NAPIER PORT

# PROPOSED WHARF AND DREDGING PROJECT

## RESOURCE CONSENT APPLICATIONS AND DESCRIPTION AND ASSESSMENT OF EFFECTS ON THE ENVIRONMENT: VOLUME 1

PREPARED FOR PORT OF NAPIER LTD

NOVEMBER 2017





Allan Planning & Research Ltd

Stantec

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## QUALITY STATEMENT

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# Napier Port

## Proposed Wharf and Dredging Project – VOLUME 1

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# EXECUTIVE SUMMARY

## Proposal

Napier Port's proposed wharf and dredging project is the subject of resource consent applications to the Hawke's Bay Regional Council under the Resource Management Act (the RMA). The applications relate to the Port's proposal to construct a new wharf to meet the growing needs for berthage, and to undertake dredging to provide a safe and navigable approach channel for larger vessels in the future.

### Proposed New Wharf (Wharf 6)

It is proposed to construct a concrete wharf, 350 metres in length and 34 metres wide, alongside the northern face of the existing container terminal.

Construction of the wharf involves placement of 332 piles and decking. It also involves reshaping and increasing the depth of the existing revetment (faced with limestone and/or concrete armour units) beneath the wharf at a gradient of 2 (horizontal) to 1 (vertical), transitioning back to the existing reclaimed face of the Northern Container Terminal. Two mooring dolphins at the same height as the new wharf will be constructed at the west end of the wharf both being approximately 16 metres by 18 metres and supported by nine piles each.

The construction site and laydown area for the storage of materials (including any hazardous substances), plant, machinery and associated office and other construction site facilities will be securely fenced and located adjacent to the working area within the Port's operational area.

Construction will involve replacing the existing revetment, driving the piles and laying the decking area. It will be undertaken progressively and will take 18 months to two years.

### Proposed Dredging

The dredging applications involve both capital dredging (dredging that lowers the sea bed to a greater depth than previous dredging) and maintenance dredging (dredging that removes any material that has started to fill in the area that has already been capital dredged).

The capital dredging work will deepen the existing swinging basin and harbour entrance, and progressively extend a larger channel out from the Port, to a final depth of 14.5m. This will be done in five stages (campaigns).

The first stage will provide full depth to 14.5m under the new wharf and an adjacent "berth pocket". It will also include deepening the swinging basin, parts of the inner harbour area and the first part of the area of the new channel closest to the Port to a depth of 12.5m. This will involve approximately 1.14 million cubic metres of dredged material.

Stages 2 to 5 will involve extending the new channel and increasing its depth by 0.5m each campaign. Each of campaigns 2 to 5 involves a similar volume of material; the overall total being approximately 3.2 million cubic metres.

Between campaigns, some material will enter the previously dredged areas. This will be dredged either as part of the next capital dredging campaign or as a separate maintenance dredging activity.

The bulk of the material to be removed in the capital dredging campaigns is the consolidated stiff silt and mudstone which comprises the sea floor in the vicinity of the Port. This requires a type of dredge called a backhoe dredge. This is fixed in place while a long-reach excavator breaks up the material and places it in a nearby barge for transport to the offshore disposal area. For the less consolidated material, including the maintenance dredging material, a trailing suction hopper dredge will be used. This sucks up the material, stores it, and the dredge itself then transports the material to the disposal area.

The first stage of dredging will take approximately 50 weeks, with each of the subsequent four stages taking eight or nine weeks. As the dredging programme is subject to the demands for larger vessels visiting the Port, the timing of the campaigns will be flexible.

## Proposed Disposal Area

A new disposal area is proposed some 4km to 6km immediately to the east of the Port in water of 20m to 23m depth. The total area is 342 hectares. This will allow for the dredged material to be placed in a way that raises the seabed on average less than 1m above the existing sea bed.

## Summary of Consents Sought

The consents sought and durations requested for each are set out below:

| Napier Port Wharf and Dredging Project | | |
|---|---|---|
| **Application No.** | **Nature of Resource Consent** | **Duration** |
| | **Construction, Use and Maintenance** | |
| **1** | Coastal permit for the construction, use, operation and maintenance of a new wharf (Wharf 6) and associated activities. | 35 years<br>(Construction - 15 years) |
| | **Capital Dredging** | |
| **2** | Coastal permit for Stage 1 capital dredging beneath the proposed new wharf, in the inner Port area, swinging basin and part of the Deep Water Channel. | 35 years |
| **3** | Coastal permit for Stages 2 to 5 capital dredging within the inner Port area, swinging basin, in and near to the existing three channels and to form a new channel. | 35 years |
| | **Maintenance Dredging** | |
| **4** | Coastal permit for maintenance dredging within the areas for which capital dredging permits are sought (Stages 1 to 5). | 35 years |
| | **Disposal of Dredged Material** | |
| **5** | Coastal permit for deposition and disposal of dredged material from capital and maintenance dredging into deposition and disposal areas shown in the application. | 35 years |
| | **Occupation** | |
| **6** | Coastal permit for the occupation of the common marine and coastal area for existing Port activities (replacing the existing coastal permits held by Napier Port to occupy an area for Port purposes), the proposed new wharf, the adjacent berth pocket including the areas on both sides of the dolphins, and the new swinging basin, as shown in the plan attached to the application. | 35 years |

Figures 1 and 2 on the following page show the areas of the wharf and dredging, and the disposal location. Figure 3 shows the area of occupation for which a permit is sought.


**Figure 1: Location of Proposed New Wharf and Extent of Dredging**

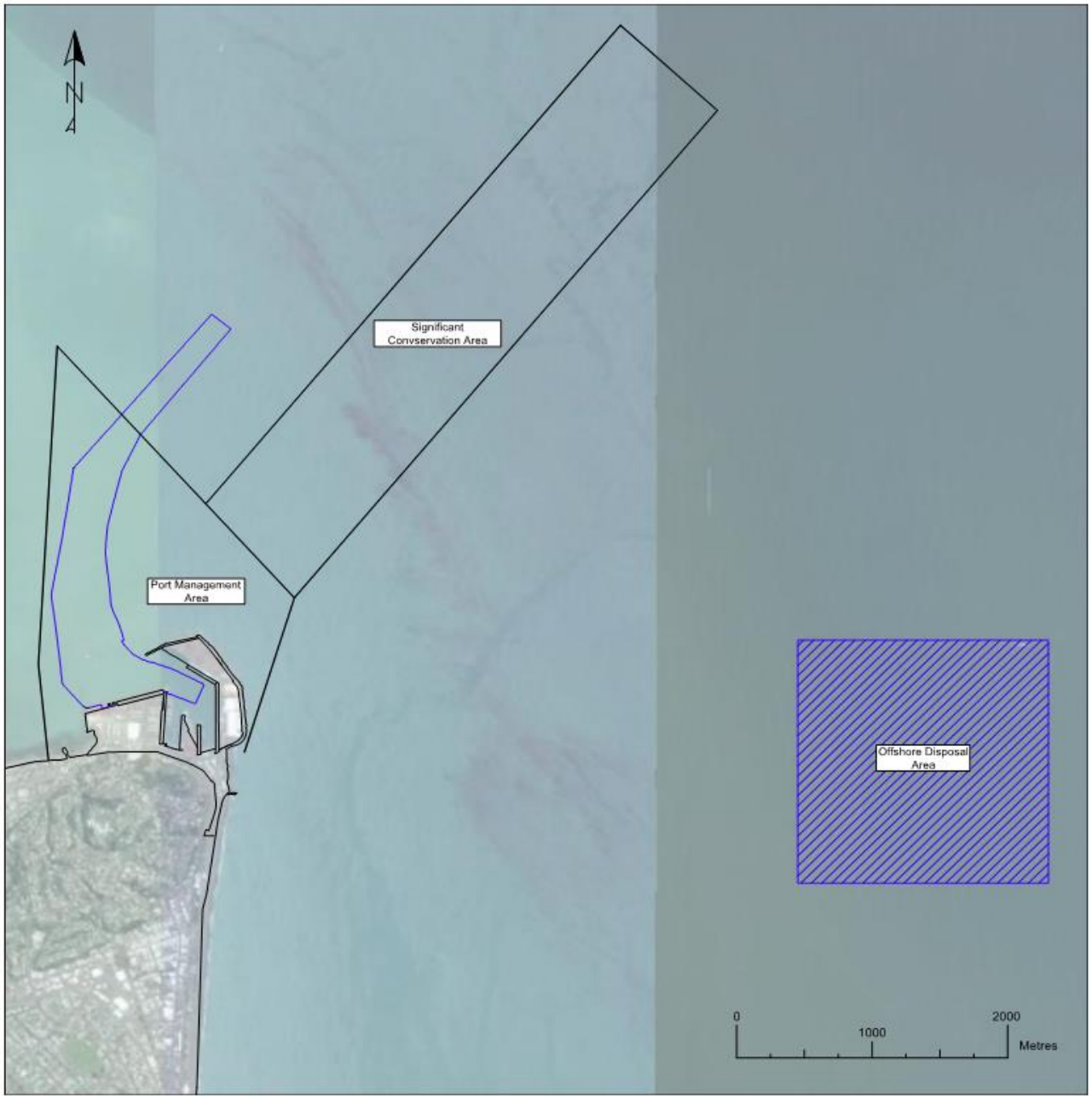


**Figure 2: Location of Proposed Disposal Area**

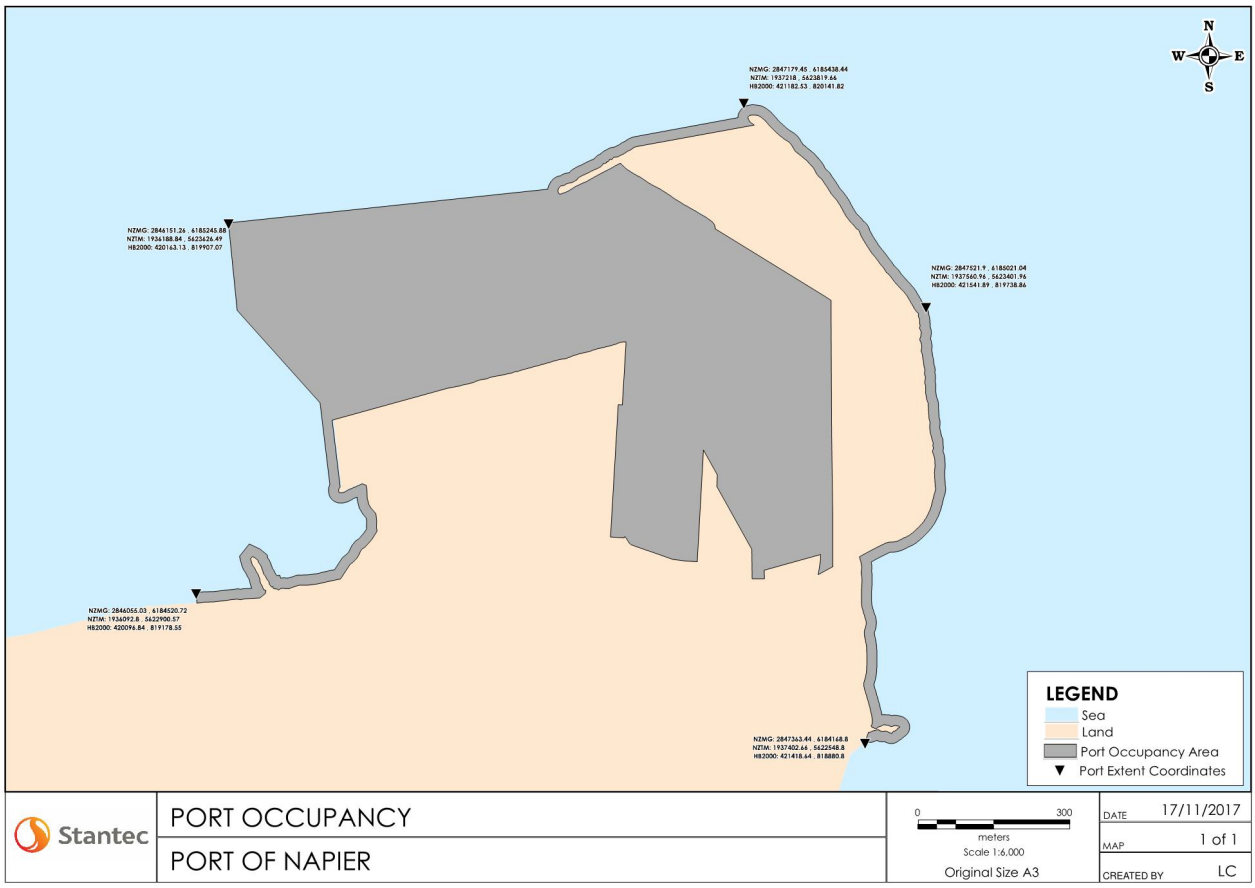


**Figure 3: Area of Occupation Permit**

## Summary of Effects on the Environment

There are a wide range of components of the receiving environment which could potentially be impacted in either the short term or long term (permanently) by the different elements of the new wharf and dredging project. These components range from nearby coastal areas, to sea life on the bed of the sea or in the water column, to people living nearby, or who use the sea area for recreation, and on those who have particular cultural affinity and association with the area.

A comprehensive assessment of effects has been undertaken, involving the inputs of numerous technical specialists, including new investigations, modelling and simulations, and the development of expert opinion. The various actual and potential effects that have been identified are summarised in Table 1 on the following page. Each of the types of effects has been described and assessed in the relevant section of the application report noted in the first column of the table. The technical reports are also provided as Appendices to the application documents.

In accordance with the RMA, the extent of each of the effects is noted following mitigation. The mitigation has either been built into project design and is thus part of the project description, or is subject to a specific proposed condition. This is indicated in the final column.

The description of the extent of effect is based on a five-level scale, as follows:

- negligible
- less than minor
- minor
- moderate
- significant

There is some flexibility in the use of this scale. For example, a moderate or significant effect may be evaluated as minor or less than minor if it is anticipated to occur for only limited period(s).

As can be seen from Table 1, all the actual and potential effects except for two have been evaluated as minor or less. Many are at the less than minor, or negligible, end of the scale. No cumulative adverse effects have been identified in relation to this project. All physical and coastal effects are within the range of natural variability.

The only effect which has been identified as potentially significant (i.e. where risk remains an issue) is in relation to effects on blue penguins already living in the Port revetment (which will be dismantled and replaced). The indicative population as recorded in a survey conducted in September 2017 noted 29 indicative burrows. These steps, taken to measure the population, will assist in the offset in terms of maintaining the overall regional population. Further, a draft condition is proposed which would enable this to be determined by agreement, including the involvement of Department of Conservation and Iwi.

The economic benefits of the project (which also have a social component in the wider community), along with the benefit of coastal occupation for port purposes, have been identified as a moderate to significant benefit.

## Policy Analysis

The RMA now requires that applications are supported by a comprehensive analysis of the policy that applies. This forms the last part of the application documentation, and is summarised below.

**New Zealand Coastal Policy Statement 2010 (NZCPS)**

The NZCPS is a comprehensive policy framework for coastal management. Although it includes a number of restrictive provisions, these only apply to the extent that there are valued areas and resources (such as Pania Reef) which could be affected by the project. The decisions made in formulating the project have avoided, remedied and mitigated effects on such areas and values in ways that have made the project consistent with this policy. The NZCPS also recognises the importance of an efficient and safe national network of ports, and that ports have to locate and carry out their activities at the interface of land and sea.

When assessed directly against the various relevant NZCPS policies, Napier Port's proposed wharf and dredging project is not opposed to or inconsistent with any policy areas, and it gives effect to a number of the policies. The project is largely taking place within the Port Management Area and is subject to evaluation within the series of policies and rules that apply to that area. While there are both actual and potential effects associated with the project, the mitigation which is either inbuilt within the project or is proposed through draft conditions has been able to ensure that effects will all be minor or less.

**Hawke's Bay Regional Policy Statement (2006)**

The project is not inconsistent with the objectives of the Regional Policy Statement that relate to the coastal environment, and to regionally significant infrastructure. The investment and ongoing development proposed is in line with, and given effect to, this regional policy. The single objective relating to coastal water quality underpins the water classification applied through the regional coastal plan, with which the dredging and disposal activities are also consistent.

The policy relating to tangata whenua requires respectful and appropriate consultation, which Napier Port is undertaking, and the recognition and protection of waahi tapu and mātaitai areas. By emphasising the intention to minimise adverse effects on Pania Reef, while also providing monitoring information, these regional-level objectives and policies are being given effect to.

**Hawke's Bay Regional Coastal Environmental Plan (2014)**

This plan recognises and provides for Napier Port by identifying various areas as set aside for Port activities, and also sets out rules and policies relevant to the applications. The plan also sets out environmental guidelines which the project has been assessed against, including water quality, deposition of contaminants (including dredged material), and structures and occupation of the coastal marine area.

When evaluated against the policy and guidelines, the project is found to be in accordance with this plan.

**Part 2 (purposes and principles of the RMA)**

This part of the RMA sets out the general purpose of sustainable management of natural and physical resources, matters of national importance, other matters (such as efficiency in use of resources, and maintenance of amenity values), and the need to apply Treaty principles in undertaking use and development.

The assessment under the Part 2 framework finds that the project is generally in accordance with the matters set out in Part 2, including enabling people and communities to provide for their social, economic and cultural wellbeing and their health and safety, and that effects on the environment have been adequately and appropriately avoided, remedied or mitigated.

## Conditions

A draft set of conditions to manage the effects of the project is put forward as part of the documentation. This includes a draft water quality management plan. These will be the subject of discussion with Hawke's Bay Regional Council, as well as submissions, when the applications are notified.

**Table1: Summary of Effects on the Environment associated with the Proposed Wharf and Dredging Project**

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| **Coastal Processes (section 8)** | Wave height and direction (north of Port). | Small potential for changes to wave height and direction on some parts of coastline north of Port due to changes to Swinging Basin and Fairway. | Negligible | Mitigation already built into design of extended swinging basin and channel |
| | Sediment supply in coastal zone north of Port. | Already little contribution from south of Port to north of Port. | Negligible | Not needed |
| | Wave height and direction (south of Port). | Small potential for changes to wave height at Marine Parade/Town Reef due to dredge disposal.<br>No change to direction of waves. | Negligible | Not needed |
| **Water Quality (section 9)** | Discharge to water of any hazardous contaminants. | Dredged material is "clean" (i.e. contains no problem chemical or organic contaminants). | No effect | Not needed |
| | Discharge of sand, silt and clay during and following dredging and disposal of dredged material. | Localised and temporary effects of turbidity and suspended sediments near to dredged and disposal areas during dredging activity. | Less than minor | Monitoring of suspended sediments and turbidity at Pania Reef during dredging campaigns |
| | | Longer-term potential for resuspension of material disposed at offshore site to affect Pania Reef. | Negligible | Mitigated through choice of disposal location and size of area |
| **Benthic Ecology (section 10)** | Direct effect of dredging. | Removal of benthic sediments and lowering of sea bed over 117ha – associated with Stage 1 to 5 dredging. | Less than minor | Not needed |
| | Direct effect of disposal of dredged material. | Smothering of 350ha of offshore sea bed area with disposal material to a depth of approximately 1m. | Less than minor | Not needed |

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| | Indirect effects of dredging of disposal of dredged material on Pania and other reef areas through sediment plumes and elevated turbidity, during dredging campaigns. | Risk of sediment plumes in unusual and adverse conditions reaching Pania Reef, or other reef areas. | Less than minor | Not needed, but turbidity monitoring proposed.<br>Dredging would cease temporarily if Pania Reef was exposed to long duration sedimentation events associated with dredging activities. |
| | Indirect effects of dredging and disposal of dredged material on soft sediment benthos close to project areas. | Within immediate proximity (up to 100m) of active dredging and disposal areas. | Less than minor | Not needed |
| | Longer term impacts of resuspension of sediment from disposal area. | Risk of resuspension of disposal material in longer term | Negligible | Not needed. However, ongoing monitoring of reef ecology proposed. |
| **Commercial and Recreational Fishing (section 11)** | Direct and indirect effects of dredging and disposal of dredged material, and any dredge plume. | Modification of habitat in which fish breed or feed | Negligible | Not needed. |
| **Marine Mammals (section 12)** | Noise and disturbance from wharf construction. | Implications of underwater noise from pile driving and other construction activities, including disturbance or damage to hearing. | Negligible | Management plan, including observation and response to any marine mammals in proximity. |
| **Avifauna (section 13)** | Disturbance of habitat during wharf construction. | Potential to disturb and/or damage Little Blue Penguins living in existing revetment. | Potentially significant | Management plan, including rescue and relocation and/or offset contribution to alternative habitat or population. |
| | | Potential effects on other birds nearby. | Minor or less | Not needed, but monitoring proposed. |

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| **Wharf Construction (section 14)** | Specific impacts on nearby population. | Potential impacts from noise, vibration and construction traffic. | No more than minor (will meet all standards in residential areas) | Noise management plan, construction traffic management plan (within overall construction management plan) |
| **Coastal Access and Recreational Use and Values (section 15)** | Potential impacts on recreational fishing, beach use, coastal access, boating and surfing. | Potential impacts which may change recreational fishing | Negligible | Not needed |
| | | Potential impacts which may change beach use or coastal access | No effect | Not needed |
| | | Potential impacts on boating | Negligible | Not needed |
| | | Potential impacts on surfing | Negligible – may be minor benefit on closest break | Not needed. Potential impact on surfing mitigated through design of channel |
| **Natural Character and Visual and Landscape Values (section 16)** | Landscape and visual impacts of new wharf. | Assessed from a number of local viewpoints. | No more than minor | Not needed |
| | Natural coastal character. | Assessed on the basis of additional structure and activities in the coastal area. | Less than minor. Negligible in relation to marine environment | Not needed |
| **Tangata Whenua Cultural Values (section 17)** | Adverse or beneficial cultural impact. | Implications of changes on cultural values, including Pania Reef, ecological values and customary use. | Minor | Cultural monitoring proposed |
| **Marine Archaeology (section 18)** | Effect on items identified in the HBRCEP. | Assessed on the basis of effects on coastal processes. | Negligible | Not needed |

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| **Navigation and Safety (section 19)** | Risk management. | Taken into account in design of whole project. | No effect | Mitigation already built into design of all aspects of project |
| **Climate Change and Natural Hazards (section 20)** | Implications in terms of coastal natural hazards. | Considered in location and design. | No effect | Not needed |
| | Lifelines implications. | Benefit in terms of additional capacity, modern structure. | Minor benefit | Not needed |
| **Occupation (section 21)** | Occupation of defined coastal marine area for Port purposes. | Application includes replacement of existing permit to occupy, and extension to allow safe commercial operation and maintenance of new facilities (wharf and swinging basin). | Less than minor adverse effects. Moderate to significant benefit | Not needed |
| **Economic Impacts and Benefits (section 22)** | Contribution of additional wharf and larger channel. | Implications of increased business and multiplier effect in wider regional economy – both short-term and long-term. | Moderate to significant benefit | Not needed |

# PART I: APPLICATIONS

# APPLICATION SUMMARY TABLE

## Resource Consents Sought

| Napier Port Wharf and Dredging Project | |
|---|---|
| **Application No.** | **Nature of Resource Consent** |
| | **Construction, Use and Maintenance** |
| **1** | Coastal permit for the construction, use, operation and maintenance of a new wharf (Wharf 6) and associated activities. |
| | **Capital Dredging** |
| **2** | Coastal permit for Stage 1 capital dredging beneath the proposed new wharf, in the inner Port area, swinging basin and part of the Deep Water Channel. |
| **3** | Coastal permit for Stages 2 to 5 capital dredging within the inner Port area, swinging basin, in and near to the existing three channels and to form a new channel. |
| | **Maintenance Dredging** |
| **4** | Coastal permit for maintenance dredging within the areas for which capital dredging permits are sought (Stages 1 to 5). |
| | **Disposal of Dredged Material** |
| **5** | Coastal permit for deposition and disposal of dredged material from capital and maintenance dredging into deposition and disposal areas shown in the application. |
| | **Occupation** |
| **6** | Coastal permit for the occupation of the common marine and coastal area for existing Port activities (replacing the existing coastal permits held by Napier Port to occupy an area for Port purposes), the proposed new wharf, the adjacent berth pocket including the areas on both sides of the dolphins, and the new swinging basin, as shown in the plan attached to the application. |

# RESOURCE CONSENT APPLICATION FORMS

# APPLICATION FOR RESOURCE CONSENT
# SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

## APPLICATION 1

## Coastal Permit Pursuant to Section 12 and Section 15 of the Resource Management Act 1991

**To:** Hawke's Bay Regional Council
Private Bag 6006
NAPIER 4142

**From** Port of Napier Limited
PO Box 947
NAPIER 4140

**Port of Napier Limited** applies for the following type of resource consent:

Coastal permit for the construction, use, operation and maintenance of a new wharf (Wharf 6) and associated modification of the existing reclamation edge and installation of mooring dolphins, along with disturbance of the bed of the coastal marine area, diversion of water in the coastal marine area by piles and mooring dolphins, minor reclamation due to reshaping and deepening of part of the existing revetment, along with incidental deposition, and incidental discharge of contaminants in the coastal marine area during construction. Further details are provided in the Project Description in the Assessment of Effects on the Environment that accompanies this application.

**1. The owner and occupier of the land to which the application relates:**

The subject seabed is part of the common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011.

The Port of Napier Limited holds a section 384A permit under the Resource Management Act 1991 to occupy part of the area of the Port where the new wharf is proposed.

**2. The location to which this application relates:**

The proposed wharf structure and associated activities are located at or about map reference NZMG 2846555-6184912 to NZMG 2846928-6184997, and the location is shown on Plan 1 attached to this application.

The location is fully described in the Assessment of Effects on the Environment that accompanies this application.

**3. Duration of consent sought:**

The duration sought for the construction aspects of this consent is 15 years. For other aspects (use and maintenance activities) the duration sought is 35 years.

**4. Lapse period:**

A period of 10 years is sought before the consent shall lapse in terms of section 125 of the Resource Management Act.

**5. Additional resource consents:**

The additional resource consents required in relation to this activity are being applied for concurrently with this application and are as follows:

- A coastal permit for capital dredging including within the areas known as the inner Port area, the swinging basin and part of the Deep Water Channel, to provide for an operational depth of 14.5m below and adjacent to the new wharf, and otherwise 12.5m (below chart datum) (Application 2).
- A coastal permit for dredging of parts of the swinging basin and the existing three channels, and formation of a new channel, to provide for an operational depth of 14.5m (below chart datum) (Application 3).
- A coastal permit for the maintenance dredging of the areas for which capital dredging permits are sought, to maintain the depths stated (Application 4).
- A coastal permit for the deposition and disposal of material from wharf construction, capital dredging and maintenance dredging within the area shown on the plan attached to the application, some 4 to 6km offshore from Marine Parade (Application 5).
- A coastal permit for the occupation of the common marine and coastal area for existing Port activities, the proposed new wharf, the adjacent berth pocket and the new swinging basin area (Application 6).

**6. Effects on the Environment:**

Attached, in accordance with section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA), is an Assessment of Effects on the Environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This includes an assessment in terms of the New Zealand Coastal Policy Statement 2010 and relevant policy in relevant plans.

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Garth Cowie, Chief Executive
On behalf of Port of Napier Limited

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Date

**Address for Service:**
Napier Port
PO Box 947
Napier 4140
Attn: Michel de Vos
DDI: (06) 833 4458
Mobile: (027) 530 3325
Email: michelv@napierport.co.nz

## PLAN 1 – Location and Layout of Proposed New Wharf (No. 6 Wharf) Adjacent to Northern Container Terminal

# APPLICATION FOR RESOURCE CONSENT
# SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

## APPLICATION 2

## Coastal Permit Pursuant to Section 12 and Section 15 of the Resource Management Act 1991

**To:** Hawke's Bay Regional Council
Private Bag 6006
NAPIER 4142

**From** Port of Napier Limited
PO Box 947
NAPIER 4140

**Port of Napier Limited** applies for the following type of resource consent:

Coastal permit for Stage 1 capital dredging adjacent to and below the proposed new Wharf 6 to an operational depth of 14.5m prior to its construction, and within the areas shown on the attached Plan 2, including areas known as the Inner Port area, the Swinging Basin and part of the Deep Water Channel to a depth of 12.5m below chart datum. Further details are provided in the Project Description in the Assessment of Effects on the Environment.

**1. The owner and occupier of the land to which the application relates:**

The subject seabed is part of the common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011.

The Port of Napier Limited holds a section 384A permit under the Resource Management Act 1991 to occupy part of the area for which the coastal permit is sought.

**2. The location to which this application relates:**

The proposed dredging area is located at or about map reference NZMG 2846727-6184935 to NZMG 2846431-6186768, and the location is shown on Plan 2 attached to this application.

The location is more fully described in the Assessment of Effects on the Environment that accompanies this application.

**3. Duration of consent sought:**

The duration sought for this consent is 35 years.

**4. Lapse period:**

A period of 10 years is sought before the consent shall lapse in terms of section 125 of the Resource Management Act.

**5. Additional resource consents:**

The additional resource consents required in relation to this activity are being applied for concurrently with this application and are as follows:

- A coastal permit for the construction, use, operation and maintenance, of a new wharf (Wharf 6) and associated activities in the coastal marine area (Application 1).
- A coastal permit for dredging of parts of the swinging basin and the existing three channels, and formation of a new channel, to provide for an operational depth of 14.5m (below chart datum) (Application 3).
- A coastal permit for the maintenance dredging of the areas for which capital dredging permits are sought, to maintain the depths stated (Application 4).
- A coastal permit for the deposition and disposal of material from wharf construction, capital dredging and maintenance dredging within the area shown on the plan attached to the application, some 4km offshore from Marine Parade (Application 5).
- A coastal permit for the occupation of the common marine and coastal area for existing Port activities, the proposed new wharf, the adjacent berth pocket and the new swinging basin area (Application 6).

**6. Effects on the Environment:**

Attached, in accordance with section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA), is an Assessment of Effects on the Environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This includes an assessment in terms of the New Zealand Coastal Policy Statement 2010 and relevant policy in relevant plans.

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Garth Cowie, Chief Executive
On behalf of Port of Napier Limited

---

Date

**Address for Service:**
Napier Port
PO Box 947
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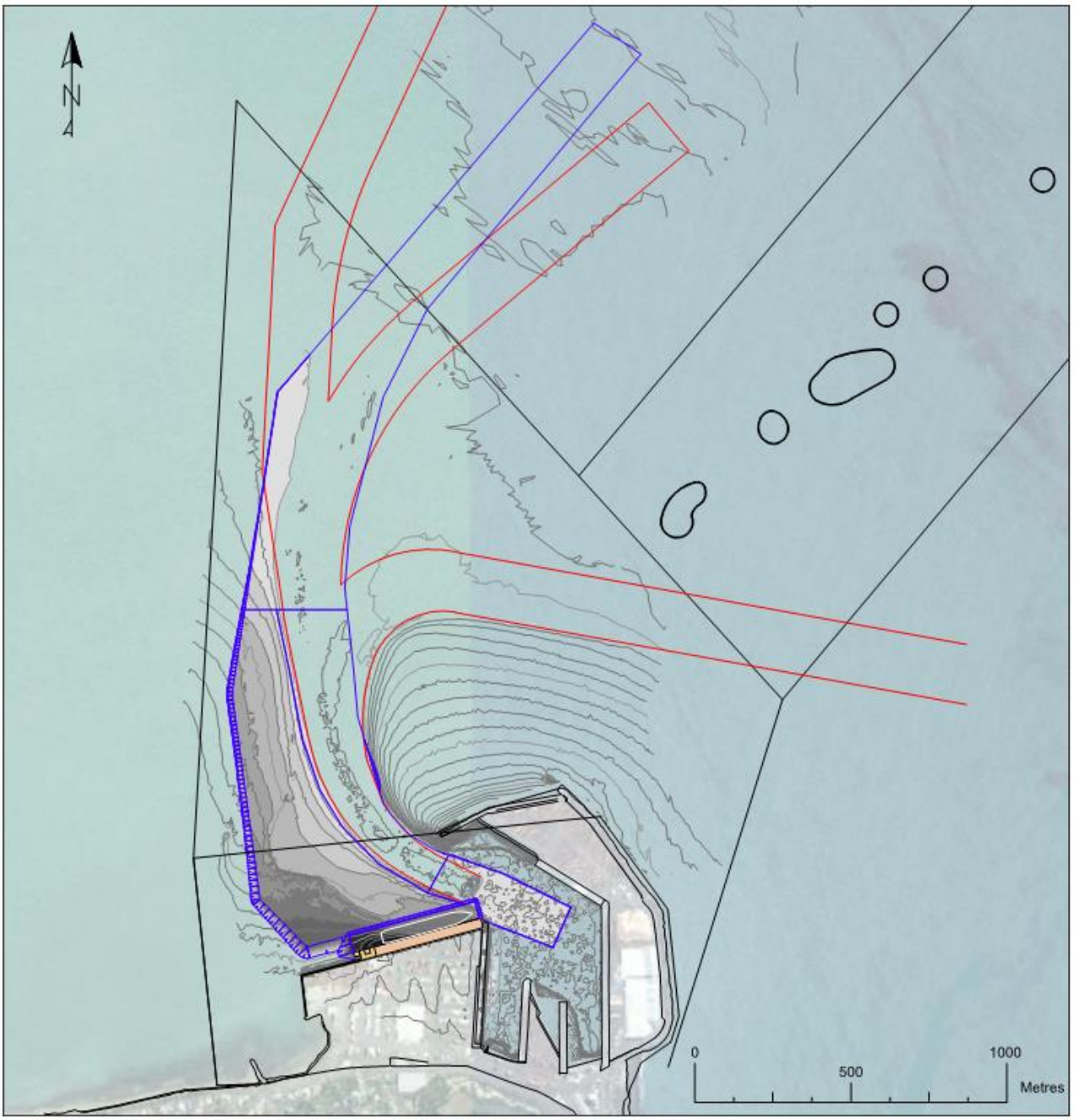
## PLAN 2 – Location of Stage 1 Capital Dredging – all areas shown grey within the blue outlines



# APPLICATION FOR RESOURCE CONSENT
# SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

## APPLICATION 3

## Coastal Permit Pursuant to Section 12 and Section 15 of the Resource Management Act 1991

**To:** Hawke's Bay Regional Council
Private Bag 6006
NAPIER 4142

**From** Port of Napier Limited
PO Box 947
NAPIER 4140

**Port of Napier Limited** applies for the following type of resource consent:

Coastal permit for Stages 2 to 5 capital dredging within the inner Port area, the swinging basin, in and near to the existing three channels and to form a new channel to a depth of 14.5m below chart datum. Further details are provided in the Project Description in the Assessment of Effects on the Environment that accompanies this application.

**1. The names and addresses of the owner and occupier of the land to which the application relates:**

The subject seabed is part of the common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011.

The Port of Napier Limited holds a section 384A permit under the Resource Management Act 1991 to occupy part of the area for which the coastal permit is sought.

**2. The location to which this application relates:**

The proposed dredging area is located at or about map reference NZMG 2846726-6184935 to NZMG 2847606-6188081 and the location is shown on Plan 3 attached to this application.

The location is more fully described in the Assessment of Effects on the Environment that accompanies this application.

**3. Duration of consent sought:**

The duration sought for this consent is 35 years.

**4. Lapse period:**

A period of 10 years is sought before the consent shall lapse in terms of section 125 of the Resource Management Act.

Following the commencement of the activity, the consent shall not lapse due to the passage of time between stages of dredging.

## 5. Additional resource consents:

The additional resource consents required in relation to this activity are being applied for concurrently with this application and are as follows:

- A coastal permit for the construction, use, operation and maintenance, of a new wharf (Wharf 6) and associated activities in the coastal marine area (Application 1).
- A coastal permit for capital dredging including within the areas known as the inner Port area, the swinging basin and part of the Deep Water Channel, to provide for an operational depth of 14.5m adjacent to the new wharf and otherwise 12.5m (below chart datum) (Application 2).
- A coastal permit for the maintenance dredging of the areas for which capital dredging permits are sought, to maintain the depths stated (Application 4).
- A coastal permit for the deposition and disposal of material from wharf construction, capital dredging and maintenance dredging within the area shown on the plan attached to the application, some 4km offshore from Marine Parade (Application 5).
- A coastal permit for the occupation of the common marine and coastal area for existing Port activities, the proposed new wharf, the adjacent berth pocket and the new swinging basin area (Application 6).

## 6. Effects on the Environment:

Attached, in accordance with section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA), is an Assessment of Effects on the Environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This includes an assessment in terms of the New Zealand Coastal Policy Statement 2010 and relevant policy in relevant plans.

---

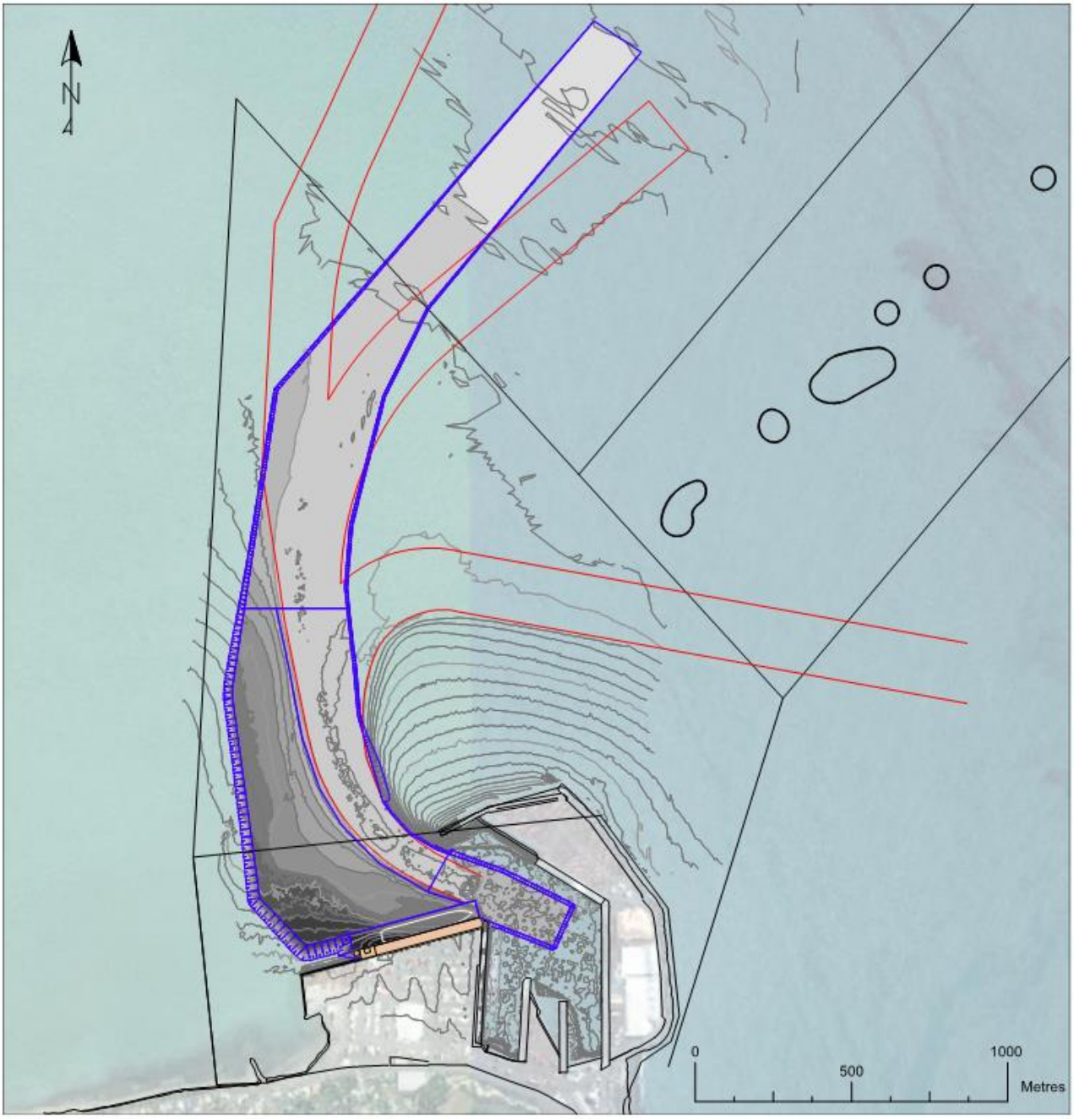
Garth Cowie, Chief Executive
On behalf of Port of Napier Limited

---

Date

**Address for Service:**
Napier Port
PO Box 947
Napier 4140
Attn: Michel de Vos
DDI: (06) 833 4458
Mobile: (027) 530 3325
Email: michelv@napierport.co.nz

**PLAN 3 – Location of Stage 2 to 5 Capital Dredging – all areas shown grey within the blue outlines (excludes wharf and adjacent berth pocket)**



# APPLICATION FOR RESOURCE CONSENT
# SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

## APPLICATION 4

## Coastal Permit Pursuant to Section 12 and Section 15 of the Resource Management Act 1991

**To:** Hawke's Bay Regional Council
Private Bag 6006
NAPIER 4142

**From** Port of Napier Limited
PO Box 947
NAPIER 4140

**Port of Napier Limited** applies for the following type of resource consent:

Coastal permit for the maintenance dredging of the areas for which capital dredging permits (Applications 2 and 3) have been sought to maintain the depths below chart datum provided for in those permits. Further details are provided in the Project Description in the Assessment of Effects on the Environment that accompanies this application.

**1. The names and addresses of the owner and occupier of the land to which the application relates:**

The subject seabed is part of the common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011.

The Port of Napier Limited holds a section 384A permit under the Resource Management Act 1991 to occupy part of the area for which the coastal permit is sought.

**2. The location to which this application relates:**

The proposed dredging area is located at or about map reference NZMG 2846726-6184935 to NZMG 2847606-6173222 and the location is shown on Plan 3 attached to Application 3.

The location is more fully described in the Assessment of Effects on the Environment that accompanies this application.

**3. Duration of consent sought:**

The duration sought for this consent is 35 years.

**4. Lapse period:**

A period of 10 years is sought before the consent shall lapse in terms of section 125 of the Resource Management Act.

Following the commencement of the activity, the consent shall not lapse due to the passage of time between stages of dredging.

## 5. Additional resource consents:

The additional resource consents required in relation to this activity are being applied for concurrently with this application and are as follows:

- A coastal permit for the construction, use, operation and maintenance, of a new wharf (Wharf 6) and associated activities in the coastal marine area (Application 1).
- A coastal permit for capital dredging including within the areas known as the inner Port area, the swinging basin and part of the Deep Water Channel, to provide for an operational depth of 14.5m adjacent to the new wharf, and otherwise 12.5m (below chart datum) (Application 2).
- A coastal permit for dredging of parts of the swinging basin and the existing three channels, and formation of a new channel, to provide for an operational depth of 14.5m (below chart datum) (Application 3).
- A coastal permit for the deposition and disposal of material from wharf construction, capital dredging and maintenance dredging within the area shown on the plan attached to the application, some 4km offshore from Marine Parade (Application 5).
- A coastal permit for the occupation of the common marine and coastal area for existing Port activities, the proposed new wharf, the adjacent berth pocket and the new swinging basin area (Application 6).

## 6. Effects on the Environment:

Attached, in accordance with section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA), is an Assessment of Effects on the Environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This includes an assessment in terms of the New Zealand Coastal Policy Statement 2010 and relevant policy in relevant plans.

---

Garth Cowie, Chief Executive
On behalf of Port of Napier Limited

---

Date

**Address for Service:**
Napier Port
PO Box 947
Napier 4140
Attn: Michel de Vos
DDI: (06) 833 4458
Mobile: (027) 530 3325
Email: michelv@napierport.co.nz

# APPLICATION FOR RESOURCE CONSENT
# SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

## APPLICATION 5

## Coastal Permit Pursuant to Section 12 and Section 15 of the Resource Management Act 1991

**To:** Hawke's Bay Regional Council
Private Bag 6006
NAPIER 4142

**From** Port of Napier Limited
PO Box 947
NAPIER 4140

**Port of Napier Limited** applies for the following type of resource consent:

Coastal permit for the deposition and disposal of material from capital and maintenance dredging from the areas described in Applications 2, 3 and 4, in the area shown on Plan 4 attached to this application. Further details are provided in the Project Description in the Assessment of Effects on the Environment that accompanies this application.

**1. The names and addresses of the owner and occupier of the land to which the application relates:**

The subject seabed is part of the common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011.

**2. The location to which this application relates:**

The proposed dredging area is located within the rectangle delineated by the following NZMG co-ordinates: 2851625 E, 6185195 N; 2853458 E, 6185114 E; 2853388 E, 6183265 N; 2851543 E, 6183341 N, and the location is shown on Plan 4 attached to this Application.

The location is more fully described in the Assessment of Effects on the Environment that accompanies this application.

**3. Duration of consent sought:**

The duration sought for this consent is 35 years.

**4. Lapse period:**

A period of 10 years is sought before the consent shall lapse in terms of section 125 of the Resource Management Act.

Following the commencement of the activity, the consent shall not lapse due to the passage of time between stages of dredging and deposition.

## 5. Additional resource consents:

The additional resource consents required in relation to this activity are being applied for concurrently with this application and are as follows:

- A coastal permit for the construction, use, operation and maintenance, of a new wharf (Wharf 6) and associated activities in the coastal marine area (Application 1).
- A coastal permit for capital dredging including within the areas known as the inner Port area, the swinging basin and part of the Deep Water Channel, to provide for an operational depth of 14.5m adjacent to the new wharf, and otherwise 12.5m (below chart datum) (Application 2).
- A coastal permit for dredging of parts of the swinging basin and the existing three channels, and formation of a new channel, to provide for an operational depth of 14.5m (below chart datum) (Application 3).
- A coastal permit for the maintenance dredging of the areas for which capital dredging permits are sought, to maintain the depths stated (Application 4).
- A coastal permit for the occupation of the common marine and coastal area for existing Port activities, the proposed new wharf, the adjacent berth pocket and the new swinging basin area (Application 6).

## 6. Effects on the Environment:

Attached, in accordance with section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA), is an Assessment of Effects on the Environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This includes an assessment in terms of the New Zealand Coastal Policy Statement 2010 and relevant policy in relevant plans.

---

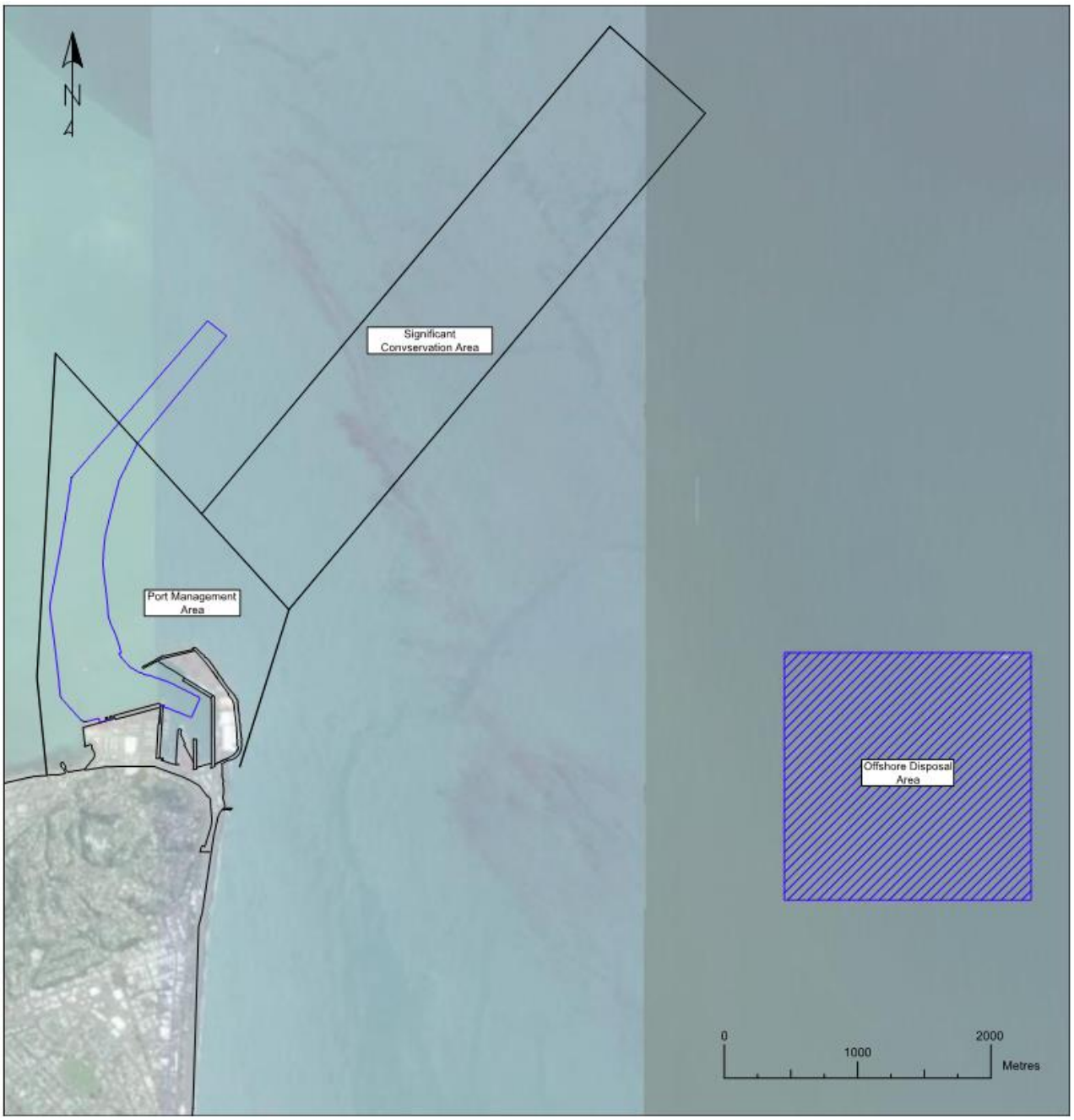
Garth Cowie, Chief Executive
On behalf of Port of Napier Limited

---

Date

**Address for Service:**
Napier Port
PO Box 947
Napier 4140
Attn: Michel de Vos
DDI: (06) 833 4458
Mobile: (027) 530 3325
Email: michelv@napierport.co.nz

## PLAN 4 – Location and Size of Proposed Disposal Area



# APPLICATION FOR RESOURCE CONSENT
# SECTION 88 OF THE RESOURCE MANAGEMENT ACT 1991

## APPLICATION 6

## Coastal Permit Pursuant to Section 12 of the Resource Management Act 1991

**To:** Hawke's Bay Regional Council
Private Bag 6006
NAPIER 4142

**From** Port of Napier Limited
PO Box 947
NAPIER 4140

**Port of Napier Limited** applies for the following type of resource consent:

Coastal permit for the occupation of the common marine and coastal area for existing Port activities (replacing the existing coastal permits held by the Port of Napier Ltd to occupy an area to manage and operate port-related commercial undertakings), the proposed new wharf, the adjacent berth pocket including the areas on both sides of the dolphins, and the proposed new swinging basin. Further details are provided in the Project Description in the Assessment of Effects on the Environment that accompanies this application.

**1. The owner and occupier of the land to which the application relates:**

The subject seabed is part of the common marine and coastal area under the Marine and Coastal Area (Takutai Moana) Act 2011.

The Port of Napier Limited holds a section 384A permit and one other occupation permit under section 12 of the Resource Management Act 1991 to occupy much of the area for which a replacement coastal permit for occupation is sought. Additional areas are also sought.

**2. The location to which this application relates:**

The proposed areas of occupation are located at or about map reference NZMG 2846055-6184520 to 2846151-618524538 to 2847521-6185021 to 2847363-6184168, and are shown on Plan 5 attached to this application.

The location is fully described in the Assessment of Effects on the Environment that accompanies this application.

**3. Duration of consent sought:**

The duration sought for this consent is 35 years.

4. **Additional resource consents:**

The additional resource consents required in relation to this activity are being applied for concurrently with this application and are as follows:

- A coastal permit for the construction, use, operation and maintenance, of a new wharf (Wharf 6) and associated activities in the coastal marine area (Application 1).
- A coastal permit for capital dredging including within the areas known as the inner Port area, the swinging basin and part of the Deep Water Channel, to provide for an operational depth of 14.5m below and adjacent to the new wharf, and otherwise 12.5m (below chart datum) (Application 2).

- A coastal permit for dredging of parts of the swinging basin and the existing three channels, and formation of a new channel, to provide for an operational depth of 14.5m (below chart datum) (Application 3).
- A coastal permit for the maintenance dredging of the areas for which capital dredging permits are sought, to maintain the depths stated (Application 4).
- A coastal permit for the deposition and disposal of material from wharf construction, capital dredging and maintenance dredging within the area shown on the plan attached to the application, some 4 to 6km offshore from Marine Parade (Application 5).

