures and use tends to negate the stormwater benefits (and requires high water consumption). Community gardens along the riverside may be a more-cost-effective alternative for urban food-growing activities.

HOW LANDCARE RESEARCH COULD HELP

- Invite Christchurch City Council representatives (and other stakeholders) to a planned **half-day seminar** (November 2011) presenting the green roof guidelines developed for Auckland.
- Develop **guidelines and resources specifically for Christchurch conditions**.
- Design and install a cluster of up to five types of **demonstration green roofs** (each 5 to 20 m², with interpretation) in Christchurch to compensate for the few examples of easily-viewable green roofs currently seen or recently lost. These could be installed in Autumn 2012.

COMMUNITY GARDENS AND CENTRAL CITY PARKS

The Plan refers to the creation of parks and community gardens within the Central City.

The Central City occupies the levee of the Avon River and contains the range of soils (except sand dunes) derived from deeper alluvium within Christchurch City. Within 100 to 250 metres from the banks of the Avon (and including the proposed Avon River Park (p31)) are found well-drained Waimakiriri soils; these have high natural fertility, and typically elevated pH (from the use of lime and concrete products in buildings). These soils are ideal for community gardens (p40) and will require little preparation or need for raised beds. Maintenance, and some resources such as mulch (tree prunings/leaves), will be needed to ensure that community gardens are enduring and aesthetically attractive.

Some soils will be contaminated from previous urban uses. Smart planning and understanding of contaminant-plant interactions provides the opportunity to beneficially use these soils for urban plantings, in many cases reducing contaminant concentrations over time and improving the wider environment.

The naturally fertile soils of the Central City and Lower Plains would historically have supported vigorous native forest including the finest stands of tall native trees (tōtara, mataī, kahikatea miro). To the north and south of the River Avon the soil remains fertile but the freely drained soils grade through imperfectly drained Kaiapoi soils into poorly drained Taitapu soils. Native planting in feature areas will need to reflect this soil pattern (maps are available providing guidance in this respect).

Areas around the Central City can facilitate the development of thriving parks and gardens by supporting a resilient core of essential pollinators (bees, butterflies, moths) and natural insect predators in native, wildflower and herbal pastures.

Being at the intersection of land, sea, rivers and hills, Christchurch City historically had some of the richest and most diverse natural ecosystems in New Zealand – the remaining fragments still contain similar plant diversity to our national parks. Some treasured wildlife also remains and bellbird sightings are increasing. There is potential to enhance, link and expand this diversity through the



(Left) Rain garden in car park with central pedestrian walkway, using native hebe and oioi. (Centre) Manuka on a pedestrian overbridge. (Right) Greenwall using some native plant species in a multi-storey atrium.

Central City so it can be celebrated in the riverside corridor and eco streets, supported by mammal-free green roofs and green walls; possibly also supplemented by a predator-free sanctuary in the Red Zone Horseshoe Lake area.

Rebuilding the city provides opportunities not only to enhance biodiversity itself but also to leverage Christchurch's unique natural and human history for educational and cultural purposes as well as for the development of eco-tourism in the city. Developing a truly 'green' city (that embraces green technology and infrastructure as well as its unique biodiversity, history, and recreational opportunities) will ensure we can promote the City as a destination in its own right, as well as the gateway to the rest of the South Island – for which the natural environment is widely recognised as the principal drawcard.



RECOMMENDATIONS

- Plantings and park and garden locations should reflect the soil patterns in the Central City and wider cityscape.
- Biodiversity corridors, including eco streets and the Avon River Park, should facilitate the movement of pollinators, insect predators, birds, and native animals through the different parks, gardens and habitats.
- Look for opportunities to beneficially use and remediate contaminated soils.
- Maintenance requirements should be built into design and implementation plans to ensure that the parks, and especially the community gardens, are enduring and remain aesthetically attractive.

HOW LANDCARE RESEARCH COULD HELP

- Provide **soil interpretation** for the Central City to assist with decisions around park and garden locations and planting schemes.
- Provide **environmental contaminants assessment and advice** to assist with the management and remediation of land affected by previous urban uses.
- Design **restorative landscaping for strategic tourist areas**.
- Advise on the **creation of biodiversity corridors** and the attraction of pollinators, predators, and wildlife.
- Provide **interpretation of the landscape and its history** for educational and touristic purposes.
- Leverage existing collaborative relationships with other organisations to ensure **holistic and integrated approaches**. Anticipated partners include CPIT, Sustainable Living Education Trust, Greening the Rubble, Gap Filler, Lincoln University.

IMPLEMENTATION AND EVALUATION

Landcare Research endorses the proposal to use an 'Integrated Sustainability Assessment' (p14) to evaluate the outcomes achieved through implementation of the Plan. The natural and physical resource outcomes of projects in the Plan can be improved when they are coordinated and defined, in accordance with both the Resource Management Act and Local Government Act, in terms of their performance across all four wellbeings: cultural, social, environmental and economic sustainability.

Each of the projects in the Plan will have its own implementation and evaluation requirements and these will need to be set out in detail before the projects begin.

For example, central to implementation of the eco streets (p41) and green roofs (p42) projects will be the need to:

- Define 'levels of service' for natural urban waters in terms of all four wellbeings
- Fund the 'depreciation' of natural resources affected by urban drainage in order to ensure ongoing budget availability for asset inspection, maintenance and replacement
- Identify cost-benefit opportunities for replacement of existing undamaged built infrastructure by natural infrastructure, for example day-lighting or otherwise naturalising streams, or requiring the use of low impact measures, from rooftop down, in areas of growth or intensification, instead of installing new stormwater reticulation
- Set ambitious goals for regenerative and self-sustaining natural resources/assets with a minimal requirement for ongoing maintenance funding, as they get to the point where natural processes can take over.
- Use planning techniques such as integrated catchment plans, natural asset management plans, multi-criteria and life-cycle analysis and strategic policy evaluation.

A range of tools is available to assist with the implementation and evaluation needs of the projects in the plan, for example:

- Natural asset management plans provide for sophisticated identification of different aspects of levels of service for community wellbeing.
- Multi-criteria analysis is a tool that can include a wide range of stakeholders in decision-making around multiple (and very different) alternative options.
- Life-cycle analysis is the process of assessing the cost of an asset or activity through its life cycle from design to disposal.

Decisions around the costs of natural assets can be particularly complicated as some assets (such as lawns and specimen plants) require significant ongoing management, while others (for example natural areas and self-regenerating plants) require minimal human intervention. This distinction impacts on costs such as depreciation and therefore on the ability to use the Local Government Act to fund ongoing maintenance. The development of comprehensive implementation and evaluation plans, recognising the different characteristics of different assets and activities, will facilitate generation of the anticipated positive results for the City.

RECOMMENDATIONS

- Native and other plantings, stream banks and stormwater outfalls all need inspection and maintenance if they are to continue to meet urban drainage as well as other community outcomes.
- Implementation and monitoring plans should be devised prior to project commencement.
- The four wellbeings should be represented at the highest level in decision making about the City's future; expecting that social, ecological, and cultural concerns can be retrofitted into decisions is costly in terms of economics but also in terms of community goodwill that has been fostered in the process to date.
- Consider the balance and integration of natural and built infrastructure from a perspective of most effectively enhancing the four wellbeings.

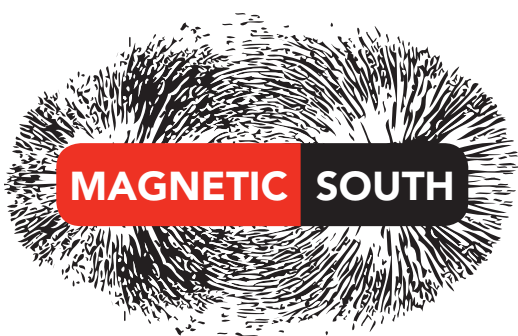
HOW LANDCARE RESEARCH COULD HELP

- Advise on **implementation and evaluation frameworks** appropriate to different activities and requirements.
- **Review of existing plans and policies** to ensure they support the Central City Plan.
- **Review of asset management plans** highlighting any required revisions.
- Assist with **assessing, and learning from, comparative approaches to local planning** from other New Zealand cities and overseas.

PUBLIC INVOLVEMENT

We support fostering the strong sense of place emphasised in the Plan. Key to success is building and maintaining social networks to ensure ongoing public commitment to the new vision for the City. This must extend beyond formal consultation so that communities have a long-term involvement in design, planning, implementation and review of the Central City development.

It is only by involving people through the whole project cycle (design, implementation, monitoring, and reviewing) that it becomes possible to draw on local knowledge, skills, and aspirations. This builds civic trust, and fosters the critical sense of place, collective ownership, and attachment that is essential for the Plan's long-term success. Overseas experts often provide fresh and interesting perspectives, but these should be integrated with the substantial knowledge, expertise and experience within the City, as well as the wider tertiary institutes, government departments and businesses of New Zealand. Alongside the sectors commonly perceived as having expert knowledge, a broad range of other stakeholders, including residents and community interest groups, need to be involved in decision-making processes. Success requires continuing community and stakeholder involvement (rather than consultation at key stages) and is likely to require an investment of significant time and resources. It is this investment, however, that will ensure that the complex long-term benefits of the projects outlined in the Plan include the integrated and effective City that the Plan envisions.



Magnetic South was an on online game exploring the future of Christchurch. This picture shows 'game guides' Bob Frame and Alison Greenaway (Landcare Research) and Stephanie Pride (StratEDGY Strategic Foresight) interacting with players through the online interface.

The community engagement that is required can be achieved in numerous ways and it will require the use of both new and established techniques. Christchurch City Council can demonstrate leadership following the huge success of 'Share-an-Idea', which introduced the use of social media into the public consultation phase. Further innovative developments, including the more interactive gaming technologies such as those piloted in Magnetic South (<http://magneticsouth.net.nz/>), will become commonplace over the recovery period. It will be important to integrate the different tools and techniques, and the ideas and contributions resulting from them, into cohesive and representative frameworks and strategies for the rebuild. The draft Plan is an excellent first step along this path.

Christchurch City Council has the opportunity, through its engagement of the public, to provide not just a Central City recovery of international renown but for the City to become known as the place that also developed the processes to make it happen.

RECOMMENDATIONS

- Strong community engagement in the redevelopment of the city will ensure ongoing public commitment to the new vision for the city.
- There is considerable research available on how to encourage and support community engagement and this should be used to inform each stage of the implementation of the Plan. Key features of successful engagements include that they are ongoing (rather than staccato incidents) and that they include a wide and relevant range of stakeholders.
- Christchurch has strong social capital, and a strong desire for engagement following the earthquakes, and these constitute an ideal foundation on which to build an example of global relevance.
- Willingness to be engaged can be expected to be quickly eroded if people begin to feel frustration at a lack of communication, or lack of responsiveness, from the agencies leading the engagement.
- New social media technologies can, in some circumstances, ease the traditional concerns that consultation is resource-intensive and expensive. A carefully managed mix of social media and more traditional techniques can be used to balance competing needs for width and depth of engagement.
- Use of MOU-based formal partnerships with interest groups can help to keep these groups engaged and in touch with progress, as well as helping to develop common goals and directions with them. These relationships must not, however, result in the exclusion of stakeholders who are not members of formal interest groups.

HOW LANDCARE RESEARCH COULD HELP

- Advise on **strategies and technologies for community engagement** and investment in social infrastructure, drawing on extensive research around public consultation processes relating to highly complex issues.
- **Provide analytical and integrative skills** to assist the Council in reaching decisions.
- **Monitor and evaluate social impacts** of infrastructure projects.



Exterior native living-wall, now relatively low maintenance except for irrigation and occasional stripping.

CONCLUDING REMARKS

Landcare Research's submission offers assistance in the areas where we are passionate and have expertise, experience and a track record – New Zealand's unique natural environment, its soils, plants and animals, catchment processes, environmental sociology and governance and sustainable business – and in ways that make best use of our independence and capability, that is, education, peer review and monitoring rather than contracting to design specific structures. We focus on how to help achieve the 'Green City', and in particular how the Avon River Park/Papawai Ōtakaro, eco streets and green roofs can enhance the rivers, urban ecosystems and healthy Central City communities. Our submission identifies roadblocks to adoption of 'green features' generally, and in Christchurch City, and how they have been overcome based on our low impact urban design and development research findings.

Landcare Research wishes to note that there will be a number of other science-based institutes and universities making submissions. The tight time frames of the Plan and submission process mean that Landcare Research's submission has not been coordinated with those of other agencies and it is likely that emphasis, and even the nature of recommendations, in the different submissions will vary. We propose that these differences should not be treated as contradictory but rather it should be acknowledged that they come from different disciplines and focuses of expertise. Establishment of a 'Christchurch City Plan Think Tank' involving the key science providers would allow the different experts to work together to devise solutions that are acceptable for all disciplines. This approach would lead to a high level of cooperation and unprecedented creativity in rebuilding the visionary City which we are united in seeking.

FOR FURTHER INFORMATION ON ANY OF THE CONTENT OF THIS SUBMISSION PLEASE CONTACT:

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