ACTIVATING WATER SENSITIVE URBAN DESIGN IN NEW ZEALAND

Barriers Workshop

Venue: Christchurch
Date: 12 December 2017
Time: 9am – 3pm

Attendees

ORGANISATION	CONTACT NAME
Avon-Otakaro Network	Evan Smith
Christchurch CC	Clive Appleton
Christchurch CC	Boyd Barber
Christchurch CC	Peter Wehrmann
Christchurch CC	David Boothway
Christchurch CC (EAG)	Paul Dickenson
CTN Consulting	Peter Christensen
Dunedin CC	Warren Biggs
Environment Canterbury	Jenny Walters
Environment Canterbury	Nick Moody
Fulton Hogan	Kenedy Evans
Landcare Research	Colin Meurk
Metro Green	Paul Malcom
Morphum	jan Heijs
Morphum Environmental (EAG)	Stu Farrant
Opawaho Heathcote River Network	Annabelle Hasselman
Stormwater360	Anton Carr
Stormwater360 (EAG)	Mike Hannah
Tasman DC	Wouter Woortman
University of Canterbury	Vicky Southworth
University of Canterbury	Frances Charters
Waimakariri DC	Greg Bennett
Waimakariri DC	Alicia Kloss
Working Waters Trust	Sophie Allen

Project Team

ORGANISATION	CONTACT NAME	EMAIL ADDRESS
Manaaki Whenua Landcare Research	Robyn Simcock	SimcockR@landcareresearch.co.nz
NIWA	Jonathan Moores	Jonathan.Moores@niwa.co.nz
Batstone Associates	Chris Batstone	chris@batstone.co.nz
Koru Environmental	Sue Ira	sue.ira@koruenvironmental.co.nz
Environmental Communications Ltd (Facilitator)	Clare Feeney	clare@clarefeeney.com

Workshop Notes – Summary of Key Comments
A copy of the notes taken on the whiteboard are included in Appendix B.

Burning Issues

- We want to see more of this type of stormwater treatment design throughout our existing city because we have a huge challenge with trying to retrofit stormwater treatment within existing (brownfield) areas. Greenfields development is easier to deal with.

- How do we start doing integrated holistic designs? The main barrier is urban and landscape design. We see fragmented small developments which each do their own thing and do not take a whole of catchment approach.

- Frustrated with the "show pony" examples around the city. Councils like to create and construct projects which show how good they are, but they are so isolated. The isolation and small scale implementation means receiving water benefits are insignificant. Very little maintenance and monitoring ever undertaken so we are not able to fully quantify the benefits. Economics are not done well by engineers so we can't sell WSUD through the economic benefits. Lastly we need to change the minds and hearts of professionals – we've (engineers) been trained to drain wetlands, pipe stormwater, etc. so we need to change this mindset, especially in brownfields/retrofit (WSUD is easy to apply in greenfields).

- The uptake of WSUD in NZ is minimal. The issues are not technical but rather institutional and regulatory. We don't have the rules to support or force uptake of WSUD. There are some science gaps but they are not the major issue. There are a lot of myths around the economics and aesthetics. There is resistance within specific parts of councils, for example roading engineers are very uncooperative and unresponsive to WSUD ideas.

- There needs to be more transparency around the costings of WSUD – capital (establishment), maintenance costs through to whole of life costs.

- WSUD is pretty new (30-40 years old) and NZ is not taking it seriously. Its more than just following about TP10 and chucking in individual treatment devices. There needs to be a lot more effort around monitoring, design, construction and particularly compliance that checks devices are operating before and after signoff on behalf of the regulators and more information around costing. It takes at least 5 years before rain gardens and other practices are fully operational, so we need to start monitoring.

- Can WSUD help us comply with the Land and Water Regional Plan Guidelines via Network Discharge Consents? Zinc is our problem. Retrofitting is the most difficult area for WSUD.

- Despite knowledge around WSUD, we still see standard engineered (kerb and channel with pipes) solutions going in – there is a gap between the science and the implementation by consultants, developers and councils. There are too many missed opportunities through the development (including commercial) process. For example, national 'big box' business chains that have very high impervious surfaces such as supermarkets, building stores, retail.

- The difficulty that council officers have is that different departments in local authorities aren't collaborating on a number of different issues. There are a lot of silos within council.

- Let's be positive: it is exciting to see the changes which have happened over the last few years as we have had a number of rain gardens installed across Christchurch city. These installations have varying degrees of success, but at least they're there. There is also less kerbing around landscaping so land is connected to the stormwater network, providing at least some degree of Stormwater treatment and passive 'self-watering' of landscaping . Very large wetlands have also been put in (up to the size of Hagley Park), innovations such as foresting infiltration basins and Christchurch has NZ's largest 'Stormfilter' system. We are starting to reverse the trends of negative effects of urban landuse. Key frustration is funding - healthy waterways is a council priority and a strategic outcome, but budgets are less than desirable, especially operational spending and push back on maintenance and this leads to frustration by the officers and the community.

