APPENDIX 2

DESCRIPTION OF REBUILD, REPAIR, ENHANCEMENT AND RECONFIGURATION PROJECTS

Lyttelton Port of Christchurch

PROPOSED RECOVERY PROJECTS

LYTTELTON PORT RECOVERY PLAN

NOVEMBER 2014

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1 Summary of asset repair, rebuild, enhancement and reconfiguration

The following information sets out the current thinking on the repair, rebuild, enhancement and reconfiguration of Lyttelton Port post-earthquakes. As stated elsewhere in the information package, LPC has only been able to plan for this reconfigured port since early 2014. Consequently the information contained here represents early thinking on many of the projects with many of them still in feasibility or concept design phase.

In addition, the needs of the port users change regularly and rapidly, in response to global economic demands and trends in global shipping. It is likely that many of these projects will change in some way, be it the specifics of the design, the location or the intended user of the infrastructure.

The overall program and sequencing will need to continuously adapt to economic conditions and the changing needs of the port's users. This could result in changes in the priority of projects, changes in sequencing or changes in required delivery timeframes.

In order to manage the projects, the projects are split into three groups, and these groupings are used here also. The three groups are:

- Group A Reclamation
- Group B Cashin Quay
- Group C Inner Harbour

A description of the individual projects within each group is included below. We have also included a description of the proposed reconfiguration of the port including the details of the proposed capital dredging of the shipping channel.

Three plans setting out the proposed recovery works are also attached at the rear of this document. These plans set out the location of the following:

- Plan 1: The rebuild and repair projects (rebuild or repair of existing assets, which may include upgrade to modern standards)
- Plan 2: The enhancement projects (construction of existing assets or infrastructure which was not present at the Port prior to the earthquakes)
- Plan 3: The reconfiguration of the Port (the proposed changed land use configuration of the port)

The project codes used in the description (such as A01) are also included on the plans to allow connection to the description of each project. Note that there are some projects that are port wide and are not graphically shown on the plans.

An overall construction program is also attached and as previously stated this is the current thinking on the duration and sequencing of the projects.

2 Reconfiguration and dredging

Growth in freight volumes and changing needs of the port users are driving the need to change the layout of the port and provide improved levels of infrastructure. This particularly relates to the co-ordination of wharf side infrastructure with land for handling and storage of freight.

As much of the port's infrastructure requires rebuilding or significant repair, it makes sense to rebuild and recover the port in a way which delivers increased freight capacity and handling efficiencies. A crucial part of providing for increased freight growth and meeting the needs of the shipping companies is a wider and deeper shipping channel. This will enable the port to cater for the ever increasing vessel sizes used by international shipping companies.

The following sections set out the proposals to reconfigure the port's operations as well as to provide a larger shipping channel.

2.1 Reconfiguration

The rebuild, repair and enhancement projects will in combination, allow the port to reconfigure its current operations to better meet the future freight demands. It will also enable LPC to provide public access to the waterfront at Dampier Bay.

Currently port activities operate in the following areas of the port:

- The Naval Point area which includes the oil terminal as well as some log storage
- The Inner Harbour which includes the Oil wharf, Dry Dock, recreational marina and general cargo wharfs
- Cashin Quay which includes the container terminal and coal loading facilities
- Coal stockyard used to store coal prior to export, and
- The hill slopes below Sumner Road which include access roads to the quarry and the quarry itself

The reconfiguration of the ports layout is driven by the need to provide additional cargo handling capacity and increased public access to the Inner Harbour waterfront. This overall reconfiguration centres around an overall movement east, and is called the "Port to the East' concept. This Port to the East concept underpins the reconfiguration of the port.

The key to the move east is the reclamation of land at Te Awaparahi Bay. The reclamation enables the container terminal to move east, freeing up Cashin Quay for general cargo use. The new container terminal at Te Awaparahi will have two big ship capable berths with up to four ship to shore cranes servicing each berth. The terminal will continue to utilise a straddle carrier operation to move containers. A key aspect of the new container terminal will be 300-500m of land behind the two wharfs as recommended by international best practice guidelines. The terminal will include modern gate facilities to ensure an efficient transfer of containers to trucks and a rail system designed for a higher rail mode share.

As the container terminal moves off Cashin Quay, general cargo will migrate onto the vacant space. It is anticipated that the noisy, dusty trades and those that require greater areas of land will move onto Cashin Quay. This will likely include, logs, dry bulk cargo and scrap metal. Other cargo, e.g. break bulk, cement, fishing etc. may stay in the eastern Inner Harbour utilising No 2 and 3 wharves. The oil berth and dry dock operations will remain in the western Inner Harbour.

The reduced operational reliance on the Inner Harbour means Dampier Bay will no longer be needed for port operations. Dampier Bay can then be re-developed with modern marina facilities, a mixed used commercial development which public access to the waterfront. A further stage of redevelopment between No.7 wharf and No.3 wharf, called Dampier Bay Extension is also proposed. This could include another marina and potentially more on land development. The timing and ability to undertake parts of Dampier Bay and all of Dampier Bay extension is dependent on the Port to the East and ultimately the reclamation.

Whilst the reconfiguration of the port will result in changes to the general location of port operations, the specific activities within those areas will change on a daily basis. For example a wharf might be used for loading logs one day and unloading cars the next. This flexible use of wharves and landside is critically important to provide the port flexibility to cope with changes in shipping schedules on a day to day basis as well as longer term changes in the freight mix that goes through the port.

2.2 Dredging

The current shipping channel which provides access to the port comprises a 180m wide, 12.1m deep (below chart datum) channel. This configuration is able to provide all tide access to vessels with a draught of 10.4m and tide dependent access to ships with a draught of up to 12.4m.

In order to enable the larger container and bulk cargo vessels to access the port, LPC propose a capital dredging project to deepen, widen and extend the Lyttelton Harbour shipping channel.

It is planned to deepen the existing channel in the Harbour by approximately 4m, allowing a 14.5m draught vessel to sail on all tides. Due to greater wave action, the new channel would need to be a further 0.5m to 1m deeper out beyond the heads of the Harbour. The existing channel will also need to be widened by between 20 and 40m to allow for manoeuvring of the larger vessels the existing turning basin will need to be enlarged and deepened. The proposed dredging is likely to be undertaken using a suction dredge and the dredge disposal ground will be approximately 8km north east of the harbour entrance, designed to ensure dredge material does not re-enter the harbour or affect the shoreline.

In addition to the shipping channel, deepening of the berths and portions of the Inner Harbour will be required to enable the larger ships to dock at the wharves. At this stage it is proposed to provide deeper berth pockets along Cashin Quay, the Oil Berth and the wharfs at the proposed reclamation.

The proposed outer cruise berth will also require a small westward extension of the dredged channel, a new berth pocket and vessel manoeuvring space. Due to the shallower draught of cruise ships, these areas would only require dredging to a depth of approximately 10.5m.

Whilst the total dredge volume has yet to be determined, it is likely to be more than 20 million cubic metres in total. Due to scale and cost it is most likely the dredging will occur over more than one campaign

3 Reclamation Group A

Combined, the projects in this group will provide a finished and functional container terminal on reclaimed land at Te Awaparahi Bay. Essentially this comprises the construction of land and wharfs, the civil works to provide an appropriate pavement and services and the installation of container handling equipment.

As there is an urgent need for additional land to provide for increasing freight capacity, a staged construction methodology is proposed. Essentially this will allow LPC to use the readily available quarry materials to quickly build a useable portion of land. This will take the immediate pressure off the land constraints and allow time for construction of the second phase which may need to use fill materials which are not as rapidly available or take longer to create useable land, such as hydraulic fill.

If the entire reclamation was to be constructed in one stage, there would not be any land useable for a container terminal until the entire reclamation was complete. Consequently the port would be unable to meet the growing freight demands within the short to medium term.

3.1 A01 - 10 Ha Reclamation (enhancement)

Construction of a 10 ha land reclamation is underway at Te Awaparahi Bay using demolition rubble from Christchurch. This reclamation was consented under an Order in Council in 2011. Construction is by end tipping clean earthquake rubble into the sea, once the required level is reached the land will be compacted and surfaced to allow future use. A floating boom with a silt curtain surrounds the active working face and is designed to contain silt and prevent floatable debris entering the harbour.

The reclamation will be used to provide much needed space during the recovery and support the trades that the Port services, in particular vehicle imports and container terminal activities. It will also be used to accommodate construction work, and is already being used to store rock armour for the construction of CQ2. Reclamation construction commenced in March 2011 and is expected to be completed around June 2016 (5 year duration). As at the time of writing, the reclamation was over 7ha in size and already being used for container and vehicle storage as well as a construction lay down area.

Ultimately this reclamation will form part of the proposed container terminal and is the first step in the Port to the East project.

Figure 1. Current reclamation (under the 10ha consent) – original shoreline is at rear of photo in the location of the road and rearward container stack.

3.2 A02 – 8 Ha Reclamation for Stage 1 Container Terminal (enhancement)

Approximately 8 ha of additional land reclamation is needed to develop Stage 1 of the Container Terminal. It is proposed that construction of this reclamation will commence as the existing 10 ha reclamation (A01) is nearing completion in early to mid-2016. It is expected to take 2 - 5 years to complete.

This reclamation will not use earthquake rubble. Instead it will use quarry sourced rock and gravels, either from LPC's quarry at Gollans Bay, waste rock from Sumner Road reopening or other private quarries. If rock from the LPC quarry or Sumner Road is used it will be transported along the repaired haul road which runs below Sumner Road. Large mining type trucks would likely be used and the haul route would not include any public roads.

The construction methodology will be similar to the existing reclamation and would likely advance by end tipping southwards towards the centre of the harbour. Some preparatory dredging may be required prior to placing the fill materials. Finished seaward faces would need to be armoured with large rocks to prevent wave erosion.

3.3 A03 – 19 Ha Reclamation for Stage 2 Container Terminal (enhancement)

A 19 ha reclamation is needed to develop Stage 2 of the proposed Container Terminal. This will be constructed by either:

- forming a rock bund around the perimeter of the reclamation and using dredged marine sediment (hydraulic fill) or imported material as fill (estimated 2 million cubic metres), or
- by end tipping hardfill (possibly using a leader berm) as per the stage 1 reclamation.

The actual construction methodology will largely depend on the availability of material and the timeframe available for construction.

Some form of ground improvement may be required to increase the strength of the land or speed up the settlement of the fill and underlying sediments. This could include high energy methods such as dynamic compaction or lower energy methods such as preloading and installation of wick drains. Some form of dredging may also be required in the construction.

The seaward edges of the reclamation will need to be rock armoured to prevent wave erosion.

At this stage it is not anticipated construction will commence until 2017-2019 and is expected to take 4 – 7 years to complete.

3.4 A04 – Lower Haul Road (repair)

The Lower Haul Road is approximately 500m long and runs from the eastern end of the coal terminal up to the ridge above the Battery Point gun emplacements. This road is the lower portion of the overall haul road that will be used to access the Gollans Bay Quarry to source armour rock and fill material. It may also be used to support the removal of excess material from Sumner Road.

The alignment of the road is to generally follow that of the existing road with a new section needed to extend down onto the level of the coal stockyard. To provide the required levels of grade on the road it is proposed to cut down the road corridor. This will result in the road being below the surrounding land and less visible. Estimated earthworks volumes (a combination of cut and fill) are 220,000 m^3.

The earliest that construction works for this road can begin is likely to be mid 2015. It is estimated it will take 6 months to complete. The construction works will involve ripping, excavating and some blasting. Excavated material taken from the works will be used in the 10 ha reclamation or stockpiled for later use.

