

In-Touch

Opus Research

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INNOVATIVE TOOLS FOR COMMUNITY ENGAGEMENT

Image prepared by Pocock Design Environment

Recently Opus' community engagement tools enabled rich public feedback as a critical part of planning for new cycleways in Whanganui, New Zealand.

Whanganui District Council and the NZ Transport Agency have given the green light for two exciting projects that will create two high quality urban shared pathways in Whanganui. The first of these, City to North Mole, will follow the Whanganui River from the town centre to the rivermouth, and the second, Te Tuaiwi, will improve urban links and connect people with schools, workplaces, the town centre and recreational areas. The pathways are being built with more than just avid walkers, runners or cyclists in mind; they will also create spaces for people to stop and enjoy being in, and will become a focal point for visitors to Whanganui.

The District Council had selected their preferred route for each shared pathway, but they had also identified key issues of potential concern and sought Opus to engage with and seek input from the public. This engagement has included

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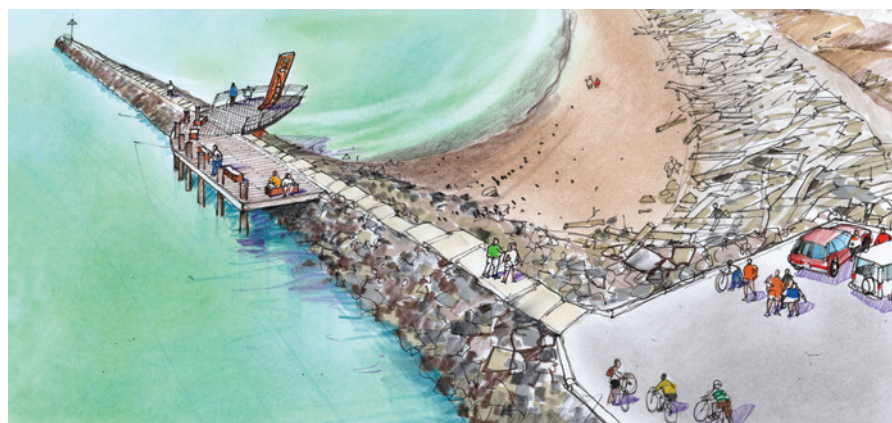
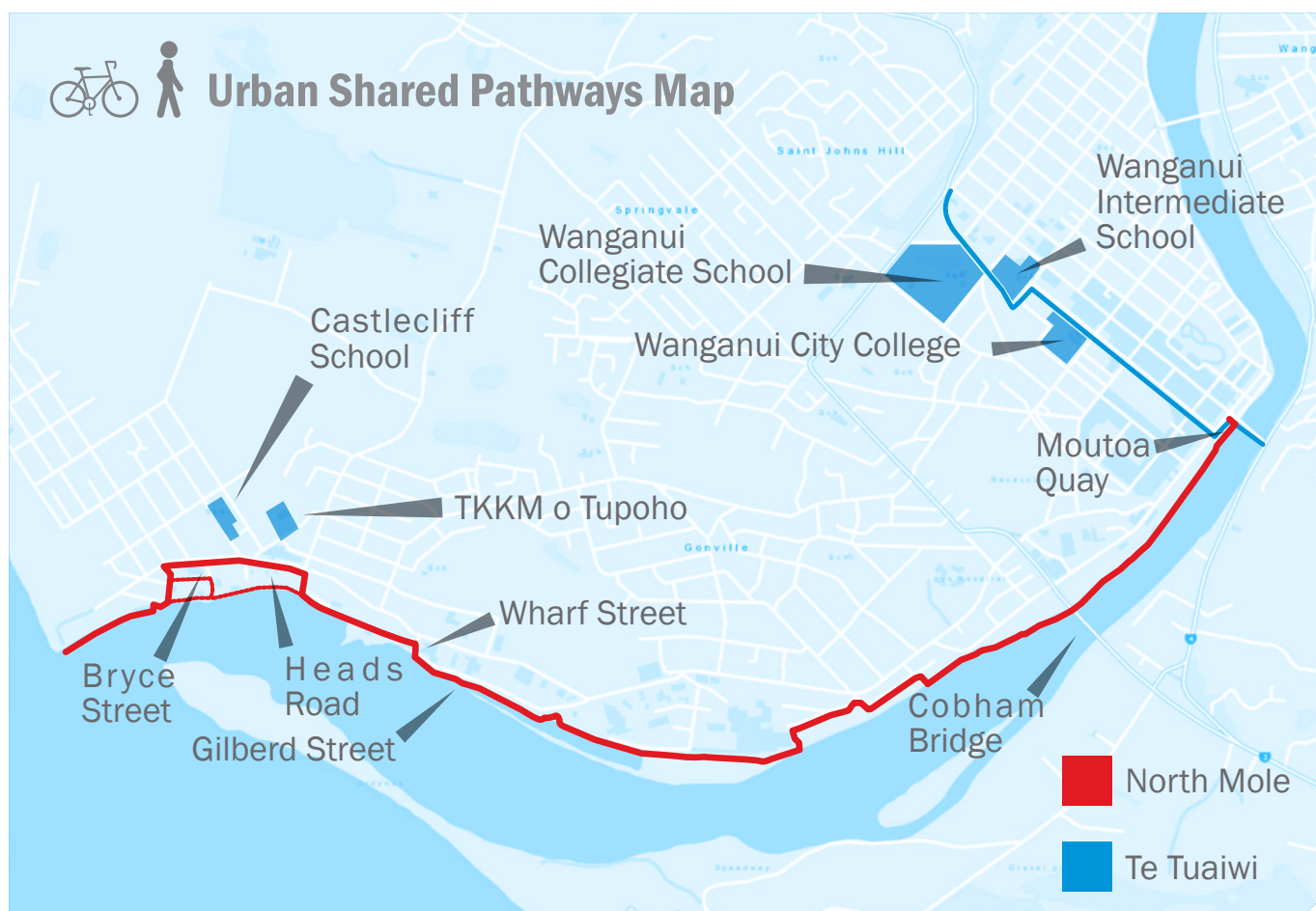