- We are concerned about zinc levels in stormwater, retrofitting devices at factories / industrial areas and the challenges in that space. As a city and citizens of Christchurch we point the finger at the rural areas, and we need to look at what we are a city are doing and the impacts the city is causing. Council should lead by example.

- Biodiversity and biosecurity should be more fully considered in terms of their role in placemaking as part of WSUD. These issues are often treated as 'green fluff' and sometimes subsumed by dubious hydrological models which are risk averse and highlight constraints which go beyond what is likely to happen. In Christchurch city (Avon) this resulted in removal of taller native shrub groundcovers and flaxes – and replacement with mown grass. Part of the issue is that the profession of ecology is also subsumed and not involved in the conception from design through to implementation. Ecology is often excluded by landscape architects. This is due to the silo-type of environment that we all work in.

- How can we activate WSUD principles in a more tangible way that allows people to engage with it and experience it? We need to expand on best practice and to combine systems to include aesthetics and <u>people</u>, not just function.

- We need to have coordinated budgets: there is a lot of good will between people in councils but this is not enough – goals, budgets and timings do not coexist. WSUD crosses silos. We need to monitor what we do. All the additional green space is wonderful, but sometimes our actions may be making things worse. For example, there

is a huge focus on flood mitigation but not a focus on day to day flows or supporting base flows. Are we keeping up with some of the modern pollutants such as plastics and temperature – what impact is that having on the environment? Stormwater is still considered a nuisance and problem by many, but water is so critical to life and it should be seen as a resource – and therefore needs to be respected.

- NGOs and community groups are very important as they are interested in the whole catchment, but they also sit between the decision-makers and professionals to try and elicit collaboration at that scale. NGOs are a voice for the community which try to bring councils and communities together, and work across the silos. Potentially 50% of the stormwater remediation/ treatment will be infrastructure-based, but 50% will be due to the community, connecting them with water to support better water quality. As a result, community education, awareness and public perceptions are very important. Information is just not out there for people and there are no incentives to do better. Incentives are very under-utilised. Make water issues fun and tangible for people which allows them to connect with their streams.

- We need community led involvement on the ground if we're going to make a difference. Education is key and we need to take communities on the WSUD journey with us. We need clearer messaging beyond 'show pony' projects – to show how nature can take a role in protecting / restoring water

- Holistic catchment management is key. How can we bring things together in a catchment and engage with communities at the same time? We need to understand where we are but also have a clear pathway to where we want to go. How do we influence existing businesses to do something more? Grants or incentives are needed, as is behavioural change.

- How can we make WSUD sexy? Council officers ability to influence good urban design outcomes is very low because they only get to have input late on in the project design process when consents are applied for.

- Since education is important, what can the university's role be in all of this? We help change hearts and minds in students, so they see Stormwater beyond water quality and flow. What opportunities can we make from the WSUD? What research can be done as part of these barriers? Funding of WSUD research in general and for performance monitoring is a barrier as it is very limited but needed to improve design.

- Due to all the media rhetoric if feels like people are really starting to connect with their waterways and we are on the cusp of changing things, but the technical capacity really lets us down both in the consulting world and in approvals. Landscaping and engineering are not listening nor understanding to each other, and no one is thinking about the ecological outcomes. Many stormwater systems are over engineered resulting in inflated/additional cost without necessarily improving amenity or ecology. Councils sometimes don't understand those subtle nuances. In New Zealand the national psyche seems to be content with just reaching minimum guidelines to get a 'pass'. There is little will by developers to create fantastic urban spaces, rather most

just want to meet the standards set by councils. This contrasts with some developers in Australia. The economics of WSUD is very important – e.g., increased section prices (Australian subdivisions)

- Infrastructure design defaults to hard engineering solutions and we have a lot of missed opportunities. Additionally, in the project space there is a lot of time and money pressure to get through consenting and design processes and high risk aversion. There are no incentives.

- We need to use stormwater as a resource, e.g. to (passively) water trees in tree pits. Trees can be successfully grown in city hard paved areas, but we're not seeing it here and many of the trees are dying. Why not use stormwater to help grow trees?

- Why have we not seen building WSUD features (such as rain tanks) being incorporated into the Christchurch rebuild.

- The language that we use is really important. We need to bring to life the word "environment" and incorporate the biological component. Perhaps by changing to 'ecology', as this evokes living. Environment can have dead connotations, e.g., 'clean water' 'clean air'.