The consents for the 10ha reclamation included consents to upgrade the lower haul road (CRC 111660), although a slightly different alignment was initially proposed.

3.5 A05 – Upper Haul Road (repair)

The Upper Haul Road extends from the Lower Haul Road (A04) up to the Gollans Bay Quarry. This will be used to provide access to the Gollans Bay Quarry to source armour rock and fill material. It may also be used to support the removal of excess material from Sumner Road. The road is being designed to be used by large off road earthmoving trucks.

This road has been closed since Feb 2011, and is subject to the same risk of rock fall as the currently closed Sumner Road which is above the haul road.

The construction works will involve ripping, excavating and some blasting. Like for the Lower Haul Road, excavated material taken from the works will be used in the 10 ha reclamation or stockpiled for later use. Estimated earthworks volumes (a combination of cut and fill) to create the fill are 65,000 m^3.

The earliest that construction works for this road can begin is early 2016. Construction work is likely to require rock fall protection works, or may be sequenced to align with proposed work by CCC on risk mitigation for Sumner Road. It is estimated it will take 5 months to complete. Uncertainties associated with this project include actual project start date and loess disposal location.

The 10ha reclamation consents included a consent (CRC 111660) to construct the Upper Haul Road.

3.6 A06 – Quarry operation and Sumner Road Enabling Works (repair)

LPC have been operating a quarry at Gollans Bay since it was established as a source of fill for the Cashin Quay reclamation. More recently it has been largely used as a source of armour rock for maintenance of seawalls and batter slopes. In 2011, LPC sought and gained a consent to extract rock from a larger area at the Gollans Bay Quarry. Under the current consent, the extracted rock can only be used for the existing 10ha reclamation. Due to rockfall hazards associated with Sumner Road, no extraction has occurred at the quarry since the consent was granted. The currently consented footprint is set out in Figure 2.

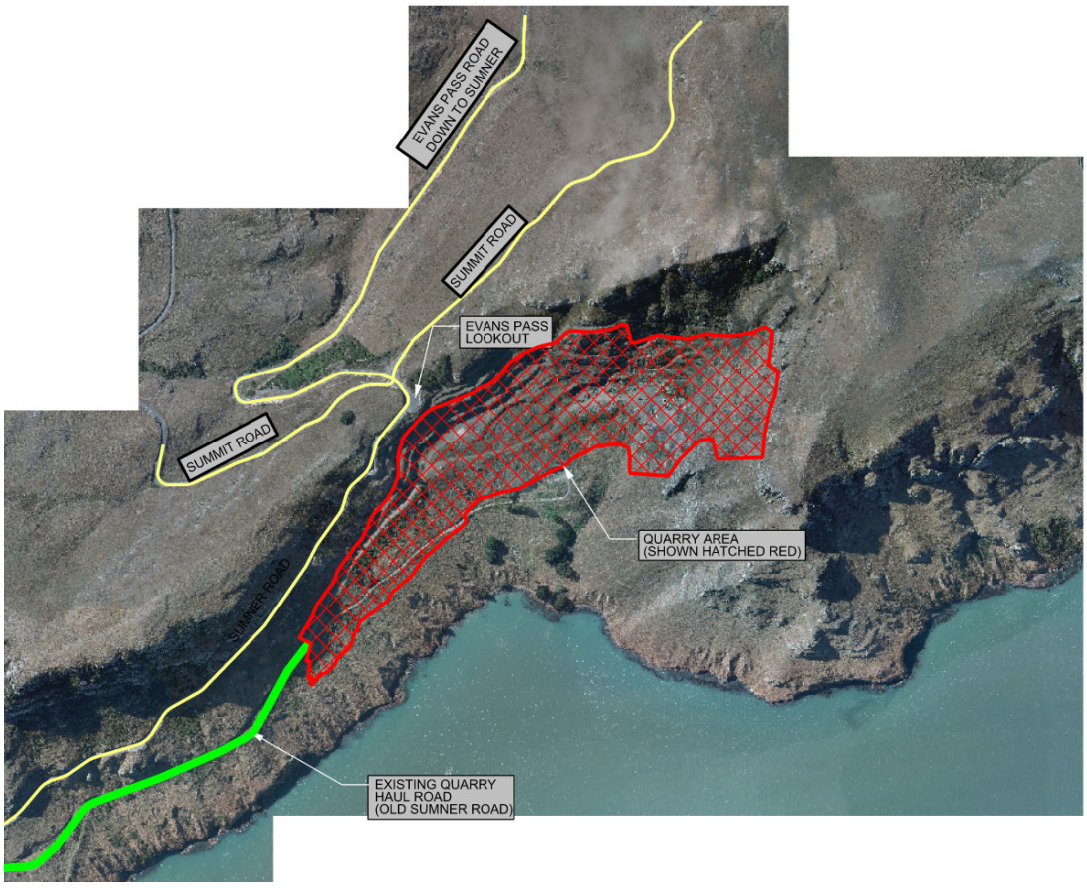

Figure 2. Consented quarry footprint (hatched red)

As part of the recovery projects, it is proposed to undertake quarrying within the same footprint as the existing consent, but to use the rock for wider recovery projects at the port. This will include reclamation fill, repair of rock armouring throughout the port and other miscellaneous uses. The quarrying will be a combination of blasting and removal by excavator and will likely be carried out in five stages as set out in Figure 3. The stages cover both ground that has previously been quarried as well as unmodified ground.

The extracted material will be transported to the port via the upgraded haul road (Project A04 and A05). Some sorting of the material will be required at the quarry to segregate high quality armour rock from general fill materials.

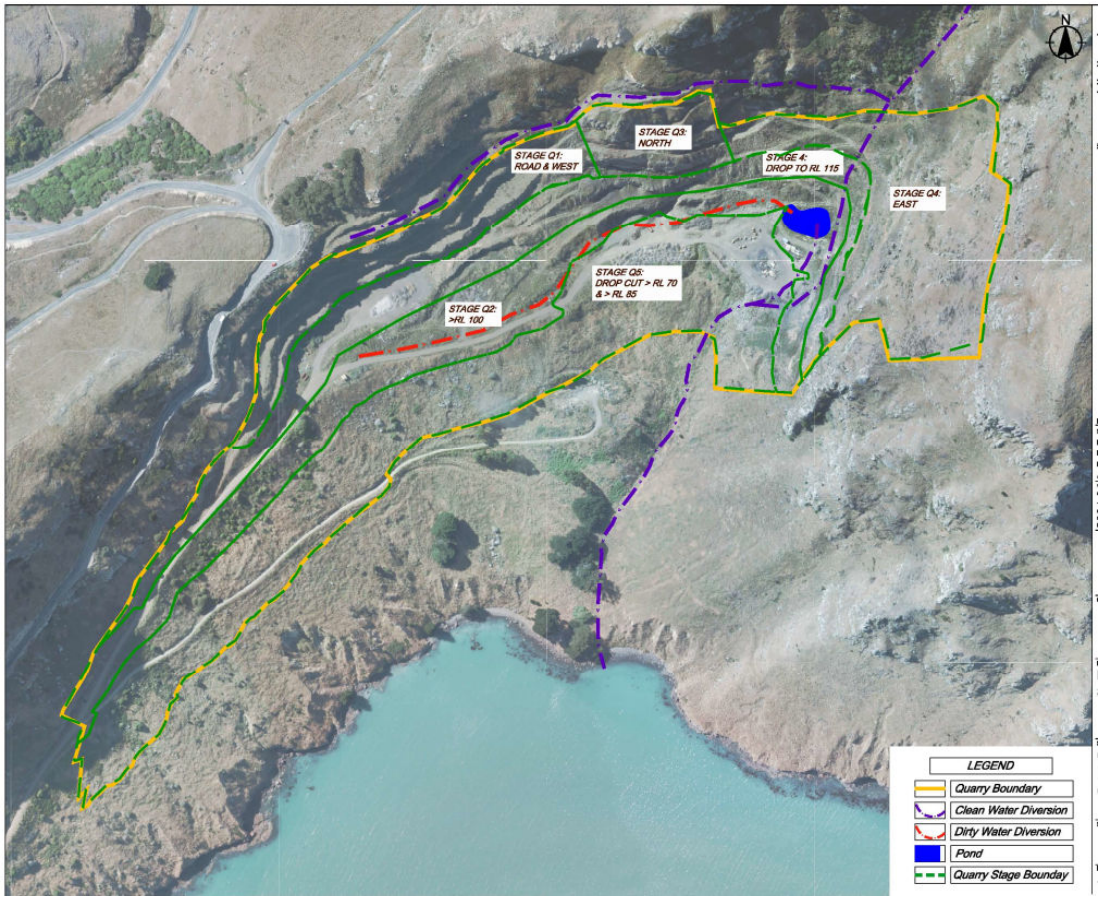

Figure 3. Staging of quarry development and related storm water controls

As part of the quarry works, there may be a need to store rock from the Sumner Road stabilisation works (undertaken by CCC). To enable the deposition and storage of this rock, some work will be required at the quarry. The purpose of the work would be to provide a way to avoid double movement of material and may involve earthworks to construct access ways and stockpile areas within the quarry or up to Sumner Road/Evans Pass.

The start date and duration of both projects are somewhat dependent on CCC planned mitigation works. If Sumner Road was not to be opened, it is possible to provide safe access along the Haul Road to enable access to and operation of the Quarry. This will enable fill to be provided for the reclamation irrespective of the decision to open Sumner Road.

3.7 A07 – Terminal Development Enabling Works (enhance)

The terminal development enabling works will involve identification and early movement or construction of structures, buildings, utilities, services, transportation elements, and ancillary works in advance of Terminal-specific development. The works will be used for planning and delivering infrastructure required to service the new terminals.

The commencement date and duration of the works is not yet known.

3.8 A08 – Terminal Development – Wharf (enhance)

The container terminal wharf will be used to berth container ships and support the proposed eight (8 No.) container cranes. The works will involve constructing two 350 m, 35 m wide wharves along the southernmost edge of the reclamation. Each wharf is expected to take 2 years to construct, and whilst the design has not yet been undertaken they are likely to have approximately 400 driven steel piles with a concrete wharf deck comprising approximately 25,000m3 of concrete. Services, such as water and power, will also be provided to the wharf and stormwater collection and treatment systems will be installed. The earliest the works would commence is 2017.

3.9 A09 – Terminal 1 Development – Civil (enhance)

This project comprises the earthworks and general civil works involved in construction of pavements and services for Terminal 1 (Stage 1 of the container terminal). The pavement will comprise a typical heavy duty pavement made up of compact granular fill with an asphalt surface. The works will also involve the construction of drainage systems (including stormwater treatment system) and the installation of terminal lighting, security and communication networks.

The works are estimated to take two years to complete and will be carried out in conjunction with A10 - Terminal 1 Development Mechanical and Electrical. The earliest start date for the works is 2017.

Uncertainties associated with these works include the design of access points to the terminal, the configuration of the terminal, and the design of rail and road unloading and staging facilities.

3.10 A10 – Terminal 1 Development Mechanical and Electrical (enhance)

Terminal 1 Development Mechanical and Electrical will involve the procurement and establishment of four quay cranes, straddle carriers and an automation system for Terminal 1. The construction time is estimated to be two years and would occur in conjunction with the A10 Terminal 1 Development – Civil project. The earliest this project could commence is upon completion of the additional 8ha reclamation (A02) which may be sometime in 2018.

Minimal earthworks would be required for this project, with the only ground disturbance to install electrical supply for cranes and associated backup generation.

3.11 A11 – Terminal 2 Development – Civil (enhance)

This project will involve the construction of pavement and services for Terminal 2. The pavement will comprise a typical heavy duty pavement made up of compact granular fill

with an asphalt surface. The works will also involve the construction of drainage systems (including stormwater treatment system) and the installation of terminal lighting, security and communication networks.

