PROJECT NAME: STAGE 1 LAND RECLAMATION AND DREDGING MANAGEMENT

Lead Contractor:

HC&R Joint Venture

Project Timeframe:

Stage 1 – Duration of 2 Years Between December 2018 and December 2020



Environmental effect	Risk
Dust	LOW
Contaminated land	LOW
Erosion & Sediment Generations	HIGH
Noise	LOW
Archaeology	LOW
Hazardous Substances Management	HIGH



Version #	Prepared By	Reviewed By	Approved By	Date
A	Will Pryce	Greg Kroef	-	March 2018
В	Will Pryce	-	Greg Kroef	April 2018
С	Will Pryce	LPC	Greg Kroef	November 2018
D	Will Pryce	LPC	Greg Kroef	20th December 2018
E	Will Pryce	LPC	Greg Kroef	24 <sup>th</sup> January 2019
F	Will Pryce	Ecan	Greg Kroef	1 <sup>st</sup> Feb 2019

Role	Name	Signature	Date
Author	Will Pryce		
Lead Contractors	Greg Kroef		
LPC Project Environmental Adviser	Jared Pettersson		

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## **1 PURPOSE OF THE RCEMP**

#### 1.1 PURPOSE OF THE RCEMP

This Reclamation Construction Environmental Management Plan (RCEMP) has been prepared to fulfil the arrangement between Lyttelton Port Company (LPC) and HC&R to conduct stage 1 project works of the Te Awaparahi Bay Dredging & Reclamation Project.

The purpose of this RCEMP is to implement mitigation measures which will reduce negative environmental impacts for the duration of the Project. Ongoing monitoring and review of environmental effects throughout the works may require changes to these practices.

This RCEMP sets out the specific environmental risks for Stage 1 reclamation works, which includes the perimeter haul road to the rail crossing and the handling of quarry materials into the bund, reclamation and surcharge in conjunction with material handling on to the Mesenge Barge with a wheeled loader.

This RCEMP details practices required to mitigate the potential environmental effects of the reclamation processes and utilisation of the perimeter haul road to carry out reclamation activities specifically for construction of Stage 1 of the Te Awaparahi Bay Dredging and Reclamation Project (herein referred to as the Project).

This RCEMP is a working document and will be amended as required with any Contract requirements following the Principal's approval to commence quarry extraction and processing activities on the designated Gollans Bay site.

The information provided by the LPC consultants for tender purposes and Appendix 28 in the LPC Port Recovery Plan forms the basis of the risk assessments, mitigation of risk, control measures and monitoring and HC&R will ensure that at whatever stage the Project is at, the environmental risks will be continuously re-evaluated in the monitoring, and all the necessary control measures are in place.

In preparing this RCEMP, consideration has been given to the potential environmental risk each activity the Reclamation will present.

#### 1.2 ROLES AND RESPONSIBILITIES

Implementation of this RCEMP is the responsibility of the Contractor and all staff shall be aware of this RCEMP and understand the risks and controls. HC&R's environmental policy is also detailed below as it is a key responsibility for all Contract personnel to follow:



STAGE ONE LAND RECLAMATION AND QUARRY MANAGEMENT

# **ENVIRONMENTAL POLICY**

#### **Our Commitment**

HC&R Joint Venture is committed to undertaking its operations in an environmentally responsible manner, and proactively managing risk that may harm or affect the environment.

HC&R Joint Venture will:

- Establish and maintain an environmental management system in accordance with AS/NZ 14001.
- Comply with all contract conditions and relevant environmental legislation.
- Regularly review business operations, identify and implement opportunities for continuous improvement.
- Establish clearly defined environmental objectives and targets to measure performance and identify opportunities for continual improvement.
- Ensure that Senior Management are accountable and provide leadership and resources to manage environment performance.
- Ensure that Supervisors and Superintendents are held responsible for their work areas and proactively address environmental issues applicable to their work site.
- Ensure and that all personnel are aware of their responsibilities and have the relevant education and training, including Project-specific awareness training and indecent reporting procedures.
- Strive to prevent pollution, reduce waste, and commit to recovery and recycling where feasible.
- Periodically review this policy for effectiveness, compliance and stakeholder participation.
- Ensure that subcontractors and consultants adopt all principles of HC&R Joint Venture's Environmental Policy and Construction Environmental Management Plan.

Greg Kroef JV Leadership Team Geert Meijers JV Leadership Team Nick Ross JV Leadership Team Tim Ross JV Leadership Team



Table 1:	Roles and responsibilities
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Role	Company Name	Person Responsible	Contact Details
LPC Project Manager	LPC	Craig Monkman	021 630 560
LPC Project Environmental Advisor	Enviser Ltd	Jared Pettersson	021 679 838
Contractor – lead	HC&R	Bernard Conner	0276226420
Foreman	HC&R	Tony Oakly	0274064390
Technical experts			
Contaminated land specialists	Envirowaste	Dean Burwell	0274784022
Archaeologist	Under Over Archaeology	Kirsa Webb	0212361126
Noise expert	Marshall Day	Jon Farren	033658455
Hazardous substances specialists	Envirowaste	Joe Wildy	0212771099
Approved handler (hazardous substance)	RedBull Powder Co	Matt Cowie	0276488636
Erosion and sediment control expert	PSES	Peter Stevens	021757081
Person responsible for n	nonitoring and reporting and c	onsite referral of complaints	3
Dust	HC&R	Bernard Conner	0276226420
Erosion and sediment generation	HC&R	Bernard Conner	0276226420
Noise	HC&R	Bernard Conner	0276226420
Archaeology	HC&R	Bernard Conner	0276226420
Contaminated land	HC&R	Bernard Conner	0276226420

#### 1.2.1 Training

It is the responsibility of HC&R to ensure all staff involved in the construction project understand the environmental risk involved with the reclamation project and are trained and competent in implementing this RCEMP.

Also, the reclamation HSE Manager and/or Project Manager shall provide instruction and education to project personnel in relation to the RCEMP implementation and the resource consent requirements through various communication mediums including:

- Project inductions;
- Technical briefings with staff undertaken prior to and during the project works that include:
  - o Erosion & Sediment Control



- o Dust Management; and
- Hazardous Substances.
- Toolbox Meetings with regular discussion on the RCEMP requirements including:
  - o SOP's for bunkering & Refuelling.
  - o Managing sediment plumes
- Emergency Response Drills with focus on hydrocarbon spill events;
- Pre-start Meetings with focus on:
  - Weather conditions;
  - o Previous Environmental issues; and
  - o Previous Environmental improvements or implemented / proven mitigation measures.

#### 1.3 SITE DESCRIPTION

The reclamation site is located in Te Awaparahi Bay adjacent to the coal stockyard and between the Cashin Quay Breakwater and Battery Point. There is an existing 10 ha reclamation at the site and an additional 24ha of reclaimed land and wharf structure is proposed.

#### Image of Stage 1 Reclamation location



Figure 1: Location of the reclamation construction site boundary.

#### 1.4 **PROJECT DESCRIPTION**

Stage 1 includes approximately 5 Ha of reclamation works which extends into Te Awaparahi Bay from an existing area of about 10 ha of reclamation that is nearing completion, extending south from the existing coal stockyard.

The Stage 1 Project involves the following items which form the Contract Works:

- 1. To construct an engineered bund which will retain the reclamation fill and provide a foundation for the future LPC wharf construction. The engineered bund interfaces with the existing breakwater at the reclamation site.
- 2. Removing soft sediment under the proposed bund footprint using dredging methods with disposal in the designated area offshore.
- 3. Constructing the engineered bund by initial placement of Select Fill with a bottom dumping barge, followed by endtipping rock onto the leading face of the bund and pushing the Select Fill rock into the harbour along the partly filled dredged channel using a bulldozer or excavator.



- 4. Extending the new southern bund approximately 50 m beyond the proposed eastern end of the planned reclamation to enable the construction of a 350 m long Stage 1 wharf.
- 5. Reclaiming the land between the bund and the existing reclamation by end tipping material from the quarry into the area along the north side of the bund. This would commence when sufficient length of the southern bund has been constructed such that the bund can be formed concurrently and the reclamation is contained.
- 6. Construction material will be primarily from rock and fill material excavated from the LPC owned GB Quarry. Some earthquake rubble may also be utilised if it is available and suitable. The larger rocks for armouring which become available from the quarry operations will be used along the sea wall and in accordance with the bund construction specifications.
- 7. A surcharge stockpile is to be placed along the completed southern bund and across the northern reclamation area together with settlement monitoring stations.

The overall construction programme for this Stage 1 work is expected to take two years between December 2018 and December 2020.

#### THE RECLAMATION WORKS

The proposed reclamation would extend into Te Awaparahi Bay from an existing 10 ha reclamation that is near completion and from the existing coal stockyard as shown on Figure 2.



Figure 2: Reclamation Area

#### RECLAMATION SEQUENCING

The planned sequence below shall be utilised as the basis for bund and reclamation construction which demonstrates the use of bottom dumping material to ensure the risk of slope instability is reduced to as far as reasonably practicable.





 First excavation of the trench along the existing Breakwater and placing of select fill to - 6m bottom dumping. The area is over excavated to prevent run in of the softer sediments and removal of fill when dredging the next area.





Next two stages of the excavation and fill to - 2m using bottom dumping barges.





 Once the staged excavation against the Breakwater is completed the dredging and fill will be carried out over the total footprint of the bund. Fill starts to progress at - 6m using barges and the first end tipping of select fill from - 2m to 5m CD.



3) First slide shows the progression of the - 6m fill and end tipping of the 9m bund to chainage 130. Second slide shows the continued progression of the - 6m fill and at this stage the separation fill and geofabric







on the 9m wide design until completed. Reclamation fill continues progressing forward, preloading will be progressing on three levels.



8) Marine plant has effectively completed dredging and placement. Reclamation fill continues to be place at a faster pace now that the bund is complete. Surcharging of the reclamation fill continue on three levels.

#### Machinery

The machinery used for Stage One reclamation works will be typical equipment used for large civil construction/earthworks projects. The machinery for the reclamation shall be a combination of floating and land-based plant and equipment and shall include:

Plant	Utilisation
Survey Vessel - White Pointer	Hydrographic survey and crew changes
LHK Multicat	Multipurpose vessel
Split Hopper Barges 241 & 242	For bottom dumping rock
Flat top barge – Mesenge 2	Load out barge for select fill
Liebherr 9250 Longreach Excavator	Trimming bunds and placing rock
ZX 670 Longreach Excavator	Trimming bunds and placing rock
ZX 470 Excavator	Loading SHB from the Mesenge 2
Caterpillar D10	Pushing out select fill
Dump Trucks as required from the quarry	End tipping select fill and loading the Mesenge 2
Water Truck	Dust mitigation throughout reclamation area

#### 1.5 REGULATORY REQUIREMENTS

The preparation and implementation of this RCEMP is required under the following rules (and related matters of control) inserted in the Regional Coastal Environment Plan via the Lyttelton Port Recovery Plan:

Rule 10.2 – Placement or erection or any wharf structure located in, on, under or over the foreshore or seabed within the Te Awaparahi Bay Reclamation Area.

a) Preparation and content of a RCEMP that includes methods of construction and mitigation to address the effects of the deposition of material on marine ecosystems.

