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Rebuilding the Streets of Kaiapoi after the Canterbury Earthquake

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Abstract

Early in the morning of 4 September 2010, a 7.1 magnitude earthquake struck the Canterbury region; amongst the areas worst hit was the town of Kaiapoi. Essential infrastructure in the town was extensively damaged, which left the Waimakariri District Council facing challenges of immediate repairs and also longer term reinstatement. An 'Infrastructure Recovery Team' was promptly established to manage these challenges and the opportunties that soon become apparent. The opportunties included revitalising a 1960s residential development to achieve better urban design and transport outcomes.

There was also a Town Centre Revitalisation planning project already underway that had scope to integrate with the residential street rebuild, particulary given the number of buildings that required demolition. All of the emerging opportunities presented the community with an environment where the economic prosperity of the town could be enhanced through urban design and transport improvements.

This paper outlines the collaborative environment in which the recovery team was operating, the fast track scheme development and consultation process, the successful alignment and integration with other projects, and the outcomes that have resulted from the recovery so far. In particular the paper focuses on the outcomes that will enhance the streetscape and improve accessibility.

1. INTRODUCTION

The essential infrastructure that serves our communities is vulnerable to natural disasters. This proved to be the case when Canterbury was struck by a reasonably severe earthquake on September 4th, 2010. In some areas of the region sewer and water pipes no longer functioned, power and telephone services were lost and roads became unusable or difficult to negotiate.

Much work has been done over the years with regard to reliability, preparedness and the immediate term actions required to restore service to communities. This paper focuses on the longer term recovery that road controlling authorities (particularly Councils) face when road infrastructure is useable but no longer functions to an acceptable level of service. For example the kerb and channel no longer performs the function of storm water control, footpath surfaces are uneven and roads are uncomfortable to drive.

The scale of the rebuild required in Kaiapoi is far greater than most councils deal with under normal circumstances let alone with traumatised (and increasingly frustrated) communities. The recovery process in itself has therefore been a challenge to the team engaged to lead it. There are a number of tasks underway in parallel that would normally be carried out sequentially, this leads to an iterative process particularly for the street design. This paper outlines a pragmatic approach to scheme design on this scale and the associated consultation.

The Waimakariri District Council (WDC), in their recovery and rebuild process, has taken the opportunity to achieve better community outcomes and ultimately moves towards prosperity. These outcomes are discussed throughout the paper. The recovery is still underway at the time of writing and many of the outcomes outlined here will be subject to final approvals and funding discussions with the New Zealand Transport Agency (NZTA). However the principle of the outcomes is unlikely to differ significantly from what is presented in the paper.

2. THE EARTHQUAKE

The magnitude 7.1 Darfield Earthquake occurred at 4:36 am local time on 4 September 2010. The hypocentre was about 40 km west of Christchurch City, at a depth of 10 km. The epicentre was close to the town of Darfield.

The mechanics of the earthquake are described in the report (Tonkin and Taylor, 2010a) commissioned by the Earthquake Commission (EQC). The Tonkin and Taylor report notes that land beneath the urbanised areas of Christchurch City and Waimakariri District, and parts of the Selwyn District, is susceptible to ground liquefaction from strong earthquakes. Liquefaction hazard maps prepared by Environment Canterbury (ECan) in 2004 indicate that large areas have the potential to liquefy in a moderate to large earthquake event. Some of these areas did not liquefy in the recent earthquake but this does not mean that they are not at risk under future earthquake events.

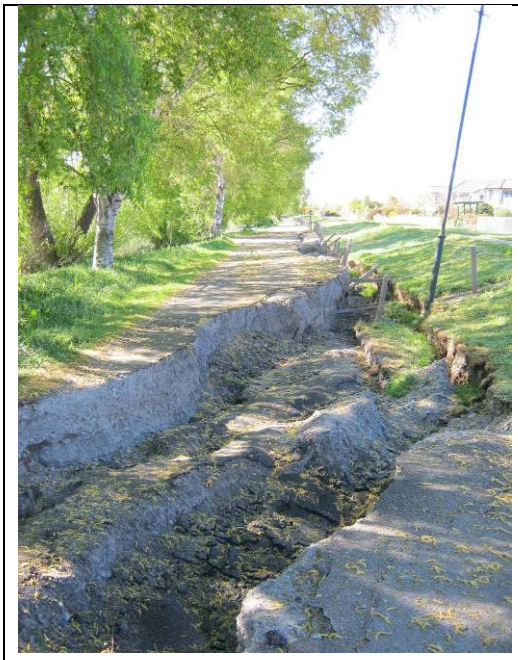
Liquefaction occurs when loose soils are densified by shaking and the groundwater between the soil particles becomes pressurised as the soil tries to compress. The sand volcanoes seen following the earthquake were caused by the liquefied, and pressurised, silt and sand being ejected to the ground surface via tension cracks. Large quantities of sand were ejected to the ground surface in Kaiapoi.