The works are estimated to take two years to complete and will be in conjunction with A12 - Terminal 2 Development Mechanical and Electrical. The earliest start date for the works is 2022

3.12 A12 - Terminal 2 Development – Mechanical and Electrical (enhance)

Terminal 2 Development - Mechanical and Electrical will involve the procurement and establishment of four quay cranes, straddles and an automation system for Terminal 2. The construction time is estimated to be two years and would occur in conjunction with the A11 Terminal 2 Development – Civil project. The earliest this project could commence is 2022.

4 Cashin Quay and Coal (Group B)

The Group B projects comprise the repair or rebuild of the assets and land associated with the Cashin Quay berths, current container terminal, the coal storage yard and associated transfer/handling systems.

Cashin Quay was constructed in the late 1950s and became operational in 1964. From this time on it has been the principal cargo facility at the port, particularly with the arrival of containerised cargo in the 1970's. In addition to container ships, Cashin Quay has also been used for general cargo, cruise ships and more recently for vehicle unloading. The easternmost berth (Cashin Quay No.1) is where coal ships berth. The coal conveyor loading system extends from the coal stockyard to this berth.

The coal stockyard stores a range of coal grades mined on the West Coast and transported to Lyttelton by train. As the west coast mines do not have sufficiant stockpiling capacity, the continued operation of the Lyttelton coal stockyard is critical to their operations. If the coal stockyard and the ship loader was to cease operations, it is estimated the west coast mines would run out of stockpile capacity in 4-6 weeks and would then have to cease mining.

Due to the importance of the Cashin Quay infrastructure to the day to day operation of the port, reconstruction of Cashin Quay 2 has already started. Significant temporary repairs were also completed to Cashin Quay 1, 3 and 4 totalling more than $20M in the period immediately following the earthquakes.

The following sections contain a short description of the projects required to repair, rebuild and reconfigure the Cashin Quay infrastructure.

4.1 B01 – Cashin Quay 2 (repair/replace)

The Cashin Quay 2 (CQ2) wharf (approximately 230m long), associated land and seawall were extensively damaged during the earthquakes. Figure 4 below illustrates the type of damaged suffered at CQ2. The wharf was deemed irreparable and a complete rebuild planned.

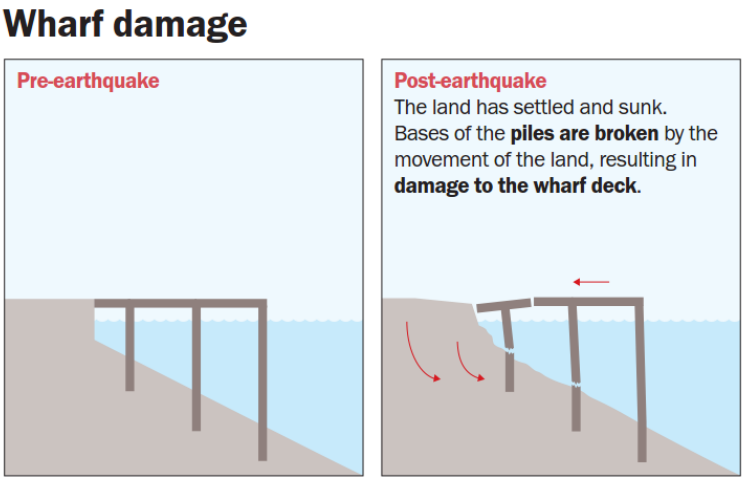

Figure 4

Consents were obtained and the wharf rebuild commenced in December 2013, initially focussing on the repair of the damaged land. The next stage was the demolition of the existing wharf, which included cutting and removal of the concrete wharf deck and

supporting beams. This was then followed by removal of the piles and re-grading of the batter slope. The re-grading of the batter slope will involve removal of the erosion protection rock layer which lies above and below water. This will be followed by re-grading of the failed batter slope and then replacement of the rock protection layer. In total over 70,000m^3 of material will be excavated or placed during this work.

A brief outline of this process is illustrated in Figure 5

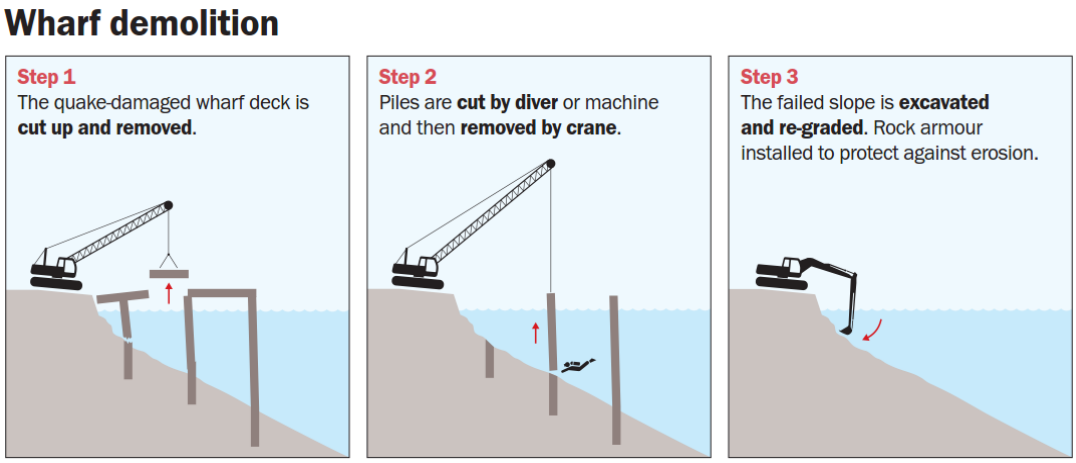

Figure 5

As demolition and batter slope work progress the process the driving of the new steel piles commences. The piles are initially driven by a land based piling rig, using a large weight dropped onto the pile to hammer the pile into the sea bed. As the work progresses the piling rig moves onto a platform over the sea (see Figure 6) to drive the outer rows of piles. In total six rows of piles (parallel to the shore) are needed. Each steel pile is 900mm in diameter, approximately 60-65m in length and in total approximately 290 piles are needed to support the concrete wharf deck.

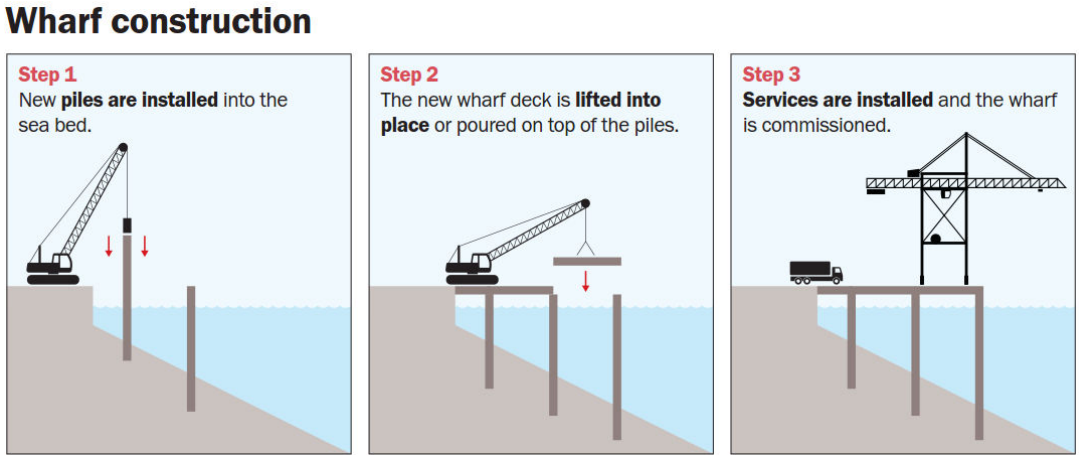

Figure 6

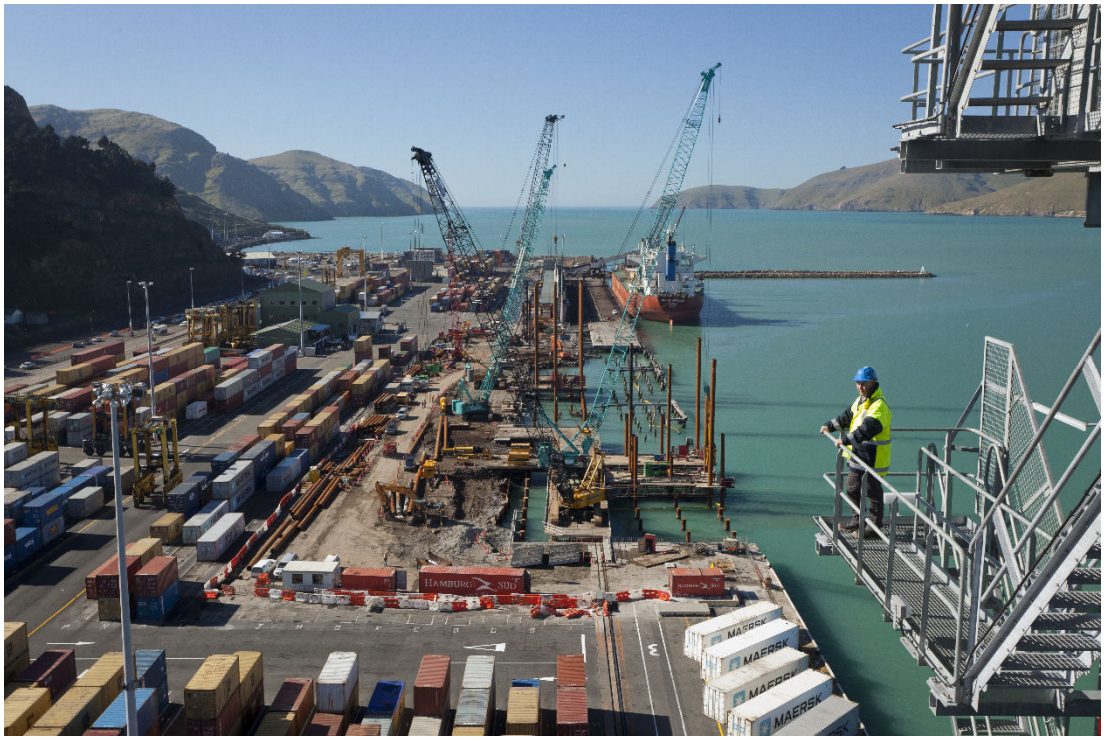

Figure 7. Looking east across the Cashin Quay 2 construction site to the coal berth where a ship is being loaded.

Throughout the works strict environmental management processes are in place. These manage the potential risks associated with the construction and include controls and/or monitoring of noise, dust, water quality, handling and spills of hazardous substances among others. A specific marine mammal management plan is also in place to mitigate potential effects of the piling on marine mammals (principally Hectors Dolphins). Figure 8 below, shows a section of the CQ2 rebuild works, this photo shows the silt curtain which is designed to prevent sediment discharge from the disturbed batter slope. The photo also shows the new piles being installed with some of the old piles still to be removed. The green marks on the closest pile are metre marks to enable the operator to monitor progress during pile driving.