Image prepared by Pocock Design Environment



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demonstrating the proposed routes via the web and other communication channels, and seeking feedback to help make decisions for design options, e.g. intersections, car parking layouts and around existing trees along the routes.

Opus' researchers and local planners developed a number of innovative tools to present the design options to the community and give residents an open forum to express their ideas. An online, interactive map allowed people to take a 'virtual walk' along each of the proposed pathways. Visitors were able to see what the current environment looks like

alongside concept artwork of the potential pathway and landscape design options.

This was accompanied by a short online survey that explored the themes the Council most wanted to understand public opinions around, and made use of open-ended questions so residents and other interested people could contribute their thoughts on the projects and potentially identify novel solutions or designs that had not yet been considered. Public feedback collected via the survey was overwhelmingly positive and constructive, demonstrating the value of using innovative and accessible tools to

engage a wide cross-section of the public in the conceptual stages of the project.

Our approach and feedback has been welcomed by Council staff, and the engagement approach has been nominated for the Society of Local Government Managers Local Government Excellence Awards. The innovative approach and tools used for this project present opportunities for a wide range of engagement and consultation processes relating to infrastructure planning.

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Image supplied by Wellington International Airport

AIRPORT SERVICES TAKING OFF

With ongoing growth in passenger numbers at New Zealand's major airports and a forecast doubling or trebling of numbers in the coming 30 years, the pace of airport development is quickening across New Zealand (and in many other countries). Auckland, Wellington and Queenstown airports have each announced major development plans over the past year. The focus of this development is to provide better passenger experiences.

AS A RESULT, OPUS RESEARCH HAS CARRIED OUT A VARIETY OF SPECIALIST INVESTIGATIONS, PRIMARILY RELATED TO OPERATIONAL SAFETY, AND AIRPORT INFRASTRUCTURE MAINTENANCE.

JET BLAST AND WIND SPEEDS

Jet blast is wind caused by aircraft engine exhausts. For large aircraft, the effects of jet blast can be very powerful, potentially causing damage to airport structures, particularly structures close to the runway, and also causing hazardous conditions which may extend beyond the airport perimeter. Therefore, jet blast is a specific hazard at airports. It is strongest when the aircraft is taking off, but airport operators also need to be aware of potential jet blast hazards when an aircraft is taxiing. Opus Research has carried out both jet blast desktop and field measurements for Queenstown, Rotorua and Wellington airports.

Even without jet blast, wind speeds at airports can still be high due to the need for open spaces around airports for take-off and landing manoeuvres. Of particular concern are the wind speeds experienced by pedestrians in outdoor areas such as in drop-off zones and parking areas as well as passengers walking across the apron to and from aircraft. Airport operators need to incorporate specific consideration of wind effects into their planning and the design of airport buildings.