**6. Effects on the Environment:**

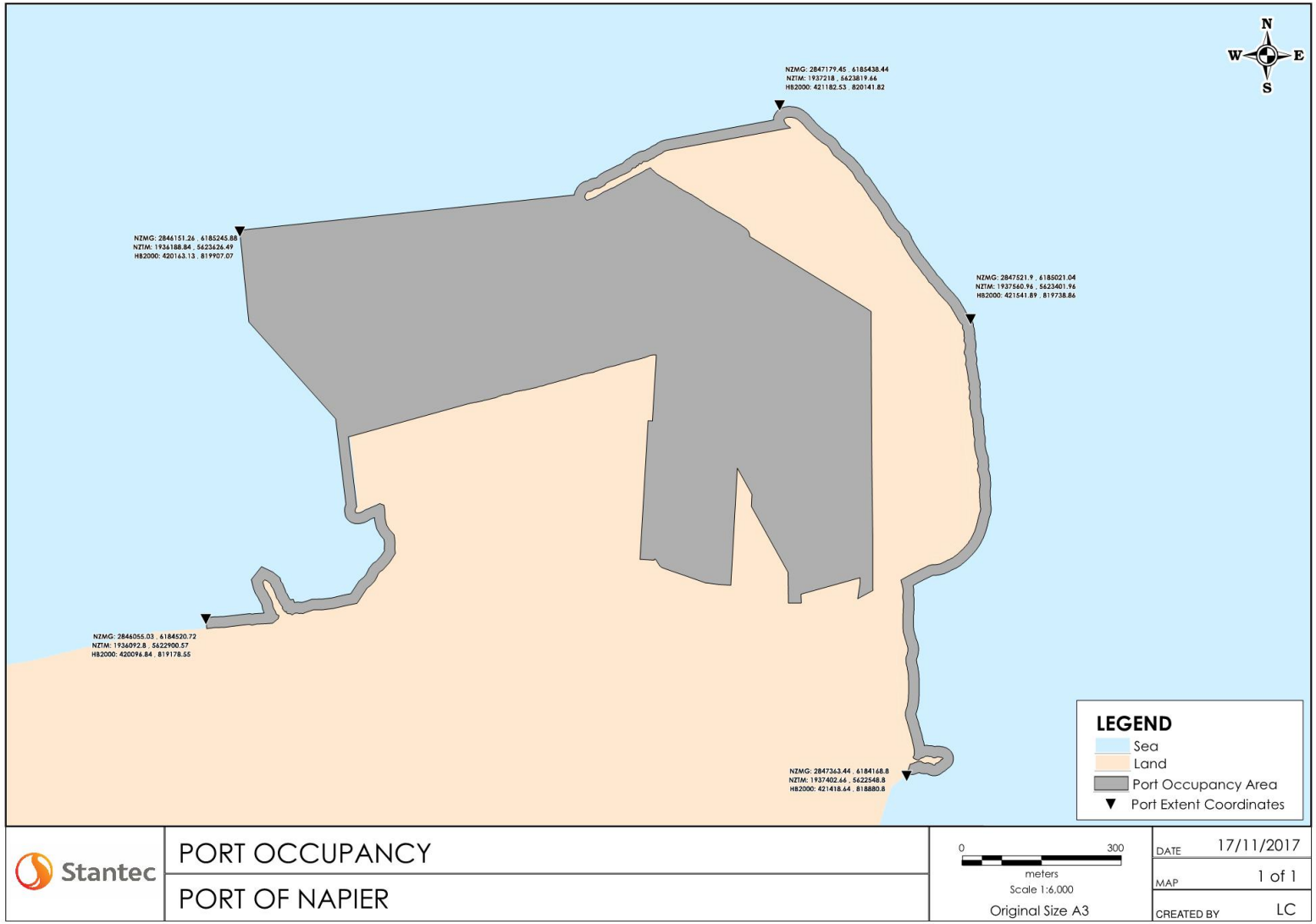
Attached, in accordance with section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA), is an Assessment of Effects on the Environment in the detail that corresponds with the scale and significance of the effects that the proposed activity may have on the environment. This includes an assessment in terms of the New Zealand Coastal Policy Statement 2010 and relevant policy in relevant plans.

---
Garth Cowie, Chief Executive
On behalf of Port of Napier Limited

---
Date

**Address for Service:**
Napier Port
PO Box 947
Napier 4140
Attn: Michel de Vos
DDI: (06) 833 4458
Mobile: (027) 530 3325
Email: michelv@napierport.co.nz

## PLAN 5 – Area for which Coastal Permit for Occupation is sought



# PART II: DESCRIPTION AND ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

# 1. INTRODUCTION

## 1.1. Purpose

The Port of Napier Limited (Napier Port, or the Port) proposes to undertake further Port development consisting of a new berth, and associated dredging in the inner harbour and an extended swinging basin area. In addition, existing shipping channels will be deepened and a new main fairway for larger vessels created. The dredged material is proposed to be disposed of in a new disposal area approximately 4 to 6km offshore of Marine Parade and south and east of Pania Reef. Together these components comprise Napier Port's proposed wharf and dredging project (the project).

The berth, which will require dredging and the construction of a new wharf, Wharf No. 6, will be located within the Port's current operational boundary at the northern end of the container terminal.

Figure 1-1 shows the location of the new proposed wharf, the extent of the dredged areas and the intended areas for the disposal of the capital and maintenance dredged material.

Napier Port is now seeking a number of resource consents (coastal permits) from the Hawke's Bay Regional Council (HBRC or Regional Council) to provide for the planned development, to enable the construction of the new wharf and capital and maintenance dredging and disposal of dredged material. Further details are provided in the following sections of this report.

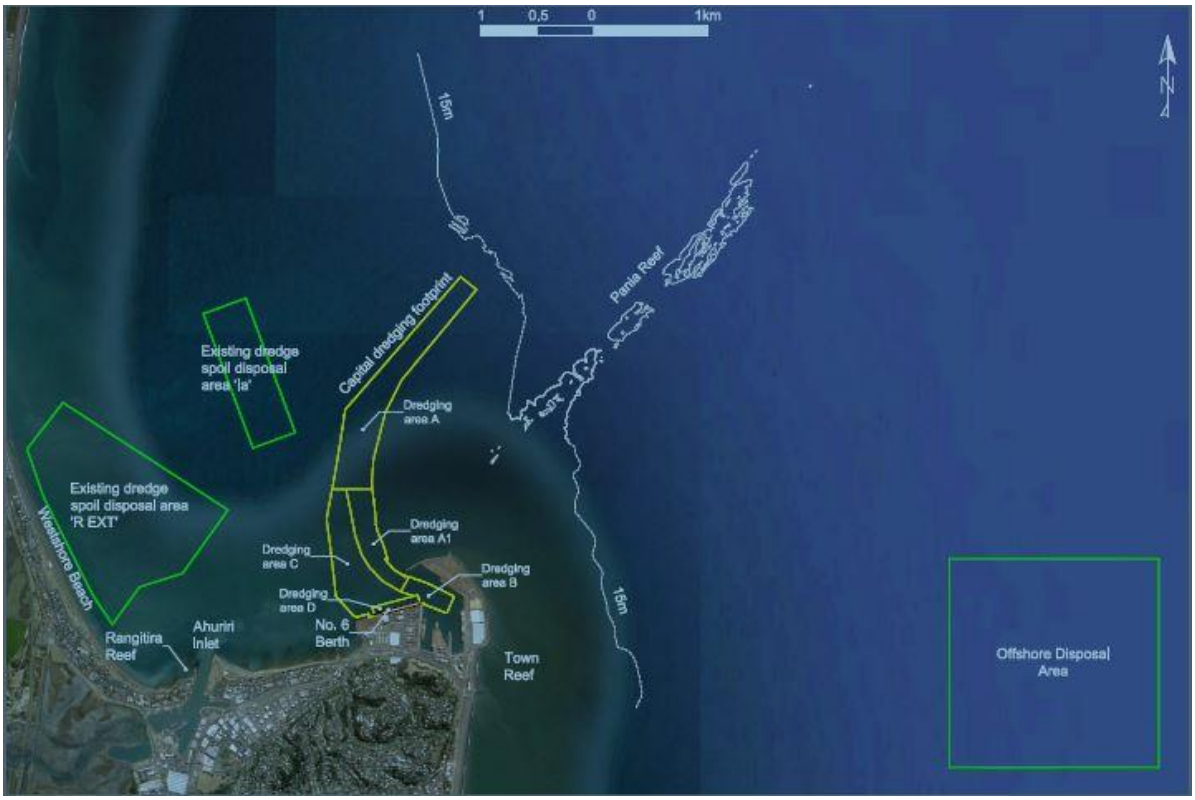



**Figure 1-1: Composite aerial of Napier Port showing the scale and layout of the proposed project elements**

## 1.2. Structure of the Report

The resource consent application documentation comprises three volumes.

Volume 1 contains the application forms and the project's description and assessment of effects on the environment (the AEE).

Volume 2 contains the plans and drawings relevant to the applications.

Volume 3 contains the more detailed technical reports on which the assessment of effects on the environment is based.

The description and assessment of effects on the environment (AEE) has been prepared in accordance with Section 88 and the Fourth Schedule of the Resource Management Act 1991 (RMA). It includes:

a) A description of the proposed project, including a description of the wharf and the associated construction activities, capital dredging and disposal, and maintenance dredging and disposal, along with possible staging;
b) An explanation of reasons for the project and alternatives considered;
c) A description of the existing environment;
d) Information on the statutory framework of the applications;
e) An assessment of the effects on the environment of the proposed project;
f) Measures to avoid, remedy or mitigate adverse effects;
g) An evaluation of the applications in terms of their policy context;
h) A summary description of the consultation undertaken and the matters raised; and
i) Draft resource consent conditions.

Table 1-1 below sets out the requirements of the RMA's Fourth Schedule and lists the sections of this report within which the information is provided.

**Table 1-1: Report Content against RMA Fourth Schedule Requirements**

| Clause | Content | Where found in this document |
|---|---|---|
| 1(a) | Description of the activity | Section 3 |
| 1(b) | Description of the site at which the activity will occur | See Figure 1-1 and Application Forms 1-6 |
| 1(c) | Full name of applicant and ownership status | See Application Forms 1-6 |
| 1(d) | Description of any other activities which are part of the proposal | See Application Forms 1-6 and Section 3 |
| 1(e) | Description of any other resource consents | See Application Forms 1-6 |
| 1(f) | An assessment against RMA Part 2 matters | Section 23.5 |
| 1(g) | An assessment against any other statutory documents | Section 23 |
| 3(a),(b) | Permitted components and existing consents | Section 6.3.2 |
| 6(1)(a) | Alternatives considered | Section 5 |
| 6(1)(b) | Assessment of effects | Sections 8 to 23 |

| Clause | Content | Where found in this document |
|---|---|---|
| 6(1)(d) | Information relating specifically to discharges | Sections 5 and 9 |
| 6(1)(e),(g) | Mitigation measures, including monitoring | Sections 8 to 23, and 26 |
| 6(1)(f) | Consultation undertaken and matters raised | Section 25 |
| 6(2) | Additional information required | The relevant regional plan does not include any specific requirements for information |

## 1.3. Context and Background

### 1.3.1. Geographical Context

Napier Port is situated on the south-western edge of Hawke Bay adjacent to Napier City. As it is not part of a natural embayment, it is the North Island's only breakwater-based port and is developed largely on reclaimed land.

Napier Port is also the only container port on the east coast of the North Island of New Zealand. It serves as the primary export and import port for the Hawke's Bay region, and further afield into adjacent regions. It is now the fourth largest container terminal in New Zealand, and the sixth port in overall tonnage.

The Port has been progressively developed since the late 19th century, and now comprises a reclaimed land area of approximately 52 hectares.

The key features of the Port are its substantial breakwater, the berths and inner harbour, and the land area used for access, cargo storage and handling and Port administration.

### 1.3.2. Historical Context

Tangata whenua of Hawke's Bay have strong traditional and cultural relationships with the coastal environment. As kaitiaki (or guardians) of their coastal resources, they have assumed the responsibility to ensure the mauri (life force) of these resources is safeguarded. The significance of this traditional and cultural relationship is recognised by the current Port administration, who are developing closer links with local tangata whenua organisations including through involvement in the current application processes.

Early European history includes records by Captain James Cook in December 1769 of the prominent feature of 'bluff head', today known as Bluff Hill or Scinde Island. The site of what was to become the Port is described as…:

*"… on each side of the bluff head is a low and narrow sand or stone beach, between these beaches and the mainland is a pretty large lake of salt water as I suppose; on the SE side of this head is a very large flat which seems to extend a good way inland to the westward,…"*

The reference to the "large lake of salt water" is the Ahuriri Lagoon. The area connecting the sea and the lagoon saw the development of early port activity including through to mid 1862, including dredging and

reclamation within Ahuriri Lagoon, the Inner Harbour and the Iron Pot. Increased development pressure, and natural limitations, such as the shallow depth of the harbour, tidal movement uncertainty and shingle bank migration led to discussion on the merits of a new harbour. As a result the Napier Harbour Board was formed and funds allocated to construct the first groyne (breakwater).

Work on the development of an artificial harbour at Bluff Hill began in 1887. From 1887 - 1890 the construction of the Port's breakwater took place. This breakwater (designed to be 2,470 feet in length), projected eastward out from Bluff Hill shore. The typical breakwater design headed northwards before arching westward more or less parallel to Bluff Hill, creating a large area of coastal water which was sheltered from the high ocean waves.

The 1931 Napier Earthquake resulted in significant changes to the land and coastal environment, with the bed of the inner harbour rising more than two metres, thereby removing its ability to act as a viable port. This natural disaster resulted in the development of the new Napier Port, with the use of Port Ahuriri changing to better suit the shallow depths[1].

The main concrete armoured breakwater was progressively developed and was not completed until the late 1960s. Construction of the limestone spur breakwater (along with the reclamation within these boundaries) was carried out in the early 1970s.

In 1978-79, the Hawke's Bay Harbour Board carried out a major dredging operation to widen and deepen the entrance channel into the Port. This channel was initially formed in 1973 to a clear overall depth of 12m. The north end alignment of the channel (dredged to a depth of 12m in 1976) had a north-easterly orientation to provide the shortest distance to the natural 12m isobath. However, as ship size increased and with a need for improved navigational safety, pilots preferred to approach the entrance channel from a northerly direction. Before this, the main approach channel to the Port was to the south of Pania Reef on the line of the Westshore beacons. The southern channel between Pania Reef and the Breakwater was surveyed and buoyed in 2003. This channel was for ships arriving from, and departing to the south of Napier in the direction of Cape Kidnappers.

Since 1976, maintenance dredging has been to provide a clear overall depth of 12m for the full width of the 200m wide shipping lane as required by international and national standards to allow safe navigation in extreme weather conditions. Major capital dredging took place in 2012 to provide a clear overall depth of 12.4m, the current depth.

### 1.3.3. Industrial and Commercial History

New Zealand began to be served by container services from 1971/72. From 1978 Napier became the base for regular service in the form of Scan Carriers "roll on/roll off" vessels.

Dedicated container services developed from the early 1990's in Napier, following New Zealand port reform when the Harbour Board was replaced by the port company which invested in the first shore crane.

[1] Port Ahuriri continues to be used by the Hawke's Bay fishing fleet and a range of recreational activities, alongside commercial and residential activities.

Containerisation affects not only the method of moving cargo, but equally critically has had a major impact on shipping. Through until the early 1970's, containers were carried on converted cargo vessels. As purpose built container ships began to appear, specialist port infrastructure was needed to service the developing transport system, which eventually reached New Zealand and Napier.

The impact of containers in Napier has been highly significant, from a small number or small containers carrying a handful of tonnes in 1978 to now handling over a quarter of a million TEUs[2].

To obtain greater economies of scale, international shipping lines have greatly expanded the size of vessels in recent decades – in the process placing pressure on ports to handle ever larger and more complex vessels with increasing speed, lower cost and continually improving systems. Proficiency in information technology and systems is now a core operating skill for ports, along with handling shipping and cargo.

As with other ports, the growth of the container trade has led to a need for highly efficient handling processes and the use of off-site facilities for container storage, and in some cases for cargo agglomeration. Napier Port relies on container management, particularly for the storage of empty containers during the busy export period, at its Thames Street, Pandora yard at Ahuriri.

Significant growth has also occurred in bulk trades which do not rely on containers, including log and pulp handling.

While conventional and bulk shipping continues to play a significant role, a further growth area has been in passenger liners, meeting the demand for safe and unique holiday opportunities in the South Pacific.

[2] Twenty-foot equivalent unit containers.

# 2. EXISTING NAPIER PORT

The land and sea comprising Napier Port is intensively used. The coastal marine area beyond the Port but which gives access to it is also intensively used for transport and other activities on a shared basis.

## 2.1. Approach Channel and the Main Breakwater

The approach channel and adjacent waters extend offshore from the northwest of the Port itself to the east. Depending on the conditions, and the vessel itself, vessels approach along slightly different paths.

The main breakwater is exposed to open coastal conditions, and shelters the inner harbour basin from waves and wind from the east and north. The proposed wharf and dredging project will not affect the breakwater, but will take advantage of the sheltered area it provides.

## 2.2. Fairway, Channels and Swinging Basin

The Fairway is the main approach to the inner harbour of Napier Port. There are three existing named channels which join the Fairway – the South Channel, the Josco Channel and the Deep Water Channel. Parts of the Fairway and the Josco Channel have been dredged at the port end.

The Outer Swinging Basin is at the entrance to the Inner Harbour (Inner Swinging Basin) and allows for the manoeuvring of shallow draft cruise vessels using the 'halfback' manoeuvre[3].

## 2.3. Berths and Inner Harbour

The inner harbour (Inner Swinging Basin) provides for berthage at five existing wharfs. Table 2-1 sets out the details of each (source – Napier Port Marine Factsheet, 3 November 2015).

**Table 2-1: Details of Existing Napier Port Wharves**

| Name | No. | Length | Pocket width | Berth pocket depth below CD | Berth height above CD |
|---|---|---|---|---|---|
| Cassidy Quay | 1 | 250 m | 40.0 m | 12.5 m | 3.8 m |
| Higgins | 2 | 485 m | 36.1 m | 11.7 m | 3.8 m |
| Geddis | 3 | 210 m | - | 8.5 m | 3.8 m |
| Herrick | 4 | 270 m | 38.0 m | 12.2 m | 4.7 m |
| Kirkpatrick | 5 | 390 m | 47.1 m | 12.6 m | 3.8 m |

CD = chart datum

[3] The manoeuvrability of the vessels is greater than other types of vessel, meaning that larger cruise ships can berth. The half-back and other manoeuvres that are undertaken (the "fullback" and "flip-flop") can be seen on Napier Port's website: https://www.youtube.com/watch?v=TTz7q3NIcn4&list=PL5zgAp4fsd_01zbCv2JASKJ9g6Dcy3DSO&index

## 2.4. Ownership and Status of Land/Seabed

Napier Port is owned and operated as a fully autonomous subsidiary of Hawke's Bay Regional Investment Company (HBRIC)[4], which has a 100% shareholding. In turn the Hawke's Bay Regional Council (HBRC) beneficially owns 100% of the shares in Napier Port through HBRIC Ltd.[5]

The various applications for coastal permits apply to the sea bed within the coastal marine area, which is managed through the Marine and Coastal Area (Takutai Moana) Act 2011.

Port of Napier Limited holds a RMA section 384A permit (CL940231M) to occupy an area within the coastal marine area to enable the company to manage and operate the port-related commercial undertaking of the Napier Port. This permit includes the inner swinging basin and an area of a width of 20m beyond the edge of the existing port land, around the full port perimeter, as well as the area occupied by navigational aids. The permit conveys exclusive occupation rights and runs to September 2026. A further occupation permit is held relating to the seaward site of the revetment, which has a matching duration[6].

## 2.5. Port Activities

Napier Port's influence has been growing over recent years due to its position directly adjacent to New Zealand's main east coast international shipping lane. In 2016 it was the North Island's fourth largest export port by tonnage[7], and it is New Zealand's fourth largest container terminal overall[8].

The Port's growth and effectiveness reflects the regional businesses the Port serves.

In the 2014/15 financial year, the Port invested some $34 million in its processes and infrastructure to build terminal capacity and boost productivity. This included buying and installing two new mobile harbour cranes to deliver a faster and more consistent performance.

The Port has enjoyed a substantial period of growth in most trades for the past 10 years.

In the last 10 years overall tonnage handled has grown from 2.79 million tonnes in 2006 to 4.07 million tonnes in 2015, up 45.9% (Figure 2-1). Container volumes have exceeded this growth – increasing from 142,779 TEU in 2006 to 256,432 TEU in 2015, up 79.6% (Figure 2-2).

[4] HBRIC is an investment company established by Hawke's Bay Regional Council to manage some of its larger and future proposed investments in infrastructure within the region.
[5] http://www.hbrc.govt.nz/hawkes-bay/business/hbric/port-of-napier/
[6] This is a 20m x 240m strip, Consent No. CL030374O.
[7] After Tauranga, New Plymouth and Whangarei, see http://www.transport.govt.nz/ourwork/tmif/freighttransportindustry/ft010/
[8] After Auckland, Tauranga and Lyttleton http://www.championfreight.co.nz/largest-nz-ports

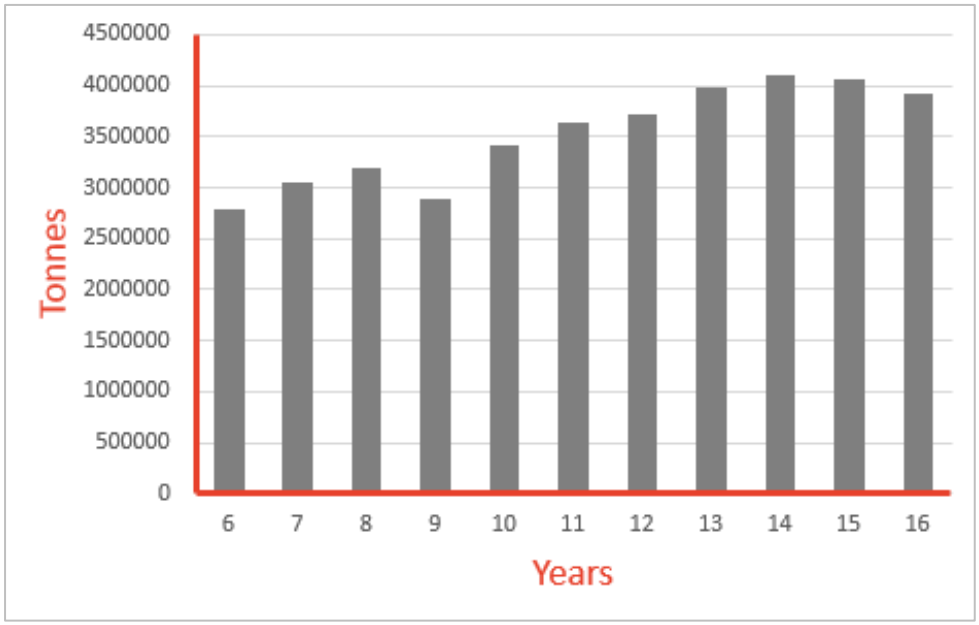



**Figure 2-1: Growth in Overall Tonnage**

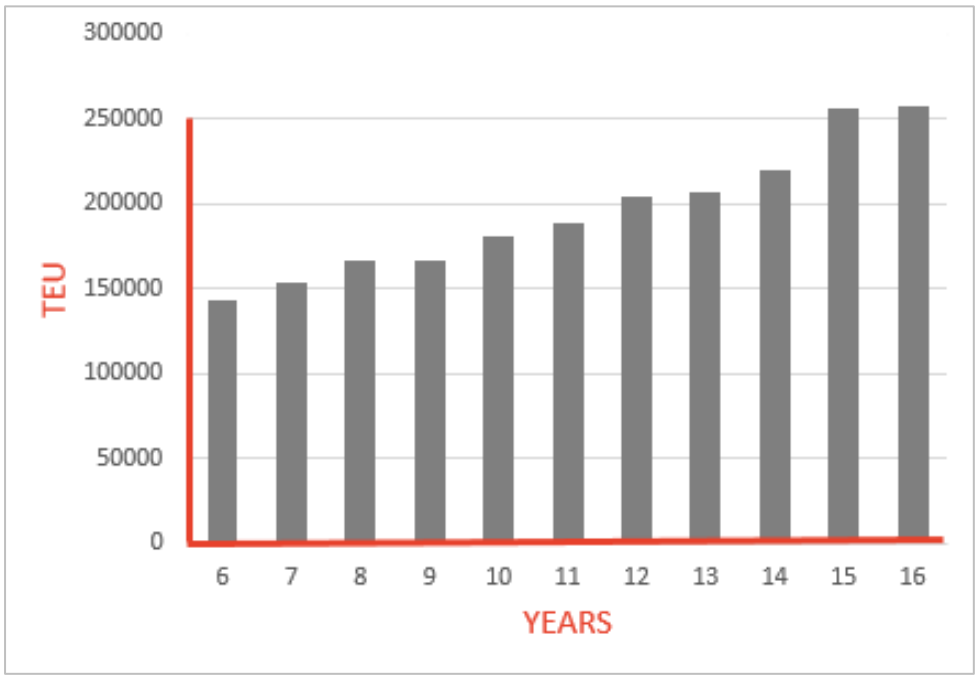



**Figure 2-2: Growth in Container TEU**

Estimated growth in the next 10 years sees overall tonnage increasing from 4.07 million tonnes to 6.08 million tonnes, up 49.4% (Figure 2-3). Container growth is forecast to see overall TEU volumes grow from 256,432 TEU (2015) to 355,463 TEU in 2025, up 38.6% (Figure 2-4).

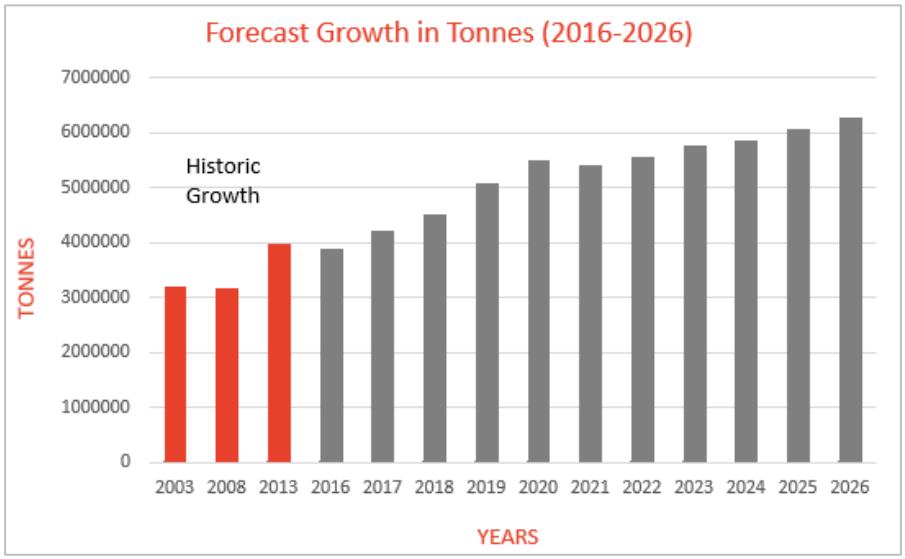



**Figure 2-3: Forecast Growth in Overall Tonnage, 10 Years (2016-2026)**

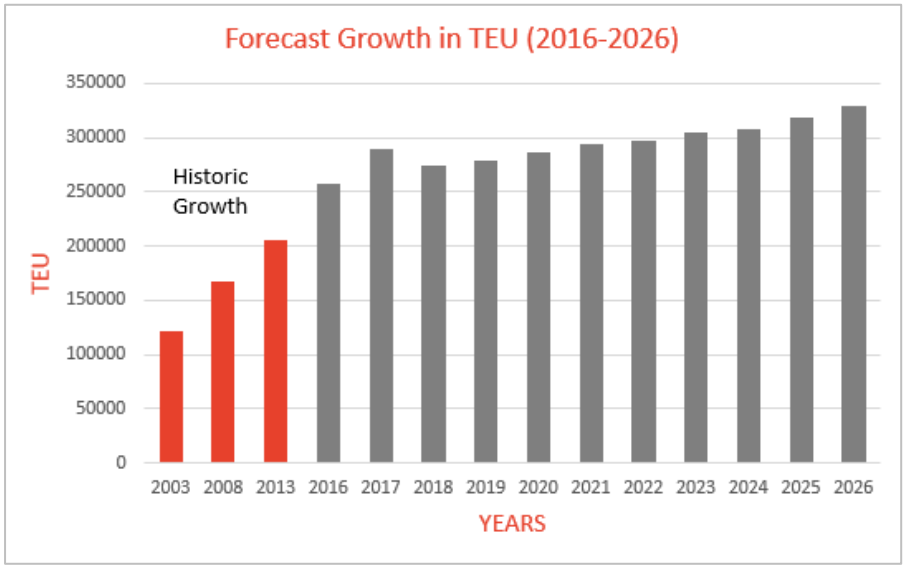



**Figure 2-4: Forecast Growth in TEU, 10 Years (2016-2026)**

Trade growth through Napier is linked to a number of key sectors (pip fruit, horticulture, viticulture, agriculture and forest products).

Most of the recent and projected trade growth is based on “in region” volumes, with “out of region” container volumes representing less than 10% of the total by 2025.

Napier Port is the gateway for the cruise industry into the region. In the past 10 years visitor numbers have grown significantly, with an average of approximately 125,000 visitors each year (based on last 5 years) and in the 10 year period, over 900,000 passengers and crew have disembarked at Napier Port (Figure 2-5). In 2016/17, 55 vessels with approximately 133,000 passengers and crew visited, and in 2017/18, 56 vessels with 127,225 passengers and crew are expected.

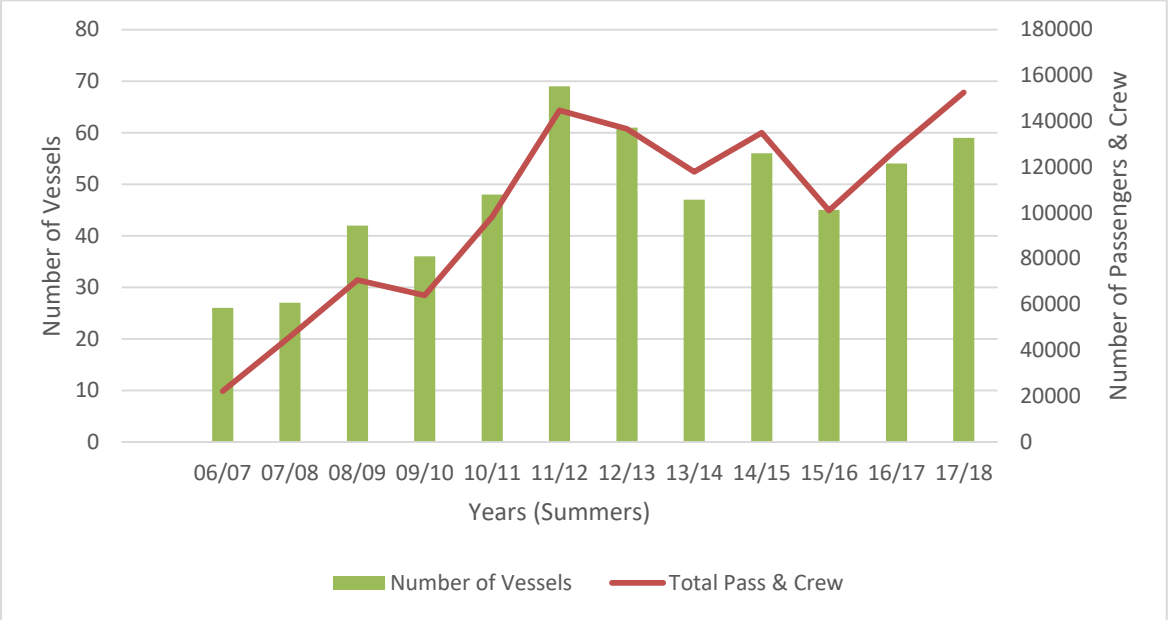



**Figure 2-5: Cruise Ship Calls and Passenger and Crew Numbers (2006-2018)**

Napier's container terminal is currently reliant on one 390m berth Kirkpatrick Wharf (No. 5) for the working of gearless vessels (i.e. those requiring the Port's shore cranes to exchange cargo).

Vessels requiring the services of the container terminal have coped with high berth utilisation to date because of Napier Port's approach to providing fixed berth windows which are pre-allocated time slots in which a shipping line must call each week to be guaranteed of services.

Napier Port is focused upon improving productivity per hour (the number of containers moved). While this is another means of reducing working time at the berth, as the average size of cargo exchanges has risen, this has had the opposite effect of increasing time at the berth.

The Port's peak season is during central New Zealand's apple, squash and onion export season, which typically starts around late February and runs through until about June. Operational capacity is now tested every year at Napier due to the very pronounced export season, typically from February to May, directly related to the type of products handled. This seasonal pattern has been a part of the Port's core business for a considerable period of time.

Figure 2-6 below shows the seasonal nature of container volumes, and Napier Port's ongoing year on year overall container growth. The make-up and exact timing of the peak volumes is however difficult to accurately predict.

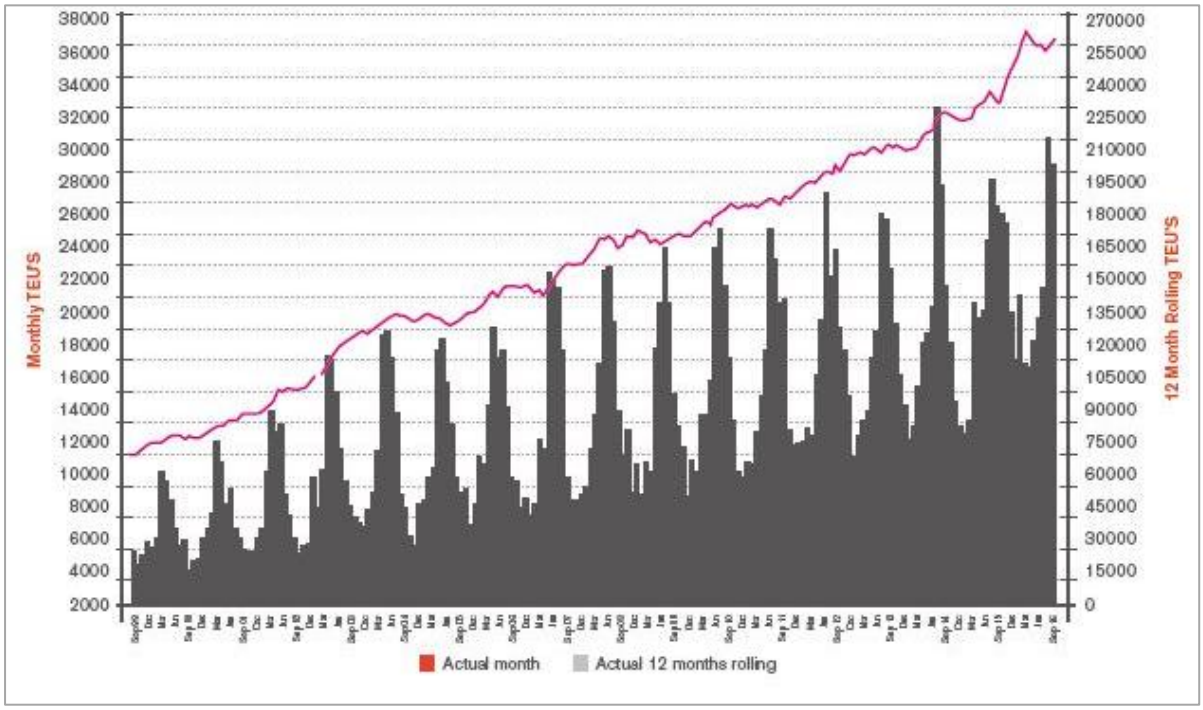



**Figure 2-6: Seasonal nature of container volumes, and ongoing overall container growth**

The Port's ability to defer peak season volumes is very limited as commodity based products (apples, squash and onions) target very particular markets for very specific timings. The intensified production season now being experienced over successive years has further added impetus to plan for this increase in exported products. If Napier Port achieves its growth targets, and depending on how pronounced peak season volumes are and other operational factors, then it estimates it will reach its effective single berth capacity in 2020 or shortly thereafter, and will require additional berth capacity.

# 3. PROJECT DESCRIPTION

## 3.1. General

The proposal is to establish a new, additional, wharf berth aligned parallel with the existing main reclamation (i.e. the Northern Container Terminal) with a broadly west / east orientation. The wharf will have a width of approximately 34m and a length of 350m. Beyond the wharf to the west two mooring dolphins will be installed to provide for berthing of longer vessels. In the future, a 50m extension at the western end to the wharf would be possible.

The positioning and location of the new wharf relative to the existing Northern Container Terminal is shown in Figure 1-1, and in more detail in the plans in Volume 2.

The 350m length of the wharf will enable larger ships to be accommodated at the Port consistent with the evolving scale and nature of international shipping. Container ships of a size up to 320m with a width (beam) of 42.8m are expected to berth at the new wharf, whilst cruise vessels up to 360m (Oasis Class) will able to be accommodated.

Associated with the new wharf, some reorganisation to the access and layout of containers, which currently stack up to six high, is likely although the overall combination and nature of Port activities on the yard of the Northern Container Terminal will remain unaltered, with containers being assembled in this central Port area, and log storage to the west and east.

To provide adequate long-term depth to the wharf and adjacent berth, the area it occupies will be dredged to the target 14.5m below CD prior to construction. An adjacent berth pocket will also be dredged to this depth.

To service the new and existing wharves, a larger and slightly relocated outer swinging basin will be needed. The outer swinging basin will be extended to the west where it will allow vessels to manoeuvre before berthing at the new No. 6 Wharf.

It is proposed to progressively increase the depth of the harbour entrance and approach channels, initially to a depth of 12.5m, and subsequently through consecutive dredging campaigns over a number of years, to the long-term target depth of 14.5m below CD.

The main Fairway area will also be deepened and extended to allow vessels which are both wider and have deeper drafts to access the Port. This will involve development of a new channel beyond the Fairway slightly to the west of the Josco Channel, to retain necessary distance from Pania Reef. The new channel will also be progressively developed to meet needs for the Port to provide for larger vessels.

## 3.2. Wharf No.6 Description

The new wharf is to be located on the northern side of the existing reclaimed area of the Northern Container Terminal.

Plans and cross sections of the proposed wharf are provided in Volume 2, Plan Set 1. Volume 3 contains the technical report relating to the wharf design and construction. See Appendix A of that Volume.

### 3.2.1. Deck and Mooring Dolphins

The new wharf will comprise a 700mm thick continuous concrete deck in two joined lengths. At the inner and outer edge of the concrete deck, the slab is thickened to form a beam to support the crane rails. The deck slab is supported on piles at approximately 6.5m grid in an east/west direction. In a north/south direction the piles are spaced at approximately 6.0m. These are described in more detail below. The deck level will be 3.81m above CD.

Two mooring dolphins will be positioned west of the new wharf, located 15m from the wharf end at distances of approximately 18m apart. Each mooring dolphin measures approximately 18m x 16m. Mooring dolphins are fixed structures that extend close to or beyond the length of the new wharf, and are used to 'tether' longer vessels or if two vessels are berthed. The locations of the mooring dolphins have been 'future proofed' to provide for a future 50m extension to the west of the new wharf, should demand for an extended wharf warrant an extension in future (that potential extension is not part of the current applications).

On the outer wharf edge, precast panels are connected to support cone fenders against which the vessels will berth. Crane rails and a power cable slot in the outer edge run the length of the wharf. The concrete deck will house additional utility cables and ducts to convey co-located utility services beneath the concrete deck support.

The concrete deck platform has a 0.5% landward fall towards the Northern Container Terminal to convey stormwater to the existing stormwater reticulated network and consented discharge points[9].

At its eastern end, the new wharf adjoins the existing Wharf No. 5. A seismic gap is provided, which is likely to be bridged by a steel plate to allow for vehicle circulation across the gap.

### 3.2.2. Revetment Modification

The existing revetment on the edge of the northern container terminal is armoured with limestone rock at a gradient of approximately 1.5(H):1(V). It traverses the edge of the reclaimed area over a distance of 600 metres. The width of the existing revetment extends into the coastal marine area by approximately 10 metres at the eastern end, with the toe embedded into the seabed by approximately 3 to 4 metres, but less at the western end where the sea is shallower.

The rear (southern) edge of the proposed wharf will meet the existing reclamation. The existing reclamation wall will need to be modified to provide a replacement revetment beneath the wharf to continue to protect against scour and waves, including the wash from manoeuvring vessels. This will extend below and beyond the full length of the wharf. The scour protection will extend up to an additional 30m beyond the end of the wharf.

At the top, along the inner wharf edge there will be a precast retaining wall suspended below the crane rail beam, extending down to 0.0 CD. Alternatively a stand-alone retaining wall which is not connected to the wharf may be used, such as an L-shaped reinforced retaining concrete wall and/or sheet piling.

[9] Covered by existing coastal permit CD040033Wa 'to discharge stormwater from the Port of Napier premises and surrounding area into the coastal marine area and/or onto the gravel beach immediately adjacent to the coastal marine area'.

The slope beneath the wharf will be reconstructed to a suitable slope, and extended in depth to meet suitable supporting material below the deeper dredged area. The final slope will be approximately 2H:1V in finished profile. A small area of infilling (reclamation) behind the slope of the new revetment surface will be needed towards the eastern end of the revetment to provide for the more gentle finished revetment slope. The finished revetment will be armoured up with up to two layers of revetment material being either large limestone rocks or manufactured pre-cast interlocking concrete forms, depending on the final protection selected.

There is an area of existing fill at the west end of the wharf that is susceptible to liquefaction that is required to be strengthened. Strengthening will be through the use of concrete ground improvement works, including where necessary, reinforced concrete piles with permanent steel casing. Additional fill material if required is likely to be sourced from reusing limestone rock that forms part of the existing face of the reclaimed Northern Container Terminal or possibly by using suitably sourced seabed material obtained during capital dredging campaigns.

Any material required to reshape areas beneath the new revetment prior to armouring the finished surface is also likely to be locally sourced from the on-site limestone rock or suitably sourced seabed material reserved from dredging.

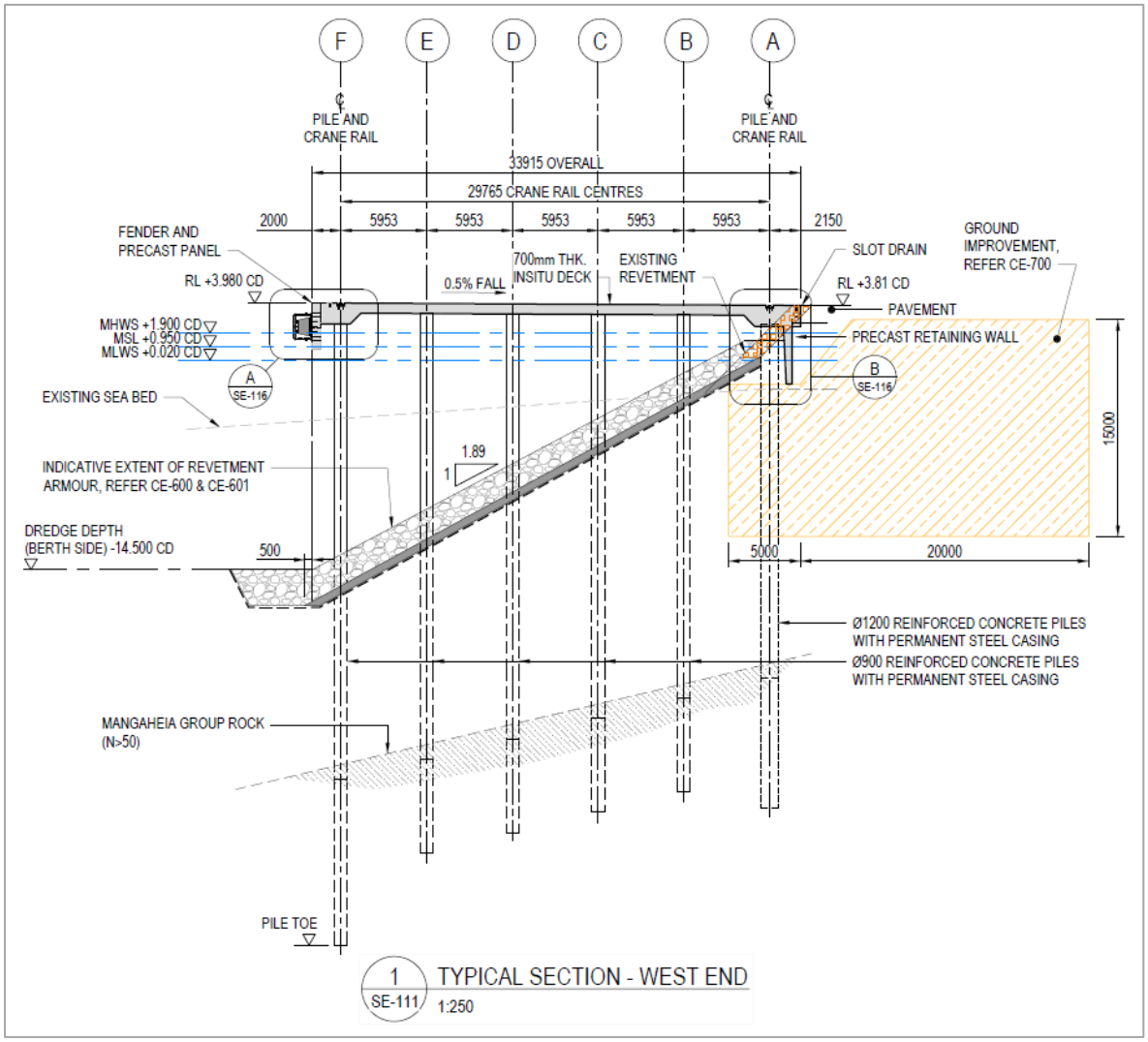



**Figure 3-1: Typical Wharf Cross-Section – west end**

To the west of the proposed wharf, the existing reclamation behind the proposed mooring dolphins will transition back to the existing edge of the northern container terminal, retaining its current armour of limestone rock.

Figures 3-1 and 3-2 show typical cross-sections of the wharf and revetment. Additional drawings are included in Volume 2, Plan Set 1.

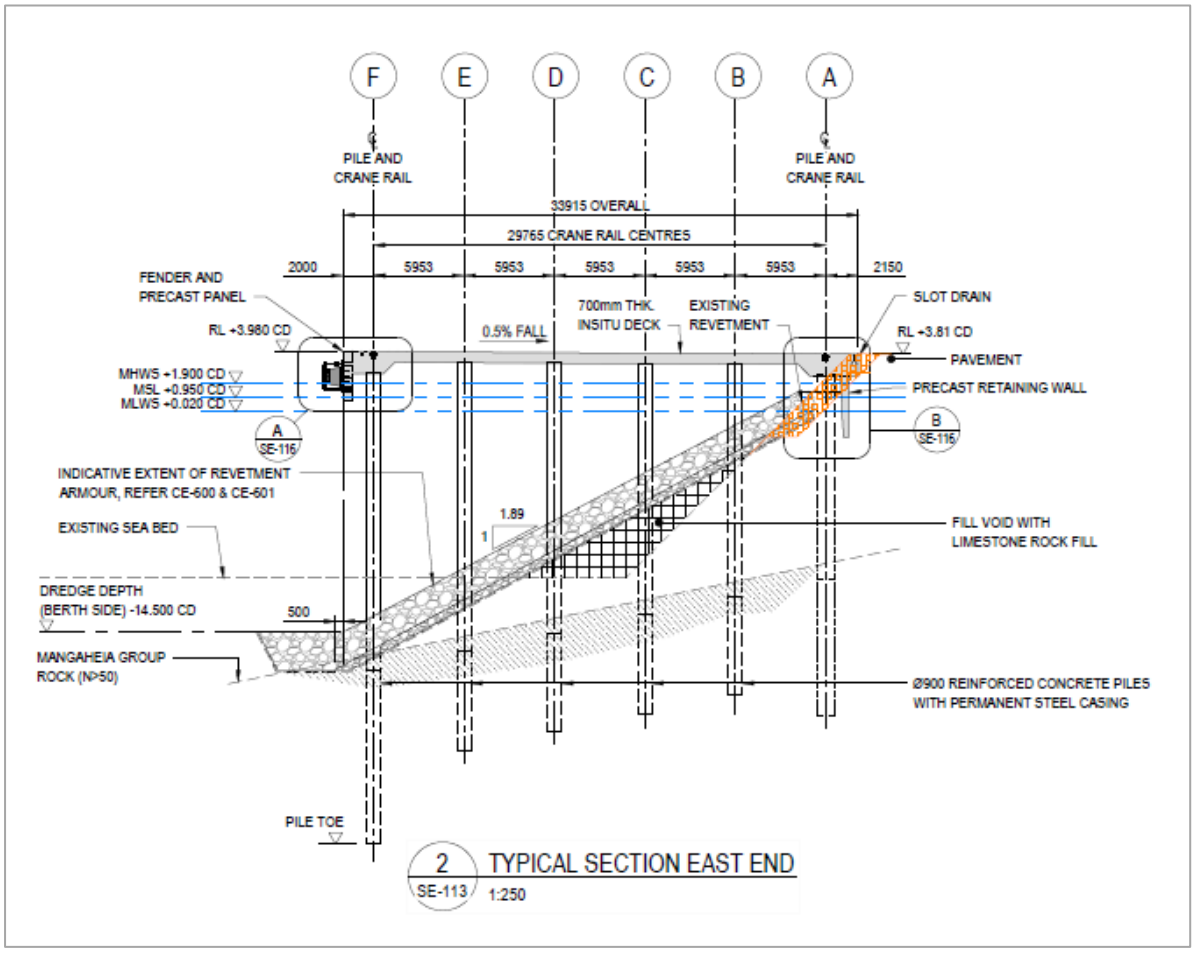



**Figure 3-2: Typical Wharf Cross-Section – east end**

### 3.2.3. Pile Arrangements

The general arrangement of the piles can be seen in the drawings in Volume 2, Plan Set 1. There are 332 in total.

The pile system comprises a grid, from the edge of the reclamation to the outer edge and along the wharf to the outer wharf edge. There are 56 bents[10] along the length of the wharf.

There are six piles in each bent (circled in red in Figure 3-3 to show typical bent). The last bent (number 56) comprises two piles.

[10] 'Bent' is a structural framework, the normal length of a structure, designed to carry lateral as well as vertical loads.

The outer five piles in each bent will be 900mm diameter piles. The inner row (Row A in Figure 3-3), located against the reclamation northern container terminal (landward side), will be 1200mm diameter piles, as these will resist the horizontal loads from the movement of heavy machinery between the existing Northern Container Terminal and the new wharf.

The two mooring dolphins are located beyond the western end of the new wharf. The dolphin piles, in a 3 by 3 grid format, are 1800mm in diameter, with nine piles in each mooring dolphin. Table 3-1 summarises the arrangement and total number of piles.

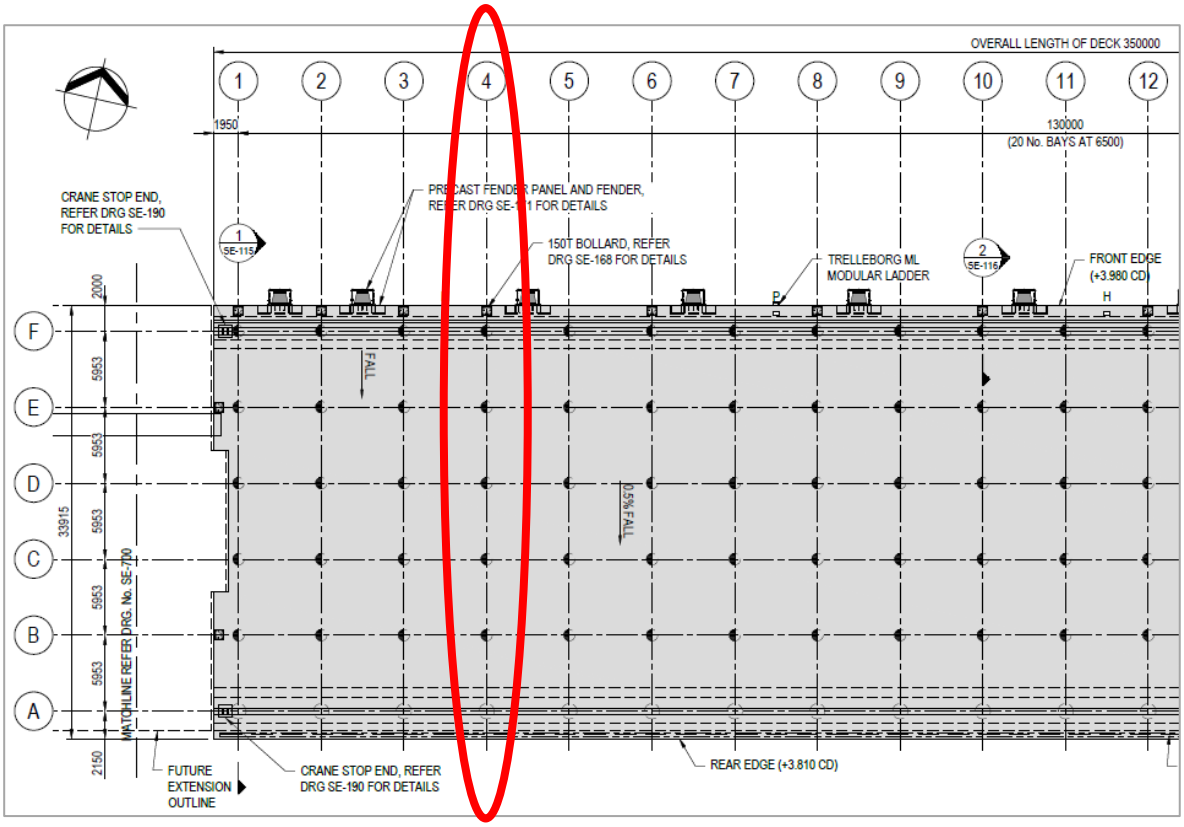



**Figure 3-3: Typical bent circled in red**

The pile arrangement is shown in Drawings 3124410-SE-111 (General Arrangement Plan and Elevation Sheet 1), 3124410-SE-112 (General Arrangement Plan and Elevation Sheet 2) and 3124410-SE-113 (General Arrangement Plan and Elevation Sheet 3). Pile details is shown in Drawings 3124410-SE-123 (Pile Details Sheet 1) and 3124410-SE-124 (Pile Details Sheet 2) in Volume 2, Plan Set 1.

It is important to note that, among other wharf design criteria shown in the drawings in Volume 2, Plan Set 1, pile size (i.e. diameter and number of piles) and the overall configuration of the piles and bents will be optimised at the time of tendering and construction to achieve time, cost and constructability efficiencies.

The piles will also vary in length and consequently in depth as they are driven into the underlying mudstone, due to the varying underlying geological material[11].

[11] 6 Wharf Development – Geotechnical Factual Report (Beca (February 2016)), and 6 Wharf Development: 3D Geological Model and Dredge Volumes, Beca (October 2016) – see Volume 3, Appendices B and C.

**Table 3-1: Structure and indicative pile locations, number and diameter**

| Structure | Location of Piles | Number of Piles | Pile Diameter |
|---|---|---|---|
| Wharf No. 6 | Outer rows | 277 | 900mm |
| | Inner edge row | 55 | 1200mm |
| Mooring Dolphins (two) | Mooring dolphins | 18 | 1800mm |

## 3.3. Wharf Construction Methodology

The final construction methodology will be determined by the selected contractor. The following describes the likely methodology and sequence of works.

Wharf construction is likely to take approximately 18 to 24 months in total.

### 3.3.1. Construction Laydown Area

A construction laydown area will be established for the contractor adjacent to the new wharf site, on the Northern Container Terminal. This will be fenced off to separate construction activities from Port operations, possibly with a line of empty containers and/or security fencing. Vehicle access to the construction site will be through the western gate, and a defined route from the gate to the site will be established.

To avoid any potential conflict with the movement of Port operation plant and machinery, parking for construction workers on site will be within the confines of the fenced off and restricted construction area.