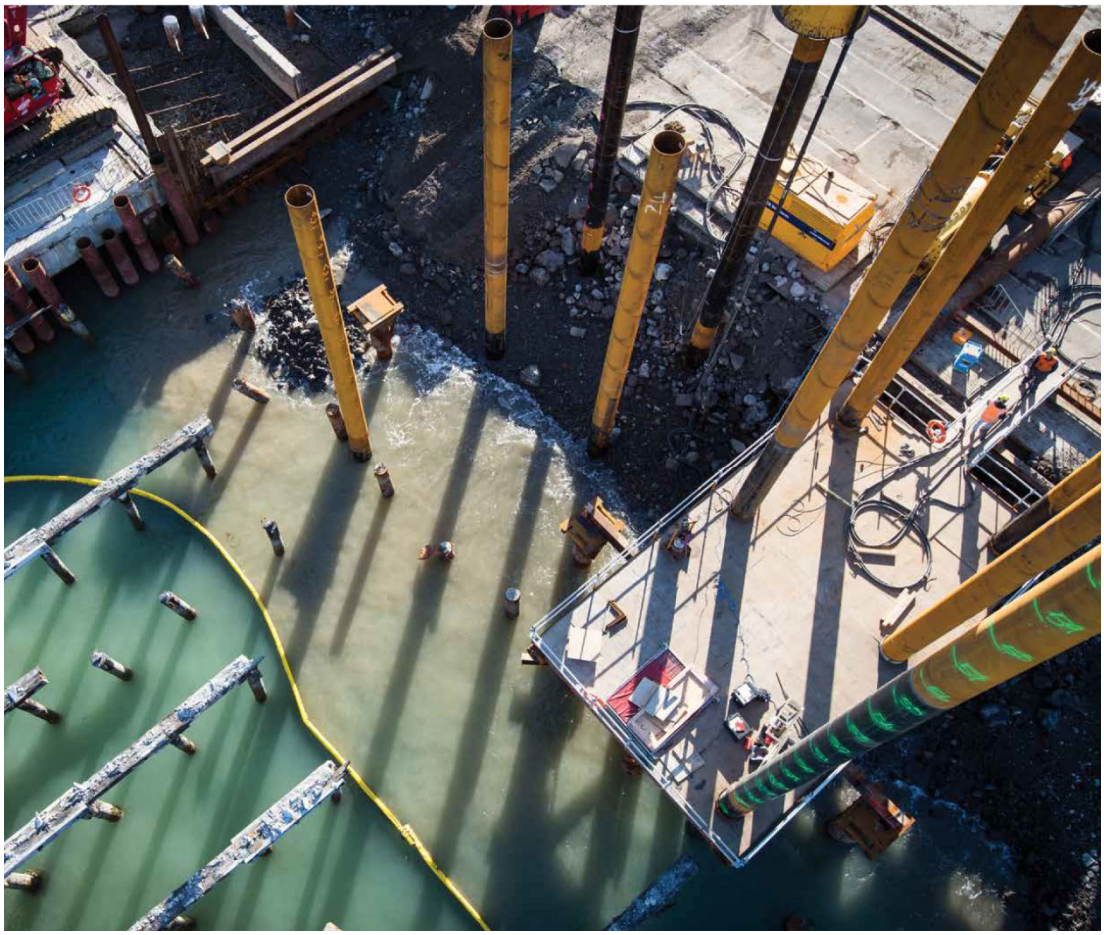

Figure 8. Close up of a portion of the Cashin Quay 2 rebuild showing installation of new piles and silt curtain to prevent sediment discharge from the batter slope works

These works are expected to be competed in 18-24 months with an estimated completion date of late 2015. Once complete the wharf is expected to be the most seismically resilient wharf in New Zealand and provide a much needed additional container ship berth. Overall project costs are in the order of $85M.

The construction of this berth has dramatically impacted on the capacity of the container terminal with more than 10% of the available slots being decommissioned at a time when the terminal is already close to capacity.

4.2 B02 – Cashin Quay 3 (repair/replace)

Cashin Quay 3 was badly damaged during the earthquakes but continues to operate as a container berth albeit with operational restrictions in place. The structure has suffered damage to piles below sea level which has significantly shortened the overall life and earthquake resilience of the structure. It is not yet clear whether this wharf will require a complete rebuild or significant repairs.

If the ultimate decision is that the wharf needs to be rebuilt then the nature and scale of the works would generally be similar to project B01 and would involve demolition, dredging, excavation, pile driving, ground improvement, concrete construction and general civil works.

The scale and nature of the works will partially be determined by the "Port to the East" programme and the likely trades CQ3 is required to service. In the short to medium term it is expected CQ3 will support the container trade transitioning to general cargo when the new container terminal is operational.

The repairs or rebuild may commence in late 2015 and are expected to take 18 months to complete.

4.3 B03 – Cashin Quay 4 (repair/replace)

Cashin Quay 4 was damaged in the earthquakes but is still operational and is currently the primary operational container ship berth. Like the adjacent Cashin Quay 3 the structure has suffered damage to piles below sea level which has significantly shortened the overall life and earthquake resilience of the structure. It is not yet clear whether this wharf will require a complete rebuild or significant repairs.

If the ultimate decision is that the wharf needs to be rebuilt then the nature and scale of the works would generally be similar to project B01 and would involve demolition, dredging, excavation, pile driving, ground improvement, concrete construction and general civil works.

The scale and nature of the works will partially be determined by the "Port to the East" programme and the likely trades CQ3 is required to service. In the short to medium term it is expected CQ3 will support the container trade transitioning to general cargo when the new container terminal is operational.

The works are expected to start in 2016 and are expected to take 18 months to complete.

4.4 B04 – Utilities - Sewer, Potable Water, Electrical and Data (repair)

The utilities (sewer, potable water, electrical (including High Voltage data) which service port operations sustained mixed damage during the earthquakes. The full extent of the repair works has not yet been determined, however the overall resilience of the supply network has been compromised. Work is underway to assess how to best repair these assets. In general repair or rebuild work will require excavation of the existing services and repair or relaying of new services and will be completed at the same time as other capital work in the vicinity wherever possible. These may be in similar locations but it is expected that a modified service layout would be required to provide for the proposed reconfiguration of the port

The intention is to improve the overall resilience of supply of network infrastructure as the scale of the business grows, and as reliance on communications and electrical infrastructure increases.

The nature and duration of the work will be ascertained as further design work is competed on this project.

4.5 B05 – Cashin Quay Breakwater (repair)

The Cashin Quay breakwater is the rock armoured point at the eastern end of Cashin Quay. The breakwater is designed to reduce the wave action on the Cashin Quay berths and allow safe loading and unloading of cargo from ships. The earthquakes caused the breakwater to settle into the underlying soft sediments, with a total drop of up to 1.5m in some places.

There have been some temporary repairs undertaken but more permanent repairs are needed. The repair works will involve re-establishing the land to the original elevation above sea level. These works are expected to take three months to complete and will commence in 2015, but may be deferred depending on the timing of the reclamation of adjacent land.

4.6 B06 – Coal Handling (repair)

The coal facility is used for the storage and export of coal and comprises the following key parts:

- The coal import system which includes the hopper which collects coal from the bottom dumping trains, the conveyor which transports the coal and the import loader
- The coal stockyard and associated stormwater treatment system (Project B012) where up to 325,000 tonnes of coal can be stored
- The export bucket wheel/coal loader which picks up the blended coal and deposits it on the export conveyor system which transports the coal to the berth and shiploader
- The coal shiploader runs on rails (on Cashin Quay No.1 wharf) and is used to transfer the coal from the conveyor system into the holds of the ships.

The various parts of this system suffered significant damage during the earthquakes. This damage caused misalignment of the mechanical plant, water ingress into underground structures and buckled the rail system for the coal loader rendering it immobile. The coal handling project aims to return the existing coal export facility to its pre-earthquake state.

As the West Coast mining operations depend on the ongoing operations of the coal handling at Lyttelton, temporary repairs were undertaken immediately. Initially this comprised repair of the mechanical plant to enable operation, it also included some interim methodology changes to ensure ships could still be loaded. The most significant temporary repair was the re-piling of the ship loader running rails which enabled the ship loader to regain mobility. This temporary repair was completed in 2012, took 12 months to complete and cost $20 million.

Work continues on the mechanical plant and additional work may be required to the CQ1 wharf (set out below).

4.7 B07 - Cashin Quay 1 (repair/replace)

Cashin Quay 1 is used for the berthing of coal vessels. It sustained significant damage during the earthquakes and has much reduced functionality. At this stage detailed design has not yet been undertaken and the repair or rebuild works have not been defined. However like Cashin Quay wharfs 3 and 4, the works will likely involve demolition, dredging, excavation, pile driving, ground improvement, concrete construction and general civil works.

The duration of the works are not yet known and will depend on scope of the repairs/rebuild. It is expected that repair/rebuild work on this wharf will commence sometime in 2015, with some additional temporary repairs possible in 2014.

4.8 B08 – Empty Container Yard/Full Container Yard (ECY / FCY) (enhance)

ECY / FCY has been recently constructed, is located partially on newly reclaimed land and is used for container storage. The construction took eight months to complete (commenced 2014) and involved earthworks, installation of services, lighting towers and construction of pavements to support new ECY / FCY operations.

4.9 B09 – Maintenance Building (replace/reconfigure)

The maintenance building is used for servicing straddles and providing ancillary maintenance services. The building will need to be relocated once operations move onto the reclamation, and in the meantime will need repairs to address earthquake damage. A small expansion is also needed in the interim to accommodate the increased maintenance demands of the expanding fleet of straddles. The relocation will be timed to coincide with the development of the new terminal and will take 10 months to complete. The location of the new building has yet to be determined.

The Maintenance Straddle Workshop facility is a space used for the maintenance and repair of the Container Straddle fleet including other large machinery and the fabrication of bespoke components. A new facility is planned which will likely be in a different location. The original structure was damaged by the earthquakes however this is not the sole reason for constructing the new facility. To enable greater efficiency and enable the Port to handle increasing freight demands the workshop needs to be relocated on to the reclamation once this is developed.

These works will firstly require demolition of the existing structure which is expected to take 4 months. Rebuild works will then follow which will involve the pavement overlay of the existing facility following the construction of a new facility.

Figure 9. Current container terminal looking south, the green building in the centre is the straddle maintenance building

4.10 B10 – Crane (enhance)

A new Liebherr ship to shore gantry crane was procured in 2013 to provide additional ship loading/unloading capacity for the container terminal operations. The crane was built in Ireland, shipped to Lyttelton in pieces and erected on site at the container terminal. The erection of the crane took 2 months and was completed in September 2014. This brings the total number of ship to shore cranes at Lyttelton to four.

During the two month period while it was assembles the crane reduced the capacity of the container terminal by more than 7%.

4.11 B11 - LCT Admin Building (replace/reconfigure)

The LCT Admin building is a three storey reinforced concrete building used for the container terminal administration and operation. It suffered damage in the earthquakes which has resulted in parts of the building being decommissioned. It is likely that the LCT will be demolished. Due to the extensive damage suffered by the Port administration building on Norwich Quay, it is likely that the new LCT building will be designed to accommodate LCT administration staff/ facilities and the overall port management functions. Design work is still being undertaken prior to confirmation of location and function.

4.12 B12 – Coal Stormwater Treatment

The current coal yard stormwater management and treatment facility was damaged as part of the earthquakes, but has continued to function following minor repairs. This project is focused on further work to improve the resilience of the facility, as well as improving the overall effectiveness of the treatment through non-earthquake related improvements.

Work will include drainage improvements to prevent stormwater ingress to the coal yard, including improvements to perimeter bunding, and the provision of additional storage capacity to better balance demand from significant rainfall events. These works will commence in 2015 and are expected to take 12 months to complete.

5 Inner Harbour (Group C)

The Inner Harbour is the oldest part of the operational port having been the focus of shipping in Lyttelton Harbour since the 1850's with the arrival of the 'first four ships'. The two breakwaters that enclose the Inner Harbour were constructed in the 1860's, along with reclamation of land seaward of the current Norwich Quay. Fill for the reclamation was sourced from the rail tunnel which was under construction at the same time. Wharves were progressively added to service the growing port trade, however the general arrangement of the Inner Harbour has not significantly changed since around the 1920's.