Rule 10.11- Disturbance associated with activities adjacent to and including the Te Awaparahi Bay reclamation

- a) The preparation and content of a RCEMP that deals with the methods of construction and dredging; and
- b) Methods to mitigate adverse effects of the activity on water quality, including methods to manage the propagation of sediment; and



- c) Methods to manage effects on marine ecology; and
- d) Monitoring requirements; and
- e) Matters set out in Rule 10.35.

Rule 10.20 - Controlled Activity – Reclamation in Te Awaparahi Bay

- a) Preparation and content of a RCEMP; and
- b) The management of any marine biosecurity risks; and
- c) Methods to control the propagation of sediment plumes during construction; and
- d) Stormwater management;

Rule 10.31 - Discharge of contaminants during construction of the reclamation

- a) The preparation and implementation of a RCEMP that deals specifically with storm water management and erosion and sediment control.
- b) The introduction of sediment control measures and methods to control the propagation of sediment plumes; and
- c) Methods to manage the discharge of stormwater; and
- d) The matters set out in Rule 10.35

Rule 10.32 – Discharge of contaminants during construction of the reclamation.

- a) Preparation and implementation of a RCEMP; and
- b) The introduction of sediment control measures and methods to control the propagation of sediment plumes; and
- c) Methods to manage the discharge of contaminants, including screening of reclamation material and methods to avoid and contain spillages; and
- d) Methods to monitor the discharge; and
- e) Matters set out in Rule 10.35.

#### **RESOURCE CONSENTS**

#### The following resource consents apply to the works and must be complied with at all times.

RESOURCE CONSENT CRC175507: Pursuant to Section 104 of the Resource Management Act 1991.

A COASTAL PERMIT (S12): Coastal permit to reclaim seabed and construct a wharf, and associated disturbance of the seabed, and deposition onto or into the seabed in the Coastal Marine Area.

RESOURCE CONSENT CRC175508: Pursuant to Section 104 of the Resource Management Act 1991. A COASTAL PERMIT (S15): To discharge water contaminants into water or into or onto land, and associated deposition in the coastal marine area.

RESOURCE CONSENT CRC175509: Pursuant to Section 104 of the Resource Management Act 1991. A COASTAL PERMIT (S15): To discharge construction phase stormwater into water, or onto or into land, in the coastal marine area.

RESOURCE CONSENT CRC175510: Pursuant to Section 104 of the Resource Management Act 1991. A COASTAL PERMIT (S15): To discharge dust into air.

RESOURCE CONSENT CRC17555: Pursuant to Section 104 of the Resource Management Act 1991. A DISCHARGE PERMIT (S15): To discharge contaminants into air.

RESOURCE CONSENT CRC172522: Pursuant to Section 104 of the Resource Management Act 1991. A COASTAL PERMIT (S12):



1. To discharge contaminants (seabed material and water) into water associated with channel deepening dredging as described in CRC172455;

2. To discharge (dump) dredge material from a ship into water at the disposal ground as described in CRC172455; and

3. To discharge contaminants (seabed material and water) from a ship into water associated with channel deepening as described in CRC172455.

#### 1.6 ENVIRONMENTAL RISK ASSESSMENT

The environmental risk assessment for reclamation is addressed in Table 1: Risk ratings for types of work associated with reclamation construction and the Environmental risk assessments have been carried out utilising the LPC CEMP Guideline manual and the Contract specification documents together with the experience of the Contractor working on Reclamation Projects.

#### **Bund Construction**

HC&R will construct the bund to the design and tolerances as specified in the technical specifications, currently the bund has a 72m base and a 9m width at the top of the bund. The bund is to be constructed using select fill, nominally 100 - 350mm rock, to be quarried and trucked to the reclamation.

Split hopper barges will be loaded with the select fill by an excavator from the spudded barge the Mesenge. Dump trucks will deliver the fill onto the barge where it can be loaded onto the SHB's on either side of the Mesenge. Once loaded, the barges will be towed by the LHK Multicat which shall accurately place the rock in the dredge area to a RL-2m CD. T

This process is expected to minimise the High risk of:

- Wave action leading to erosion; and
- Sediment generations, due to nature of loading process at the Quarry and on the Mesenge II, the majority of fines are expected to be left behind in the loading areas. The fines quantity when bottom dumped are expected to minimal.

Bund construction from -2m to 5m CD will be completed using end tipping using land-based equipment until the design height is achieved. Select Fill shall be placed within the bund area only and no other material.

As the final elevation of 5m Chart Datum is reached a 500mm transition layer of 50-100mm rock is to be placed on the northern wall prior to placing the Geotextile.

#### **Reclamation Construction**

Once the bund crest has progressed easterly to a point, which will mitigate the risk of mud waves in the reclamation. The transition layer and separation Geotextile shall be installed, and the reclamation will be progressively filled in an easterly direction. This will potentially be a combination of fill from land-based dump trucks, frontend loaders and bottom dumping from barges.

As part of the resource consent conditions for the Stage 1 reclamation, the amount of rubble that can be placed in stage 1 reclamation is limited to 5%, this is approximately 25,000m<sup>3</sup>. It is anticipated that once the available allowance has been used that any rubble still being accepted at the site will be used as surcharge material.

As fill between bund and existing reclamation is completed, installation of instrumentation and progressively place surcharge can be started maintaining a 50m bench for working room between the toe of the surcharge and ongoing edge of the fill for temporary stability purposes. Filling is to continue up to Stage 1 reclamation boundary. No fill can extend past this limit.

The Bund and Reclamation Construction shall consist of various processes which shall introduce similar risks profiles



specific to that construction activity, these include:

- Truck and other machinery movements onsite moving of materials and machinery which presents a Low risk of creating dust from haul roads movements, the control measures are detailed in Section 2 of this plan.
- Placement of reclamation material utilising Split Hopper Barges to 2m chart datum to reduce the risk of slope stability to Low, due to the allowance of 30 day settlement periods and monitoring of reclamation settlement through regular hydrographic survey.
- End-tipping using trucks/bulldozer to move material from land into sea, including placement of filter rock, rip-rap and works associated with any ecological engineering trials which presents a Low risk of creating dust from tipping processes, the control measures are detailed in Section 2 of this Plan
- On-site stock-piling and processing of material on land material processing such as, sorting, grading, screening and concrete crushing, which presents a Low risk of creating dust, the control measures are detailed in Section 2 of this Plan.
- On land earthworks and bulk filling surcharge of reclamation, land contouring, work associated with planting etc. Trimming/shaping of seawalls, revetments and toe of slopes using excavators, cranes and other machinery either on-land or on a barge which presents a Low risk of creating dust and a Medium to High risk of erosion and sediment effects, the control measures are detailed in Section 2 and 4 of this Plan respectively.
- Managing the exposed reclamation surface –including construction of storm water control systems and discharge
  points entails a Medium to High risk of erosion and sediment effects, the control measures are detailed in section
  4 of this Plan.

Environmental Effect					
	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface
Dust	LOW	LOW	LOW	LOW	LOW
Contaminated Land	LOW	LOW	LOW (MED for within 10 ha)	LOW	LOW
Archaeology	LOW	LOW	LOW	LOW	LOW
Erosion and sediment generations	LOW	MEDIUM	HIGH	MEDIUM	HIGH
Noise	LOW	LOW	LOW	LOW	NA
Hazardous Substances	HIGH	HIGH	HIGH	HIGH	HIGH

Table 1: Risk ratings for types of work associated with reclamation construction.



# 🙆 2 DUST

#### 2.1 ENVIRONMENTAL RISK ASSESSMENT

The discharge to air of dust from reclamation operations is a potential environmental risk, this includes the discharge of dust from utilisation of haul roads, stockpile and loading areas may propagate onto operational areas of the Port to the North (Coal) and the West (Container Terminal). Measures are needed to prevent this occurrence and protect the workers and equipment in those areas.



Figure 3: Screenshot of Map 1: Sensitivity of the Receiving Environment in relation to Dust Generation in the LPC CEMP Manual. Green area indicates a LOW sensitivity.

Table 2: Environme	ntal risk assessment,	Dust to Air
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Environmental	Risk					
Effect	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface	Dredge Spoil infill and dewatering
Dust	LOW	LOW	LOW	LOW	LOW	LOW

#### 2.2 PERFORMANCE STANDARDS

The management of dust is subject to the provisions of the Resource Management Act 1991, regional and district plans and Resource Consent CRC175510, Coastal Permit to discharge dust into air. The geographic separation of Te Awaparahi Bay from Lyttelton town means there is little risk of dust migrating from the construction activities at the Bay to the residents of Lyttelton. Therefore, the receiving environment is primarily port operations on nearby or adjacent LPC land. These land uses are considered insensitive to moderately sensitive and as such dust levels should be managed to below 100 – 120 g/m3 (fixed 24 hr average) at these locations.



#### 2.3 CONTROL MEASURES

Despite the low risk rating, HC&R shall manage the risk of dust at each of the areas throughout the reclamation activity zone. Limiting dust generation and nuisance is generally undertaken by limiting exposed surfaces, limiting generation from those surfaces and managing dusty operations. The single most important control of airborne dust at the reclamation is to have the water truck with sprays available and in use continuously in dry weather conditions. The water supply for the purpose of filling the water truck is the unlimited supply (150 mm pipe at mains pressure) at the coal yard filling station which will share the tank filling time with the LPC water truck.

Dust management measures shall include:

- 1. Spraying or placing water or wetting agents on to unconsolidated surfaces;
- 2. Control and reducing vehicle speeds if water spraying proves inadequate;
- 3. Windy conditions can aggravate airborne dust so assessing the weather conditions in advance to determine the appropriate dust control measures will be applied;
- 4. Weather monitoring process to determine requirements for future conditions and whether control measures are required to be adjusted or activated;
- 5. Setting of agreed speed restriction (10-20 km/h) for the site, particularly for unsealed haul routes;
- 6. Ensuring appropriate training for employees and contractors to ensure they are aware of the dust management requirements and that they meet the requirements of the Reclamation CEMP;
- 7. HC&R designating a specific person in the team to be responsible for carrying out all the actions needed in order to meet the requirements of this consent; and
- 8. Maintaining the reclamation haul road surface in good condition with regular grading and fresh gravel material addition which is appropriate for heavy off-highway dump trucks.

The table below sets out the dust risk and main matters of control for each of the activities associated with the reclamation work. As many of the control measures rely on dampening down surfaces, HC&R shall have a water cart (or other suitable means of applying dust suppressant) available at all times. Further matters of control are given as part of the Inspection Checklists in Appendix B.

Type of work	Dust Risk	Control
Truck Movements in reclamation area	Low	Minimise speed and travel distances of construction traffic around the site, stabilise internal roads, use stabilised construction entrances and keep unsealed roads damp in windy conditions.
Onsite stockpiling and processing	Low	Minimise speed and travel distances of construction traffic around the site, stabilise internal roads, use stabilised construction entrances and keep unsealed roads damp in windy conditions.
On land earthworks and bulk filling	Low	Limit loading in windy conditions and minimise drop heights to control the fall of materials.
End tipping into sea to form bund	Low	Limit loading in windy conditions and minimise drop heights to control the fall of materials.
Trimming/shaping seawall and	Low	Wet areas as needed. Not expected to be dusty operation as material will be wet.

#### Table 3: Environmental risk assessment, dust – main matters of dust control

Type of work	Dust Risk	Control
revetment		
Exposed reclamation	Low	Wet down if dust is visible, stabilise surface.