There will be numerous truck deliveries to site during the construction. The most concentrated number of deliveries will be during major deck pours, when 5 to 8 concrete trucks will arrive every hour over a period of 4 to 6 hours. This will be in addition to the number of trucks carrying containers that enter the Port daily.[12]

The number of truck movements required for the revetment work will add further truck movements accessing the Port. Assuming an 18 month construction period and allowing for approximately 25 blocks being trucked to site per day[13], the estimated 11,800 block units will involve 78 weeks of truck movements, six days per week, or approximately 486 construction days. If the construction period is longer, there would be fewer trucks per day.

[12] MWH Traffic Impact Assessment (May 2017) – see Volume 3, Appendix M.
[13] Five blocks per truck trip (or 10 truck movements).

**Figure 3-4: Typical revetment armour block units which would be manufactured off-site and transported in**

The timing of the delivery of the units is likely to coincide with the wharf deck construction sequence including the timing of the piles being driven into the seabed. The units will be stored adjacent to the construction site before being lifted into place.

It is anticipated that some materials, most significantly the pipe and reinforcing steel for the piles, will be delivered by ship or barge directly to the Port. This may also apply to some other materials such as rebar – reinforcing steel within the concrete piles.

In addition to the wharf construction, it is anticipated that the contractor will manufacture the precast retaining wall sections and fender support panels on site. An area will also be required for storage of materials including reinforcing and pile pipe material, as well as for fabrication of reinforcing cages for the piles and welding of pipe sections.

Any storage of hazardous substances will be within a secure building and bunded appropriately.

Once the wharf structure is complete, the pavement area along the south edge of the wharf will be re-graded to 'tie-in' and match the elevation of the wharf deck. In an area approximately 50 metres wide and running the length of the 350m wharf, the asphalt will be removed, and if suitable, recycled. Trenching and backfilling for the necessary service connections will be undertaken and additional base-course placed, and compacted. New asphalt will be placed at a suitable grade to provide for the movement of the Port's heavy machinery between the existing Northern Container Terminal and the new wharf.

### 3.3.2. Construction Equipment, Sequence and Method

It is anticipated that the wharf will be built from the edge of the existing reclamation, using the permanent piles to support first, temporary staging so that equipment can drive piles, drill the sockets into the bedrock and place the concrete and rebar forming the piles, and subsequently to support a soffit form on which the reinforced concrete deck will be poured.

### 3.3.3. Construction Equipment

Wharf construction will involve the following heavy equipment and plant:

- Crane for concrete lattice installation
- Piling crane
- Vibro hammer for initial installation
- Hydraulic hammer for final pile driving
- Service cranes
- Track mounted drill rig
- Loaders and trucks
- Concrete trucks and concrete pump
- Dump trucks
- Long-reach backhoes and/or excavator for armour rock or pre-cast concrete blocks
- Service boat for under wharf work
- Welding machines, small tools and compressors.

### 3.3.4. Construction Sequence

A summary of the construction sequence is provided in Figure 3-5.

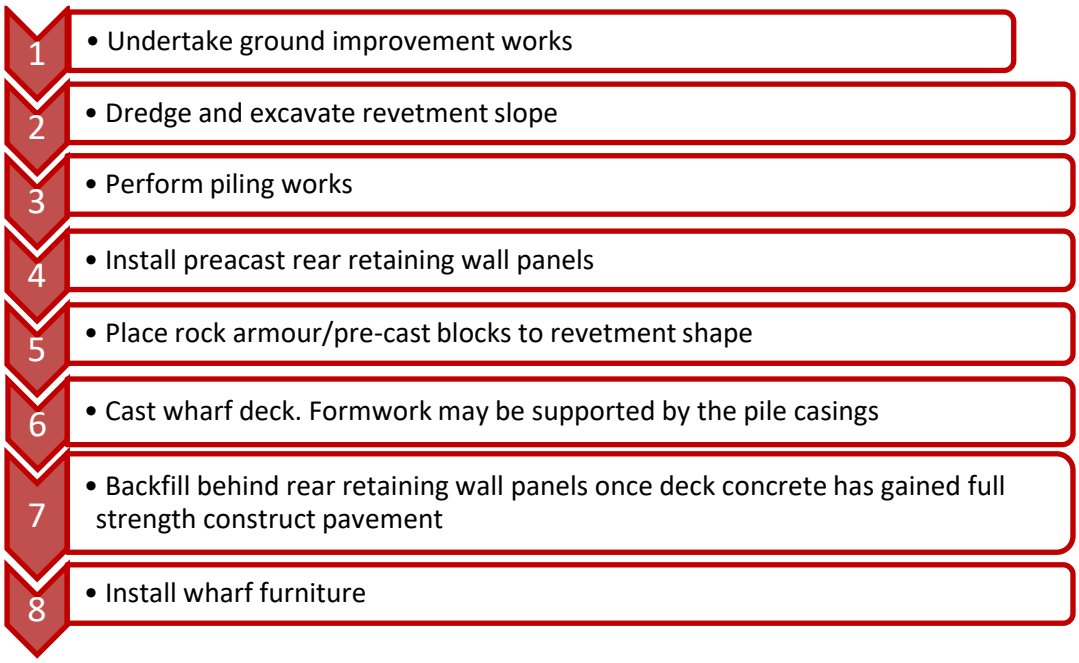



**Figure 3-5: Generalised Wharf Construction Sequence**

Details of the construction sequence will generally be as follows:

1. Undertake ground improvement works and stone column installation commencing from the middle of the wharf and working in a westwards direction.

2. At the same time, working from the edge of the existing reclamation and starting from the east end of the wharf, the piles in two bents will be progressively installed from the edge out by installing temporary staging as each pair of piles is driven. As the driving equipment moves out it will also install the piles on the two bents on either side of the bay in which it starts. Piles will be driven to bedrock using a large hydraulic hammer. After driving, a drill rig will clean out the piles and drill the pile sockets. As pile sockets are completed, rebar cages will be installed and the piles filled with concrete. Once piles have been installed to the outer edge and the next staging installed, the piling and staging will advance along the wharf. Once about three bays of staging are installed, the staging will be transferred from behind the equipment to the front as the work advances.

3. The material from the pile sockets will include mudstone which, because of the drilling procedure, will include a high proportion of fines. This material will be disposed of off-site in an approved landfill. Other material, if suitable, may be used for some of the re-grading of the site adjacent to the new wharf to minimise waste.

4. Once the temporary staging being used for the installation of piles has moved forward, armour rock or the pre-cast block units would be placed along the edge of the revetment. Firstly, long-reach backhoes and/or excavators will trim the existing slope to the design lines, working from their own smaller area of staging. If material is suitable it will remain on-site and be re-used. Once the surface is trimmed, filter cloth will be placed and the armour rock or pre-cast block units placed to form the revetment.

5. The next stage will be the installation of the soffit formwork for the deck slab and edge beams. The formwork will have large panels which fit within the pile spacing and in-fill panels on the pile lines. They will be installed in sections. On the inner edge, the precast retaining walls will be placed and connected into the inner crane beam. Once one section is poured and cured, the infill panels will be dropped, the main soffit form released by lowering it slightly and then the soffit form will be advanced along the wharf to the next area, before the process is completed.

6. As sections of the deck slab become available, wharf furniture and fittings will be installed, including:

    - Crane rails
    - Mooring bollards
    - Pre-cast fender support panels, followed by the fenders
    - Stormwater drainage systems
    - Water supply, power and communications
    - Navigation aids.

As the wharf construction proceeds, the pavement along the existing Northern Container terminal will be re-graded to match the elevation of the wharf deck, including base-course filling and asphalting.

## 3.3.5. Construction Methods

### Ground Improvement linking new wharf to existing Northern Container Terminal reclamation

To tie in the newly constructed wharf to the existing reclaimed Northern Container Terminal, ground improvement works will probably be required on the seaward edge of the existing Northern Container Terminal pavement.

Approximately 5 metres of the new 34 metre wide wharf will overlap into this area. Depending on the final construction method to be used by the successful contractor, the likely ground improvement method may involve re-grading of the base-course, filling and asphalting (using pumped concrete lattice into the ground) adjacent to the new wharf edge.

### Pile Driving

All piles will be driven open-ended to the underlying mudstone which varies in elevation between - 6m CD at the south east corner to -28m CD at the north-west corner. The piles will be pitched and initially driven with a vibro hammer to the top of the weathered rock. A hydraulic hammer will then be used to ensure the pile penetrates into the weathered rock to achieve a seal. The pile will then be cut off at the correct level.

As the inner piles are driven into the sea bed, a working platform will be erected supported by the steel casings to allow the equipment to move to the outer rows. The working platform will generally consist of a service crane, welding machines, small tools and compressors.

A drill rig will then be used to drill out the overburden in the pile and to drill the required socket into the mudstone to provide the necessary vertical load capacity. If the pile is not sealed, it may require further driving to achieve a seal. The drilled material, consisting of bedded sandstone, siltstone and limestone[14], will be deposited into hoppers on the working platform and later transferred to trucks for offsite disposal, or stored for use for re-grading the reclamation edge.

A service crane will then install the reinforcing cage and the pile will be filled with concrete delivered by a concrete pump.

### Armour Material

As the piling moves forward, the armour rock or precast block units will be installed, with a likely method involving the following steps. A small work platform will be installed by a service crane to allow the backhoe or long-reach excavator to reach the toe of the revetment where the armour material is to be placed. At the eastern end of the wharf, the armour material will extend down to the exposed bedrock. The backhoe or long-reach excavator will trim the slope and then place the required material. At the western end of the wharf where the bedrock is below dredge level, the armour will extend down the full length of the slope and a scour protection geotextile blanket will extend into the berth. In this area the temporary platform will be extended to the wharf edge to allow the geotextile blanket to be installed and then progressively removed as the armour material is installed.

[14] Information from "6 Wharf Development – Geotechnical Factual Report" (Beca (February 2016)), and "6 Wharf Development: 3D Geological Model and Dredge Volumes", Beca (May 2016) – see Volume 3, Appendices B and C.

### Concrete Deck

Once a line of piles is completed, the working platform will move ahead. Once several bays are completed, the deck soffit formwork will be installed in the first bays, and the reinforcing installed. It is anticipated that half the width of the deck for one or two bays will be poured at the one time.

Once the concrete cures and achieves the required strength in each area, the soffit form will be released from the concrete by lowering the supporting jacks, and the form slid longitudinally along the wharf to the next bays.

This work will be supported by one or two service cranes, handling rebar, formwork and other materials. For the concrete pours, a concrete pump will be used.

### Furniture and Fittings

As completed areas become available, the wharf furniture and fittings will be installed. This will involve a service crane, welding machines and small tools.

### Other Activities

All powered equipment will require refuelling, which will be carried out by a tanker truck at a dedicated area within the secure construction site. Spill containment and clean-up materials will be kept on site as a contingency.

Equipment working over the sea will use biodegradable hydraulic oil, where practicable, to mitigate the effect of any accidental spill to coastal waters.

The risk of spilling concrete into the sea will be mitigated by the use of concrete pumps in preference to concrete buckets wherever possible. For the major deck slab pours, the soffit form will extend beyond the edge of the slab as an access way and providing an area which will catch any spilled concrete material.

All works will be within the Napier Port International Ship and Port Facility (ISPS) security area which restricts unauthorised access. The construction site will be demarcated and provided with agreed emergency entry and exit points. As well as providing security, this will provide separation between the contractor's plant and workers and the Port operations.

## 3.4. Capital Dredging

### 3.4.1. Volumes and Areas

For the purposes of estimating the dredge volumes and describing the dredging programme, the total area proposed to be dredged has been divided into subareas identified by letters A to D. The areas are shown in Figure 3-6 and details are set out in Table 3-2 on the following page.

**Table 3-2: Summary of dredge campaign volumes and methods (source: Table 5.1, Appendix C, Volume 3)**

| Area | Symbol | Campaign No. | Volume | Method* |
|---|---|---|---|---|
| Swinging Basin Extension | A | 1 | 27,100 | TSHD |
| | | 2 | 92,100 | TSHD |
| | | 3 | 176,200 | TSHD |
| | | 4 | 220,300 | TSHD |
| | | 5 | 252,800 | TSHD |
| Extended/New Channel | A1 | 1 | 6,000 | TSHD |
| | | 2 | 33,900 | TSHD |
| | | 3 | 85,600 | TSHD |
| | | 4 | 89,800 | TSHD |
| | | 5 | 89,900 | TSHD |
| Inner Harbour | B | 1 | 24,300 | BHD |
| | | 2 | 27,400 | BHD |
| | | 3 | 31,500 | BHD |
| | | 4 | 32,300 | BHD |
| | | 5 | 32,800 | BHD |
| Swinging Basin | C | 1 | 970,300 | BHD |
| | | 2 | 157,800 | BHD |
| | | 3 | 157,800 | BHD |
| | | 4 | 157,800 | BHD |
| | | 5 | 157,900 | BHD |
| Berth Pocket | D | 1 | 170,900 | BHD |

* TSHD= Trailing Suction Hopper Dredge: BHD = Backhoe Dredge. Although specific dredge types are indicated for the various Areas, variations in material may mean that alternatives dredging methods may be used in some circumstances.

Full details are provided in Volume 3, Appendix B, "6 Wharf Development: Geotechnical Factual Report", and Appendix C, "6 Wharf Development: 3D Geological Model and Dredge Volumes". For example, Table 3-2, yields a volume of just under 3Mm$^3$, elsewhere the volume may be referred to as approximately 3.2Mm$^3$. In addition, the dispose volume will be larger than the *in situ* naturally compacted volume of material.

Note that a level of tolerance is allowed for in the dredge material volume estimates. The dredges used are not able to dredge to complete accuracy, meaning that some areas will be overdredged and some underdredged in any campaign (possibly up to 0.5m in either direction in some places). Similarly, horizontal tolerance will need to be allowed for, which may be up to 1m from the exact design.

The capital dredging design is intended to provide initially for the development and use of the new wharf through creating a permanent berth pocket at 14.5m (to allow for wharf construction) and new outer swinging basin and widened and extended Fairway initially to a target depth of 12.5m, and then progressively lowering the depth of this area and forming a new channel over time in increments of 0.5m, to the overall target depth of 14.5m. While five campaigns are indicated, the first is the most intensive and will last the longest. It will also involve both types of dredging (by backhoe dredge (BHD) and trailing suction hopper dredge (TSHD)).

Campaigns 2 to 5 involve less material and it is possible that two campaigns may be run together. The timing of these campaigns will depend on the demand for larger vessels to access the Port.

Areas B, C and D involve the inner harbour and new swinging basin. In these areas the material to be dredged comprises consolidated materials – marine sediments classified as Quaternary Marine Sediments, or Mangaheia Group or Residual Mangaheia Group[15]. These are bedded sandstone, siltstone and limestone, some containing high clay factions, with various past exposure to weathering. All are sufficiently stiff and resistant to require backhoe dredging.

Areas A and A1 involve loose and poorly consolidated materials ranging from sand to clay size, and can be dredged using the trailing suction hopper dredge.

### 3.4.2. Dredging Methods

Two types of dredge are proposed to be used. Backhoe dredges are suited for capital dredging where the subsurface material is harder[16]. In this project it will be used to excavate material from areas of consolidated sediment in the proposed wharf pocket, the extended swinging basin and the inner Port areas as well as the more consolidated areas of the channel.

The Machiavelli (Figure 3-7 and Figure 3-8)[17] is the size of backhoe dredge most likely to be used. This comprises a long-reach hydraulic excavator on a stationary floating pontoon which is stabilised in place by three “spuds” or poles which anchor the pontoon while it works, and which allow it to be relocated as necessary in accordance with the positioning system to be used. Such systems also ensure that the appropriate depths are achieved within acceptable tolerance levels. The weight of the dredge provides stability on the sea bed through the spuds.

[15] 6 Wharf Development: 3D Geological Model and Dredge Volumes, Beca (October 2016) – Volume 3, Appendix B.
[16] See http://www.iadc-dredging.com/ul/cms/fck-uploaded/documents/PDF%20Facts%20About/facts-about-backhoe-dredgers.pdf
[17] Source: http://www.heronconstruction.co.nz/Equipment/Machiavelli.html

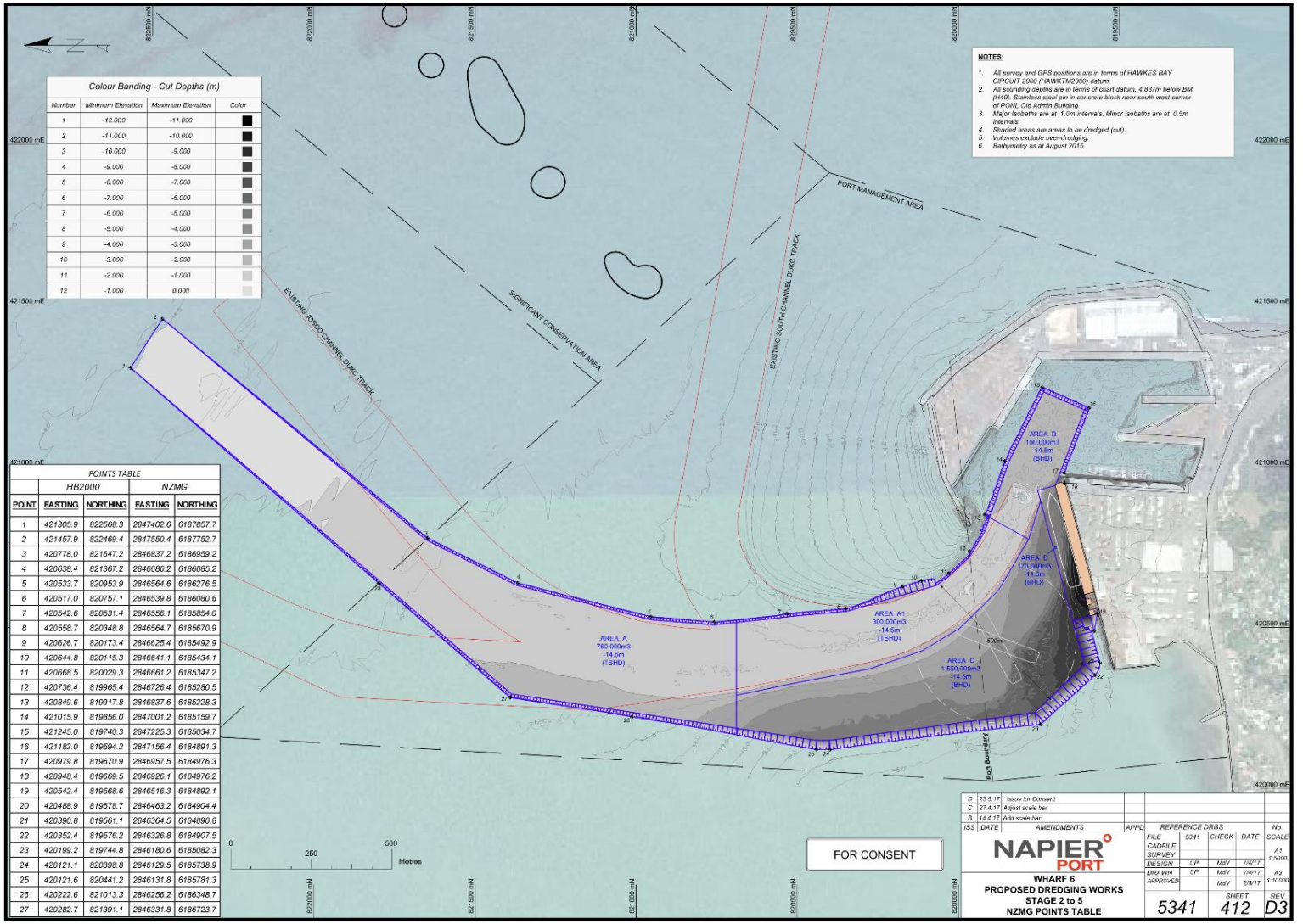



**Figure 3-6: Dredge Areas A to D**

**Figure 3-7: Machiavelli Backhoe Dredge (BHD)**

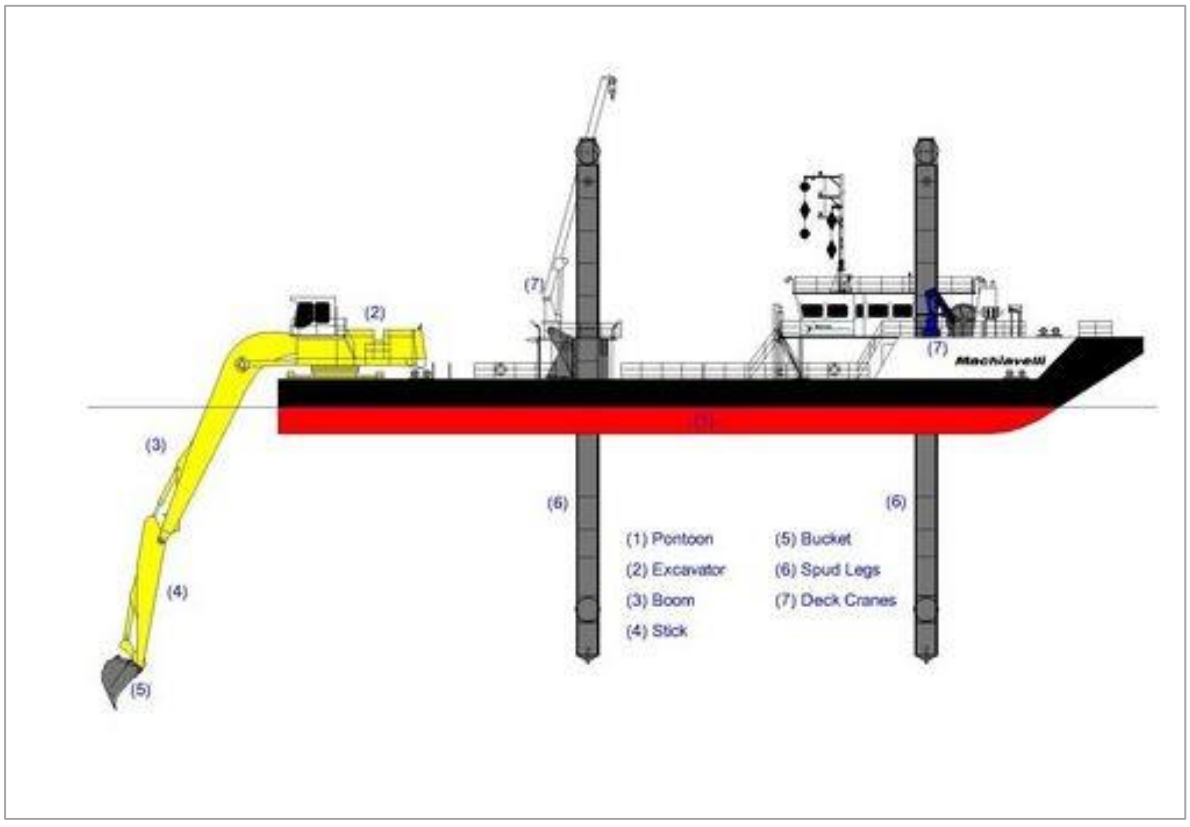



**Figure 3-8: Schematic of BHD**

The dredge excavates the seabed and will fill a split-hopper barge, which will be towed by tug to the appropriate area for disposal. A continuous process of tugs moving back and forth will ensure the intended dredging and disposal programme is maintained to optimise the use of the dredging barges.

The likely duration of the dredging process using the backhoe is set out earlier in Table 3-2.

For less consolidated material, particularly in the areas of the Fairway and channels, and for maintenance dredging, trailing suction hopper dredging is to be used[18]. An example is the Mahury, shown in Figure 3-9 below[19]. These dredges are mobile and pull drag heads across the seabed, mobilising the material which is then sucked in slurry form up through one or two suction tubes into the dredge's hopper. In the hopper, settling takes place, with the water near the surface being able to overflow back into the sea. The rate and practicable duration of dredge runs varies and is determined by the vessel's crew. The dredge itself transports the material to the disposal site, returning to continue the dredging process.


**Figure 3-9: Mahury Trailing Suction Hopper Dredge (TSHD)**

## 3.5. Disposal of Material from Capital Dredging

The material from capital dredging is proposed to be disposed of in a new disposal area, approximately 4km to 6km offshore of Marine Parade in depths of 20m to 23m. This is an area 1.85km by 1.85km in extent (approximately 340 hectares). The proposed dredged material disposal area is shown on Figure 1-1. The full barges or dredge (depending on whether a BHD or TSHD is being used) will move from the dredging area out to the disposal ground, and deposit the material regularly during the working periods.

[18] See http://www.iadc-dredging.com/ul/cms/fck-uploaded/documents/PDF%20Facts%20About/facts-about-trailing-suction-hopper-dredgers.pdf

[19] Source: https://www.google.co.nz/search?q=Mahury+Trailing+suction+dredge&client=firefox-b&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwiw1J_ykeXVAhVCv7wKHYCqCbcQsAQIMg&biw=1366&bih=643#imgrc=T9TAeLsxOrUPKM

The depth of deposited material at the end of the capital dredging is estimated to be approximately 1m above the existing seabed level. This assumes the dredge disposal volumes set out in Table 3-2, a small allowance for over-dredge[20], and a bulking factor[21]. The initial disposal pattern will result in mounds, which settle to a more even surface over time.

The material will be systematically placed so that it spreads out within the disposal areas in as even a way as possible. However, to retain the material within the dredge disposal area, there may be greater thicknesses of dredge material near to the centre of the disposal area. The existing seabed topography is gently sloping and contour in the area is around -20m to -23m.

In addition, the volumes will be disposed of progressively over the five campaigns, on the basis of a grid. Depths will be monitored over the duration of the disposal process.

The actual destination of the material from the various barges of trailing suction hopper dredge trips within each of the campaigns will be determined by the dredge (and barge) operators on the basis of its composition in association with the seabed topography and intended progressive disposal pattern.

The total duration of each campaign is summarised in Table 3-3.

**Table 3-3: Estimates of dredging duration (weeks) in each campaign, broken down by dredging areas (refer Figure 3-6), (source: Table 6, Appendix E, Volume 3)**

| | Target | A and A1 | B | C | D | Total |
|---|---|---|---|---|---|---|
| | Depth (m) | TSHD | BHD | BHD | BHD | BHD |
| Campaign 1 | 12.5+14.5* | 0.3 | 1.1 | 40.5 | 9.0 | 50.7 |
| Campaign 2 | 13.0 | 1.0 | 1.5 | 6.7 | - | 8.2 |
| Campaign 3 | 13.5 | 2.1 | 1.9 | 6.7 | - | 8.6 |
| Campaign 4 | 14.0 | 2.5 | 2.1 | 6.8 | - | 8.8 |
| Campaign 5 | 14.5 | 2.7 | 2.2 | 6.8 | - | 9.0 |

*under wharf and in berth pocket

As explained earlier, the timing of each campaign is not yet known. It is also possible that up to two of campaigns 2 to 5 may be carried out together.

Between the campaigns, the disposed dredge material will settle on the seabed and consolidate slightly to form a more uniform surface (compared to the initial "pimple" disposal pattern formed by the disposal from the barge or dredge).

[20] For this project, a calculated allowance of 0.2m over half of the total surface area of the dredged area.
[21] Providing for the fact that the dredge material in situ is compacted, and the act of dredging and disposal will result in interstices and a lower rate of consolidation. The bulking factor is normally 0.87.

## 3.6. Maintenance Dredging

Between the capital dredging campaigns, some unconsolidated material will re-enter the dredged areas. This material is technically material which would normally comprise maintenance dredging. For this reason it is intended that consents are obtained for both maintenance dredging and capital dredging.

This material will be removed either as a separate maintenance campaign, or as part of the subsequent capital dredging campaigns. It is not possible to reliably estimate volumes separately from capital dredging. Instead an allowance has been made in establishing the dredge spoil disposal volumes and depth. However, records will be kept of any separate maintenance dredging campaign, including volumes and locations. Further maintenance dredging material may be disposed of in the proposed offshore area to be consented as part of the project, or in the areas for which consents for maintenance dredge disposal are already held (depending on suitability).

Once the capital dredging programme is completed, there will also be ongoing maintenance dredging of the total capital dredged area to maintain the specified depth of 14.5m below CD. This will be unconsolidated material which will be regularly dredged, most likely using the trailing suction hopper dredge system. The disposal location may be in the offshore area, or in the inner area for which consents are already held, depending on suitability.

# 4. REASONS FOR THE PROJECT

## 4.1. Background

As set out in section 2.5, Napier Port has experienced significant growth in recent years in terms of overall tonnage, container numbers, log volumes and cruise vessel visits. Its forecasts show a continuation of this growth, based on regional production.

Napier Port is facing a number of circumstances which have led to the current proposals. These are:

- changes in sizes of vessels which will be servicing New Zealand in coming decades;
- existing very high levels of utilisation of existing facilities at particular times of the year;
- limitations in the Inner Swinging Basin; and
- existing assets that are aging and require investment or replacement.

Together these have led Napier Port to propose the new No. 6 Wharf, and the provision of a larger channel and swinging basin (in width, depth and manoeuvring space) to meet the needs of the region in coming decades.

These driving considerations are outlined in this section.

## 4.2. Increased Vessel Size

As a long term infrastructure provider, it is important from a port planning point of view to understand the type and size of vessels that will be servicing New Zealand over the next two or three decades. What the Port builds and operates from now will need to be able to service the future needs of the wider Hawke's Bay.

International shipping lines/ship owners/ship operators are multi-national operations, and are solely driven by return on investment. The industry is global in nature, and New Zealand is subject to the varying circumstances of global supply and demand in any given year or cycle, in any given trade or sector.

The only stable driver in the shipping industry is generally the cargo interest i.e. cargo owner or shipper.

Since the introduction of container shipping into New Zealand, with the first call of the Columbus New Zealand in 1971, with a capacity of 1200 TEU, New Zealand has seen a steady increase in the capacity of container vessels calling. Most services calling New Zealand now deploy vessels between 3500-4500 TEU, though this has now entered a new regime with the recent arrival of the Aotea Maersk with the ability to carry 9640 TEU's – see Figure 4-1 on the following page.

As at February 2016, the global cellular container fleet stood at 5162 vessels (modest growth of 6.21% in numbers from February 2011). However this represented capacity of 20.020 million TEU, up 39.32% on 2011. The growth in vessels over 5100 TEU was greater, with 1306 vessels – up 68.95% in the five year period.

At April 2016, the global order book (new container vessel deliveries) 2016-2019[22] recorded 471 new vessels to be delivered. Of these, 239 or 50.74% are larger than 5100 TEU.

As recently as October 2016, the Aotea Maersk[23] at 347 metres in length, with 9640 TEU's and a draft of 10.4m, was able to berth at an upgraded New Zealand port. This was the first vessel of this size that was able to be accommodated at a New Zealand port.

Figure 4-2 on the following page illustrates the increase in size of the largest vessels in the world.

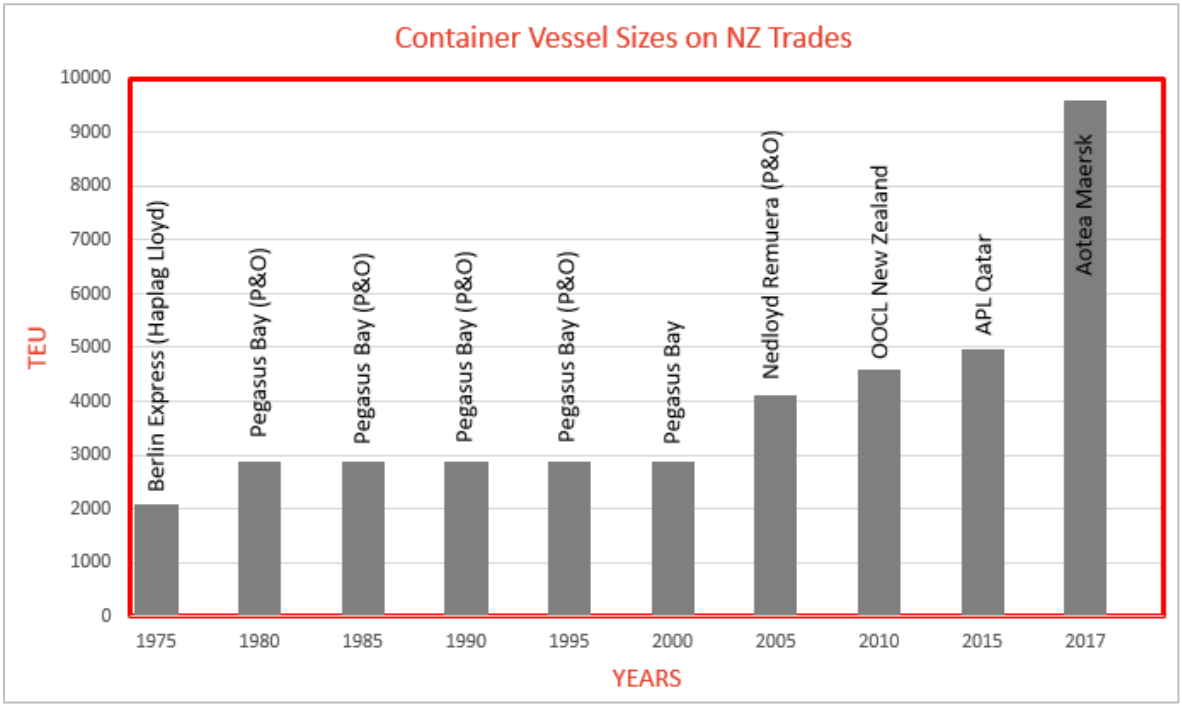



**Figure 4-1: Largest container vessels visiting New Zealand**

In 2016, six out of eight liner services used Napier Port's main container berth due to their length. The same year, six out of eight liner services were gearless and were reliant upon the integrated shore facilities to process containers on and off vessels.

Manoeuvres of container vessels up to 280m are able to be accommodated at No. 5 Wharf without affecting vessels on No. 1 and No. 2 wharves, in normal conditions. Vessels between 280-295m (the maximum length that can be manoeuvred onto No. 5 Wharf) can be managed, however there are restrictions covering daylight hours and No. 1 and No. 2 wharves must be clear at the time. These restrictions will be more and more difficult to accommodate as vessel numbers and cargoes handled over these wharves, including logs, also continue to grow.

Another key trend is the cascading of larger vessels into smaller trades. As shipping lines continue to build larger and larger vessels, they cascade the older larger tonnage into smaller trade lanes. A 12,000 TEU vessel will be used in a trade where before 8,000 TEU vessels were used, whilst those 8,000 TEU sized

[22] See Alphaliner Month Monitor – April 2016, page 2.
[23] http://www.maerskline.com/lv-lv/countries/int/news/news-articles/2016/10/aotea-maersk-arrives-in-new-zealand

vessels move to a trade that was serviced by 6,000 TEU vessels. There is a trend developing where vessels are starting to be allocated "where they fit" rather than "where they are needed". The key implication is that ports that cannot handle larger vessels, risk being omitted from these services.

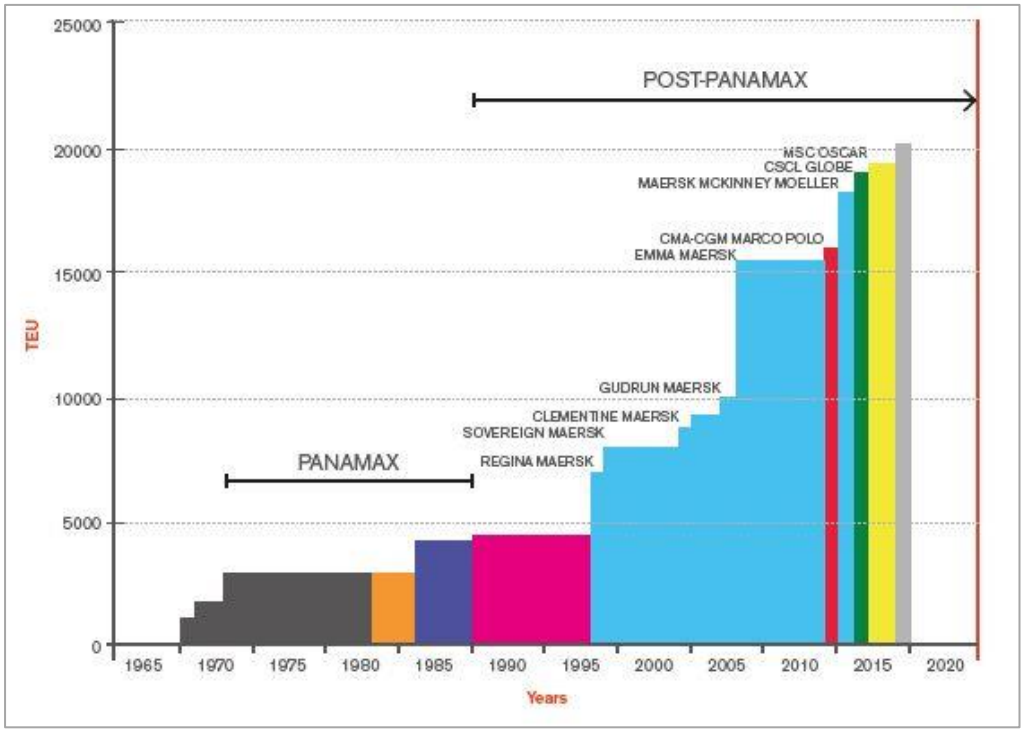
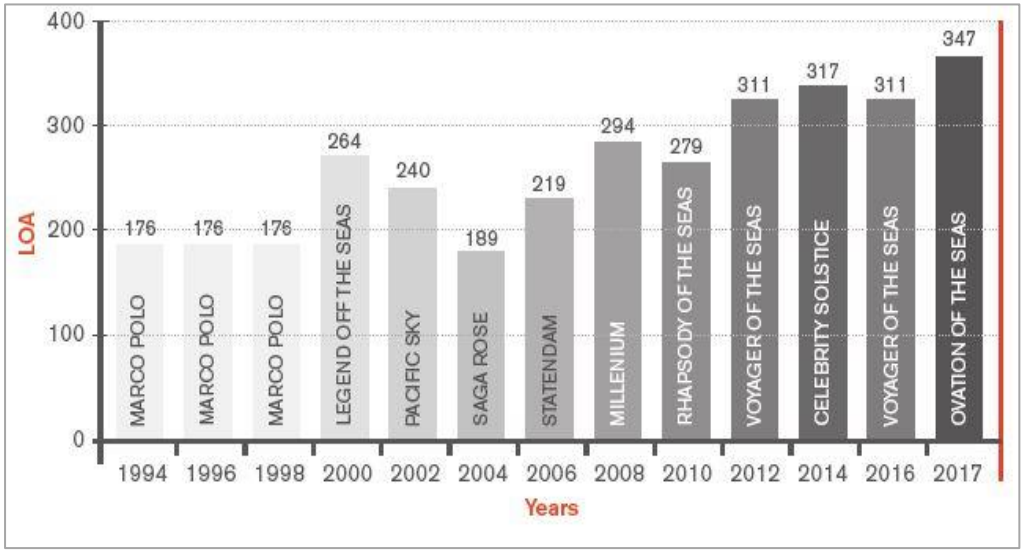



**Figure 4-2: Development of container ship sizes (biggest vessel) on a global scale**

A similar trend is occurring with cruise vessels which are increasing in size globally and in the Oceania market. Figure 4-3 below shows the largest vessels Napier has handled over the past 20 years. RCCL[24] have advised that New Zealand ports, including Napier Port, should be planning now for the Oasis class of vessel – 360m long – which they foresee coming to Australasia within 5 to 10 years.




[24] Royal Caribbean Cruises Ltd, the main South Pacific cruise supplier.

**Figure 4-3: Cruise vessel lengths**

Napier Port will not be considered for the Oasis size vessel calls if it cannot provide infrastructure to accommodate the scale of these cruise vessels.

The increase in length, draft and beam of container vessels visiting Napier Port is shown in Figure 4-4 below.

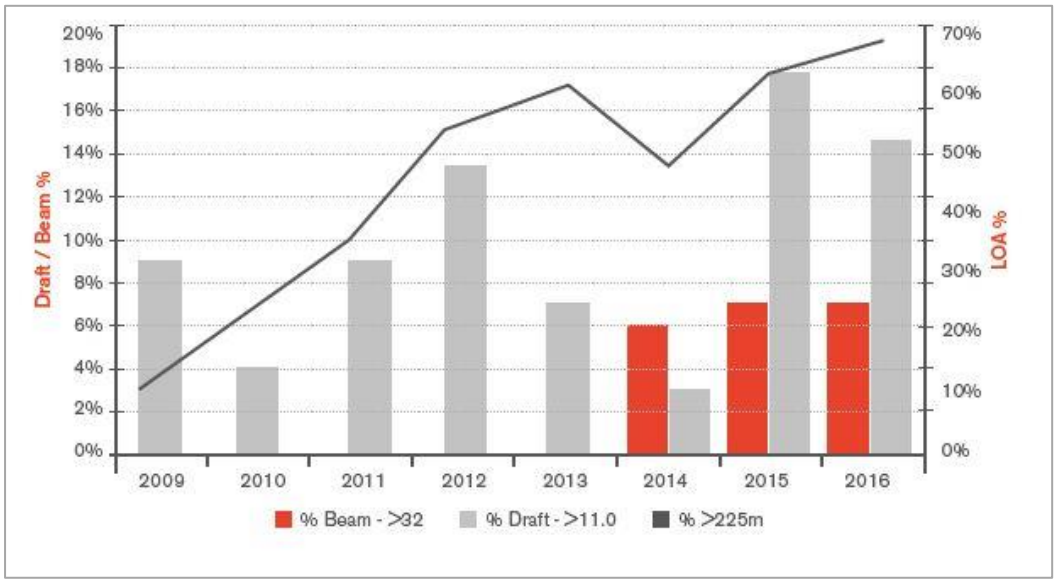



**Figure 4-4: Length, draft and beam of container vessels visiting Napier Port**

## 4.3. Berth Utilisation and Operational Capacity

A container terminal by definition is one whereby vessels are reliant upon integrated shore facilities to process cargo on and off vessels.

In past times, lesser vessel lengths allowed for two vessels to be accommodated simultaneously on the main 390m berth. However over the last few years, as a result of larger vessels, only one vessel can be worked at a time at the 390m Kirkpatrick Wharf (No. 5).

Napier Port's average berth utilisation over the full year in 2014 was 46%, but was 63% in the peak season of February to May. In 2016 the monthly average utilisation had increased to 50%, with the peak month reaching 61%.

It is generally accepted amongst Terminal Operators globally that new berth capacity is required whenever utilisation of existing facilities exceeds 50%. This approach acknowledges that ships waiting for a berth incur sufficient non-productive time, sufficient to justify looking for alternative ports in which to call and work on arrival with minimal waiting.

Despite Napier Port's investment in state of the art information technology, which enables highly efficient handling of containers for visiting vessels (more so than many bigger container ports around the world), the increased size of vessels and increased volume of cargo exchanges inevitably results in increased time at berth.

Vessels using the container terminal have coped with high berth utilisation to date because of Napier's approach to providing fixed berth windows which are pre-allocated time slots in which a shipping line must call each week to be guaranteed services. At times since 2015, occupancy has exceeded 70%, significantly greater than the crossover point of 50% when it is generally accepted that a new berth is needed. Increases in cargo exchanges and ship numbers will exacerbate this situation during the peak season in particular.

If Napier Port achieves its growth targets then it will reach its single berth capacity in 2020 or thereafter and will require additional berth capacity. This is based on a peak volume growth of 14% on an overall volume of 300,000 to 350,000 TEU, using the current operating method. A lower growth rate of 13% will delay this critical point by only two years – see Figure 4-5 below.

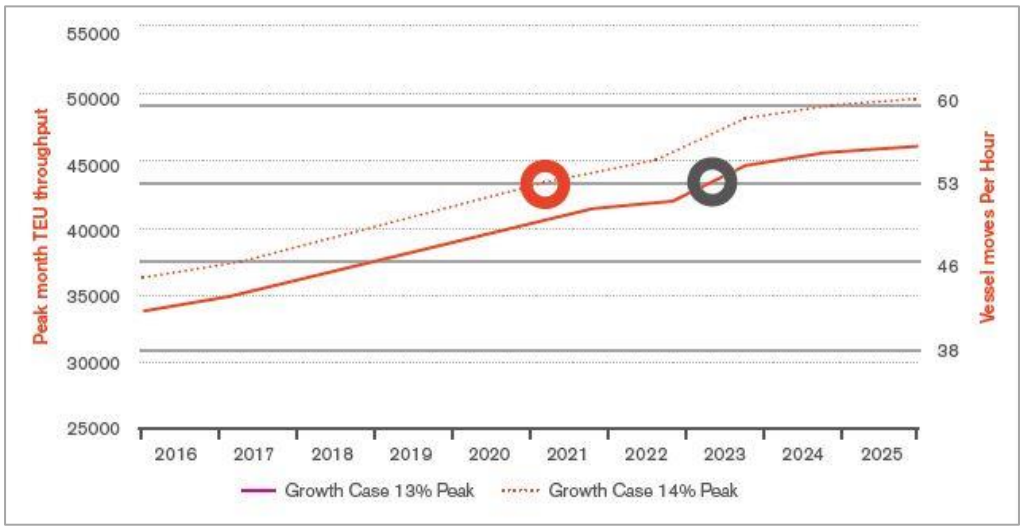



**Figure 4-5: Single berth capacity/productivity**

The proposed No.6 Wharf is designed to accommodate a vessel up to 360m in length, and this would allow the Port to simultaneously work two container vessels of greater than 230m. Such a combination is not operationally feasible at present.

The new wharf would also greatly enhance the Port's ability to handle two larger cruise vessels. The Port currently limits the number of cruise vessel calls at Napier due to operational constraints. This has a direct impact on the tourism sector in terms of passenger numbers and local spend. On average the Port could attract another five to six cruise vessels, meaning another 12,000 visitors per annum.

## 4.4. Inner Swinging Basin limitations

Currently the Inner Swinging Basin has an operational depth of 12m (CD). This is the minimum required to safely provide for the manoeuvring of current large vessels already calling at Napier Port and will be insufficient for those vessels forecast to call in the future.

## 4.5. Aging Assets

Many of Napier Port's assets are aging and require modernisation, including increased size and strength to cater for larger vessels.

No. 5 Wharf, with the remedial work currently programmed[25], is estimated to reach the end of its design life within 15 to 25 years from now.

Current infrastructure and layout does not have the capability to meet future shipping and cargo needs. Also, the current wharf infrastructure cannot accommodate the gantry cranes which will be necessary in delivering increased throughput capacity when required in the future. These current container wharves do not have the strength to support these types of cranes.

Retro-fitting current assets presents the challenge of displacement of current operations and has a port-wide effect during the long construction period. It is usually also relatively costly and often associated with considerable unknowns such as combining aged structures with new structures, adding to overall engineering design, cost and environmental risk. In addition, the current wharves are built to specific depths and existing piles limit the ability to deepen adjacent berth pockets[26].

## 4.6. Conclusion

Because of the combination of factors described above, Napier Port needs to make provision for growth and change in the immediate future. So while alternative development options are potentially available, none deliver a long term ten year plus infrastructure solution.

Napier Port's assets are aging, and are reaching their design limits. This is due to growing trade and the pressures for larger vessels for the shipping industry, requiring more maintenance, and ultimately the need to replace aging assets far earlier than anticipated when they were built.

Hawke's Bay is seeing substantial investment in new export ventures and regional infrastructure projects that will continue to see export freight grow. Maintaining and increasing peak season capacity is critical long term to the success of the Port's business offering.

Longer term, the Port will need to invest in wharf capacity and additional capacity such as wider boom cranes and supporting services such as logistics, ship schedules and planning, to provide the level of productivity customers demand, and more importantly actually to be able to handle the volume required over the peak months.

The trend toward larger vessel (longer, wider and deeper) will continue at a faster pace than in the previous 25 years. This is already evident with larger vessels aiming to visit New Zealand ports over the next decade. Coupled with visitor demands of cruise vessels, this industry can continue to grow only if Napier Port has increased berth capacity at the scale required.

The new wharf is therefore Napier Port's first priority. This has been designed to accommodate larger vessels in the future, including the berth pocket of the maximum 14.5m depth that is eventually likely to

[25] Including but not limited to crack injection, spalling repairs and deck overlay remedial works.
[26] Additional depth piling could be undertaken but this is prohibitively costly and the length limitations would remain.

be required, and allow for more large vessels visiting the Port simultaneously. It has also been designed with provision for gantry cranes in the future to provide for faster container turnaround if needed.

As needed, the swinging basin, fairway and approach channel will be progressively deepened and widened. In the case of the channel, this will involve capital dredging in a location hitherto unaffected by dredging.

The development at Napier Port will meet the region's current and future growth projections and is a critical and strategic asset for the wider Hawke's Bay and lower North Island customers and communities.

# 5. ALTERNATIVES CONSIDERED

## 5.1. Introduction

The Fourth Schedule of the RMA requires that alternatives are considered if a proposal may have significant adverse effects on the environment. In this case, no significant adverse effects are considered to be associated with the proposal for which consents are sought.

Napier Port has however been through a careful assessment of options in reaching its preferred option for the wharf. These include do-nothing/status quo, redevelopment of No. 5 Wharf, an extension of No.1 Wharf, and a new reclamation and wharf, and are described in section 5.2.

The design development of the channel and swinging basin has been through a comprehensive process of design refinement, as noted in section 5.3. Alternatives for the disposal of the material from capital dredging have also been considered, as described in section 5.4.

## 5.2. Wharf Options

### 5.2.1. Status Quo – Rely on No.5 Wharf

This option positions the Port to handle some growth long-term, and would see Port management focussing on ways to reduce the impact of the peak season volume whilst endeavouring to increase productivity beyond the present.

Given Napier's mix of vessel sizes and capacities, increasing productivity on average over the peak period will remain challenging. However, working three cranes continuously at every opportunity, and providing for smaller vessels on No.4 Wharf, could provide the required productivity if peak volumes were able to be managed. One strategy would be not to seek cargo from out-of-region customers, and by doing so reducing the peak volumes. This would however also reduce overall volumes, and would be adverse to Port operations in the off-season months.

With this option, where larger vessels, anything over 295m, were scheduled to call on New Zealand, then Napier would not be considered. Napier would potentially lose fringe cargoes to Ports of Auckland and Port of Tauranga, as those ports are capable of handling larger vessels and would thus be able to obtain the benefits of the economies of scale these larger vessels provide shippers.

The key assumption underpinning a status quo option is that there will always be a number of international lines whose strategy will be to call at multiple ports directly to pick up cargo, versus a hubbing strategy. This could work if there was a change in vessel design seeing shorter and wider vessels for capacity, versus longer and sleek for speed. However short and wider vessels would create issues for Napier due to limitations of the mobile harbour cranes.

Relying on the status quo would reduce the Port's ability longer term to grow its container base and to remain relevant to international shipping lines. It also has the minimum capital expenditure ('capex') requirement, but would in the longer term constrain Napier Port's growth.

As a long-term infrastructure provider, the Port considers it must provide fit for purpose facilities for customers and to achieve the productivity required to be competitive.

Assets have a natural life span. These can be extended through maintenance. However at some point the design life comes to an end. The end of the design life of No.5 Wharf is somewhere between 15 and 25 years from now.

This option could provide short-term bridging. However, if the Port does not provide the infrastructure required to service customers' needs, shipping options will be reduced, which will lead to increased costs to regional businesses. This option runs the risk of permanent loss of regional trade as port facilities become more limited in terms of demand and potentially technically obsolete.

### 5.2.2. Redevelopment of No.5 Wharf to Take Gantry Cranes

To achieve the necessary pile depth, the existing piles would need to be removed or paired with piles adjacent to the existing ones. The removal of piles is costly and dangerous, as they can (and often do) break and have to be drilled out.

As this option involves new piles in front of the current wharf, this has the effect of reducing the distance between berthed vessels at No.4 and No.5 Wharfs. Consequently, the ability to handle vessels with wider beams would be severely restricted and therefore the operational capacity of the Port would reduced.

With an estimated build time of 18 months or more, container operations would need to move to an alternative working berth. The only practical option would be No. 2 Wharf, which is a difficult working model for container operations and would also mean that those charter vessels that would traditionally use the berth (cruise vessels, oil tankers and fertiliser vessels) would need to be accommodated elsewhere. Due to their infrastructure requirements, this would be very problematic, and logistically very difficult.

Potentially, if the visits of container and other vessels coincided, in some circumstances the Port would have to consider some financial relief for vessels (or shipping companies) if they were unable to be accommodated or there were significant delays.

There are also anticipated to be considerable difficulties in operating the container terminal itself with this option.

During the construction phase this option would also create a large amount of operational displacement for multiple parts of the Port's business. The service levels to all customers would be reduced for the period of construction.

### 5.2.3. Extension of No.1 Wharf to Gantry Compatible Status

The option to develop No.1 Wharf in the short-term is a potential workable alternative to the more comprehensive No.6 Wharf development. However, longer term it presents the Port with multiple issues across multiple activities.

Larger vessels are not likely to be added into the New Zealand trade all at once. It is likely that one service will change and the others will follow over a three to five year period. This has been the trend over the last 25 years.

Extending No.1 Wharf to accommodate one service in the first instance, using truck and trailer container transport, is a possible option. However, the longer term infrastructure needed when several services require the use of this wharf, become operationally and cost constrained.

To operate No.1 Wharf as a sole container terminal would require considerable further investment in reefer facilities and double-handling of containers, including 24 hour truck and trailer operation.

The current log volume would need to move to the current container terminal. This would require 6.5 hectares, leaving only approximately 3.2 hectares for container use.

The movement of the log operation into the current container terminal would see multiple operations in the same area, with traffic management and controls being critical to ensure all potential risks would be mitigated.

On-site storage of containers to meet the needs for rapid transfer at peak demand periods would also be complex and marginal, and also involve risks from the proximity of logs and reefer and ordinary containers. Considerable investment in trucks and trailers (or similar) would also be needed. This option presents considerable risk in productivity performance.

Longer term this option would not significantly grow the Port's operational capacity. It simply transfers the container operation to a more constrained part of the Port, with the ability to handle longer vessels. If the wharf was extended, the swinging basin would remain a limiting factor. It does not future-proof the Port to allow for deeper drafts if longer and wider vessels are required.

### 5.2.4. Western Development, including Reclamation

An alternative which was developed a decade ago was a Wharf No.6 project, similar in size to that currently proposed, to be constructed beyond an extended reclamation approximately nine hectares in area beyond the current reclamation edge. As well as providing an additional berth, the project would have provided for significantly greater in-port container storage and logistics space.

This project was not proceeded with for a number of reasons including cost, environmental impacts including loss of amenity and its impacts upon Port Beach, consenting risk, duration and associated disruption to existing port activities. The availability of the Thames Street empty container storage area also reduced the need for an extended reclaimed container area.

## 5.3. Design Development – Channel and Swinging Basin

Alternatives for the dredging programme, including the design of the channel and the shape of the swinging basin have been considered in the process of design. However, the location of the channel has been governed by the location of the existing Port, the proposed new No.6 Wharf, the need to retain the required distance from Pania Reef, and to meet the needs of new large vessels in terms of length, depth and width. The proposed channel design has been optimised in terms of safety and efficiency, including modelling undertaken by Smartship Australia, which simulated ship type and conditions (loaded and unloaded) and different sea conditions, tug availability, navigational aids and safety requirements[27].

[27] Napier Port Development, 14-16th March 2016, Smartship Maritime Solutions, unpublished report.

Further refinement was undertaken through modelling of wave refraction, period and height, under a range of wave conditions[28]. Through this process, minor adjustments were made to the alignment of the swinging basin and new channel edge.

The extent and design of the swinging basin has thus been assessed in terms of the navigational needs and safety of vessels, and the potential effects in terms of wave focussing in relation to nearby shorelines and in terms of managing effects on the nearby surf breaks.

The proposal for which consent is sought is the outcome of design refinement, rather than review of a series of alternatives in their own right.

## 5.4. Disposal of Dredged Material

### 5.4.1. Alternative Disposal Locations

Consideration of suitable areas for expanded volumes of dredged material were commenced in 2005 when the project described in section 5.2.4 of this report was being considered. Initial studies of five alternative locations and the potential for sediment transport from them were carried out by Worley Parsons in 2005. The studies applied relatively simplified numerical modelling – based on a one-month limited dataset of information on seabed current directions and strength. The modelling applied a number of basic assumptions about the nature of the dredged material and the disposal method. The sites considered are shown in Figure 5-1 on the following page.

The preliminary investigations simulated the likelihood of fine particles deposited as part of the dredge disposal process reaching two ecologically sensitive sites[29] - Pania Reef and Town Reef under the typical measured current conditions. The numerical model estimated the number of particles reaching Pania Reef and Town Reef – under the typical measured current conditions over time from each of the different dredge disposal sites. Table 5-1 provides the ranked preference for the five possible sites[30] in terms of their potential exposure to adverse ecological effects from sedimentation and turbidity.

**Table 5-1: Ranking of potential disposal sites in relation to impacts on Pania Reef and Town Reef**

| | Ranking | Pania Reef | Town Reef |
|---|---|---|---|
| Most Preferred | 1 | Site 5 | Site 5 |
| ↓ | 2 | Site 4 | Site 4 |
| | 3 | Site 1 | Site 3 |
| | 4 | Site 2 | Site 2 |
| Least Preferred | 5 | Site 3 | Site 1 |

[28] This is reported in "Napier Port Proposed Wharf and Dredging Project – Coastal Process Studies in Support of Consent Application", Advisian, June 2017 – see Volume 3, Appendix D.
[29] As identified by Cawthron Institute at the time.
[30] Sites 1 to 5 had also been subject to a preliminary review of their ecological values by Cawthron Institute to ensure that they contained no special features or values.

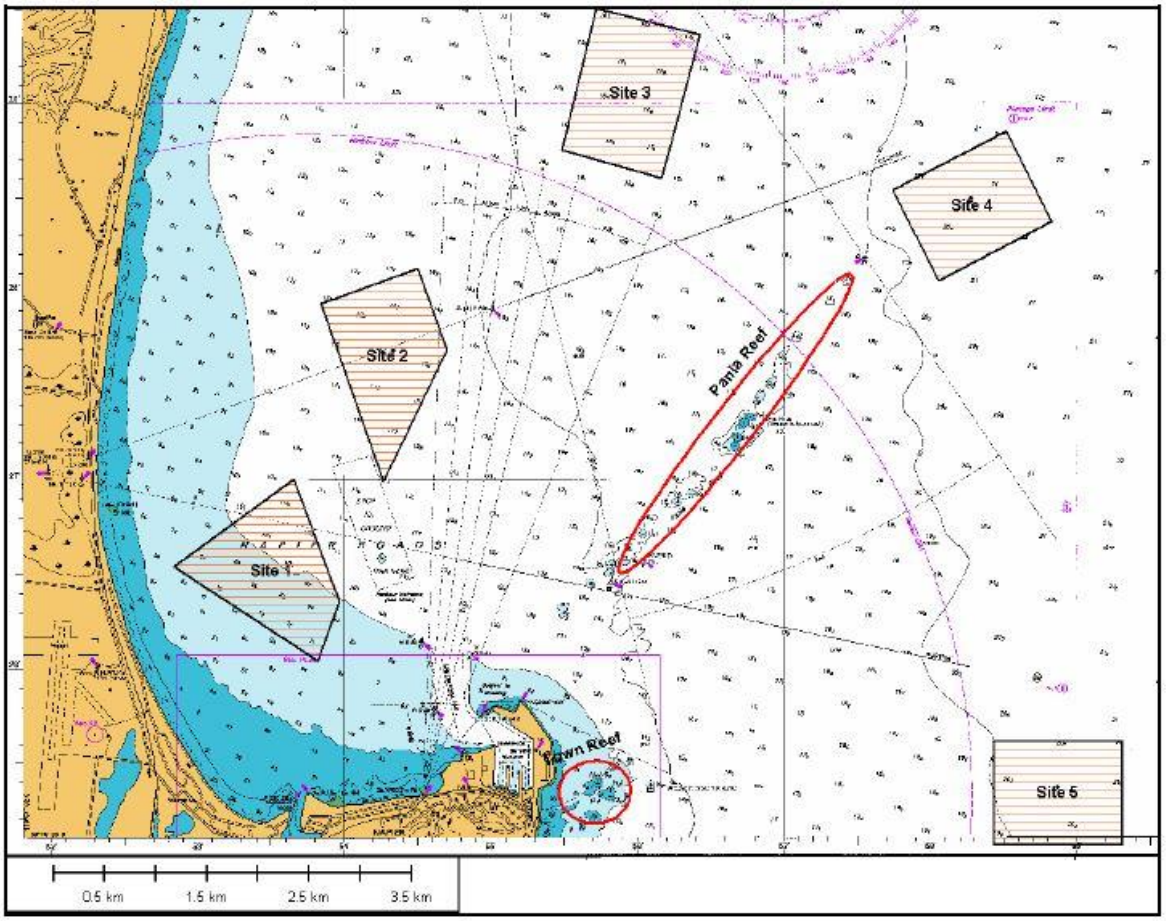



**Figure 5-1: Site options considered in 2005 for disposal of dredge material**

While the results of this early exercise are indicative only, it was noticeable that Site 1 appeared to have a substantially greater potential adverse effect on Town Reef, and Site 3 appeared to have a greater potential adverse effect on Pania Reef than other options.

Napier Port then commissioned further numerical modelling of the potential for sediments from the disposal of dredged material at Sites 4 and 5 to each Pania Reef and Town Reefs. This modelling took into account more comprehensive current information[31] and assumptions about the nature of the dredged material (silt) and the method and duration of disposal[32].

The modelling found that:

- The potential for sediment plumes from material disposed at Sites 4 and 5 to reach Pania Reef or Town Reef are significantly lower than from disposal at Site 2.
- The turbidity plumes tend to extend to the south from both Sites 4 and 5, with high dispersion in the vicinity of both Pania Reef and Town Reef.

[31] Three months of measured tidal currents from two nearshore locations (November 2004 to January 2005) which was able to be correlated with long-term wind information (1999 to 2005).
[32] Using BH and TSD (two different sizes for the latter) over two six-day periods modelled over a one month period.

- The model predicts lower potential for turbidity at both reefs from Site 5 compared to Site 4.
- Generally, material settles within the disposal areas, with material moving outside the disposal area limited to pulses during and immediately after a release event with concentrations rapidly reducing beyond the site.
- During disposal at Site 5 under prolonged easterly, south easterly and southerly storm events, there is some potential for tidal currents to move the silt-sized material towards the north. If Site 5 is used, then disposal would not be recommended during such conditions.
- During disposal at Site 5 under low wind conditions and during prolonged north, northeast, west and northwest wind directions the plume will move towards the southeast.

As Napier Port did not proceed with the 2005 proposal, no further work was undertaken in relation to possible sites for disposal of dredge material.

The Hawkes Bay Regional Coastal Environment Plan became operative in November 2014. This included the two sites (shown as Dredge Disposal Areas 1 and 2) for which Napier Port holds current dredge disposal consents, so these were the initially preferred disposal areas for the proposed dredging project (although consents would still have been required). It was recognised that the volume of material to be disposed of was also significantly larger than the two areas could contain without influencing wave patterns and also current movements at a localised scale, so the area between Dredge Disposal Areas 1 and 2 was also given consideration as part of the disposal area.

As part of the ongoing analysis undertaken during the design of the capital dredging areas, more detailed studies were undertaken by Advisian[33]. These studies have indicated that fine sediments deposited within and between the areas initially considered for the disposal of dredged material would in most conditions move in an anti-clockwise direction back towards the dredged channel area and potentially in the direction of Pania Reef[34].

Most of the dredged material (approximately 70%) is in the silt or fine sand range (0.2mm or less in diameter) which is subject to these transport processes, which involve transport in suspension rather than as bedload. On the basis of these findings, the Port has reviewed its approach and has decided that consent should be sought for an offshore disposal site on the basis that it would have reduced adverse environmental effects over the intended inshore site. This decision has been taken only after careful evaluation and consultation.

The Site 5 locality has been identified as the preferred option on the basis of past and more recent investigations[35]. A larger area is sought for deposition at the proposed location than in the original "site 5". This is because of the substantially larger volume of material (approximately 3M cubic metres compared to the 0.62M cubic metres associated with the earlier project) and the intention to allow for less than one metre increase in bed height over the offshore disposal area.

The potential residual effects associated with disposal of dredged material in this location are discussed later in section 9 of this report.

[33] See discussion in Advisian Reports "Napier Port Proposed Wharf and Dredging Project – Coastal Process Studies in Support of Consent Application", section 8, and "Napier Port Proposed Wharf and Dredging Project – Post-Disposal Fate of Dredge Sediments", section 5, both in Volume 3 of this documentation, Appendices D and E.
[34] This finding aligns with the suggestions from consultation that Pania Reef has experienced higher turbidity in recent years possibly as a result of dredge disposal.
[35] Advisian, Ibid, and "Port of Napier proposed wharf and dredging project; Physical coastal environment", Shore Processes and Management Ltd, May 2017 – see Appendices D, E and F in Volume 3.

### 5.4.2. Beneficial Uses of Dredged Material

Alternative uses were considered for land-based use or disposal of dredged material. As noted earlier, a small portion of suitable dredged material will be used for the limited amount of reclamation involved along the revetment, and for ground surface levelling in the vicinity of the edge of the Northern Container Terminal.

Napier Port sought advice from Tonkin and Taylor on the suitability of the material for alternative beneficial uses, specifically for:

- Land reclamation within Napier Port
- Utilising the material as bulk engineered fill for sites within Hawkes Bay.

Tonkin and Taylor reviewed the geotechnical investigations for the project undertaken by Beca in 2016[36] and have advised[37]:

> ***"Land reclamation within Napier Port***
>
> *We are not aware of the land reclamation requirements to be carried out at Napier Port as part of the Wharf 6 project. However, we note from recent T+T geotechnical investigation for various buildings with the Port facility that the existing sand fill obtain from historic reclamation campaigns is susceptible to liquefaction in the event of a design earthquake.*
>
> *Given that the proposed dredge material comprises marine sands and silts, it is likely that this material if used as a land reclamation fill would also be susceptible to liquefaction. Significant ground improvement or material conditioning would be required to mitigate the liquefaction risk.*
>
> ***Engineered fill on external sites***
>
> *It is possible that the dredged material could be used as engineered fill on development sites, however there are significant challenges to be overcome.*
>
> *The dredged sediments are likely to be saturated and significantly wet of optimum moisture content. To use this material as engineered fill, and given the volume of material, it would require significant areas to dry and condition the material prior to use as engineered fill. Lime would need to be added to chemically dry the fill during the winter months. This is likely to incur significant costs and would require a significant amount of transport and handling. We are not aware of any such space within the Napier Port facility or alternative nearby sites for such a fill operation and this option is unlikely to be feasible.*
>
> *These soils could also be susceptible to liquefaction depending on the type and extent of treatment and site conditions."*

Finally, should parts of the material be found to be suitable for use at Westshore, and other aspects such as timing of any project could work effectively, the Port would consider making the material available.

[36] Set out in the Geotechnical Factual Report, see Appendix B in Volume 3 of this documentation.
[37] Letter to Michel de Vos from Jamie Yule and Kevin Hind, Tonkin and Taylor, dated 12th May 2017.

## 5.5. Summary

In terms of the additional berthage required, consideration of a wide range of alternatives has demonstrated that while there are some options available which would meet some of the shorter term needs (up to 10 years), no alternative option provides an acceptable, robust and versatile long-term solution which provides for future needs and the increasing size of vessels.

With the exception of the comprehensive Western development option each of the options has greater operational limitations, greater complexity and greater risk (due to potential for operational conflicts on land and sea). Some have potential environmental adverse effects which exceed those associated with the current proposal. Potential beneficial uses of dredged sediments have also been considered, but the material has not been deemed suitable for known uses. The project for which consents are now being sought is clearly the preferred alternative to meet the Port's needs and thus to contribute to the regional economy's needs.

The details of the capital dredging proposed have been arrived at through a careful process of design development. There are still uncertainties as to when the various depths will be needed as this depends on international trade and the requirements of the companies servicing the various New Zealand ports. Sufficient flexibility is built into the consent applications to allow the design to be achieved over a time frame that is responsive to these needs.

The location of the dredge spoil disposal site for which consent is sought has also been arrived at as a result of consideration of alternatives. The site has been chosen on the basis of consideration of sediment movements during and post deposition and is considered more suitable than other alternatives in terms of the ability to minimise any potential adverse effects on the environment.

# 6. STATUTORY FRAMEWORK

The proposal is to construct a new wharf structure (Wharf No. 6) and associated revetment within the coastal marine area, and to undertake capital dredging of the associated berth pocket, an extended swinging basin, the existing fairway and a new deep water channel. There will need to be associated disposal of dredged material. There will also be a need for ongoing maintenance dredging and disposal activities following the initial capital dredging. These activities all require consents in terms of the RMA, and in particular under the rules of the Hawke's Bay Regional Coastal Environment Plan. This section describes the statutory context, the consents needed, and the main objectives and policies of the relevant statutory planning documents.

## 6.1. RMA Context

### 6.1.1. Purpose and Principles

#### Section 5 – Purpose

The purpose of the RMA is to promote the sustainable management of the natural and physical resources of New Zealand. Part 2, Section 5 of the RMA defines sustainable management as:

> *…managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –*
>
> *(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and,*
> *(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
> *(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

Section 5 has the overriding purpose of promoting sustainable management. It provides a benchmark against which all decisions are measured and is a fundamental consideration for a consent authority.

The application must also be considered in terms of RMA Part 2 matters, which are the overriding considerations for all applications[38]. Other Part 2 sections relevant to this application are Sections 6, 7 and 8.

#### Section 6 - Matters of National Importance

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, must recognise and provide for the following matters of national importance:

> *(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*

[38] This requirement has been moderated through a recent High Court decision (RJ Davidson Family Trust vs Marlborough District Council, CIV-2016-406-14 [2017 NZHC 52]) which indicates that reference back to Part 2 for an application should be addressed on the same basis as plan changes – i.e. only when there is "invalidity, incomplete coverage or uncertainty of meaning" in a plan under the RMA, is it necessary to look at Part 2. However, a Part 2 assessment remains a requirement in the 4th Schedule, so an analysis of Part 2 considerations is included later in this assessment.

*(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*

*(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*

*(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*

*(e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*

*(f) the protection of historic heritage from inappropriate subdivision, use, and development:*

*(g) the protection of protected customary rights:*

*(h) the management of significant risks from natural hazards.*

Matters of national importance which may be relevant to the proposal are considered to be subsections (a), (c), (e), (f) and (g). An analysis of these provisions is provided in section 24.6 of this report.

## Section 7 - Other Matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, must have particular regard to –

*(a) kaitiakitanga:*

*(aa) the ethic of stewardship:*

*(b) the efficient use and development of natural and physical resources:*

*(ba) the efficiency of the end use of energy:*

*(c) the maintenance and enhancement of amenity values:*

*(d) intrinsic values of ecosystems:*

*(f) maintenance and enhancement of the quality of the environment:*

*(g) any finite characteristics of natural and physical resources:*

*(h) the protection of the habitat of trout and salmon:*

*(i) the effects of climate change:*

*(j) the benefits to be derived from the use and development of renewable energy.*

Matters which may be relevant to the proposal are considered to be subsections (a), (b), (c), (d), (f), (g) and (i). An analysis of these provisions is provided in section 24.6 of this report.

## Section 8 - Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Section 8 matters underpin the ongoing relationship the Port of Napier has established and maintains with local iwi. This is further described and discussed in sections 17 of this report.

### 6.1.2. Responsibilities

The Hawke's Bay Regional Council has responsibilities within the coastal marine area (CMA), including control of the use of land comprising the seabed and associated natural and physical resources including the water column and the airspace above the seabed, within the CMA. The Napier City Council has responsibilities with respect to the use and development of the Napier Port land.

### Activities within the Coastal Marine Area

The RMA defines the coastal marine area (CMA) as:

> *…the foreshore, seabed, and coastal water, and the air space above the water –*
>
> *(a) of which the seaward boundary is the outer limits of the territorial sea:*
>
> *(b) of which the landward boundary is the line of mean high water springs…*

The proposed No. 6 Wharf and associated dredging and dredge disposal activities are occurring within the CMA. Sections 12, 14 and 15 of the Act control activities within the coastal marine area.

**Section 12** sets out limitations on activities within the coastal marine area, and provides that:

*(1) No person may, in the coastal marine area –*

*(a) reclaim or drain any foreshore or seabed; or*

*(b) erect, reconstruct, place, alter, extend, remove, or demolish any structure or any part of a structure that is fixed in, on, under, or over any foreshore or seabed; or*

*(c) disturb any foreshore or seabed (including by excavating, drilling, or tunnelling) in a manner that has or is likely to have an adverse effect on the foreshore or seabed (other than for the purpose of lawfully harvesting any plant or animal); or*

*(d) deposit in, on, or under any foreshore or seabed any substance in a manner that has or is likely to have an adverse effect on the foreshore or seabed; or*

*(e) destroy, damage, or disturb any foreshore or seabed (other than for the purpose of lawfully harvesting any plant or animal) in a manner that has or is likely to have an adverse effect on plants or animals in their habitat; or*

*(f) .....*

*(g) destroy, damage, or disturb any foreshore or seabed (other than for the purpose of lawfully harvesting any plant or animal) in a manner that has or is likely to have an adverse effect on historic heritage —*

*unless expressly allowed by a national environmental standard, a rule in a regional coastal plan as well as a rule in any relevant proposed regional coastal plan for the same region (if there is one), or a resource consent.*

*(2) No person may, unless expressly allowed by a national environmental standard, a rule in a regional coastal or in any proposed regional coastal plan for the same region, or a resource consent, —*

*(a) occupy any part of the common marine or coastal area; or*

*(b) remove any sand, shingle, shell, or other natural material from that area.*

*(3) Without limiting subsection (1), no person may carry out any activity —*

*(a) in, on, under, or over any coastal marine area; or*
*(b) in relation to any natural and physical resources contained within any coastal marine area, —*

*in a manner that contravenes a national environmental standard, a rule in a regional coastal plan or a rule in a proposed regional coastal plan for the same region (if there is one) unless the activity is expressly allowed by a resource consent or allowed by section 20A (certain existing lawful activities allowed.*

In relation to section 12(2) note that the definition of "occupy" in section 2 of the RMA is:

*"occupy means the activity of occupying any part of the coastal marine area –*
*(a) where the occupation is reasonably necessary for another activity; and*
*(b) where it is to the exclusion of all or any class of persons who are not expressly allowed to occupy that part of the coastal marine area by a rule in a regional coastal plan and in any relevant proposed regional coastal plan or by a resource consent; and*
*(c) for a period of time and in any way that, but for a rule in the regional coastal plan and in any relevant proposed regional coastal plan or the holding of a resource consent under this Act, a lease or licence to occupy that part of the coastal marine area would be necessary to give effect to the exclusion of other persons, whether in a physical or legal sense".*

**Section 14** sets out restrictions relating to water, including water in the coastal marine area, as follows:

*(2) No person may take, use, dam, or divert any of the following, unless the taking, using, damming, or diverting is allowed by subsection (3):*
*(a) water other than open coastal water; or*
*(b) heat or energy from water other than open coastal water; or*
*(c) heat or energy from the material surrounding geothermal water.*

*(3) A person is not prohibited by subsection (2) from taking, using, damming, or diverting any water, heat, or energy if —*
*(a) the taking, using, damming, or diverting is expressly allowed by a national environmental standard, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent.*

**Section 15** limits the discharge of contaminants, as follows:

*(1) No person may discharge any—*
*(a) contaminant or water into water; or*
*(b) contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
*(c) contaminant from any industrial or trade premises into air; or*
*(d) contaminant from any industrial or trade premises onto or into land—*
*unless the discharge is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent.*

### 6.1.3. Assessment

The rules of the applicable regional coastal plan and district plans must be evaluated in order to determine whether consents are required under the provisions of the Act. These rules are addressed further in section 6.2.3 below.

### 6.1.4. Decision Criteria

The key decision criteria, where consents are needed, are set out in section 104. In specific circumstances, sections 105 and 107 include additional criteria. These three sections are set out below.

**Section 104 –** consideration of applications

*(1) When considering an application for a resource consent and any submissions received, the consent authority must, subject to Part 2, have regard to–*

*(a) any actual and potential effects on the environment of allowing the activity; and*

*(b) any relevant provisions of—*

*(i) a national environmental standard:*

*(ii) other regulations:*

*(iii) a national policy statement:*

*(iv) a New Zealand coastal policy statement:*

*(v) a regional policy statement or proposed regional policy statement:*

*(vi) a plan or proposed plan; and*

*(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application*

*(2).....*

**Section 105 –** matters relevant to certain applications

*(1) If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—*

*(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*

*(b) the applicant's reasons for the proposed choice; and*

*(c) any possible alternative methods of discharge, including discharge into any other receiving environment.*

*(2) If an application is for a resource consent for a reclamation, the consent authority must, in addition to the matters in section 104(1), consider whether an esplanade reserve or esplanade strip is appropriate and, if so, impose a condition under section 108(2)(g) on the resource consent.*

**Section 107 –** restriction on grant of certain discharge permits

*(1) Except as provided in subsection (2), a consent authority shall not grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A allowing—*

*(a) the discharge of a contaminant or water into water; or*

*(b) a discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*

*(ba)the dumping in the coastal marine area from any ship, aircraft, or offshore installation of any waste or other matter that is a contaminant, —*

*if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:*

*(c) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:*

*(d) any conspicuous change in the colour or visual clarity:*

*(e) any emission of objectionable odour:*

*(f) the rendering of fresh water unsuitable for consumption by farm animals:*

*(g) any significant adverse effects on aquatic life.*

*(2) A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A that may allow any of the effects described in subsection (1) if it is satisfied —*

*(a) that exceptional circumstances justify the granting of the permit; or*

*(b) that the discharge is of a temporary nature; or*

*(c) that the discharge is associated with necessary maintenance work —*

*and that it is consistent with the purpose of this Act to do so.*

*(2) In addition to any other conditions imposed under this Act, a discharge permit or coastal permit may include conditions requiring the holder of the permit to undertake such works in such stages throughout the term of the permit as will ensure that upon the expiry of the permit the holder can meet the requirements of subsection (1) and of any relevant regional rules.*

## 6.2. Hawke's Bay Regional Coastal Environment Plan

### 6.2.1. Context

The Hawke's Bay Regional Coastal Environment Plan (HBRCEP) became operative in November 2014 as result of the Minister of Conservation's approval. Under Section 67 of the Act, the Regional Coastal Plan must give effect to the New Zealand Coastal Policy Statement (NZCPS) and the Hawke's Bay Regional Policy Statement (RPS), which is part of the Regional Resource Management Plan and became operative in 2006. The HBRCEP Plan must not be inconsistent with any other regional plan for the region. In terms of the current proposal, the NZCPS and RPS as well as the HBRCEP provide the important policy context. However, only the HBRCEP includes the rules which apply. A comprehensive policy analysis is provided in section 23 of this report. The remainder of this section sets out the relevant provisions of the HBRCEP and rules which apply.

### 6.2.2. Framework of HBRCEP in the Vicinity of Napier Port

A number of planning maps apply in the vicinity of Napier Port as set out in Table 6-1 on the following page[39]. The relevant features on the maps, as well as setting the plan's intended management context, may relate to the rules and alter the status of activities.

Even if they do not affect the rules, they may indicate important values or environmental issues which may be important when assessing the effects of an activity for which a coastal permit is sought.

The mapped features of the plan are shown in Plan Set 3 in Volume 2.

**Table 6-1: Features in Vicinity of Napier Port, shown on HBRCEP Planning Maps**

| Planning Map No. | Scale | Description of Relevant Features |
|---|---|---|
| 115 | 1:50,000 | • Dredge Disposal Area 1 and 2 (Pale Grey tone on Legend)<br>• Class CR (HB) water (see HBRCEP Schedule E), abutting the Port Management Area at its eastern end and the landward edge of Dredge Area 2.<br>• Historic Heritage item 4 (see HBRCEP Schedule M) being a shipwreck south east of Perfume Point.<br>• Historic Heritage item 5 (see HBRCEP Schedule M) being a former freezing works site in the Whakariri Avenue vicinity.<br>• The entire port is within the Pilotage Limit (Gazetted Harbour Area). |
| 116 | 1:50,000 | • SCA13 (Significant Conservation Area) (Green on Legend) surrounding Pania Reef. This adjoins at its southern end, the Port Management Area.<br>• The boundary of the Port Management Area (Red on Legend)<br>• The boundary of the Fairway and Swinging Basin (Red Line on Legend)<br>• The entire Port area is within the Coastal Environment Area covered by the HBRCEP (Yellow line on Legend). The port area is excluded from Coastal Hazard Zone 2 (landward boundary denoted by dotted black line on the Legend – this applies only north and south of the Port).<br>• The entire port is within the Pilotage Limit (Gazetted Harbour Area). |
| 50, 51, 55, 56 and 59 | 1:50,000 | Expanded version of items shown on maps 115 and 116. |

From Maps 55 and 56 it can be seen that the proposed No.6 Wharf development is entirely within the Port Management Area. Parts of the intended scour protection extend into the Fairway and Swinging Basin Area.

[39] Volume 2, Plan Set 3 of this documentation shows these features in their geographical context.

From Map 115 and 116 it can be seen that the capital and maintenance dredging lie within the Port Management Area, but with the extended dredged channel reaching beyond this area.

From Map 116 it can be ascertained that the proposed dredge disposal area is partly within and partly beyond the Pilotage Limit.

### 6.2.3. HBRCEP Relevant Rules

Regional Council consents for the proposed activity are required under sections 12, 14 and 15 of the Resource Management Act 1991 for structures, disturbance to the seabed, removal of sand and other natural materials, discharge of contaminants (i.e. dredged material), occupancy and incidental deposition and diversion of seawater.

Table 6-2 on the following page provides assessment of the rules relevant to the proposed activities.

**Table 6-2: Rules in the HBRCEP relevant to the Proposal**

| Activity | Plan Rule | Status | Rationale/Principal Reason |
|---|---|---|---|
| **Reclamation in the Coastal Marine Area** | | | |
| Reclamation of the seabed not regulated by, or no complying with other rules. | Rule 111 | Discretionary | The project involves the very minor reclamation[40] of a small strip of coastal marine area beyond the existing revetment beneath the wharf deck and piles (this is all below MHWS so does not create new land in the adjacent district). |
| **Structures in the Coastal Marine Area** | | | |
| Structures not regulated by, or not complying with, other rules. | Rule 117 | Discretionary | The project involves a new No.6 Wharf structure and associated mooring dolphins to the north which are not regulated by other rules. |
| **Disturbances, Depositions and Extractions in Coastal Marine Area** | | | |
| Disturbances of the foreshore or seabed not regulated by, or not complying with other rules. | Rule 130 | Discretionary | This rule will apply to the construction of No.6 Wharf and associated mooring dolphins, including piling and provision of erosion protection, and incidental associated activities. |
| Maintenance dredging within the Fairway, Swinging Basin and Berths in the Port Management Area. | Rule 139 | Permitted | This rule applies to a component of the maintenance dredging where it can be distinguished from the capital dredging programme. |

[40] See definition of reclamation, Part I, HBRCEP.

| | | | |
|---|---|---|---|
| Maintenance dredging within the Port Management Area. | Rule 140 | Controlled (conditions on area and volume apply) | Some of the necessary maintenance dredging within the Port Management Area is outside the area where it is a permitted activity under Rule 139. |
| Disturbances within specified Significant Conservation Areas | Rule 143 | Prohibited | Consent cannot be sought for any activity involving disturbance (dredging or disposal) within 700m of the area delineated on the plan maps as the Pania Reef SCA (SCA 13). |
| Removal of sand, shell, gravel or other natural material not regulated by, or not complying with, other rules. | Rule 144 | Discretionary | This rule captures all other activities associated with the disturbance of the foreshore and seabed, including all capital dredging. |
| Deposition of substances arising from maintenance dredging of the Fairway, Swinging Basin and Berths in the Port Management Area. | Rule 150 | Controlled (conditions on volumes and deposition areas) | Deposition of dredged material from maintenance dredging of some areas into specified areas. |
| Deposition of more than 50,000$m^3$ per year. | Rule 151 | Discretionary | Covers disposal of dredged material. |
| **Discharge of Contaminants** | | | |
| Discharges not regulated by, or not complying with other rules. | Rule 160 | Discretionary | Covers disposal of dredged material, including turbid water associated with such activities (except for activities covered by Rule 139 – permitted maintenance dredging). |
| **Occupation of Space in Coastal Marine Area** | | | |
| Occupation of CMA not regulated by, or not complying with other rules. | Rule 178 | Discretionary | This rule applies because the Port is seeking to renew its existing occupation permits, and at the same time obtain a permit for the occupation of space in the coastal marine area by the new No.6 Wharf, mooring dolphins, and the revetment, and the new berth pocket and swinging basin. |

Noise emissions within the Operation Port Area, and noise from dredging activities will meet permitted activity requirements under Rules 176 and 177.

The storage of hazardous substances within the Port Management Area is a permitted activity under Rule 172.

Subject to the construction of the Wharf 6, it is proposed to vary the existing stormwater discharge consent (CD040033Wa) to include the new wharf catchment. Stormwater from the new wharf will discharge through existing stormwater discharge points covered by the existing discharge permit.

### 6.2.4. Existing Coastal Permits Relevant to the Project

Napier Port currently holds seven existing coastal permits potentially relevant to this proposal. These are set out in Table 6-3 below.

**Table 6-3: Existing Coastal Permits Relevant to Wharf and Dredging Project**

| Existing Consent | Description of Activity | Expires |
|---|---|---|
| CL110542E | To undertake capital dredging to excavate material from the seabed from within the Josco Channel, Fairway Berths and Inner Swinging Basin. | 31 May 2019 |
| CL120004E | To undertake capital dredging of up to 50,000m$^3$ of seabed material to form an outer swinging basin. | 31 May 2019 |
| CL120172E | To undertake maintenance dredging of a 13.35 hectare area of seabed within the Port Management Area. | 31 May 2032 |
| CL970159D | To deposit up to 350,000m$^3$ of dredge spoil over any 12 month period at "Ia" and "R" disposal areas. | 31 May 2033 |
| CD040033Wa | To discharge stormwater from Port of Napier and surrounding area in the coastal marine area and/or gravel beach immediately adjacent to the coastal marine area. | 31 May 2024 |
| CL940231M | To occupy exclusively the inner harbour area and a 20 metre by 240 metre (4,800m$^2$) strip of the coastal marine area adjacent to the edge of the land owned and occupied by the Port, as defined on plans, including areas occupied by navigational aids, for the undertaking of port related commercial activities. | 30 September 2026 |
| CL030374O | To occupy exclusively a 20 metre by 240 metre (4800m$^2$) strip of coastal marine area on the seaward side of the breakwater to undertake port activities. | 30 September 2026 |

## Capital Dredging Coastal Permits (CL110542E and CL120004E)

These two existing coastal permits will be surrendered if consent is granted for the project, provided that the new coastal permits and their conditions are favourable for the capital dredging regime sought by Napier Port.

As previous mapping, reporting and bathymetric surveys carried out as part of these coastal permits have been undertaken effectively, similarly worded draft conditions have been suggested and are included in section 26 of this report.

### Maintenance Dredging Coastal Permit (CL120172E)

This existing coastal permit will be surrendered if consent is granted for the project, provided that the new coastal permits and conditions are favourable for the operational maintenance regime sought by Napier Port.

As previous mapping, reporting and bathymetric surveys carried out as part of these coastal permits have been undertaken effectively, similarly worded draft conditions have been suggested and are included further under section 26 of this report.

### Deposition Coastal Permit (CL970159D)

This existing coastal permit may be surrendered if consent is granted for the project, provided that the new coastal permits and conditions are favourable for the deposition regime required by Napier Port. Alternatively the permit (or parts of it) may be retained for the deposition of some dredged material in the future.

As previous mapping, site specific locations for dredging and deposition areas, macrobenthos and bathymetric surveys, adaptation to methodology and reporting, carried out as part of this coastal permit have been undertaken effectively, similarly worded draft conditions have been suggested and included in section 26 of this report for the proposed new disposal area.

### Stormwater Discharge Permit (CD040033Wa)

This existing discharge permit will be retained if consent is granted for the port development.

Once the new wharf is constructed, stormwater from the wharf deck and pavement will discharge through existing stormwater discharge points covered by the existing discharge permit. It is proposed to then seek to vary this existing stormwater discharge permit to include the new wharf catchment into an updated Plan attached to consent CD040033Wa.

### Occupation of the Coastal Marine Area (CL940231M)

These permits, under section 384A and section 12 of the RMA, will be surrendered if new coastal permits, and any conditions, are appropriate for the activities for which the occupation permits are sought, including operational, navigational and maintenance port-related purposes.

## 6.3. Napier City District Plan

The Napier Port land area is zoned Port Industrial under the Napier City District Plan.

The project does not involve any new uses or development on land for which a resource consent would be needed. Under Rule 28.3, temporary construction activities, including ground strengthening activities, storage of material and resurfacing would be permitted, subject to the activities meeting the conditions for permitted and controlled activities.

These conditions include meeting the height (total and in relation to boundaries), noise limits, light spill, vibration, and hazardous substances storage provisions for the zone. These conditions can all be met for the project, so no consents will be needed.

The plan includes separate requirements for earthworks (Chapter 52A) and contaminated sites (Chapter 64).

Chapter 52A has a number of requirements to be met, and consents would be required if the standards are not met. For example, to remain permitted, earthworks must not exceed 50m$^3$ per site involved. Earthworks applies to "earth" and so does not cover the revetment material which is being removed, stored and reused as part of the project. However, the need for any further consents will be reviewed prior to a contract for construction being entered into.

Chapter 64 is essentially a cross-reference to the requirements of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. It is considered that the requirements for soil disturbance to be a permitted activity will be able to be met (even if the soil was found to be contaminated) through the construction management plan process, and no consent from Napier City Council would be needed. This aspect will also be kept under review and if it is found that consents are needed, they will be sought separately at a later date.

## 6.4. Summary of Resource Consent Requirements

Coastal permits are required from Hawke's Bay Regional Council to disturb the coastal marine area, foreshore and seabed associated with the construction of proposed No. 6 Wharf and associated activities and occupation, and dredging and disposal of dredged material.

Most of the above consents are for discretionary activities, with some permitted and some controlled activities. The status of the activities, when bundled, is fully discretionary.

The resource consents (coastal permits) sought are set out in the Application Forms in Part I of this report.

The consent duration sought in most cases is 35 years with the exception of the construction aspects, where a 15 year duration is sought. A lapse period of 10 years is also sought. In addition, the coastal permit for capital dredging (i.e. for stages 2 to 5) seeks to incorporate sufficient flexibility for the dredging to take place as and when required.

This consent duration approach is vitally important to Napier Port. It signals that the project involves a long-term investment strategy and would create surety and certainty for this major infrastructure port development.

For the same reason, the applications include an occupation permit that both replaces and extends the existing occupation permits for a further 35 years. The remaining 9 years that these permits have to run do not provide sufficient certainty for the major investment involved.

The existing coastal permits for capital dredging will be surrendered upon the granting of the consents sought. The maintenance dredge disposal permit may be retained and used in the future for disposal of small volumes of maintenance dredging material.

The stormwater discharge permit will be retained and subsequently will be varied once the new wharf is constructed to allow for stormwater generated from the new wharf deck to discharge through existing discharge points.

## 6.5. Other Matters

The proposed project has also had cognisance of a number of other matters governed by other legislation. That legislation is outlined below.

### 6.5.1. Port Companies Act 1988

Napier Port is a significant facility for the Hawke's Bay regional economy[41]. The Port Companies Act 1988 enables Napier Port to promote and improve the efficiency, economy, and performance in the management and operation of its commercial aspects.

### 6.5.2. Civil Defence Emergency Management 2002

Napier Port is defined as a "lifeline utility" under Schedule 1 (Part A) of the Civil Defence Emergency Management Act 2002 (CDEM).

One of the key duties[42] of a lifeline utility is that it must ensure it is able to function to the "fullest possible extent", even if this is at a reduced level, during and after an emergency. The construction of Wharf No. 6 will further add to the significant infrastructure provided by the Port in relation to its lifeline role, and will assist in meeting the Port's obligation to continue functioning during an emergency.

Following the commissioning of Wharf No. 6, Napier Port would update and provide relevant information of its plan to integrate Wharf No. 6 into the CDEM Plan for functioning during and after an emergency.

### 6.5.3. Marine and Coastal Area (Takutai Moana) Act 2011

Napier Port occupies the marine and coastal area to carry out its functions.

The sea bed within the coastal marine area is managed through the Marine and Coastal Area (Takutai Moana) Act 2011, as well as through the RMA.

A number of notices have been given to the Minister by a range of groups under section 95 of this Act for protected customary rights and/or customary marine title over areas occupied by or adjacent to Napier Port.

Applications for customary marine title have effect from the time they are lodged. A resource consent applicant must notify the group applying for customary marine title and seek its views on the consent application prior to lodging the application.

Protected customary rights do not take effect unless a protected customary rights determination has been made. None have been made under the Act so far.

[41] Hawke's Bay Economic Impacts of Port of Napier Operations (September 2016)
[42] Pursuant to section 60 of the Civil Defence Emergency Management Act 2002.

The status of Napier Port as an “accommodated activity” and “accommodated infrastructure” within this legislation has some bearing on the status of its activities within this context. The various processes will need to be addressed prior to and during the processing of the applications.

### 6.5.4. Wildlife Act 1953

The Wildlife Act protects wildlife, including a range of bird species. A permit under this Act will be required from the Director General of Conservation for handling or relocating any protected wildlife which will be disturbed by the project. This would include little blue penguins which may be disturbed or harmed accidentally by removal and replacement of the revetment along the edge of the existing reclamation. Further details are given in section 13 of this report.

### 6.5.5. Building Act 2004

Section 212 of the Building Act 2004 makes territorial authorities responsible for building consents for buildings and structures within coastal marine areas adjacent to the district (unless there is another territorial authority which is responsible for the area). Napier Port will need to obtain building consents for the wharf and revetment alterations from Napier City Council prior to construction commencing.

# 7. GENERAL DESCRIPTION OF THE ENVIRONMENT, SPECIALIST STUDIES UNDERTAKEN AND APPROACH TO THE ASSESSMENT OF EFFECTS

## 7.1. Introduction

This section provides a general description of the environment within which the Port's proposed wharf and dredging project is located.

The project affects a number of specific areas and aspects of the environment and to understand these actual and potential impacts a series of specialist studies has been undertaken. These are intended to assist with a more in-depth understanding of the implications on different attributes and qualities of the environment. The specific studies undertaken are listed later in this section. The following sections provide a more detailed description of the parts of the environment affected by the various components of the overall project, as well as a summary description and assessment of the effects of the project.

The broad environmental setting of the project is described here so that the implications of the detailed assessment can be placed in its wider context.

## 7.2. Geographical Setting

Napier Port is situated on the south-western edge of Hawke Bay adjacent to Napier City. As it is not part of a natural embayment, it is New Zealand's only fully constructed port on reclaimed land. The Port currently covers an area (comprising coastal water and land) of approximately 74 hectares of which approximately 52 hectares is reclaimed land. The general location and current use of the Port's land area can be seen on Figure 7-1.

The Port is adjacent to Bluff Hill, which is a largely residential area, and lies east of Ahuriri which is a mixed residential, light industrial and suburban commercial area. The areas have developed in parallel with the growth of the Port over the past 150 years. Breakwater Road (State Highway 50) and the Napier Port Branch Railway Line lie between Bluff Hill and Port Napier. Breakwater Road joins into Marine Parade to the south and Hardinge Road to the north, with State Highway 50 continuing through Ahuriri to the north and Marine Parade to the south.

The majority of the Port buildings are located toward the Breakwater Road frontage, with open hardstand on the seaward side. The breakwater extends out along the eastern edge of the Port to Hawke Bay and wraps around to the north. The eastern part of the Port is used primarily for the marshalling of logs and processed timber products loaded along Cassidy Quay (Wharf No. 1) and Higgins Wharf (No. 2). The majority of the land area on the western side of the Port is occupied with container handling, although there is currently a further log assembly area in the northern section of the western part of the Port. The inner sheltered waters of the Port incorporate Geddis Wharf (No. 3) and Herrick Wharf (No. 4). Kirkpatrick Wharf (No. 5) forms the eastern edge of the main container terminal hardstand and marshalling area.

**Figure 7-1: Port of Napier, Geographic Setting**

The proposed wharf is to be located on the seaward edge of the northern end of the container terminal. The full length of the land/sea interface in this part of the Port (see northern edge of container terminal on Figure 7-1) is approximately 600 metres. The proposed new wharf is approximately 350 metres in length, and 35 metres wide. Including the two mooring dolphins, the coastal edge directly affected by the proposed wharf is approximately 400 metres in length.

## 7.3. Access to the Port

Gate 1, with access off Marine Parade, is the main non-containerised cargo entrance to the Port. The access extends east and then runs parallel to Marine Parade and Napier beach before obtaining access via the Port's security entrance. Gate 2 is permanently locked and not in current use. Gate 3 is the main container cargo entrance and access here is also via a Port security entrance. It is located at the western edge of the existing port operational area on Breakwater Road/State Highway 50. A separate access to the Main Office and Administration Buildings at Gate 3 provides access to the main Port operational area. The railway accesses the Port from Ahuriri and the north. In the vicinity of the Port, the rail runs parallel to the Ahuriri Bypass and Chatham Street before crossing Breakwater Road/State Highway 50 where it then runs more or less parallel to the Port on the seaward side of Breakwater Road. The rail corridor passes Gate 3 before terminating adjacent to the Port's security entrance for road vehicles by Gate 1.

Sea access for vessels to the Port is via three defined channels - the Deep Water Channel, Josco Channel and the South Channel. The South Channel approaches the Port from the east passing between the south end of Pania Reef and the breakwater; the Josco Channel approaches north of but parallel to Pania Reef; and the Deep Water Channel approaches from further north before merging with the Josco Channel.

## 7.4. The Coast in the Vicinity of Port Napier

The coast in the vicinity of the Port forms the western edge of Hawke Bay. While the coastal edge at the Port has been constructed over the years, north and south there has less modification.

To the south of the Port, the coast comprises a broad north-east curve of steep gravel and sand barrier beach as far south as Cape Kidnappers. This beach is punctuated by river mouths at Clive some 2km south of the Napier urban area and 6km from the Port, being the mouths of the Tutaekuri, Ngaruroro and Clive Rivers (which reach the sea through a single estuarine mouth) and the Tukituki River some 2km further to the south. The southern end of the barrier beach is effectively at the cliffs at Cape Kidnappers, some 10km further to the south and east.

East and north of the Port the coast is more complex. A small sandy beach has formed here (referred to as Port Beach), aided by construction of a small breakwater to the west. Along Hardinge Road, as far as the edge of the Ahuriri channel at Perfume Point, there is either an absence of beach, or a mixed sand and gravel beach with a narrow steep north-facing form backed by some exposed rock in situ and a range of artificial armouring. Perfume Point also comprises a breakwater and both sides of the Ahuriri channel are armoured with rock or sea walls.

The Ahuriri mouth comprises a complex area known as the Inner Harbour with a number of mooring areas, marinas and slipways. Inland of this area is the extensive Pandora Estuary, Main Outfall Channel and associated wetlands. West of the Ahuriri mouth consent has recently been given for a new coastal protection structure involving a rock revetment, beach armouring and support structure along a short section of coast behind Whakarire Avenue. This has not yet been constructed, but is part of the existing environment in RMA terms.

The coastline west and north of the Ahuriri mouth is a similar sweeping curved barrier beach form facing to the east but on a slightly different angle to the coast south of Napier City.

The Esk River discharges into Hawke Bay some 8km north of the Port, and the Tangoio River and Pakuratahi Stream discharge from a shared mouth approximately 5km further north. Beyond the settlement of Tangoio the coastline comprises cliffs and small embayments.

The 1931 earthquake raised the land in the vicinity of Napier, modifying the lagoon areas in the vicinity of Bluff Hill, Westshore and Pandora and affecting the existing barrier beach both north and south. The raising of the land also modified the river mouths and the delivery of sediment from inland to the sea.

## 7.5. The Coastal Marine Area in the Vicinity of the Port

The mean high water springs (MHWS) defines the seaward edge of the coastal marine area. Generally, the subsurface area of Hawke Bay is gently shelving beyond the active steeper areas adjacent to the beach where waves and currents continually modify the beach and near-shore area.

In the vicinity of Port Napier and north of the Esk River the 10m bathymetric (depth) contour is located approximately 1km from MHWS. North of the Port, and south of Napier city the 10m contour is further from MHWS – being 2.5km or more. Local features such as reefs however, interrupt the gently shelving form close to or at the shore in some places. The 20m contour is located more consistently between the Tangoio River mouth and Cape Kidnappers, at 5 to 7km offshore.

Unlike the active beach and near-shore areas, which consist of mobile material with a range of grain sizes, and in some areas natural or introduced boulder or cobble material, the surface of the gently shelving offshore areas mostly comprises a range of sands and gravels or finer material, grading out to more even areas, predominantly surfaced with mud, silt and fine sand.

In the vicinity of the Port, as a subsurface continuation of the hard strata forming Bluff Hill, Pania Reef is a major seabed feature. This has been mapped as part of Napier Port's project investigations, and the location and shape of the reef is shown on Figure 7-2. This image is not to scale. The south-west extent of reef is shown as the lower part of the image, and the north-east at the upper part of the image. Town Reef is a shorter and more southern reef, close to the beach south of the Port.

Pania Reef is described as a liner series of bank and pinnacles, extending approximately 4km offshore in a north easterly direction. The most seaward point of Pania Reef is the steep pinnacle-like North Rock, which is isolated from the reef proper by a 700m stretch of flat sandy bottom. The north-western boundary of the reef system tends to be steeper than the south-western side which shelves off to boulder-strewn plateaus before descending on to a sandy bottom.

The maximum tidal range at Napier is less than 2m, with spring and neap tides being 1.9m and 1.2m respectively. Storm surges, most common in March to June, contribute to slightly higher average water levels over those months, as well as minor variations in averages at all times of the year.

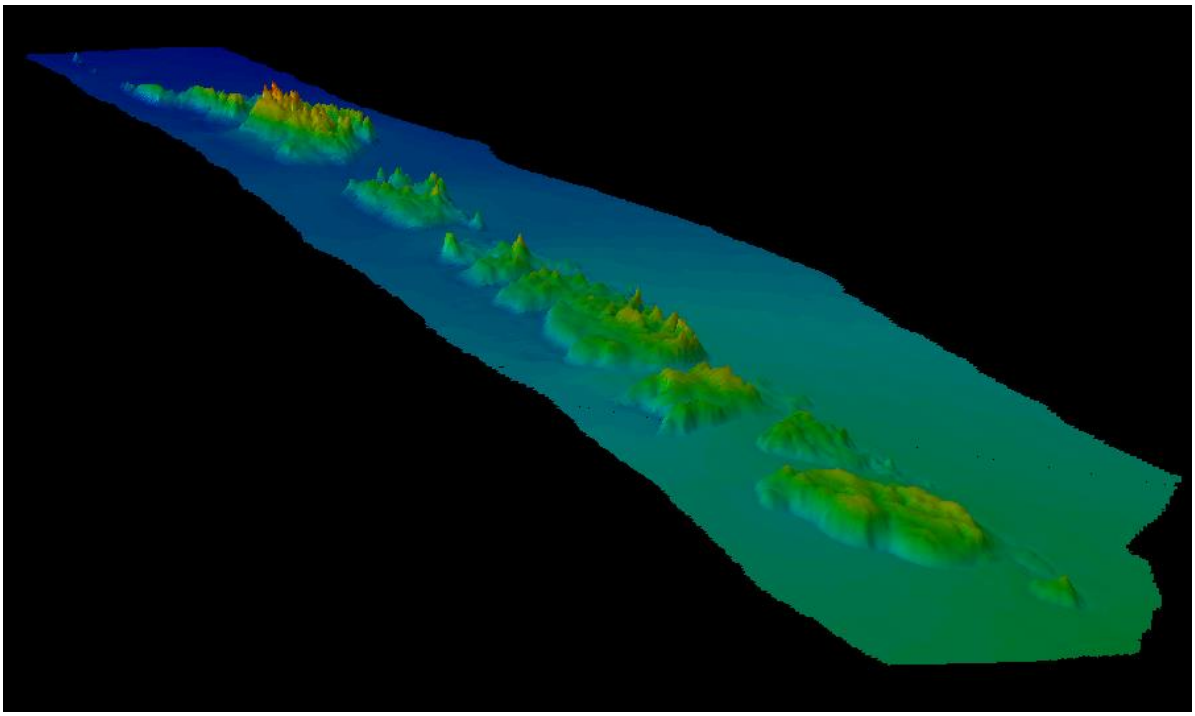


**Figure 7-2: 3-D image of Pania Reef indicating relative extent and elevation of reef form**

## 7.6. Climate and Weather

Napier's climate[43] is generally described as mild, warm and temperate with an average rainfall of 483mm per annum with January, October and November being the driest months and November to March the warmest.

The prevailing wind is westerly to south-westerly with a high frequently of calm or very light winds, with winter and spring having the highest proportion of strong winds (above 31 km/hr). In anti-cyclonic conditions, local on-shore sea breezes are common and persistent. The wind rose, giving details of average annual wind direction and strength for Port Napier is shown in Figure 7-3[44]. The strongest winds are from the north and northwest, with the median speed being in the order of 8m/second[45].

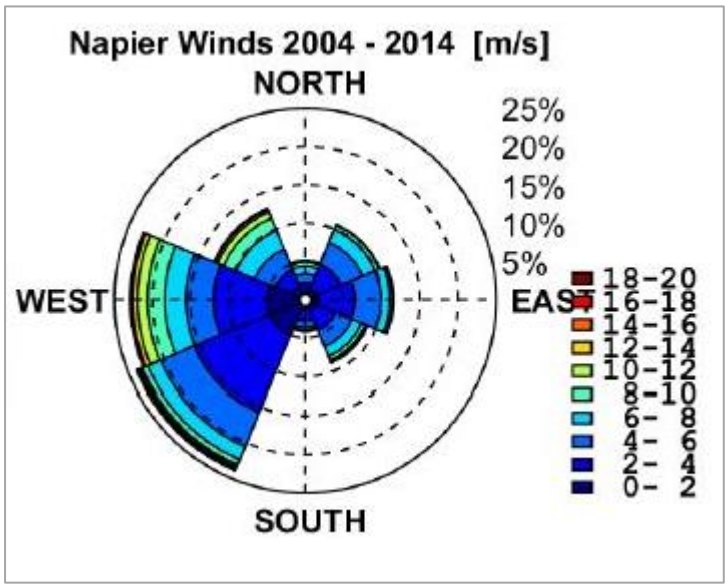



**Figure 7-3: Napier Port Wind Rose plot – 1-Minute Average Wind Speeds and Directions (shown as "coming from")**

Hawke's Bay has experienced numerous extreme weather events in recent years, including cyclone Bola in March 1988, a widespread "100-year" heavy rainfall event in Napier and Hastings in December 2001, and two closely-spaced storm events including flooding and storm surges in late July-early August 2008. All these events were associated with coastal erosion and high turbidity in Hawke Bay due to river discharges. More frequent events include thunderstorms (an average of eight per year), snow to low levels and hail, all of which can result in localised flooding and sediment run-off. Flood events are the primary means by which gravel and other sedimentary material is brought to the coast from inland via the region's rivers and streams.

Wind speed and direction has some influences on local wave direction and currents, and the turbidity of sea water in Hawke Bay is strongly related to rainfall events in the inland catchments of Hawke's Bay.

[43] The information in the first few paragraphs here is in part derived from "The Climate and Weather of Hawke's Bay", PR Chappell, NIWA, 3rd Edition, 2013.
[44] This data has been collected by Napier Port over the period 2004 to 2014, and correlates closely with longer-term date from Napier Airport.
[45] Further details, including seasonal variations, are provided in the Advisian report, Appendix D in Volume 3.

## 7.7. Sea Swell, Waves and Currents

Within Hawke Bay, waves from the southerly quarter are the most frequent, due to the region's exposure to the south. The frequency of one to two metre swells is 65%, while those greater than two metres is 20%. Most of the large southerly swells arriving in the Hawke Bay originate in the strong south-westerly wind zone that frequently exists between New Zealand and the Chatham Islands, where the uninterrupted fetch length is over 500km. In the large expanse of Hawke Bay, these swells are refracted so that waves arriving in the vicinity of the Port are predominantly easterly or east-southeast in direction.

Hawke's Bay circulation is dictated by a combination of wind, waves and the influence of the north flowing Wairarapa Coastal Current and south flowing East Cape Current. These two currents are reported to drive the general circulation within Hawke Bay which has previously been described as a bifurcating system whereby west flowing water masses enter the middle of the bay and diverge into north and south travelling shoreline flows. On smaller scales, currents have been recorded travelling in many directions, with local conditions overridden by wind forcing.

Apart from the active coastal strip, where wave action may predominate, sub-surface currents move finer sediments in suspension.