In addition to ground settlement, liquefaction can also result in the ground moving laterally (horizontal displacement) if there is a lack of lateral confinement (i.e. a free edge). This process is known as lateral spreading. The lack of confinement is usually a stream, river, drain, or the coast, and the ground essentially stretches towards this free edge. The Kaiapoi River was one such free edge and the lateral spreading experienced on either side of the river has been measured at more than 3 m. The land and buildings adjacent to the river

suffered very severe damage. In Kaiapoi there are approximately 300 homes that will require rebuilding.

Further investigations commissioned by the EQC (Tonkin and Taylor, 2010b) have concluded that works to confine the free edge is required in some areas of Canterbury; two such locations are either side of the Kaiapoi River. This will be achieved by constructing underground perimeter walls.

Figure 1 illustrates some examples of the types of damage seen in Kaiapoi.



A riverbank track severed by lateral spreading

A street light pole dropped several metres in liquefied soil

Figure 1: Photographs of earthquake damage in Kaiapoi

3. THE FIRST FEW WEEKS – RESPONSE MODE

On the day of the quake, the Civil Defence response swung into action. Council staff responsible for roads quickly arranged for contractors to start restoring access throughout the network.

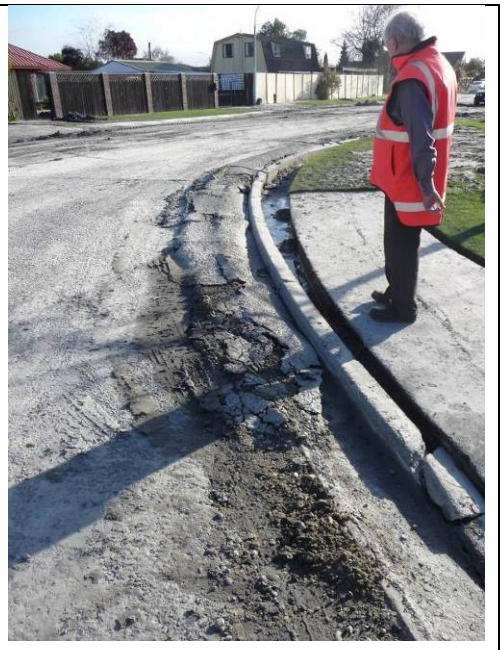
Initially a series of 'Residents Only' signs were installed on the entrances to the worst affected areas, this was to reduce the volume of unnecessary vehicles given the number of contractors working to restore power, water and sewer. Later 30 km/h speed restrictions were put in place to minimise potential damage to properties through vibration and to minimise potential damage to underground services.

In the days after the quake engineers walked the street network undertaking a visual assessment of the damage. This was difficult in some areas as the silt from the liquefaction was covering much of the road. This exercise concluded that 17 km of road would need to be repaired in some manner, ranging from full reconstruction to footpath and kerb repairs only. The initial estimate for this work was $20 million. Figure 2 shows several photographs from that exercise.

Contractors were busy in the four or so weeks after the quake cleaning streets and repairing sunken sections of road; in one location 300 to 400 mm of granular overlay was required to bring the road level back to its original level. The sand and silt was removed from the roads within the first five days and in the weeks following, temporary chipseal and asphaltic concrete surfaces were applied where the road surface had to be removed due to the severe

damage and where depressions needed to be levelled. Water carts were in constant circulation keeping the dust to a minimum until dust free surfaces were in place.

Vertical displacement in Double Days Road.



The kerb and road moved away from the path in Grey Crescent.

Figure 2: Road damage

4. THE RECOVERY

Recovery Team

Eleven days after the earthquake an Infrastructure Recovery Manager was appointed. The manager then began establishing an Infrastructure Recovery Unit (IRU) to facilitate the medium to long term recovery. This unit is made up of four teams focusing on core activities and is generally comprised of consultants and new staff on 12 month contracts. The land rehabilitation team is the most recent team to join the unit. This was established to manage the council's co-ordination role of the building of the perimeter walls, and this involves a key communication role.

The IRU has been working closely with other council units, particularly those who manage the infrastructure. The council's welfare efforts have been operated from a Recovery Assistance Centre in Kaiapoi and the team there also work closely with the IRU to update the community and answer infrastructure related queries as they arise.

The governance aspect of the recovery is handled via a Recovery Management Team and on the political side an Earthquake Recovery Committee has delegated authority for making final approvals. Both of these groups meet regularly enough to allow the process to move swiftly as required.