Dust

#### 2.4 MONITORING AND REPORTING

#### 2.4.1 Monitoring

Monitoring will include:

- Check and log weather forecast daily including assessment of wind speed and rainfall to adjust dust mitigation methods as required.
- Carry out a visual inspection of site activities, dust controls and site conditions and record in a daily dust log.

#### 2.4.1.1 Meteorological Forecasts

HC&R will check the weather forecasts daily for wind speed, direction and rainfall to assist in managing the site activities and implementing the dust controls. HC&R will request access to the LPC site weather station for this daily data which will be the most representative data available for the reclamation operations.

It is noted that the prevailing wind directions at Lyttleton Port are north easterlies and south westerlies which will be considered for implementing the dust controls and determining the potential effects of dusty conditions.

#### 2.4.1.2 Dust Monitoring

Visual inspections shall be undertaken at least once daily, depending on conditions and a daily dust log will be maintained by HC&R to record the conditions observed during a visual site inspection, the type of work and the potential for any airborne dust generation along with the control measures. In addition, the water truck use, location and quantity of water used will be recorded.

The details of the monitoring activities are summarised as follows with the frequency of checks:

Monitoring Activities	Frequency
Check weather forecasts for strong winds and rainfall to plan Contract activities and dust management response	Daily
Observe weather conditions, wind via observations and data outputs from weather stations and the presence of rain.	Daily and as conditions change
Visual inspections shall be made of all the active reclamation working areas	Daily and increased to at least three times daily during the dry months
Inspect all exposed soils and exposed surfaces for dampness and to ensure that surface exposure of loess and topsoil is minimised	Daily and as conditions change
Inspect stockpiles to ensure enclosure, covering, stabilisation or dampness. Ensure stockpiles of over 3 m in height are appropriately stabilised.	Daily and as conditions change

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Monitoring Activities	Frequency
Inspect dusty activities including material delivery to Mesenge II and stockpile areas to ensure dust emissions are effectively controlled.	At all times in particular when wind speed is over 5.5 m/s (20 km/h or 10 knots)
Inspect water cart and sprays to ensure equipment is maintained and functioning to effectively dampen the exposed areas in the reclamation including the haul road into the reclamation area along the perimeter road that bypasses the coal yard.	Continuous observation with weekly inspection logged

HC&R will also maintain a regular photographic record of site progress and conditions in particular a record of any airborne dust occurrences.

HC&R will check any local airborne dust stations for monitoring information in particular at the Principal's LPC site.

#### 2.4.2 Reporting

In addition to the daily dust logs, HC&R shall maintain a record of completed dust management inspection logs as well as of any incident or complaint investigations. These records shall be completed and provided to the LPC Project Manager at least once a week. In the event of a dust complaint from the public, the following should be noted:

- Time, date and location of the complaint;
- Description of the dust complaint;
- Wind direction and strength and weather conditions at the time;
- Possible cause of the dust complaint;
- Details of the site inspection following the complaint and dust management and control measures being undertaken at the time of the complaint as well as any changes made to these as a result of the complaint; and
- Name of complainant, if available.

#### 2.5 CONTINGENCY

HC&R will utilise the best practice equipment operation to minimise dust and, in the event, that further measures are required to control any site dust discharges these will be discussed with the Principal.

A contingency measure that may be required if the road watering application for dust control with one water truck proves to be inadequate is that the contractor can mobilise a second water spraying truck with both road spray boom and hose fittings to wet stockpiles.

In the event that real time monitoring of dust is required for additional control & monitoring an experienced consultant will be engaged to advise on the location, and type of real time particulate monitor.

In moderate windy conditions HC&R will consider additional controls such as further water applications, carry out additional site inspections and limit activities that may be causing airborne dust conditions.

In extreme conditions of wind with strong winds over 10 m/sec combined with dry weather causing high airborne dust risk it may be necessary to relocate, scale down or consider a temporary suspension of equipment operations which are causing the airborne dust nuisance, until the wind eases.

If the reclamation road condition is contributing to the risk of airborne dust it may be necessary to upgrade the haul road running surface by a combination of adding fresh quarry aggregate and grading the road in addition to the normal application of water by HC&R's water truck tanker.

The use of reclamation roads in wet weather can generate fine sludge on the road surface that subsequently changes to



dry fine material which potentially can generate dust if not kept wet.

Additives to the water truck tank may be considered if the potential dust causing areas require these wetting agents.

The following table summarises the contingency actions which may be required during adverse wind conditions

Weather Forecast	Action to Consider		
Winds of 5.5 m/s (20 km/h or 11 knots) or more	<ul> <li>Limiting the activities that may cause dust</li> <li>Additional visual inspections of exposed areas and activities</li> <li>Assessing the need for additional controls such as increased water application rates</li> </ul>		
Strong winds over 10 m/s (36 km/h or 20 knots)	A site "shutdown and cover up" policy whereby all site operations that can lead to dust should cease and all exposed areas covered or treated to minimise dust emissions. All dusty activities should stop until wind eases.		
Dry weather (particularly between September and February)	Additional water suppression may be required		

Table 4: Actions for dust management in different weather forecast



# 3 CONTAMINATED LAND

#### 3.1 ENVIRONMENTAL RISK ASSESSMENT

The Project site is not currently included in the contaminated land risk zone categorisation maps 1 as the area is currently sea. The site is in proximity to both areas of low (wharf areas) and medium (coal stockyard) risk of contaminated land. The existing 10ha reclamation is not categorised either, however for management purposes it is being treated as a Category 2 (medium risk) site. The primary risk of encountering contaminated soil on site is from imported demolition materials, or from excavation works within the existing 10ha reclamation.



Figure 4 - Categorisation of land around the project site separate into LOW risk (green) and MEDIUM risk (orange) of disturbing contaminated soil.

#### 3.2 CONTAMINATED SITE MANAGEMENT PLAN

Given the site works will interact with the 10ha reclamation and demolition debris will be received, the Category 2 SMP will be applied and this is attached as Appendix A.

Environmental Effect	Risk						
	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface	Dredge Spoil infill and dewatering	
Contaminated Land	LOW	LOW	LOW (MED for within 10 ha)	LOW	LOW	LOW	

Table 5: Environmental risk assessment, contaminated land – reclamation construction



# A ARCHAEOLOGY

#### 4.1 ENVIRONMENTAL RISK ASSESSMENT

The project site location is not included in the CEMP Manual land categorisation for archaeological risk Zones 4. The area is adjacent to both areas of low (wharf areas) and high (coal stockyard and coastline) risk of archaeological discovery (refer Figure 5).



*Figure 5:* Categorisation of archaeological disturbance risk in areas surrounding the project site where red signifies a HIGH risk and green are LOW risk of archaeological discovery.

The categorisation was advised by assessment undertaken as part of the application for global archaeological authority submitted by LPC in 2014. This identified sites of on-land archaeological significance. Although certain parts of the reclamation are situated alongside high-risk areas, none of the identified sites will be disturbed by the proposed activities (refer Figure 6 for locations of sites of archaeological significance in proximity to the project site). Therefore, the archaeological risk to land based sites of significance is low or non-existent.



Figure 6 – Archaeological Significant Site



#### Table 6: Environmental risk assessment, Archaeology

Environmental	Risk					
Effect	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface	Dredge Spoil infill and dewatering
Archaeology	LOW	LOW	LOW	LOW	LOW	LOW

#### 4.2 PERFORMANCE STANDARDS

All work undertaken must comply with the authority requirements under the Heritage New Zealand Pouhere Taonga Act 2014. All construction works, and equipment will be operated, maintained, supervised, monitored and controlled at all times so that the low risk of potential impact on archaeological sites is minimised.

#### 4.3 CONTROL MEASURES

As this project has a low risk of disturbing archaeological remains, there are no additional controls, monitoring or reporting requirements, apart from the risk assessment detailed in this RCEMP.

#### 4.4 MONITORING AND REPORTING

No monitoring or reporting activities are required for low risk activities, same with project closure.

#### 4.5 CONTINGENCY

The Accidental Discovery Protocol (ADP) applies across the Port in all areas of high and low risk activities. In the event of any discovery of a suspected archaeological site the actions included as part of this must be followed by HC&R and shall include the following action:

- Cease all works immediately within a 20 m radius.
- Advise the site supervisor of a find.
- The site supervisor shall contact the appointed archaeologist, who will advise on the significance of the find and outline what steps are to be taken. In all instances, the appointed archaeologist will advise Heritage New Zealand Pouhere Taonga of the discovery.
- The archaeological site will be recorded and excavated in accordance with standard archaeological practice.
- In the event of a Mori archaeological site being found, Te Hapu o Ngti Wheke will be advised of the find and will be consulted with regard to any matters of tikanga in relation to the discovery.
- In the case of uncovering kiwi (human remains), Te Hapu o Ngti Wheke, Heritage New Zealand and the New Zealand Police must be contacted. Te Hapu o Ngti Wheke will be consulted with regard to any matters of tikanga in relation to the discovery.
- In the event of the discovery of kiwi tangata (human remains), discussions about the future of the site shall be entered into by Te Hapu o Ngti Wheke and LPC (or their nominated representative). All parties shall work towards operations recommencing in the shortest possible timeframes

# 5 EROSION & SEDIMENT CONTROL

#### 5.1 ENVIRONMENTAL RISK ASSESSMENT

Erosion and sediment control measures during construction of the reclamation land/bunds is required for:

- Storm water runoff and discharge
  - During rainfall events, runoff from construction sites can entrain considerably higher concentrations of suspended sediments than from vegetated or paved land. Construction site runoff often tends to contain fine particles that can impact on the receiving environment.
- Erosion of the leading face of the reclamation and/or bund due to wave action.
  - Rough sea and swell conditions may cause large localised erosion events of the leading face or bund of the reclamation through waves impacting the bunds or running up onto the reclamation.

#### Stormwater runoff and discharge

An assessment of the potential risk to ecological environments from suspended sediment plumes resulting from the reclamation construction was undertaken by Cawthron Institute. The assessment determined a Low risk of the discharge of storm water from reclamation construction impacting on the ecological environment of Te Awaparahi Bay. Despite this, the Project is deemed as posing a HIGH erosion and sediment risk due to the size of the project site area.

During rain events, uncontrolled channelling of run off surface water if not managed could discharge fine particles into the receiving environment. The primary risk is from runoff across fine grained sediments (such as loess), off loess stockpiles and from highly trafficked areas where the ground may pug and become muddy. The controls for this project need to be considered separately to the existing LPC reclamation area and only for the perimeter haul road, stockpiling and stage 1 reclamation area and the breakwater.

HC&R shall use a combination of clean-water diversion, appropriate site grading a temporary 500mm high storm water drainage control bund will be constructed at the toe of surcharge on the southern and eastern sides of the area. Three soak holes as a minimum are to be placed into the bund to allow for the controlled release of the runoff from the stockpile, and soakage to control silt laden storm water. A single outflow pipe will also be installed to cope with high flow rainfall events. A treatment device (such as a silt fence) will be installed prior to this discharge point, to prevent sediment laden water discharging.

All stockpiles shall be track rolled or otherwise surface compacted to prevent erosion. Highly trafficked areas shall be monitored and appropriate remediation work (i.e. placing granular fill) undertaken where required. Stabilised construction exits/entrances shall be constructed for all site access points.

In practise, the reclamation fill is so pervious that ponding and flowing water on the reclamation is very rare. The only time it does occur, and for short periods, is on trafficked areas (i.e. internal roads) where the stabilised surface has a lower permeability. In these instances, the runoff pools for a short period (hours) before discharging via filtration into the reclamation. No overland flow has been observed during the 10ha construction and no formal storm water outlet has been needed.