The Inner Harbour continues to be a critically important part of the Port, serving a range of general cargo operations as well as bulk oil and fuels, ship maintenance at the dry dock, fishing vessels as well as recreational craft at the marina. Significant damage to the Inner Harbour structures combined with increasing growth across bulk trades such as logs and steel has presented challenges to servicing bulk vessels within the Inner Harbour. This has been compounded by the damage suffered on the Cashin Quay wharves which has reduced their capability to service bulk trades.

The following sections set out the proposed projects within the Inner Harbour, which when completed will result in a reconfiguration of the use of the Inner Harbour. Operational port activities will move out of a portion of the western Inner Harbour (Dampier Bay) to allow for increased public access and enhanced marina facilities. This will be the most significant change in the Inner Harbour since the 1920s.

5.1 C01 - No.1 Breastwork (repair/replace)

This structure was close to end of life prior to earthquakes, and following the earthquakes it has been challenging to continue to meet the levels of service required for the cement trade. The wharf and seawall suffered damage from the earthquakes and the structure now requires replacement or significant repair to remain in this location.

Given the significant capital cost associated with replacement of the structure, alternatives are being investigated for the cement trade on the adjacent Jetty's. Should a decision be made to relocate this business then it is likely that it would be partially demolished with the remaining usable asset able to accommodate the much lower requirements of the local fishing fleet with piled moorings and low level access.

If the cement trade is re-established in this location then the structure will be similar in form and scale but be designed to meet modern engineering standards. It would include the excavation and reconstruction of the seawall, installation of approximately 30 piles, and construction of a concrete deck.

5.2 C02 – Dry Dock (repair)

The Dry Dock is one of only two dry docks in New Zealand, the other is the NZ Navy dock in Auckland. The dry dock is used to undertake maintenance and repair work on ships, which usually involving activities like re-anti-fouling, grit blasting and painting and welding. The Dry Dock did not sustain significant earthquake damage to the dock itself however the associated Pumphouse was significantly damaged as a result of the earthquakes and had to be demolished. Options for rebuilding a pumphouse are being explored.

The large basalt and sandstone blocks that form the dry dock suffered some movement in the earthquake and as a consequence the water tightness of the structure was

compromised. This has resulted in increased seepage of groundwater into the dock. Work is underway on how to address this issue and control the seepage water. The wastewater treatment system of the Dry Dock did not sustain significant damage, but options for upgrading the treatment system are being worked through as part of normal business.

5.3 C03 - Ferries and tugs

Whilst the Tug wharf suffered damage as a result of the earthquakes, engineers have deemed it suitable to maintain its current level of service with an increased level of maintenance required. The seawall land side of the structure however will require repair.

The breastwork structure where the Black Cat Ferry terminal is currently located is destroyed and not permitted to take any loading – this will have to be removed. The seawall beneath the breastwork is considerably damaged as well and will require significant repair. These projects will cause a significant disruption to the Ferry operation and are therefore programmed to take place when the Ferry terminal is relocated to the western side of No.7 wharf at Dampier Bay.

The new ferry location will provide an increased level of amenity compared to the current location, with modern facilities including a covered terminal, direct access to public transport and safe pedestrian routes to Lyttelton Township. The co-location with the Dampier Bay development will also provide additional amenity such as retail shops, public areas and will remove the conflicts with operational port activities. The ferry terminal move will be completed within 10 years and is dependent on the progress of the ports migration to the east.

5.4 C04 - Z berth (repair)

Z berth, the wharf structure, was completely destroyed as a result of the earthquakes and is beyond repair. The eastern mole (breakwater) immediately south of the berth has been significantly damaged as well, including the loss of rip rap, slumping and seawall cracks. The breakwater is very important to the sea state of the eastern inner harbour, including protecting the existing ferry terminal, pilot boats and Tugs and hence requires repair to bring it back to its original state. Z berth itself will be removed, along with Gladstone Pier which was unusable prior to the earthquakes. The Gladstone Pier seawall will also require some repair due to slumping and the sheer weight of the terminal in behind it trying to push seaward as a result.

As noted in Cruise below, Z berth and the breakwater solutions are dependent on outcomes of other projects. Should full or partial removal of the breakwater be required to facilitate a new Cruise berth, then timing will need to coincide with ferry relocation and other options to protect the eastern Inner Harbour. This would likely have a significant impact on programmes of all three projects, Z Berth, Cruise and Ferries.

5.5 C05 – Cruise (enhance)

Prior to the earthquakes, a range of cruise ships visited Lyttelton with the larger vessels docking at Cashin Quay and the smaller vessels docking at the Inner Harbour. 80+cruise ships per year visited the port prior to the earthquakes. While smaller cruise ships do still visit Lyttelton, the damage to Cashin Quay means that the Port cannot currently cater for larger cruise vessels.

Across the cruise industry the vessel size has increased rapidly but appears to have levelled out at around 350m. To properly provide for the cruise industry a berth than can handle

these very large vessels (up to 350m in length) is needed. Cruise ships are the longest and tallest ships that visit the port, and have very tight schedules which necessitate a dedicated berth during the season. Two possible options for the location of a cruise berth have been developed. The figure below graphically shows the two options; the inner harbour option at Gladstone Pier and the outer harbour option at Naval Point.

At this stage only feasibility studies have been undertaken to assess the viability of constructing a new berth, both from an economic and technical perspective. Both have some challenging technical issues and both will require new wharf structures and dredging of the harbour.

The Inner Harbour option will require removal of the eastern mole (which provides wave protection for the eastern Inner Harbour), dredging, repair of the batter slope, construction of a new wharf and associated civil infrastructure. Removing the mole will result in larger waves in the eastern Inner Harbour, and as a consequence the ferry terminal would need to be relocated before the eastern mole was removed. Depending on the timing of the cruise berth (and only if the Inner Harbour option was selected), the ferry terminal may need to be moved to an interim facility prior to the proposed location in Dampier Bay.

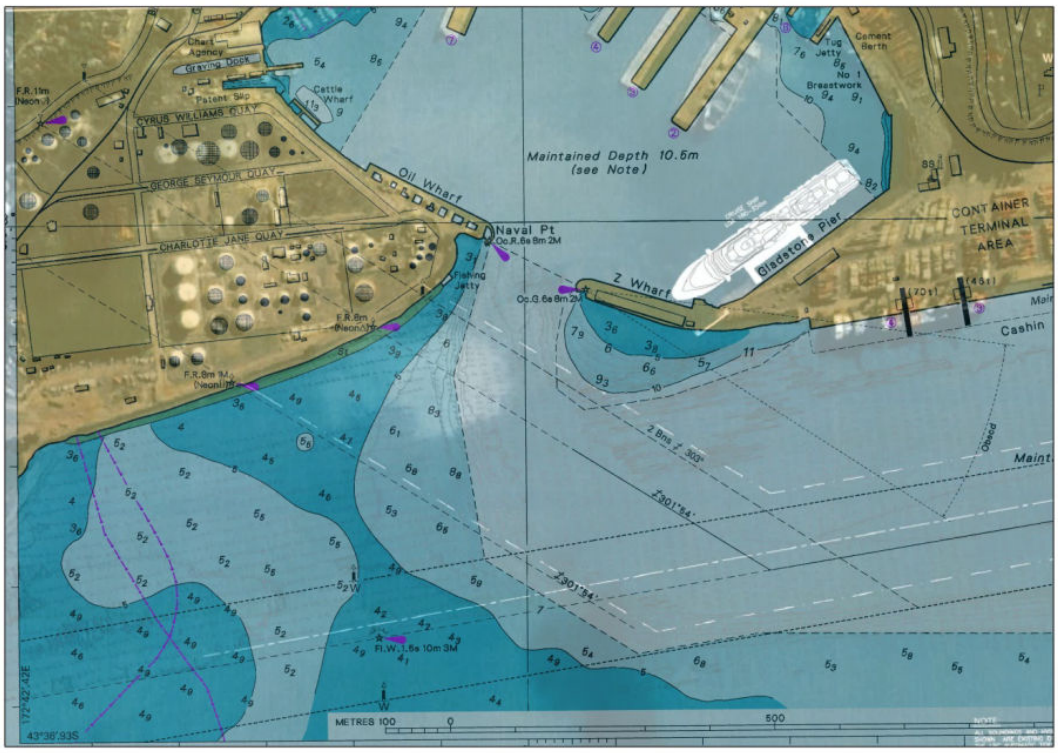

Figure 10 Inner Harbour cruise berth option (note that this figure does not show the eastern mole removed, which is required for this option)

The outer harbour options would also require dredging to extend the exiting channel and provide a turning basin for the ships. A new wharf would also be needed along with the on land civil infrastructure.

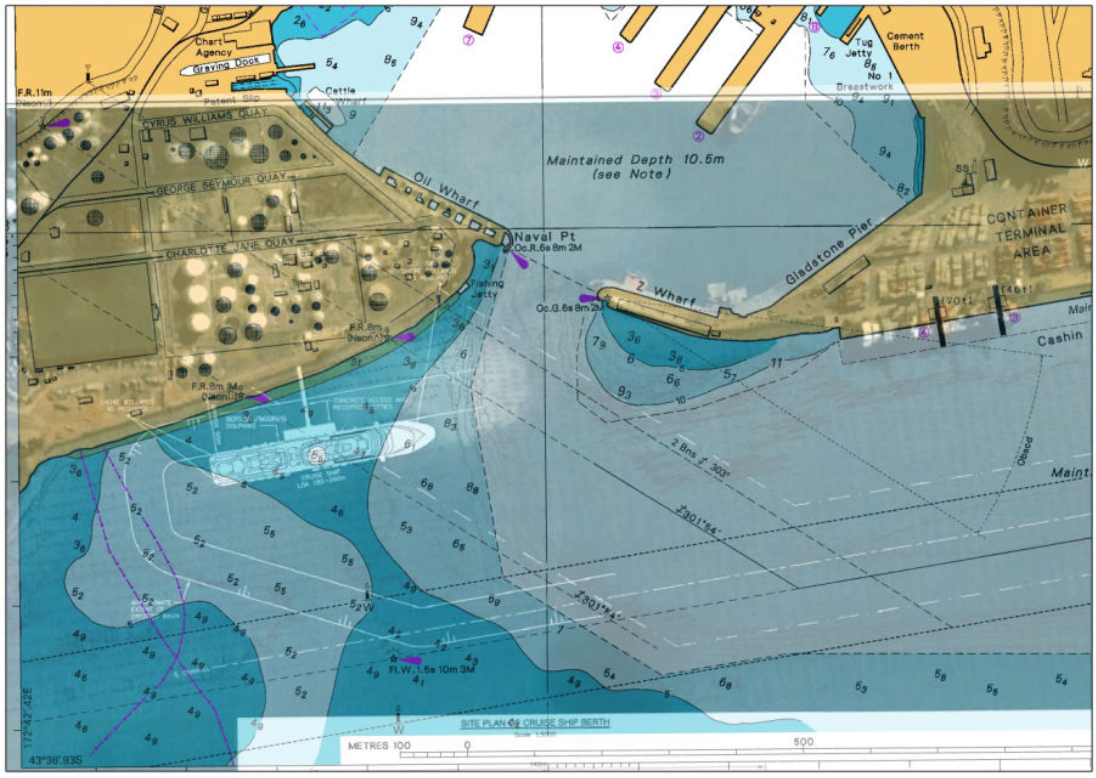

Figure 11. Outer harbour cruise berth with approximate dredged approach and swing basin.