General Discussion (morning session)

- We encourage the research team to look holistically at WSUD. Stormwater treatment is vital, but it is the ambulance at the bottom of the cliff. We need other people involved in this, but unfortunately no roading engineers or developers here. We need to be able to influence the roading engineers and architects.

- Need to look at our roads from a six values approach. We need to try and stop contaminants at source, especially in relation to building products, to try and stop them needing to be treated in the first place.

- Christchurch City Council wants to launch a million dollar community water partnership where everyone takes responsibility for their own water. Community behavior change and social networking is important for activating WSUD.

- It's not just about treatment - we need to be talking about restoring the whole natural water cycle. But we do acknowledge that this is difficult to do within the resource consenting process.

- We need to make sure that the roading engineers and developers also take the survey. Why don't they 'do' WSUD? Because they don't have to. NZ needs to get tougher on developers and work out how we can convince developers that this is the way to go. Perhaps the NPS-FM will trigger that. We also need to influence architects <u>not</u> to use exposed copper

- National psyche thing – really complicated around numbers. In Australia developers just get it and they have simplified targets but majority of good developers go way

beyond that. This is because they don't have to go through any consenting hurdles. We've burrowed down into a hole of complexity and technical numbers and a consenting regime which stifles innovation.

- We need to introduce a word like 'legibility' which describes the ability to 'read the landscape' and tells us about our history (geological, social, ecological, topographical = streams/wetlands/ terraces). People have a fundamental need to understand where they come from and where they're going to.

- We need a good process which brings people together and stops them working in their silos.

- Implementation of WSUD is very disjointed and non-linear in its functionality (we are not creating green corridors) and this should be picked up on. An example is the East Frame that we will see on the WSUD walk – this arm of green is disjointed, not connected (for land-based native species at ground-level), not ecological. This contrasts with the Northern Corridor design and build project that is bringing WSUD and ecology together – and going for 'bronze green road' status, a first in New Zealand.

- Collaboration is easier through a design and build approach. The CNC team is going to try for a green roads certification (bronze) which hasn't been achieved yet in NZ.

Site Walk Over

- Site 2 raingarden: The inclusion of the old kerb as a heritage feature was noted. However the relatively high level of the raingarden to the kerb & channel invert effectively means this will rarely operate as an effective raingarden. The use of the wood mulch also indicates this raingarden is considered not to pond as this type of mulch has a high propensity to float when youthful and dried out (if wetted/ slightly decomposed or mixed with some compost it would not tend to float). This is an example of significant additional cost (installation of the scruffy dome and associated piping) without much benefit, and also finished levels that don't allow even ponding of water across the surface. The wooden dividing board is probably unnecessary if the levels were changed. The planting repeats the use of large European/Northern hemisphere trees rather than equivalent 'noble' native trees (totara, beech, kahikatea, etc.) which means the potential for supporting native wildlife (birds, invertebrates) is unrealized and the rich, unique history remains hidden.

- Site 4 gardens: This is a lost opportunity – a broad, linear garden that could have been designed as a functioning raingarden, despite needing to be shallower due to depth of the existing pipe network. Examples like these can be relatively costly to build but provide little/no functional benefit thus contributing to the perception of WSUD as a high cost nice-to-have. In this kind of retrofitting project it is generally the case that green technology is installed in conjunction with piped systems, unless soils are sufficiently permeable to allow full infiltration of stormwater. This doubling up also contributes to the high cost nice-to-have perception of WSUD.

- Site 7 raingarden: noted that the cut-away section of the kerb (inlet) was currently deliberately and very effectively blocked (with concrete) until plants have become established. When the inlet was open, inflow of water and sediment meant that the area was a bog and getting compacted (specialized raingarden media have not been used) However, relative levels of road-edge channel and raingarden mean that most stormwater is likely to be conveyed along the gutter, rather than into the raingarden. Note low (100-400 mm) native and non-native plantings, with a lack of trees or taller vegetation. Is there really likely to be a traffic visibility issue here? Have native *Dianella* (turutu) been substituted with Australian *Dianella*? Most of the plants appear to be landscaping cultivars, not local eco-sourced species – and this reduces the ecological value of the plantings.

- Worcester St: Originally planned as a higher profile, 'prettier' space within this area of redevelopment but hasn't really delivered on that. The axis forms a major cycle route and greenway across the city and where it intersected with the greenframe was initially envisioned as a 'shared space', so it connected with parks with no visual separation of cars and people. Another example of gardens that are not functioning raingardens. Noted that cost of maintaining these sorts of gardens unlikely to differ much from maintaining functioning raingardens, justifying incorporating WSUD devices rather than just landscaping. Also noted that the linear park bisected by Worcester St does not provide a green corridor for ground-based fauna – it's too disconnected. The area has low ecological value although a few native totara are in adjacent hoggin surface (sensible to reduce maintenance associated with deciduous leaves). Also connectivity is low with vertical concrete surface, absence of (daylighted) water / swales connecting with nearby Avon, instead lots of mown grass and paving. Contrast with Waitangi park in Wellington or Wynyard Quarter in Auckland that use very high component of locally-relevant and much taller groundcover plant species, including tree canopy, reflecting local ecosystems.