During the construction, the active working of the surface and constant grade change due to settlement means a conveyance-based system cannot be implemented. Instead, a reliance on direct infiltration, treatment of any localised flows and stabilisation measures shall be implemented in order to reduce the risk of erosion and sediment on the receiving environment.

#### Erosion of the leading face of the reclamation and/or bund due to waves

Wave induced erosion of the active reclamation face can generate sediment plumes as fine material is eroded by wave action and transported by currents. The occurrence, concentration and extent of sediment plumes is dependent on a number of factors with the most important being the content of the fill and the wave energy.

In addition, during high energy events, waves may run up onto the reclamation and erode the edge of the reclamation as the water recedes.

There is a high potential for wave induced plumes to occur, although given relatively infrequent occurrence of these large events, and the management knowledge gained during the 10ha, the frequency and duration of these plumes are not expected to be significant. However, for the purposes of this project, and given the duration for the works, the risk for this component is considered high and measures to mitigate this risk are required.

Control measures to minimise the risk of erosion to the leading face of the reclamation are detailed in in Section 5.3.1

#### Mud-waves resulting from end-tipping

As end tipping progresses, sediments on the seafloor can be displaced forming a 'mud-wave'. This mud-wave is pushed away from the end tipping, and based on monitoring the 10ha reclamation, is expected to extend up to 30m from the working face. The size and extent of the mud wave is dependent on the seafloor sediments and the scale of the end tipping **operation**. However, due to the nature of bottom dumping with Split Hopper Barges and only utilising end tipping at -2m to 5m chart datum, mud waves are expected to be a Low risk, if not negligible.

Environmental	Risk					
Effect	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface	
Erosion and sediment generations	LOW	MEDIUM	HIGH	MEDIUM	HIGH	

Table 7: Environmental risk assessment, Erosion and Sediment generation – Reclamation Construction

#### 5.2 PERFORMANCE STANDARDS

The water quality requirement for discharges from LPC to the Harbour is set out in the Resources Consent CRC175509 states stormwater discharge system(s) that discharge to coastal water shall be designed to achieve a Total Suspended Solids (TSS) concentration of 170mg/L at the point of discharge for all rainfall events up to and including the 1 in 20-year storm event for Lyttelton Harbour/Whakaraupo. The following discharge rates apply:

- Flow rate (I/s):
  - Stage One: peak 35 l/s (1 in 20 year)
- Suspended sediment concentration of 170 mg/l.

These performance standards are relevant at the point of discharge.

Stormwater discharges to coastal water shall not give rise to the production of conspicuous oil or grease films, or floatable materials further than 100 metres from the discharge point in any direction.

Sediment, and any material or debris contained in the stormwater shall be intercepted and as far as practicable removed before stormwater discharges to coastal water.

#### 5.3 CONTROL MEASURES

Avoidance, treatment and control measures shall be implemented to minimise erosion and sediment risks. These can include:

- Using non-erodible fill when depositing material directly into the harbour;
- Use bunds to isolate the reclamation area from the harbour if erodible fill is to be placed into the water;
- Bunds must be armoured with non-erodible material such as armour rock;
- Monitor area (guide: 50m in the High, 100m Medium and Low) for visual sediment plumes;
- Use a debris boom for reclamation material that contains floatable material.
- Review reclamation method and install appropriate control if visual sediment plumes extend past the specified monitoring zone (50m or 100m).
- Use monitoring form A1 to record visual sediment plume monitoring (Appendix B).

#### 5.3.1 Controls

The primary controls that will reduce the erosion and sediment for each risk of work is given in Table 8 below.

Type of Work	Erosion and Sediment Risk	Main matter of Control
Truck Movements in reclamation area	HIGH	Stabilised road, entry/exit point designed to prevent sediment tracking offsite. Road Inspections and remedial work as required to prevent pugging. Edge bunds and table drains to channel water that runs off the haul road. The haul road around the reclamation is essentially level and drainage will be to a number of tip outs from the table drains to allow water to seep into the reclamation on the inside of the road edge and into the harbour via the rock armouring on the outside. To manage this is, multiple tip outs so that any surface water is spread not concentrated into any single channels. There will be water (from water truck) added to the haul road but this will be controlled to minimise wasted run off. The reclamation and stockpiling area is dynamic therefore there will be ground soakage. A single piped exit point on the eastern side will be created with associated silt fence to manage any overland runoff. The reclamation area needs to be filled to control the level and shape any gradients towards where the surface water will flow. i.e. to tip outs, to

#### Table 8: Primary Controls

Type of Work	Erosion and Sediment Risk	Main matter of Control
		soakage zones, to a channel or any SRP.
Stockpiling material onsite	MEDIUM	Divert surface water runoff away from stockpiles. Compact surface of stockpiles (track or by bucket etc) Cover for rainfall or high wind events. Keep away from the water edge (> 50 m) and surround with silt fences if needed. A cut off bund around the reclamation area to keep water there and into any internal Sediment Retention Ponds ( SRP ). If water from the LPC reclamation needs to go across the perimeter haul road it should be by culverts
On land earthwork and bulk filling	MEDIUM	Potential for sediment erosion from tidal action against the revetment and from surface water runoff from the reclamation area). End tipping material shall only be limited to -2m chart datum, bottom dumping Is the primary method and shall reduce the erosion and sediment risk due to the nature of the bottom dumping process.
Trimming shaping sea wall & revetment	MEDIUM	Minimise working area, prompt removal of excavated material. Silt curtains are not anticipated but may be installed if other measures unsuccessful. Visual observations and monitoring using monitoring form A1 to record visual sediment plume monitoring. If small fines and silts are mixed amongst the armour rock, the rock shall be washed to remove fines before it is placed into the harbour, however due to the nature of the loading process at quarry and barge interfaces, fines are expected to be minimal.
Reclamation Surface	HIGH	Storm water diversion and treatment Silt curtain as a contingency measure if current construction method is not adequate.

#### 5.3.2 Sediment Controls

The following control measures shall be utilised throughout reclamation activities.

#### Perimeter diversion measures

Interception of 'clean' water upstream of the site is important for two reasons – reducing the storm water runoff volume and reducing the potential for contaminants offsite to enter the construction area. Catch drains shall be implemented around the perimeter of the site and storm water treated and discharged:



- a) onto or into land in the Coastal Marine Area; and
- b) Into coastal water from one location on the eastern edge of the reclamation area.

Diversion channels shall be stabilised with geotextile if they exhibit signs of degradation.

In addition, diversion measures will be implemented onsite during the construction. This will be for the purposes of diverting water away from stockpiles and separating the large catchment areas into smaller manageable catchments.

#### Stabilisation of Roads - watering and compaction

Perimeter haul road shall be built up and profiled to eliminate ponding on the road. This is to be carried out with quarry fines and rock as reclamation fill. Good quality road surface and subgrade to keep the road in good condition. Stabilisation of roads will be undertaken using watering and compaction to minimise erosion potential and tracking offsite. Watering helps stabilise the surface of the reclamation meaning fine particles are at less risk of being eroded by storm water runoff. Watering also minimises dust - refer section 2.0 Dust.

#### Sediment fences or site barriers

Install site barriers or filter methods (silt fence, hay bales etc) to prevent sediment laden water discharging offsite into the marine environment. These are only required where there is a potential for sediment laden water to discharge from the site (i.e. from a catchment that drains to the marine environment) These controls (i.e. site barriers, filter socks, silt fences or straw bale barriers)have been implemented successfully at the 10 ha reclamation. These barriers are set into the ground and direct storm water flows as well as providing health and safety controls (such as activity separation, traffic lanes etc).

All silt fences etc will be installed as per ECan's Erosion and Sediment Control Guidelines.

#### Soakage Systems

The primary mechanism for storm water runoff discharge will be via direct infiltration through the reclamation fill and ultimately into the surrounding water. If the surface of the reclamation becomes bound and ponding occurs, specific soakage pits may be needed. These will be constructed in the reclamation fill and backfilled with a suitable highly permeable fill (like cobbles, rock etc). See DWG 1.

#### **Sediment Curtains**

Sediment curtains may be deployed in isolated instances for the Stage One reclamation construction to manage unexpected sediment plumes if existing controls are not mitigating the risk.

Wide scale use of a silt curtain/boom is not considered necessary given the likely extent of plumes from the proposed works, the natural variable turbidity regime and the effectiveness of such a device.

Furthermore, unlike the 10ha reclamation, the fill material will not have floatable components and there will be much greater control over the nature of the material arriving. This means HC&R can schedule the most appropriate material for the stage of construction. For example, HC&R will use rock fill for the bund and exposed working faces, reserving the fill with finer grained material for enclosed areas or bulk filling above the water line.

#### Incoming material controls

HC&R shall take all practical measures to ensure that all materials used in the reclamation comply with the permitted materials. This will require the implementation of an elevated observation post, as used in the 10-ha reclamation. All contractors or persons bringing materials to the reclamation shall be made aware of the permitted (and disallowed) materials.

The accepted materials include:



- a) Any quarry sourced virgin material;
- b) Rock, gravel, sands, silts and clay;
- c) Stone;
- d) Bricks;
- e) Tiles;
- f) Aggregates;
- g) Reinforced concrete;
- h) Unreinforced concrete;
- i) General rubble;
- j) Cured asphalt (to be placed out of wave erosion zone);
- k) Glass; and
- I) Demolition Debris, as defined below.

For the purposes of this consent, "Demolition Debris" means materials that result from the demolition of buildings and structures. These materials shall only include:

- a) Stone;
- b) Bricks;
- c) Tiles;
- d) Aggregates;
- e) Reinforced concrete;
- f) Unreinforced concrete;
- g) General rubble;
- h) Cured asphalt (to be placed out of wave erosion zone); and
- i) Glass.

Prohibited material:

- a) Gib/plaster board, timber, all metals, carpet, plastics and electrical cables at a total volume of more than 5 percent per load;
- b) Asbestos cement products;
- c) Organic material at a volume of more than 5 percent per load;
- d) Liquids or semi solids (other than fluidised dredge spoil);
- e) Chemicals in bulk, either in a liquid or solid form; and
- f) Sheets of metal cladding

Where demolition rubble is accepted, randomly selected loads shall be inspected at the dispatch office and all loads inspected as they are dumped on the reclamation. Loads of demolition rubble shall be dumped on the reclamation surface (and not the face) to allow inspection prior to placement.

A record of all Earthquake Debris deposited at the site shall be kept. This record shall include the name of the person and



company that delivered the material to the site, the date of deposition, the source of the material, a description of the material and the approximate quantity of material.

#### **Erosion & sediment control plans**

The constructability sequence of the bund and reclamation (as detailed in section 1.6) shall minimise the effect of Erosion of the leading face of the reclamation and/or bund due to wave action. Once the bund crest has progressed easterly far enough to contain any mud waves in the reclamation, the transition layer and separation Geotextile have been installed the reclamation will be progressively filled in an easterly direction. Following trimming of each section of select fill, HC&R will use the Liebherr 9250 Longreach excavator to place the temporary amour rock along the slope. Rock will progressively be placed from the toe of the batter up the slope in two layers using a bucket or grab. Dump trucks will deliver the rock to the excavator from the quarry as required. This method of placement will ensure that maximum interlock between layers occurs and reducing the risk of erosion to the leading face of the reclamation to as far as reasonably practicable. The following sediment control plans provide graphical details of the of mitigation measures (as detailed above) that shall be implemented for Stage 1 Reclamation.