Due to the seasonal nature of the cruise industry, very high cost of the berthing infrastructure and the need for a dedicated berth the revenue from the cruise industry to LPC is not sufficient to cover the full cost of the berth. Based on initial workings, LPC can fund at least half of the total cost of the berth. External funding from other organisations who depend on cruise ships, and benefit from the economic value they bring, will be needed to fund the remainder.

5.6 C06 – Oil berth (repair/replace)

The Oil berth is used for bulk fuel and bitumen delivery to the fuel tank farm at Naval Point and to the bulk storage facilities at Heathcote/Woolston (serviced by two pipelines over the Port Hills). The wharf is also used for bunkering (re-fuelling) of small and medium sized vessels.

The wharf and seawall were significantly damaged in the earthquakes and require replacement or repair at same location. Temporary repairs have already been undertaken at a cost of $1.2m.

Both options will include partial or full demolition of the existing wharf deck and removal of piles. The current proposal involves relocating the wharf 22m seaward from the existing berth line and constructing a new wharf to accommodate the bulk fuel vessels. Due to the continuous need to operate the berth and the very high cost to create a temporary berth, the new berth will need to be constructed while bulk fuel vessels continue to use the berth.

The construction works will likely include the installation of approximately 48 piles and the construction of a wharf deck, gangway tower, MLA's (marine loading arms) and associated

services. The berth will be designed so that it can be extended and depended to allow for increasing vessel size. The berth pocket will also need to be deepened.

Work is scheduled to commence in the third quarter of 2016 and is expected to take up to 18 months to complete.

5.7 C07 Fishing (reconfigure)

The fishing industry, extremely important to the community and the port, has been very accommodating since the earthquakes as one of their key berths, Z berth, was destroyed. The move to east concept is important to ensuring we can retain a high level of service to the fishing industry as this will free up Inner Harbour berths allowing ease of access, lay up options and allowance for growth. The No 1 Breastwork proposal mentioned above may provide smaller vessel offload and mooring options.

5.8 C09 – Jetty 7 (repair/replace)

Jetty 7 is used for bulk cargo loading and unloading including cars. It has the heaviest load capacity of the Inner harbour structures and is the only structure currently capable of handling the heavy bulk trades. The wharf structure and seawall were damaged in the earthquakes and require repair. Options will likely include partial demolition of the existing wharf deck and removal of some piles. The seawall and batter slope will also require remedial works; this is likely to include partial or full excavation and reinstatement of the seawall. Repair works would take 9 months to complete. Works are expected to commence in the third quarter of 2017.

In the long term, Jetty 7 is proposed to form part of the public access area of the Inner Harbour. If and when this happens this is dependent on the container terminal migrating onto reclaimed land at Te Awaparahi Bay freeing up critical landside operational space and berthing capacity.

5.9 C08 – Dampier Bay (enhance/reconfigure)

The Dampier Bay project encompasses a number of sub projects, all designed to create a vibrant and engaging mixed use development at Dampier Bay with a modern walk on marina.

Key components of Dampier Bay will be:

- A mixture of land use to ensure a commercially viable development
- Public access from Lyttelton to the waterfront at Dampier Bay
- A new modern ferry terminal with safer links to the bus network (Project C03)
- An engaging and vibrant public place that people can use and enjoy
- Enhanced marina facilities including a walk-on floating marina.

Whilst the planning is still in its early stages, descriptions of the key aspects of Dampier Bay are included in the following sections.

Mixed land use

The successful delivery of Dampier Bay relies on the development being commercially viable. A crucial part of this is flexibility in the type of land use that can happen at Dampier Bay. This will allow the development to adapt to the changing market demands and provide for the range of activities and services that are desired by the community. The

right mix of activities in combination with the recreation opportunities are what will make the development successful and provide a vibrant and engaging environment.

At this stage it is proposed to include a mixture of office, industrial (marine related), recreational, community, hospitality and retail activities at Dampier Bay. The intention is to create a development which complements the existing Lyttelton Town Centre and brings additional visitors to Lyttelton.

Public access to the waterfront

Since the events of 9/11, and with an increasing awareness of the health and safety risks of mixing the public and port operations, port security has significantly tightened. We are now required to provide a much higher level of security than before, which has necessitated removing access for the general public from the operational areas of the port. The reconfiguration of the port and movement of operational activities out of Dampier Bay will mean this area of the port can be reopened for public access.

Whilst the design is still in its early stages, and will require the input of an experienced developer/investor, it is envisioned that the public will be able to eventually access Dampier Bay from Norwich Quay (via Sutton Quay) as well as the existing access by the Dry Dock. A waterside walkway will link these two main access points and provide public space and amenity. Other pedestrian access points may also be available near Voelas Road. These access points and waterfront walkways will provide better pedestrian/cycling linkages to the existing recreational area and public areas at Naval Point and further afield to Cass and Corsair Bays.

The Diamond Harbour Ferry terminal will most likely be located at the base of No.7 wharf on the western side. It is expected that the public bus service will link to the Ferry at or near this location. See project C03 for further details.

Marina Facilities

The existing marina at Dampier Bay comprises seven rows of pile moorings with a small floating dock and associated office and toilets. The berths do not have power or water or direct land access (i.e. owners have to take a small dinghy out to their moored vessel). There are approximately 70 berths in the marina and there is significant demand for additional berths.

This marina itself did not receive any earthquake damage, but the land adjacent to the marina did with slumping and displacement of the seawall.

As part of the Dampier Bay Development it is proposed to remove the existing pile moorings and install a modern floating pontoon marina with approximately 150-200 berths in the first stage. There is potential to have a second stage (Project C16), located where Jetty 4, 5 and 6 are currently, with up to 400berths.

The mixed use development at Dampier bay will include on land facilities for the marina, such as ablutions, office and parking. A trailer boat ramp is not proposed for Dampier Bay.

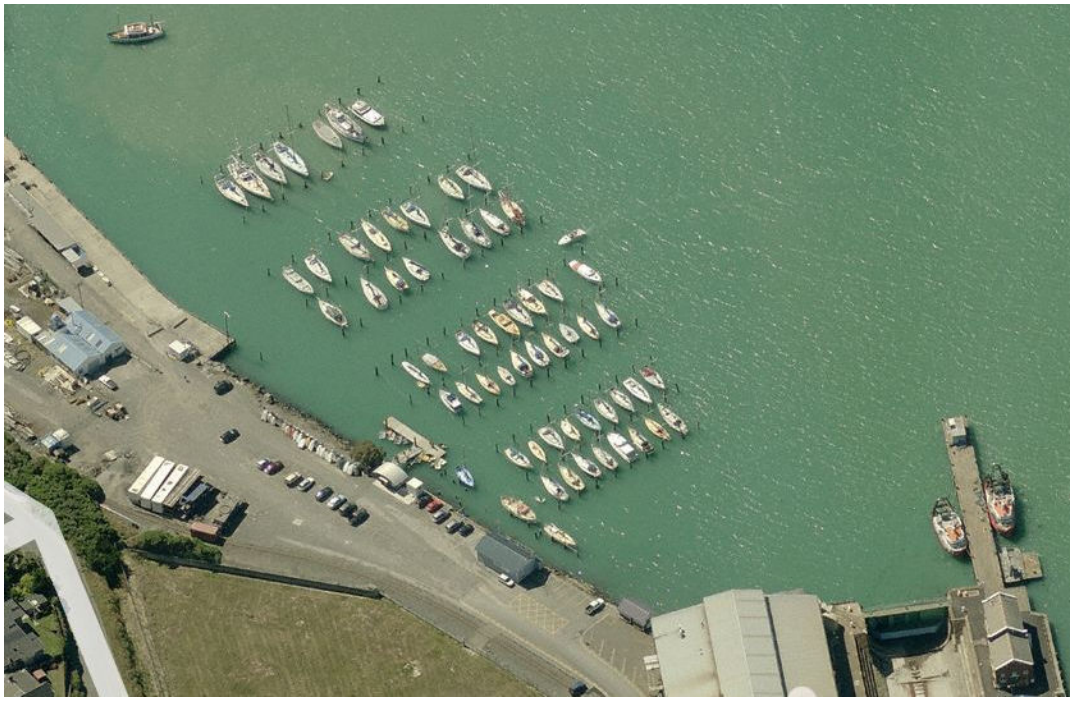

Figure 12. Existing Dampier Bay marina

Timing

The program for Dampier Bay is still being developed and is largely dependent on the timing of the reclamation and the port moving eastward. Currently No.7 is a critically important asset for the Port and is heavily used along with the land around it. The operational use of No.7 and the associated heavy vehicle access via Sutton Quay needs to continue until some of the general cargo operations migrate onto Cashin Quay.

The development of Dampier Bay is expected to occur in four phases (phases indicated in the graphic below):

- **Phase 1** - Construction of the floating marina and associated land side services. Completed 2016/17
- **Phase 2 -** Landside mixed use development to add to the activities developed in phase 1. Completed 2017/18.
- **Phase 3 -** Further landside development of the former Mobil yard. Completion dependent on this area no longer being needed for construction activities. Timing tied to reclamation progress likely to be 7-10 years.
- **Phase 4 -** Western end of Dampier Bay landside development, connection to Norwich Quay and establishment of Ferry Terminal. Timing dependent on movement of container terminal to reclamation and consequential retirement of No.7 wharf – likely to be 7-10 years.

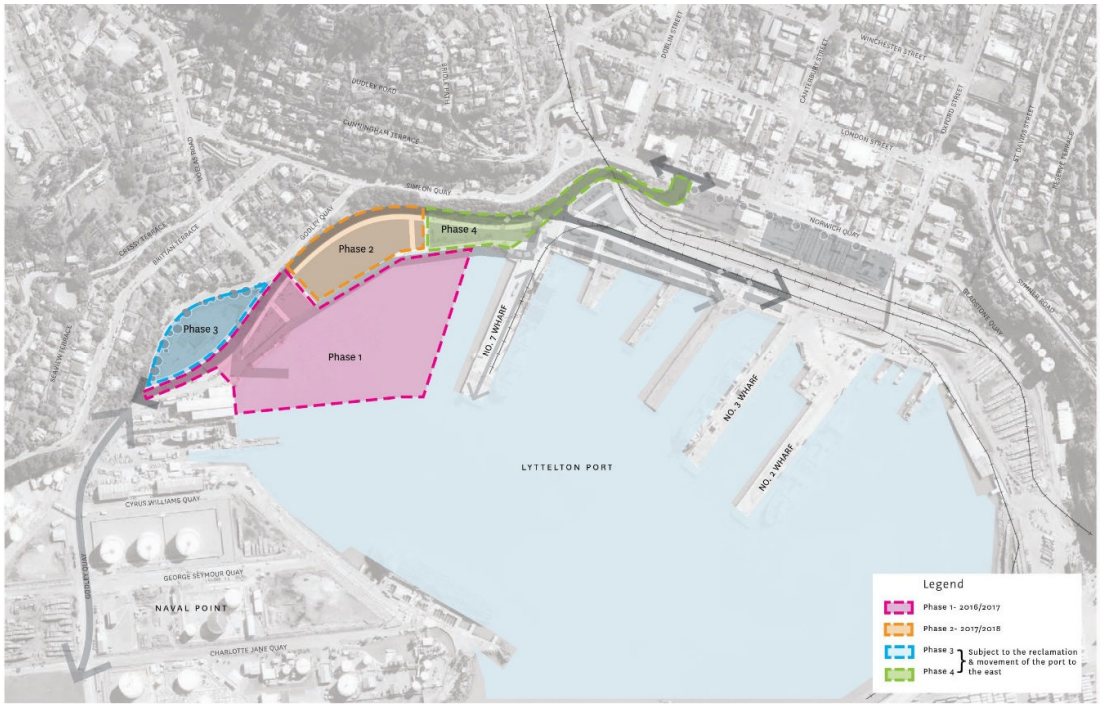

Figure 13. Phasing diagram for Dampier Bay Development

5.10 C10 – Jetty 2 (repair/replace)

Jetty 2 is used for bulk and break bulk cargo loading and unloading. The wharf and seawall at Jetty 2 are damaged and require replacement or repair at same location. Either the replacement or repair work will include partial or full demolition of the existing wharf deck and removal of piles. The seawall and batter slope will require remedial works; this is likely to include partial or full excavation and reinstatement of the seawall. If the replacement option is pursued it is anticipated that the wharf will be replaced with a structure that has similar form and scale but is designed to modern seismic requirements and to meet modern levels of service. While the final scope of the work is yet to be determined it is expected to commence in the third quarter of 2017. The works are expected to take 9 months to complete.