The external parties involved in the recovery are numerous and in many cases the IRU is effectively collaborating with the parties to minimise overlap of resources and ensure consistent information is provided to the community, for example through combined representation at public meetings.

Initially based at the Waimakariri District Council offices in Rangiora, the IRU was then relocated to Kaiapoi. Figure 3 graphically outlines the unit structure and identifies the key parties that the unit has a relationship with.

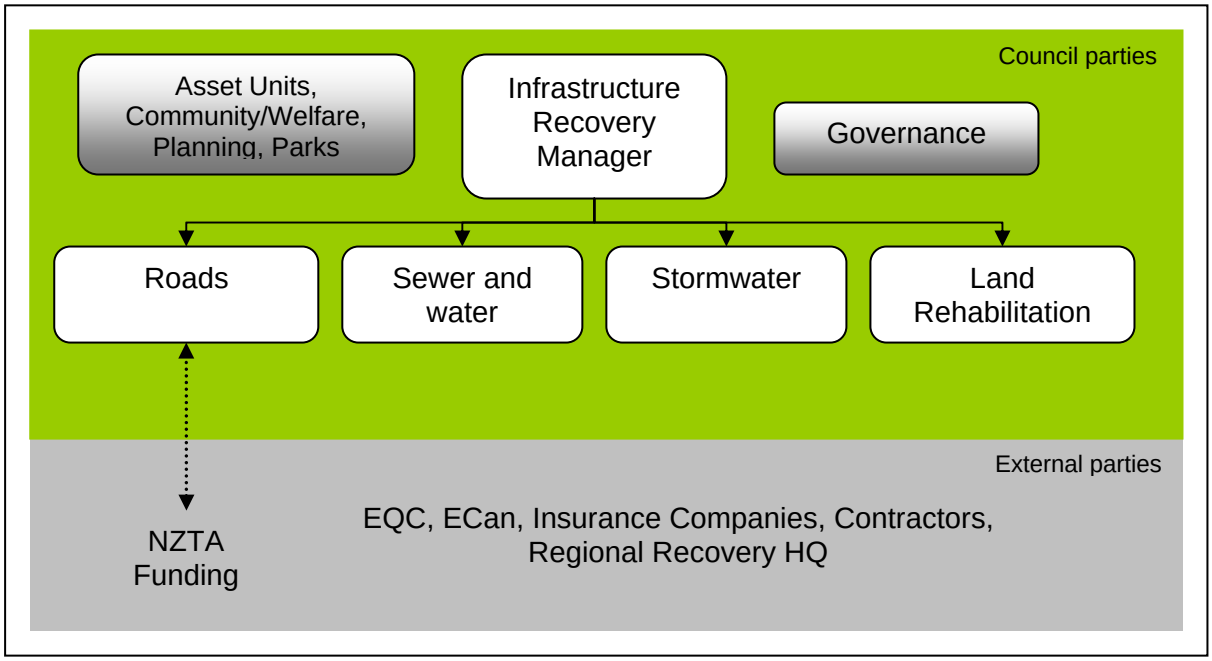


Figure 3: The Recovery Team in relation to Council and external parties

The Roads Team is the most relevant to this paper and the principal author is the programme manager for this team. The team is assessing the exact extent of the damage and preparing designs to be constructed when appropriate. For the purposes of the consultation the team is known as the 'Streetscape Team', the deliverables are Streetscape Plans for the recovery areas. The Streetscape Team includes engineers, planners, landscape architects and urban designers.

The recovery areas

In the Waimakariri district the earthquake caused significant damage in Kaiapoi, Pines Beach and Kairaki Beach. The focus of this paper is Kaiapoi, which comprises of four key recovery areas; these are shown in Figure 4 below and described for context.

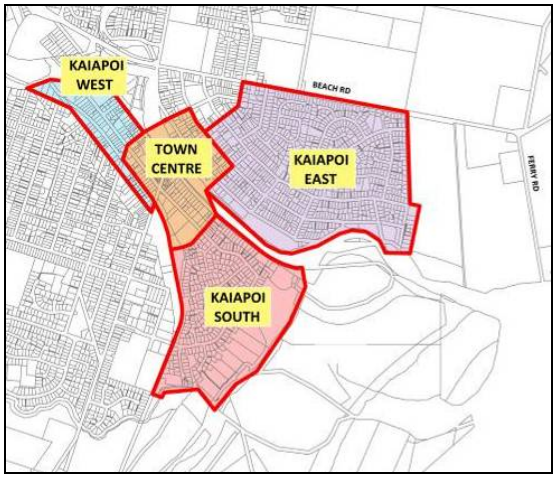


Figure 4: Earthquake recovery areas

Kaiapoi West recovery area: This area is one of the older areas in Kaiapoi and generally features wide streets. The area is predominantly residential, however the Kaiapoi Borough School is located at the west end of Hilton Street. Access to the school has been the subject of several reviews over recent years and the recently revised layout at the end of Hilton Street allows for double parking at busy times. A railway line runs through the area and is crossed by Peraki Street. Adderley Terrace crosses the railway line as a pedestrian underpass at the west end of the area, providing access to the river walks and school grounds. There is a reserve with a playground on Fuller Street.