Figure 7: Sediment Control Plan (DWG 1)





Figure 8: Sediment Control Plan – (DWG 2)





Figure 9: Sediment Control Plan – Typical Cross Section

#### 5.3.3 Decommissioning of controls

Removal of erosion and sediment controls will only occur once the exposed surfaces are stabilised or permanent storm water management measures are in place.

Any marine based controls shall only cease once the works which require the controls cease.

#### 5.4 MONITORING AND REPORTING

HC&R shall monitor and report in particular, observations, during rain events to identify the surface water flows beside the



haul road, and around the reclamation area.

In any steady rain event the truck haulage is normally suspended as operating on very wet haul roads damages the road surface and it takes time to recover.

#### 5.4.1 Monitoring compliance with performance standards

In order to evaluate the effectiveness of the control measures, monitoring is required. Due to the highly dynamic environment, quantitative monitoring is not always possible, consequently the monitoring is a mixture of qualitative and quantities measures. HC&R shall monitor compliance measures with performance measures from the CRC175509 Resource Consent include:

- When construction works are being undertaken and a discharge into coastal water is occurring, HC&R shall
  when practicable complete a visual inspection including taking photographs of the working reclamation face from
  a suitably elevated position (such as Old Sumner Road above Battery Point) during and immediately following
  any rainfall events exceeding 20 millimeters in depth (where it is safe to do so) to monitor the presence and
  extent of discernible sediment plumes. HC&R shall keep records of visual inspections, including photographs, for
  the duration of consent and these shall be provided to the Consent Authority on request.
- If stormwater discharge occurs from the stormwater outlet(s), HC&R shall collect no less than four times each year a sample of stormwater discharging from each stormwater outlet. Samples shall be tested for Total Suspended Solids and compared against Condition (3). If more than ten continuous samples comply with Condition (3), HC&R thereafter may sample twice per year (if discharge from the stormwater outlet(s) occurs)..
- In the event that a discharge sample collected in accordance with Condition (15) exceeds the Total Suspended Solids concentration limit in Condition (3) the following shall occur:
  - a) HC&R shall implement any management practices required to reduce the Total Suspended Solids concentration of the discharge;
- As soon as practicable, the Consent Holder shall collect a discharge sample to reassess for compliance with Condition (3) of the Resource Consent CRC175509; and
- Any laboratory testing and analysis of samples required by virtue of the monitoring requirements of this resource consent shall be carried out by an organisation and laboratory accredited by International Accreditation New Zealand (IANZ) for the tests and analyses involved.

#### 5.4.2 Maintenance, inspections and monitoring

Maintenance, inspections and monitoring are required to ensure the control measures are in good working order and are performing as expected. The nature of the maintenance and the frequency of inspections/monitoring are dependent on both the type of control and the environmental conditions. Table 9 details the inspection and monitoring requirements for the different work phases. Check sheet for inspections is included in Appendix B.

Work Phase	Frequency	Monitoring Actions
Bund Construction progressing	Daily	Visual inspection from elevated. position to assess sediment plumes and stability of bund.
Reclamation surface is un-stabilised but not changing	Weekly Before expected rainfall event After rainfall event greater than 20 mm/24 h	Inspect all control measures (cut off drains, silt fences, soakage pits, dish drains), ensure all weather access to measures is maintained).



		Walkover on reclamation to identify any channelised flow, erosion of surface and any non- controlled discharges off reclamation. Once a week – fill in inspection sheet.
After stabilisation and installation of final stormwater system	Monthly After rainfall event greater than 20 mm/24 h	Inspect whether surface remains Stabilised. Check all stormwater control features and ensure no uncontrolled discharges are occurring.

#### 5.5 **REPORTING**

- HC&R will provide the LPC Project Environmental Adviser with their completed inspection/monitoring checklists on a weekly basis.
- Once a month the LPC Project Environmental Adviser shall accompany HC&R during the weekly site inspection to undertake an audit and ensure compliance with the RCEMP and identify where/if any improvements are required.
- A regular meeting will be held on site by HC&R to discuss the results of the weekly inspection and monthly audit.
- Where inspections identify areas of non-compliance or possible improvement HC&R will be advised either verbally or in writing by either the LPC Project Manager or if applicable, via a Notice to Contractor prepared by the Project Engineer.

#### 5.5.1 Complaint Reporting

HC&R shall maintain a record of completed dust management inspection logs as well as of any incident or complaint investigations. These records shall be completed and provided to the LPC Project Manager at least once a week. In the event of a dust complaint from the public, the following should be noted:

- Time, date and location of the complaint;
- Description of the dust complaint;
- Wind direction and strength and weather conditions at the time;
- Possible cause;
- Details of the site inspection following the complaint and dust management and control measures being undertaken at the time of the complaint as well as any changes made to these as a result of the complaint; and
- Name of Complainant.



#### 6 **NOISE & VIBRATION**

Assessment of the Assessment of the expected noise resulting from the reclamation undertaken by Hegley Acoustics indicates that the maximum potential disturbance on residents of Lyttelton Harbour will be less than minor. This assessment considered the main activities of reclamation placement and material transportation. Therefore, all activities are considered to have a Low noise and vibration risk. In addition to the terrestrial noise, the generation of underwater noise can affect the health and behaviour of marine mammals, particularly Hectors Dolphins. In order to minimise the potential effects on marine mammals, specific controls are required.

Based on the proposed construction methodology the greatest noise is expected to come from:

- Loading rock onto the Mesenge II barge,
- Dumping loads of rock onto the reclamation, and

Moving rock piles with loader

#### 6.1 ENVIRONMENTAL RISK ASSESSMENT

The maximum receiver noise for reclamation construction (which includes all equipment being used concurrently for worst case scenario) in relation to reclamation activities 31 dB LAeq.

Table 10 Environmental risk assessmen	, noise and vibration – reclamation construction.	

Environmental Effect					
	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface
Noise	LOW	LOW	LOW	LOW	NA

#### 6.2 PERFORMANCE STANDARDS

Table 11 sets out the construction noise limits which apply to the project. Note that these limits apply at the boundary of receptor property. The noise criteria for the project is based on the New Zealand standard for construction noise NZS 6803;1999. Where the noise criteria in the following Table cannot be achieved, the contractor will implement controls to manage the noise.

Building type	Days	Times	Noise limit	
			L <sub>Aeq(t)</sub>	L <sub>AFmax</sub>
Residential	Weekdays	0630-0730	55 dB	75 dB
		0730-1800	70 dB	85 dB
		1800-2000	65 dB	80 dB
		2000-0630	45 dB	75 dB
	Saturdays	0630-0730	45 dB	75 dB

Building type	Days	Times	Noise limit	
			L <sub>Aeq(t)</sub>	L <sub>AFmax</sub>
		0730-1800	70 dB	85 dB
		1800-2000	45 dB	75 dB
		2000-0630	45 dB	75 dB
	Sundays & public		45 dB	75 dB
h	holidays	0730-1800	55 dB	85 dB
		1800-2000	45 dB	75 dB
		2000-0630	45 dB	75 dB
Industrial & commercial All days	All days	0730-1800	70 dB	-
		1800-0730	75 dB	-

Table 11 – Guideline Construction Noise Limit

#### 6.2.1 Reclamation

Reclamation activities will commence once construction of the bund wall has reached a stage that is able to contain any potential mud wave. Equipment will be potentially working from 730am to 10pm 7 days a week and will undertaken by much of the same equipment used to haul the fill from the quarry to the reclamation.

Several streams of delivery of rock are expected to operate simultaneously from the quarry, select fill to the barge loading facility, select fill to the stockpile, reclamation fill and the delivery of separation fill/temporary amour.

Trucks will deliver select fill from the quarry to the Mesenge II barge where it will be loaded onto the smaller SHB's using an excavator. SHB's will be able to place on either side of the Mesenge II to provide continuous operation of the bottom dumping.

Trucks delivering to the reclamation will primarily transit between the quarry to the reclamation along the haul road to a dump face. Once the material has been unloaded it will be pushed out using a bulldozer and frontend loader.

Longreach excavators will be used to remove, trim and place geofabric and rock of batters for the duration of the project.

#### 6.3 CONTROL MEASURES

All construction work meets the requirement for the "yellow zone" in the CEMP.

Screening Noise Assessment, indicates the reclamation activities are able to be undertaken day or night, seven days a week provided that (as predicted by the noise assessment) the works meet the following noise limits:

- Daytime Mon Sat 07:30 18:00 70 dBA
- Daytime Sunday 07:30 18:00 55 dBA
- Night time Monday Sunday 18:00 7:30 45 dBA

If actual site measurements indicate different noise levels, the hours of work could be altered (either shortened or extended). Alternatively, the noiser activities, such as loading the barge, could be restricted to certain times of the day. If required, an initial identification & measurement of the noise levels can be carried out by a qualified noise consultant when the quarry equipment commences operation.



#### 6.3.1 Source controls

- Where possible, plant and equipment are to be selected that can be fitted with options to minimise noise such as covers, mufflers, shrouds and other noise suppression equipment.
- Plant and equipment is to be turned off and not left idling when not in use.
- Plant and equipment is to be operated in accordance with industry standards and have been serviced as per manufacturer specifications.
- Noisy plant and equipment is to be oriented away from sensitive receivers where possible.
- Employee parking will be minimized and located as far as possible away from sensitive receivers
- Where possible, temporary screens or other items that provide a noise buffer (including plant and equipment) are to be used proximate to noise sources.
- Low noise emission plant and equipment is to be selected where available.
- Broadband reversing alarms or similar is to be used as an alternative to a traditional beeper reversing alarm for vehicles permanently on site.
- Plant and equipment is to be well maintained and serviced regularly to ensure it is not generating excessive noise.
- Minimise drop heights of rock into barges/trucks.

#### 6.3.2 Administrative controls

LPC will inform the local community of the work and when major components start and are complete..

- The use of horns and alarms are to be minimised, most particularly during works undertaken in the evening and night time periods.
- The staff and visitor induction protocols are to include awareness of noise generating activities and mitigation measures and techniques that should be implemented.
- HC&R will notify the Principal of all planned out of hours work well in advance of the minimum 1-week notification period.
- A complaints procedure shall be implemented by the Principal and contact details provided to potentially affected residents and businesses in the area.
- The complaints procedure executed by the Principal shall include a record of complaints indicating cause and measures taken to resolve/minimise cause.

#### 6.3.3 Engineering controls

The following measures shall be put in place for the duration of the project.

Table 12: Summary of controls

Noise and Vibration Risk			Control					
Loading rock onto trucks and barge		Minimise drop heights of rocks onto truck decks and onto barge, consider the time of day these works are undertaken.						
Reclamation bulldozer	construction	(trucks,	excavator,	Minimise essential.	night-time	works	unless	absolutely



#### 6.3.4 Ongoing assessment

Due to identified low risk no ongoing assessment is required. However, a complete record will be maintained of any testing carried out on site by a noise consultant to assess noise levels and the results will be reported to the Principal.

#### 6.4 MONITORING AND REPORTING

No monitoring is required due to the low risk rating of the activity. However, the Principal may require noise monitoring at the start of the work and when changes occur, and a noise control specialist will be engaged for this work.

#### 6.4.1 Monitoring

No monitoring is required for any of the reclamation activities.