- Site 9 Armagh raingarden/grass swale: best design of any of the examples on the walk because no kerb, a small but effective drop that prevents sediment buildup and ensure road runoff enters along its entire length. However, odd to include a grass swale, lined by trees along invert which over time may impact on the conveyance function of the swale. The trees are planted into the mown grass (which is mown much shorter than the 100 mm height usually specified for swales) and the base of every tree has bark that has been physically damaged (by weed-whackers?), creating opportunities for fungus to enter, so shortening tree life. The landscaping on the opposite side of the road is a very good example of what raingarden groundcover should target, with a variety of native shrub and herbaceous species and established tree cover - again, this landscaping is lower than the footpath, so can receive some stormwater runoff, helping achieve some treatment and reducing plant stress.

- Site 12. Margaret Mahy and Avon River with noble tree plantings into mown lawn and provision of access to the water's edge providing connectivity to the River. Along the river native sedges (*Carex secta*) self-established when the Council stopped mowing right down to the waters edge, and these provide refuges and habitat; unfortunately non-native 'male' ferns also establihsed. Across the river is an important area of native

trees that were planted by early Christchurch settlers, show casing their growth and potential contribution to the landscape – it includes southern rata, totara, beech and cabbage trees. Later, 'golden' totara were planted slightly downstream – again – a wasted opportunity to provide for native birds, as the *Podocarpus totara* 'Aurea' do not fruit.

Site Walk Debrief

- Proposal to create an updated version of the site walkover with commentary as a result of the workshop was supported.

- There should be signage around the devices so that people understand what the rain gardens are for and why they're there.

- Portland has produced guidance for the public on how to disconnect impervious surfaces and deal with stormwater on your on site, effectively build your own raingarden.

- Given Christchurch is in the process of installing raingardens throughout the redeveloped areas monitoring should start right now – to build the local evidence base.

- The extent of raingardens/WSUD has been limited because SKIRT's mandate was to get the city horizontal infrastructure (drainage, roads, water supply) functioning under funding for a 'like for like' condition (i.e. pre-earthquake, not modern)

- Jan Heijs provided a summary of his previous work on developing an impervious surface tax in Europe: Germany developed a 'concrete tax' and the money was put into subsidies for creating rain gardens (funded from the tax on impervious surfaces). Expected uptake of about 50% over a few years, but uptake was actually around 90% within the first year. A proposal was together for a similar system in NSCC but not submitted to Councillors . It is important that the tax $/m^2 is high enough to assist with behavior change, as is the subsidy.

- Los Angeles asked the public to vote on whether or not they were in favour of an impervious surface tax. 80% voted in favour. The program focused on why it is needed and made it about protecting the bay.

- Ecological and landscape literacy: need to get people to look deeper than the surface. Can we afford to keep building these fancy ideas and systems? Signage on drains help people understand where the water goes.

- We need to be able to step back and learn from our mistakes – we should be honest about our mistakes so that we don't have more lost opportunities.

- For the next site walk we need to actually reach the river!

- We need to encourage the multi-use of space, especially around roads and park areas, and co-creation of designs.

- The site walkover focused on rain gardens but what other NZ devices have been demonstrated successfully elsewhere?

Afternoon session on Barriers and Transitioning
Appendix A includes a summary of the results of the activity group session.

Final Session:

- Any holistic solution to activate WSUD is going to have to work for everyone as we all have the same aspiration but we are all in different positions and have different perspectives in terms of barriers to achieve this. Need to remember that because Christchurch is built on a swamp there is a long-standing cultural imperative to drain, and get water away.

- It is not so much about convergence but about inclusiveness and accommodating diversity. We also can't forget the role of random events which creates action and motivation. Especially droughts and floods - 'a lot of rain focuses political will'.

- Political environment is a barrier. We're working in a political environment so we need to get backing from the general public to get them to push politicians to do more.

- About 20% of Christchurch has protection from flooding (basins, wetlands) and 80% will be unprotected; with retrofitting needed into roads and public spaces. The Waterways Enhancement Programme started by focusing on restoring waterways, and got to a stage where it was decided that easements were needed in areas where public land areas for flood management were inadequate, so budget was moved into protection and buying land in SW Christchurch (meaning restoration was put on the back burner).

- We need to make a greater effort to make WSUD about every day activities (e.g. wash your car on the grass) – we need to make people aware that they have "water" choices.

- Nationally we are finally waking up to our 'water issues' – community desire to talk and look after environmenta, including taking action themselves is increasing – hence potential backing of WSUD from general public. However, local government are at the mercy of budgets with strong push-back on rates rises

- We need to recognize the value of iwi input into this discussion and recognize that iwi groups are allies of WSUD.

- There are a lack of events like this in Christchurch – everyone agreed to share email addresses. Also noted that information on the Canterbury Stormwater Forum activities (approximately quarterly) would be useful to send.

- We would like to see a guide book on the different types of stormwater treatment devices as a one-stop place and resource for people.

- Information from MfE and other similar groups is not being filtered down to the people working at the ground level. MfE could provide direction that is specified and clear that creates clarity and cuts out ambiguity on the need for a change in Stormwater management – e.g. maybe direction on source control (building materials, tyres, brake pads)

- Information on the 'need' for stormwater management is lacking to drive source control – for example understanding the impacts of copper and zinc.

- Mike Hannah offered ot use the LinkedIn Stormwater Group page to share information about the Activating WSUD in NZ project.

Closing
The research team thanked all the attendees for their time and participation at the workshop.

Thanks also to the following people for their assistance:
- Clare Feeney, The Sustainability Strategist, for facilitating the workshop.
- Briony Rogers, Monash University, and the CRC for Water Sensitive Cities, for sharing their research information with us and allowing us to use it in the workshop. www.watersensitivecities.org.au

Appendix A: Summary of Afternoon Activity Group Session

Activity 1 - Benchmarking							
	Workshop 2 (Christchurch)						
	GRP A (NEL)	GRP B (WLT)	GRP C (Chch)	GRP D (Chch)	GRP E (Chch)	GRP F (Chch)	GRP G (Chch)
Water Supply City	100%	100%					
Sewered City	100%	100%	Old city				
Drained City	80%	100%		60%			75%
Waterways City	70%	10%	Greenfields new development	40%	Just to the right of the black line.	Waterways city	25%
Water Cycle City	10%	0%					
Water Sensitive City	0%	0%					

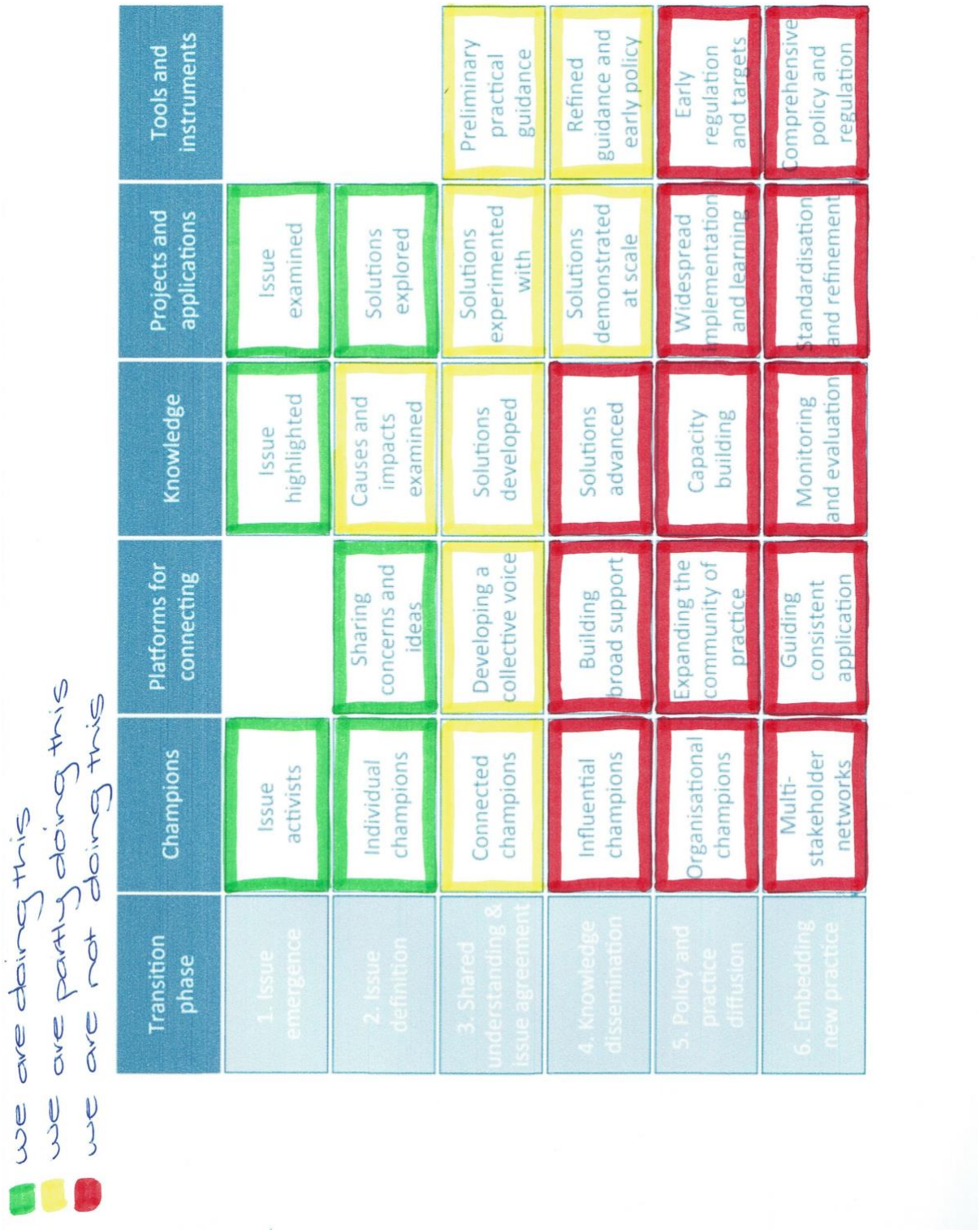
TDF Narrative (workshop 2)	GRP A	Where you are in the change spectrum can be role specific. Generally in the shared understanding & agreement phase (3). Tasman
	GRP B	Issue emergence (1). Wellington [note: could also be at different levels for different issues, i.e. quan quality issues]
	GRP C	Between issue definition and shared understanding and issue agreement (2 and 3). Christchurch
	GRP E	Between shared understanding and issue agreement and knowledge dissemination (3 and 4). Christ
	GRP F	Between issue definition and shared understanding and issue agreement (2 and 3). Christchurch
	GRP G	Around policy and practice diffusion (5).

Additional Comments:
Waterways city - need to charge for water. Need to understand drivers for change to WSC.
The political will to accept impacts is limited and there is a lack of general public understanding therefore currently at start of shift to issue emergence (Wellington).
In Christchurch there are still many drains with no treatment.
Christchurch: until we meter water, a water cycle city would not be achievable.
If Christchurch were to develop to it's full extent, it would be 20% treated and 80% untreated.
In terms of the transition dynamics framework: where we are on the spectrum depends on if we're talking about the public or people in the industry.
Public are only at issue emergence whilst the industry is at shared understanding and issue agreement.
The Christchurch rebuild means we are now looking more to WSUD.
Christchurch has gone backwards in terms of it's WSUD implementation - previously had the wet waterways guidance, but now replacing "like for like".
Lack of funding as budgets move from rebuilding functional services to vertical infrastructure.
We need financial incentives to put in WSUD.
The Christchurch rebuild initially focused on restoring functionality through the replacement of horizontal infrastructure (roads and pipes). The 'like for like' approach adopted was a lost opportunity to adopt more progressive WSUD approaches. The rebuild has now moved from functionality to attractiveness, with a focus on vertical infrastructure. But there is a $1B shortfall to deliver on aspirations.

The publication of Christchurch City's Waterways Guide several years ago shows that 'hearts are in it' in Christchurch. But the city has lost ground since then.
The council had a programme of actively buying up tributary land for 'restoration' and then focused this on SW Christchurch, given the development planned in that part of the city. However no actual restoration took place on this land.
Earthquakes and internal restructuring has contributed to the lack of progress.
Christchurch aspires to managing its waterways for the '6 values', even if not there yet.
What sort of % of the population pushing for transformation would be a critical mass?
Wellington and Dunedin are lagging behind, at the 'issue emergence' step.

Activity 3: Building a Strategic Transition Program: Where are we?

The matrix presented below is indicative only, and represents a summary of the results from the different group discussions.



Activity 3 - Barriers
Transition Dynamics Framework: Matrix
We have connected champions and are developing a connected voice. Working on examining causes and impacts and exploring solutions. We have prelimiary pratical guidance. (Tasman)
We have some individual champions and are starting to share concerns and ideas. We are experimenting with solutions and are refining guidance and early policy (Wellington)
We have connected champtions and are developing a collective voice. Solutions are advanced and demonstrated at scale, and we are refining guidance and early policy. (Christchurch)
We have some individual champions and are starting to share concerns and ideas. We are examining the impacts and causes and are exploring solutions. (Christchurch)
There is a lack of collaborative networks and a lack of knowledget and accessable information. There is also a lack of consensus (diversity of opinions)
We have individual champtions and today we are sharing concerns and ideas. We have some solutions demonstrated at scale and preliminary practical guidance. (Christchurch)
We have individual champtions and we are starting to develop a collective voice. We are developing solutions and experiementing with them, and are refining guidance and policy. (Christchurch)

Barriers
Council structures lead to silos and non-sharing.
There is resistence to WSUD and people do not see a problem (they're in denial)
We need smaller councils which are less layered and more direct connections to councillors and like minded colleagues. This would make it easier to develop supportive groups, but harder to develop knowledge and applications.
People don't want to pay for services, for houses and for cleaner rivers
We have a legacy of living in a swamp and therefore a drainage mentality.
Political resistance to implementing measurable numbers in global stormwater consents due to costs and responsibility.
Cost of increased rates is a barrier.
Politics - getting agreement from council and govt is difficult.
Getting government, councils and the public to take responsibility for the issue is problematic.
Budget restrictions and funding.
Insufficient incentives to implement WSUD (generally no water shortages)
Likely to increase the cost of housing which is already too expensive.
Legislation impacting on councils as are the regional plans. Not many regions have RPs with sufficient water quality standards. Canterbury WQ standards are unachievable as written.
Majority of the people (public) don't understand the link between urban contaminants and water quality.
Council departments are focussed on a few single issues = silos (e.g. Building consents dept only administers the Building Act Requirements.
More leadership from government would help.

No-one is painting the big picture at national/ international level (e.g. as David Attenborough is doing for polar bears).
Too many levels of administration/ government which allows issues and solutions to be 'watered down' at each level.
Councils and governments are risk adverse.
WSUD concepts should be bought into the universities.
We need to find money and financing to implement solutions.
Councils and regional councils are trying to deal with point and diffuse pollution, but they are resource constrained and behaviour change constrained.
We need involvement from local iwi.
Prejudice from professionals that WSUD can't be community led.
There is a lack of resourcing/ funding for community-led WSUD.
Lack of platforms for connecting around WSUD in Christchurch.
Lack of clear messaging about what is best practice.
Lack of proven effectiveness - need more monitoring.
Budgets are needed for general opportunistic WSUD philosophy rather than specific line item upgrades/ projects (e.g. xxxx street upgrade).
Councils need to be able to take advantage of WSUD opportunities but detailed design consenting approach prevents this.
We need financial incentives to put in WSUD.
Too many restructures in councils over the past few years has led to fragmentation and loss of institutional knowledge.
Organisations can't "pool" budgets further reinforcing the silo mentality.
Solutions demonstrated and implemented are often not desirable or good examples of WSUD practices.
In Christchurch there has been a return to silos with 'forced' widespread application of not very good solutions. No targets are set and no measurement against commitments made.
Key barriers are a lack of rules and lack of political will (compare actions on microbeads and copper).
Existing power structures within council are a barrier.
Examples of WSUD are isolated or often hybrids with convential systems (not true WSUD)
Ambiguity in central, regional and local government roles.
Unclear role of MfE – good intent but not realizing true potential to do something more useful for NZ, given the relatively small size of the country.

WSUD Narrative for NZ
Mana whenua are able to access and enjoy customary food areas and species (mahinga kai)

Appendix B: Whiteboard Notes

Burning issues

- More design in Chch but retrofit a challenge (4)
- Integrated holistic design – needs to be catchment-wide – whole landscape not small isolated fragments (5)
- Long range (out to 50 years) planner: isolated WSUD "show ponies" are insignificant for creating change. Lack of maintenance and monitoring > no case for benefits to sell. Engineers don't do economics so it's hard to sell the financial and other benefits of WSUD. Need to change hearts and minds away from drains & pipes mindset and change to a positive game. Easy to do WSUD in greenfields, difficult in brownfields (5)
- Frustration is with minimal uptake: institutional and regulatory issues more serious than technical issues. The science gap is not major compared with this. Myths around the economics and functions of devises. Uncooperative parts of councils pose a barrier (e.g. roading engineers) (6)
- Lack of transparency with respect to costings – e.g. capex, establishment and maintenance costs (2-3)
- WSUD now 30-40 years old but still not taken seriously. Still device-focused. Need more effort as commented above – design, cost, regulation (5-6)
- Retrofitting WSUD. Waimakariri District Council currently going through network discharge consents – how to comply with Regional Land and Water Guidelines? Zinc an issue (2-3)
- Gap between WSUD (proven) and standard infrastructure codes for kerb and channel etc > reluctance of developers and their consultants + councils: still have difficulties, unclear etc. Frustrating to see opportunities missed to install WSUD upfront especially on commercial sites e.g, gas stations (WSUD operations = 5-6; WSUD design = 2-3)
- Difficulty departments in TLAs in collaborating with each other and the commuity and environment – lots of silos (3)
- Taking a positive perspective: extremely excited with change in the last few years e.g. raingardens in Chch – landscape connected to stormwater networks. New Zealand's largest storm filter (2nd biggest in the world?) being install – a huge wetland the size of Hagley Park, in the Heathcote catchment. Seeing a reverse in trends of problems with urbanisation. Frustrated with funding of Healthy Waterways – not enough money, especially for operational spending (5)
- Zinc in stormwater, retrofitting WSUD devices on factory sites. Canterbury more focused on rural than urban water quality. Chch can lead by example (2)
- B&B (biodiversity and biosecurity) and their role in placemaking. Biodiversity is treated as green fluff and subsumed into very risk-averse hydrological / hydraulic models that are not ground-truthed. Ecologists are not included from project inception and design – no collaborative learning process (3)
- Sees opportunity: how to activate WSUD principles in a tangible way so people experience it and expand on best practice. Systems function, ecology. Aesthetics, and people (1)
- Lack of co-ordinated budgets: - there is goodwill on council but money, timing and priorities don't always overlap. Monitoring – lots of new green space but is the water quality better or worse as a result? We are doing a lot of flood mitigation, but what are the effects on baseflows, that happen 97% of the time? Keeping up with modern pollutants e.g. plastics, temperature. Stormwater is still considered a nuisance but water is critical to life! (4)
- The current devolved model of water management means NGOs play a big role – they see the whole catchment but sit between the community and many siloed council professionals, and bring the two together. 50% of WSUD will come from community groups. Education, awareness, perceptions will lead to a big shift towards more sustainable behaviour in the way that we changed behaviours around recycling. Water is fun as well as functional (1, but more if a holistic view is considered part of WSUD)
- Role of community-led initiatives is to bring people along with us. Water quality and biodiversity effects on streams that are downstream of urban areas (4)

- Holistic catchment management – how to bring things together in a catchment. Where are we compared with where we want to be – lack of a clear pathway for the one to the other, so how to get funding? Grants? (5, with respect to behaviour change)
- How to make WSUD sexy? People, places, water. (5, for passion; 1 for ability to influence, because opportunities get ruled out before developments come to council
- How can the UoC change the hearts and minds of new engineers beyond water quality and quantity to wards the big picture? Role of research and lack of $ for performance monitoring to improve technical designs (4)
- Agree with all the above but we are on the cusp – people are starting to connect with their waterways but the technical capability and interdisciplinary understanding lets us down. The national psyche is oriented towards doing the bare minimum. (5)
- Infrastructure design defaults to hard solutions, leading to missed opportunities. We are also very risk-averse. (2-3)
- Also positive but some frustrations – NZ is behind
- Thesis on building scale devices e.g. rain tanks – why are we not doing it?

How involved have you been in WSUD over the last few years, on a scale of 1-5

Hardly at all	Sometimes				Extensively
1	2	3	4	5	6
2	**1**	**2**	**4**	**6**	**1**
1	2-3		4	5-6	
	3			**1**	

Debrief of walking tour

- Signage/interpretation would raise community awareness
- Portland Oregon has videos e.g. how to do a rain garden
- Incentivisation gives the best results forgetting stormwater out of combined sewers: eg
  - for downspout disconnect
  - depave to reduce impervious area
  - treebate
  - green roofs allow extra floors in buildings
  - industry training
- concrete tax – his report said one city got a 90% uptake of a depaving incentive in the first year. The$/m2 needs to be enough to change behaviour
- LA County “Proposition O” – 80% f people were in favour because it helped the harbour – people like it!
- Ecological land landscape legibility and literacy – look deeper than the superficial (see “Interpretation”, above). Very natural stuff often looks “untidy” and “broken” – we need a culture shift with respect to what we see and how we see it
- Bring to light the patterns of water movement across the landscape – e.g. fish on stormwater inlets
- Video/walk – honestly – learn from mistakes/show the river in all weathers
- Parks people are fine with below grade recreation areas – even roading engineers are OK if we rewrite the specs
- Co-creating WSUD – be here now!
- Website – before and after shots, GIS-based/searchable
- Focus today was on raingardens – what other opportunities are there?

Wrap-up

- Everyone has their own position – where they come from/where they're at – even though they may have the same vision, therefore activating WSUD needs to work for everyone, whatever position they're in
- Convergence + diversity – not everyone will converge on values, so how do we work towards a valuable outcome?
- Role of external events > moments of opportunity > new ways of looking at things/tipping point
- Political environment – e.g. marine plastics a known issue 20 years ago. Water quality is the same therefore we need to leverage off the political environment and community. Money talks to politicians, therefore bring in the community to give confidence to elected representatives
- More effort to bring it down to everyday activities: bike vs car/wash car on lawn/on road
- Importance of iwi involvement – voice of iwi must be strong
- Importance of political will > need for community support to sustain the political motivation