Kaiapoi East recovery area: This area consists of an older area (towards the river) and several 1960s residential developments. The streets are generally wide (14 m), particularly in the older areas (Charles Street, Sewell Street and Cass Street). The 1960s streets are around 10 m wide with some street trees. There are several pedestrian accessways, and paths through local parks, that link some of the streets. Two of these allow pedestrian and cycle access to Beach Road. The intersections in this area are generally poorly defined and create long crossing distances for pedestrians. The area is predominantly residential with a Church and pre-school at the western end of Cass Street. There are four parks and reserves in this area.

Kaiapoi South recovery area: This area consists of streets built in the 1990s as part of the Courtney Downs subdivision. The main street through the area is Courtney Drive; this provides access to eight residential no exit streets. The design of the streets is considered reasonably modern and attractive however the width of the streets is not much different from the 1960s streets in Kaiapoi East.

Kaiapoi town centre: This area is the core retail area of the town, with two supermarkets and several small to medium sized shopping complexes and a main street shopping area. There are also several hospitality outlets, the main one being the Workingmen's Club; the other three were destroyed in the earthquake. The town centre is spilt by the river over which there is one road bridge and one pedestrian bridge; the later was damaged by the earthquake and awaiting repair.

The recovery process

Due to the scale and relative urgency of the rebuild required in Kaiapoi there are numerous tasks underway in parallel that would normally be carried out sequentially. This leads to a fast track, iterative and potentially risky process particularly for the street design where the design needed to be commenced prior to knowing what streets needed rebuilding (some, of course, were obvious). This has presented challenges to the team but through considered risk management is working well. The approach to the design and consultation, given the need to fast track the process, are outlined in more detail in the following sections. Figure 5 graphically outlines the process.

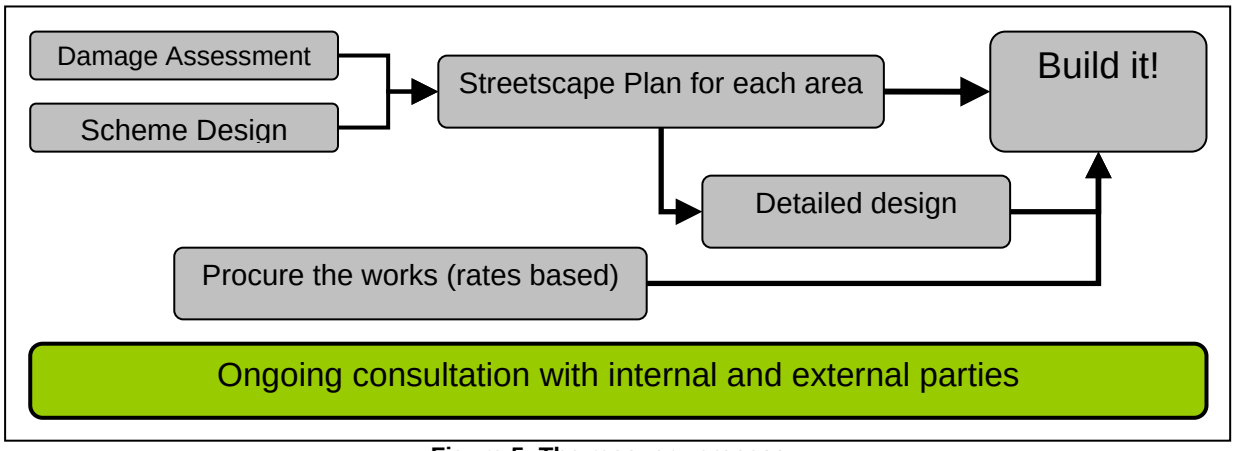


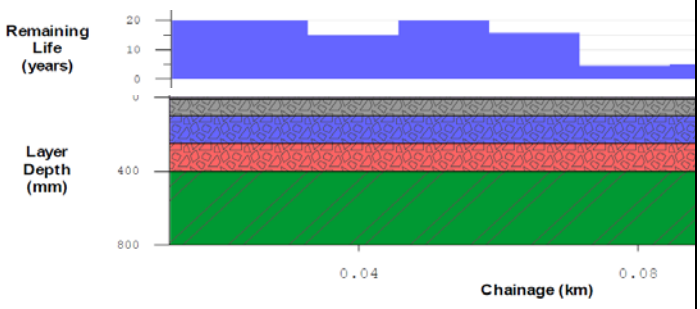
Figure 5: The recovery process

Damage assessment

Damage assessments to determine the exact extent of the damage were undertaken to establish which streets, or parts of streets, needed rebuilding. The damage assessment included a topographical survey of the road reserve and pavement testing. The survey data is allowing the team to assess the kerb and channel flow patterns and this was supplemented with an exercise of pumping water into the channel and observing the flow behaviour.