#### 6.4.2 Reporting

Complaints will be reported as part of the standard complaint procedures for LPC.

#### Table 13: Information reporting requirements

Information	Timeframe
Noise complaint initial report	Within twenty-four hours
Noise complaint closed	Within one week of closing complaint

#### 6.5 CONTINGENCY

Complaints must be managed using the complaints process. During works there must always be a delegated person available to discuss noise issues with the LPC Project Manager and take immediate action as required. HC&R Project Manager shall be responsible for communicating noise levels.



# 7 HAZARDOUS SUBSTANCES MANAGEMENT

#### 7.1 ENVIRONMENTAL RISK ASSESSMENT

The environmental risk of hazardous substances associated with the reclamation construction is from servicing, refuelling and operating machinery which uses diesel, petrol, lubricating greases and oils, de-greasers and compressed gases.

Bulk oil will be stored in a service container on the reclamation area. Inside the container will be three 1,000 litre pods which are all labelled with the type of oil. The container is fully self bunded and contains all the relevant MSDS sheets.

A diesel fuel tank will be stored on the designated reclamation area. The tank will be fully self bunded and have a capacity of 15,000 litres. The tank will not be stored within 20m of the shoreline.

The potential risk while using these substances in the equipment throughout the reclamation include:

- a) Re-fuelling machinery with diesel;
- b) While lubricating and servicing the machinery on the reclamation;
- c) Carrying out preventative maintenance which requires the use of grease, applied through fit for purpose grease guns;
- d) During normal operations if a fault occurs (i.e. hydraulic hose breakage)

Table 14: Environmental risk assessment, hazardous substances management – reclamation construction.

Environmental Effect					
	Truck & Other machinery Movements	Onsite stockpiling & processing of material	On land earthwork and bulk filling	Trimming / Shaping sea wall and revetment	Reclamation surface
Hazardous Substances	HIGH	HIGH	HIGH	HIGH	HIGH

#### 7.2 PERFORMANCE STANDARDS

Due to the nature of the reclamation activities and the utilisation of long reach excavators over water, the risk of hydraulic oil entering the water over the project period is ranked as High. To minimise the risk of hose failure, HC&R shall conduct daily visual inspections on high risk hoses in conjunction with the use of biodegradable Panolin hydraulic oil in the long reach excavators.

The management and control of hazardous substances at the Port shall be undertaken in accordance with the performance standards as in Section 12 of the CEMP Guidelines and as follows:

- As a minimum comply with the statutory requirements for the storage, use and disposal of hazardous substances in accordance with Health & Safety at Work (Hazardous Substances) Regulations; and gazette notices;
- Hazardous substances are transported to and from site in accordance with the requirements of the Land Transport Management Act, 2003;
- Storage facilities and equipment that hold significant quantities of hazardous substances are appropriately
  designed and operated to prevent/ reduce the potential for any accidental spillage or leak of a hazardous
  substance from the facility;
- Containers, facilities and equipment containing or storing hazardous substances are appropriately labelled and



signed to identify the potential hazards;

- Emergency Response Plans are in place which in the event of an incident/ accident involving hazardous substances will be used to minimise the effect of the event on the environment;
- Staff and subcontractors at the site are trained how to handle, use and store hazardous substances in a safe manner and how to respond in the event of an emergency incident;
- No spills and leaks to soil or water will occur from the storage or use of hazardous substances;
- No spills and leaks to soil or water will occur from the maintenance of any on -site equipment;
- No storage of hazardous substances shall occur within 20 metre of the harbour;
- All refuelling of equipment on land or over water will be supervised throughout the whole activity and spill containment equipment must be immediately available;
- All refuelling equipment will have cut -off valves;
- If working in or near water then appropriate spill containment equipment must be available; and
- A monitoring regime will be in place for daily/weekly inspections of all equipment, storage facilities, and spill containment equipment.

Prior to commencing work the Contractor will identify the requirements of the hazardous substances likely to be used or stored at the LPC site.

#### 7.3 CONTROL MEASURES

Spill response kits will be available on the reclamation site as part of HC&R's site management and all site staff will be trained in the use of the kits. Spill kits will, at a minimum, be located at the diesel tank, the hazardous substance storage container and near the active working area. Pre-start inspections by the experienced machinery operators shall be conducted and documented to ensure early detection of any minor leaks or opportunities for hose replacement.

Type of work	Hazardous Substance risk	Control
Re fuelling equipment and maintaining mobile plant	Fuel, oil & grease spillage	Trained operators & procedures for spill kit use then clean up any spillage residues. SOP
Excavators (hydraulic)	Hydraulic oil release from burst hose	Preventative maintenance Schedule maintained.
Storage of hazardous substances	In correct use, leakage, fire,	Correct storage with fire extinguisher available Labelling & SDS available Experienced handlers used
Maintenance welding with oxy acetylene	Fire, release of gas causing hazardous atmosphere zone	Regulations followed for use and storage
Transport of hazardous substances	Fire, spillage risks	Follow Land Transport Rules

The following controls to be adopted are from the CEMP Guidelines.

Controls – prior to bringing hazardous substances on-site:

- Provision of a hazard substance store;
- At least 1 fire extinguisher located at each hazard substance store;
- Provision of a cage for any storage of gas cylinders;
- Preparation of an Emergency Response Plan including a Spill Response Plan;
- A dedicated Approved Handler who is responsible for the Hazardous Substances stores and ensuring compliance with the Health & Safety at Work (Hazardous Substances) Regulations;
- Review process for new hazardous substances brought on-site but not included in the list of specific substances, In particular the need to ensure a copy of the safety data sheet is provided; and
- A process to monitor compliance with the requirements of the RCEMP.

Controls – during works:

- All hazardous substances shall be stored in the appropriate storage location.
- The "Person in Charge" shall maintain a Hazardous Substance Inventory and ensure it is kept up to date and available on request to LPC, ECAN and Worksafe staff.
- Copies of safety data sheets shall be held on site and available for staff to review.
- Controlled zones shall be established around all Hazardous Substance stores and shall be included on a site map and should be clearly marked on site.
- Requirements for hazardous atmosphere zones and location test certificates shall be identified and met.
- Appropriate signage shall be in place.
- All vehicles and works area must have as a minimum a spill kit appropriate to the hazardous substances and volumes being used.
- All refuelling of equipment on land or over water will be supervised throughout the whole activity and spill containment equipment must be immediately available.
- All refuelling equipment will have cut off valves.
- If working in or near water then appropriate spill containment equipment must be available.
- Spill containment equipment must be available as all activity is on or near water.

Storage of hazardous chemicals - required under regional or district plans:

- There shall be no storage of fuel within 20 metres of the Coastal Marine Area;
- Fuel shall be stored securely or removed from site overnight;
- Stock reconciliation of a specified hazardous substance shall be undertaken at regular intervals;
- A container storing hazardous substances located on or over the land surface shall be visually inspected for leakage at least once per month;
- Copies of the stock reconciliation records or the most recent certification of the container shall be held and be available to environment Canterbury on request within five working dates;
- Maintain a current inventory of all specified hazardous substances on the site and shall be available onsite

Store or use the substances in a facility which is designed, constructed and managed to:

• Prevent the escape of substances or contaminated water;



- Prevent storm water runoff entering the facility;
- Contain a leak or spill and allow the leaks or spilled substance to either be collected or lawfully disposed of; and
- Have spill kits to contain or absorb the spilled substance located close to the substance storage and use areas at all times, along with instructions on how to use the spill kit.

Specific controls relating portable refuelling containers:

A portable container can be fixed to a vehicle or towed by a vehicle.

- a) The containers are not located within 20 m of a surface water body.
- b) The aggregate quantity of specified substances stored on site in a portable container shall not exceed 2,000 litres.
- c) A container shall be located in an area or structure that will contain a leak or spill of the substance and allow the spilled substance to be collected.
- d) A spill kit shall be located with the container at all times with instructions on how to use the kit.

#### Health and Safety at Work (Hazardous Substances) Regulations 2017 Controls.

- a) Maintain an inventory of hazardous substances used and stored;
- b) Maintain a record of SDS for every hazardous substance present;
- c) Maintain a location plan showing the hazardous substance storage areas, location of the fire fighting equipment and spill kits;
- d) Ensure all hazardous substances are correctly labelled;
- e) Ensure that hazardous substances are transported safely;
- f) Demonstrate how you will ensure hazardous substances are safely stored and secured.
- g) Ensure that containment (bunding) is provided for all liquid hazardous substances, and
- h) Ensure that hazardous substances and their containers are appropriately disposed of.
- A hazardous substance register will be provided to LPC.
- Safety Data sheets will be provided and available on site to the Contractor's staff.
- Location plan will be prepared and available for staff to access it.
- All containers of hazardous substance will be labelled.
- It is the responsibility of the supplier to follow the Land Transport Rules for delivery and collection of hazardous substances including portable toilet effluent.
- The storage, positioning, secondary containment, signage, location test certificates, segregation and security will be in accordance with the CEMP guidelines.

#### **HC&R Specific Controls**

- Preventative Maintenance Schedule in place which includes visual checks of high-risk hydraulic hoses on excavators.
- Biodegradable Panolin Hydraulic Oil utilised in excavators.
- Refuel during daylight hours where possible;
- Spill response kits (including hydrocarbon booms) located around the construction site, on the passenger wharf and on-board construction and dredging vessels to facilitate containment of any water-based spills.
- The lowest volumes of hydrocarbons (oil, grease, petrol, diesel) practicable will be stored on site.
- Bunding of chemical storage areas and stored in accordance with the products Safety Data Sheet (SDS) on



board construction and dredging vessels, and land-based construction areas.

- Completion of regular spill response drills.

#### 7.3.1 Waste Management

All hazardous substances no longer required during the construction phase shall be:

- The ablutions facility will be serviced as a Portaloo system with effluent removed from the site;
- · Removed and stored at another suitable storage facility for hazardous substances; or
- Removed by a licensed operator and treated so that it is no longer a hazardous substance.

In addition, packaging that contained (directly in contact with) a hazardous substance will be disposed of in a manner that is consistent with that of the substance it contained, considering the nature and type of packaging. If any residue of the hazardous substance has been removed, or treated so it is non-hazardous, the package may be reused or recycled.

#### 7.4 MONITORING AND REPORTING

The requirements of the Controls required for Hazardous substances include:

- a) documenting the location, quantity of any hazardous substances and providing SDS for each substance
- b) Monitoring the use and quantity of hazardous substances in storage in accordance with the Regulations

The event of any hazardous substance spillage will normally require the immediate shutdown or isolation of the specific item of equipment for remedial action to minimise and clean up the spillage and to repair any damage such as a burst hydraulic fitting with all incidents to be recorded and reported.

The site manager is required to notify the ECAN 24-hour emergency response service in the event of a spill that results in contamination to a stormwater system, water body or on to land.

#### 7.5 CONTINGENCY

An Emergency Response Management Plan shall be in place for the duration of reclamation construction.

HC&R will ensure that:

- a) Spill kits are clearly labelled and located in easily accessible position for all staff;
- b) All staff are aware of and can access the chemical spill management and chemical spill guidelines and know how to use the spill kit in case of emergency;
- c) Spill kits are restocked following use and the contents checked on a monthly basis.



# 🛹 8 WILDLIFE

#### 8.1 ENVIRONMENTAL RISK ASSESSMENT

The reclamation development is considered to have an overall High risk to wildlife that periodically inhabit areas surrounding the project. White Flippered Penguins (WFP) can be found within the sea walls surrounding the reclamation and the coal yard (image 8.1 below). During the breading and moulting period (July – Feb) seawalls in this area provide nesting and moulting habitat for the WFP. Outside of the breading and moulting period (March – June) WFP periodically use the seawalls as resting or sheltering spots.

The reclamation is likely to involve construction activities on and around the sea walls in the last month of the breading / period and throughout the moulting period and is therefore considered to have an overall risk rating of high.



*Figure 10*: Aerial Photo identifying White Flippered Penguin Habitat (red outline), Moulting Adults (red dot) signs of previous penguin (yellow dot) occupation surrounding the project area.

Hectors Dolphins are also identified from time to time swimming around the 10ha reclamation. Construction activities for the reclamation are considered to have an overall low risk. Construction activities do not involve any loud underwater noises or vibrations which may be herd or felt by Hectors Dolphins.

Table 8-1	Environmental risk	assessment, wildlife
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		Type of work		
Truck & Other machinery Movements	Onsite stockpiling & processing of	On land earthwork and bulk filling	Trimming / Shaping sea wall and	Reclamation surface



		material		revetment		
Wildlife	Low Risk	Low Risk	Low Risk	High Risk	Low Risk	

#### 8.2 PERFORMANCE STANDARDS

Performance standards applicable to the management of construction activities within White Flippered Penguin Habitat are outlined in wildlife permit 56584-FAU (to disturb little Penguins) attached in Appendix H.

#### 8.3 CONTROL MEASURES

Control measures for managing works within WFP habitat vary depending on the time of year works is completed. During the breading and moulting season WFP more stringent controls are required to ensure there are no Penguins within the construction area.

Wildlife	Wildlife Risk	Control
Sea wall disturbance during the Moulting and Breeding season (July – Feb)	High	<ul> <li>WFP Contractor Briefing completed prior to works commencing (appendix I)</li> <li>Complete works in accordance with Flow Diagram 1 (appendix J)</li> <li>WFP exclusion zone to be followed if a nesting or moulting penguin is uncovered (appendix K).</li> <li>WFP habitat infilling procedure followed if required (appendix L)</li> <li>WFP capture, handling and relocation procedure followed if required (appendix M).</li> </ul>
Sea wall disturbance outside of the moulting and breeding season (March – June)	Medium	<ul> <li>WFP Contractor Briefing completed prior to works commencing (appendix I).</li> <li>Complete works in accordance with Flow Diagram 2 (appendix J)</li> <li>WFP habitat infilling procedure followed if required (appendix L)</li> <li>WFP capture, handling and relocation procedure followed if required (appendix M).</li> </ul>
Hectors Dolphin	Low	<ul> <li>Minimise floatables within loads accepted at the reclamation</li> <li>If floatables are caught in the derbis boom ensure they are picked up and removed from the ocean</li> <li>If a dolphin is spotted inside the floating boom, stop end tipping material into the harbour and wait for the dolphin to swim away.</li> <li>If construction activities change to include loud underwater noises or vibrations control measures are to be reviewed by the project manager prior to works commencing.</li> </ul>
Sea birds	Low	<ul> <li>If a nesting sea bird is encountered ensure construction activities are carried out around the seabird.</li> </ul>



#### 8.4 MONITORING AND REPORTING

#### 8.4.1 Monitoring

Monitoring requirements for managing works within WFP habitat vary depending on the time of year works is completed.

#### Sea wall disturbance during the Moulting and Breeding season (July – Feb):

#### • Prior to works commencing:

For works carried out during the moulting and breeding season a sea bird ecologist will survey areas of the seawall subject to disturbance to identify if WFP are nesting or moulting within the construction area. If a nesting or moulting penguin is uncovered the WFP exclusion zone procedure is to be implemented.

Results of the survey and any exclusions zones are to be recorded and given to the project manager.

#### • Daily monitoring requirements:

The seawall construction area must be inspected on a daily basis by trained member of the construction team to ensure no WFP are located within the disturbance area.

Written evidence of the daily inspection must be recorded in the daily pre-start meeting minutes.

#### Seawall disturbance outside the moulting and breeding season (March – June):

After storm or swell events seawall areas subject to disturbance will be inspected prior to works commencing to identify any WFP resting or sheltering within the seawall.

Evidence of the WFP survey will be recorded in the daily pre-start meeting minutes.

#### Hectors Dolphin monitoring requirements:

• Daily Monitoring requirements

Construction crews shall monitor the marine area within the boom, and adjacent to active construction works, for Hectors dolphins.

#### 8.4.2 Reporting

Records will be kept of any instances where WFP are encountered, handled, relocated or any action taken in related to the WFP. The following information is to be recorded:

- Date and time found
- Location of where WFP found
- Status (Adult bird, Adult bird +chicks, chicks, moulting bird).
- Actions taken (exclusion zone or relocation)
- If relocated where the bird was taken
- Time of release.

#### 8.5 CONTINGENCY

If an injured or harmed WFP is encountered during construction works the project manager will be informed immediately, if required the nominated sea bird ecologist or DOC will be contacted.



# 9 OTHER EFFECTS

HC&R has prepared a Biosecurity Management Plan (BMP) (Appendix F) for the marine plant involved in the reclamation activities which includes measures to reduce the potential of marine biosecurity risk from ballast water, sediments and biofouling. In particular the plan includes:

- Description of the vessels expected to be employed during reclamation construction and its attributes that affect risk (e.g. voyage speed, maintenance history, prior inspection, voyage history since last dry-docking and antifouling);
- Description of the key sources of potential marine biosecurity risk from ballast water, sediments and biofouling;
- Findings from previous inspections;
- A description of the risk mitigation taken prior to arrival in Lyttelton;
- Record keeping and documentation of all mitigation undertaken to enable border verification if requested by Ministry of Primary Industries and to facilitate final clearance.

#### 9.1 PLANT MOBILISATION

HC&R intend to mobilise floating plant from within New Zealand, not from overseas.

#### 9.2 MARINE WORKS CHAPTER

The overriding principles of the control measures within the Marine Works Chapter are to:

- Minimise disturbance of sediment and sediment plumes.
- Capture waste and prevent contaminated discharges to the marine environment.
- Prevent spread of contaminated sediment.

#### 9.2.1 Equipment (plant)

Clean and well-maintained equipment significantly reduces the risk of discharges during construction.

- Equipment shall be clean, and cleaning must occur away from the marine environment. Clean machinery minimises the risk of contaminants being washed into the marine environment during rain or when machinery is subject to wave splash.
- Equipment shall be well maintained, to minimise the risk of discharges to the environment. Failures such as blown hydraulic lines can result in discharges of oils and other contaminants.
- HC&R shall ensure that all machinery is in good working order with a low risk of machinery failure. Equipment
  shall be well maintained to minimise time delays. Poorly maintained equipment is more likely to result in lost time.
  Methods that are programmed to minimise environmental effects are often based on meeting specific
  construction windows or timeframes (e.g., working around tides, avoiding breeding seasons). Machinery failure
  can prevent such timeframes being met, and can also inhibit the timely completion of other activities necessary to
  minimise discharges and off-site effects, such as the maintenance of sediment control measures.
- The reclamation excavators utilise biodegradable oils to protect against accidental spills in to the marine environment.
- Wherever possible, maintenance and refuelling shall be carried out away from the marine environment to minimise the risk of discharges and spills.



#### 9.2.2 Activity Specific Control Devices

For the construction or repair of seawalls the most effective way of minimising sediment discharge is methodology and material selection. Clean, armour rock or aggregates must be used on the exposed face of the reclamation or seawall. If small fines and silts are mixed amongst the armour rock the rock must be washed to remove fines before it is placed into the harbour. Image 1 and 2 show finished sea wall with clean armour rock.

If construction of the sea wall requires bulking, filter cloth such as bidum cloth can be used to "wrap" the erodible fill and the armour rock can be placed on top. Image 3 showing construction of the Water Front House seawall where bidum cloth was used to create a barrier between the existing reshaped erodible fill and the new clean armour rock.



Figure 11: Water Front House seawall construction using bidum cloth to provide a physical barrier between bulk fill and the armour rock



Activity	Controls	Risk cate measures a	gory wher oply	e control
		High	Medium	Low
Reclamation and s	seawall construction and repair: the design, materials used and construction method is crucial to managing environr	nental effects		
Reclamation	•Use non erodible fill when depositing material directly into the harbour	0	0	[
	•Use bunds to isolate the reclamation area from the harbour if erodible fill is to be placed into the water. Bunds must be armoured with non erodible material such as armour rock.	0	0	0
	Use a debris boom for reclamation material that contains floatable material.	[]	0	0
	• Monitor area (guide: 50m in the High, 100m Medium and Low) for visual sediment plumes.	0	0	00
	Use monitoring form A1 to record visual sediment plume monitoring	0	0	00
	• Review reclamation method and install appropriate control if visual sediment plumes extend past the specified monitoring zone (50m or 100m)	0	0	0
Sea wall	•Use non erodible fill when depositing material directly into the harbour	0	0	[
and repair	• Monitor area (guide: 50m in the High, 100m Medium and Low) for visual sediment plumes.	0	0	
	Use monitoring form A1 to record visual sediment plume monitoring	0	0	0
	• Review construction method and install appropriate control if visual sediment plumes extend past the specified monitoring zone (50m or 100m)	0		





#### 10.1 WITHIN THE PROJECT TEAM

Table 15: Reporting requirements to the LPC Project Manager

Frequency	Requirements
Weekly	Site Conditions, observations and photographic records
Needs basis	Reporting of environmental incidents.

#### 10.2 COMPLAINTS PROCEDURE

The following procedure shall be followed for all complaints:

- All complaints should be immediately directed to the person listed in the Section 2 or the LPC Project Manager. Their contact details are listed in Section 2
- It is important that any interaction with the complainant is polite and does not belittle their concern
- As soon as the complaint is received it will be recorded on the project complaints register (Appendix C). Note there are specific requirements for what is to be recorded for dust in the Dust Management Technical Chapter
- An initial response will be made and recorded. Depending on the nature of the complaint the initial response could be to immediately cease the type of work pending investigation, replace an item of equipment, apply additional control (e.g. water sprayer for dust), or reinstate a damaged control device. However, in some cases it might not be practicable to provide immediate relief. LPC and the complainant will be informed of actions taken
- Where the initial response does not address the complaint, the LPC Manager will be informed and will undertake (either themselves or delegated to HC&R) further investigation, corrective action and follow-up monitoring as appropriate. The complainant will be advised of the outcome of this process
- All actions will be recorded on the project complaints register and the complaint will then be closed.

#### 10.3 DOCUMENTATION

All paper/electronic files relating to the RCEMP will be kept in the Site Office. This will include:

- The RCEMP and associated documentation (e.g. Safety Data Sheets for hazardous substances; type of workspecific noise schedules etc.);
- Consultation and complaints registers
- Monitoring data
- Signed induction records which show that people inducted onto site understand what is required of them under the RCEMP.

The HC&R Project Manager is responsible for the distribution of this Plan. This Plan will be introduced to all Project staff and the workforce through general introductions to the management systems during the project inductions.

A controlled copy of this Plan will be maintained in the project Dropbox folder, the web-based document control system used by HC&R. Once copies are downloaded, these copies will be deemed as uncontrolled.

A controlled copy of the RCEMP, as well as future updates, will be provided to the Principal as contractually required.





## **11 UPDATING THE RCEMP**

To maintain relevance, the RCEMP must be reviewed when any changes to the methodology are made and updated accordingly.

This RCEMP will be amended if:

- The scope of the HC&R works or methodology is going to change;
- The mitigation measures are not working sufficiently;
- Responsible parties to the Contract change;
- The season or time of day in which the works need to take place changes;
- The area of works increases or changes;
- HC&R has identified improvements to the process or mitigation measures;
- The duration of the Contract works changes;
- Anything else changes that alters the effectiveness of your CEMP to manage the negative environmental effects of the Contract works

# **12 APPROVAL CHECKLIST**

EMP Component			Co	ontract	or				L	PC Pro	oject N	lanage	er	
Purpose of the environmental management plan (EMP)														
Contractual obligation the EMP fulfils are listed														
Responsibilities are assigned in front table and signatures of assignees are present for the following:														
Controls actions														
Monitoring actions														
Reporting actions														
Site description contains:														
Location map showing the location of the site within the Port and the extent of the area where works will be undertaken, a north arrow, a scale bar and a title														
A description of the site condition and current use														
A description of the surrounding land use														
Project description contains:														
Description of what works are being done and why														
Method and equipment to do the works														
Project duration - including hours and days of operation														
Regulatory requirements contain:														
Whether resource consent is needed														
If it is needed, whether a resource consent has been obtained														
Resource consent reference and a description of what it is for														
Relevant consent conditions, how they will be achieved and who is responsible (in Table 1 of CEMP template)														
The contractor has discussed the regulatory requirements with the LPC PM before EMP is submitted														
Environmental effects and mitigation:														
For each environmental effect tick whether the following is provided (all except 'Other' must be completed):	ust	ontaminated land	rchaeology	rosion and sediment	oise and Vibration	azard Substances	ther (specify)	ust	ontaminated land	rchaeology	rosion and sediment	oise and Vibration	azard Substances	ther (specify)
		0	∢	ш	Z		0		0	◄	ш	2		0
Description of the effect and risk category											1			
Environmental risk assessment undertaken	├──													
	──													
Performance criteria (e.g. noise level limits)														
Mitigation:														

			-									
Describe the mitigation measures for the effect described above												
Monitoring requirements:	Monitoring requirements:											
The monitoring method (e.g. measuring total suspended solids 10 m downstream of the site)												
How often monitoring will be done												
Monitoring actions are assigned to specific people												
Reporting requirements:												
States how regularly reporting is required												
States what is going to be reported												
States who the report must be submitted to												
Reporting actions are assigned to specific people												
Contingency:												
Describes actions to be taken in the event of non- compliance or if non-compliance is likely												
Information sharing:												
Describes adequate processes to share information with Contractor's staff and sub-contractors to enable the EMP to be implemented												
Approval:												
EMP is signed by the Contractor												

# APPENDIX A - CONTAMINATED SITE MANAGEMENT PLAN (IF REQUIRED)

### **APPENDIX B - INSPECTION CHECKLISTS**

Project: [type Project]

**Inspection By**: [Click here and type]

Current Weather Condition (eg sunny, cloudy, rain)

Wind Direction/Strength (eg strong, moderate, light, still):

### Areas(s) inspected:

SCOPE OF INSPECTION	Ci	ircle t	he	COMMENTS		
	Y	N	N/A			
Is there visible dust from site work activities, stockpiles, earthworks areas or haul roads?				Click here to enter text.		
Are haul roads visibly dry and need spraying with water truck?				Click here to enter text.		
Are any exposed earthworks or stockpile areas visibly dry and need water spray?				Click here to enter text.		
Stockpile heights less than 3M?				Click here to enter text.		
Stockpiles covered/stabilised where needed?				Click here to enter text.		
Are there any signs of dust going off site as a result of site activities? [Inspect land adjacent to the site (including vegetation, residential properties and cars), construction exists and adjoining roads for the presence of dust deposits].				Click here to enter text.		
Are site windbreak fences intact?				Click here to enter text.		
If wind speeds are strong (over 5.5m/s) are additional inspection and mitigation measures being put in place? (eg increase water application, restrictions on dusty activities)				Click here to enter text.		
Are watering systems (eg water carts, wheel wash) operating effectively to minimise dust?				Click here to enter text.		
Is plant and equipment producing visible emissions for longer than 10 seconds?				Click here to enter text.		
Are trucks carrying loose (uncovered) material entering or leaving the site?				Click here to enter text.		
If real time dust monitoring being undertaken, is this showing compliance with dust trigger limits?				Click here to enter text.		
Overall assessment: Is dust generation likely to impact on nearby residents?				Click here to enter text.		

#### RECOMMENDATIONS

Priority (H/M/L)	ACTIONS	By Whom	By When	Completed Y/N
Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.

Date: [type date] Time: [type time]

### HC&R JV Monitoring checklist for discharge points

Monitoring date:	File reference
Monitoring undertaken by;	
Weather conditions;	

Photograph taken showing condition of monitoring location Y/N

Monitoring standard	Standard met (Y/N)	Comments
The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials		
Any conspicuous change in the colour or visual clarity in the Harbour		
Any emission of objectionable odour		
The rendering of fresh water unsuitable for consumption by farm animals (unlikely to be applicable for most discharges)		
Any significant adverse effects on aquatic life		
Add additional performance standards as appropriate		

HC&R JV

# MAINTENANCE ACTIONS FOR SEDIMENT CONTROL STRUCTURES

File reference

Inspection Date		Weather conditions		
Inspection by				
Sediment Control structure	Trigger	Maintenance Action	(Y/N)	Complete
Sediment	Forebay more than 20% full	Empty Forebay and remove sediment		
Retention	Main pond more than 20 % full	Empty pond and remove sediment		

pond (SRP)	Floating decant blocked or sunk	Empty pond and repair decant		
	Scouring at discharge point from pond	Place material to dissipate energy from discharge		
	Level spreader not level	Re-level & seal with geotextile or concrete		
	Erosion of bund	Armour bund by either placement of geotextile or rock		
	Poor operating performance	Reduce catchment area, by diverting runoff into adjacent catchments and control structures		
		Close down spoil area and immediately stabilise		
		Add flocculent system to pond		
Sediment fence	Fabric flapping in wind	Reattach fabric to guide wire and increase number of fabric locks. If reqd install additional waratahs		
	Build-up of sediment greater than 150 mm in depth resulting in straining structure	Clean sediment away		
	Large rocks distorting fence alignment	Remove rocks		
	Bottom of silt fence not properly anchored	Dig fence into ground and secure pegs to keep in position		
	Undercutting of fence by concentrated flow	Identify options to avoid concentrated flow or replace with DEB		
	Silt fence broken off top wire	Install additional clips on top wire, in very windy locations a netting fence ma be required to keep the silt fence in place.		
	Failure	Replace with super silt fence. Install runoff diversion channel / bund and divert to DEB		
Filter sock	Sock full and over topping	Replace with new section of sock or place new section in front of old section		
Control structure	Trigger	Maintenance Action	(Y/N)	Complete
Filter sock (continued)	Undercutting of sock by concentrated flow	Use tie downs to improve ground contact. Disperse flow upstream of sock.		
Drainage flumes & pipes	Connections coming apart	Improve anchoring and joins		
	Scour at outlet	Install T bar diffuser on outlet for pipes or place armour or sand bags for flumes		
Clean water	Blockages	Remove material		
diversion drain	Scouring at outlet	Use sand bags or rock to dissipate energy		

Decanting earth & rock bunds	More than 20 % full with sediment	Empty DEB	
(DEBs)	Scouring of drain	Install geotextile cloth	
Include the Rock Filter Bunds RFBs	Scour at exit point	Install pipe exit or sand bag over flow point to provide erosion resistant surface	
	Insufficient capacity filling quickly	Recalculate catchment area and enlarge DEB or provide additional DEB's	
	Poor performance	Increase size or construct additional DEBs	
		Reduce catchment by divert excess runoff or by diverting excess runoff	
		Undertake batch dosing with flocculent or install flocculent blocks or flow activated flocculent system upstream of DEBs	
		Improve armour in water tables, rock checks, crimped straw mulch on disturbed surfaces	
		Close down spoil area and immediately stabilise	
Water tables and culverts	Blockages or build-up of material	Remove material	
	Scouring	Use sand bags or rock to dissipate energy	
Stabilised areas	Poor vegetation growth	Additional hydro seeding and re- scarifying; fertilising	
	Paving not providing adequate protection	Repair any damage to surface from overland flow or vehicles	
	Weed infestation	Weed removal with wick booms, spraying or hand pulling as necessary	

Note: Sediment removed from SRPs, DEBs and sediment fences will be disposed of to spoil fill areas

# A1-Sediment Plume Observations

Monitoring date/time:				
Monitoring undertaken by:				
Weather conditions:				
Construction activities to be completed during the monitoring period				
Monitoring standard	Standard met	Comments		
Sediment plume observations undertaken to ensure sediment plumes generated from the works site are not visible more than 50 or 100m from the				

construction area.				
Take photographs to identify extend of plume during construction activities				

Attach relevant photos

# Debris monitoring form

Project:	[type Project] Date: [type date]		[type date]
Inspection By:	tion By: [Click here and type] Time: [type time]		[type time]
Current Weathe			
Wind Direction/			
Areas(s) inspect			

SCOPE OF INSPECTION		Circle the relevant item		COMMENTS
Is there visible demolition debris in the water?	Υ	Ν	N/A	
Is any demolition debris contained by the boom?				Click here to enter text.
Is debris contained in the boom cleared at the end of each day and deposited to land?				Click here to enter text.
Is there demolition debris outside of the boom?				Click here to enter text.
Has any demolition debris that outside of the boom been collected and deposited to land?				Click here to enter text.

#### RECOMMENDATIONS

Priority (H/M/L)	ACTIONS	By Whom	By When	Completed Y/N
Click here to	Click have to optor toxt	Click here to	Click here to	Click here to
enter text.	Click here to enter text.	enter text.	enter text.	enter text.
Click here to	Click here to enter text.	Click here to	Click here to	Click here to
enter text.		enter text.	enter text.	enter text.
Click here to	Click have to optar toxt	Click here to	Click here to	Click here to
enter text.	Click here to enter text.	enter text.	enter text.	enter text.

### **APPENDIX C - COMPLAINTS REGISTER**

GB Quarry, HC&R JV					
COMPLAINT LOG			File reference		
Date of Incident		Time of Incident	Weather conditions at time of Incident		
Date of Complaint		Time of Complaint			
Name		Address	Contact Details		
Complaint			I		
Signed	n				
Action taken					
Future Actions					
Reporting	Complainant	Site supervisor			
Signed		Project Manager	I		

# APPENDIX D - NOISE SCHEDULES [AS REQUIRED]

## **APPENDIX E - MATERIAL SAFETY DATA SHEETS**

## **APPENDIX F – CONSOLIDATED BIOFOULING MANAGEMENT PLAN**

## **APPENDIX G – CONSOLIDATED RESOURCE CONSENT**

### APPENDIX H – WILDLIFE PERMIT 56584-FAU

## **APPENDIX I – WFP CONTRACTOR BRIEFING**

### **APPENDIX J – WFP FLOW DIAGRAM 1**

## **APPENDIX K – WFP EXCLUSION ZONE**

## **APPENDIX L - WFP INFILLING PROCEDURE**

## **APPENDIX M - WFP CAPTURE, HANDLING AND RELOCATION PROCEDURE**