Previous studies of currents in the vicinity of Napier have found that currents tend to follow bathymetric contours. Their speeds are dominated by winds, and are typically in the range of 0.05-0.1m/s[46]. In the vicinity of and just north of the Port, both measurement and modelling has now demonstrated the presence of a persistent anti-clockwise gyre under strong winds from the southwest, and during all winds from the west and northwest. This current tends to be lower speed – 0.02-0.04m/s – and travels in a net southward direction along the coast from Westshore towards the Port and in a net easterly flow direction immediately adjacent to the Port.

The current speeds are so low that they would be unlikely to move sediment on their own. However, when sediments are picked up by wave movement, the persistent currents can effectively move finer material in suspension.

## 7.8. Past Dredging and Disposal Activities

The Port's records of dredging and disposal of dredged material go back to 1973. The first records relate to capital dredging for the new fairway at the time, followed by campaigns of maintenance dredging within the inner harbour at Ahuriri, in the fairway and swinging basin and around berths, often involving relatively small volumes of material and a few weeks work for the dredges of the time. Apart from mention of gravel and limestone associated with a few records, most of the material dredged was described as fine sand, silt, mud and clay.

From 1999 when consents were granted to dispose of dredged material into Area 1a and R ext (now shown on the HBRCEP plans as Dredge Disposal Areas 1 and 2[47]), maintenance dredging has taken place approximately every 2 to 3 years. Less frequently, capital dredging has also taken place. The volumes of dredged material over this period have been described as approximately 427,640m$^3$ of maintenance

[46] The studies these findings are based on have been short-term – 2 to 8 weeks – however Advisian considers these adequate to determine the magnitude and direction of mean currents.
[47] See Plan Set 3 in Volume 2 of the application documentation.

dredging, 118,930m$^3$ of capital dredging, and 472,470m$^3$ of combined capital and maintenance dredging. The major capital dredging exercise took place over two months in 2012, involving 342,320m$^3$ [48] of material removed from the Fairway and Josco Channel. Together, over the almost 20 year period, some 1,019,020m$^3$ of material has been dredged from and deposited in the vicinity of the Port and Westshore, contributing to change in the local environment.

## 7.9. Specialist Studies

To assist with the understanding of the detailed local environment likely to be affected by the project, and to enable the effects on that environment to be understood, a number of specialist studies has been undertaken. Table 7-1 sets out the studies which form part of the documentation for the resource consent applications.

All documents in Table 7-1 below are provided in Volume 3 as part of the application documentation.

**Table 7-1: Specialist Reports forming part of the Application Documentation in Volume 3**

| Vol 3, Appendix No. | Subject and Report Title | Main Author/Date |
|---|---|---|
| A | Napier Port 6 Wharf – Preliminary Design Report | Beca, July 2016 |
| B | 6 Wharf Development – Geotechnical Factual Report | Beca, October 2016 |
| C | 6 Wharf Development: 3D Geological Model and Dredge Volumes | Beca, May 2017 |
| D | Napier Port Proposed Wharf and Dredging Project – Coastal Process Studies | Advisian, June 2017 |
| E | Napier Port Proposed Wharf and Dredging Project – Dredge Plume Modelling | Advisian, June 2017 |
| F | Napier Port Proposed Wharf and Dredging Project – Post-Disposal Fate of Dredged Sediments | Advisian, May 2017 |
| G | Port of Napier proposed Wharf and Dredging Project: Physical Coastal Environment | Shore Processes and Management Ltd, May 2017 |
| H | Assessment of Effects on Benthic Ecology and Fisheries Resources from Proposal Dredging and Spoil Disposal, Napier Port (Report No. 2895) | Cawthron, November 2017 |
| I | Assessment of Effects on Marine Mammals from Proposed Dredging and Spoil Disposal for the Port of Napier (Report No. 2907) | Cawthron, August 2017 |
| J | Port of Napier – Wharf No. 6 Assessment of Construction Noise Effects | Marshall Day Acoustics, April 2017 |
| K | Port of Napier – Wharf No. 6 Future Port Noise Maps (2026) | Marshall Day Acoustics, September 2017 |
| L | Potential Effects on Birds of a Proposed New Wharf and Dredging Project at the Port of Napier | Wildlands, June 2017 |

[48] This figure includes a bulking factor of 0.87.

| | | |
|---|---|---|
| M | Traffic Impact Assessment | Wanty Traffic Consultants/ Stantec, May 2017 |
| N | Proposed Wharf and Dredging Project – Landscape and Visual Assessment | Boffa Miskell, July 2017 |
| O | Hawke's Bay Economic Impacts of Port of Napier Operations | Economic Solutions Ltd, May 2017 |
| P | Proposed Wharf and Dredging Project – Consultation Report | Napier Port, November 2017 |
| Q | Proposed Wharf and Dredging Project – Cultural Impact Assessment | Laurie O'Reilly (Ngati Pārau), November 2017 |

In addition, there has been considerable collection of data and a number of preliminary investigations have been carried out, such as geotechnical investigations and interpretation and ongoing monitoring results which have contributed to the above reports by providing basic information on the nature of the project (e.g. volumes and types of dredge sediments). There have also been design-related investigations which have resulted in the preliminary wharf design. These investigations are not provided as part of the documentation, but may be referred to as needed.

Consultation is an ongoing process, including with tangata whenua.

## 7.10. Assessment of Effects on the Environment

The assessment of effects on the environment from the project is provided in the following sections of this report. The RMA requires that effects must be assessed against the existing environment (including RMA consents and permits which have been granted but not yet implemented). It is also usual to take reasonable mitigation into account in assessing effects.

There are a wide range of components of the receiving environment which could potentially be impacted in either the short term or long term (permanently) by the different elements of the project. These components range from nearby coastal areas, to sea life on the bed of the sea or in the water column, to people living nearby, or who use the sea area for recreation, and on those who have particular cultural affinity and association with the area.

Potential effects on the environment have been investigated and evaluated under appropriate headings in the following report sections. Each section explains and describes:

- the nature of the existing environment
- the aspects of the project which may impact on the environment, and how they may be affected
- the type and extent of the actual or potential effect(s)
- the proposed mitigation which has either been built into the project already, or is proposed to be the subject of a condition on any consent or permit granted.

Section 23 then summarises the effects on the environment from the project.

# 8. EFFECTS ON COASTAL PROCESSES

## 8.1. Introduction

The proposed wharf and dredging project will over time modify the shape of the sea bed in the vicinity of the Port by progressively lowering the sea bed as described in section 3.4 of this report and shown in detail in Plan Set 2 in Volume 2 of this documentation. The area which will be subject to dredging is a total of approximately 117ha, of which approximately 60% has not been dredged in the past. The end state of the process is that the Port will have an operational channel, swinging basin and wharf area available at a depth of -14.5m below CD.

The design of the dredging component has been subject to detailed development over an 18 month period and through seven iterative processes, involving both:

- investigation of the depth and shape of channel and the manoeuvring space needed for the design of larger vessels; and
- the physical implications of the changes in the seabed in terms of their potential effects on waves, currents and sediment transport in the vicinity.

This process has resulted in an optimised design, as shown in the plans in Plan Set 2, Volume 2.

The disposal location for the dredged material has been chosen in an offshore area approximately 4 to 6km east of the Port in water depths of 20 to 23m. The dredged material will slightly raise the sea bed (by approximately 1m) over the area of approximately 340ha.

The new wharf itself and the associated dolphins are not considered to have any effects on coastal processes. The wharf lies adjacent to the existing coastal edge and will involve a replacement revetment below the new wharf which will continue to absorb wave energy along the edge of the container terminal.

The wharf and dolphins are supported on piles which provide for wave and current passage and which do not interrupt existing coastal processes in the area they will occupy.

The implications of the changed shape of the sea bed at both the dredged and disposal areas have been extensively investigated as part of the project. The key background reports covering this aspect are two reports by Advisian relating to coastal processes and disposal of dredged material, and an interpretive coastal process study by Shore Processes and Management Limited. These are provided as **Appendix D, F and G** in Volume 3 of the application documentation.

## 8.2. Description of the Receiving Environment

The Napier coastline has been the subject of intensive investigation over many years, with the comprehensive report by Komar and Harris[49] providing the current widely-accepted understanding of coastal evolution, erosion and coastal management issues in Hawke's Bay between Tangoio and Cape Kidnappers.

[49] Komar, PD and Harris, E. "Hawke's Bay, New Zealand; Global Climate Change and Barrier – Beach Responses", Report for Hawke's Bay Regional Council.

The environmental context for coastal processes for the current applications is the more immediate Hawke Bay area, including the beaches to north and south of the Port and proposed dredge and dredge material disposal area. This has been described generally in section 7.4 of this report, and is detailed in the reports referred to in section 8.1.

The beaches exhibit the overall nature of the coastal environment. They are generally comprised of sand and gravel, carried from the land to the sea and reworked due to waves and currents. The orientation of the beaches is generally north-south, except at the southern end of Westshore where the shoreline curves to face northeast, the northeast facing beach at East Pier, and the shoreline between Ahuriri Lagoon inlet and the Port which faces north to northwest. Waves approaching are refracted within Hawke Bay and generally approach the shore from the east to south east.

The coastal area is dynamic and subject to a varying wave regime, sediment inputs from rivers, and currents. In general terms, waves actively move and modify material in the beach and nearshore zones, while currents transport fine material in suspension over a wider area. Land elevation along the coast and sediment supply to the coast has been affected by tectonic activity (particularly the 1931 Hawke's Bay earthquake) and land clearance and human modification of rivers inland.

The beach along Marine Parade south of the Port is described as currently stable to slightly accretional; the shore adjacent to the Port and south of the Ahuriri Lagoon inlet is stable except for the Port Beach which is slightly accretional; the shore along Westshore is erosional and has changed in character from a mainly sandy shore until the late 1970s to its current state as a mixed sand and gravel beach as a result of artificial nourishment to limit erosion; and the shore north of Napier Airport is gravel dominant, and has demonstrated a slightly erosional long-term trend. Due to the dynamic nature of the factors that influence coastal processes – tides, wind, waves, and sediment supply to the coast – there are wide variations within the long-term trends.

The reports referred to in section 8.1, particularly the report by Shore Processes and Management Limited, describes the geological setting, the tectonic history, and the sea bed sediments (both on the present sea surface and sub-surface within the area proposed to be dredged). They also describe the active coastal process environment, including waves and currents[50], based on previous literature and data collected by Napier Port; the bathymetry; nearshore and beach sediment characteristics; and human activities including beach protection and nourishment patterns and patterns of dredging and dredged material disposal.

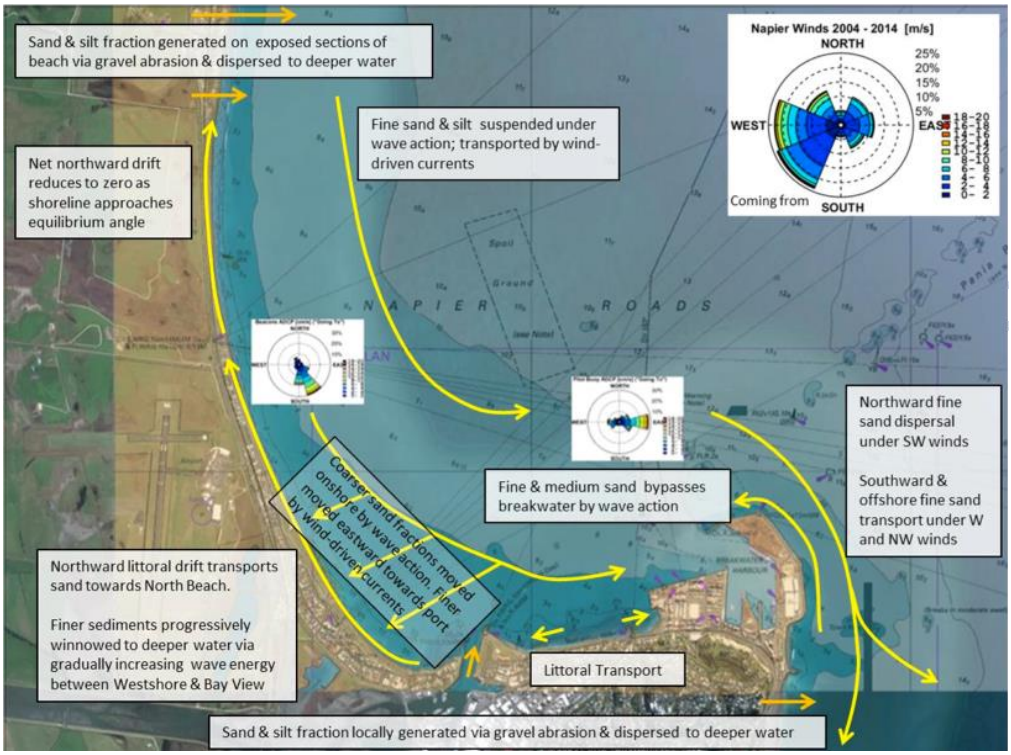
The key coastal process patterns found in the existing environment are summarised in Figure 8-1. The processes involve many variables acting together and contributing towards the overall patterns. Figure 8-1 illustrates the following:

- Both south of the Port – at Marine Parade – and at Bay View, beach gravel material is moved on the beach in the swash zone and abraded, contributing sand and silt which is dispersed to deeper water;
- From the Ahuriri Lagoon inlet to the vicinity of Bay View, there is a net northward transport (littoral drift) of beach material while the same processes occur in the swash zone. This reduces to zero as the shoreline curves to the north where it is at an equilibrium angle to the waves. Sand and silt from the abrasion processes are dispersed into deeper water all along this coast. At the

[50] Ocean currents, tidal currents and wave induced currents.

southern end only the finer particles are lifted and placed into suspension. Further north, the increasing wave energy results in larger particles being lifted and transported further offshore[51];

- Where dredged material has been placed in the vicinity of Westshore, any larger sand or gravel has been moved onshore by wave action during larger wave events. The finer material has been stirred into suspension where it remains and has been moved eastward by a persistent low-speed current gyre which moves anti-clockwise (see current roses on Figure 8-1). This current carries the fine material in suspension back towards the Port although some of the larger particles may be captured by wave action and deposited in the beach pocket between Perfume Point and the Port, particularly at Port Beach. This then moves backward and forward in the relatively low-energy littoral zone.
- Throughout the area, wind driven currents carry suspended sediment (silt and fine sand) from shore abrasion processes and from northern rivers (the Esk and Tangoio Rivers and any contribution from the Ahuriri under flood condition) southwards, particularly during west and northwest winds[52]. Under southwest winds, offshore currents transport fine material in suspension northwards[53].
- Fine and medium sand picked up in storm conditions from the Marine Parade area may make its way under wave action along and north of the breakwater.




[51] This pattern has been observed in the fate of beach nourishment material at Westshore, where fine material does not persist on the beach for long periods (see Shore Processes and Management Ltd report, section 2.7). Advisian reports recent measurements of the sizes of material on the beach, in the intertidal zone and below low tide westward and northward of the Port as far as Bay View which indicates that fine particles are not found in the active (swash-backwash) zone, but dominate offshore.

[52] Note that the west and northwest winds are generally the predominant winds and the strongest winds that the region experiences (see wind rose and simulated currents in Figures 8-1 and 8-2). These generate the strongest currents.

[53] Southeast winds are very infrequent, although they can generate strong currents. The southwest winds are more frequent but generate only weak currents (see wind rose and simulated currents in Figures 8-1 and 8-2).

**Figure 8-1: Coastal Process Patterns Summarised**

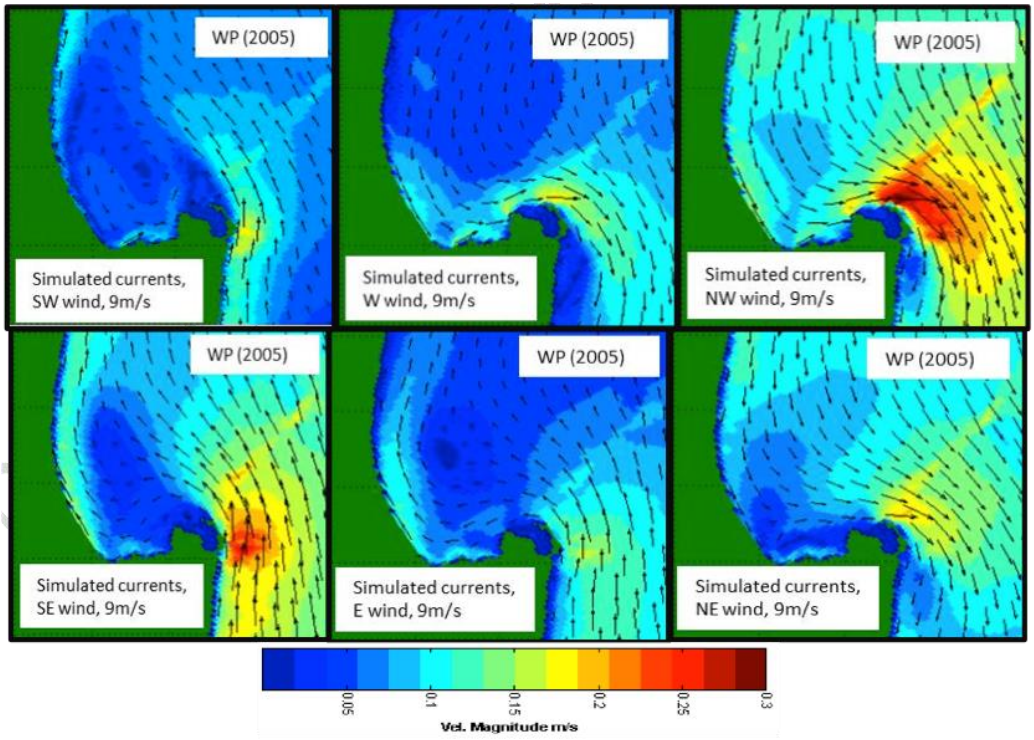



**Figure 8-2: Current Patterns in Vicinity of Port (simulated and correlated with available measurements)**

Identifying and assessing the coastal process effects of the project involves understanding how and to what extent the changes in the shape of the sea bed due to dredging and dredged disposal may influence these coastal process patterns and thus result in adverse effects.

## 8.3. Actual and Potential Effects on Coastal Processes

### 8.3.1. Changes Due to Dredging

The dredging proposal involves a Stage 1 of deepening the area below and adjacent to the new wharf and dolphins and the area where ships will berth when tied up at the wharf or dolphins, to the final design depth of -14.5m below CD. It also involves extending and shaping the swinging basin to a depth of -12.5m, and increasing the depth of the inner harbour and inner part of the existing channel to -12.5m.

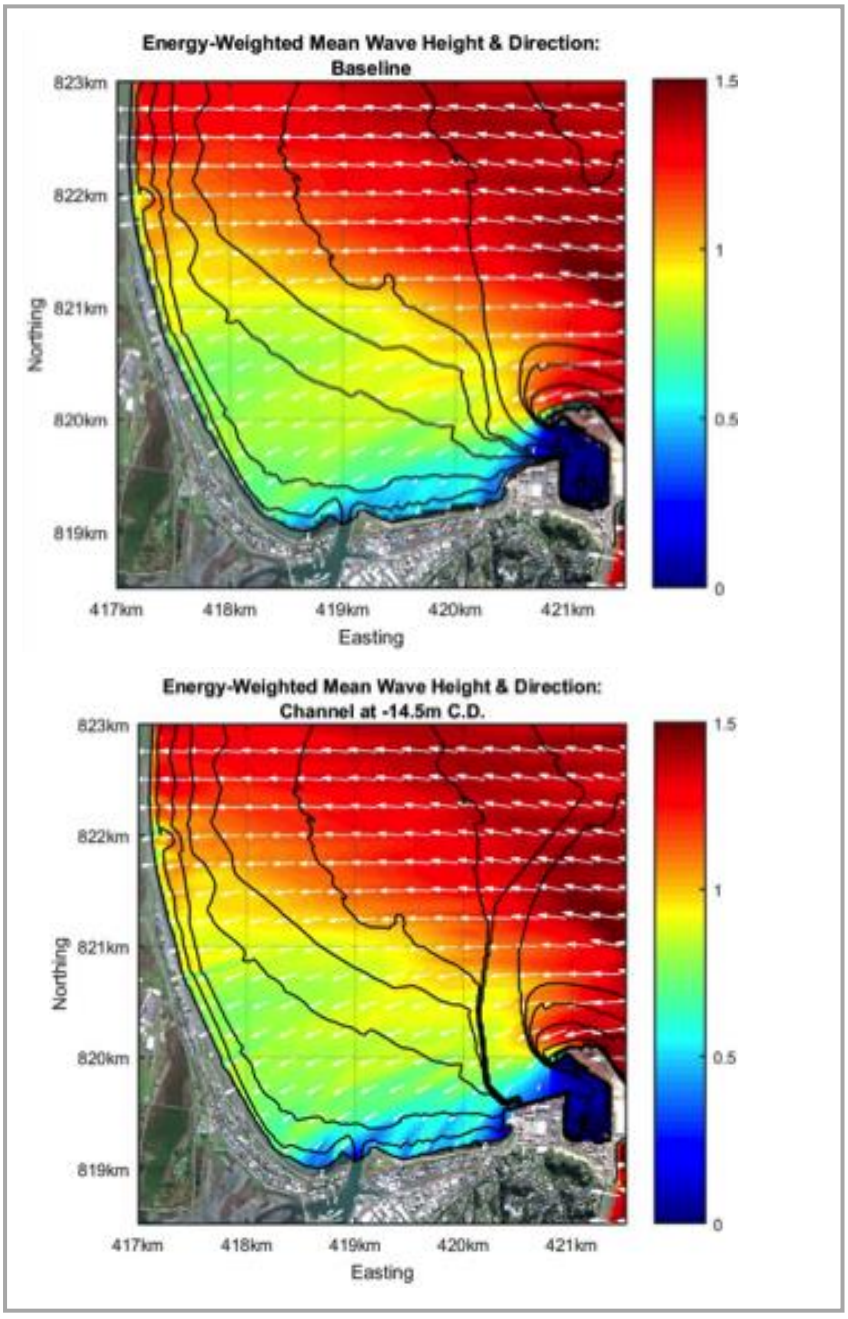
Subsequent campaigns in Stage 2 to Stage 5 will progressively increase the depth of these areas and extend a dredged channel out approximately the length of the current Josco Channel. Most of this area has not been subject to past capital dredging.

The dredging will result in a shaped "lip" to the channel, particularly on its western side with a maximum depth of approximately 12m close to the existing revetment, and phasing out to nothing over the approximate 3.5km length of the dredged channel[54]. As the sea bed deepens naturally to the eastern side of the channel, the "lip" is not so great in that area.

[54] At the other (northern end) of the channel the depth of dredging needed reduces to 0 at the -14.5m CD depth.

The end design (at -14.5m) would have maximum implications in terms of coastal processes and this has been investigated through modelling the interaction of waves with this modified sea bed shape. The earlier campaigns will have less effects than have been investigated and described in the various reports.

The implications of the change in channel shape have been investigated through modelling processes which are fully explained in the two Advisian reports referred to in section 8.1[55]. The model studies involved wave, current and sediment transport processes and good-practice models which were calibrated and then verified against measured data.




[55] The processes are summarised by Shore Processes and Management, particularly in section 3.2.

**Figure 8-3: "Energy-weighted" patterns of wave refraction at present (top) and following dredging (bottom)**

Changes in the wave climate identified from the modelling related the current or “baseline” situation against the situation with the modified bathymetry across the range of wave conditions (height and direction) experienced in the area. The findings are set out in Figure 8-3 expressed as mean wave height and refraction.

A visual inspection of Figure 8-3 indicates that the changes are small across the whole modelled area, with no change over most of the area. There is some modification of height and angle discernible in the vicinity of Hardinge Road from waves approaching from the east and southeast due to slight refraction further to the east from the swinging basin edge.

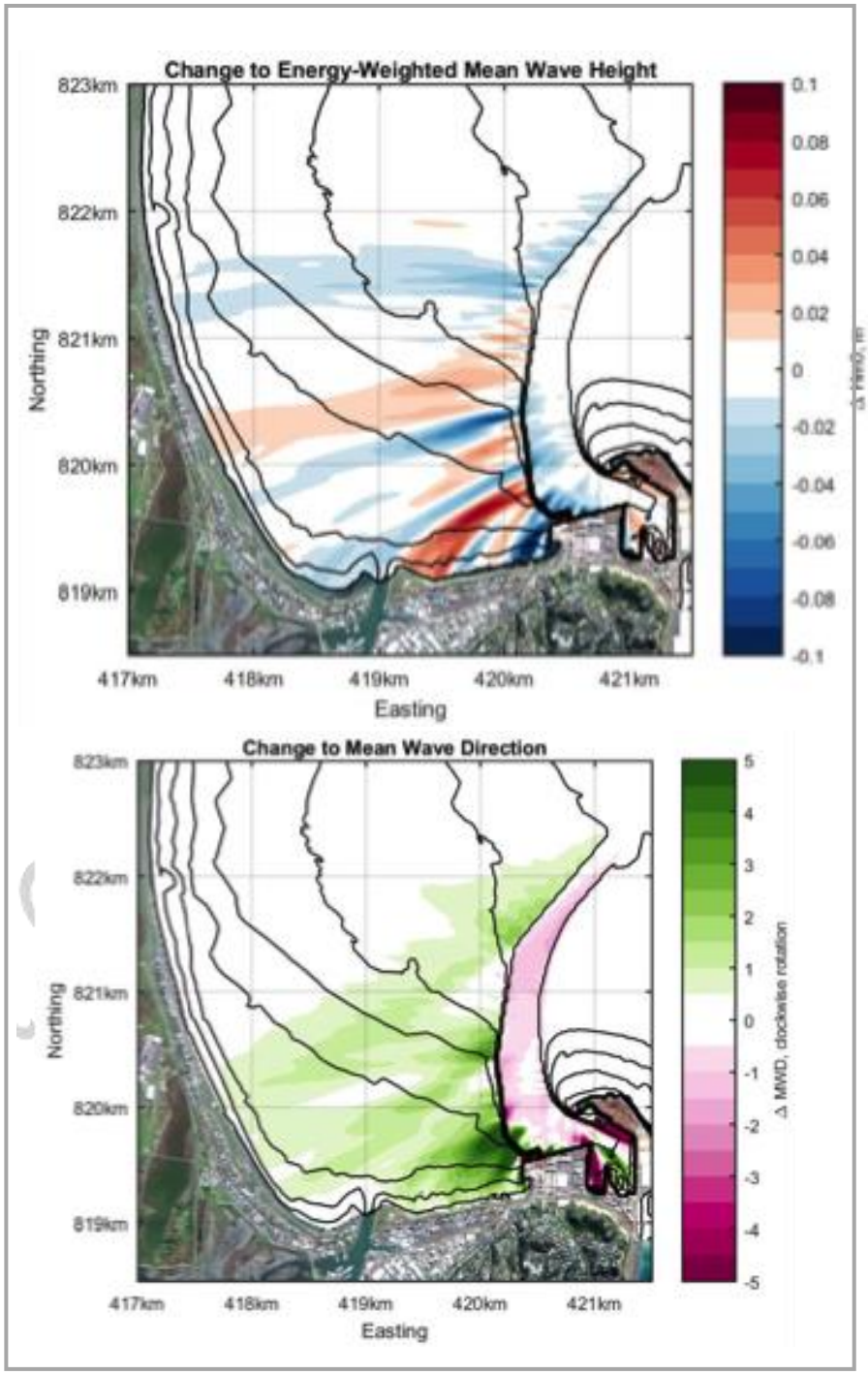


**Figure 8-4: Changes to mean wave height and mean wave direction, caused by channel dredging**

The relative changes to wave height and angle of approach are compared in Figure 8-4. This shows the effect of the channel, and demonstrates that the effects reduce with distance from the channel.

The height of waves (and thus their energy) is reduced close to the Port, along parts of Hardinge Road and the southern part of Westshore. These changes reach a reduction of mean wave height of about 5cm close to the Port, an increase of about 6cm at Hardinge Road, a decrease of 2cm at Westshore and an increase of about 2cm opposite the airport.

The wave angles of approach to the shore are slightly modified, as the channel reduces the refraction of waves as they cross it. The change in angle ranges from about four degrees near to the Port, to less than one degree variation at Westshore. The wave angle is rotated clockwise so that the resultant change is to the west and north. There is no change in wave direction in the southern part of Westshore or north of The Esplanade.

Overall, these changes are negligible and within the range of natural annual variability.

Both the Advisian and Shore Processes and Management studies conclude that the magnitude of the changes are so small that they will have no persistent geomorphological effect at the shoreline. Shore Processes and Management notes that the Port Beach may become slightly more depositional, and there may be slightly more beach sediment transport towards the Ahuriri Lagoon inlet. At Westshore, where wave energy is slightly reduced but the angle of approach slightly modified, sediment may move north along the beach face, but to the south in the littoral zone and nearshore.

Further detailed investigations of impacts on existing surf breaks were undertaken. These are discussed in section 15, as part of the assessment of effects on recreational activities.

Changes in currents were not specifically investigated as they are prominently wind induced rather than tidal. Currents have implications in more offshore areas. It is not considered that the change in bathymetry will modify local current speeds or directions to more than a *de minimis* extent.

The Shore Processes and Management report points out that the magnitude of the changes to wave height or direction is small in comparison to the national variability of conditions and concludes that *"there is unlikely to be any measureable long-term adverse or beneficial change to the geomorphological beach response to the wave environment"*.

### 8.3.2. Sediment Supply for Coastal Processes

#### Material from the South

The report by Shore Processes and Management sets out the sources of beach material and the processes in the nearshore areas north and south of the Port. Quoting Komar, 2010, the report explains that, south of the Port, *"beach gravel and coarse sand arriving from the south is consumed by abrasion .... converting it to the fine sand and silt component of the greywacke, which only then is able to move offshore and round the breakwater's arm"*. This description is consistent with earlier (pre-Port breakwater construction) descriptions of lack of build-up of material to the south of the Ahuriri training walls.

Thus the deeper channel proposed to be dredged will not affect the availability of sediment supply to the beaches to the north of the Port. Some of the fine material being transported by currents from the south of the Port area to the north (see Figure 8-1) may be deposited within the channel in quiescent periods, and will require periodic removal as part of the maintenance dredging regime, as is the current maintenance dredging practice.

### Material from Current Maintenance Dredging

Most of the material that has been dredged from the Port area in the past has been deposited in the currently consented areas (shown on the Plan Maps in Plan Set 3 in Volume 2). In particular, since 1999, consents encouraged disposing of any coarser dredged material as close to the Westshore beach as was practicable. Records show that some 384,000$m^3$ in, or 22,600$m^3$ per year on average have been deposited in this location. Based on an analysis of the Fairway surface sediments, only a small portion of this material (estimated at 1,100$m^3$ to 5,600$m^3$) may be larger than fine sand, and temporarily contribute to the beach material before moving north and/or being abraided further.

The remainder of the material will have been suspended and transported in the gyre to the south and east or moved offshore in suspension, as part of the transport system shown in Figure 8-1.

Port Napier intends to continue to use the current consents for disposal of maintenance dredging when this process is undertaken separately from capital dredging campaigns. If material is of suitable size it will be deposited in the inshore area as in the past.

The change indicated cannot be considered as an "actual" effect. Rather, it is part of the permitted baseline against which effect of the project needs to be measured. It is included here for completeness only.

## 8.3.3. Changes Due to Disposal

The disposal grounds are located 4 to 6km offshore, in water depths of 20 to 23m. The intention is that dredge material will be placed at approximately 1m in height across the whole area by the conclusion of the capital dredging campaigns, assuming settlement over time which gradually reduces the pattern from a series of hummocks immediately following disposal to a more even mound.

The potential for this mound to modify waves passing over it has been modelled by Advisian (see Appendix F in Volume 3). This modelling has been conservative, in that it has been based on a 2m high mound across the approximately 350ha of the disposal area. It has also taken into account a range of sea conditions, including storms.

The potential for the mound to modify the angle of wave approach to the shore, and for a change in wave energy within the marine environment across which the waves pass have both been investigated.

Figures 8-5 and 8-6 show the change to wave energy and wave direction as a result of the increase in height of the sea bed in the disposal area.

As can be seen, the waves in this part of the CMA are generally approaching mean to the shore. Any effect will therefore be experienced at the northern end of the Marine Parade beach, or the outer edge of the breakwater. Because of the depth of the water, most of the time there will be no change as the orbital motion of the waves will not reach the sea bed. The maximum change in wave height at the shore is less

than 4cm higher than at present. Any change in wave direction is limited to the area within 1 to 2km of the disposal mound itself and has disappeared well before the shore.
The Shore Processes and Management report states that *"the changes will not result in measureable changes to the geomorphological work the waves will do at the shore"*. In other words, any effect will be imperceptible.

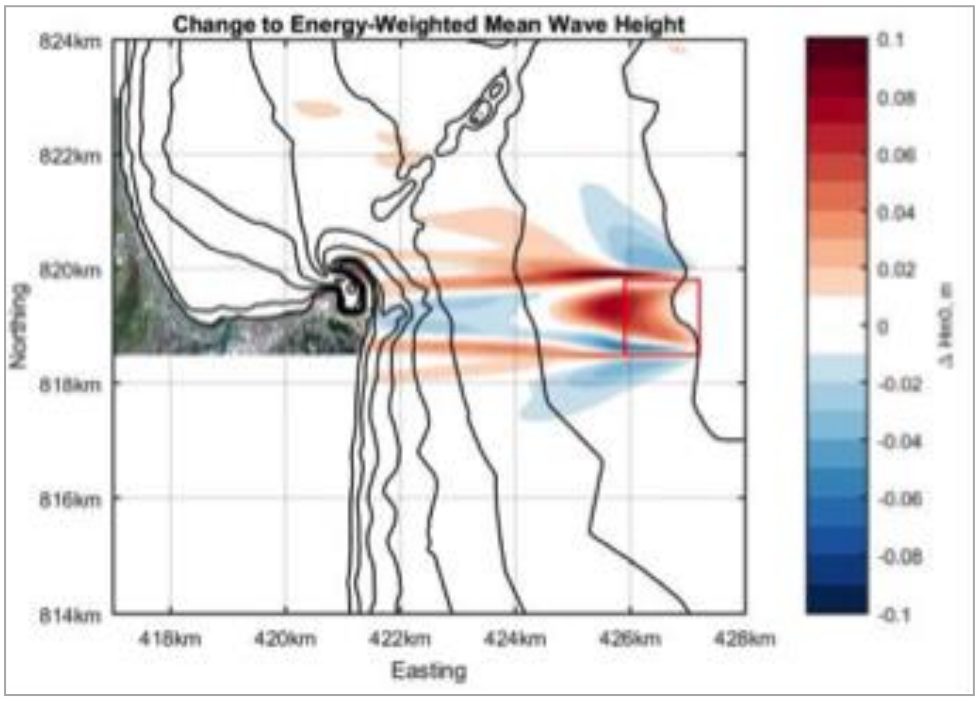



**Figure 8-5: Change to mean wave height following disposal of dredged material**

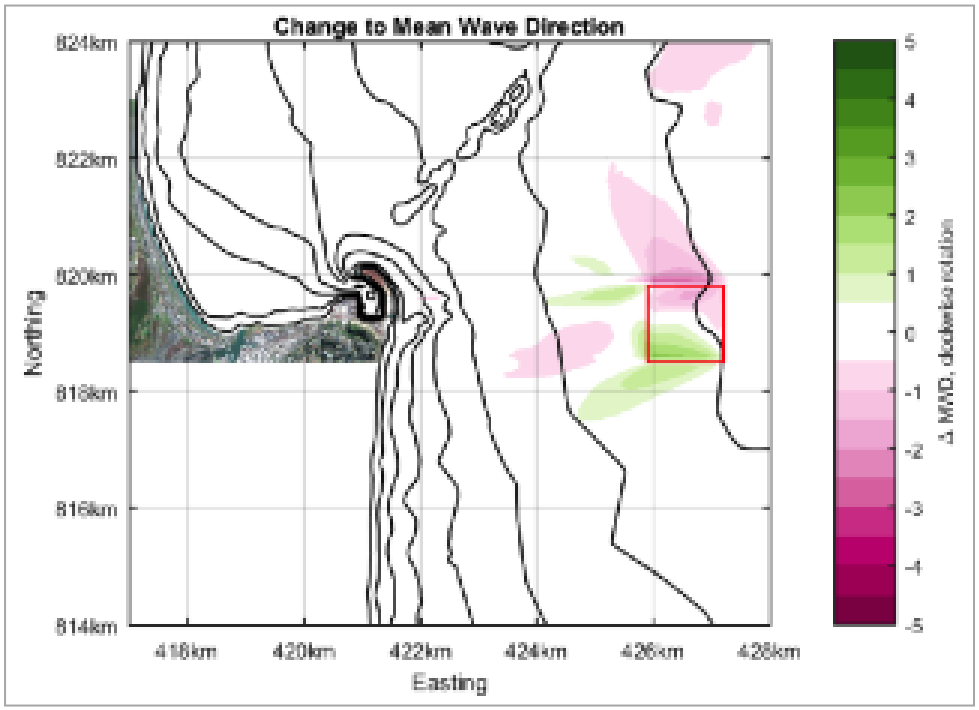


**Figure 8-6: Change to mean wave direction following disposal of dredged material**

The Advisian investigation indicates that the disposal site is mildly dispersive for fine and medium sand. Thus while there is a higher potential for some silt in the top layer of disposal sediments to be re-suspended and move from the confines of the disposal site (as discussed in the next section of this report), there is little chance that the sand fraction will move. Thus the dredged material disposed of in the proposed disposal area will not affect the shoreline sediment supply and nor will it move back into the dredged channel.

## 8.4. Conclusion and Mitigation

Detailed investigations into the potential for dredging of the proposed deeper swinging basin, fairway and channel, and the associated disposal of the dredged material, to modify coastal process have been carried out. These have been subject to expert review and the outcome is presented in several reports provided as appendices to the application documentation.

The potential effects in relation to coastal processes and thus to local beaches have been assessed as negligible as there will be no changes to existing patterns and variability of beach response to very slight changes in the wave environment. There will be no increase in erosion or risk of inundation at the shore either north or south of the Port.

Immediately to the north of the Port, Port Beach may become slightly more accretional than at present[56], and there may be a slight increase in sediment transport from the beach south of Perfume Point towards the Ahuriri Lagoon inlet.

Mitigation of potential coastal process effects has been achieved due to the iterative design processes involved in the location and final design of the proposed dredged swinging basin and channel, and the decision to choose an offshore dredge disposal location where effects are minimised.

The draft conditions in section 26 include a provision for coastal monitoring in the vicinity of Perfume Point, at a level in accordance with the potential effects which have been identified.

[56] This may be a project benefit, although its extent will depend on the availability of sand material in the nearshore environment which could be moved in the "gyre".

# 9. WATER QUALITY EFFECTS

## 9.1. Introduction

The RMA in section 2 defines contaminants as including any substance (including liquids, gases, solids, odorous compounds and organisms) energy or heat that on its own or in combination with the same or other substances, energy or heat, when discharged into water, changes or is likely to change the physical, chemical or biological condition of water. This is a broad definition in relation to any activity that involves excavation and deposition of sea bed material.

Port dredging activities are frequently associated with contaminant risk from sediments containing various contaminants carried in stormwater runoff or point source discharges from land, or from loss of past cargoes such as coal dust and fertiliser into the marine environment as a result of accident or wind transport.

A second aspect of dredging and dredge disposal which affects water quality is turbidity and suspended sediments in sea water from the process of extracting material from the sea bed and disposing of it elsewhere in the marine environment. Turbidity is measured in nephelometric turbidity units (NTUs) and is an optical quality of water. Suspended sediment are a physical parameter and are measured as suspended solids concentrations (SSCs) as mg/L.

The potential for contaminants (other than natural materials) has been investigated through a programme of sampling bed and subsurface material in the areas to be dredged. The implications of the project in terms of turbidity has been investigated through developing an understanding of the material to be dredged, particularly the grain size, and then investigating the behaviour of the material once released into the environment where it is subject to the action of waves and currents. Turbidity has potential consequences in terms of the ecology of an area as it affects water clarity (the amount of light reaching the sea bed) as does suspended sediment which when it settles out can smother the sea bed.

The key background reports covering this aspect are two reports by Beca which include the results of geotechnical investigations of the sea bed below the wharf and other areas to be dredged, three reports by Advisian relating to the physical nature of the coastal environment and coastal processes, a coastal process review report by Shore Processes and Management Ltd, and a report by the Cawthron Institute investigating the ecological effects of the project. These are provided as **Appendices B to H** in Volume 3 of this application documentation.

Wharf construction involves dredging to the reduced level of -14.5m CD within and adjacent to the wharf footprint, including forming a berth pocket. This is part of the Stage 1 dredging campaign and the effects on water quality are thus included within the wider effects of dredging. The wharf construction itself involves removal of the existing revetment material, minor reclamation below MHWS, and placing of replacement armour material, pile driving into the sea bed, and construction of the wharf over the sea surface. These processes will cause some localised turbidity, and the construction must be managed in a way that construction materials including concrete and fluids are not accidentally discharged into the marine environment. A detailed construction management plan will be a requirement of any consent to ensure that any potential for contaminant discharge from the wharf construction is avoided.

The main potential for adverse water quality effects arises from dredging and disposal of dredged material within the overall project.

There will be additional stormwater runoff from the surface of the proposed new wharf. This is addressed separately in this section as a potential contaminant source for which a consent will be required – see section 9.6.

## 9.2. Risk of Chemical Contamination

Samples from the area to be dredged were collected in December 2015. These included samples at depth (deep core sediments down to -15.7m), and surface sediments which included material in areas subject to earlier capital and more recent maintenance dredging. The sediment samples were taken from widely across the area within the capital dredging footprint, including within the current swinging basin and Port entrance where ship movement is currently greatest.

The samples were tested for a range of potential chemical contaminants, including organic content and heavy and trace metals[57]. Contaminant concentrations were found to be very low in all samples analysed. All trace metals were at concentrations well below the accepted Interim Sediment Quality Guidelines (ANZECC 2000), low guideline values[58], usually at least by an order of magnitude. Semi-volatile organic compounds (SVOCs) and organotin compounds were all below detection levels[59].

This analysis was consistent with earlier investigations of surface sediments in the same general area undertaken in 2004 by Cawthron Institute.

In addition, Napier Port is required by its current resource consent for maintenance dredge spoil disposal to ensure that there is no statistically significant toxicity to marine life from the dredged sediment. As a minimum, this involves annual Microtox ecotoxicological testing of composite sediment samples from the berths, swing basin and fairway, undertaken by the National Institute of Water and Atmospheric Research (NIWA). Testing carried out since 2006 has reported no evidence of toxicity for any sediment sample. This has included areas within the Port inner harbour area and berths which are not directly involved in the current dredging proposal, but where it might be expected that any elevated levels of metals or organic substances may be found.

The Cawthron report notes that the capital dredging programme involves disturbing sea bed sediments which have not been disturbed in the past and are not subject to risk of human influence such as modern contaminants.

Thus it can be concluded that there is minimal contaminant risk associated with the dredging and dredge material disposal activities, and thus a *de minimis* potential effect.

## 9.3. Description of the Receiving Environment

Turbidity and suspended sediments in the receiving environment vary over time and in relation to place, although there is very little background data relating to this.

[57] Arsenic, cadmium, chromium, copper, lead, mercury, nickel, tin and zinc.
[58] The ANZECC 15Q Guidelines, Low Values, indicate the lowest level at which biological effects are *possible*. This compares with the High Values, at which a *probable* biological effect will occur.
[59] These are all very low compared with sediments tested at other New Zealand and international ports. See Cawthron Report, Appendix H, Volume 3.

While turbid conditions are common in the near-shore waters of Hawke Bay, there is limited quantitative data available with which to describe the receiving environment. Earlier investigations have suggested that wind speed may be an important factor influencing near-shore turbidity, but even strong offshore north-westerly and westerly winds with little swell have been observed to produce significant inshore turbidity.

Independent surveys were carried out between April and August 1995, which found background turbidity in southern Hawke Bay ranged between 0-25 NTU, with the higher levels generally associated with near-shore areas up to 15m water depth and especially in the vicinity of the river mouths. Continuous logging during a two week period (May-June 1995) of surface water turbidity at the location of the existing disposal area off Westshore Beach ("1a") by Napier Port identified two peaks in values up to 20 NTU sustained for two and three days, respectively.

The total sediment contribution to the near-shore zone of Hawke Bay from the Esk, Ngaruroro, Tutaekuri and Tukituki rivers is estimated to be in the vicinity of 2.7 million tonnes/year. It has also been reported that turbidity produced by the three rivers to the South of Napier can extend northwards towards the Port area[60]. These three rivers deliver a combined silt loading far greater than the Esk River alone. However, waves are acknowledged to be the dominant mechanism by which fine bed sediment may be entrained and retained in suspension; particularly waves of one metre and greater which occur more than 240 days each year in Hawke Bay. The Cawthron report notes that it is most likely that many of the high turbidity events occurring naturally in the area of Pania and Town Reefs arise principally from wave-induced re-suspension of benthic sediments, and that it would be reasonable to expect a measure of similarity between background suspended particulates and those generated by dredging and spoil disposal operations in the local area.

Cawthron Institute has undertaken limited background data collection of suspended sediments and turbidity from water sampling near to Pania Reef. The sampling was undertaken in November and December 2005 at the southwest and northeast end of Pania Reef. Samples were collected 1m below the water surface and 1m above the sea bed on 16 occasions during different tidal and sea states and with a variety of wind conditions.

The suspended sediment data compiled by Cawthron from analysis of Pania Reef water samples in 2006 recorded median TSS values at the southern end of the Reef at 15mg/L at the seabed and 9mg/L at the surface. Maximum values were 54mg/L and 41mg/L, respectively. This TSS data was collected only during conditions conducive to small boat operations, so may represent the lower end of the natural range of values.

Turbidity monitoring buoys have now been installed in the vicinity of and on each side of Pania Reef[61]. Pania Reef is considered to be the most sensitive environment from an ecological and cultural point of view.

The first turbidity monitoring buoy was installed in April 2016, sited immediately to the west of Pania Reef in approximately 15m of water. This location was chosen to correspond with the most likely plume-path from dredging related activities that could impinge upon Pania Reef from the disposal sites initially being investigated. A growing record of information from this buoy is now indicating some patterns. The second (eastern) buoy has been in place since April 2017 and will provide a basis for comparison with the western buoy as well as yielding specific information for that location.

[60] P. Frizzell, Coastal Zone Management, reported in the Cawthron Report.
[61] Their locations can be seen in Figure 10-1.

Seawater grab samples have been collected at the Pania buoy from the same depth as the turbidity sensor and analysed for TSS to provide correlation between the NTU readings and TSS in the water column. This indicates a reasonably good linear relationship.

The record for surface turbidity at the Pania Reef monitoring buoy gives median and 95th percentile values of 1.6 NTU and 8.8 NTU, respectively. It indicates that turbidity is variable with periods of elevated turbidity associated with specific weather or wave events. The application of the preliminary correlation between turbidity and suspended solids results in estimated values for median and 95th percentile TSS for the monitoring period of 3.6 mg/L and 15.3 mg/L, respectively.

It is the experience of local divers that highly turbid conditions can persist on Pania Reef for up to several weeks[62]. During the diving surveys conducted in November 2005, an attempted transect dive on North Rock at the offshore extremity of the reef was aborted due to high turbidity resulting in zero visibility below 15 m water depth. Conditions for the dive were otherwise calm with winds below 10 knots.

Figure 9-1 shows aerial photographs of turbidity effects in the Napier coastal region. Photograph (A) shows an extensive turbid plume in the immediate vicinity of the Port. Conditions on the day of the photograph were ENE winds at 5-6km with a significant wave height of 0.5m; mean period 5-6 seconds, mean true direction east. While the source of the turbidity is not clear, the image is consistent with modelling results suggesting that sediment re-suspended in the Port area may form a plume that can propagate over the inshore sections of Pania Reef. The frequency of such occurrences is uncertain but the observations of sediment veneers on Reef surfaces during transect dives, together with other anecdotal observations, suggest that such effects are not uncommon. Photograph (B) shows a turbidity plume apparently generated by waves breaking over Pania Rock at the centre of Pania Reef. It appears, from the relative clarity of the surrounding water, that the source of the plume is sediment re-suspended from the reef top itself rather than the deeper soft sediment areas on either side. This is again consistent with diver observations of natural silt deposition upon Reef surfaces.

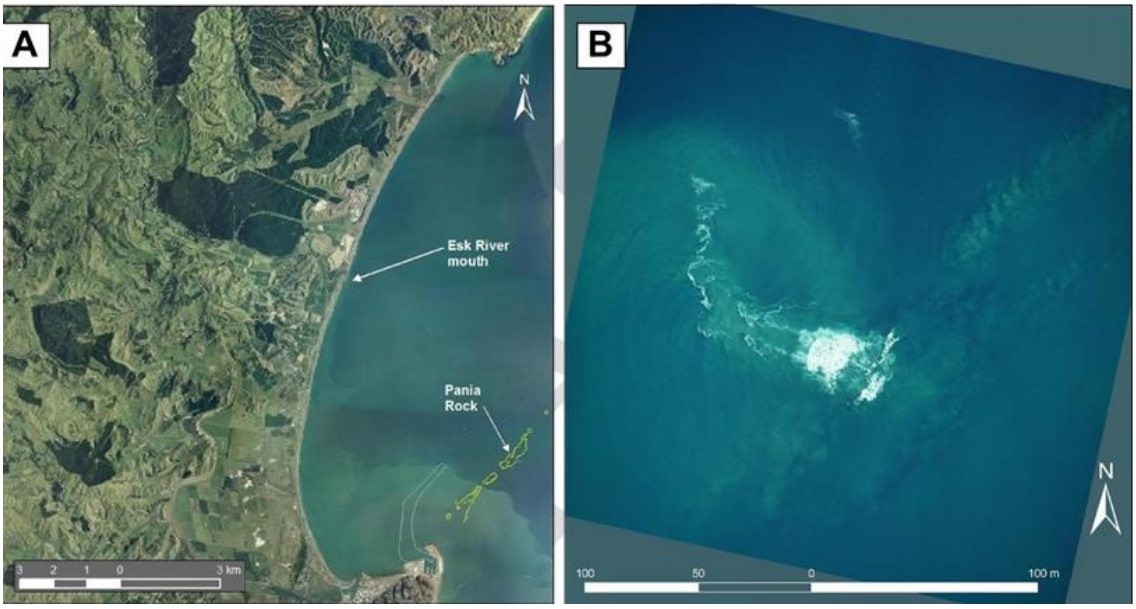



**Figure 9-1: Aerial photographs of Napier coastal turbidity effects**

[62] Hayden Moffit, Ocean Adventures HB Ltd, reported in the Cawthron Report.

The results of TSS analysis of water samples from the two Pania Reef monitoring stations indicates a logical order in terms of expected TSS, with the highest levels coming from the inshore site near the seabed and the lowest suspended solids generally near the surface beyond the outer end of the reef. The results were also found to be logically consistent with wave and wind conditions. Higher TSS coincided generally with greater wave height and onshore wind directions, enabling Cawthron to conclude that swell is likely to be an important factor contributing to the re-suspension of bottom sediments from the seabed surrounding Pania Reef.

It was also concluded that the presence of suspended sediments in the waters surrounding Pania Reef is highly variable and dependent upon sea state and other environmental factors[63].

Turbidity monitoring results from the Pania west monitoring buoy are now available from April 2016 up to the present[64]. The results show generally that turbidity levels are low, or less than 10 NTU, but with a small number of spikes in excess of 30 NTU. The 2016 winter was generally mild in terms of weather and storm events, and so higher levels of turbidity may be within the expected range. Salinity and temperature were also recorded, and correlation of salinity and turbidity may assist with understanding the impact of rain and storm events. Similarly, turbidity may be correlated with wave height and the data be correlated with this information from the Port's wave buoys.

The two highest spikes in NTU identified to date have correlated with increases in discharge flows from the Hawke's Bay rivers as well as increased wave heights.

The second Pania turbidity monitoring buoy, on the west-side of Pania Reef, was deployed in April 2017. Figure 9-2 provides correlation between NTU readings over the first week of operation of the two buoys. This includes a single storm event which raised turbidity close to 20 NTU.

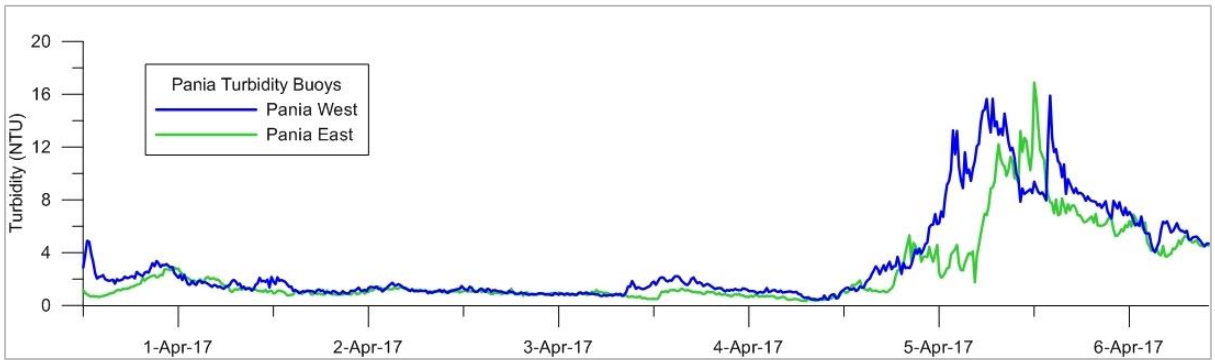



**Figure 9-2: Comparison of turbidity data from Pania East and West buoys for early April 2017**

As can be seen, the turbidity readings from each buoy track one another reasonably well both before and during the storm event. The increase in turbidity at Pania West preceded the response at the further offshore Pania East location by several hours, but the magnitude and duration of the event in NTU were almost identical. This demonstrates that it should be possible to track a more spatially limited event, such as a dredge plume, that may affect only one location or present a greater time-lag between the onset of a change in turbidity.

[63] Which would include the contribution at any time from the Hawke's Bay rivers.
[64] With some limited interruptions due to maintenance requirements. See Figure 4-1 in the Cawthron report.

Cawthron has brought all the available measured turbidity information together to provide a potential frequency distribution of background turbidity. This takes the form of a leptokurtic, right-skewed Gaussian distribution[65], resulting from long periods of relatively low turbidity punctuated by episodic peaks of highly turbid water (see Figure 9-3 on the following page). The histogram is shown overlaid with a normal Gaussian fit and alongside a box-whisker plot showing the quartiles and minimum/maximum values. For the compiled dataset, the median turbidity value was 1.3 NTU with a maximum of 79 NTU. The respective 95$^{th}$ an 99$^{th}$ percentile values were 6.8 NTU and 13.2 NTU.

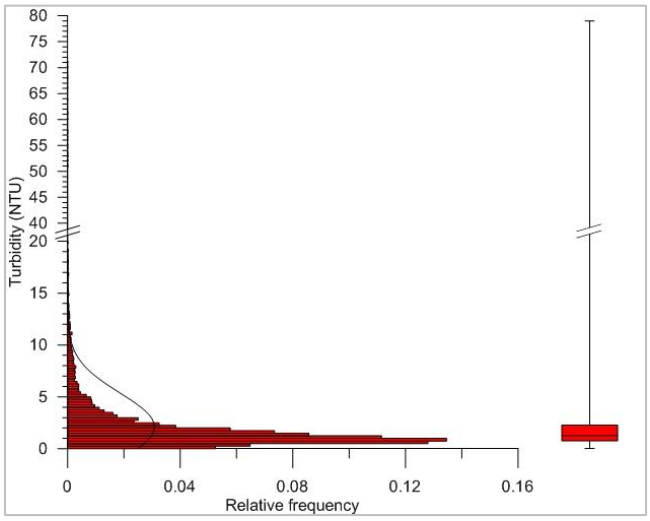



**Figure 9-3: Histogram of turbidity data collected 18$^{th}$ April 2016 to 10$^{th}$ April 2017, alongside a box-whisker plot of the same dataset**

A limited correlation has also been undertaken between NTU and TSS at the West Pania buoy and the seawater grab samples (May 2016 to September 2016). This is shown in Figure 9-4 below.

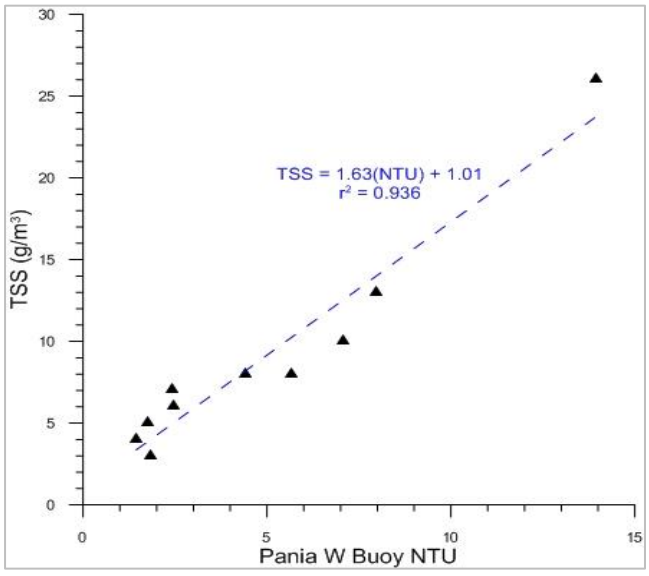



**Figure 9-4: Relationship between TSS samples (in g/m$^3$) and NTU at the West Pania buoy**

[65] I.e. a curve that is skewed towards the lower NTU values from what would be a normal bell-shaped distribution.

The TSS and NTU datasets will continue to be collected during the period prior to implementation of the dredging consents (if granted). While it is expected that turbidity range over which a correlation can be derived will be extended, it is recognised that there are obvious limitations to the capture of TSS extreme conditions due to the need to sample from a small vessel[66].

Inshore from Pania Reef, in the shallower and more active coastal zone where dredging is proposed to take place, there is considered to be high turbidity and high TSS. For example, this can be seen in Figure 9-1, Photograph A, and is aligned with the understanding of coastal processes set out in section 8 of this report. In addition, this area is regularly traversed by large ships which themselves stir up sediments into suspension.

Town Reef, the other sensitive receiving environment, is much closer to shore and is therefore subject to high variability in both TSS and NTU.

It is this variable environment within which the additional disturbance of both dredging and dredge material disposal will take place.

## 9.4. Sediments to be Dredged and Dredge Processes

As well as investigation for potential contaminants, the material to be dredged has been extensively investigated in terms of its particle size range and thus the likelihood that dredged and disposal material, disturbed during the processes, will remain in suspension as a type of contaminant.

The information from the boreholes and vibrocore investigations has been brought together with the geotechnical information and the volumes to be dredged[67]. A composite graph of particle sizes is shown in Figure 9-5.

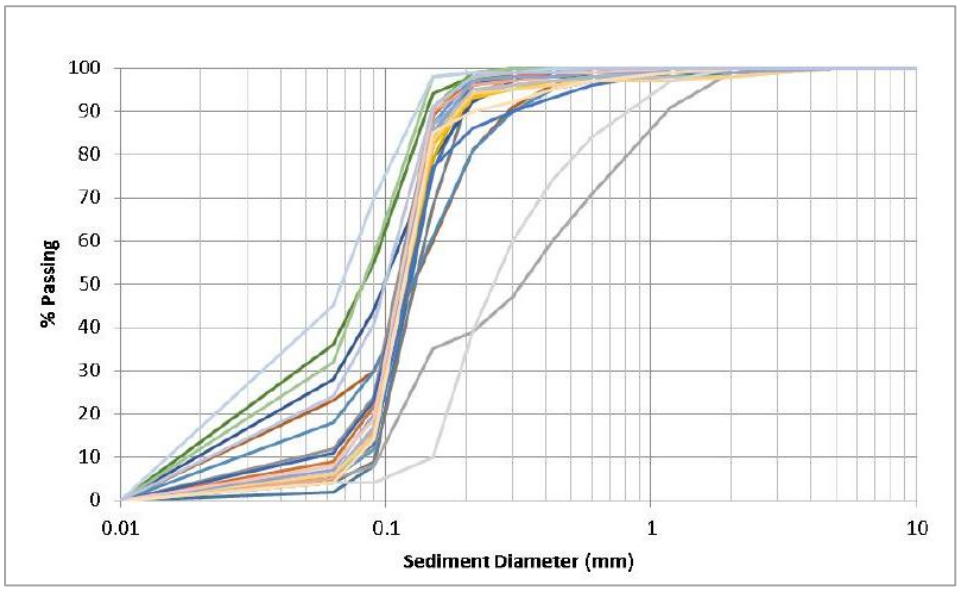



**Figure 9-5: Particle size distribution in sediments to be dredged (different colours indicate results from different boreholes)**

[66] I.e. during stormiest and possibly most turbid periods, sea conditions prevent data being collected.
[67] Particle size information has been assessed as if it was unconsolidated and available to move freely in the marine environment during and following disposal. This is conservative, as some of the material will remain "clumped" as consolidated in the strata that it has been excavated from.

The results show that, within the area to be dredged:

- approximately 20% of sediments are finer than 0.1mm
- approximately 70% of sediments are sized between 0.1mm and 0.2mm
- approximately 10% of sediments are coarser than 0.2mm (and of these, only 1% are >0.5mm and only 3% are >0.3mm)
- the median particle size is approximately 0.125mm.

The material is therefore largely in the fine sand or smaller (silt and clay) particle size with a small portion of medium sand size and very little coarse sand or gravel size.

Clay and fine silt particles are particularly mobile and are the particles that disperse during dredging and during disposal of the dredged material. The material will be transported from the dredging area to the disposal area providing two locations and incidences of discharge of fine material, with the material in the disposed mound remaining in situ with the upper layers potentially able to be re-suspended during some sea conditions. The surface of the area which has been dredged also remains a source of suspended sediment in some sea conditions while the margins "relax" into an equilibrium state.

Advisian has investigated the implications of the dredging programmes in terms of the movement of suspended sediments from the dredged areas and the proposed disposal area taking into account the dredged methods to be used (BHD or TSHD), the duration of the campaigns and a typically stormy weather period (July 2016 conditions). TSHD has a greater proclivity to disperse sediment during the suction dredging as it is working on loose sediment which it disturbs as it dredges. BHD involves more solid material, but there are times when both are working together, contributing to the greatest potential for suspension during dredging processes.

## 9.5. Actual and Potential Effects on Water Quality

### 9.5.1. Effects during Dredging and Disposal

The likelihood of suspended sediments entering the water column during dredging is described as follows in the report of Shore Processes and Management Ltd:

> *"The dredging activity will result in suspended sediments being added to the water column resulting in turbidity. The character of the sediments are such that sand particles will rapidly drop to the seabed, while silt and finer sediment concentrations will be relatively evenly spread through the water column.*
>
> *During dredging, the plume generated will be very localised to the area worked. Sand overfill (spilling from the dredge hopper) will settle quickly. The highest concentrations occur at the beginning of the dredging campaigns due to trailer suction hopper dredge dominating. Lower suspended sediment concentrations result from backhoe dredging. Dredging along the navigation channel will have potential for plume generation, but because of the sediment character, this will have lower sediment concentrations than the plume resulting from dredging the inner harbour port area. It is unlikely that plume generation from dredging the channel will be greater than occurs at present during maintenance dredging."*

The potential for suspended sediment at the disposal area is shown in Figure 9-6 on the following page as part of an overall process.

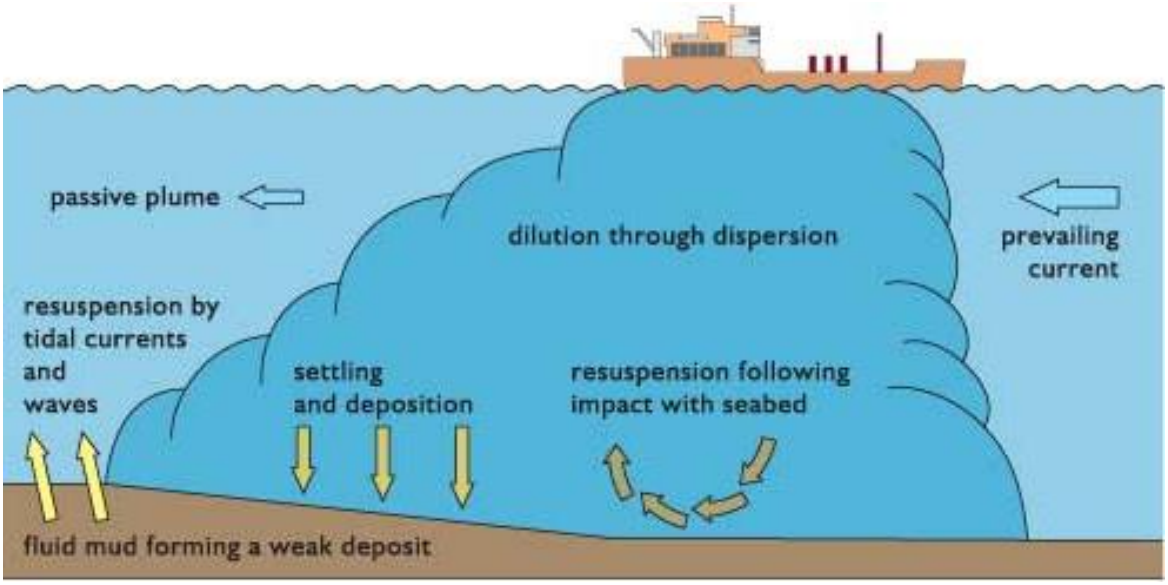



**Figure 9-6: Schematic of a dynamic sediment plume discharge from a dredge hopper**

Cawthron notes that very high suspended sediment concentrations tend to be very localised, as the greater density of the water containing the sediment means that it results in downward turbidity currents carrying the plumes back to the sea bed where suspended material is re-deposited.

The process immediately following deposition is described in the report of Shore Processes and Management as follows:

> *"Deposition at the disposal ground will generate a more extensive plume than the dredging. As with overfill, settling of the sand fraction will occur rapidly and will not travel far from the discharge site.*
>
> *Modelling for a large range of wave and wind and resulting current scenarios showed that there is no potential for Pania Reef to be affected by suspended sediments >10mg/L[68] above background. Suspended sediment concentrations at the reef, while negligible, are highest during times when the currents at the spoil ground are directed toward the northwest. The 98%ile Silt/clay fraction concentration (exceeded for less than 1 day per month during the dredging campaigns) is less than 10mg/L above background levels over the reef area."*

The modelling undertaken by Advisian was based on Stages 1 and 5 dredge campaigns[69] and the varying material from each. They also took into account the use of the various dredges (BHD or TSHD, or both), and eleven particle settling velocities from clay sized to a diameter of 2mm (sand size). It was assumed that all particles were independent (i.e. they had broken down completely from their strata and had not flocculated together). In reality, some sediments will remain "clumped" and others will flocculate and thus

[68] The comment relating to 10mg/L above background is a reference to the New Zealand Water Quality Guidelines (non-statutory) for aquaculture. These guidelines are not considered to be reliable in terms of ecological effects on any type of farmed species, and should not be taken as a reliable indication of potential ecological effects when exceeded. Many species thrive in this level of turbidity.

[69] Stage 1 was chosen because of its volume and duration. Stage 5 was chosen because it involves considerable use of the TSHD in the outer channel area and closer to Pania Reef.

settle faster. Thus the model outputs will be conservative in providing for slower particle settlement on average than is likely to actually occur. Conservative, "worst case" sea conditions were tested although a full range of conditions were modelled. Assumptions based on Advisian's extensive experience were used to base the different levels in the water column within which releases or sediment would be made for both dredging and dumping of dredged material. This included an allowance for overflow[70] at the dredge site and a degree of propeller wash.

Figures 9-7 and 9-8 show the 98 percentile exceedances (i.e. levels of suspended sediments exceeded for only 2% of time in any campaign) for Stage 1 dredging and disposal both in aerial extent and as a cross-section in the water column. This campaign involves wharf and berth pocket, Port entrance and swinging basin dredging and comprises approximately half the total volume. Figures 9-9 and 9-10 show the same information for Stage 5, where the dredging is closer to Pania Reef but smaller in total volume.

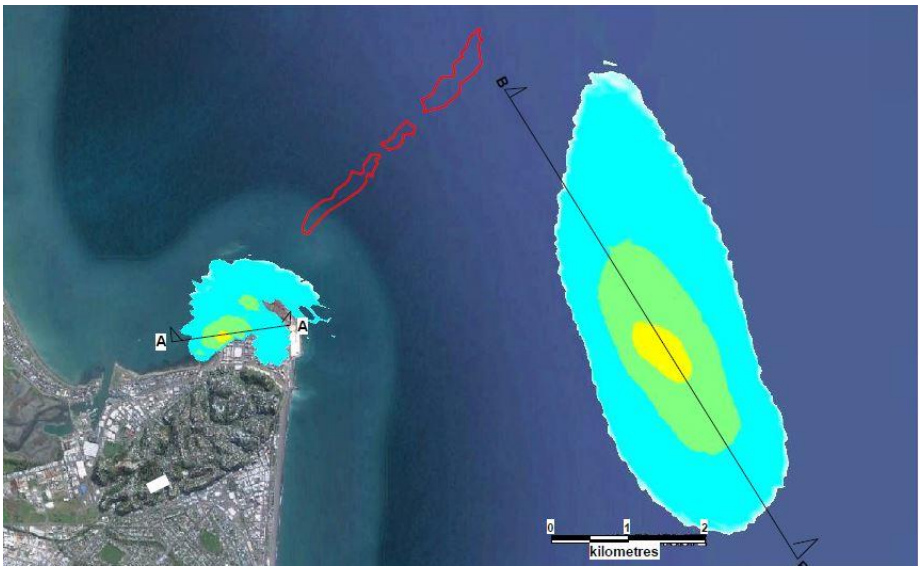
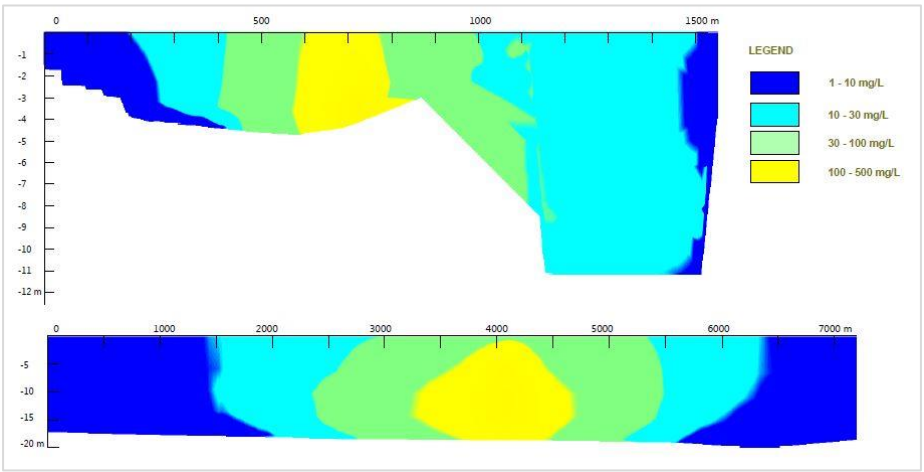



**Figure 9-7: Dredge plume extent – Stage 1 dredging and disposal**




[70] Overflow is provided for within TSHD, as it reduces the weight of the load and speeds up the time that the dredge takes moving to and from the disposal area.

**Figure 9-8: Stage 1 cross-section concentrations at the disposal site (section AA, top and BB, bottom)**

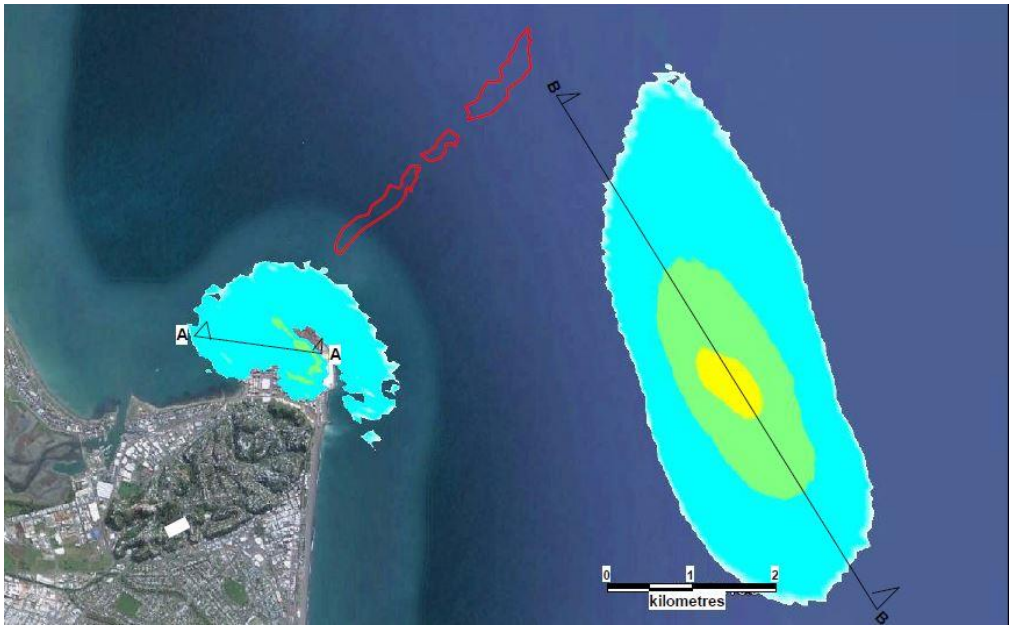



**Figure 9-9: Dredge plume extent – Stage 5 dredging and disposal**

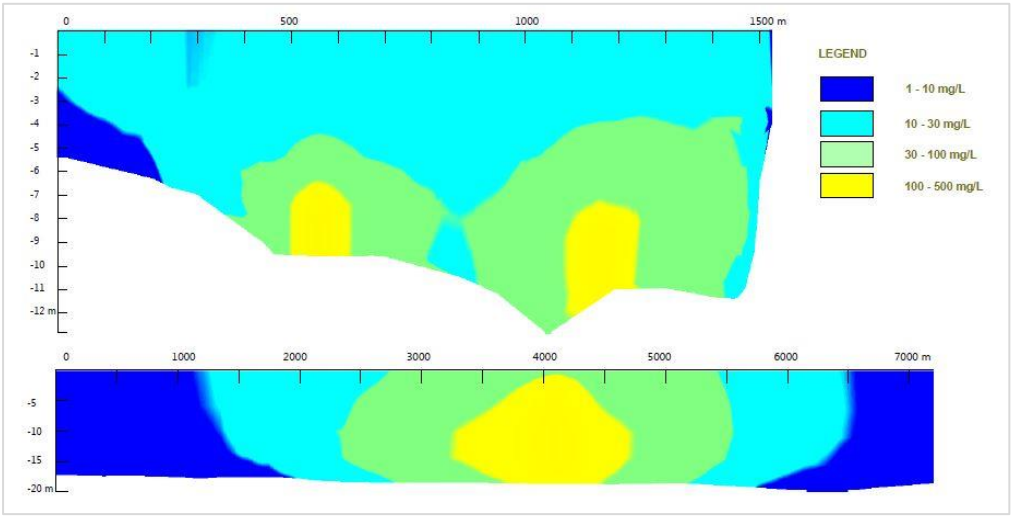



**Figure 9-10: Stage 5 cross-section concentrations at the disposal site (section AA, top and BB, bottom)**

Advisian made the following general observations in relation to the model results:

- The plume generated at the disposal area was more extensive than that generated at the dredge site, for all scenarios tested;
- Sediment concentrations are spread relatively evenly over the vertical distance of the water column in the vicinity of the disposal ground but are higher near the bed in the vicinity of the dredge area;
- The model results do not show any potential for deposition of fine silts or clays over the footprint of Pania Reef during the timeframe of the dredging campaigns. Sediment deposition at the reef would be limited also due to the effects of sediment resuspension due to wave stirring, as the

water depth at the reef is relatively shallow, allowing any sediments to be resuspended by wave-induced near bed-currents;

- The model results show that the suspended sediment concentrations over the Pania Reef footprint were always less than 10mg/L above background over the entire simulation period, including all the finest material;
- The sand fractions of the discharge settle quickly. Sand fraction deposition is limited to the immediate vicinity of the disposal and dredge areas;
- The highest suspended sediment concentrations above background levels are in the inner Port area and at the disposal area;
- The highest concentrations occur at the beginning of the campaigns due to the TSHD dredging dominating. Lower concentrations result from backhoe dredging; and
- Prevailing currents at the disposal area are generally directed toward the south-east. However, under some wind conditions, currents can be toward the north-west, resulting in suspended sediments being directed toward the Reef, but at concentrations below 5mg/L over the footprint of the reef. These concentrations would be below those that would be visible to a casual observer above the surface, and occur less than 2% of the time over the simulation period.

Both Cawthron and Shore Processes and Management consider that the suspended sediment and turbidity from the proposed project is within the range already regularly experienced in the area associated with maintenance dredging.

### 9.5.2. Effects Due to Resuspension at the Disposal Site

The likelihood of re-suspension of material from the mound in the period following deposition of the dredged material has been further investigated by Advisian. The modelling is conservative in that it assumes a 2m high mound[71] and a range of weather conditions, including prolonged storm conditions. Figure 9-11 shows the percentage of time in any year sediment may be re-suspended. This information has been included in modelling relating to potential direction of travel of this material.

As can be seen in Figure 9-11, sediments at the top of the mound which are smaller than about 0.15mm may become mobile approximately 0.25% of the year. This is contributed to by the depth of water and the reduced ability for suspension from wave action. Suspension and transport is only likely to occur during strong northwest winds, under which currents will transport material from this area to the south and away from Pania Reef.

Background turbidity at Pania Reef can be high for prolonged periods due to natural wave action, with observers noting that fine material is re-suspended from the higher levels of the reef, rather than from the softer sediments on each side.

[71] Whereas the size of the area provides for approximately a 1m mound once material has settled.

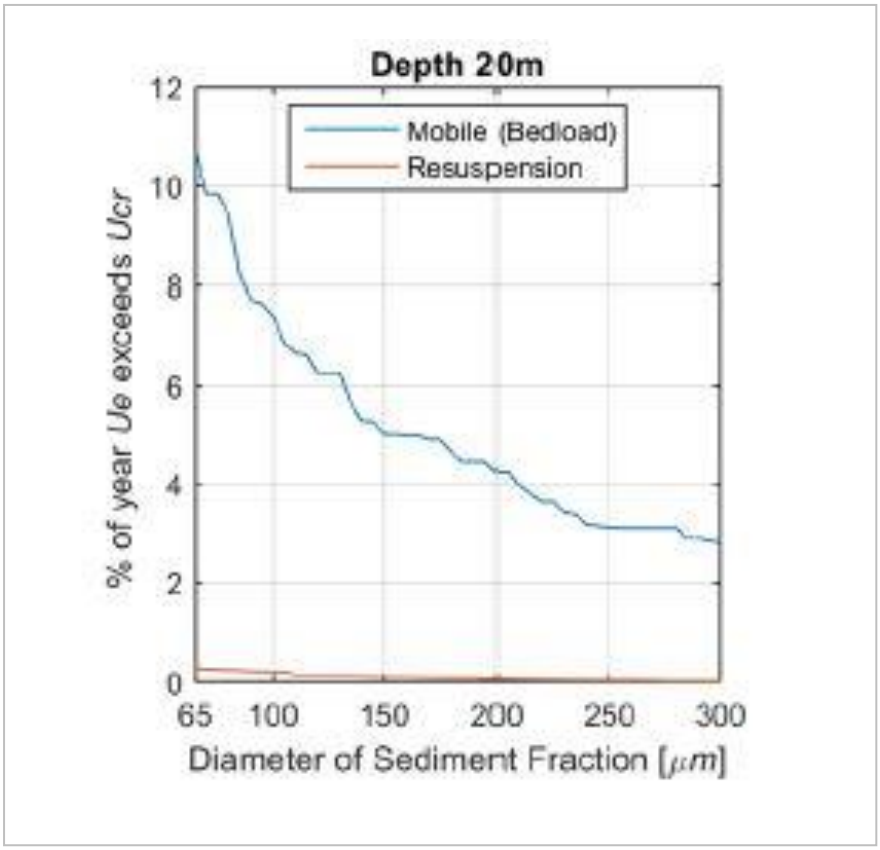



**Figure 9-11: The percentage of time annually that material at the disposal area may move as bedload or suspended, by particle size**

Only one wind direction could potentially transport fine material towards Pania Reef: this is a due west wind and such conditions exist for less than 10% of the time. The maximum potential spread of fine suspended sediment could contribute 2mg/L above background at the top of the water column at the distance of the reef, and 4-6mg/L above background at the bottom.

The Advisian report also points out that, even though minor amounts of additional sediment may be added to the background TSS within the water column, this will not settle out or be deposited on the reef due to the sheer stresses (from wave action) at the reef being higher than those at the disposal site.

Cawthron notes the variability of background conditions at Pania Reef which have been observed, and the information from the grab samples and correlated turbidity information, which suggests that background (ambient) suspended sediment concentrations of 10mg/L may be reasonably typical of Reef conditions, but that this level may be greatly exceeded during high swell or runoff events and remain elevated for several days. On that basis, Cawthron indicates that *"a project-related increase in SSC of less than 7mg/L is very unlikely to lead to adverse ecological effects"* at Pania Reef. In relation to any overall contribution of sediment settling on or near the vicinity of the reef as a context for the extent of any effect, Cawthron notes that, even if some deposition was assumed, the project plumes would only add incrementally to existing background deposition at the reef and would not persist, in accordance with known natural patterns of occurrence. Cawthron has been able to conclude that any contributions from dredge sediments to adversely affect the Pania Reef area will have effects that are less than minor.

## 9.6. Stormwater Discharge Effects

### 9.6.1. Present Situation

Napier Port currently holds an existing stormwater discharge permit[72]. This permit provides for the discharge of stormwater from the Napier Port premises and surrounding area into the coastal marine area and/or gravel beach immediately adjacent to the coastal marine area.

The consent requires that all reasonable measures shall be taken to ensure that the discharge is unlikely to give rise to any of the following effects in any receiving water after reasonable mixing:

- the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
- any conspicuous change in colour or visual clarity;
- any emission of objectionable odour;
- the rendering of any aquatic organism unsuitable for human consumption; and
- any significant adverse effect on aquatic life.

An extensive monitoring programme is in place to sample first flush stormwater events, i.e. stormwater generated within one hour of rainfall commencing, at selected sites within the Port. In addition, water samples and sediment samples are taken, analysed and reported to the HBRC.

### 9.6.2. Stormwater generated from new Wharf catchment

Stormwater will flow overland from the deck hardstand area from the new wharf catchment to slot drains running parallel to the wharf and located on the landward edge of the deck wharf. The container terminal pavement will be graded, at a 1% fall away from the wharf, over approximately 50m to a new slot drain. The new wharf catchment area is approximately 12,000m$^2$ and will be used for container storage, and the movement of mobile cranes and associated port machinery and plant.

The three existing slot drains will be upgraded to 525mm diameter concrete pipes running perpendicular to the wharf and discharging via the existing discharge points to coastal waters[73].

The catchment area is of a nature and scale that any stormwater generated is minor both in volume and in terms of potential environmental impact on coastal waters. Stormwater discharges will meet the overall receiving water standards, after reasonable mixing, as required. The increased discharge will be consented by a modification to the existing permit immediately prior to construction and will be managed within the context of the conditions above.

## 9.7. Conclusions and Mitigation

In the context of the HBRCEP, water quality considerations in the CMA are the subject of objectives and policies to maintain and enhance water quality and ensure that water quality remains fit for aquatic ecosystems and contact recreation in defined areas including the coastal strip 200m wide west and south of the defined Port Management Area[74], and elsewhere for aquatic ecosystem purposes.

[72] CD040033Wa Coastal and Discharge Permit, including Plan 4498-5D.
[73] At locations 13, 14 and 15 on Plan 4498-5D attached to the existing stormwater discharge permit.
[74] This can be seen on the HBRCEP maps in Plan Set 3 in Volume 2.

The applicable provisions are found in Part D 1b of the HBRCEP, and Schedule E.

Regardless of which classification applies, in relation to the discharge components of the project, all standards and requirements relating to water quality are met. This includes that:

- There are no chemical or organic components in the discharge which approach or exceed accepted levels. The material to be dredged and disposed in the marine environment is not contaminated.
- The contaminants (sand, silt and other particles) which have been assessed in this section as having the potential to affect water quality will bring about minor or less changes to the existing environment, in that such changes will be localised, temporary, or within the range of background or "normal" conditions in the area.
- While technically comprising an effect in their own right, there is also the potential for such discharges to have ecological effects. Such potential effects are addressed in later sections of this report – however, no adverse effects with more than minor implications have been identified.

Mitigation is however proposed through draft conditions which involve the ongoing continuous monitoring of turbidity, and sampling of TSS as before, to gain a more comprehensive knowledge of background NTU and TSS in and around Pania Reef, along with conditions which will be embedded within a Water Quality Management Plan, requiring responses depending on the intensity and persistence of turbidity events during dredging campaigns. These are set out in the draft conditions and draft management plan in section 26 of this report.

The stormwater generated from the new wharf will flow overland from the newly constructed hardstand area into the slot drains to discharge from the existing consented stormwater outlets into coastal waters. The potential adverse environmental effects associated with the stormwater run-off after reasonable mixing will be negligible.

# 10. EFFECTS ON BENTHIC ECOLOGY

## 10.1. Introduction

The potential for effects on benthic ecology[75] will vary across the receiving environment depending on both the nature of the ecology itself and the nature of the changes arising from the project.

The project may have direct effects, from removal or smothering of the habitat that the biota is found in or on (dredged areas and disposal areas) or indirect effects from changed conditions – in this case potentially from changes associated with changed turbidity and deposition of suspended sediments outside the disposal area.

The key specialist report which investigates and evaluates the implications of the project on benthic ecology has been prepared by the Cawthron Institute. This is provided as **Appendix H** in Volume 3 of the application documentation.

Cawthron Institute has had a long track record or surveying, monitoring and analysis in and around Napier Port. For this project it has:

- surveyed sediment characteristics in directly affected areas, and intertidal and subtidal habitats, infauna[76] and epifauna[77];
- collated and compared new data with that from previous surveys of the areas potentially affected;
- undertaken desktop assessment of marine resources and potential impacts using available information sources;
- assessed the relative importance of habitats and marine resources lost or potentially altered by the proposed development; and
- assessed the potential spatial extent of probable impacts.

## 10.2. Description of the Existing Environment

### 10.2.1. Information Base

Surveys of benthic biota were undertaken, along with an investigation of the material on or within which they live, in the following general areas in preparation for the applications:

- the area to be affected by dredging (approximately 112ha at a depth of -4m to -13m CD)
- Pania Reef (by 8 x 100m diver transects)
- the proposed offshore disposal area (approximately 350ha in a depth of -20m to -23m CD)
- the nearshore area close to the Port, including the revetment, beach and intertidal area west of the Port Beach (9.3ha in a depth from MHWS to -7m).

Information from previous surveys was also integrated into the overall dataset. This included from areas immediately north of the Port breakwater (approximately 40ha at depths of -0 to -7m CD) and the extensive areas formerly used for dredged material disposal and a control zone off Westshore and north of

[75] Benthic ecology relates to plants and animals that are within (Infauna) or attached (epifaunal) to the sea bed, or living on the sea bed surface, including all the surface between land below MHWS and the sea itself.
[76] Fauna living in the sediments of the sea bed.
[77] Fauna living on the surface of the sea bed, or attached to the surface.

the Port (400ha in depths of 0 to -12m). A range of techniques from cores, to surface sampling through dredge trawls, to dive and photographic transects, were used.

Figure 10-1 demonstrates the location and extent of areas for which relatively detailed benthic ecology information is now available.

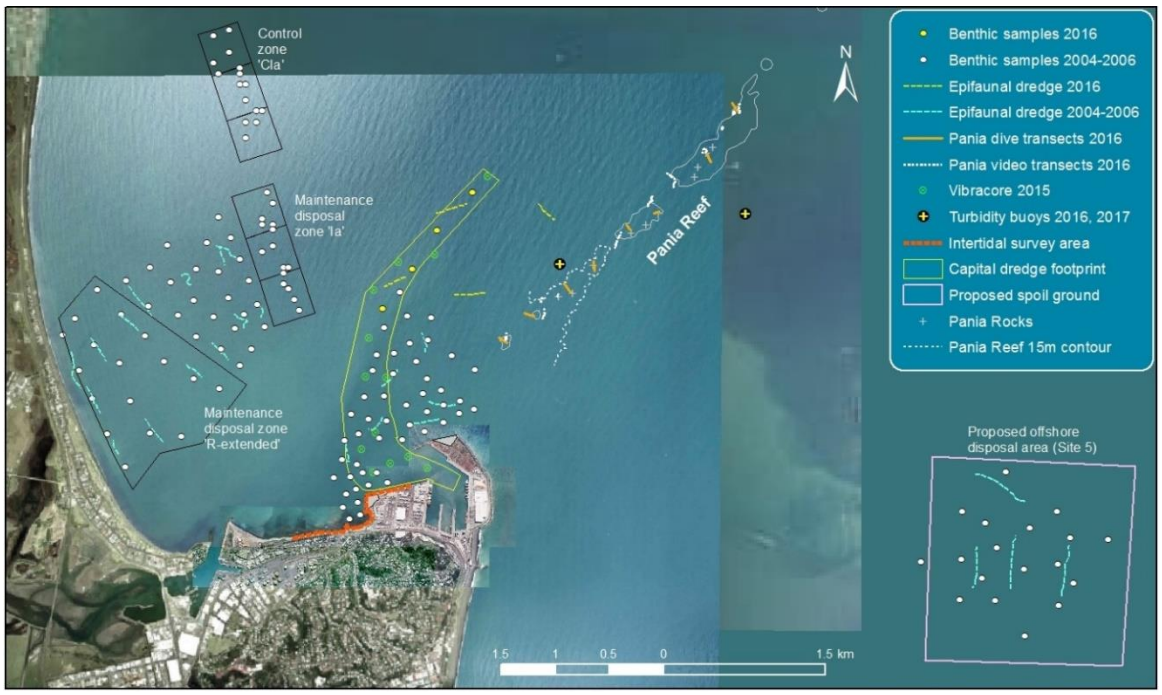



**Figure 10-1: Overview of benthic survey components and type of survey**

While the dredge disposal areas off Westshore do not comprise part of the current applications, the information from this area is important as it helps with an understanding of the ability of local benthic ecology to recover between periods of considerable change due to deposition.

## 10.2.2. Channel and Swinging Basin Area

### Infaunal Communities

The infauna in the vicinity of the Fairway and new channel to be dredged include amphipods, polychaetes, nemertean worms and ostracods, with the first two being the most abundant. While there was a range of densities of occurrence of the infauna, there was significant spatial uniformity, particularly with depth from the surface. There was slight variation due to whether the area had been dredged in the past or not, but this was not a significant variation. Compared with earlier data, it could be seen that there was a slight increase in abundance of some species – peaking with some opportunistic polychaetes and nemertean worms. In contrast, the bivalve species in the area subject to maintenance dredging had decreased in density. Such differences are reported as being expected, given the time separation of the surveys.

### Epifaunal Communities

The trawls of this area indicated that the sand dollar is the predominant feature within the undredged areas, but it and a range of other epifauna were largely absent from dredged areas. Outside of the dredged area were found urchins, horse mussels, brittle stars, cushion stars, olive shell and several species

of crab. These were particularly found in the areas with a silt benthos, and less found in areas with a mobile benthos.

### 10.2.3. Existing Disposal Areas off Westshore

#### Infaunal Communities

This area is subject to existing consents, and has been monitored regularly since the disposal of dredged material began. While differences in community structure were found across the various sampling sites, the difference across sites is less than the differences due to survey years. The differences cannot be explained by location, water depth or sediment compensation. The differences largely related to changes in dominant species, rather than loss of diversity or encroachment by opportunistic species.

Following a more detailed analysis of this information, Cawthron was unable to draw any clear conclusions. The suggestion was that the variations over time constitute a small but measureable shift in community structure rather than a clear adverse impact. Such patterns are report to not be unusual and do not demonstrate long-term trends which would comprise an adverse effect from repeated deposition of dredged material.

#### Epifaunal Communities

Previous studies[78] had compared communities over time and between the control and deposition sites and had demonstrated no significant differences and therefore no adverse effect. While there were some spatial differences in species present[79], abundance and species diversity had been maintained. The most abundant species, as in the undisturbed ones close to the channel, was the sand dollar. These were followed by wedge clam, hermit crabs and olive shells.

### 10.2.4. Near Shore Intertidal and Subtidal Habitats

#### Subtidal Areas

In the soft sediments in this area near to the Port the epifauna was similar to that in the other soft sediment areas described above. The sand dollar was the dominant species, with olive shells, whelks and hermit crabs also present.

Within this area was also found exposed cobble and rock areas which supported some bryzoans, red algae, sponges, and sparse patches of horse mussels. Between the rocky areas and the fine-sediment areas was a transitional area which is rock shoreline but regularly subject to sedimentation as a result of the coastal processes in the immediate area. Here the repeat modification of the substrate means a patchy and lower general diversity than in the more continuous reef areas, limited by sediment movement and high silt exposure.

Below the tidal range in this area there is an area of permanent natural shallow reef which is semi-sheltered due to its northerly aspect and the shelter of the Port reclamation. The taxa here was dominated by large brown algae, or kelp, which itself creates habitat for mobile species including young fish.

[78] In 2004, 2007 and 2012.
[79] Potentially related to differences in depth.

On the rock wall areas below low tide were found large macro-algae and coralline paints and turf along with cats-eye snails, ascidians, calcareous tubeworms, sea stars and red rock crabs.

### Intertidal Areas

The intertidal boulder reef to the west of the Port Beach supported communities of high diversity and species mix typical of a moderate energy rocky environment. Sea lettuce, brown algae, velvet weed and undaria were all found in this area. Fauna were also diverse including dense colonies of tube worms, anemones, ascidian, a range of crab species including the half-crab, various gastropod species, chitons and sea stars.

### Rock Batters

These areas are more exposed due to orientation, but the steepness and detail of overhangs, caves and crevices, provides additional habitat to those of the reefs. There is a single substrate though, with little available sediment. As a result, communities are less diverse. A range of barnacle species, limpets and gastropods were found on exposed rock faces, while coralline turf, rock velvet and comb weed were found on vertical faces.

## 10.2.5. Proposed Disposal Area

### Infauna

This area has a flat and homogenous soft sediment habitat of fine and very fine sands, silt and clay (98% of the total surface sediments). Sediments were also well-mixed in the top layers, indicating little vertical diversity. The core samples showed considerable population variation, but this was likely to be due to a few recurring dominant species – particularly one species of polychaete, and a small bivalve species which is typically patchy in distribution. There were 43 species recorded in all. Cawthron concluded that the community was not under stress and the variability is normal for offshore stable sandy sediment areas.

### Epifaunal Communities

The dredge trawls yielded numerous small sea cucumbers (of more than one species), whelk species, hermit crabs and sea spiders. Most of the individuals collected were small, and it is possible that more fell through the 10cm dredge mesh, so that densities may be higher than indicated. There was little variation across the site and all species are described as relatively common to sandy coastal sea bed areas in the region at similar depth.

## 10.2.6. Pania Reef

The form of this feature was shown in Figure 7-2. It commences some 800m from the Port breakwater and extends some 3.5km to the northeast. It is 400m wide at its widest. Dive transects and video surveys were undertaken to assist an understanding of the Reef's ecology.

The findings of the transects can be summarised:

- There is greater species diversity than at any of the other areas investigated, due to the depth and diversity of the reef itself. In all, 82 animal taxa and nine macroalgae taxa were identified.

- Typical species include sponges, bryzoans, nudibrachs, hydroids, ascidians, sea tulip and macroalgae such as red algae and kelp, as well as bivalves (including green-lipped mussels), kina and whelk species. In some places there are horse mussels and oysters and rock lobsters.
- Fish species present include butterfly perch, blue cod, various triple-fin species, wrasse, scorpion fish, moki, leather jacket, tarakihi, sweep, hiwihiwi, marble fish and ray.
- Depth, position along the reef, orientation and level of sedimentation appears to affect distributions strongly. Depth is correlated to light availability and water movement – both reduce with depth.
- Wave exposure re-suspends sediments and can thus increase food availability for filter feeders and planktivores. Sedimentation increases with depth and reduces with distance from the Port.
- Cawthron noted a transition in community composition at about 11m depth. Above this communities were characterised by brown seaweeds, corraline paint, some sponges and bryzoa species, green-lipped mussels and butterfly perch.
- Below 11m, the same species were present but in lesser abundance, but other species which need less light or cannot compete effectively with those abundant at higher levels, are found.
- Depth patterns were more pronounced than longitudinal patterns, although the outer transects supported more brown macroalgae. The inner transects exhibited less diversity. The presence (and absence) of sediment may in part explain this variation.

Each transect is fully detailed, with cross-sections of topography and colour-enhanced photographs showing representative habitat, in the Cawthron report. Where relevant, comparisons have been made with earlier records from 2005.

## 10.3. Actual and Potential Effects on Benthic Ecology

### 10.3.1. General

The Cawthron report investigates the extent and significance of both direct and indirect effects on benthic ecology as a result of the project.

Dredging results in direct loss of habitat and the individuals within the dredged areas. The habitat is not replaced in its pre-existing form as the modified sea bed has greater depths and potentially different surface characteristics which will themselves modify over time with minor infilling of mobile sediments between maintenance dredging episodes.

Unavoidable direct loss of habitat also occurs in the area where the dredged material is to be deposited for permanent disposal. In this case, the new benthos resulting from dredging will be similar to the pre-existing environment in terms of composition and depth.

Indirect effects can potentially result from chemical and organic contaminants in the dredged material (in this case there is no such contamination present), and from the effects of suspended sediments in the water column and turbidity. This can modify habitats by reducing light levels at the benthos, on which the pre-existing ecology relies, and can smother benthic areas when the suspended sediments settle out.

The nature of the wider receiving environment in Hawke Bay is one experienced in and thus adapted to receiving sediment inputs from rivers, and from the active coastal process nearer the shore. There is a naturally occurring range of turbid and elevated suspended sediment concentration conditions which are not expected to be exceeded by any contribution from the dredging activities.

The extent of ecological effects from high turbidity and suspended solids depends on a number of factors, including:

- the nature of the suspended matter (composition, size range, reactivity, etc);
- concentration within the water column;
- duration of the turbidity event and the rate of dilution and dispersion;
- rate of settlement of suspended particulates out of the water column; and
- the level of background turbidity to which ecological communities are naturally adapted.

The last factor, relating to the inherent tolerance of marine communities to high turbidity/suspended solids, is an important consideration. For benthic communities, this depends to an extent upon the nature of the existing substrate. Those living on or within fine soft sediments will be inherently tolerant of near sea bed turbidity layers resulting from natural re-suspension processes and relatively high rates of deposition. In contrast, reef communities may be less tolerant, especially at sites where clear water is the norm.

### 10.3.2. Areas Directly Affected

#### Channel and Swinging Basin

These are the areas that are subject to direct dredging and comprise 117ha in total of which 60ha have not been dredged in the past. The water depths vary from approximately 6m to 14.5m below CD. The benthic substrate is currently quite uniform, comprising gently shelving consolidated and unconsolidated sands, fine sands and silts[80].

This area is part of the much wider and relatively uniform benthic habitat found in inshore Hawke Bay. The studies have found no taxa or communities of special scientific or conservation interest. Cawthron considers that the dredge project will have no discernible effect on the ecological functioning and productivity of the wider inshore area.

Many of the species found in this area are already short-lived and can recolonise suitable areas post-dredging quite quickly. Cawthron indicates that the progressive dredging and substrate change (including increased depth) will cause only a small shift in infauna community structure, although the area may become less suitable for species such as sand dollars and some bivalves. It is also noted that areas already affected by maintenance dredging will not be changed other than by increased depth which involves only marginal change to habitat in this area.

#### Disposal Site

[80] The Cawthron report addresses the swing basin and Port entrance separately and notes that this area includes some shelving hard surface areas but that sedimentation reduces any values that might normally occur. Effects of further capital dredging here would be equal to the usual maintenance dredging.

The disposal site is approximately 350ha and lies 4 to 5 kilometres offshore in an area of 20 to 23m depth below CD. The disposal of dredged material will result in a layer of spoil material, nominally approximately 1m thick, over the area. Advisian has described the area as *"mild dispersive for silt, and weakly dispersive for fine and medium sand"*, meaning that once material has settled, it will involve only occasional surface disturbance from storm waves[81].

The area at present has a benthic habitat which is indistinguishable from the wider Hawke Bay area with the same depth and substrate. No species found in the area are of special scientific or conservation value.

The dredged material to be deposited in the area is slightly finer in composition, compared to the existing substrate. Cawthron notes that part of the dredge material is consolidated and may remain so despite the dredging and disposal processes. Despite these differences, Cawthron states that they *"should represent little impediment to the process of recovery towards pre-deposition benthic communities".*

Although disposal of dredged material results in smothering of pre-existing benthic communities *in situ*, it is unlikely that any species will disappear completely from the area due to the ability of fauna to migrate vertically during disposal processes, allowing new benthic communities to develop quite rapidly[82]. This recovery will be aided by the staged nature of the overall project.

### 10.3.3. Indirect Effects

#### Introduction

The effects of the project on water quality have been described in section 9 of this report. The ecological implications of the predicted changes have been evaluated in relation to their ecological implication by Cawthron. Cawthron notes the lack of chemical and organic contaminants in the material being dredged and disposed of, and focuses on the potential implications of turbidity and suspended sediments on the ecology of the range of wider receiving environments.

As significant receiving environments, the Cawthron report evaluates the implications on reef and inshore reef habitats. Pania Reef and the area that surrounds it is identified in the HBRCEP as a Significant Conservation Area (SCA 13) – see Plan Set 3 in Volume 2.

#### Pania Reef

Although there is only a relatively short-term measured record, Pania Reef is known to experience prolonged periods of elevated exposure to elevated suspended sediments and turbidity. The reef's ecology is adapted to that. The Cawthron report notes median TSS values measured to date of 15mg/L at the sea bed and 9mg/L at the surface, and maxima of 54mg/L and 41mg/L respectively[83].

[81] This is in contrast with the current area for disposal of dredged material which is much more dynamic.
[82] This has been found in the existing disposal area, although Cawthron notes the more dynamic environment there which means that comparisons may only be valid in part.
[83] It is also noted that higher-end levels may not have been captured due to date-collection being limited to periods accessible by small boats.

The Cawthron report summarises the Advisian modelled findings of suspended sediments during campaigns as follows:

For the one month Stage 1 simulation:

- There was no potential for Pania Reef to be affected by increases in total suspended sediment concentrations (SSCs) above 10mg/L at any time.
- Taking into account sediment stirring by wave-generated currents (which would result in re-suspension of any fine sediment that may be deposited on the reef), no deposition on the reef was predicted by the model.
- Time-series outputs of near-surface sediment concentrations, averaged over a 500m grid area for points at the outer, middle and inner sections of Pania Reef, indicated that SSC would remain less than 5mg/L above background values and with only isolated peaks above a 1mg/L increase. Minor peaks in SSC on the reef would coincide with periods where currents in the vicinity of the disposal area were directed towards the northwest.

For the one month Stage 5 simulation:

- Similar to Stage 1, there was no potential for Pania Reef to be affected by increases in total suspended sediment concentrations above 10mg/L at any time.
- Taking into account sediment stirring by wave-generated currents, no deposition on the reef was predicted by the model.
- Suspended sediment concentrations were slightly higher for Campaign 5 but – averaged over a 500m grid area – remained less than 7mg/L (and with only isolated peaks above 1mg/L) above background values for the three nominal locations on the reef.

Comparing these results with the known background conditions and variability of SSC at Pania Reef, Cawthron was able to conclude that, for dredge disposal periods:

> *"Unless sustained for significantly longer than is predicted by the model, a project-related increase in SSC of less than 7mg/L is very unlikely to lead to adverse ecological effects at the reef"*;

For the post-disposal longer term scenario, the potential for plume effects at Pania Reef was explained as below:

> *"Although for significantly elevated background turbidity under such conditions* [as would cause resuspension and the risk of a northerly drift of a sediment plume]*, this potential contribution from spoil ground sediments is considered to be less than minor."*

Considering the impact of any potential sedimentation at the reef which could be associated with the project (a potential which is not supported by the modelling undertaken), the Cawthron report notes the existing situation at the reef. This includes observed sediment on surfaces, indicating that natural sediment deposition occurs which is described as significant and especially noted at deeper points on inshore reef transects. Within this context, any contribution from dredging would only add incrementally to existing background deposition. Furthermore, the report notes that natural sedimentation patterns on

the reef will be in equilibrium with periodic swell events that lift and disperse fine material which has settled in calm periods. The report concludes that *"any short-term increases in suspended sediment supply may result in temporary increases in the thickness of deposited silt veneers under calm conditions, it is important to acknowledge that such layers occur naturally and do not persist over longer time-scales".*

In evaluating ecological impacts, the Cawthron report notes that the upper surface of the reef is notably free of sediments, but lower and closer to the Port, there can be localised depths. However, these are regularly modified and flushed by wave impacts at depth, and actively so for much of the time at shallow depths.

Some species present at Pania Reef are particularly adapted to variable sediment inputs, and this may favour them. Such species include red and turfing forms of algae[84], which trap and bind sediment. Sponges may also benefit from such conditions, but the mechanism for this is not known.

Limitations on light due to turbidity can cause changes in species or stratification. The Cawthron report notes that at about -15m CD on the outer areas of Pania Reef, sponge gardens begin to take over from brown algae (which require more light). This is at less depth than in many parts of the New Zealand coastline with clearer waters, suggesting that light attenuation associated with turbidity may be an influence.

Cawthron concludes that, if there are any changes in species compensation due to light changes from temporary dredge effects, these would recover to their pre-existing state on seasonal time-scales.

Sedimentation can also affect feeding, particularly filter feeders, and the attachment of adult and juvenile grazing organisms to reefs. Apart from the upper 4-8 metres of water at Pania Reef, sediment in the form of silt layers and veneers are found. This however appears not to be having a significant effect on the presence of a range of species, and any change due to dredging is unlikely to cause any modification.

Pania Reef species appear to be adapted to scour effects which can be associated with sediments in high-energy environments.

The Cawthron report concludes that any modifications to community structures will be subtle, and may include the following:

- an increase in prevalence of taxa that are well-adapted to such conditions at the expense of those more sensitive to suspended or deposited sediments;
- a decrease in erect canopy-forming macrophytes species, and a decrease in depth of these species; and
- changes in prevalence and community structure of grazers.

However, the Cawthron report notes that the communities are already resilient to variations and such changes would be unlikely to be of a scale that is measurable. The report states that "*where the level of stress is not acute, community response will be gradual and, ultimately, reversible following a return to more typical conditions"*, and further, that from the modelling, *"there appears to be little potential for a project-related increase in SSC at Pania Reef of a magnitude and duration that is ecologically significant"*.

[84] Turf coralline forms were not present at Pania Reef.

### Town Reef and Other Reef Sites

Town Reef will be more exposed to elevated TSS and potential deposition during dredge campaigns, but not above 10mg/L for more than 15hrs, with deposition of up to 1mm over a similar period. Similar modelled outcomes are predicted for the reefs in the western embayment adjacent to the Port.

The Cawthron Report explains that nearshore sites further west, such as Rangitira Reef, and areas further north such as the Moremore mataitai area, are unlikely to be exposed to significant plume effects.

The Cawthron report however does consider the potential impact of plumes, given the relatively dynamic, variable and robust location, high sediment movement and well-adapted ecology of these areas. It concludes that all these locations are likely to re resilient to any sediment plumes reaching them, particularly given the low levels (rarely if at all above 10mg/L) and short duration of any plumes reaching them.

### 10.3.4. Wharf Construction

The new wharf involves dismantling approximately 400m of the current reclamation edge revetment and replacing it with a longer and deeper revetment, potentially of concrete rather than limestone facing, at a slightly lower angle. The new revetment will also be under the wharf and therefore light availability will be substantially reduced.

Stormwater runoff is to be managed in a similar way to the present but will collect and discharge from the new wharf deck in addition to the container area.

The wharf and dolphin piles will also form benthic surfaces with the sea with a range of light exposures but generally a smooth unbroken surface.

The areas will be subject to disturbance from ships manoeuvring, and periodic maintenance dredging.

The construction extends such habitats which already exist within the Port area, rather than creating a new habitat, and is therefore a minor incremental change.

Construction is expected to be managed through a construction management plan which will avoid or minimise containment release to the marine environment.

Overall, any impacts on benthic ecology are expected to be minimal.

## 10.4. Conclusion

The benthic ecological implications of the project have been investigated through studying the ecology of the various areas to be directly impacted by dredging and disposal of dredged material, and those that could be impacted indirectly by elevated levels of suspended sediments and turbidity.

Both the areas of dredging and disposal represent a small part of similar habitats found throughout Hawke Bay. They do not contain rare species or unusual community compositions. They are likely to be recolonised rapidly by fauna and plant species already present, with fauna sufficiently motile to in some cases stay ahead of the sedimentation in the disposal area. Thus they will recover quite rapidly, although

in parts of the dredged area, this will involve several stages of dredging with partial recovery in between. The evaluation by the Cawthron Institute indicates that such effects are minor or less.

Indirect effects on sensitive environments, including Pania and other reef areas, have been investigated through surveying and developing an understanding of these areas within the context of modelled "worst case" exposures to turbidity plumes and temporarily additional suspended sediment loads in the local marine environment. The modelling has indicated exposures which are short-lived (if they occur at all) and well within the natural variability of the local environments for benthic ecology.

Cawthron has concluded that there will be no adverse effects at Pania Reef unless exposure occurs and is sustained for considerably longer than predicted by the modelling. The other reefs are closer to shore and therefore already impacted by sediment movement to a much greater extent than Pania Reef, so impacts will be insignificant. Similarly, soft sediment benthic communities close to dredging and disposal areas will temporarily be exposed to higher sedimentation and turbidity than usual. The benthic ecology in these areas is already well-adapted to elevated near-bed turbidity and any significant effect will be very localised and temporary. Such effects can be assessed as minor.

Wharf construction will also affect localised benthic communities by direct disturbance, changing light levels, and providing new surfaces. This is not an adverse effect overall in benthic ecological terms.

Despite lack of any more than a potential for minor and localised adverse effects, it is proposed to continue to monitor turbidity at Pania Reef throughout the project and beyond, and to continue to obtain information on TSS that enables further understanding of the correlation between the two indicators. It is also intended to continue to regularly monitor the ecology of the reef so that long-term understanding of this identified significant ecological area is developed. The proposed monitoring programme is included in the draft conditions in section 26 of this report.

The two turbidity monitoring buoys will provide the basis for monitoring against levels of turbidity from dredging and disposal of dredged material. Trigger levels are proposed that would result in additional management and reporting during dredging campaigns, including a specific trigger that could temporarily interrupt dredge disposal if prolonged high levels of turbidity that could have a measurable adverse ecological effect are experienced. This is described in the draft conditions and draft Water Quality Management Plan in section 26.

# 11. EFFECTS ON FISH AND FISHERIES RESOURCES

## 11.1. Introduction

The relatively shallow waters of Hawke Bay support a range of demersal[85] and pelagic[86] fish species, all of which are widespread. A broad review of current and historical information on the marine coastal resources of the Hawke's Bay region undertaken in 2016[87] described the region as supporting a mixed-species fishery with the predominant commercial fishing method being demersal trawling.

The Hawke Bay area is within Quota Management Area 2 (QMA2, Central East) and there are more than 30 fish species which are commercially or recreationally exploited here. Many of these have a wide range of vertical distribution; some spend one or more stages of their life cycles in near-shore areas and others are more exclusively inshore in their distribution. There has been recent widespread concern over the current state of the fishery in Hawke Bay across all sectors (commercial, customary, and recreational), with indications that a number of historically abundant species are in decline.

Fish stock are motile and are unlikely to be directly affected by the project. However, any change in habitat requires evaluation to determine the types and extent of potential adverse effects.

The key specialist report covering this aspect is the report by the Cawthron Institute which also covers benthic ecology. This is provided as **Appendix H** in Volume 3 of the application documentation.

Both recreational and commercial fisheries species and stocks are addressed in this section.

## 11.2. Description of the Existing Environment

### 11.2.1. Inshore Species

The consideration of fisheries stocks potentially vulnerable to dredging effects should be limited to species whose major aggregations occur within the 30 m contour or where such shallower depths are important to one or more life stages or migratory behaviours. Beyond this area there is very little risk of any effect from the project, including any plumes from dredging activities.

In terms of commercial catch weight, the main inshore fisheries species in the Hawke Bay are tarakihi, red gurnard, barracouta, trevally, flatfish and snapper, with blue moki and red cod also landed in significant quantities. Of these species, those for which shallow near-shore habitats are likely to be important are flatfish, gurnard, tarakihi and snapper. Other species for which near-shore areas are likely to be important include elephant fish, rig and school shark.

### 11.2.2. Recreational Fish and Customary Harvest

Inshore Hawke Bay provides important recreational fisheries for red gurnard, tarakihi, snapper, kingfish, kahawai, and trevally. There are also small set net fisheries for butterfish. Pania and Town Reefs are fished

[85] Living and feeding close to the seafloor.
[86] Living and feeding in the surface layers of oceanic and coastal waters.
[87] Report by Haggit, T and Wade, O, 2016, Hawke's Bay Marine Information: Review and Research Strategy. Report prepared for Hawke's Bay Regional Council.

for rock lobster and harvested for mussels. Pania Reef's status as a Mataitai means that commercial fishing is prohibited.

Hawke Bay also provides plentiful opportunities for shore-based fishing. Surfcasting is undertaken at the three rivermouths of the Tukituki at Haumoana, the Tutaekuri/ Ngaruroro at Clive and the Esk. Targeted species include kahawai, kingfish, gurnard and rig, with trevally and blue moki also occasionally caught from shore. Local to Napier, Town Reef and Perfume Point are also popular for shore-based fishing. The mouth of the Tutaekuri/Ngaruroro River is fished for flounder, as may be the Tukituki and the Esk river mouths.

Line fishing from recreational vessels targets red gurnard, tarakihi, snapper, kingfish, kahawai, hapuku/bass and trevally. Butterfish, moki and kahawai can be caught by set-net.

Nearshore rocky reef habitats near to Napier (including Pania Reef, Town Reef and Tangoio Bluff) have significant customary and recreational value for the collection of green-lipped mussels, kina, paua, rock lobster, and various fin-fish species (including kahawai, gurnard and hapuka). While all finfish species caught in Hawke Bay have a high value to customary fishers, taonga finfish species include blue moki, butterfish, blue warehou, rig, kahawai, hapuku/bass and terakihi.

### 11.2.3. Commercial Fisheries Management within Hawke Bay

The quota management system (QMS) divides the exclusive economic zone (EEZ) into 10 fisheries management areas (FMAs). For each quota management species, separate stocks are defined by quota management areas (QMAs). The QMA may be the same as an FMA or a grouping of FMAs, depending on the geographical distribution of that fish stock. Commercial catch limits are set annually for each fish stock, as total allowable commercial catch (TACC).

Fisheries catch data has historically been collated from catch effort landing returns (CELR) into a Ministry of Fisheries (MFish) database by fisheries statistical area (FSA) within the EEZ. For each species group, fishers report catches to a unique FSA. For the last decade, such data have been recorded, for vessels longer than 6 m, at specific locations[88].

The Port of Napier is situated on the boundary between statistical areas 013 and 014, within fisheries management area 2 (FMA2). Commercial fishers land the majority of the finfish catch in FMA2 by mid-water and bottom trawling, bottom long-lining and set netting methods.

Figure 11-1 shows the principal commercial fishing restrictions in place in central to southern Hawke Bay.

Hawke Bay is part of larger inshore areas from East Cape to Castle Point within which bans are in place for pair trawling and fishing vessels larger than 46m.

There is a prohibition on the use of Danish seine nets in Hawke Bay within three nautical miles of the shore. Additionally, Danish seine and the use of trawl nets by vessels larger than 13.5m LOA is prohibited within a line from Waipatiki Stream to Cape Kidnappers. Within lines between Ahuriri Bluff and either Petane Beach or Tukituki rivermouth, there is a prohibition on the use of any trawl net for commercial

[88] Latitude and longitude instead of by broad statistical areas.

fishing. No commercial harvesting of paua or mussels is allowed within 1 km of the shoreline from Cape Runaway to Blackhead.

The 'Wairoa Hard' is closed to commercial fishing and along with Pania Reef is recognised as a significant conservation area within the HBCEP (see Plan Set 3 in Volume 2 of the application documentation).

Two Mataitai areas are established in Hawke Bay. Moremore (a) extends 500 m from the shore and begins at Whirinaki Bluff, 11.6 km north of Port of Napier. It follows the coastline north-eastwards for approximately 18 km. Moremore (b) encompasses Pania Reef. In these areas, all commercial fishing is prohibited and amateur fishing regulations apply except when amended by appointed tangata tiaki/kaitiaki who can authorise customary food gathering.

## 11.3. Actual and Potential Effects on Fish and Fisheries

### 11.3.1. Key Considerations

The factors associated with the project that may have the potential to affect fisheries resources in the Napier region are described as:

1. the permanent alteration of benthic areas by capital dredging and the ongoing disturbance of these areas from maintenance dredging;
2. the temporary loss of benthic habitat due to smothering and new to the proposed disposal area; and
3. the elevated suspended sediments concentrations and poor water clarity within turbidity plumes potentially generated by dredging and disposal activities.

Wharf construction is expected to have no impact on fish species, although individuals may be temporarily disturbed.

### 11.3.2. Benthic Habitat Affected

Neither the proposed capital dredge area or dredge disposal area have been identified as being of special ecological or conservation importance. However, the wider areas of inshore Hawke Bay are of some importance as recreational and commercial fisheries areas. In particular, the area running south of Napier appears to be productive for the flatfish trawl fishery. As noted earlier, the area potentially impacted is within an area where trawling is prohibited for vessels greater than 13.5 m LOA (Figure 11-1 above). Most trawling occurring inside the 20 m depth contour is expected to be targeting flatfish although some gurnard may also be targeted.

The relative importance to fisheries species of seabed habitat lost, altered or temporarily disturbed as a result of the proposed activities depends to an extent upon the proportion of similar habitat within the wider region.

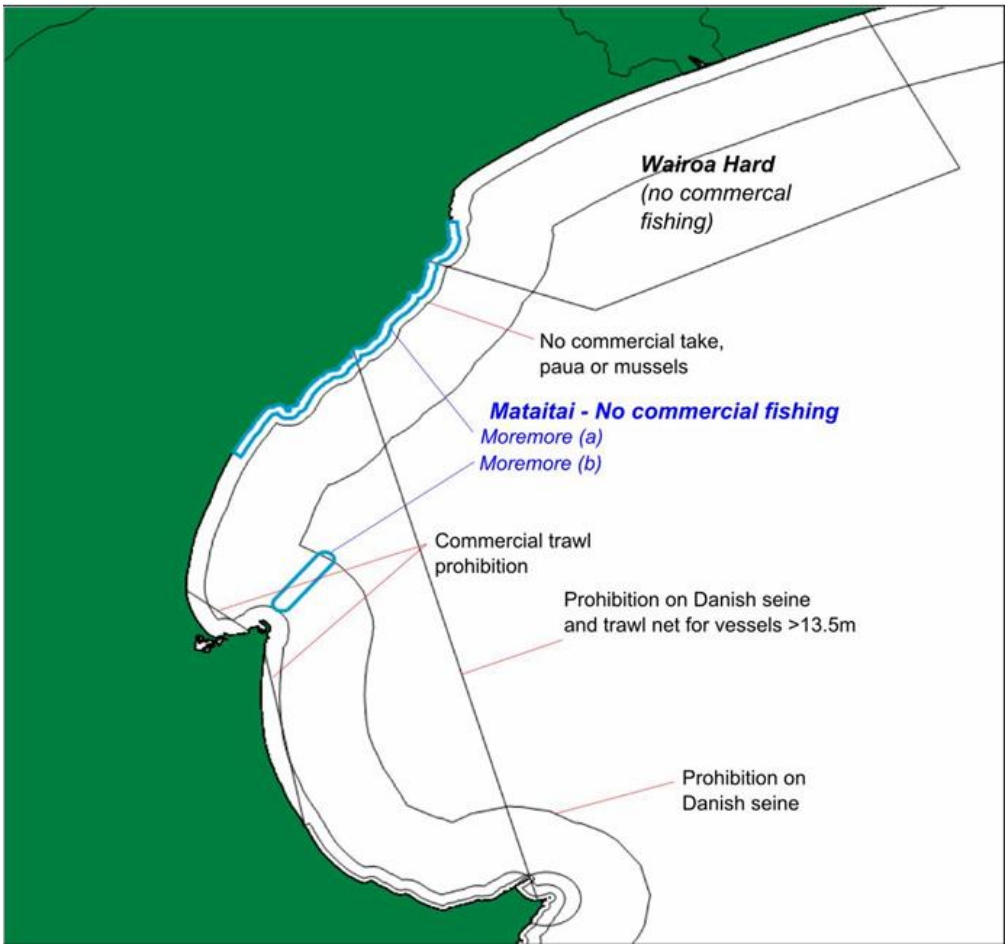



**Figure 11-1: Commercial fishing restrictions in place for central and southern Hawke Bay**

## Dredging Areas

An area of 117ha will be effectively permanently altered from its natural state due to capital dredging and the ongoing need for periodic dredging to maintain depths. The survey data for this area does not identify it as a type of habitat that is spatially limited in the wider inshore area; hence, in terms of the area of productive seabed directly affected, its potential loss to fisheries species is considered less than minor.

Sediment areas in transition zones around reef habitats can have particular importance for species such as snapper and tarakihi. However, the approximately 1km distance between the dredged area and Pania Reef is considered an adequate buffer to avoid changes in foraging behaviour for these species.

## Disposal Area

The benthic area in the vicinity of the proposed disposal area has been investigated and does not encompass physical habitats or biogenic features which significantly differentiate it from much of the sandy offshore sea bed areas of Hawke Bay at similar depths. Thus this specific area has no importance to certain species that would set it apart from other areas in similar water depths.

Although part of an area where approximately 60% of the total flatfish catch is caught, the size of the area relative to similar habitat in the wider southern Hawke Bay area mean that the temporary impact on

benthic ecology from disposal of dredged material in this area is likely to have little impact on general populations of fish such as gurnard or flatfish which may currently forage in the area. Such species are wide-ranging and will avoid the area during dredge disposal campaign periods. Similarly, tarakihi and snapper are known to range widely over extensive feeding areas, and have a very varied diet.

The fish species on which bottom contact trawl effort is concentrated within Hawke Bay under this management regime include red gurnard, tarakihi, flatfish and snapper[89]. Trawling effort for flatfish is concentrated in nearshore areas running south from Napier; effort for gurnard ranges from the near-shore out to approximately the 100 m depth contour. Species targeted in depths shallower than 50 m are generally limited to flatfish and elephant fish (median depth around 30m) although the gurnard fishing may also extend into this area.

### 11.3.3. Invertebrate species

There are a number of important invertebrate fisheries species that are taken in the Hawke Bay area. The two most sought-after on a national basis are blackfoot paua and spiny rock lobster or crayfish. The New Zealand swimming crab is common in and around the immediate Port environment. It has been a significant if variable local fishery in the Napier area for several decades but has little or no recreational importance. No commercial fisheries information is available, probably due to the small number of vessels involved.

There is little information about paua in the Napier area and it is excluded from commercial harvesting within 1km of the shore throughout Hawke Bay. None were recorded in the Pania Reef surveys undertaken for the current applications. Lobsters however were common at Pania Reef where they are taken by recreational fishers and divers. This may influence their distribution but no patterns were found from the survey.

A range of surf clam species is also able to be commercially harvested. All occur with Hawke Bay and consultation has revealed some interest in their commercial exploitation. Four of the seven species has been found in the areas where ecological surveys have been undertaken for this project, but all have been at low numbers.

### 11.3.4. Fish Movements and Critical Habitats

The Cawthron report notes that, despite recent efforts, information gaps in the life-cycles and habitat preferences of key species remain. This includes large gaps in understanding the importance of various habitat types in supporting fishery production and different life history stages of fished species.

With the possible exception of Pania Reef, benthic habitats known or suspected to be important to particular fisheries species do not occur within the area potentially affected by the proposed project. Habitats with macroalgae forests do support large numbers of small fish (mainly wrasses) but few large benthic-feeding fishes. Large carnivorous species such as tarakihi, blue moki and blue cod are more likely to occur in significantly higher densities over sandy bottom areas with small patch reefs with sparse algae. Pania Reef has a mix of such habitats and the transect dives undertaken for the project support this

[89] Tarakihi trawling is targeted at -100 to 250m contour areas. Snapper is mostly north of East Cape, but between Napier and Cape Kidnappers it is undertaken at around -50m.

understanding of fish distribution, although no large aggregations of fisheries species have been consistently reported for the Reef.

Benthic recovery of the disposal area is expected to occur rapidly (over a period of months) following deposition events, and thus use of the area for fish foraging will also quickly recover.

## Fish Migration

Although a number of species are known to move from inshore estuarine and harbour environments to offshore areas on a seasonal basis for spawning or as part of a change of habitat preference with development from juvenile to adult stages, there is no information which suggests that the Napier area is particularly important in this regard.

The Ahuriri Estuary is utilised by several migratory species including flatfish and whitebait. Seasonal offshore movements of sand and yellow-belly flounder are relatively well documented but it appears that both species have long spawning periods and both are effective breeders. In any case, different elements of the project are not considered to represent a barrier to fish movement, especially as the Ahuriri already features high levels of turbidity from land.

## Spawning and Nursery Areas

There are no specific areas potentially affected by the project which are known or suspected to be important spawning or nursery grounds for fisheries species. While the Ahuriri Estuary is likely to function as a nursery area for several species and possibly a spawning area for whitebait, its potential exposure to project-associated stressors is limited due to the absence of contaminants and limited exposure to any dredging plumes. As noted above, the exposure to suspended sediments from catchment inputs is likely to far exceed that from any tidal entrainment of dredging plumes.

Both locally common species of flounder move into deeper waters annually to spawn, as do gurnard, kahawai and blue moki. Red gurnard are believed to spawn over inner and mid-shelf areas. While rig aggregate annually in spring and summer in shallow coastal waters to breed, there are no known specific areas of importance. Both this species and school shark are ovoviviparous and highly mobile. Pregnant female rig can travel large distances in a short time. Since these species do not require specific habitats for egg-laying, they are likely to avoid the immediate areas of benthic disturbance little disruption to the life cycles of local populations.

Elephant fish are the only fisheries species identified as utilizing shallow near-shore waters for spawning. Eggs are laid in spring, in water depths of 5-30m, and take 5-8 months to hatch. Hawke Bay is near the northern extent of the range of this species and represents a very small proportion of the total landed catch. The inshore area around Napier is unlikely to be a spawning area important to this fisheries stock.

The semi-sheltered inshore area of mixed substrate adjacent to the Port and expanded swing basin is considered by Cawthron to be too limited in extent to be critical to the life cycles of any wide-ranging species. The majority of fisheries species are distributed in off- shore areas and are not considered to be reliant upon the limited habitats identified in the Port area.

The macroalgal habitats of Pania Reef may be of limited and localised importance to the juvenile stages of some species such as blue moki, although there is no evidence to support a status of critical nursery area.

The mixed substrate areas of the Wairoa Hard and Clive Hard are associated with both the adult and juvenile phases of several fisheries species including john dory, tarakihi and snapper. Both these areas are at substantial distances from the project area.

### 11.3.5. Effects of Suspended Sediment

The tolerance of, and behavioural responses to, potentially high suspended sediment concentrations are the key issues in considering effects on fish populations.

Variable and sometimes elevated background turbidity is a natural feature of inshore Hawke Bay. Occasionally very high levels of suspended sediment concentrations will occur in shallow regions near the coast as a result of storm events and riverine inputs. The significance of suspended material as a potential stressor is related to the size distribution and composition of particles as well as their concentration. The plumes generated by dredging and spoil disposal activities comprise marine sediments from local sources, similar to those continually re-suspended by natural processes, and therefore a degree of natural tolerance to elevated turbidity is expected in local fish populations, especially benthic species such as flatfish and gurnard.

The Cawthron report identifies the potential impacts to fin-fish from high suspended solids concentrations as:

- gill clogging and abrasion
- egg smothering and abrasion
- reduced foraging success
- increased vulnerability to predation.

Generally finfish are very mobile and are able to avoid areas of localised stress or disturbance. However, where areas of very high turbidity are significant in extent or completely cover suitable habitat or territory, adverse effects on populations may arise.

The report notes that many fish thrive in turbid conditions and increased turbidity can be favourable to some species, as it helps with protection from predation and provides cover from which to hunt prey. It is likely that most if not all demersal species utilizing near-shore areas are well adapted to such levels, although the total duration of exposure may be a relevant factor in exceeding such tolerance.

The inshore and estuarine species of flatfish are inherently tolerant of high concentrations of suspended sediments. The yellowbelly flounder has a preference for very muddy environments and it is likely to be a predominantly nocturnal non-visual feeder.

The Cawthron report notes that in the relatively unconstrained areas of inshore Hawke Bay, plumes of suspended sediments with concentrations high enough to be of concern are not expected to extend more than a few hundred meters from the point of suspension, and any such effects will be temporary. Avoidance of areas of particularly high suspended solids is likely to be the principle response of fin-fish species and there will be no enduring adverse effects.

### 11.3.6. Potential Impacts on Invertebrate Fisheries Species

#### Paua

The occurrence and distribution of paua within the Napier region is not well documented, however taking into account the known spatial distribution of suitable habitat, the only mechanism by which reef populations could be potentially affected by the project would be via the propagation of turbidity plumes.

Elevated turbidity and deposited sediment may also affect the settlement success of invertebrates such as paua but it has been noted that paua occur abundantly in very turbid waters elsewhere such as the coast of Banks Peninsula and within Lyttelton Harbour. Healthy populations of paua occur along the northern shoreline of outer Lyttelton Harbour within the long-utilised disposal grounds for Lyttelton Port's maintenance dredging program[90]. Adult paua are unlikely to be affected by either sedimentation or turbidity.

#### Spiny lobster

Pania Reef is a locally productive recreational and customary fishery for spiny lobster.

Lobster occur over a broad range of natural turbidity but information regarding the effects of suspended solids on this species is very sparse. Direct effects of turbid plumes on adult individuals are likely to be minimal, but any prolonged impingement of rocky reefs by high strength plumes may affect light levels which may in turn impact on fish and lobster populations through reduction in macroalgal cover. Nonetheless, lobster were commonly observed southern section of Pania Reef where macroalgal cover is notably sparse.

Juvenile rock lobster were recorded during a 2004 dive survey of patchy subtidal reef inshore of the Port outer swing basin. The importance of this small embayment to the wider lobster fishery is unknown, but in view of its very limited spatial extent it is considered very unlikely to be even locally significant. It is also thought lobster larvae in wider ocean areas tolerate very variable turbidity so would be unaffected by the dredging and disposal of sediments.

#### Paddle Crabs

Although there appears to be an intermittent fishery along Westshore Beach for the New Zealand swimming crab or paddle crab the species is a highly mobile scavenger occurring over a wide range of conditions that suggest it is inherently tolerant of elevated turbidity. What is known of its biology and life history does not suggest that the stock within Hawke Bay will be particularly vulnerable to stressors arising from the project[91]. Localised elevated turbidity is unlikely to significantly affect the highly mobile adult crabs and recruitment of larval stages will remain unaffected following any temporary increase in physical stressors.

#### Other Species

The habitat of surf clams is the surf zone, where they are well-adapted to significant disturbance, including high levels of sediment movement, suspension and deposition particularly during storm events. Plume modelling suggests that additional turbidity in nearby areas, including areas where commercial surf clam

[90] Cawthron unpublished data.
[91] This is particularly the case since the choice of the offshore disposal site means that localised surf clam or other bivalve populations which may be food sources will not be affected by direct spoil deposition.

development may be considered, would not exceed normal variability and therefore would not constitute an adverse effect.

There is anecdotal evidence that cockles are gathered within an arm of the Ahuriri Inlet behind Westshore Beach, but the inherent turbidity tolerance of this species coupled with the distance from dredging and construction activities means that these beds would not be expected to be affected.

## 11.4. Summary and Mitigation

The potential for the project to affect fish or fisheries in the Hawke Bay area has been evaluated. The project areas lie inshore, largely in areas where commercial fishing is limited although near to well-used recreational fishing areas. What commercial fishing there is within the area out to a depth of about 30m, is largely limited to flatfish and possibly gurnard.

Having considered the potential for changes in benthic productivities and direct effects from potential sedimentation and turbidity, the Cawthron report concludes that, given the location of the dredge and dredge material disposal areas and the limited nature of the changes from the existing environment (in terms of space and time), there will be no adverse effects on fish populations which are perceptible. This applies not only to commercial and recreational fish species, but also to invertebrate (paua, spiny lobster, paddle crabs and surf clam) species.

# 12. EFFECTS ON MARINE MAMMALS

## 12.1. Introduction

Marine mammals are an important part of the Hawke Bay environment, visiting offshore and coastal areas as part of their mitigation patterns, with some venturing on shore in places, including in the vicinity of the Port at times.

The project may potentially affect marine mammals due to a range of aspects including sea bed disturbance and the generation of underwater noise. There are potential effects from both the construction of the wharf and mooring dolphins, and from the dredging.

Napier Port commissioned the Cawthron Institute to investigate potential impacts. The investigations drew on the information already developed and analysed in relation to benthic ecology by the Cawthron Institute (Appendix H in Volume 3). However, the investigations drew on a much wider range of available material relating to marine mammals' behaviour and ecology both locally and internationally. The study also took into account information about the underwater noise that the project would generate.

The two key specialist reports investigating the implications of the project in terms of marine mammals are by Cawthron Institute and by Marshall Day Acoustics. These are provided as **Appendices I and J** in Volume 3 of this application documentation.

The assessment in the Cawthron report covers:

- the characteristics of marine mammal visitors to Hawke Bay and existing populations;
- what is known about the effects of dredging and disposal of dredge material, as well as construction activities, on marine mammals that visit Hawke Bay;
- an assessment of the specific implications of the project in terms of the immediate context; and
- potential mitigation for the adverse effects identified.

## 12.2. Description of the Existing Environment

At least twenty-five species of cetacean species (whales, dolphins and porpoises) and pinniped species (seals and sea lions) have been sighted or stranded within Hawke Bay, although there is little detailed research about them in the Hawke Bay context. Most common records include Common and Hectors dolphins, Southern Right whale and Pilot whales[92].

Sightings occurred throughout inshore and offshore regions, but were generally more frequent north of Mahia Peninsula and within deeper waters associated with the continental shelf break (at approximately 150m isobaths). As expected, strandings of dead (or live) animals were spread along the coastline itself, and over 80% occurred mainly within Hawke Bay itself. Historically, Mahia Peninsula (particularly Opoutama Beach) and Napier have been described as stranding hotspots for marine mammals.

[92] But note that each sighting does not necessarily mean a unique animal – the same animal or group may be reported by several people. To an extent, the sightings reflect the density of people, as much as marine mammals.

Table 12-1 provides a list of the most prevalent species found to reside or regularly visit the coastal waters of Hawke Bay or nearby, and in particular the Napier vicinity.

These species have been classified into three main categories that describe their distribution within this particular region, as follows:

- Resident – a species that lives (either remaining to feed and/or breed) within Hawke Bay and surrounding waters either permanently (year-round) or for regular time periods (seasonally);
- Migrant – a species that regularly travels through parts of Hawke Bay and surrounding waters, remaining for only short or temporary time periods that may be predictable seasonally; and
- Visitor – a species that may wander into Hawke Bay and surrounding waters intermittently, depending on the Bay's proximity to the species' normal distribution range. Visits may occur seasonally, infrequently or rarely.

In terms of specific species, the Cawthron report notes:

- The only species commonly sighted in the vicinity of the project area is the New Zealand fur seal. At times these are known to rest on the Port breakwater. Although not migratory, they range widely and do not remain in one location all year. The main haul-out sites are at Mahia Peninsula and south of Cape Kidnappers, suggesting that they travel out to feed in deeper waters rather than relying on inshore fish species.
- Common dolphins have been seen offshore in large numbers, near the -150m sea bed contour. They are likely to be year-round residents of the wider region. They are thought to feed inshore during the day and offshore at night.
- Orca visit seasonally mostly during early winter and late spring. They commonly forage on rays, pelagic and reef fish and other marine mammals.
- Southern right whales regularly travel through Hawke Bay waters. They appear to seek out inshore waters, and often they are seen as cow/calf pairs.
- Pygmy sperm whales are usually considered to prefer deeper waters where they prey on octopus and squid. However, they frequently strand in Hawke Bay. A large proportion of the strandings are of pregnant females or females with a calf, suggesting that the offshore waters may be an important calving area or nursery habitat.
- Pilot whales in large groups are sighted year-round in offshore Hawke Bay waters. From their diet, they are considered to be a deep water species, and nomadic in that they follow prey trends. However, they appear to move inshore in summer and autumn, and offshore at other times of the year.
- Other whale species in the area include various beaked whales, Humpback and Sperm whales. They tend to be deepwater species, but may move landward at some times of the year. Beaked whales in particular are known to strand in Hawke Bay.
- Noteworthy are the two nationally endangered species of Hector's dolphin and Bottlenose dolphins. Both are rare visitors and Hawke Bay may be at the southern limit for Bottlenose dolphins.

Having regard to the statutory requirements to protect significant habitats of indigenous fauna, the Cawthron report states that none of the species have home ranges that are limited to Hawke Bay waters, and Hawke Bay does not stand out as a significant area for feeding, breeding or resting compared with the remainder of the south and eastern coastline of the North Island. At best, Hawke Bay is a part of their wider range. Southern Right whales however must be particularly considered because of the "nursery" role of Hawke Bay, and some offshore species because they are particularly noise-sensitive.

## 12.3. Actual and Potential Effects on Marine Mammals

### 12.3.1. Present Knowledge

The Cawthorn report notes that despite the frequent use of dredges in most ports, harbours and coastal development projects, little research has focused specifically on the effects of dredging operations on marine mammals. The most obvious interactions between marine mammals and coastal development usually result from a direct overlap between the actual location of the development and an important habitat of the species (i.e. feeding or nursing grounds).

The direct effects of any overlap range from physical interactions with the animals (e.g. vessel strikes or entanglements) to avoidance or even abandonment of the area by the species due to the general increase in activity (e.g. noise or marine traffic).

Indirect effects may result from physical changes to the habitat itself that adversely affect the health of the local ecosystem and/or impinge on important prey resources.

This section describes the direct and indirect effects that port development dredging can have on marine mammals based on available (predominantly overseas) studies while relying on a wider range of research focused on coastal development and marine mammals in general.

One particular risk aspect, particularly related to major construction in the marine environment, is the implication of underwater noise. This is addressed in a separate section.

### 12.3.2. Direct Effects

The removal of bottom substrate in itself is not expected to directly affect any marine mammals known to frequent Hawke Bay waters. Rather, any effect is likely to be associated with an increase in vessel activity, and of underwater sound and physical activities within the general Port area.

#### Vessel Strikes

Dredge material disposal in total will involve around 2,000 return trips of a 1,840m$^3$ TSHD travelling at up to 9 knots (kn) and around 3000 return trips using split-hopper barges (associated with back-hoe dredging) travelling at about 5kn between the dredging area and the disposal area[93]. Normally marine mammals will move out of the way of slow vessels[94].

[93] The dredge vessels will follow routes that keep well clear of Pania Reef, normally using the existing shipping channel to the west of the reef.
[94] Risks are greater at above 11kn of both collision and damage to the animal.

**Table 12-1: Marine Mammal species Hawke Bay and potential species-specific effects**

| Common name | Species name | NZ threat classification (NZTCS)* | IUCN red listing* | | Residency category in Hawke Bay | Potential effects of dredging activities (Todd et al. 2015) ** |
|---|---|---|---|---|---|---|
| ***RESIDENTS*** | | | | | | |
| NZ fur seal | *Arctocephalus forsteri* | NZ native & resident, evaluated | Not Threatened | Least Concern | Seasonal to Year-Round Resident | Habitat alterations, increased turbidity & changes to prey availability, masking, incidental capture or injury, avoidance to increased shipping traffic |
| Common dolphin | *Delphinus delphis/capensis* | NZ native & resident, evaluated | Not Threatened | Least Concern | Seasonal to Year-Round Resident | Habitat alterations & changes to prey distribution |
| Orca (killer whale) | *Orcinus orca* | NZ native & resident, threatened | Nationally Critical | Data Deficient | Seasonal to Infrequent Visitor | Increased boat traffic, masking, alterations to prey availability, habitat avoidance or behaviour alterations |
| Pygmy sperm whale | *Kogia breviceps* | NZ native & resident, evaluated | Not Threatened | Data Deficient | Potential Offshore Resident | Changes to cephalopod availability or distribution & increased shipping traffic |
| Long-finned pilot whale | *Globicephala melas* | NZ native & resident, evaluated | Not Threatened | Data Deficient | Potential Offshore Semi-Resident | Increased shipping traffic & chance of collisions & changes to prey availability |
| Beaked whales | Ziphiidae species | NZ native & resident, not evaluated | Data Deficient to Not Threatened | Data Deficient to Least Concern | Potential Offshore Resident to Rare Visitor | Change to behavioural (surfacing, feeding) patterns, avoidance & increased shipping traffic |
| ***MIGRANTS*** | | | | | | |
| Southern right whale | *Eubalaena australis* | NZ native & resident, evaluated, threatened | Nationally Vulnerable | Least Concern | Seasonal Migrant | Collision with a dredging vessel, habitat avoidance, behavioural changes & masking |
| Humpback whale (oceanic pop. only) | *Megaptera novaeangliae* | NZ native, evaluated | Migrant | Endangered | Seasonal Migrant | Movement away from habitat, noise pollution, habitat degradation, behavioural alterations, masking of conspecifics at close range ( < 1 km), alterations to migration routes & avoidance |

| Common name | Species name | NZ threat classification (NZTCS)* | IUCN red listing* | | Residency category in Hawke Bay | Potential effects of dredging activities (Todd et al. 2015) ** |
|---|---|---|---|---|---|---|
| Sperm whale | *Physeter macrocephalus* | NZ native, evaluated | Not Threatened | Vulnerable | Potential Offshore Migrant | Increased shipping traffic (Broker and Ilangakoon, 2008), changes to cephalopod availability or distribution |
| ***VISITORS*** | | | | | | |
| Bottlenose dolphin | *Tursiops truncatus* | NZ native & resident, evaluated | Nationally Endangered | Least Concern | Irregular to Rare Visitor | Altered feeding patterns, increased shipping traffic & potential disturbance to the nursing areas |
| Hector's dolphin | *Cephalorhynchus hectori hectori* | NZ native & resident, evaluated, threatened | Nationally Endangered | Endangered | Irregular to Rare Visitor | Disturbance from increased shipping traffic & noise levels, destruction & alteration of habitat |

* Species conservation threat status is listed for both the New Zealand system (Baker *et al.* 2016) and international IUCN system (Version 3.1) (reproduced from Clement 2016).

** Proposed effects by Todd et al. (2015) are highly dependent on the location, the scale and context of the project (e.g. equipment used, duration, spoil volumes) as well as species. See paper by Todd VL, Todd B, Gardiner JC, Morrin EC, MacPherton NA, Di Marzio NA, Thomsen F; 2105 "A review of impacts of marine dredging activities on marine mammals" – ICES Journal of Marine Science.

The risk of collision between dredges and marine mammals is considered to be minimal if the activity avoids critical habitats and seasons when the species of concern may be distracted (e.g. feeding or resting) or have calves present. To date, most reported incidences internationally of vessel strikes have been with baleen[95] whales. There has only been one reported incident of a whale and a dredge colliding between 1975 and 2002.

Despite the low probability, the risk is not zero and the resulting consequences could be major (i.e. death of an individual of an endangered or threatened species). The use of simple and common sense boating behaviour guidelines around marine mammals by the dredge vessel, particularly around baleen whales and any calves, are expected to further reduce any risk of collision to near zero (see the Cawthron report, Appendix I in Volume 3, for further details).

Lost ropes, support buoys, bags and plastics and other marine debris can be potentially harmful to marine mammals. As most marine debris is plastics, it often tends to float and persist rather than degrading quickly.

The major hazard associated with marine debris to marine mammals is the possibility of entanglement. Whales, dolphins and pinnipeds are often attracted to floating debris, with a potential risk of becoming entangled in floating lines and netting. The nature of dredge operating activities means that the risk of entanglement in marine debris is low.

### 12.3.3. Indirect Effects

Coastal dredging and associated spoil disposal within any established ecosystem will result in some change to that system. However, the nature and extent of such change depends on many variables, including the scale of dredging. Currently there is little to no research on how ecosystem changes due to dredging activities might indirectly affect marine mammals. While most marine mammals are generalist feeders and flexible in their feeding habits, some species have been known to dramatically alter their distribution patterns in response to even small changes in prey availability and/or ecosystem dynamics. The potential effects of the project include changes to the ecosystem as a whole, including change that could modify the abundance, distribution and/or health of marine mammal prey resources.

#### Quality of Dredge Material

It has been noted that risks are greatest to marine mammals only when dredging contaminated sediments (i.e. not all sediments have significant contaminant loading). As explained in section 9 of this report, contaminant levels associated with the dredging programme have been identified as low risk for the ecology of Hawke Bay or the benthic area of the proposed disposal area.

Even in examples where contaminated sediments have been dredged, exposure of marine mammals is spatially restricted. In Hawke Bay, local or visiting marine mammals are generalist feeders that potentially range and forage throughout the entire bay, in waters further offshore and along other eastern coastline regions. Thus, even if contamination was a concern (which it is not) individual animals would not be expected to forage regularly or frequently on individual prey fish exposed to dredged material or sediments re-suspended by project activities. Similarly the limited potential for exposure means that any

[95] Baleen whales – subspecies separate from toothed whales. Including Southern right whales and Pygmy whales.

risk of bioaccumulation and/or biomagnification in local marine mammal species from the re-suspension and dispersal of any contaminants in dredge sediments has been assessed as very low.

### Effects on Habitat and Prey Species

As was discussed earlier in relation to benthic ecology and fisheries, the marine ecosystem is highly interdependent and small changes in either may have consequences elsewhere in the marine food chain.

The additional area subject to capital dredging, and the disposal area for the dredged material are both too small in the context of similar habitat availability in Hawke Bay to pose any threat higher up the food chain that might affect marine mammals. This is specially the case as partial (in areas subject to maintenance dredging) or full recovery (where disposal areas are not re-used for long periods) are components of the overall implications of the change.

No features of special ecological importance for fish species were found in the areas that will be directly affected by project activities. Species that utilise the proposed dredging and spoil disposal areas are expected to temporarily avoid the immediate vicinity during phases of direct physical disturbance and due to associated temporary loss of existing food sources. However, it was concluded by Cawthron that the benthic areas involved are too small for such effects to result in impacts on stocks of any inshore fish species at the population level.

Hence short- or long-term flow-on effects to local marine mammal are assessed as being negligible. In summary, this conclusion was based on:

- the project involves alteration and/or temporary loss through dredging of a relatively very small percentage of benthic habitat within Hawke Bay inshore waters, which is expected to recover between subsequent periodic maintenance dredging;
- benthic smothering effects are confined to a limited area within and around the disposal site, and affected communities are expected to recover rapidly (time-scale of months);
- there would be only temporary and localised avoidance of capital dredging and/or spoil disposal sites by fish (representing marine mammal prey species) with minimal effect on species populations or recruitment;
- there is no evidence that project sites serve as unique and / or rare habitat for any marine mammal species in terms of feeding activities; and
- overall home ranges of local marine mammal species are large and overlap with similar types of habitats in other parts of Hawke Bay and along other eastern coastline regions.

In terms of effects of turbidity, marine mammals are known to inhabit fairly turbid environments worldwide and especially within New Zealand. While they generally have very good vision, it does not appear to be the sense they rely upon most for foraging. Instead, odontocetes (such as orca and dolphins) mainly depend on echolocation systems for underwater navigation and searching for food. Even baleen whales, which do not have the ability to echolocate, regularly forage in dark, benthic environments, stirring up sediments to find prey. Thus, turbidity plumes are more likely to affect marine mammals indirectly via their prey resources rather than directly. Previous research on plumes suggests that any impacts on local food organisms should be short term and limited in scale, and therefore, no substantial flow-on effects to local marine mammals are expected.

### 12.3.4. Underwater Noise

Underwater noise is generated by all vessel movement, and will increase in the vicinity during the dredging campaigns. Wharf construction, and particularly the pile driving involved will, over the approximately 18 to 24 month construction period, introduce new types of high-frequency sounds directly into the marine environment. Both types of noise have the ability to affect marine mammals' behaviour and in some circumstances can cause harm to the hearing of the mammals.

The Marshall Day Acoustics report (Appendix J in Volume 3) explains the US Department of Commerce National Ocean and Atmospheric Administration's guidance for assessing the effects of anthropogenic sound on marine mammals (NOAA Guidelines). Two thresholds, at 160dB[96] for impulsive noise such as pile driving, and 120dB for non-pulse noise such as dredging, drilling or vibratory piling, are applied. However, for pile driving, effects may occur due to single very loud strikes or from long-term exposure. Marshall Day has measured ambient underwater noise levels in and around the Port to understand how acclimatised visiting marine mammals may be to noise levels. Ambient levels[97] are regularly at 130-140dB in the absence of anthropogenic noise (suggesting that the NOAA guideline of 120dB for dredging activities may be too low). The presence of visiting vessels and running engines do raise the ambient, but not greatly. With this background information available, Marshall Day was able to model the additional effect of pile driving, and Marshall Day and Cawthron together were able to draw conclusions as to the extent of impacts and suitable mitigation of effects.

Increasing underwater noise is always a concern in regards to marine mammals. Noise has the potential to adversely affect both cetacean and pinniped species since they heavily rely on underwater sounds for communication, orientation, predator avoidance and foraging. Only a few studies have specifically examined the effects of dredging noise on marine mammals or attempted to separate out such effects from other, often coincident, construction noise sources.

Potential effects associated with underwater noise from the project will be dependent on the types and levels of noise produced, with possible impacts ranging from short-term avoidance, behavioural changes and loss or reduction in ability to communicate, to physical injury resulting from auditory damage.

#### Dredge Noise

Generally, the noises produced from dredging activities are continuous, broad-band sounds mostly below 1kHz. Dredges produce relatively lower sound levels than a large ship. However, the two differ in that a dredge may be actively operating within one general area for long periods of time (weeks or months) while a ship rarely remains in the same area for long (minutes or hours). The associated noise characteristics of dredging activities can also vary depending on the type of dredge, operational stage, and ambient conditions.

The Cawthron report found that TSHD and BHD, the two dredge types to be used for this project, produce mostly low frequency, omni-directional sounds between 100-500Hz. However, their bandwidths could fluctuate as low as 20Hz and as high as 20kHz. The exact ranges are dependent on the process and the types of sediment being extracted, with coarser gravel causing greater sound levels, (which the project is not expected to encounter).

[96] Measured at a reference pressure for the underwater location, which means the level cannot be directly related to dBA in the atmospheric receiving environment.
[97] Due to wave and wind noise providing the ambient, with additional noise from vessels and land-based activities.

## Species Sensitivity

The lower frequency vocalisation ranges of southern right whales suggest their best hearing capabilities are at least between 50Hz and 2kHz, and 20 Hz to 12 kHz for humpbacks, while the functional hearing of baleen whales in general is thought to be between 7 Hz and 22 kHz. These frequency ranges directly overlap with most anthropogenic underwater noise, including dredging activities meaning baleen whales are the species most susceptible to any dredge noise effects.

There is a moderate likelihood of any migrating baleen whales being able to detect or hear underwater noise produced by dredging activity, depending on their proximity to the Port. However, dredging source sound levels are similar to the majority of vessels currently travelling to and from the Port; hence the consequences of hearing dredge noise are expected to be only minor with the strongest responses resulting in short-term masking of some whales' communication calls and possibly temporary avoidance of the area by whales with calves during their migration past the bay.
This conclusion is based on:

- mainly lower-frequency noise are expected to be generated by dredging vessels, and these would be detectable by whales up to at least several kilometres, if not more;
- only a few whales occur in Hawke Bay restricted mainly to winter and some spring months; most only remain for a few days while southern right whales may stay for a few weeks; most pass by in deeper water (beyond 100m);
- whales known to come to Hawke Bay are regularly exposed to similar noise levels throughout their distributional range; and
- dredging sound levels are not expected to exceed any permanent injury threshold criteria, while whales' short-term visits (i.e. days to weeks) ensure that any exposure effects will be low to not applicable.

Odontocetes (e.g. orca and dolphins) generally communicate at higher frequency ranges than baleen whales and have the capability to echolocate (produce biological sonar) for navigation and hunting. While most dolphins' functional hearing range is estimated to be quite large, and they can likely detect low-frequency sounds, their sensitivity significantly decreases at frequencies below 1-2kHz (Clement, 2016). Pinnipeds' hearing ranges are thought to vary more widely, including some ultrasonic frequencies, and are quite sensitive to frequencies below 1kHz (based on grey and harbour seals). However, a study of New Zealand fur seals in Western Australia reported no disturbance reactions to dredging taking place close to haul-out sites[98].

The noise from dredging and disposal operations is expected to have a *de minimis* effect on local or visiting odontocete and pinniped species. If any effects do occur, they are expected to result from the increase in activity as much as from underwater noise, which may lead to temporary avoidance or even attraction to the activity area. This conclusion is based on:

- that the increase in underwater noise will be temporary due to the limited duration of dredging activities (although of longer duration than that due to shipping traffic and the current level of maintenance dredging activities);

[98] Dredge sound levels are not expected to exceed any permanent injury criteria.

- most odontocetes and pinniped species frequenting Hawke Bay are exposed to similar noise levels across their entire distributional range;
- New Zealand fur seals' continued year-round occupancy of nearby haul-out sites and occasional presence on the Port breakwater structure (despite on-going maintenance dredging taking place over the last several decades);
- differences in functional frequencies ranges between species' hearing sensitivities and the lower frequency sounds produced by dredge activities;
- extremely close proximity to dredge vessels would be necessary for any other exposure effects to be felt (and most visits are transient); and
- Hawke Bay waters are not considered to be unique or particularly important feeding, resting or nursery habitats for the species.

### Pile-Driving Noise

Pile-driving has been found to be one of the 'noisiest' of all construction sounds as it generates a very high source level as broadband impulses of underwater sound. Pile-driving has the highest potential to disrupt marine mammal behaviour at many kilometres distance, and could theoretically induce hearing impairment at closer ranges. However, there has been little detailed investigation and different species appear to respond differently. It is clear that some species can be affected and some take avoidance action at 15km distance (e.g. porpoise species).

The proposed berth construction activities will involve the driving of approximately 350 steel pile casings over a period of months within the 18 to 24 month construction period. Marshall Day used 3D underwater noise modelling software to establish spatial envelopes for sound levels from the piling operation for the Napier coastal area. From these modelling outputs, specific zones of influence were generated using the NOAA Guidelines. While pile-driving has the potential to injure the hearing of any marine mammals within close range the distances provided by Marshall Day for hearing loss from cumulative 24 hour exposure was between 20 and 580m. As this risk is largely within the Port itself, and given the limited number of animals observed in this immediate area, there is no more than a low risk of injury.

The behavioural disturbance threshold associated with impulse sounds, such as pile driving, is given as 160dB. Applying this to the acoustic modelling results, Marshall Day concluded that any behavioural response by marine mammals will be limited to animals within 2.25km from the source. The principal response of relevant species is likely to be abandonment / avoidance of the affected area.

Marshall Day provided recommendations for several mitigation measures to ensure that any potential effects are minimised. These include steps that can be taken during the piling operation and will substantially reduce the area of potential risk of damage or avoidance behaviour.

## 12.3.5. Summary of Effects and Mitigation

The range of potential effects on marine mammals from the project is set out in Table 12-2. As can be seen, some of the items have been assessed on the basis of mitigation being in place.

As can be seen from Table 12-2, despite relatively low levels of effect, mitigation is proposed for three of the areas of effect: vessel strike, entanglement and underwater noise. Mitigation for the first two

involves relatively obvious common-sense observation, recording and good-behaviour management relating to the use of dredge(s) and barges. The management of piling in particular to mitigate potential noise effects will involve active management as part of the construction management plan. The rationale for the additional mitigation relates to the New Zealand Coastal Policy Statement's Policy 11 requirement to avoid, remedy or mitigate all adverse effects on at risk species, and on habitats and areas important for migratory species.

The Cawthron report notes the relevance of the NOAA guidelines, and proposes that requirements should be included in the construction management plan for the wharf, and any management plan for dredging and also in contracts, relating to underwater noise. The aims of this part of the plan or procedures should be to *"identify practicable noise mitigation measures and … minimise adverse noise effects on marine animals and fauna"*. The key mitigation actions are briefly described below with some additional considerations:

- Verification of actual noise levels from dredging and pile driving activities by measuring the associated underwater noise of these activities during the early stages of the project.
- Consider techniques for both pile driving and dredging in relation to noise levels and where practicable, choose the least noisy.
- Apply soft-start/ramp-up procedures in which the pile-driving slowly increases the energy of the emitted sound, giving any animals in the area time to move a safe distance away.
- Establish a safety zone that involves a dedicated observer scanning a defined radius of the water's surface and coastal shoreline around the construction area for the presence of fur seals, dolphins or whales prior to commencement of pile-driving activities. If present, ramp-up procedures for pile driving should only commence once any animals spotted have moved out of the zone. Cease piling operations if animals enter the zone. The size of the zone will be dependent on the technique used for pile driving (vibro-driving vs impact driving) and any mitigation devices used, such as plastic or plywood dolly/cushion head.

**Table 12-2: Summary of actual and potential effects on marine mammal species**

| Potential environmental effects | Spatial scale of effect | Persistence/duration of effect | Consequence | Likelihood of effect | Overall risk level *Includes mitigation measures |
|---|---|---|---|---|---|
| **Marine mammal/vessel strike due to increased vessel activity** | **Medium to Large:** Limited vessel movements between the port and disposal site up to 5 km away | **Short to Persistent:** Whales will only be present in the area for a few days to weeks; Campaign 1 expected to last up to 9 mo (mainly BHD). Other campaigns ≤ 10 wks (BHD & TSHD). | **Population Level:** death or injury of endangered or threatened species<br><br>**Individual Level:** death or injury of non-threatened species | **Low** | **De minimis*** |
| **Behavioural and/or physical responses to underwater sound from:**<br>• **dredge/disposal activities** | **Small to Large:**<br>Dependent on sounds produced; behavioural/masking responses predicted at large distances (several kms), potential TTS only within close proximity (< 10 m) | **Short to Persistent:** dependent on species' presence in area; Campaign 1 expected to last ≤ 9 mo (BHD). Other campaigns ≤ 10 wks (BHD & TSHD). | **Individual to Regional Level:** Individuals may avoid, approach dredging activities or hearing effects. | **Low -** TTS<br>**to**<br>**Moderate -** behavioural | **De minimis** |
| • **pile driving activities** | **Small to Large:** Behavioural/masking responses predicted at large distances (2.25 km), potential hearing injury/impairment with close proximity | **Moderate:** Wharf construction completed over ≥ 20 weeks | **Individual to Regional Level**: Individual avoidance or hearing injury/impairment; possible reduction in communication ability (regional) | **Low -** PTS, TTS<br>**to**<br>**High** – behavioural, communication | **Nil –** TTS/PTS<br>**to**<br>**De minimis**, behavioural, communication* |
| **Marine mammal entanglement in** | **Small to Medium**<br>Limited to immediate waters around operating dredge vessels | **Short to Persistent**<br>Mainly while dredge vessel is operating; Campaign 1 | **Population Level:** death or injury of endangered or threatened species | **Low** | **De minimis*** |

| Potential environmental effects | Spatial scale of effect | Persistence/duration of effect | Consequence | Likelihood of effect | Overall risk level *Includes mitigation measures |
|---|---|---|---|---|---|
| **operational gear and/or debris** | | expected to last up to 9 mths (mainly BHD). Other campaigns ≤ 10 wks (BHD & TSHD). | **Individual Level:** death or injury of non-threatened species | | |
| **Contaminant effects on marine mammals from dredge sediments and/or spoil** | **Medium to Large** Limited to immediate waters and habitats adjacent to dredge and disposal sites (< 3 km). | **Short to Persistent** Dependent on level of contamination in sediments | **Individual Level:** Limited potential for any individual to consume more than few prey species exposed to dredging sediments | **Not Applicable to Low** | **Nil to De minimis** |
| **Marine mammal habitat/prey disturbance and increased turbidity due to dredging/disposal activities** | **Medium to Large** Limited to immediate waters and habitats adjacent to dredge and disposal sites (< 3 km) | **Short to Persistent** Re-colonisation will begin during on-going activities and recovery within disposal site only after disturbance has ceased | **Individual Level:** Possible avoidance of disturbed area, some individuals may approach disposal site(s) for foraging | **Not Applicable to Low** | **Nil to De minimis** |

Note: Ranking of terms used in table:

- Spatial scale of effect: Small (tens of metres), Medium (hundreds of metres), Large (> 1 km)
- Duration of effect: Short (days to weeks), Moderate (weeks to months), Persistent (years or more)
- Consequence: Population, Regional, Individual
- Likelihood of effect: Not Applicable (NA), Low (< 25%), Moderate (25–75%), High (> 75%)
- Significance of effect: Nil (no effects at all), De minimis (effect too small to be discernible or of concern), Less than Minor (discernible effect but too small to affect others), Minor (noticeable but will not cause any significant adverse effects), More than Minor (noticeable that may cause adverse impact but could be mitigated), Significant (noticeable and will have serious adverse impact but could be potentially mitigated)

TTS – temporary hearing loss

PTS – permanent hearing loss

Table 12-3 summarises the mitigation which could be built into the construction management plan for the wharf and the dredging operating procedures, to minimise the risk of adverse effects on marine mammals.