5.11 C11 – Jetty 3 (repair/replace)

Jetty 3 is currently used for bulk and break bulk cargo loading and unloading . The jetty's wharf and seawall were damaged in the earthquakes and require replacement or repair. Both the replacement and repair options will likely include partial or full demolition of the existing wharf deck and removal of piles. The seawall and batter slope will require remedial works; this is likely to include partial or full excavation and reinstatement of the seawall. If the replacement option is pursued it is anticipated that the wharf will be replaced with a structure that has similar form and scale but is designed to modern seismic requirements and to meet modern levels of service. While the final scope of the work is yet to be determined it is expected to commence following the completion of work on Jetty 2 and is estimated to take 9 months to complete (for the repair option).

5.12 C12 – Demolition of Jetties 4, 5, 6

Jetty 5 and 6 have minor use (pedestrian loadings) while Jetties 4 and 6 have no current use as they have reached the end of their useful life and can no longer sustain heavier loads

required for port operations. The demolition is expected to take 5 months to complete and the commencement date is dependent on the development of stage two of the marina, which in turn is dependent on the availability of landside and berth capacity resulting from the move east of some bulk trades. Demolition will involve removal of the timber decks followed by removal of the piles.

5.13 C13 – Pavements and Storage (repair)

Pavements at the port are used for internal transport for the Port operations area and a working surface in storage areas. The LCT pavements sustained significant irreparable damage from the earthquakes characterised by slumping, cracking of seal and damage to the underground infrastructure. Significant temporary repairs were required in the terminal to re-establish operations, these temporary repairs will attract high annual maintenance costs. Permanent repair and/or replacement works will involve typical civil works associated with rebuilding pavements (excavation, importation of hard-fill, grading, compaction and placement of pavement stones to the LCT and asphalt to general cargo areas). These works are expected, to take 7 years to complete as they have to be staged around the operation port uses. Some of these works have already commenced.

5.14 C14a – Administration Building

The LPC Administration Building on Norwich Quay was used by LPC for administrative purposes before the earthquakes. The building was written off by insurers following the earthquakes. The original building will need to be demolished which is expected to take 4 months and could commence in the third quarter of 2016.

It is likely that the functions of this building will be combined within the rebuilt LCT Administration building. Design work is still being undertaken prior to confirmation of location and function.

5.15 C14b – General Buildings (repair/replace)

LPC has a portfolio of general buildings that are used for a range of purposes from equipment storage to personnel space. Damage sustained during the earthquakes is wide and varied from complete asset loss to minor damage. To address this we are still in the planning phase and which involves a review of the entire LPC building portfolio and analysis of appropriate consolidation and/or repair of assets. This project will commence in the first quarter of 2015. The duration of any demolition or construction works are not yet known given projects are still in the planning phase.

Two examples of projects under the general buildings project group are:

- The building that used to house civil maintenance staff was damaged beyond repair in the earthquakes and our employees have been in temporary accommodation ever since. To better accommodate the Civil Maintenance team it is planned to move their facilities to the former administration buildings site on Norwich Quay.
- The northern section of the Tug building which provided refuge for pilots during downtime or poor weather was damaged enough to vacate the premises. Our pilots have therefore been in temporary accommodation that is less than adequate for the demands of the role. The building will be repaired to at least 67% of the building code and will be refitted to allow a good level of amenity.

5.16 C15 - Roading and transport (repair and reconfigure)

There are a number of roading and transport projects needed to repair the damage caused by the earthquakes. Both bridges owned by LPC, Oxford Street and Sutton Quay, have been damaged and require a level of repair that will be extremely disruptive on users (including ferry users). Oxford Street presently has propping in place as a precautionary measure. Eventually it is likely the Oxford Street bridge will be removed as it constrains land and will not meet the ports requirements as the port moves east. The Cashin Quay back road has suffered slumping and requires re-grading and repair. Long term there is also consideration for a grade separated entrance road to the port (between Oxford Street and the current entrance) to avoid the level rail crossing – this is likely to be more of an issue as rail is utilised more often to shift cargo, and with more carriages per train.

5.17 C16 - Dampier Bay Extension (enhancement)

Long term, as the port moves east, the land in between No 7 wharf and No 3 wharf is likely to be made publicly accessible, and the marina extended into the area presently occupied by jetties 4, 5 and 6. There has been little planning as to what this development may look like or entail. The marina area has a potential for a further 300-400 vessels, and land development would include repairing the seawall, boardwalks, green space and potentially some level of commercial development.

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Repair / rebuild

- **Port repair / rebuild**
- **Public / community repair /rebuild**
- **Sea wall / batter slope / brestwork**
- **Demolish / remove**

Reclamation – Group A

A01 10Ha Reclamation
A02 8Ha Reclamation for Stage 1 Container Terminal
A03 19Ha Reclamation for Stage 2 Container Terminal
A04 Lower Haul Road
A05 Upper Haul Road
A06 Sumner Road Enabling Works
A07 Terminal Development Enabling Works
A08 Terminal Development – Wharf
A09 Terminal 1 Development – Civil
A10 Terminal 1 Development – Mechanical and Electrical
A11 Terminal 2 Development – Civil
A12 Terminal 2 Development – Mechanical and Electrical

Cashin Quay – Group B

B01 Cashin Quay 2
B02 Cashin Quay 3
B03 Cashin Quay 4
B04 Utilities – Sewer, Potable Water, Electrical (including HV) and Data
B05 Cashin Quay Sea Wall
B06 Coal Handling
B07 Cashin Quay 1
B08 ECY / FCY
B09 Maintenance Building
B10 Crane
B11 LCT Admin Building
B12 Coal Stormwater Treatment

Inner Harbour – Group C

C01 No.1 Breastwork
C02 Dry Dock
C03 Ferries and Tugs
C04 Z Berth
C05 Cruise
C06 Oil Berth
C07 Fishing
C08 Marina
C09 Jetty 7
C10 Jetty 2
C11 Jetty 3
C12 Demolition of Jetties 4,5,6
C13 Pavements and storage
C14a Maintentance Straddle Workshop
C14b Administration Building
C14c General Buildings
C15 Roading and Transport
C16 Dampier Bay Extension

LPC's Information package:
Lyttelton Port Recovery Plan
October 2014

Enhancement

- **Port enhancement**
- **Public / community enhancement**
- **Removal**
- **Dredging**

Reclamation – Group A

A01 10Ha Reclamation
A02 8Ha Reclamation for Stage 1 Container Terminal
A03 19Ha Reclamation for Stage 2 Container Terminal
A04 Lower Haul Road
A05 Upper Haul Road
A06 Sumner Road Enabling Works
A07 Terminal Development Enabling Works
A08 Terminal Development – Wharf
A09 Terminal 1 Development – Civil
A10 Terminal 1 Development – Mechanical and Electrical
A11 Terminal 2 Development – Civil
A12 Terminal 2 Development – Mechanical and Electrical

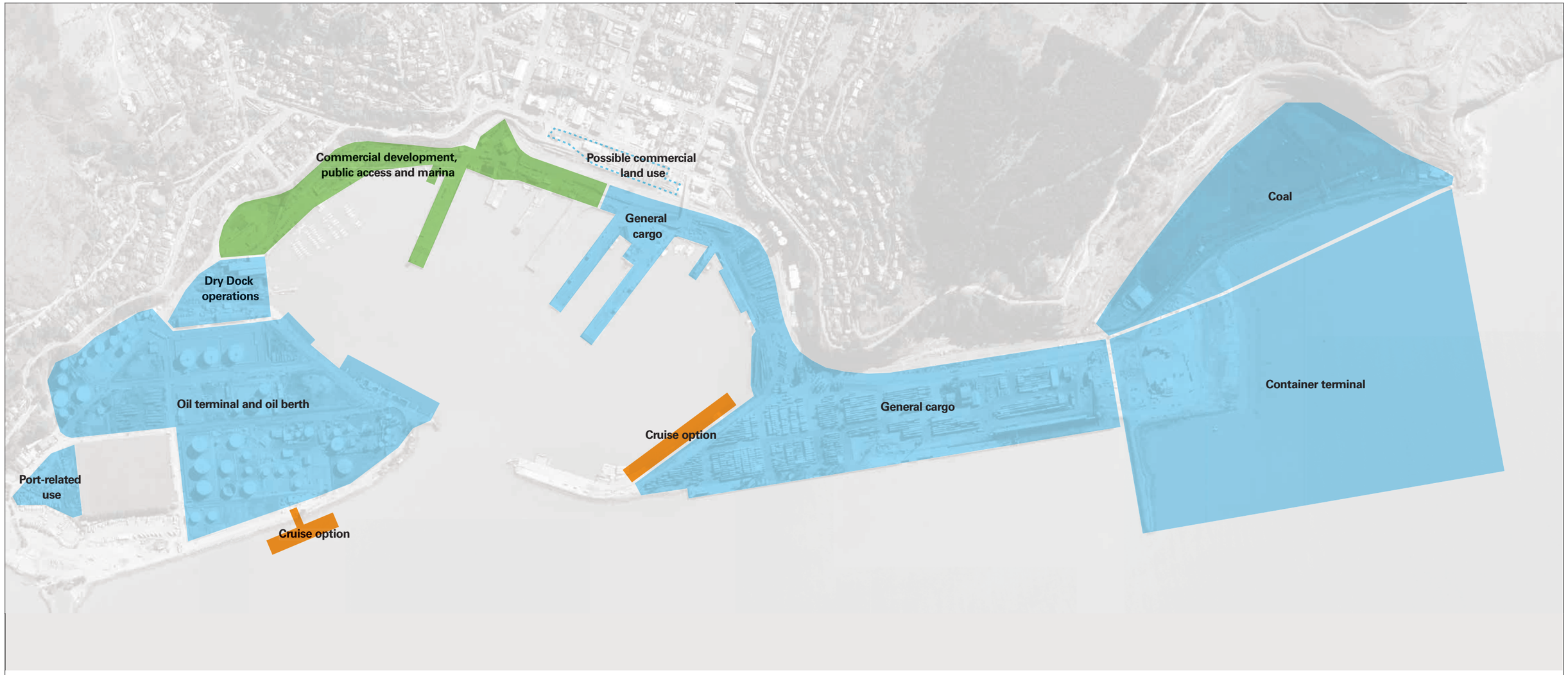
Cashin Quay – Group B

B01 Cashin Quay 2
B02 Cashin Quay 3
B03 Cashin Quay 4
B04 Utilities – Sewer, Potable Water, Electrical (including HV) and Data
B05 Cashin Quay Sea Wall
B06 Coal Handling
B07 Cashin Quay 1
B08 ECY / FCY
B09 Maintenance Building
B10 Crane
B11 LCT Admin Building
B12 Coal Stormwater Treatment