Wind also affects aircraft operations. Opus Research has investigated the effects of airport buildings near runways to ensure safe operating conditions for aircraft. For example, to minimise the likelihood of any loose objects or debris endangering aircraft operations, we have employed a combination of wind tunnel testing using our Petone-based wind tunnel facility and a portable, 340 kW wind machine that can generate wind speeds in excess of 160 km/h. The wind tunnel testing enabled a detailed understanding of wind conditions around an airport complex to be obtained whereas the wind machine was used to accurately determine the wind speed level required for ground support equipment used in the apron area to either tip over or roll along the ground. This information, when combined, allows optimal selection of equipment and placement of screening and helps improve operational procedures related to high wind conditions.

FRICTION SURVEYS OF RUNWAYS

A runway's surface condition has a major impact on the safety of aircraft operations. Low friction levels and contaminated runway surfacing can result in aircraft overruns and run-off incidents. For this



Image supplied by Wellington International Airport

reason, the Civil Aviation Authority of New Zealand (CAA) requires all airport operators to establish a runway maintenance programme that achieves good friction characteristics and low rolling resistance.

Runway friction levels deteriorate primarily due to the polishing action from aircraft tyres during acceleration and braking, and due to contaminant (e.g. rubber) accumulation. Flight frequency, weather, pavement type, original construction materials and subsequent surface treatment and maintenance practices also have an impact.

The CAA recommends airport operators perform friction testing at least annually for turbojet aircraft operations and at least once every five years for turboprop aircraft operations. A higher testing frequency does, however, allow operators to build a more comprehensive picture of runway condition over time, leading to an improved understanding of the specific causes of friction loss and the relative effectiveness of different surface treatment and maintenance interventions. The result is that operators are able to optimise friction testing frequency and timing.

Opus Research operates a C-type GripTester for friction tests which is a small trailer-based device that measures drag force and load on a single treadless

test tyre skidding at around 15% of the survey speed. Compliance requirements specify that the GripTester be operated at an applied water film depth of 1mm and two tow speeds: 65 km/h and 95 km/h.

Opus Research has conducted friction testing on a regular basis for Christchurch, Napier, New Plymouth, Ohakea and Wellington airports. As a result of our experience we have developed procedures for correcting factors such as test tyre wear and temperature to improve confidence that measured changes in runway friction levels are real rather than measurement-related. These procedures have been adopted by Australasian airports operating C-type GripTesters, including Auckland and Sydney International Airports.

Our experience at Wellington Airport, derived from over 40 friction tests since June 2003, indicates that friction is usually least in the touch-down zone, being about 15% less than the rest of the runway. Runway friction is also greatest in winter and least in summer, the summer value being about 10% less than the winter value. A further learning is that when grooved, new generation bituminous surfaces can comfortably exceed the International Civil Aviation Organisation's friction design levels.

TESTING FOR RUNWAY CONSTRUCTION QUALITY

Airport pavements have a higher risk profile than road pavements, largely because safety regulations demand zero tolerance to potholes and foreign object damage due to peeling of the surface. In addition, airport pavements are exposed to much higher loading than road pavements. These two factors when combined, necessitate high levels of quality control for concrete, basecourse and asphalt construction to ensure complying construction.

As a result Opus Research has been involved in providing on-site and laboratory testing services to ensure high quality pavements for airport operations. This has involved concrete testing of the hard stands and the taking of core samples from runways to perform density and thickness checks.

We have also been involved in the testing of taxi ways for compaction as the cement stabilized basecourse material is laid.

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BUILDING A BETTER UNDERSTANDING OF FRESHWATER FISHERIES IN AUSTRALASIA



Peter Gehrke is an environmental research and management specialist based in our Brisbane office in Queensland, Australia. He has over thirty years'

experience in freshwater ecology and fisheries, catchment and water resource management, and climate change adaptation.

In late 2015 John Wiley & Sons published the book 'Freshwater Fisheries Ecology', for which Peter co-authored a chapter on freshwater fisheries in Australasia. Peter's co-authors are fellow scientists Don Jellyman (a recently retired eels specialist from NIWA) and John Harris (Centre for

Ecosystem Science at UNSW, Australia). The chapter compares and contrasts freshwater fisheries in Australia, New Zealand, and Papua New Guinea.

Interestingly, although Australia has the largest area by size, it is Papua New Guinea that has the greatest diversity of fish species of the three countries that make up 'Australasia' in this context. Papua New Guinea is also the largest producer of freshwater fishes in the region, with an estimated output of more than 17,000 tonnes per annum. A further observation is that rainfall patterns for each country differ greatly, which in turn affects fish populations, types and migratory patterns.

The book is a substantial publication with contributions from over 100 international authors. Preparations for its publication

date back to initial discussions held in 2010. It provides a comprehensive analysis of global freshwater fisheries, threats to freshwater environments, and management opportunities.

Among his awards and accolades, Peter was winner of the Whitley Medal for most outstanding zoological publication (contributing author) in 2013, and winner of the Australian River Prize (partner with Condamine Alliance) in 2012. Peter is also a former member of the International Technical Working Group on Climate Change (2009-2013).

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POST-DISASTER WATER SUPPLY LEVELS OF SERVICE

Wellington Water, the region's provider of water infrastructure services management, is making significant investments into improving the resilience of the Wellington region's water supply. Wellington City and the Wellington region are prone to a number of natural hazards that have the potential to adversely affect the water supply network. The most damaging of these is likely to be a significant earthquake event on the Wellington fault-line, with a worst case event likely to leave the city without bulk supply for nearly two months, leaving only reservoir storage for residents and businesses to manage on.

To help prioritise Wellington Water's infrastructure investment, Opus has been working to identify water supply levels of service for a Water Supply Resilience Initiative. This research has set a robust starting point and has shaped Wellington Water's thinking in the subsequent development of a resilience business case.

Opus has proposed levels of service that focus on the amount and quality of water needed by people, groups and organisations, including where water is needed and by who, the duration that different groups might expect to live with a water supply that is not as good as what they have today, and the proportion of the

city likely to be affected by damage and how this changes over time.

Some users are more adaptable than others. Individuals and families, for example, may be able to collect enough water from a central neighbourhood location to survive, while other users such as the region's hospitals, age care facilities and prisons will need large volumes of water supplied on site to continue operating. Further down the line water becomes important for an increasing number of users and locations. The Wellington region will not successfully recover if government, business, industry, community services and education cannot reopen.

This research has been a valuable source of information to underpin Wellington Water's planning of their investment strategy across the region. It has also highlighted the need for specific conversations with key users, such as



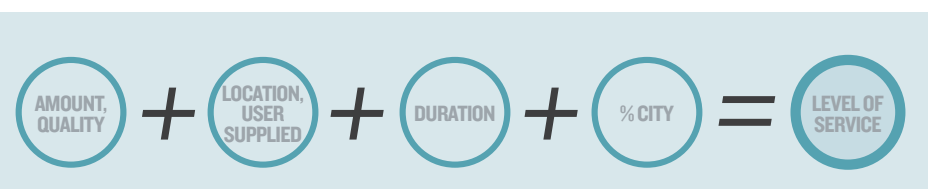
Te Marua Reservoir
Photography: Ian Couling

hospitals, which cannot be guaranteed bulk water supply following a major earthquake and which also have limited on-site storage of water. In addition, individuals and families must understand that there may be a period of time where there is no water supply, and they must take responsibility for planning for this situation.

Planning for these outcomes now will help us to retain the people, businesses and organisations that are so important to making the Wellington Region a thriving and attractive place to live, work and play.

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DATA CAPTURE INNOVATION

'Capture That!' is an innovative data management tool that can be used by field assessors and clients to input and reference rockfall hazard data across an entire network, including photographs, site history and planned remedial measures.

New Zealand road networks are extremely vulnerable to rockfall due to geological conditions and high intensity weather. A proactive approach has been needed to identify and mitigate potential rockfall hazards, as evidenced by the significant number of high-profile landslips and

crashes over recent years, which have wide reaching social and economic impacts.

Capture That! facilitates improved accuracy and reliability of network data storage. In addition, clients are able to access site data, including inspection records, on the day of inspection and to prioritise forward workload on a clear and easy-to-use website interface. The need for cumbersome paper records is removed, and data can be accessed by users on desktop and tablet devices, online and offline, at any location. Transparent

real-time data is controlled by users for users. The tool can also be readily modified to collect and display any type of network data, from road safety improvement works to culvert inspections.

Capture That! has been developed by Opus' software development team with technical leadership from Geotechnical Engineer Emily Stevens (Queenstown), and Engineering Geologist Jonathan Claridge (Christchurch).

Emily Stevens

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NEW TO THE TEAM



CLARE ROBERTSON

Clare Robertson has recently joined Opus Research as a senior researcher in our Urban Sciences team. Clare has a background in research, science communication, policy and emergency response, with a PhD in glaciology and a bachelor's degree in environmental planning. She also brings teaching and operational experience in emergency management.

Before joining Opus, Clare worked as an advisor in central government in the areas of surveying, geographic place naming and Treaty of Waitangi settlements. Clare's out-of-hours interests include an active involvement in search and rescue. She is also training a USAR search dog with the NZ USAR Search Dog Association..

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