The pavement testing was undertaken using a falling weight deflectometer (FWD). This method shows the deflections caused by a falling weight and relates this to remaining pavement life. The results showed that many roads still had sufficient remaining life and some required rehabilitation. The form of rehabilitation depends on whether the kerb is to be replaced and hence will the crown of the road need lowering. Figure 6 shows the FWD rig and a typical test output.

The FWD rig



Example of typical output

Figure 6: Falling weight deflectometer testing rig and example of outputs

The design approach

The damaged streets must be repaired to achieve an acceptable level of service (as expected by the community and from an asset management perspective). Doing nothing was considered not to be an acceptable option. The opportunity to enhance the streets and to bring them up to current standards was considered early in the process in comparison to the do-minimum option of replacing like for like.

For the following reasons it was concluded that the option of enhancing the streets was the appropriate way forward:

- Potential for streetscape to contribute to improved amenity, safety and support of active modes of transport (walking and cycling), which thereby is consistent with national, regional and local strategies.
- Potential to implement a more appropriate speed environment.
- Allows the community to actively contribute to the design process.
- This can be achieved without significant additional costs, over that of replacing like for like.
- Opportunity to reduce long term road maintenance costs.

The design process needed to reflect the fact that the exact extent of damage was not known prior to commencing design. Therefore the designs needed to be flexible enough that the old and new would fit together and over time reflect a consistent environment. A 'hierarchical approach' was adopted whereby streets were classified as a certain type and then design templates are applied to those street types. This is explained in more detail below.

A well structured street hierarchy will clearly reflect the function and users of each street in a network. The outcome is a legible and intuitive network. The WDC District Plan has a clear hierarchy for roads that carry lots of traffic; roads with lower traffic volumes are all defined as 'local roads'. For the four areas the local road network was broken into three layers to reflect the function of the road and hence a legible network. The three local road street types from the Selwyn District Council Subdivision Guide (Selwyn District Council, 2009) and draft transport plan change (Selwyn District Council, 2010) were used for this exercise and found to be appropriate. The street types used in the design process are described below; intersection designs would reinforce the hierarchy:

- **Spine road:** A street, known as a 'collector road' in the District Plan, that provides predominantly a movement function for the wider local area but also an access function for residents in the street.
- **Local area street:** A street that provides both a movement function for people in the local area and an access function for residents in the street.
- **Neighbourhood street:** A street that provides both a movement function for people in the more defined neighbourhood and an access function for residents in the street.
- **Residents' street:** A street that purely provides access for residents (or visitors) in the street.

This hierarchical approach worked best for Kaiapoi East given the larger scale of the area and the classic C-type[1] hierarchy (Marshall, 2005). The Kaiapoi South and Kaiapoi West areas are of a smaller scale and less network focused. The Kaiapoi East network is shown below in Figure 7.

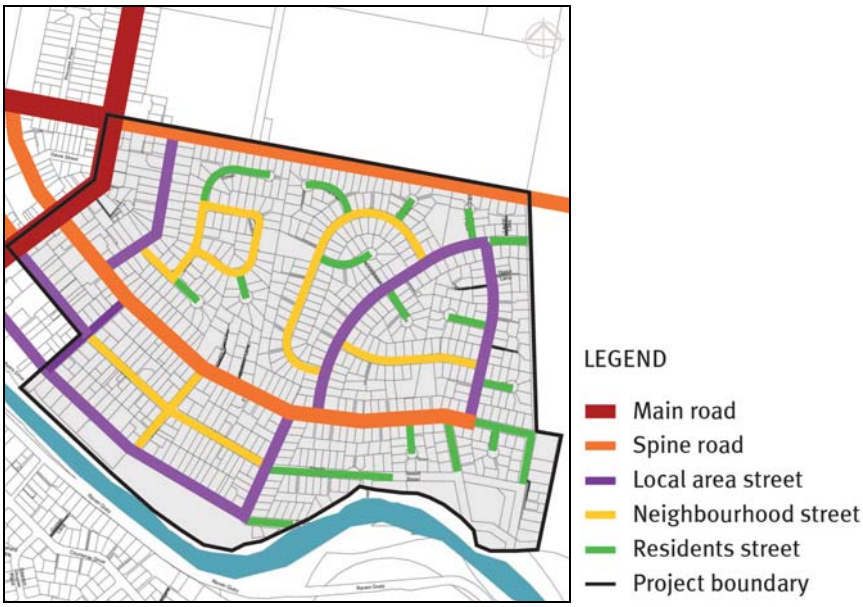


Figure 7: Kaiapoi East street hierarchy

The consultation

The approach to seeking community views was considered at the start of the street recovery process. Several key issues were raised, firstly the timing of consultation given the damage to homes. Will this contribute to information overload and how many absentee residents are