Inner Harbour – Group C

C01 No.1 Breastwork
C02 Dry Dock
C03 Ferries and Tugs
C04 Z Berth
C05 Cruise
C06 Oil Berth
C07 Fishing
C08 Marina
C09 Jetty 7
C10 Jetty 2
C11 Jetty 3
C12 Demolition of Jetties 4,5,6
C13 Pavements and storage
C14a Maintentance Straddle Workshop
C14b Administration Building
C14c General Buildings
C15 Roading and Transport
C16 Dampier Bay Extension

LPC's Information package:
Lyttelton Port Recovery Plan
October 2014



Reconfiguration

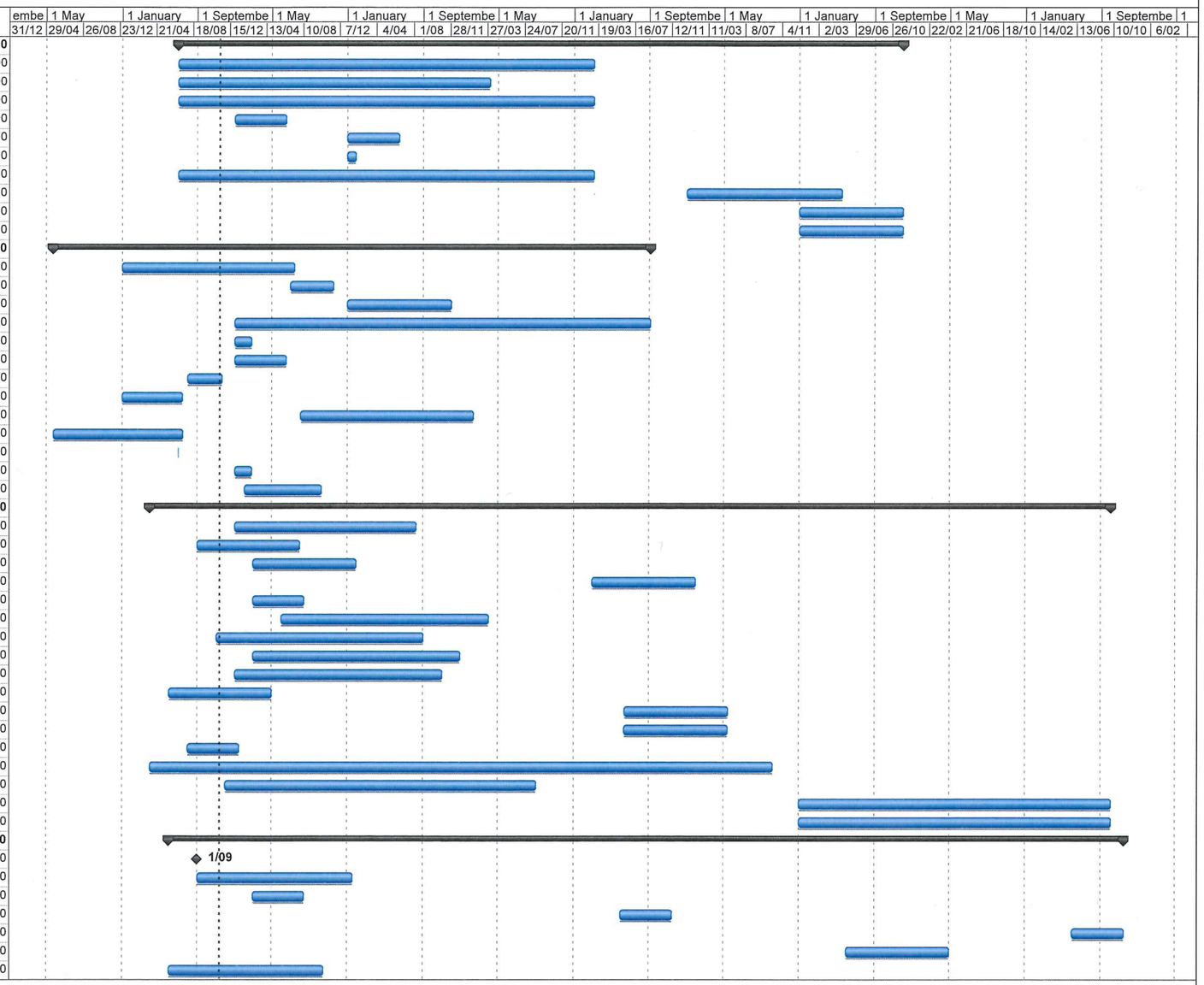
- Port land use
- Public / community land use
- Cruise options

LYTTELTON PORT COMPANY - DEVELOPMENT PROGRAMME

DATE: 30 JUNE 2014

Developed to Infom Recovery Plan preparation - Subject to change as programme continues to develop

ID	Notes	Task Name	Duration	Start	Finish	Baseline Cost
1		**RECLAMATION**	**83.75 mons**	**Wed 2/07/14**	**Tue 1/12/20**	**$0.00**
2	R01	Reclamation Land - Stage One (10Ha)	48 mons	Wed 2/07/14	Tue 6/03/18	$10,734,000.00
3	R02	Reclamation Land - Stage Two	36 mons	Wed 2/07/14	Tue 4/04/17	$25,000,000.00
4	R03	Reclamation Land - Stage Three	48 mons	Wed 2/07/14	Tue 6/03/18	$130,903,350.00
5	R04	Quarry Road - Lower Access	6 mons	Thu 1/01/15	Wed 17/06/15	$3,000,000.00
6	R05	Quarry Road - Upper Access	6 mons	Fri 1/01/16	Thu 16/06/16	$3,000,000.00
7	R06	Reclamation Material - Sumner Road	1 mon	Fri 1/01/16	Thu 28/01/16	$5,000,000.00
8	R07	Reclamation - Terminal Enabling Works	48 mons	Wed 2/07/14	Tue 6/03/18	$2,000,000.00
9	R08	Reclamation - Wharf Development	18 mons	Tue 1/01/19	Mon 18/05/20	$100,000,000.00
10	R09	Reclamation Plant/Infrastructure - Stage One Terminal	12 mons	Wed 1/01/20	Tue 1/12/20	$134,294,160.00
11	R10	Reclamation Infrastructure/Plant - Stage Two Terminal	12 mons	Wed 1/01/20	Tue 1/12/20	$84,000,000.00
12		**CASHIN QUAY AND COAL**	**69 mons?**	**Thu 23/05/13**	**Wed 5/09/18**	**$0.00**
13	C01	Cashin Quay 2	20 mons	Wed 1/01/14	Tue 14/07/15	$77,315,000.00
14	C02	Cashin Quay 1-2 The Gap	5 mons	Wed 1/07/15	Tue 17/11/15	$2,500,000.00
15	C03	Cashin Quay 3 (west) and 4	12 mons	Fri 1/01/16	Thu 1/12/16	$33,630.00
16	C04	Port Wide Services	48 mons	Thu 1/01/15	Wed 5/09/18	$23,456,574.00
17	C05	Cashin Quay Seawall	2 mons	Thu 1/01/15	Wed 25/02/15	$5,520.00
18	C06	Coal Handling System	6 mons	Thu 1/01/15	Wed 17/06/15	$3,551,000.00
19	C07	Cashin Quay 1	4 mons	Fri 1/08/14	Thu 20/11/14	$2,700,000.00
20	C08	LCT Extension and Empty Container Yard	7 mons	Wed 1/01/14	Tue 15/07/14	$6,407,000.00
21	C09	Cashin Quay 3 (Easterm 150m)	20 mons	Mon 3/08/15	Fri 10/02/17	$54,300,000.00
22	C10	Cashin Quay - Cranes and Straddles	15 mons	Thu 23/05/13	Wed 16/07/14	$18,754,000.00
23	C11	SPARE	1 day?	Wed 2/07/14	Wed 2/07/14	$0.00
24	C12	Coal Yard Stormwater Treatment System	2 mons	Thu 1/01/15	Wed 25/02/15	$784,000.00
25	C13	Cashin Quay Mechanical Infrastructure	9 mons	Mon 2/02/15	Fri 9/10/15	$20,000,000.00
26		**INNER HARBOUR**	**111.05 mons**	**Tue 1/04/14**	**Tue 4/10/22**	**$0.00**
27	H01	Inner Harbour - No.1 Breastwork	21 mons	Thu 1/01/15	Wed 10/08/16	$16,000,000.00
28	H02	Inner Harbour - Dry Dock	12 mons	Mon 1/09/14	Fri 31/07/15	$2,205,000.00
29	H03	Inner Harbour - Tugs & Ferries Stage 1	12 mons	Mon 2/03/15	Fri 29/01/16	$900,000.00
30	H03	Inner Harbour - Tugs & Ferries Stage 2	12 mons	Thu 1/03/18	Wed 30/01/19	$350,000.00
31	H04	Inner Harbour - Z Berth	6 mons	Mon 2/03/15	Fri 14/08/15	$385,000.00
32	H05	Cruise Berth Development	24 mons	Mon 1/06/15	Fri 31/03/17	$44,400,000.00
33	H06	Inner Harbour Oil Berth	24 mons	Mon 3/11/14	Fri 2/09/16	$38,000,000.00
34	H07	Inner Harbour Fishing Wharf	24 mons	Mon 2/03/15	Fri 30/12/16	$28,100,000.00
35	H08	Inner Harbour Marina Development - Stage One	24 mons	Thu 1/01/15	Wed 2/11/16	$6,000,000.00
36	H09	Inner Harbour Jetty 7	12 mons	Mon 2/06/14	Fri 1/05/15	$7,550,000.00
37	H10	Inner Harbour Jetty 2	12 mons	Thu 14/06/18	Wed 15/05/19	$11,400,000.00
38	H11	Inner Harbour Jetty 3	12 mons	Wed 13/06/18	Tue 14/05/19	$25,000,000.00
39	H12	Inner Harbour Jetty Demolition (4,5, & 6)	6 mons	Fri 1/08/14	Thu 15/01/15	$2,650,000.00
40	H13	Port Wide Pavement and Stormwater	72 mons	Tue 1/04/14	Mon 7/10/19	$39,348,000.00
41	H14	Port Wide Buildings	36 mons	Mon 1/12/14	Fri 1/09/17	$35,750,000.00
42	H15	Port Wide Roading and Transport	36 mons	Wed 1/01/20	Tue 4/10/22	$18,600,000.00
43	H16	Inner Harbour Marina Development - Stage Two	36 mons	Wed 1/01/20	Tue 4/10/22	$11,000,000.00
44		**GENERAL PROJECTS**	**110.35 mons**	**Mon 2/06/14**	**Tue 15/11/22**	**$0.00**
45	G01	Inland Depot - Land Purchase	0 mons	Mon 1/09/14	Mon 1/09/14	$25,000,000.00
46	G02	Inland Depot - Development Stage One	18 mons	Tue 2/09/14	Mon 18/01/16	$10,000,000.00
47	G03	City Depot Drainage and Pavement Upgrade	6 mons	Mon 2/03/15	Fri 14/08/15	$2,000,000.00
48	G04	Capital Dredging - 13.5m	6 mons	Fri 1/06/18	Thu 15/11/18	$25,000,000.00
49	G05	Capital Dredging - 14.5m	6 mons	Wed 1/06/22	Tue 15/11/22	$25,000,000.00
50	G06	Inland Depot - Development Stage Two	12 mons	Mon 1/06/20	Fri 30/04/21	$15,000,000.00
51	G07	Port Wide Recovery Plan	18 mons	Mon 2/06/14	Fri 16/10/15	$3,500,000.00



Project: 021714-Draft Programme-v01
Date: Tue 11/11/14

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone