

appendices

APPENDIX I: SUPPORTING THE UNIVERSITY'S STRATEGIC IMPERATIVES

The Master Plan, as a strategic document, is intended to guide the direction of the University's campuses over the next 25 years. Therefore it is of fundamental importance that the Master Plan is aligned with, and supports, the University's overall strategic plan.

Strategic direction to 2012

The University of Otago's strategic plan, Strategic Direction to 2012, outlines the following Vision, Mission and Strategic Imperatives:

Vision

"A research-led University with an international reputation for excellence."

Mission

"The University of Otago will advance, preserve and promote knowledge, critical thinking and intellectual independence to enhance the understanding, development and well-being of individuals and society. It will achieve this by building on foundations of broad research and teaching capabilities, unique campus learning environments, its nationwide presence and mana, and international links. "

Strategic Imperatives

- Achieving research excellence
- Achieving excellence in research-informed teaching
- Ensuring outstanding campus environments and student experience
- Contributing to the national good and to international progress
- Strengthening external engagement
- Building and sustaining capability

Master Plan Strategic Brief

The Strategic Brief for the Master Plan identifies objectives for the Master Plan, derived from the University's strategic plan, and the outcomes of the stakeholder consultation that was conducted by the Master Plan consultant team.

The University's Strategic Plan, Strategic Direction to 2012, prescribes six strategic imperatives. These form the core of the Master Plan Strategic Brief, which defines the ways in which the campus, through its Master Plan, should be developed to support these Imperatives. The Master Plan Brief highlights the intent of each of the imperatives and proposes critical success factors for their achievement. These factors are then translated into key enablers that form the objectives for the Master Plan, synthesised from a range of sources including the University's strategic documents, consultation and engagement with internal and external stakeholders, and external benchmarking.

Imperative I:

ACHIEVE RESEARCH EXCELLENCE

In order to

- Attract and retain high-quality, research-active academic staff
- Attract academic staff beyond New Zealand
- Create a supportive environment for research students
- Increase the number of research students enrolling
- Maintain high-quality research infrastructure

Critical Success Factors

- The ability to attract and retain world-class researchers
- Reputation of the University and of its research personnel
- Quality and availability of accommodation – professional and personal
- Attractiveness of Dunedin
 - Lifestyle and vitality of the city
 - Family-friendly: safety, social networks, employment opportunities, education
 - Employment opportunities for family members
 - Retention of links with home city/country
 - International profile and accessibility of the city
- A culture of collegiality, support and collaboration
- Availability and calibre of research staff and postgraduate students
- Availability of appropriate accommodation, with capacity to respond quickly to new opportunities
- Technology, equipment and resources - quality and support
- Ready access to information and data
- Certainty in planning and management
- Funding, promotion, publication, visibility
- Linkages and partnerships

Key Enablers

- Work with the City to enhance Dunedin's reputation as a destination of choice for staff and students, particularly in the context of the "Otago experience".
- Provide multiple-use, flexible spaces that allow and encourage interaction across divisions and research disciplines. Where practicable, co-locate research activities to enact this, fostering interdisciplinary collaboration and encouraging resource sharing.
- Recognise the differing forms of research-laboratory-based, field-based, interactive, collaborative, individual study-and develop accommodation and technology strategies that support them.
- Configure circulation space to encourage ad hoc interaction between research staff.
- Establish funding priorities for research infrastructure (accommodation, technology, equipment), particularly in areas with intensive equipment utilisation.
- Increase the visibility of research facilities and research outcomes to undergraduate students and the wider community. Enable research buildings to be visible (both in location and event/exhibition spaces).
- Optimise the opportunities for the creation of research clusters within or between departments.
- Progressively implement and regularly update quality standards for research facilities, with an emphasis on purpose built, highly serviced buildings and flexible workspace linked to laboratory facilities.
- Achieve a balance between dedicated and shared facilities, including short-term space to provide decant, churn and "rapid response" capability.
- Regularly review space and facility allocations to ensure optimal utilisation.
- Establish standards for postgraduate spaces and access for external collaborators.
- Wherever possible optimise transparency and visibility of research functions.
- Provide for partner or industry participation through facility siting and access.

Imperative 2:

ACHIEVE EXCELLENCE IN RESEARCH INFORMED TEACHING

In order to

- Enhance research-teaching link at all student levels
- Lead in innovative delivery of research-informed teaching
- Support development of research-active academic staff
- Recruit a higher proportion of 'top calibre' entrants of postgraduate and research students
- Continue commitment to distance learning
- Balance the approach to the internationalisation of learning
- Enable ongoing development of e-learning capabilities

Critical Success Factors

- A learning environment focused on debate, discussion and interaction between teachers and students
- Visibility of research in the undergraduate teaching environment
- Continuous assessment and feedback on the effectiveness of teaching methods and outcomes
- Reinforcement of the role of the University Library in supporting teaching programmes
- Support, encouragement and promotion of innovation in teaching with appropriate infrastructure and training
- Integration of "e-learning" with mainstream teaching
- Support for group/peer based learning
- 'Postgraduate Experience' to attract and retain the next generation of teachers from the ranks of undergraduates – facilities, accommodation, integration, support, collegiality, opportunity, visibility

Key Enablers

- Recognise and support the different teaching requirements of the departments.
- Create Precinct hubs that provide a focus for academic departments, school administration, staff and student services and collaboration, and teaching and learning activities.
- Enable the transition from conventional spatial entitlement to 'un-owned' teaching spaces. Move or connect general teaching spaces to Precinct hubs, to provide easy access for staff and students.
- Provide a range of adaptable teaching spaces supporting varied modes of learning, and collaboration between academics and students. Support continued research into new pedagogies for the future of new interdisciplinary relationships e.g. inquiry-based learning. Maintain an active programme of innovation in teaching and learning space to enact this, including supporting technologies through the use of pilots and shared facilities. Focus on the provision of teaching infrastructure for the next generation of learners.
- Co-locate functions and create intuitive physical linkages between integrated lecture, collaborative and informal spaces. Integrate informal group study and collaboration space with formal teaching space to provide an holistic "learning landscape" of connected and complementary learning environments.
- Strategic location of the libraries to support Precinct- based, research-informed teaching. Incorporate library and student services and facilities in Precinct hubs. Recognise and support the changing nature of the services provided by the University's libraries.
- Continued refinement of effective and efficient timetabling and spatial analysis.
- Make teaching and learning spaces visible and transparent to imbue a sense of campus activity and vitality.
- Provide opportunities for socialisation and interaction between research and academic staff, postgraduate students and undergraduate students (but recognise the need for researchers to retreat from students as well).
- Provide appropriate accommodation for senior undergraduate and postgraduate students, co-located with academic staff.
- Facilitate multiple communication channels through technological infrastructure.
- Facilitate interdisciplinary relationships between departments through the centralised location of teaching and learning facilities.
- Seek opportunities to provide multi-disciplinary programmes (e.g. Neurosciences) with their own physical spaces.

Imperative 3:

ENSURE OUTSTANDING CAMPUS ENVIRONMENTS AND STUDENT EXPERIENCE

In order to

- Maintain and enhance the attractiveness and vibrancy of the University environment for students, their parents, future employees and the public.
- Invest in world-class facilities, buildings, landscape, equipment and IT infrastructure
- Foster an appropriate physical, social and cultural environment
- Reflect the special Otago learning experience in the qualities of graduates

Critical Success Factors

- Achievement of an urban, architectural and landscape language for the campus that activates and achieves cohesion of built and open space, reflects the history and culture of the University, and expresses its mission, diverse vitality and collegiality
- An attractive environment, noted for its beauty and popular appeal
- The strength and sense of purpose of the "University Community"
- The "Otago experience" for students (undergraduate, postgraduate, Māori and other cultures) as both positive and desirable
- Appropriate and accessible facilities
- Recognition and reconciliation of the interdependence of University and City
- Socialisation of the campus through the nature, location, quality and accessibility of facilities and services, including child care
- Recognition of the value of open space and its interconnection, to enhance the uniqueness of the campus
- Reconcile the cultural and physical landscapes to reinforce authenticity
- Integration of campus planning and management with that of the city
- Assurance of the integrity of the Master Plan over time in terms of both relevance and application
- On-campus activity and vitality over extended hours (nights and at week-ends)
- Integration of the campus with the city

Key Enablers

- Develop Master Plan strategies that encompass adjacent city Precincts but ensure that all core strategies are capable of being executed by the University.
- Promote design excellence in all campus development.
- Celebrate the historical significance and prestige of the oldest University in New Zealand.
- Celebrate the diverse cultures of the University staff and student community
- Create a campus spatial structure with visible, linked and accessible social hubs that promote interaction and interconnection of Precincts. Provide appropriate student retail facilities and amenities in strategic locations tailored to each Precinct.
- Develop strategies for on-campus retail, recreation and entertainment.
- Provide student service facilities clustered at both centralised and faculty-specific (Precinct) levels. Precinct-specific facilities to be "convenience"-based while centralised facilities to be destinational. It is important that these two categories of service be complementary rather than competing with each other.
- Create a hierarchy of circulation routes that are configured and designed to make wayfinding intuitive campus navigation safe and, where possible, weather-protected.
- Create the "24/7 campus" – managing extended hours of activities and establish safe 24/7 links between activated hubs.
- Activate key circulation by using transparency of functions and the co-location of people-generating activities to foster vitality and patronage.
- Exhibit a professional and welcoming feel through configuring public/ground floor plan functions and aesthetics.
- Develop strategies for vehicular and non-motorised transport and parking, to promote on-campus pedestrian use and safety and the optimisation of green space.
- Maintain and enhance existing 'green areas' and native garden/landscapes in public and the ground floor plane. Create usable and intuitive links between indoors and outdoors, with active outdoor spaces for both learning and socialisation, and outlook from internal spaces.
- Manifest the positive aspects of the "Otago Experience" for students and staff, particularly with reference to the residential Precincts adjacent the Campus. Work with the City and student representatives to develop sustainable strategies for the provision of good quality residential accommodation and Precincts. In so doing preserve the dynamic vitality and spontaneity of student life for which the University is known, but within appropriate boundaries of behaviour.
- Develop an effective and durable collaboration with the City to integrate campus planning and development with that of the adjacent Precincts and the city at large.

Imperative 4:

CONTRIBUTE TO THE NATIONAL GOOD AND TO INTERNATIONAL PROGRESS

In order to

- Embrace a role that contributes to regional and national good and the future direction of the country
- Encourage research that supports regional and national development
- Extend relationship with Māori (research collaboration, recruitment, retention and student achievement)
- Extend relationship with Pacific communities (research, collaboration, recruitment, retention and student achievement)
- Embrace a role as critic and conscience of society - ethically, socially and environmentally responsible

Critical Success Factors

- Linkage between community, schools, vocational and University education as an exemplar for holistic learning
- Further development of Dunedin and the University of Otago as a centre of excellence for research, innovation and the commercialisation of intellectual property
- Enrichment of the cultural diversity of the city and the region
- National exemplar in corporate, social and environmental sustainability
- National exemplar in tertiary education:
 - innovation in teaching and learning
 - unique campus experience
 - efficient utilisation of facilities and resources
 - application of technology in teaching and research
- International profile as a destination of choice for high-calibre students and staff
- Integration and celebration of Māori and Pacific communities in all aspects of the University's endeavour
- Linkages with developing countries

Key Enablers

- Ensure that the University's strengths and achievements are understood by successive governments, including education on international benchmarking and "best practice". Create and maintain effective communication channels in this regard.
- Establish continual involvement and contribution to the University by Alumni, through a valuable campus experience. Manifest the history and heritage of the University and the land on which it is situated.
- Continue to promote equality and awareness across all cultures of New Zealand. The Campus Master Plan shall respect and interpret Kai Tahu, regional and international cultures, through contemporary built and landscaped form.
- Utilise the campus environment and culture as tools to promote an international reputation for innovation, knowledge and leadership in research.
- Develop excellence and leadership in sustainability capabilities, research, practice and mandate, illustrated and reinforced through new campus developments.
- Explore opportunities for a "community of learning" that engages secondary, vocational and community schools and colleges to assist in the promotion of Dunedin as a national knowledge centre and educational "best practice" exemplar.
- Support open relationships through co-location of business and research ventures representing New Zealand's innovative industry advantage.
- Establish a programme of benchmarking against international best practice to inform ongoing campus development.

Imperative 5:

STRENGTHEN EXTERNAL ENGAGEMENT

In order to

- Build relationships with political, business, professional and community leaders
- Raise awareness of research capabilities and benefits of the Otago student experience
- Enhance entrepreneurial spirit in applied research and commercialisation
- Confirm the importance of the relationship between the University and the city

Critical Success Factors

- Promotion of the University as a resource and asset of the city and region
- Develop the role of the University in sponsoring, promoting, and generating innovation and entrepreneurial activity in the city
- Strong connection to central government
- Enhancement of the reputation of the University in the community, industry and business
- Creation of a community of learning that engages other educational institutions
- Contribution to the vitality of the city through:
 - on campus activities and events
 - use of University facilities
 - use of city facilities and resources by the University
 - integration of University planning with that of the city

Key Enablers

- Actively promote the University and the city to central government.
- Seek opportunities to integrate the University physically, intellectually, commercially and socially with the city to foster its growth and development.
- Make the invited community feel welcome and compelled to come into/travel through the University Precincts and through the active promotion of the campus as a city-wide resource.
- Create spaces and buildings that support collaborative and joint-venture initiatives.
- Provide lecture/seminar/event and other visible and accessible campus spaces for community use. Ensure these facilities are welcoming, with appropriate infrastructure, services and access.
- Locate public services and amenities e.g. retail, exhibition spaces, food and beverage facilities, indoor/outdoor spaces at ground floor level along major campus circulation routes to promote patronage over extended hours. Ensure that these services and amenities complement rather than compete with those of the wider city.
- Provide spaces, infrastructure and organisational capability for the staging of celebrations, exhibitions and events.
- Provide a hierarchy of public, invited, and private-access teaching, learning, and research spaces, to promote accessibility of facilities without affecting the need for security of workspace and research.
- Focus potential new site developments on furthering academic and teaching partnerships with neighbouring institutions, particularly the Otago Polytechnic and Dunedin Hospital.
- Integrate activities, circulation and invited spaces at Precinct edges with the surrounding urban area and community.
- Seek opportunities for the University to actively participate in or sponsor appropriate facility and service developments elsewhere in the city.
- Promote linkages with the major cultural institutions of Dunedin and the region.
- Promote the University's role in fostering sporting and cultural excellence.

Imperative 6:

BUILD AND SUSTAIN CAPABILITY

In order to

- Recognise the role that academic departments and other units play in sustaining Otago's capability as a vital and collegial University
- Ensure effectiveness and efficiency by minimising excessive bureaucracy in a participative and consultative approach to decision-making
- Invest in the staff technology and information technology required to achieve excellence
- Continue to nurture entrepreneurial and enterprise-based activities of the University
- Scrutinise structures and processes internally as well as the external obligations placed on the University by government or professional bodies
- Sustain the University as a vibrant and diverse community to both professional and academic callings and also the development of the wider University organisation

Critical Success Factors

- A cohesive, engaged, committed, loyal University community
- A culture of enquiry, constructive debate and innovation
- Recognition of the importance of the role of the departments as centres of academic vitality
- Interdisciplinary collaboration and interaction
- Attraction and retention of quality staff
- Effective, strategically-aligned decision-making
- Performance-based management
- Integrated people, process and place strategies
- Efficiency in the utilisation of space, equipment and resources
- Effective and sustainable facility management and maintenance
- Streamlined and efficient administration
- Strong support from government, industry, the city and its community

Key Enablers

- Ensure future projects and developments are evaluated according to University Critical Space Plan, Precinct Master Plans, Campus Master Plan Objectives and the Memorandum of Understanding between the University of Otago, Ngai Tahu and the Treaty of Waitangi.
- Nurture open partnerships for equality and an inclusive decision-making process between indigenous, internal and external stakeholders.
- Ensure new developments are integrated into the campus aesthetic and urban context.
- Establish protocols for continued management and rehabilitation of heritage buildings.
- Develop value-added partnerships with external government and industry bodies that have a sustainable outlook on research and development.
- Create a vibrant learning, working and research environment that will attract and retain promising undergraduate students, key academics and members of staff.
- Acquire and dispose of properties as appropriate, to create more contiguous University Precincts.
- Consolidate spatially-fragmented departments and schools.
- Create a sense of team and community in each Precinct that fosters mutual support and interest.
- Develop policies for redefining space ownership, timetabling and tenancy to facilitate flexibility, to accommodate emerging demand and to optimise utilisation.
- Regularly review space allocation to ensure that priority linkages between functions are being achieved.
- Ensure the quality of use of heritage buildings is optimised.

APPENDIX 2: SUSTAINABILITY FRAMEWORK

Sustainable Buildings, Campus, Tertiary Precinct and City

The Master Plan provides the opportunity to encourage a new sustainable development paradigm for the University which will provide environmental sustainability by:

- Reducing energy consumption and greenhouse gas emissions;
- Encouraging less reliance on private motor vehicles by promoting alternatives such as walking, cycling and the use of public transport;
- Conserving water;
- Providing appropriate land use on campus;
- Enhancing the landscape and ecology of the campus ;
- Adopting socially and environmentally friendly materials;
- Reducing waste and encouraging recycling during demolition, construction and operation;
- Reinforcing the sense of place and cultural landscape of the University; and
- Facilitating sustainable growth and development and provide an improved social and economic return from land and buildings to the University.

The table overleaf summarises the main sustainability drivers for the Master Plan for buildings, the campus, North Dunedin and the city.

The benefits of developing a sustainable campus are many and include:

- Sustainable facilitation of student growth rate
- Increased sense of place – collegiality, relationship with city, living and learning, tradition
- Future-proofing of the campus asset base
- Improved staff and student satisfaction due to improvements in campus environment, connectivity, amenity and teaching environment
- Increased utilisation of existing and new buildings due to rationalisation of space
- Reduced occupancy costs (space, energy, water and maintenance costs)
- Alignment with University's sustainability goals
- Marketing and branding advantage as 'green' University in comparison with peers
- Increasing the campus ecological capital
- Carbon mitigation or immunity.



Microbiology Building upgrade



Master Plan Sustainability Drivers

	BUILDINGS	CAMPUS	NORTH DUNEDIN TERTIARY SECTOR	DUNEDIN CITY
STEWARDSHIP	<ul style="list-style-type: none"> • Future-proof asset base • Set up sustainability fund for upgrading buildings 	<ul style="list-style-type: none"> • Nurture a culture of environmental sustainability • Maintain sense of place and the Otago experience • Maintain/ enhance the cultural landscape 	<ul style="list-style-type: none"> • Encourage a healthy and sustainable tertiary sector • Support DCC star rating scheme for student accommodation. 	<ul style="list-style-type: none"> • Join up contributions to quality – design, planning, transport, urban management • Develop the concept of a ‘sustainable learning city’ • Remove barriers to accessibility
RESOURCE EFFICIENCY	<ul style="list-style-type: none"> • Use bioclimatic design principles • Limit extent of air conditioning • Use sustainable materials and procurement strategies. 	<ul style="list-style-type: none"> • Campus layout to allow sun penetration • Design for walking & cycling • Campus to reduce vehicle speeds and restrict vehicle circulation • Design campus spaces that reduce wind speeds and enhance microclimate • Use local natural materials 	<ul style="list-style-type: none"> • Reduced parking standards • Provide local access to public transport 	<ul style="list-style-type: none"> • Integrate travel modes and connect route networks • Invest in public transport infrastructure(ORC) • Improve commercial waste recycling facilities of city
HUMAN NEEDS	<ul style="list-style-type: none"> • Design to human scale • Design visually interesting buildings 	<ul style="list-style-type: none"> • Provide high quality public spaces • Combat crime through space design and management • Enhance safety by reducing pedestrian/vehicle conflict • Design for social interaction 	<ul style="list-style-type: none"> • Design visually interesting networks of space • Enhance legibility through landmarks and space disposition • Socially mix communities 	<ul style="list-style-type: none"> • Enhance legibility through sector identity and disposition • Build city image to foster sense of belonging
RESILIENCE	<ul style="list-style-type: none"> • Build extendable buildings • Build adaptable buildings • Build to last • Build using durable materials 	<ul style="list-style-type: none"> • Design robust spaces usable for many functions • Design spaces to accommodate above and below ground infrastructure requirements • Design serviceable spaces and buildings 	<ul style="list-style-type: none"> • Design robust urban block layouts 	<ul style="list-style-type: none"> • Build robust infrastructure to last and adapt • Recognize changing patterns of living and work
POLLUTION REDUCTION	<ul style="list-style-type: none"> • Re-use, recycle & treat stormwater 	<ul style="list-style-type: none"> • Reduce hard surfaces and run-off • Design-in recycling facilities • Give priority to transport modes other than cars 	<ul style="list-style-type: none"> • Plant trees to reduce pollution 	<ul style="list-style-type: none"> • Challenge solutions to water and sewerage disposal • Control private transport use and accessibility • Clean and constantly maintain city
CONCENTRATION	<ul style="list-style-type: none"> • Design compact and open building forms • Consider high buildings where appropriate 	<ul style="list-style-type: none"> • Reduce space given over to roads • Reduce space given over to car parking • Increase vitality through activity concentration and active ground floors. 	<ul style="list-style-type: none"> • Intensify around main transport routes (Albany and Clyde Streets) • Raise density standards and avoid low density building 	<ul style="list-style-type: none"> • Enforce urban containment and reduce expansion • Intensify along transport corridors • Link centres of high activity

	BUILDINGS	CAMPUS	NORTH DUNEDIN TERTIARY SECTOR	DUNEDIN CITY
<i>DISTINCTIVENESS</i>	<ul style="list-style-type: none"> • Reflect surrounding architectural character in design • Enhance locally distinctive building settings • Retain culturally important buildings 	<ul style="list-style-type: none"> • Reflect urban form, townscape and site character in design • Retain distinctive site features • Design for sense of place – local distinctiveness • Retain important building groups and spaces 	<ul style="list-style-type: none"> • Reflect spatial patterns and cultural landscapes • Identify and reflect significant public associations • Consider sector uses and qualities 	<ul style="list-style-type: none"> • Protect any positive regional identity and landscape character • Utilise topographical setting • Preserve archaeological inheritance
<i>BIOTIC SUPPORT</i>	<ul style="list-style-type: none"> • Provide opportunities for greening buildings including green roofs and walls • Consider building habitats 	<ul style="list-style-type: none"> • Maintain/enhance site ecologies • Plant/renew street trees and riparian strips • Design in robust soft landscaping 	<ul style="list-style-type: none"> • Provide minimum public open space standards • Encourage private open space • Create new or enhanced existing habitats • Respect natural features 	<ul style="list-style-type: none"> • Link public and private open space into a network • Green urban fringe locations • Integrate town and country by maintaining integrity of Town Belt • Support indigenous species
<i>SELF SUFFICIENCY</i>	<ul style="list-style-type: none"> • Provide edible landscaping elements • Provide bicycle storage for staff and wireless networks • Provide rain water harvesting 	<ul style="list-style-type: none"> • Encourage self policing through design • Provide bicycle parking facilities for students • Provide central composting facility • Reduce fossil fuel dependence and increase renewable energy supply 	<ul style="list-style-type: none"> • Build a sense of community • Involve community in decision making 	<ul style="list-style-type: none"> • Encourage environmental literacy through example and promotion • Consultation and participation in vision making and design

Implementation

An Environmental Sustainability Advisory Committee has been formed by the University to develop, review and recommend policies for the implementation of environmental sustainability practices across the University. While it is still establishing its terms of reference, the Working Party that was formed prior to the Committee's establishment recommended that the following guiding principles should be adopted:

- The development of policy and practices that promote environmental sustainability on the University of Otago campuses;
- The development, implementation and monitoring of policies and practices that nurture a culture of environmental sustainability on University of Otago campuses
- Promoting the development and maintenance of the University's campuses, facilities and services so that they embody the principles of environmental sustainability and foster high quality stewardship of the social, economic, cultural and physical environment in which the University operates;

- Promoting environmental sustainability in the policies and practices that pertain to all aspects of the carrying out of the University's research;
- Encouraging the incorporation of sustainability perspectives into appropriate areas of the University's teaching activities, to enhance students' ability to evaluate environmental sustainability issues critically;
- Promoting the principles of environmental sustainability in the practice of the University's community service and outreach

The Master Plan identifies opportunities for sustainable development of the campus by a combination of:

- Improving the efficiency and effectiveness of existing landscape, thoroughfares and building space utilisation;
- Reviewing the existing building stock and identifying opportunities for reconfiguration, upgrading and replacement;
- Identifying on and off-campus development site opportunities, for new academic space and student accommodation.

The main issue for sustainability, associated with this growth and development strategy, is how to comprehensively upgrade the environmental performance of the existing building stock as part of this process.

The first stage has been to identify those buildings with good “bones” (structure, floor plate size and configuration, adequate access for both people and services, standard of repair), worth keeping from a functional point of view and with the potential to upgrade. Those buildings that do not meet these criteria should be demolished and replaced with new buildings at an appropriate time.

For existing buildings that are considered worth keeping, sustainability should be improved incrementally on a life-cycle basis. Interior upgrades of lighting, controls, computers and equipment would be undertaken on a short term fit-out frequency. HVAC would be upgraded on a medium term services refurbishment frequency. Building fabric would be upgraded on a longer-term building upgrade frequency.

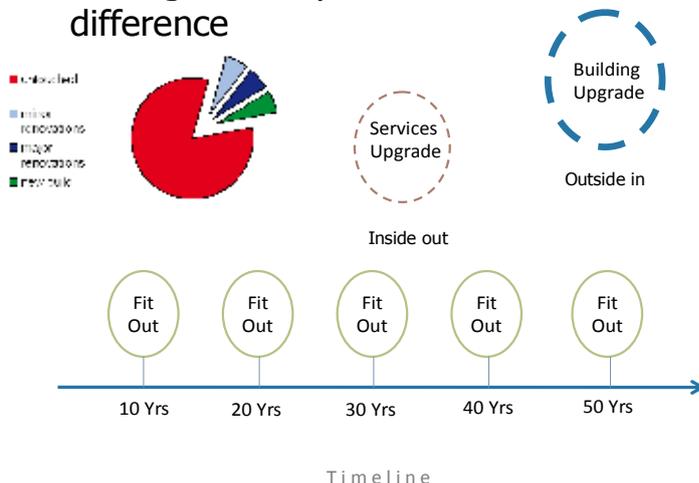
Numerous studies have shown that a high level of investment in sustainability is generally returned in 5-10 years. One possibility to assist in the implementation of sustainability across the University would be to set up a campus Sustainability Loan Fund. This could be used to fund sustainability initiatives, with capital repayment by way of operating cost savings. This is similar in principle to the New Zealand Government’s EECA Crown Energy Efficiency Loan Scheme. Harvard University has a \$12m (US) Green campus Loan Fund which is repaid by initiatives with a 5-year payback for existing buildings and 10 years for new buildings. It provided a 23% return on investment in 2007. The EECA loan scheme provides a similar return. Sustainability could be targeted specifically for potential endowment to the University.

Energy

Energy supply (and associated greenhouse gas emissions) is the most important environmental sustainability issue for the University. It is related specifically to the University’s built environment and hence directly to the Master Plan. A number of potential energy supply strategies have been considered by the Master Plan, as follows.

- If the University continues to obtain coal-fired heat supply from Energy for Industry and the Otago Polytechnic it should work in partnership with them to implement a future changeover to carbon-neutral fuels such as forest residues.
- Alternatively it could consider its own stand-alone or local area, University-district heating schemes with more efficient plant/systems and low or zero-carbon fuels. These would be located in the Health Sciences Precinct, Main campus, College of Education and University Plaza/East campus.
- Given New Zealand’s move towards 100% carbon-neutral electricity perhaps within the currency of the proposed Master Plan, it is not sensible or economic to move towards local renewable electricity generation on campus. However, small-scale demonstration of solar water heating, bio-fuelled combined heat and power generation plant and a grid-tied photovoltaic system serving the campus external lighting could be considered in the Sciences Precinct, where they could also have a potential educational benefit.
- The sustainability and energy efficiency of the vast majority of the University’s existing buildings should be upgraded progressively on a life cycle basis as fit-outs, refurbishments and major upgrades happen over the currency of the Master Plan.

Making a Life Cycle difference



- For new buildings a very high standard of energy efficiency and bioclimatic design should be included in the brief.
- Further BMS development, metering and additional staffing should be considered to increase the energy management and sustainability potential of property services. e.g. a Sustainability Coordinator.
- The Master Plan should be used as a catalyst for improving student and staff behaviours by raising the profile of energy use, demonstrating energy technologies, expanding energy related courses and research, and publishing and reporting energy performance against increasingly stringent benchmarks.
- Having an energy-efficient and potentially carbon-neutral campus might only be considered as a partial consideration, as it does not address the energy used in accommodating students. The University has influence over a number of University colleges although perhaps less so with the affiliated colleges. Private landlords also contribute to student accommodation. The Government's home insulation package, if it continues to be available, could be used as a joint catalyst by the University and private landlords to upgrade the thermal insulation standards of poorer student accommodation. This is consistent with the University's own research on the effects of better insulation on health with upgrading leading to more sustainable, affordable and healthy student accommodation. Also the proposed DCC student accommodation star rating energy efficiency.



Water

Per capita water use in Dunedin is the highest in New Zealand and the University represents a significant water demand for the City to supply. Although water is currently cheap it is likely to increase in price as demand increases and supply becomes scarcer due to the drying effects of climate change along the east coast of the South Island. It therefore makes sense to invest in water conserving technologies. Water efficient design features for new and existing buildings should include:

- Retro-fitting of best practice 4/5/6-star flow restrictors and low flow-sanitary appliances to conserve water;
- Consideration of rainwater harvesting for new buildings or upgraded existing buildings, to supply 70% of the predicted demand for non-potable toilet flushing. A central campus rainwater system could potentially be incorporated as part of the proposed flood protection works to the Leith in conjunction with any necessary rationalisation of the existing untreated storm water discharges into the stream.

- Install building-by-building water meters to record, inform and actively manage water usage.
- Testing for any leakage from campus water supply reticulation.



Transport

The Master Plan encourages a range of sustainable transport choices including walking, cycling, skateboarding, public and private transport modes which reduce reliance on private vehicle use to and from the campus.

- Maintain the existing high use of walking to the University by students and staff by maintaining a living and learning campus.
- Implement cycle routes across campus and links to existing/proposed city-wide cycle ways. Encourage ORC to trial bus-mounted bike racks for students and staff living remotely from the campus. Provide secure bicycle facilities across campus.
- Reduce single-occupancy vehicles by encouraging car pooling – ‘Scarfie Ride Share’. Also link to existing Park and Ride facility.
- Encourage greater use of public transport by developing covered bus hubs in Albany Street and Clyde Street. Work with ORC to improve regularity of off-peak servicing to satellite areas e.g. West Harbour, Otago Peninsula, Waitati and Mosgiel specifically. Encourage a review of existing bus services in terms of timetabling and user demand/capacity.
- Reduce the extent of car-parking in real terms across the campus progressively.



Waste

Waste and rubbish is a significant and unsightly issue for the University and North Dunedin. The University entered into new waste management contracts for waste collection and recycling in February 2009.



- Properly designed and accessible storage spaces and containers should be integrated into the design of the buildings and the campus for operational waste and recycling. Existing servicing arrangements to the campus should also be reviewed.
- Open space recycling facilities should also be provided around the campus, particularly at hubs such as the Union/ISB.
- Composting of organic waste from the University Union, Staff Club, colleges and other food outlets by a central hot rot box or vertical composting unit could also form an integral part of the waste management facilities.
- At the time of writing this report the University is in the process of completing a biological waste management plan and is working on chemical and radiation waste management plans. It is likely that there will also be a clinical waste management plan. The plans and waste guidelines are in use by the majority of applicable departments.
- Demolition and construction waste streams, as part of any campus growth building strategy, should also be minimised by following REBRI guidelines. A target of 70% recycling or re-use by weight should be set for all new projects. This approach is currently being trialled in the construction of the Psychology 3 Building.

Materials and Procurement

The extraction and manufacture of building materials can have a significant upstream effect on the environment. A comprehensive approach should therefore be taken to materials specification for any site-works associated with the Campus Master Plan, as follows.

- Existing mature landscaping should be retained where appropriate. Particular consideration should be given to new riparian planting alongside the lower reaches of the Leith where possible. New planting should be selected to encourage native birds.
- Where appropriate, topsoil should be stored on or off site for re-use in the final landscaping.
- New planting should be pre-grown and sourced locally.
- Organically-based products should be used in preference to synthetic fertilizers, herbicides and pesticides.
- Re-processed broken glass should be used for base-course for pathways/tracks and for back-filling for services trenching.
- Eco-friendly timber or timber substitutes should be used for decking and outdoor furniture.
- New Zealand-grown plantation timber from local forestry estates or sawmills (pine, macrocarpa and eucalyptus) should be used. Alternatively, recycled timber from demolition sites and reclamation yards;
- Exterior timber surfaces should be stained or painted using non toxic environmentally-friendly bio-paints.
- Timber woodchip mulches should be used to reduce water losses and to enhance plant survival during establishment.
- The need for retaining walls should be avoided where possible. Erosion control of slopes, if it can be carried out effectively, is likely to have significantly less environmental impact. The simplest and most common form of erosion control is battering and the use of planting. In steeper situations, crib and stepped walling constructions offer the opportunity to increase the amount of natural planting.
- Where appropriate, locally-sourced stone (e.g. basalt and Oamaru stone) should be used and aggregates for cast and precast concrete and paving.
- Concrete manufactured from cement with a recycled component can reduce the embodied energy of concrete. The use of locally-sourced sand and backfill materials will reduce the transport energy required to

move these bulky materials.

- The use of porous paving systems linked to tree-pits can be used to reduce stormwater run-off in an urban location such as the campus. Alternatively, if space permits, the use of landscaped stormwater swales(?) and rain gardens are an excellent way of increasing site biodiversity, while at the same time filtering and reducing stormwater.
- Products should be selected that contain recycled material wherever possible. Concrete pavers can be manufactured using chopped plastic or recycled crushed glass as an aggregate.
- A number of manufacturers are now making speed



bumps, seating, tables and wheel stops from recycled plastics and rubber.

The University either as a large institution has significant purchasing power which could be used to stimulate its suppliers to produce more sustainable products and services. Any approach to sustainable procurement by the University should consider:

- Strategies to avoid unnecessary consumption and manage demand;
- In the context of whole-of-life value for money, the selection of products and services which have lower operating costs and environmental impacts across their life cycle compared with competing products and services;
- Support for suppliers who adopt socially responsible and ethical practices e.g. Fair Trade.

APPENDIX 3: TEACHING AND LEARNING SPACE PRINCIPLES

Capacity

The Dunedin campus currently provides approximately 15,000 Teaching and Learning (T and L) “seats”, equal to the number of undergraduate and higher degree by coursework EFTS. While the availability of teaching spaces was not raised as a particular issue during stakeholder consultation, it is assumed that the current overall capacity is satisfactory and recommended that this seat: student ratio be preserved in forward planning.

The current spread of room capacities has not been analysed and this may be an area in which the University should undertake further study. Certainly it would seem from the summary table below that the number of mid-size rooms is disproportionately low and this could be addressed in the sizing of new facilities. However this needs

Room Capacity (seats)	Number of Rooms
500+	1
400-500	1
300-400	2
200-300	6
150-200	4
100-150	12
60-100	20
30-60	93
20-30	93
Sub 20	133
Total Seats	15,082

to be verified against current and projected enrolments and class sizes.

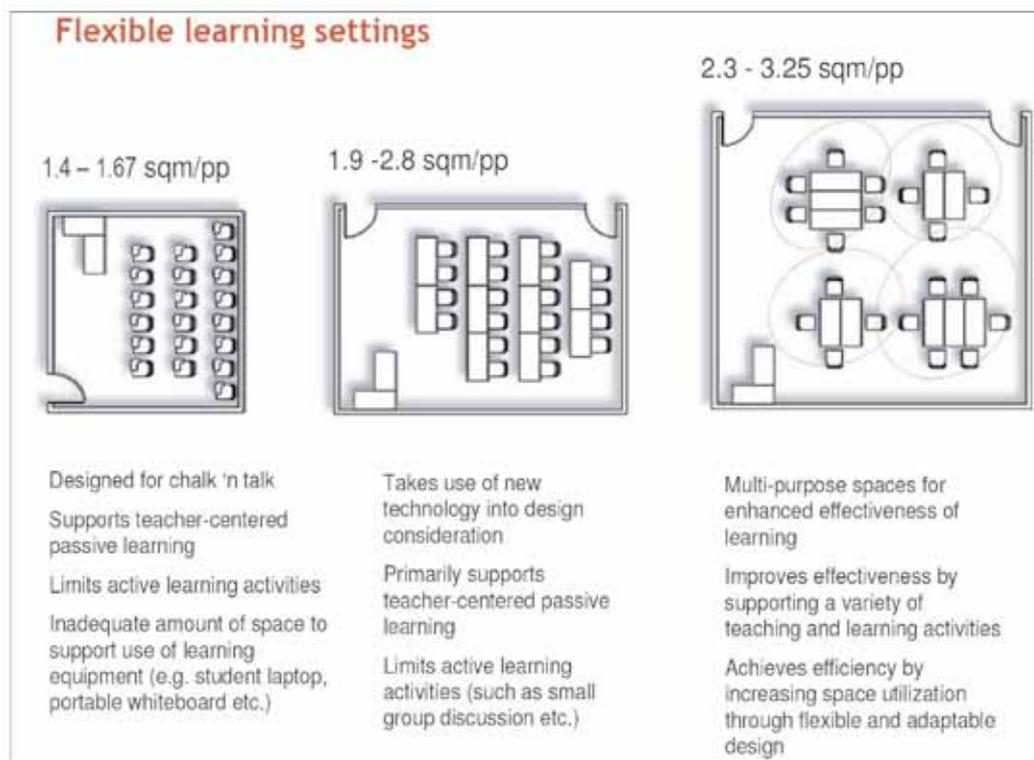
Additional/new capacity

If the recommendations of the Master Plan with respect to the College of Education and the Archway Lecture Theatres are adopted, new teaching and learning spaces will be needed to replace the 1,460 T and L seats currently provided within those facilities. In addition, the 4000 additional undergraduate and higher degree students that are envisaged under the Master Plan scenario would generate a requirement for a corresponding number of additional T and L seats. Hence a total of 5,460 T and L seats could be estimated to be required over the life of the Master Plan.

Location and management of T and L spaces

A number of design principles are recommended for the provision of new T and L spaces.

1. The current percentage of department-embedded T and L spaces of 40% of total capacity should be set as a maximum.
2. The new facilities should be provided within Precinct hubs or centrally, with smaller spaces (100p and under) located within the Precincts and larger spaces located centrally.
3. All new T and L spaces should be managed centrally and located at or near ground floor to facilitate access, including those that are embedded in departments.
4. Departmentally-controlled T and L spaces should be moved onto the central booking system over time, except where such spaces are unique to a particular department and inappropriate for use by others.
5. On-site management of flexible T and L spaces should be provided to facilitate class changeovers.



Configuration of T and L spaces

It is recommended that a menu of alternate T and L space configurations be developed by the University in consultation with the HEDC and the Departments. Any new T and L spaces should be designed to expand the choice of pedagogical settings. This menu should be the subject of ongoing review and development to factor in new pedagogies and technologies as they emerge.

It should also be noted that it is envisaged that the size of such rooms, relative to their seating capacity, will be significantly higher than is currently scheduled. Whereas room capacity for spaces in excess of 35 sq.m. is currently assessed at 1.4 sq.m / seat, it is likely that new settings may be up to three times that amount (i.e. up to 4sq.m / seat).

Informal T and L space

All formal T and L spaces should be supported with adjacent informal T and L space to facilitate before and after-class discussion and debate. As a general allowance, it is recommended that an assignable area of a minimum of 50% of in formal T and L floor area (excluding circulation space) be provided adjacent to and immediately accessible from that formal T and L space.

APPENDIX 4: WORKPLACE PRINCIPLES

Of all the space provided within the University campus, workplace - academic, research and administrative - forms the largest component. Across the campus there currently exists a huge diversity in the quality, quantity and allocation of such space. A building's attributes (shape, size, column placement, etc), its internal layout, the technology provided, and space management practices are primary shapers of the workplace.

The majority of academic workplace in departments on campus is configured as individual and shared offices. The amount of space allocated to individuals varies but a typical approach is one of reflecting seniority in the academic community. Due to space shortages, research students, part-time lecturers, and research-only staff are often left with an inadequate quality and quantity of space.

Administrative staff are generally located in open-plan areas or shared offices, with a more equitable provision of space. There are, however, instances where administrative staff as well as academic staff have been located in the basements of buildings with inadequate access to natural light.

There is very little space dedicated for communal purposes – where staff and research students can go to socialise, interact and share ideas and knowledge.

Future directions for workplace accommodation

The future of the University of Otago is focused on research and research-led teaching. It is therefore vital that its workplaces provide an environment that supports the scholarship and collaboration of its academics, researchers and students. It is important to recognise that work styles vary considerably within and across departments and administrative units – one size does not fit all. The workplace therefore needs to be flexible and have an inherent agility to adapt to changing needs and demands.

Two strategies are proposed to provide such flexibility. The first is a shift from entitlement to activity-based workplace which allows the unique needs of different work styles to be better supported. The second is a smaller, individual workspace footprint which would allow for a much greater amount of shared space and a richer diversity of support settings. It would allow postgraduate accommodation to be significantly improved.

Workplace models

It is recommended that the University formalise a workplace strategy with the objective of creating a uniform standard of high quality workspace, that is flexible, offers

choice of work environment, supports individual work but also encourages interaction and collaboration and that is cost-effective to construct and adapt over time. The following design principles should be considered in this regard:

Workplace design principles

Multiple work settings

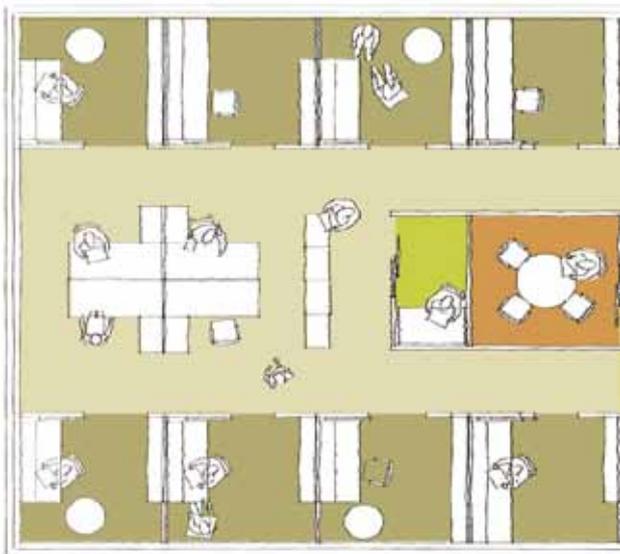
The current workplace model is based almost entirely on individual work space, with very little provision for collaborative or informal interaction space. Furthermore, people who work in the open, or who share an office, have nowhere to go if they need to concentrate or have confidential discussions. These issues should be addressed through the introduction of the concept of “multiple work settings” whereby, in addition to the space allocated to individuals, there are communal or shared work settings designed to support these activities. These should be achieved by making individual space more efficient, to yield space savings to redeploy for these new settings.

A standardised planning module

A standard workplace module is important in ensuring flexibility and interchangeability of uses over time. A 1.5-metre module is recommended as a proven standard that provides suitable dimensions for both workplace and teaching and learning spaces.

Indoor environmental quality

A good indoor environment quality is important in allowing staff and students to be productive in their work and research. All staff and research students should be provided with a safe and healthy workplace that provides equitable access to natural light, good air quality and ventilation, and adequate heating in winter. Adoption of this approach would result in buildings with relatively narrow floor plates and a high degree of internal transparency. Combining this with the recommendation for modularity would result in a strategy based on buildings with floorplates that are typically 12 metres or 15 metres wide – a multiple of 1.5 metres. Buildings of this width are able to provide excellent access to natural light. In a workplace scenario they can accommodate open-plan or perimeter offices with central corridors and collaborative/activity zone. Alternatively in a teaching and learning scenario they can accommodate two smaller rooms with a central corridor, or a larger room with perimeter corridor/informal learning zone.



Migration to a single standard office size to allow flexibility

It is recommended that a single standard office size of 9m² be adapted over time. This presumes migration to an activity-based workplace where meetings and collaboration are accommodated in shared, purpose-designed spaces. A common module of 9m² for an office allows the flexibility for staff to be moved around as appropriate, or the interchangeability to adapt the space to a four-person meeting room, or two-person study alcove as needs and the profile of a department change.

Provision of appropriate accommodation for research staff and postgraduate students

New standards require write-up space to be located outside the laboratory and this has generated the need for workspace that previously did not exist. Furthermore, most departments prefer their postgraduate students to be integrated within the department by allocating study space to them. This has placed significant pressure on departmental accommodation and in many instances has resulted in research staff being accommodated wherever space could be found, regardless of size and quality. For a University that is focused on research and research-informed teaching, this approach is not sustainable. Accordingly the workplace standards should prescribe a level of accommodation for postgraduate students and research staff that provides sufficient space to work, access to acoustically-shielded space in which to concentrate and library facilities.



Co-locate departments with synergies

Where there are synergies between departments, co-location would allow better opportunity for academic and research staff to collaborate and work on joint projects. Co-location also has the potential to allow economies of scale that would make specialist research equipment and facilities more affordable and accessible.

APPENDIX 5: PEDESTRIAN AND VEHICULAR ANALYSIS

Prepared by Space Syntax

Introduction

Successful University development relies fundamentally on high levels of pedestrian movement to generate collegiate social cohesion, economic vitality and public safety. This Report provides objective advice on how an efficient pedestrian movement infrastructure would maximise social and economic value.

Developments that rely only on locating new facilities as "attractor destinations" tend not to achieve their desired potential. Working closely with DEGW, Space Syntax helped strategically design an intelligible movement infrastructure for the University where new "attractor buildings" would work productively as part of an integrated urban layout to improve the campus's overall functional performance.

The key features of the proposed pedestrian infrastructure are:

- strategic accessibility that integrates local and global movement across the University with the surrounding city;
- increased pedestrian route choice; and
- strategic through-block routes.

Efficient pedestrian movement infrastructures work best when pedestrians have a safe, easily navigable, combined network of street paths and public spaces to improve their ability to move about on foot. The vehicle infrastructure of cycling and trafficable streets, together with the public transport system, help deliver pedestrians from afar who do not live within a walkable distance in the local urban area.

The pedestrian, cycling, vehicle and public transport movement infrastructures should work together to produce the desired successful land use outcomes for the University.

Benefits

A greatly improved pedestrian movement infrastructure will generate:

- a) Social cohesion: more opportunities for people to meet other people in the public realm for improved knowledge exchange and social interaction,

- b) Economic viability: more people use more facilities which increases economic return by attracting even more diverse facilities
- c) Public safety: more people see other people owing to increased pedestrian activity in public spaces and in streets which improves the natural surveillance of the public realm.

Public Space and Street Use

Space Syntax's research shows the primary influences on pedestrian activity and public space use are:

1. Good accessibility from the surrounding urban area - successful public spaces are located at strategic points in the pedestrian movement infrastructure (such as at the intersections of important pedestrian routes);
2. Proximity to high levels of pedestrian movement - good public spaces are located close to the routes with high levels of pedestrian movement;
3. Movement routes pass through the body of the space - to achieve good levels of use, it is important that the routes bring pedestrian movement from several directions through the heart of the space, and do not just skirt around the edges;
4. Multi-directional views into the surrounding urban area - people are more likely to use public spaces or squares where they can see where they are going and feel safe. Similarly, people prefer to stay where they have good visibility from within a public space into the surrounding areas;
5. Adjacency of "live-uses" - some land uses such as specialised retail and catering attract activity over the effects of spatial layout, and contribute to the natural surveillance of public space by providing increased co-presence of pedestrians.

Pedestrian Route Choice

Space Syntax's empirical research across the world has shown that pedestrians exhibit a number of spatially-related tendencies that affect pedestrian route choice decisions.

Most people, most of the time will:

- use public spaces that lie on the most simple path towards their seen or unseen destination; select the longest direct leg early in a journey when faced with route choice options;
- minimise directional changes along a journey to avoid back-tracking;

- select spaces that offer natural surveillance / deterrence, such as those with active frontages and clear indications of land use and ownership;
- select routes which allow them to link routes into “chain” destinations, to facilitate multi-purpose journeys.

Multiplying all these other factors, as well as having the presence of other people along routes or in spaces, will greatly affect route choice preferences. Strategic design maximises these preferences in pedestrian infrastructures, then spatially integrates them with cycling, vehicle and public transport infrastructures.

The movement infrastructure of a city is composed of its pedestrian, cycling, vehicle and public transport networks. To investigate the movement infrastructure for the University of Otago, the urban layout was analysed to a distance of 3 kilometres from the site. The 28 km² area shows all the routes (pedestrian, cycling or vehicle) within the University site and those that extend more widely into the surrounding urban environment of Dunedin.

Space Syntax's methodology analyses the configuration of urban layout to determine route choice strategies and preferences for pedestrians, cyclists and vehicles, and then simulates these journeys.

The models are constructed as accurate scale maps, by drawing the longest and fewest straight lines (routes), or “lines of sight and movement” that pass through all public spaces and streets in a selected urban area. The resulting pattern of intersecting lines is then digitised and inter-relationships among the lines (route choices) are analysed using a bespoke software package.

Spatial accessibility values are assigned to each line reflects the complexity of routes from that line to all the others within the network. This complexity influences movement in two ways. The combination of “to” and “through” movement makes spatial accessibility values a significant measure to estimate movement potentials whether pedestrian, cycling, vehicular or public transport.

The spatial accessibility models are understood as a map of lines of potential movement that can be quantitatively analysed. Spatial accessibility values are gained by calculating the likelihood that each line or route (in this case 2,100) is used to reach every other line in the network.

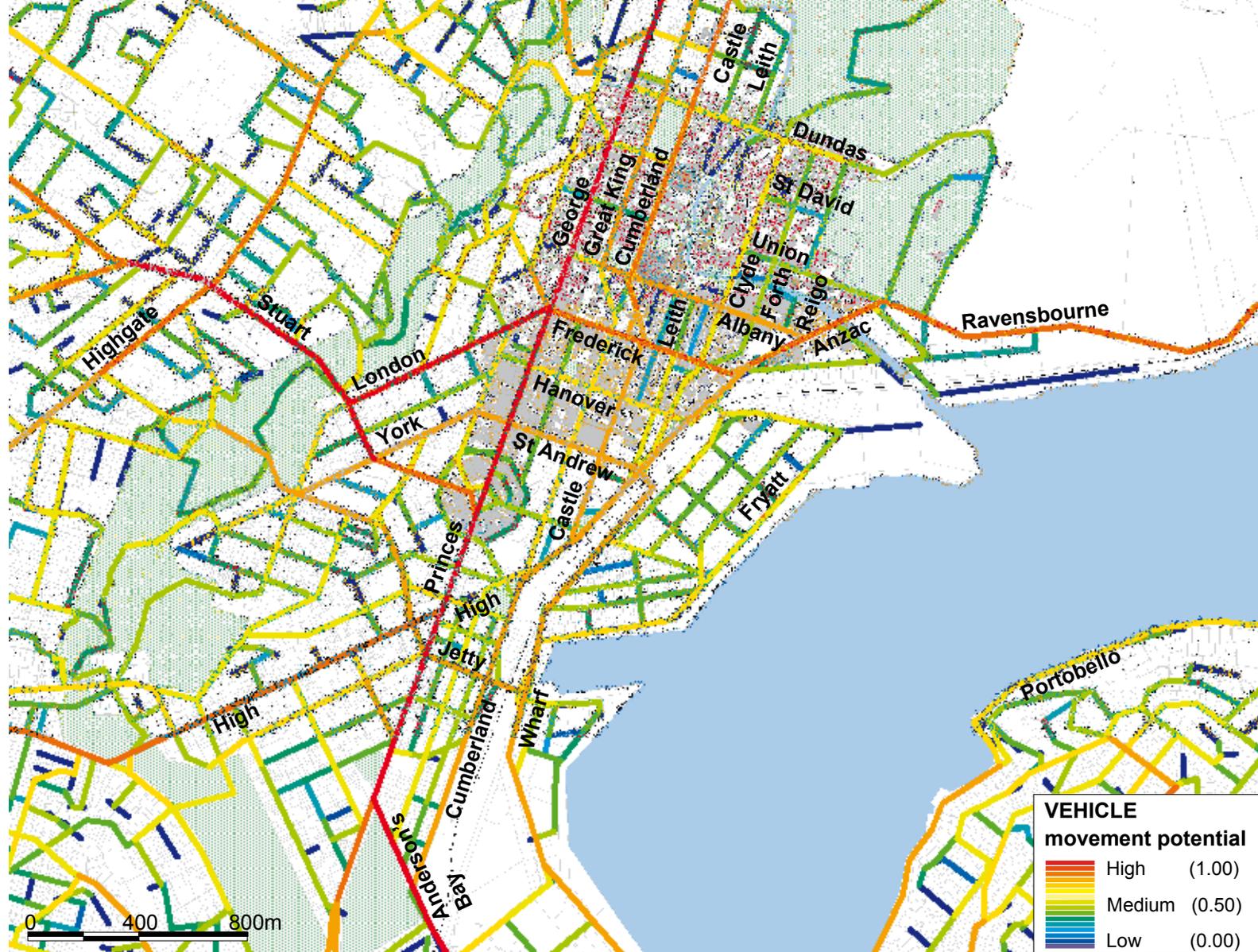
The models measure the relationship from each space to every other space in the network. The results show a hierarchy of spaces from those that are most accessible to those that are the least accessible. Results are displayed as thematic maps which are coloured to show high spatial accessibility (or movement potential) in red through to low spatial accessibility (or movement potential) in blue.

Spatial accessibility is particularly important for an evidence-based understanding the functional performance of urban centres, such as universities. Many have strong local structures but are poorly connected to the global urban structure. Analysing the spatial structure renders intelligible where to intervene in urban centres and forecast likely movement. There are significantly strong correlations between spatial accessibility and movement levels, land use, land value and patterns of crime.

Looking at the city-wide analysis, when compared with the city centre, the University seems to have a highly performing pedestrian infrastructure. However there are parts of the campus that are unintelligible, over-permeable and fragmented.

The existing pedestrian infrastructure was found to be highly fragmented and over-permeable. It has led to a numbers of students, staff and general public being spread over too much of the public realm, reducing pedestrian movement flow in many parts and leaving many spaces exposed and undefined.

The importance of the Union and Castle Streets intersection for easy, intelligible movement has been diminished by confusing landscaping schemes. The existing public space scheme is a barrier for easily intelligible access for public visitors to the University.



Existing Vehicular Analysis

To achieve the one-way traffic by-pass of the city centre, the S-bends traffic system spatially fragments the pedestrian and vehicle infrastructures between Frederick and Albany Streets. The placement of the S-bends is perpendicular to high pedestrian movement routes between the city centre and the University. Movement between the main campus facilities and the medical sciences facilities is equally unintelligible and hazardous. The segregation effect of the S-bends generates conflict between the pedestrian and vehicle infrastructures and if left intact decreases the development potential for sustainable land uses in this area of the city.

Vehicular Access and Car Parking

This diagram summarises vehicle movement and car parking in and around the University campus.

The diagram shows:

- How the implementation of previous master plans has created a vehicle free centre to the campus bounded by Cumberland Street, Dundas Street, Clyde Street and Albany Street
- The major traffic arteries along Cumberland/Great King Street and Castle Street/Cumberland Street create a divide between the vehicle-free centre and the medical campus;
- Car parking is distributed across the plan in a large number of small parking areas, occupying all available 'back land' or vacant land plots
- The need for a more structured approach to the provision of parking, in order to provide more convenient and accessible parking which does not visually dominate the public space.



Pedestrian Routes

This diagram shows, in a simplified form, the principal pedestrian routes through the Dunedin campus. The issue of pedestrian circulation is discussed in more detail in the work carried out by Space Syntax, following their detailed survey and analysis of pedestrian use of the campus. This simplified summary diagram shows:

- The intersection of Castle Street and Union Street as the central cross roads for pedestrian movement;
- The Health Sciences Precinct, centred on the Hospital, linked to this cross roads of movement via the diagonal route across the Museum Reserve and Union Lawn;
- The importance of the city streets as the routes for pedestrian movement;
- The potential of the Leith to provide the linking routes to the College of Education, Hocken Library and the stadium to be built at this eastern edge of the campus;
- The existing clear pedestrian route network provides the foundation for extending pedestrian connections to link to all parts of the future campus.