[1] "A mixture of regularity and irregularity, streets typically of consistent width; curved or rectilinear formations meeting at right angles"

there given some homes are damaged? Given the need to complete the designs as soon as possible, so that the recovery could begin early next year, it was concluded that engaging with the residents on the streetscape designs early was important and appropriate. The risk of some people not being able to participate in the consultation due to "not being in the right headspace" was accepted. As it turned out the support from the people who have participated has been very positive (even from those with houses that require replacement) and the volume of consultation feedback is not any less than would be expected under normal circumstances.

Community views were therefore sought on the inputs to the draft Streetscape Plans. The methods used to seek views are discussed below. Further views will be sought on the final Streetscape Plans in the New Year.

In October 2010 a letter and feedback form was sent to the residents and land owners in the recovery areas informing them of the process and asking three key questions (What do you like about your street/s? What aspects do think need addressing? Do you have any design ideas?).

The letter included an invitation to attend 'Street Ideas BBQs' for the Kaiapoi East and West areas and a 'Streets Ideas Open Day' in Pines/Kairaki. These events were held to seek feedback on the pre-quake streets and the types of changes people would like to see in their streets. A number of design ideas were presented for each of the various street types and preferences sought on these ideas. People spoken to at the events seemed generally supportive and enthusiastic about the different ideas. The initial consultation for parks and reserves upgrade projects was also undertaken at the events, this was important as the streets and parks interact, particularly at the street interface.

Figure 8: Talking to residents at a consultation event

The events were well attended by the community and a broad spectrum of Council staff and consultants (both technical and welfare focused) were on hand to hear people's concerns and explore their ideas, and the ideas presented by the Streetscape Team at the events. The Mayor, other elected members and the Council CEO also attended supporting the technical team and tackling issues beyond the streetscape. The presence of children at the events was helpful in determining how school based travel was undertaken within the local environment. Some children told us they walked or biked to school where there were safe and direct links. Several parents expressed an interest in improving the environment so that they would feel comfortable allowing their children to walk or cycle.

The events proved to be an education opportunity for the community. At a higher level it encouraged people to think about their streets as a public space as well as for the movement of traffic, and that the two can be compatible. Most people highlighted excessive speed as a problem in their area and their first request was the installation of speed humps. Through explanation we were able to convince them that the good design of streets can help address

this without the need to provide isolated features that usually no one wants outside their house.

There were also people asking why our idea drawings explained how cyclists would be accommodated in that particular concept as "no one cycles around Kaiapoi". We asked them why that was and have they considered that the current road environment may be the reason for that. They generally concurred and one gentleman (who took more convincing than others) even turned up the next day to another consultation event, with his family – all on bikes!

An event for the Kaiapoi South area was not held as the streets are of a more modern design and it was concluded that the opportunities to improve the streetscape are of a lesser scale. However the author attended a Kaiapoi Residents' Association meeting in late November to seek further information from attendant Kaiapoi South residents on any issues or ideas for their streets. The information gathered at the meeting supported the feedback received via the feedback forms.

The common messages from the consultation are summarised below.

- People like the proximity to the town centre and river and would like to make the most of this in terms of access,
- There is an issue with speeding vehicles and 'boy racers', and this needs to be addressed to make streets safer for everyone especially children,
- The area could be made more pedestrian and cycling friendly with improved footpaths and dedicated cycle paths,
- Pedestrian walkability needs to be enhanced, i.e. wider footpaths, better linkages, safe crossing points and good visibility,
- Street safety, functionality, car parking and cycle/pedestrian access associated with the Kaiapoi Borough School needs to be improved,
- The intersections need to be made safer,
- Improve the attractiveness of the streets, i.e. more landscaping,
- Reserves and parks are important to the community and should be enhanced,
- The ease of on-street parking should be retained, and
- There is a need to distinguish between local and through roads, particularly at entries to culs de sac.

The Streetscape Plans which will be the result of the design process will be very high level and will not show how the design is applied in relation to any one property. Sending out plans that show the fine details would not be cost effective and can also result in residents focusing on the design outside of their property rather than the overall concept. Details such as where kerb build-outs are to be located will be discussed with the residents and landowners on a one to one basis once the Plans have been released and the detailed design has commenced. The Streetscape Team will be located in Kaiapoi and will be available to discuss details with residents over defined periods in an Open Day approach.

The Scheme Design

As discussed earlier the design of each street type in the East and West areas involved the Streetscape Team preparing a series of ideas and then asking the community for their preference at Street Ideas BBQs. The ideas were based on designs that would be compatible with the sections of streets that were not damaged, for example the widths need to be similar and have features that allowed seamless transition.

This community feedback allowed the team to prepare a series of templates that could be applied to the network once the extent of the rebuild was known. In some cases a

combination of the design ideas were considered as a way to address multiple needs of the community. Also it was found that in several instances the template for a certain type of street was also appropriate for a street of other type.

Based on the issues raised the key design objectives in rebuilding the damaged streets and intersections are:

- Reflecting the speed environment appropriate for a residential area.
- Improving the amenity of the streets.
- Improving links to destinations.
- Effectively accommodating all road users.

The design templates were not subject to the Waimakariri District Plan roading standards as these only apply to streets constructed after 1998. The WDC Code of Practice (COP) provides some guidance on design but is not highly prescriptive, as the design proceeds any comment on how the COP content can be improved is being noted for future revisions.

The design templates for the Kaiapoi streets are explained briefly below:

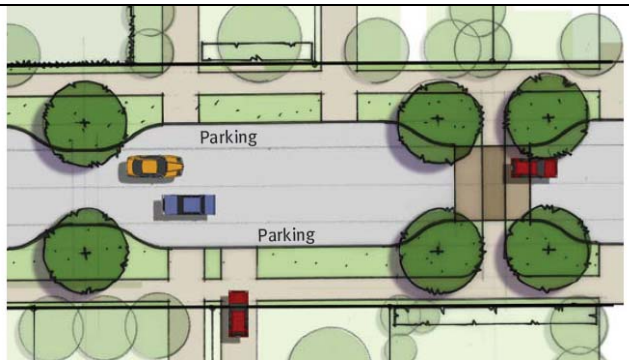
- **Spine road**: For the spine roads that need rebuilding the street will be 10 m wide. This is made up of 2 m wide defined parking bays on each side and a 6 m carriageway. There will be some kerb buildouts to allow tree planting and reinforcement of the low speed environment. A segregated bicycle path will be provided on one side of the road reserve and footpaths both sides. This layout means that that the street will be off set towards one side rather than central as currently configured. This will only be applied to the spine roads that require rebuilding along the entire length.

Cass Street now

Cass Street if spine road design adopted

Figure 9: Typical spine road design

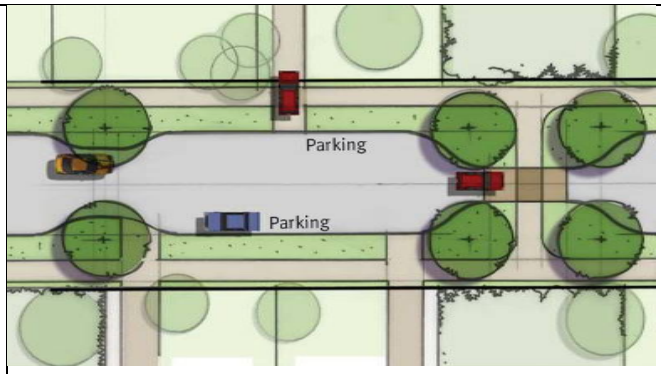
- **Local area street**: These streets will be 10 m wide. This is made up of 2 m wide defined parking bays on each side and a 6 m carriageway. There will be some kerb buildouts to allow tree planting and reinforcement of the low speed environment. Some narrow points (two way flow) will allow pedestrian crossing locations and provide distinction from the spine road layout. There will be footpaths on both sides. This design provides consistency with the current layout of the streets (mostly in the Kaiapoi East area) where not entire streets need rebuilding. The kerb buildouts allow a good transition point between the old and new.



Example of existing local area street	Design template for local area streets

Figure 10: Typical local area street design

- **Neighbourhood street:** These streets will be 9 m wide with some kerb buildouts to allow tree planting and reinforcement of the low speed environment. Parking on both sides of the road and two way flow is still possible with this width. Some narrow points (one way flow) will allow pedestrian crossing locations. There will be footpaths on both sides.



Example of existing neighbourhood street	Design template for neighbourhood streets

Figure 11: Typical neighbourhood street design

- **Residents street**: These streets will generally be of the same layout as existing but opportunities to add landscaping will be taken where possible and in discussion with the residents. Each residents street that needs rebuilding will need specific design consideration given that the road reserve widths vary and some existing vegetation may be able to be retained. The intersection of the residents streets with all other street types will be better defined so that it is clear that it is a no-exit street (as opposed to relying on signage for this purpose).

These typical designs are reasonably consistent with the New Zealand Standard for Land development and subdivision infrastructure, NZS4404:2010 (NZS, 2010) which uses a place, link and design environment context analysis to recommend typical plan and cross section details. Table 3.2 recommends for roads of a nature similar to the spine roads that there are footpaths on both sides, parking is recessed, it allows for public transport and has separate provision for cyclists. For roads such as the local area and neighbourhood streets Table 3.2 recommends, for the number of dwelling units they service, that there are footpaths on both sides, parking is separated from the movement lane, cyclists share the movement lane and the movement lane is 5.5 to 5.7 m.

The intersection design templates aim to reinforce the hierarchy, reflect the low speed environment (reduced radii and narrowed carriageways) and provide short and direct pedestrian crossing locations.

Opportunities to incorporate storm water treatment into the Kaiapoi East road reserves are being explored in parallel with the street design process. Given that many of the road reserves are less than 20 m the opportunities are limited, however if any options become viable then targeted consultation with the residents in the affected street will be undertaken.

Opportunities beyond the enhanced streetscapes include the investigation into providing further walking and cycling links between streets through strategic land purchase, particularly where buildings may require demolition on identified desired links through the network. Improvements to the existing narrow, and in one location nonlinear, links are also subject to any land purchase opportunities.

Alignment and integration with other projects

There are several urban design and transport projects, Council led and others, that the recovery project was aligned with and some that could be integrated more directly. These projects are discussed below.

Walking and cycling strategy (2010): The Council recently approved a walking and cycling for the district. The strategy did not identity any specific projects within the recovery areas but does align with the recovery through contributing to the following strategy goals:

- Promote walking and/or cycling as a good way of making short or medium length trips – as the built environment to incorporate provision for walking and cycling
- Provide safe access for children to walk or cycle to school, and for all residents to walk or cycle to sports and recreation facilities – provision of the separated cycleways that will achieve this

Kaiapoi Town Centre Neighbourhood Accessibility Plan (2010): This Plan involved an investigation that has been undertaken to ascertain how to increase the number of cyclists and pedestrians safely and easily accessing the Kaiapoi Town Centre and to encourage businesses in the town to view development of the area in an environmentally friendly way so that more people are encouraged to walk or cycle rather than drive. The Plan also involved a Community Street Review. The recovery aligns with this plan as the outcomes so far mean that walking and cycling to the town centre will be improved.

Town Centre Project: Kaiapoi, as a town centre, has been for some time competing with other areas in the district (mainly Rangiora) and retail centres in the north of Christchurch. It has been anecdotally said that only 5% of Kaiapoi residents shop locally. A Town Centre Revitalisation project underway prior to the quake was aiming to make the town centre more attractive to locals and non locals. Earthquake damage has changed the face of the built environment; particularly given the demolition of several significant buildings (including the historic Blackwell's Department Store). The residential streets adjoin the town centre and how this interaction could be managed is being considered by the Streetscape Team.

Parks and reserves: There are several parks and reserves in the recovery areas that were programmed for upgrade in the future. The council took the opportunity to integrate the consultation for the parks with the streetscape ideas. The design interface between the street and the parks is also being developed with the aim of better pedestrian access.

ECan bus route changes: Prior to the earthquake ECan reviewed bus services in Kaiapoi and proposed an extension to the 'Kaiapoi to the Palms via Brooklands' route to include eastern and western parts of Kaiapoi that do not currently have a bus route. This would provide greater access to public transport for residents. The proposal was consulted on and now the final details of the route will be prepared. Discussions between the Streetscape Team and ECan representatives have concluded that the design of the route will cater for bus stops now as opposed to retrofitting later. An extension to the route is likely to be revisited in future so the street designs will future proof for that potential outcome.

5. CONCLUSIONS

Very rarely does an opportunity occur to rebuild streets to current standards and best practise on such a large scale. This project has required a fast track process and, given the scale, has required careful consideration of risks.

The conclusions drawn from the project (so far) to rebuild the streets in Kaiapoi are:

1. A hierarchy/template based approach for large scale street networks works well and efficiently.

2. Consultation on concepts rather than details allows for better community buy-in – sort out the detail later.

3. Opportunities to provide an appropriate speed environment will result in a better walking and cycling experience in Kaiapoi and support the Councils Walking and Cycling Strategy and Town Centre Neighbourhood Accessibility Plan.

4. The attractiveness of the streets will be greatly improved through carriageway widths and intersections appropriate for local residential neighbourhoods and landscape planting.

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