**Table 12-3: Proposed Mitigation Methods to Mitigate the Risk of Adverse Effects on Marine Mammals**

| Potential effects | Mitigation goal | Best Management Practice | Reporting / monitoring |
|---|---|---|---|
| Marine mammal/vessel strike due to increased vessel activity | 1. Minimise the risk of dredge or construction vessel collisions with any marine mammal and aim for zero mortality | 1a. Adoption of best boating guidelines for marine mammals, including speed limits, to further reduce any chances of mortality from vessel strikes.<br>1b. Consider establishing a designated observer on the vessel and maintain a watch for marine mammals during any dredging and disposal activities over daylight hours.<br>1c. Liaison with the Department of Conservation (DOC) over the project period for real-time/recent sighting information, in order to anticipate and mitigate potential interactions with any whale species (but particularly southern right whales) sighted in and near the project area. | • Record and report the type and frequency of any marine mammal sighted before, during or after transiting to or from the disposal site.<br>• Record all vessel strike incidents or near incidents regardless of outcome (e.g. injury or mortality).<br>• In case of a fatal marine mammal incident, carcass(es) recovered (if possible) and given to DOC, and further steps taken in consultation with DOC to reduce the risk of future incidences. |
| Marine mammal entanglement in operational gear and/or debris | 3. Minimise entanglement and aim for zero mortality | 3a. Avoid loose rope and / or nets (*i.e.* keep all ropes and nets taut).<br>3b. Ensure that all dredging, support vessels and other project activities have waste management plans in place before the commencement of works. | • Record all entanglement incidents or near incidents regardless of outcome (*e.g.* injury or mortality).<br>• In case of a fatal marine mammal incident, carcass(es) recovered and given to DOC, and further steps taken in consultation with DOC to reduce the risk of future incidences. |
| Behavioural and/or physical responses to underwater sound from dredging/ disposal and pile driving activities | 2. Minimise the avoidance (attraction) or potential for injury of marine mammals to dredging and | 2a. Establish a construction noise management plan (as part of the MWMP) that considers;<br>**Dredging Activities**<br>2b. Regular maintenance and proper up-keep of all dredging equipment and the vessel (*e.g.* lubrication and repair of winches, generators).<br>**Pile Driving Activities** | • Measure actual underwater noise levels from dredging and pile driving activities, and adjust any modelling results and monitoring zones based on these data, if necessary.<br>• Record and report the type and frequency of any marine mammal sighted before, during or after pile driving activities. |

| Potential effects | Mitigation goal | Best Management Practice | Reporting / monitoring |
|---|---|---|---|
| | construction activities | 2c. Establish designated safety zone and trained marine mammal observers on site to maintain a watch before, during and post any pile driving activities (during daylight hours only).<br><br>2d. Adoption of soft-start procedures and choose plant/techniques on the basis of minimisation of underwater noise levels (e.g. vibro-driving preferred over impact-driving). | Include behavioural data if possible.<br><br>• Project sightings from 1b and 2c should be reported to DOC for input to database. |

## 12.4. Conclusions

The marine mammals most likely affected by the project include those species that frequent the inshore waters of Hawke Bay year-round or on a semi-regular basis. Such species include NZ fur seals, Common dolphins, Orca and Southern Right whales. However, these coastal waters are not considered significant habitats for these species. Instead Hawke Bay waters represent only a small fraction of similar habitats available to these marine mammals throughout nearby regions. A qualified exception is made for the Southern Right whales and their use of these waters as potential winter nursery habitats, and to a lesser extent, more acoustically sensitive offshore species.

In light of the limited potential direct and indirect effects the overall risk of significant adverse effects on these species arising from the proposed project is assessed as *de minimis* when considered along with mitigation actions.

Specific provisions in the wharf construction management plan for pile driving activities is suggested, with several mitigation options. Suggested operational procedures as part of dredging programmes are also proposed. These include the following:

- assessing the effectiveness of any mitigation measures put in place that can then be amended, if necessary, while dredging operations are underway; and
- providing important data on dredging activities for future projects.

The draft conditions in section 26 include measures to achieve the proposed mitigation.

# 13. EFFECTS ON BIRDS

## 13.1. Introduction

Napier Port area and its vicinity hosts a number of species of avifauna – shorebirds and seabirds. Some are thought to be permanently resident at the Port but others are short or longer-term visitors. The nearby Ahuriri estuary area is the most significant habitat of its type between Wellington and the Bay of Plenty, with over 70 bird species, including some Nationally Threatened or At Risk species[99]. The Hawke Bay is an important feeding ground for numerous sea birds.

The project has the potential to affect birds within the vicinity due to direct disturbance of habitat during construction, and/or alternation of habitat during dredging and the disposal of dredged material due to turbidity in or sedimentation of feeding areas.

Wildlands was commissioned to investigate the potential impacts – particularly on little blue penguins, who are known to inhabit the revetment and are found from time to time on parts of the container terminal – but also on other birds in and near the Port. The investigations involved site visits, iterative reviews, database searches and discussions with the Department of Conservation (DoC), HBRC officers and the National Aquarium of New Zealand.

The key specialist report which sets out information about species, risks and means of mitigation of adverse effects is the Wildlands report, provided as **Appendix L** in Volume 3 of this application documentation.

## 13.2. Description of the Existing Environment

Species with the potential to be affected by the project include little blue penguin, black-billed gull, white-fronted tern, shag species and foraging seabirds.

### 13.2.1. Ahuriri Estuary

The Wildlands report considers the potential for impacts on birds in the Ahuriri Estuary and notes that the only potential for impact could relate to increased sedimentation from the dredging and dredge deposition affecting the benthic environment and thus bird feeding in the area. Taking into account the findings of the Cawthron report[100] that the estuary's current exposure to suspended sediments is likely to be far higher than any sediment from dredge plumes and that there will be no effects on fish feeding, breeding and migration in and from the area, the Wildlands report concludes that the possibility of increased sedimentation would be low and, if there were such occurrences, the overall impacts on birds would be minor. On this basis, effects on birds inhabiting the Ahuriri Estuary are not considered further in this assessment.

[99] New Zealand Threat Classification system, Department of Conservation – 2016 Conservation Status of New Zealand Birds (Robertson et al).
[100] Appendix H in Volume 3, see comment in section 8.21 and 8.2.2.

### 13.2.2. Port Napier – Species Potentially Affected

#### Blue Penguins (Korora)

Blue penguins of the northern blue penguin subspecies are thought to nest in the limestone revetment which surrounds the northern container terminal, part of which will be dismantled and replaced during wharf construction. They may also be nesting in other parts of the Port as the breakwaters and sea walls provide good habitat. They have been found nesting amongst containers in the past.

The species is nationally classified as At Risk – Declining. With Hawke's Bay having between 1,000 and 5,000 birds, mostly at Port Napier, Cape Kidnappers and Motu-o-kura (Bare Island), the species is not considered threatened here. This is largely due to limited predation threat in the three key locations.

Individuals occupy nest sites for much of the year, and they return to nests in successive years. They leave the nests after the moult for foraging expeditions that can last up to a week, but otherwise, trips away from the nest are short-term and nocturnal. Korora may forage up to 45km away from the colony, but normally less than 20km. They generally feed on small fish and squid by diving and trapping prey on the sea bed in shallower waters.

They are prone to predation by a range of mammals, from cats and dogs to rats[101]. As they often live close to or within places of human activity they are vulnerable to vehicle collisions.

The habitat at Port Napier is beneficial to Korora as, as well as providing habitat, it also includes pest control (particularly rodents and feral cats) and dogs are excluded.

#### Black-Billed Gulls (Tarapunga)

This gull has been present in the Port, with a small nesting colony on Geddis Wharf (No.3) in 2015. It is classified as Threatened-Nationally Critical species and only a small proportion of the total population is found in the North Island.

It is unclear why the birds chose to establish a colony in a busy working port. Once the chicks hatched, the adult birds became aggressive towards Port staff, indicating that they were under stress. Once breeding was complete and the colony had left, steps were taken to discourage them from returning and they have not[102].

#### White-Fronted Tern (Tara)

This At Risk-Declining species has bred at the Port, again noted in 2015. They chose the top and side of a revetment area to nest, which provides a suitable rocky habitat. Although not present in 2016, it is possible that they may return. This species are also likely to have benefited from the predator controls operated by the Port, although they would have been vulnerable to predation by other (non-vulnerable) gull species, also present at the Port, who are known to take chicks and eggs (black-backed and red-billed gulls).

[101] Rats take eggs rather than birds. Dogs which are not leashed, or which are out at night have been found to be a considerable risk to bird populations.
[102] The Wildlands advice is that, in their national habitat of South Island braided river beds, colonies move to adapt to changing channel morphology, often from year to year, so will not have been disadvantaged by the Port's actions.

### Shag Species

A range of shag species (up to five) may use the Port breakwater for roosting but are unlikely to breed there.

## 13.3. Actual and Potential Adverse Effects on Birds

### 13.3.1. Potential Effects on Little Blue Penguins – Korora

The vicinity of the proposed wharf – namely the revetment area to be replaced, is known to contain approximately 30 Korora nests.

A survey has been undertaken in September 2017[103] which revealed that there are 29 indicative nest sites within the area to be directly disturbed by the wharf construction, and another 41 sites, within the port area further to the north.

If birds are within the nests when the revetment blocks are removed for storage, there is a high risk that injury or death would occur. At times of the year when eggs are being incubated[104] or chicks are in the nest, the risk becomes even higher.

Such risks are unavoidable, and they can only be mitigated to a certain extent as discussed in the next section. Because of the size of the revetment material and the potential for nests to be deep within the revetment, it cannot be guaranteed that all components of the population will be rescued during the approximately 18 months of construction stage. Also, there is a risk that relocated penguins returning to the area and seeking a nesting site may be harmed[105].

Mitigation will reduce the level of potential effect, but nevertheless there is a moderate to significant risk of an adverse effect on multiple individuals associated with the construction. A comprehensive condition has been proposed to actively manage, and endeavour to minimise adverse effects on the population during the construction phase and beyond. Further details are provided in section 13.4 and the full condition is set out in section 29.4. of this report.

Indirect effects include reduction in available breeding habitat as the revetment, which currently extends two to three metres above MHWS, will be reduced in height to become flush with the reclamation beyond. This affects approximately a 400m length of sea well. Further, the habitat will change because of the darkness and seclusion below the 35m wide wharf.

[103] The survey was undertaken on 24 September 2017, just prior to nesting season when a survey (using a trained dog) was considered to provide the most reliable information as to the presence of the penguins. This post-dates the information in Appendix L, Volume 3. Wildlands has however confirmed that their recommendations are unchanged by the additional details.
[104] Nests normally contain two eggs.
[105] The Wildlands report cites examples of blue penguins in Australia returning rapidly to their capture location after travelling 360km and 120km respectively.

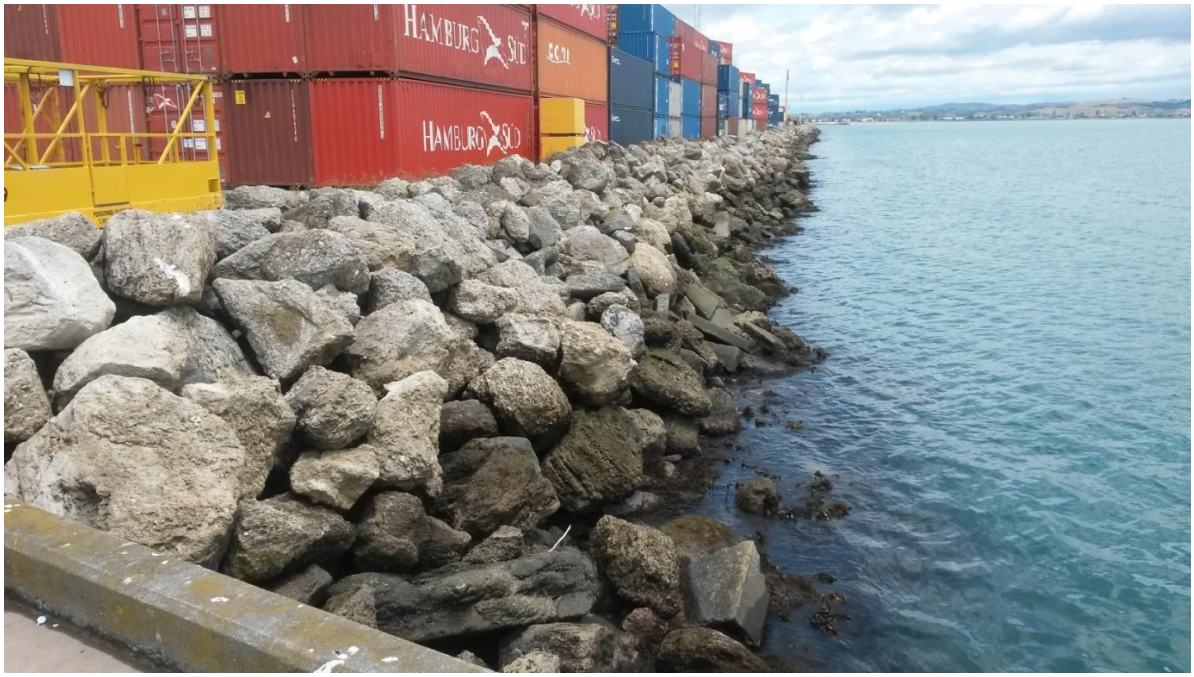



**Figure 13-1: Existing revetment adjacent to proposed wharf**

There is some potential that construction activities may disturb penguin behaviour in adjacent areas. As this species of penguin appears very tolerant to disturbance, this is not a significant risk. Further, penguins going to sea do so before dawn and return at dusk, meaning that many will be away for daytime construction activities. The penguin population is already accustomed to movements of large vessels so additional vessels in the vicinity are unlikely to cause disturbance even if they coincide with times that penguins are departing or approaching the area.

### 13.3.2. Other Species

The former nesting areas of black-billed gulls, tarapunga, and white-fronted terns, tara, are not directly within the project construction area. If these birds return it would likely to be to another part of the Port. Thus it cannot be said that they are affected adversely by the project. Both species have demonstrated high levels of tolerance to busy working port environments.

Shags roosting on the main breakwater may however be affected by pile driving noise at the distance of the new wharf.

### 13.3.3. Potential Effects of Dredging on All Species

The Wildlands report notes that there is a wider diversity of seabirds found near to Napier which will forage in the CMA, including the dredge material disposal area. These include the species already noted and a range of other species observed in the area, particularly from visiting cruise ships, as well as other species which may forage irregularly, seasonally or during bad weather.

Possible influences on behaviour may include the airborne and underwater noise particularly from pile-driving at the wharf construction site, resulting in avoidance by some species, disturbance by the regular presence of dredge vessels, or additional turbidity which would reduce visibility of prey in the water column. Wildlands has concluded that these effects are likely to be less than minor for pelagic seabirds and minor for others because:

- Seabirds in the area will already be accustomed to ship movements.
- All of the species fly or swim many kilometres to forage and will have extensive foraging areas. The limited area of change is only a small part of any one species foraging range[106], leaving large areas unaffected.

## 13.4. Mitigation

Avoidance of significant adverse effects, and avoidance, remedy or mitigation of other effects is directly in relation to New Zealand Coastal Policy Statement 11, as the species identified are all threatened or at risk.

For blue penguins, mitigation is proposed as a series of steps which involve progressive management actions, as follows:

1. The population survey undertaken during September 2017 for the whole of the Port area and nearby was the first action proposed. This has established the size of the population and will be used to help identify what mitigation or remedy may be most practicable. This survey may be repeated, depending on the timing of the wharf construction.
2. Collect other information, such as the presence of mustelids and feral cats within the Port area.
3. Once the population, and opportunities for mitigation have been identified, develop a series of management steps within a Blue Penguin Management Plan, including:
    - direct commitments/actions by Napier Port such as enhanced pest control, commitment to support offset action at other sites;
    - steps to be undertaken as part of the Construction Management Plan, including contractor training, circumstances where iwi monitoring is required;
    - timely obtaining of a Wildlife Permit to disturb and if necessary relocate birds;
    - establishment of a temporary penguin rescue centre;
    - liaison with DoC and the National Aquarium; and
    - public education measures.
4. Seek certification of the Blue Penguin Management Plan by HBRC[107].
5. Implement the Blue Penguin Management Plan in accordance with the established purpose of the plan and its timeframe.

A risk assessment will be undertaken in the context of the construction programme and the detailed construction management plan, and a method (or methods) of offsetting the estimated population loss at the construction site identified. This risk assessment will be undertaken by expert advisers in consultation with DoC. From this, proposals to offset any population loss will be developed. The proposals may include direct methods to enhance populations elsewhere within the Port or along Hardinge Road equivalent to or

[106] This is particularly the case for pelagic birds that spend most of their time at sea, including species such as petrels and shearwaters.
[107] This assumes that such a plan will be required as a condition of consent. Ideally this would also include and meet the requirements of any Wildlife Permit issued by DoC.

better than the estimated loss, or a range of other methodologies which may include subsidisation of enhancement programmes elsewhere in the region or, if appropriate, the North Island. Offset decisions will need to be made within the context of the consent conditions and, as well as HBRC and DoC, should involve Iwi. Parameters need to include a duration (or specified offset outcome) and monitoring to demonstrate that the offset has been achieved.

For white-fronted terns, no specific mitigation is necessary as the species is not currently using the Port. However, as part of the Port's internal staff training, an informal undertaking has been made as part of the role of the Environmental Advisor to maintain a watch for the species should they re-establish nesting anywhere on the Port, and seek expert advice on management of black-backed and red-billed gulls.

For shags, surveys of the use of the revetment and breakwater will be undertaken prior to work commencing, and continued to determine the effect of pile-driving on shags using the breakwater. Opportunities for mitigation (if necessary) through alternative roosting opportunities will be sought, and determined in discussion with DoC and HBRC. As the pile-driving is episodic, no specific mitigation is proposed for disturbance, and monitoring will determine whether additional steps are needed.

## 13.5. Summary and Conclusion

The investigations have identified a number of potential effects on important sea and shorebird species where the Port has been or may be a habitat. The greatest risk of moderate (or for any birds unavoidably harmed, significant) adverse effects relates to blue penguins which may inhabit the revetment to be dismantled and rebuilt as part of the project.

Table 13-1 provides a summary of the effects, including an assessment of the residual potential adverse effects, following mitigation. Offsets will be considered only if it is not possible to adequately mitigate effects within the Port boundary.

The information to be collected and the proposed public education, along with the probable involvement of Iwi in a monitoring role, provides minor positive benefits across the wider community. A condition requiring the development of a Blue Penguin Management Plan is included in the draft conditions in section 26.

**Table 13-1: Summary of Effects on Birds and Proposed Mitigation**

| Species | Activity | Potential Effects | Proposed Mitigation or offsets | Residual Potential Effects after Mitigation or offsets are in place |
|---|---|---|---|---|
| **Little Blue Penguins** | Loss of burrows, eggs, chicks and adults | Major | • Survey<br>• Response Plan – to include pest animal control at Napier Port, offset options (if needed)<br>• Management of Hardinge Road Blue Penguin population | Minor or less than minor |
| | Decrease in available breeding habitats | Potentially more than minor | | |
| | Disturbance of adjacent breeding blue penguins | Minor | | |

| | | | | |
|---|---|---|---|---|
| | Disturbance of blue penguins at sea | Minor | • Management of an alternative Blue Penguin population<br>• Public education and Blue Penguin advocacy | |
| **Black-billed gulls** | Construction | None | No action required | N/A |
| **White-fronted Terns** | Construction and Dredging | None | • Pest animal control Plan at Napier Port<br>• Observe and treat any gull predation | N/A |
| **Shags** | Construction | Minor | • Survey of roosting shags<br>• Survey main breakwater for use of this area as a roost | De minimis |
| | Pile-driving | Potentially more than minor (but is a temporary effect) | | Less than minor |
| **Foraging Birds** | Turbidity, vessel movement and pile driving | Less than minor (pelagic seabirds)<br>Minor (other species) | No action required | N/A |

# 14. CONSTRUCTION EFFECTS

## 14.1. Introduction

The overall project includes both dredging and wharf construction. The two will have substantially different "land side" components.

### Dredging and Disposal

The dredging component will take place as a number of campaigns, but the actual dredge activity takes place entirely within the CMA. While the dredges and associated barges will be present for extended periods they will simply comprise additions to vessels coming and going from the Port. The "land side" requirements and implications such as fuelling, provisioning, any minor maintenance, will be absorbed as part of the day-to-day Port operations and will generate no noticeable effects in terms of noise or traffic.

Dredging will operate within contract conditions, which will include any management requirements which are the subject of conditions as part of the resource consent regime. The contract conditions will manage Port access, security and other aspects which are not subject to RMA requirements. The outline contents of a Water Quality Management Plan, which will assist in the integrated management of the dredging and disposal activity, are included in section 26 of this report.

### Wharf Construction

Wharf construction is expected to take approximately 18 to 24 months, and additional time for clearing and setting up the construction laydown and operational area. As the construction area is to the north and reasonably geographically central to the Port, this means that it is at maximum distance from any resident population which could be directly affected. Nevertheless, there will be some construction effects which are likely to be noticeable to those living nearby. It is expected that the wharf construction will be subject to a specific management plan, and this is provided for in the draft conditions in section 26 of this report.

The potential effects considered as construction effects are noise, vibration and traffic.

Noise and vibration have been considered in a report prepared by Marshall Day Acoustics, provided as **Appendix J**. In addition, Marshall Day has provided noise predictions for Port operations, including the new wharf, as at 2026. These are provided as **Appendix K**. Traffic impacts are addressed in **Appendix M**, a report by Wanty Transport Consultancy.

## 14.2. Noise and Vibration

### 14.2.1. Description of the Receiving Environment

#### Noise

The receiving environment for noise from the Napier Port area includes residential suburbs immediately across Breakwater Road (SH50) and elevated on Bluff Hill. Noise management at the Port is undertaken on the basis of a Port Noise Management Plan, which is a requirement of the Napier City District Plan[108]. As

[108] See Napier City District Plan, Appendix 33A.

part of this Noise Management Plan, the Port must maintain monitoring equipment and regularly report its monitoring findings, and compliance with (or departures from) inner and outer Port noise boundaries which are shown on the planning maps[109]. These are included in the Napier City District Plan as rule provisions and are based on long-term predicted operational noise levels from Port activities and subject to a range of compliance requirements (such as night-time noise limits). Table 14-1 below sets out these limits at the inner noise boundary. The inner noise boundary contains a small number of houses. The outer noise boundary sets the outer area for the limits in Table 14-1.

**Table 14-1: Maximum Noise Limits Beyond the Port Inner Noise Boundary**

| | |
|---|---|
| Over any five consecutive day period | $L_{dn}$ 65 dBA |
| On any day | $L_{dn}$ 68 dBA |
| 2200 hours to 0700 hours the following day | $L_{eq\ (9hours)}$ 60 dBA<br>$L_{eq\ (15mins)}$ 65 dBA |
| 2200 hours to 0700 hours the following day | $L_{max}$ 85 dBA |

The existing ambient noise environment for the residential receivers directly to the south is generally controlled by port operations, which include truck movements, vessel movements, forklifts, excavators and crane operations. Measurements show that on a typical day the annual average 24-hour noise level received at the Bluff Hill Noise Monitoring Terminal on the corner of Seascape and Karaka Roads is 56 dB $L_{Aeq}$.

Construction noise is specifically excluded from the management of day to day operational Port noise, in accordance with the District Plan, and is managed under separate rules in the District Plan[110].

The HBRC has transferred its responsibilities for noise management to Napier City Council in relation to Port noise. However, the HBRCEP includes policy that Napier Port adopt the best practicable option to manage Port noise[111].

In terms of the receiving environment for noise, parameters are set by the New Zealand standard for construction noise (see footnote below) for the construction activities. These are set out in Table 14-2 below.

The long-term contribution that noise from the use of the new wharf may have to the overall Port noise environment must be contained within the existing requirements of the inner and outer port noise boundaries.

[109] Developed in accordance with New Zealand Standards 6809:1999 "Acoustics – Port Noise Management and Land Use Planning".
[110] Rule 57.9.1.h and Note 3 which applies the recommended limits and measurements basis of New Zealand Standard 6803:1999 "Acoustics – Construction Noise Measurement and Assessment of Noise from Construction, Maintenance and Demolition Works".
[111] Table 25-1.2, HBRCEP.

**Table 14-2: Construction Noise Limits (Long-term >20 weeks)**

| Type of Receiver | Time of week | Time period* | Noise Limit | |
|---|---|---|---|---|
| | | | $L_{Aeq}$ | $L_{AFmax}$ |
| Residential or Rural | Weekdays | 0630 - 0730 | 55 | 75 |
| | | **0730 – 1800*** | **70** | **85** |
| | | 1800 - 2000 | 65 | 80 |
| | | 2000 - 0630 | 45 | 75 |
| | Saturdays | 0630 - 0730 | 45 | 75 |
| | | **0730 – 1800*** | **70** | **85** |
| | | 1800 - 0630 | 45 | 75 |
| | Sundays and public holidays | 0630 - 0730 | 45 | 75 |
| | | 0730 - 1800 | 55 | 85 |
| | | 1800 - 0630 | 45 | 75 |
| Commercial or Industrial | All days | **0730 – 1800*** | **70** | - |
| | | 1800 - 0730 | 75 | - |

* Highlighted components are the working hours proposed, in line with the Standard

Assessments have been undertaken for both construction and long-term noise and are explained in the following sections.

### Vibration

Vibration is usually evaluated at the same time as noise predictions are made.

Vibration is propagated as ground waves. The Marshall Day Acoustics report states that *"due to the large separation distance from the proposed construction works to nearby residential receivers, effects from construction vibration would be negligible and have not been considered further"*.

## 14.2.2. Potential Noise from Construction

While a range of construction activities will generate noise, the main noise source is considered to be pile driving. This activity will have both airborne and underwater noise components. Underwater noise is of importance because of its potential effects on marine mammals[112], and has been addressed earlier in section 12 of this report.

To investigate the noise levels in the receiving environment that would be associated with construction, a noise model is used. Details are given in the Marshall Day Acoustics report. In summary, the model uses a

[112] Underwater noise also has a human component if divers are operating nearby. This has been addressed in the Marshall Day report and any effects would be limited to close to the construction site and therefore subject to control by Napier Port.

topographic[113] digital terrain of the Port and nearby areas and applies details of the noise associated with specific construction activities in the location and at the elevation that they would be undertaken. The central locus of the measurement was taken to be the western end of the wharf as this is closest to potentially affected residents. In the case of this project, it was found that most construction noise would be within the noise levels and types typically associated with the Port[114]. However, impact piling works would produce the highest levels[115] and if that activity was able to achieve compliance with the construction standards, then compliance would be achieved for all construction activities. Figure 14-1 shows the predicted noise levels for pile driving. As can be seen, the dBA $L_{eq}$ measurement of 70 dBA $L_{eq}$, which is required to be met at residential receiving environments is contained well within the Port boundaries and the nearest residential areas should only receive construction noise at levels of 45 or 50 dBA $L_{eq}$. Nevertheless, this noise will be noticeable due to its character.

These noise levels are described as *"reasonable"* by Marshall Day Acoustics due to their limited duration (i.e. pile driving will occur at various stages of the project, but not continually) and the activities will be undertaken within appropriate hours of the day. Despite this finding, Marshall Day recommends that a Construction Noise Management Plan should be implemented. This is outlined as part of mitigation below.

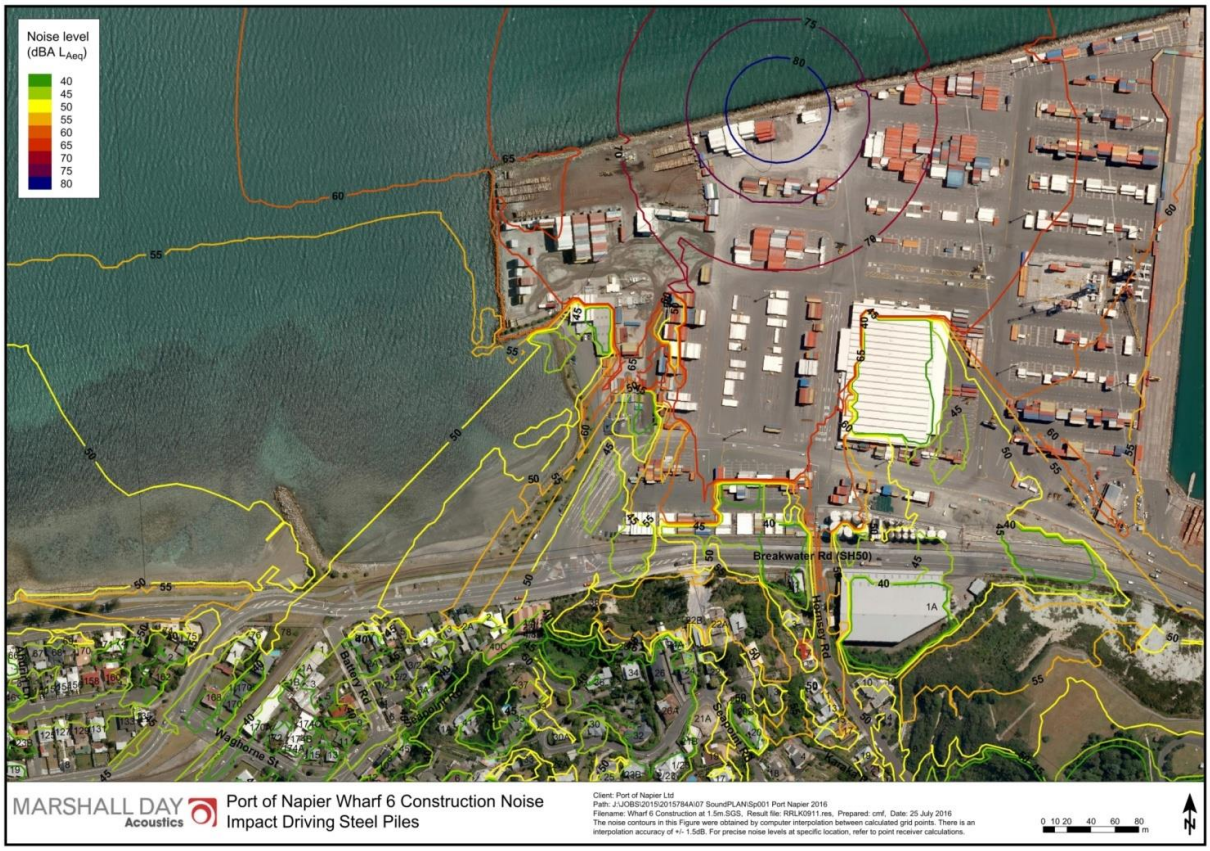



**Figure 14-1: Predicted construction noise levels**

[113] For the purposes, topography includes permanent structures and buildings which would have a shielding effect.
[114] Including excavation and crane operations, mechanical plant operation and truck and vessel movements.
[115] Including a penalty for special character sound.

### 14.2.3. Construction Noise Mitigation

Despite the construction noise standard's requirements being able to be achieved, construction noise should be managed through a Construction Noise Management Plan. This can be part of the overall Construction Management Plan, or a separate plan.

Items that should be part of the Construction Noise Management Plan include:

- the performance standards that must, as far as practicable, be complied with;
- predicted noise levels for relevant equipment and/or activities;
- construction noise mitigation strategies to be employed where practicable, for example:
  - utilising a non-metallic 'dolly' or 'cushion cap' between the hammer and the driving helmet of the impact piling rig (e.g. plastic or plywood);
  - use of an enclosed impact piling driving system that shrouds the point of impact;
  - fitting of silencers on the rig engine;
  - fitting (or upgrading) of engine covers; and
  - construction of an effective acoustic barrier, such as a stack of containers placed on the land side of the piling rig;
- noise monitoring requirements, with triggers and feedback mechanisms; and
- communication, consultation and complaints response procedures.

Some of these will also contribute to a reduction in the underwater noise component of pile driving, to the benefit of marine mammals. Developing the Construction Noise Management Plan will involve decisions on aspects such as advising local people ahead of the commencement of construction and of specific pile driving stages. Specific provisions may be able to be developed in association with the existing Port Noise Liaison Committee.

### 14.2.4. Long-Term Operational Noise

The new berth available once the wharf has been constructed will both provide for the anticipated growth to 2026 and also result in some reorganisation in the use of the existing berths. Although not part of the wharf construction process itself, the consequences of the wharf construction need to be evaluated against the Port noise boundaries that apply in the District Plan.

Modelling was carried out to evaluate the implications of the growth and change at the Port which is being facilitated by the proposed new wharf, against the established modelling outputs which are represented in the District Plan. The context and methodology is explained in the Marshall Day Acoustics report in Appendix K in Part 3.

The outcome is shown in the Appendix K[116]. As can be seen, both in 2016 (measured and modelled) and 2026 (as calculated by the calibrated noise model taking into account future development and operations) the Port's activity is predicted to remain compliant with the District Plan.

[116] Appendix C and D to report in Appendix K.

## 14.3. Traffic

### 14.3.1. Description of the Environment

The Port is located with two access gates on Breakwater Road – one at the northern end, Gate 3, through which most of the container traffic passes, and one at the southern end, Gate 1, which accepts most of the Port's non-containerised cargo (fertilisers and logs) and through which most of the cruise ship related traffic passes.

The Port has installed a number of management systems in recent years to address security and safety both within the Port itself and for vehicles arriving at the Port.

Traffic coming to and departing from the Port uses Breakwater Road. The approximate daily traffic flow on this road is 5285 vehicles per day, of which approximately 7% are heavy vehicles. Counts of turning vehicles at the two Port entrances for the peak hour on a Wednesday show 103 heavy vehicles entering/exiting Gate 3 (of a total of 534 vehicles in all) and for Gate 1, 62 heavy vehicles (of a total of 479 vehicles in all). The operational level of service at the two intersections is A or B, with delays of less than 15 seconds per vehicles. The intersections are operating safely and with a high level of performance.

### 14.3.2. Construction Traffic Effects

The wharf construction will involve some 18 to 24 months of work, during which time there will be varying phases with differing needs for construction traffic to access the work area and variations in types of construction traffic. Wharf deck concrete pours are likely to be the most intensive stages, when five to eight concrete trucks may arrive every hour over a period of four to six hours. All construction traffic will be additional to the existing Port traffic[117], and all will enter and leave the secure Port area at the western Gate 3.

Other construction activities may involve an ongoing but more steady source of traffic. For example, new material for facing the modified revetment may involve 10 truck movements per day (five return trips) or one to two truck movements per hour over 78 weeks. This would be in addition to the concrete trucks visiting the site.

There will also be delivery of large equipment; crane components, diggers, and normal size equipment. On a daily basis there will be contract staff, and construction site provisioning using light vehicles.

Modelling of intersection performance was undertaken by Wanty Transportation Consultancy on the basis of estimated typical "worse case" scenarios. This included expansion factors – 10% for conservation and 50% for stress testing or design life evaluation. The findings of this modelling were that Gate 3 remained at level of service B, and the stress test scenario resulted in continuing level of service B, but dropped to level of service C for a right-turn out of the Port. Thus any effects from construction traffic will be minor or less in relation to the wider and Port operational environment at the interface between the Port and the roading system.

The Wanty report notes that even if some light construction traffic (such as workers' shuttle vans) used Gate 1, that gate can also satisfactorily accommodate such traffic.

[117] Note that some larger materials, including pipes for the piles and rebar may be delivered straight to the Port by ship.

In considering wider traffic impacts on the transport network, during construction temporary traffic management plans can be used to manage particular stages or types of traffic, and to address any temporary pressure points on the system. It is proposed that such detailed management plans should be left to be developed closer to the time of construction when more precise details are known about the construction programme and methods. The management plans should deal with both internal and external operations and should cover interaction with the Port railway line. The development of such plans assist mitigating even the minor effects associated with construction as they target any potential small-scale temporary management issues or effects.

The Wanty report does suggest some minor safety improvements as part of a safety review for the Port, separate from the wharf and dredging project, and these are likely to be implemented well ahead of construction commencing.

### 14.3.3. Long-Term Traffic Effects

As was described for noise in section 14.2.4, the new berth available once the wharf has been constructed will provide for anticipated growth out to at least 2026 and most likely longer. The Wanty report has looked at the implications of growth in container, log and cruise ship visits in terms of traffic impacts.

It was found that, even with amplified growth to reflect seasonal peaks, levels of service for traffic turning out of the Port at Gate 3 remain at level of service B (14 second delay). This allows for uninterrupted single-lane traffic flows on Breakwater Road in each direction. Stress testing was again undertaken and this indicted that growth can continue for about 30 years without Gate 3 dropping below level of service C. At that stage, these could be a three to four vehicle queue at times leaving the Port which would still be manageable.

Evaluating the system at the Gate 1 access using the same expansion parameters, all movements continue to operate satisfactorily and slightly better than for Gate 3.

Wider implications on the road network from expanded Port-related traffic have not been assessed as these implications are addressed by the New Zealand Transport Agency for State Highways, and the Napier City Council, as road controlling authorities. Similarly, the ability of the rail system to handle more Port-related transport has not been assessed but remains a possibility.

## 14.4. Conclusion

The two aspects which will potentially affect the wider environment during and following the construction stage have been assessed: noise and traffic.

During construction, both have been found to have predictable effects which will be less than minor in terms of the receiving environment. However, it is proposed that management plans for construction noise and construction traffic should be prepared and implemented. This is good practice, and will assist in further mitigating residual effects particularly during the relatively intense stages of construction – for noise, during pile driving and for traffic, during major concrete pours and during transport of revetment blocks or units into the Port.

Draft conditions referring to a construction management plan, which would include provisions for the management of noise and traffic, have been included in section 26 of this report.

The post-construction implications in terms of noise and traffic have also been considered. In both cases, the growth which has been predicted for the next 10 years or longer will fit effectively within the current management and operating systems for noise and traffic.

# 15. ACCESS, RECREATIONAL USE AND VALUES

## 15.1. Introduction

The RMA, the New Zealand Coastal Policy Statement and the HBRCEP all place considerable emphasis on the coastal environment as a place of recreational use and values, to which public access needs to be protected.

While access to the functioning Port area for public use is unavailable due to security, safety and biosecurity requirements, the beach and foreshore areas to each side of the Port are well used by the public, and sea passage from the boat harbour and marina areas of the Ahuriri inlet means that the sea area in the vicinity of the Port is widely navigated.

Effects on recreational fishing are addressed in the Cawthron report provided as **Appendix H** in Volume 3 of this documentation and impacts on surf breaks near to the Port are addressed in reports by Advisian, **Appendix D**, and Shore Processes and Management Ltd, **Appendix G**. Past investigations have looked at the recreational use of the beaches near to the Port[118].

Visual and landscape values along with amenity values attributed to natural character of the coast are discussed in section 16 of this document and Maori cultural values are discussed more fully in section 17.

## 15.2. Existing Situation

To the south of the Port, a range of beach recreational activity takes place on northern Marine Parade beach. To the north, the Port Beach, Hardinge Road/Perfume Point beach, and Westshore South and North beaches all receive considerable recreational use.

Table 15-1 sets out the uses of the beach areas which were surveyed in 2005, and Figure 15-1 shows the beach areas surveyed. Although the patterns are based on data gathered in the summer of 2005, the figure demonstrates the range of types of activity and it is unlikely that there will have been significant change across the recreational spectrum since. It was particularly noted that the Port Beach (Western Reclamation Beach in the survey) is used by family groups with young children.

**Table 15-1: Comparison of Recreational Use (by Recreational Activity) of the Six Beaches Surveyed**

| Comparison of Importance of Activities at The Six Survey Beaches | | | | | | |
|---|---|---|---|---|---|---|
| | Nth Marine Parade | Western Reclamation | Triangle | Perfume Point | Westshore Sth | Westshore Nth |
| In Water Swimming | XX | XXXXXX | XXXXXXX | XX | XXXXX | XXXX |
| Walking /Jogging | X | <x | <x | <x | X | XXXX |
| Walking on Footpath | XXX | <x | N/A | XX | N/A | N/A |
| Windsurfing | <x | <x | <x | <x | X | <x |

[118] Napier Beach Survey, MWH for Port of Napier, March 2005.

| | | | | | | |
|---|---|---|---|---|---|---|
| Canoeing/Boating | <x | <x | <x | <x | <x | <x |
| | **Nth Marine Parade** | **Western Reclamation** | **Triangle** | **Perfume Point** | **Westshore Sth** | **Westshore Nth** |
| Picnicking | XXX | XX | <x | XXXX | XXX | XXX |
| In Car/Observing Beach | XXXXX | XX | N/A | XXXX | <x | XX |
| Playing on Beach | X | XXXX | XXXXXX | XXXX | XXX | XXX |
| Sunbathing | XX | XX | XXXXXX | XX | XXX | XXX |
| Other (Fishing) | X | <x | <x | <x | <x | X |

Note: each x represents 5% of beach use, <x represents less than 5% of beach use.

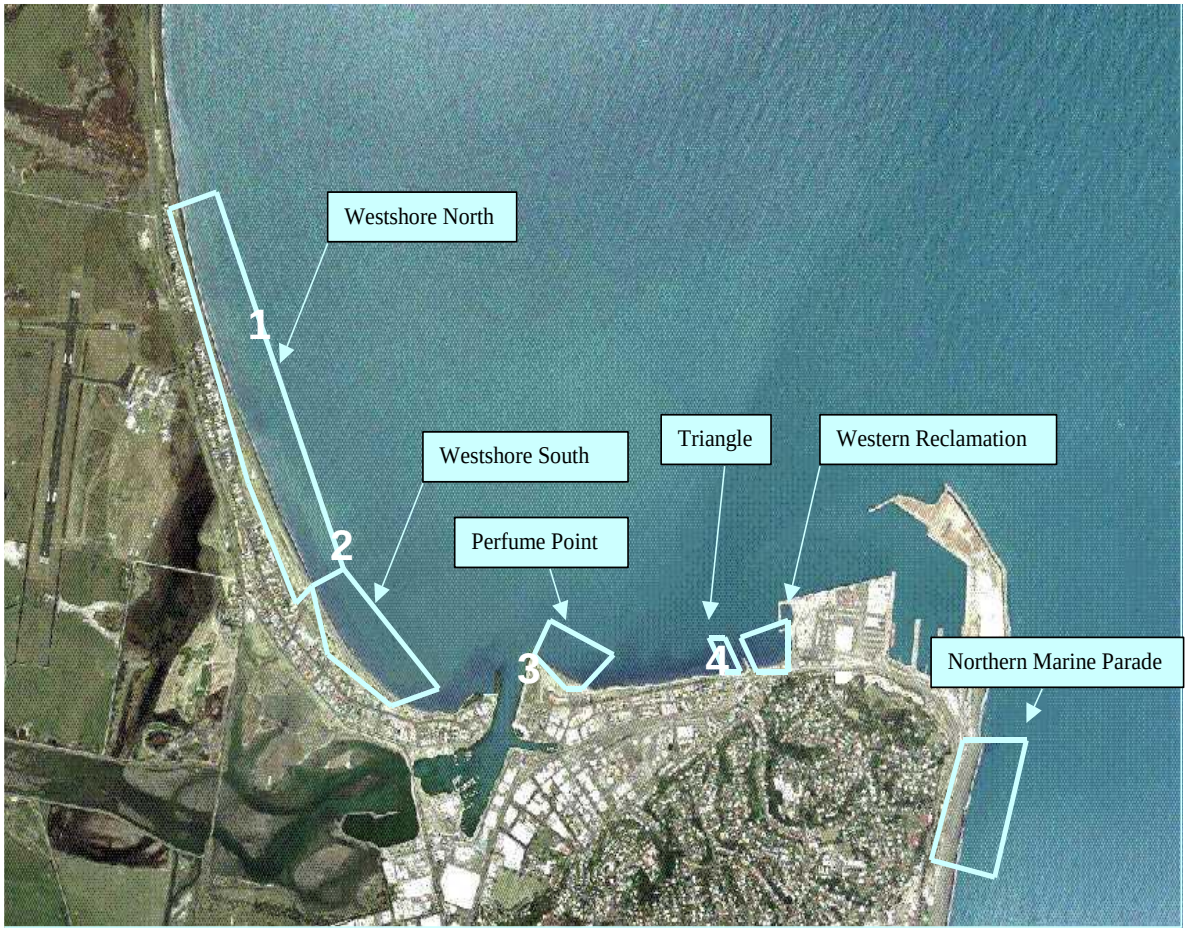



**Figure 15-1: Location of surveyed beaches, and surf beaches**

### Surfing

There are four small surf breaks north of the Port of Napier. Their locations are shown on Figure 15-1. These are their quality rating and skill level[119] (from north to south):

- The Gap – 4, beginner (see location 1 in Figure 15-1)
- Westshore – 4, beginner (see location 2 in Figure 15-1)
- City Reef – 6, beginner (see location 3 in Figure 15-1)
- Hardinge Road – 2, beginner (see location 4 in Figure 15-1)

These areas have protected access areas for surfboard or sailboard use under the HBRC's bylaws[120]. No information is available on the extent of their use.

## 15.3. Actual and Potential Effects

The proposed new wharf and dredging project does not have any direct effect on areas which are currently used for recreational purposes. Potential effects would be largely indirect. There are a number of such effects which need to be considered.

### 15.3.1. Recreational Fishing

This has been considered along with potential effects on commercial fishing in section 12 of this report. There could be potential effects if habitat, including feeding and breeding areas is affected. The Cawthron Institute's investigations have indicated that there will be no perceptible impacts on fish populations, or on invertebrate species which are food for fish or which are generated by people.

### 15.3.2. Boating

The proposed wharf development does not impinge on the Port Beach boating ramp, and will not affect areas currently used for navigation. The change in the navigational channel from dredging will slightly modify wave height and direction in the more offshore areas, as described in section 8 of this report, but this is unlikely to be perceptible under most boating conditions.

Conduct of all craft is governed by the Hawke's Bay Navigational Safety Bylaw which designates the Port of Napier Approach Channel. At present, apart from transit, craft do not use the area of the navigation channel and the area of the extended swinging basin, so there will be no adverse effects.

### 15.3.3. Beach Use

The various components of the new wharf and dredging project will not affect or impinge on normal recreational uses of the foreshore and beaches. People may notice the additional construction activity and the movement of dredges and barges. The pile-driving noise may be perceptible at times, but close to the Port (for example at Port Beach), it will be shielded by container stacks and at greater distance it will be alternated.

[119] Rating from New Zealand Surf Guide website, quality is described as numbers (thumbs up) out of 10. Skill level is as described.
[120] Hawke's Bay Navigational Safety Bylaws, 2012.

Overall, there will be no adverse effect on beach use.

### 15.3.4. Surfing

There is the potential that changes to the sea bed, in this case due to dredging of the expanded swinging basin and deeper and relocated approach channel, could affect the waves reaching the shore.

Investigation of this risk has been among the modelling undertaken by Advisian, as set out in Appendix D in Volume 3 (section 6) of that report.

The simulations undertaken apply to the City Reef[121] and Hardinge Road break areas, as the two breaks further north are beyond the area influenced by the dredging project (i.e. the direction of approach of the incident wave which facilitates surfing, as described in the Shore Processes and Management Ltd report, being from the northeast, and these waves will be unchanged). The simulations were based on a storm event from July 2016 which produced good surfing conditions at all breaks north of Napier.

The reports of the initial simulations were then able to be calibrated to wave measurements over a 10-year period (2004 to 2014) and analysed on the basis of the wave peel angle, breaking intensity and breaking wave height. The characteristics of each of the two surf breaks have been studied over the 10-year record, plotting the wave height vs peel angle across the ride path used by surfers, and analysing the quality of the "surfing amenity" at the two breaks both before and after the full dredging project is complete.

The findings are summarised below:

- **City Reef**[122] - currently this break has good left and right-handed options reportedly with "surfable" conditions reported 14% of the time and "good" conditions 3% of the time. There is also an inner break primarily used by kayakers and longboarders. Advisian concluded that the number of waves meeting the surfability criteria are expected to be unchanged and wave angle, height and form are maintained (83% of surfable waves being "spilling" and 17% "plunging" compared to 84% "spilling" and 17% "plunging" at present). If anything, the left-hand break has a slight increase in plunging breaks over spilling ones, but at 2% this is likely to be imperceptible and maintains current levels of surfing amenity and suitability for beginners. The right-hand break also has a slight shift towards plunging breakers but this is estimated at 1% and will also be imperceptible and maintains current surfing amenity.
- **Hardinge Road** – a similar analysis was undertaken for this break (for which less background material was available), which similarly demonstrated very little change in breaker type between the pre and post-dredging situation. There is a slight increase in peel angle here, consistent with the slight clockwise rotation of wave approach angle noted earlier[123] (at this point approximately a shift of 2° clockwise). This break is considered suitable for somewhat more advanced and intermediate surfers[124] than at City Reef. The slight change in angle of wave approach may result in a slight increase in surfing amenity due to an increase in number of surfable waves.

[121] Referred to as the Whakarire Avenue break in the Advisian analysis.
[122] This break has been extensively investigated as part of a resource consent application for protection works at the end of Whakarire Avenue.
[123] Section 8.3.1 of this report.
[124] This finding is based on the Advisian analysis, and is not reflected in the New Zealand Surfing Guide classification.

Overall, the change identified are so minor as to be negligible or de minimis. There is no need for mitigation.

It should be noted that consents has been given for beach protection works near to the Whakarire Avenue break, and it is possible that there may be some modification in this area prior to Port consents being implemented.

## 15.4. Conclusion

Access to the foreshore and CMA, and recreational use and amenity will not be adversely affected by the proposed wharf and dredging project. Potential adverse effects on surfing amenity have been avoided by the design of the extended swinging basin and channel.

# 16. EFFECTS ON NATURAL CHARACTER, AND VISUAL AND LANDSCAPE VALUES

## 16.1. Introduction

The natural character of the coastal environment is highly valued and is required to be preserved in terms of the RMA, as are outstanding natural landscapes. Regardless of the extent of natural character values remaining in any coastal area, adverse effects must be remedied or mitigated. Landscape and visual values can contribute to people's appreciation of an area's amenity, even when substantially modified from a natural state.

The natural character of most of the area affected by dredging and the new wharf is substantially modified, with the shorelines being reclaimed land and the Port entrance having been capital dredged in the past. The offshore disposal area is however largely natural.

A number of the reports included in Volume 3 contribute to an understanding of natural character. As natural character includes the biological environment as well as the physical one, these include the three Advisian reports (**Appendices D, E and F** in Volume 3), the Shore Processes and Management Ltd report (**Appendix G**), the two Cawthorn reports (**Appendices H and I**) and the Wildlands report (**Appendix L**). An additional report has been prepared by Boffa Miskell Ltd to analyse the visual, landscape and natural character of the project. This is provided as **Appendix N** in Volume 3 of this documentation.

## 16.2. Description of the Existing Environment

The area occupied by the Port is largely modified from natural, although the Bluff Hill is a landmark, partly in a natural state with the Bluff Hill Domain and look-out maintaining some green space at the top of the hill. The exposed sandstone geology of the hill cliff creates a dramatic elevated backdrop to the Port. Both north and south of the Port, the beaches provide a more natural component with the active foreshore backed by reserve areas with trees and/or grass and in some cases rock riprap.

In terms of the Port's relationship to existing residential development, there are two main residential catchments. Those adjacent along the flat of the foreshore and those elevated above the Port on Bluff Hill.

Development on the flat that enjoys an aspect north out to the water comprises primarily houses on the south side of Hardinge Road, and closer to the existing Port, houses east of the Ahuriri Bypass/Chatham Street intersection on Breakwater Road. There are a small number of residential properties along this stretch of Breakwater Road, and a block of motels/apartments that currently view north over the road and rail corridor to the open water of the man-made bay/swimming beach.

Development on the Bluff Hill comprises areas that look directly over the existing Port, primarily properties accessed from Hornsey and Karaka Roads, and areas to the west of this including some properties accessed from Seapoint, Kowhai and the end of Bayview Road, that currently have partial views to the western edge of the Port.

The Port activity is also overlooked from the open space of Bluff Hill Domain which from its northern edge looks over and down onto the operational workings of the Port as well as out to an expansive coastal view to the north across Hawke Bay towards the Mahia Peninsula. The Bluff Hill carpark and lookout are a

popular local and visitor destination, with the land-based Port activities and associated large vessels, occasional cruise liners, historical and military vessels creating a further foreground point of interest and attraction for many viewers at this scenic lookout.

The main component of the project that would bring lasting change to this context is the new wharf, and associated lighting and cranes, and larger vessels which will tie up at the new wharf. There may also be some landuse reorganisation within the Port area, all of which can be done as permitted activities within the Napier City District Plan. The dredge project will bring additional barge traffic into the CMA near to the Port and disposal area, and possibly cause some discolouration of the sea for relatively limited periods.

## 16.3. Actual and Potential Effects

The assessment of effects has taken into account impacts on nearby residents and those who use the many public spaces in the vicinity.

The visual catchment is contained to locations on the north side of Bluff Hill extending around the flat of the Ahuriri and more distant Westshore waterfront. It is a relatively small visual catchment but given the urban location, has a numerically relatively large viewing audience. The elevated closeness of some parts of the residential viewing audience means that the proposed development, like the existing Port, will be in part be able to be seen from some residential and recreational open space locations. However, for the large majority of these views and viewers the existing long established Port area already forms part of the view and is familiar and a source of activity and interest within the view.

Viewing audiences include:

- residents of Breakwater Road east of the Chatham Road intersection;
- residents along the south side of Hardinge Road;
- residents in north-facing elevated properties on Bluff Hill with views out over the Port, primarily those on parts of Seapoint, Kowhai, and Bayview Road as well as users of this public street network;
- people recreating and using the lookout in the Bluff Hill Domain;
- people using the street network adjacent to the site on the flat, primarily Breakwater Road, Hardinge Road and the northern portion of the Ahuriri Bypass/Chatham Road;
- people recreating along the foreshore reserve and beach west of the existing sea wall breakwater through to Perfume Point;
- people in boats on the inner waters adjacent to the Port and heading to/from the inner harbour mouth by Perfume Point; and
- people in planes flying over the area of the Port, landing or taking off from Napier Airport.

The visual absorption capacity (VAC) of the proposal in the location, that is the locality's ability to absorb the nature of the visual change proposed, is relatively high (i.e. the change can be relatively easily absorbed).

This is because the project comprises a relatively small additional wharf structure area comprising the same visual elements as those that are already well established in the view in a location that is very much internal to the workings of the Port and away from its landward public edges.

The proposal does not extend the western or eastern extent of the Port or change its established nature. The most visually evident component of the new wharf is likely to be ships berthed at this new location which will have a different orientation or alignment to that of existing ships in the Port, including the storage and handling of containers when loading and unloading from ships.

Visual simulations have been used to help evaluate the implications of the new berth. These have been undertaken from three public viewpoints – two on Bluff Hill and one along the foreshore. An evaluation is provided on a "before" and "after" in Appendix 1 of the Boffa Miskell report. The "after" visual simulations, when compared with the existing photographs demonstrate the small relative scale and limited visibility of the new structure. A ship at the berth compromises the main new element, and such ships at berth will be temporary and varying element from the elevated viewpoints.

The degree to which landscape and visual effects are generated by a development depends on a number of factors, these include:

- The degree to which the proposal contrasts, or is consistent, with the nature and qualities of the surrounding landscape.
- The proportion of the proposal that is visible, determined by the observer's position relative to the objects viewed.
- The distance and foreground context within which the proposal is viewed.
- The area or extent of visual catchment from which the proposal is visible.
- The number of viewers, their location and situation (static or moving) in relation to the view.
- The backdrop and context within which the proposal is viewed.
- The predictable and likely known future character of the locality.
- The quality of the resultant landscape, its aesthetic values and contribution to the wider landscape character to the area.

Change in a landscape does not in and of itself, constitute an adverse landscape or visual effect.

In this case the proposal involves a modest extension to the established Port in Napier comprising a new wharf aligned with the existing northern face of the existing reclamation and small changes to the storage and handling of containers when loading and unloading from ships.

The proposal is not incongruous with the established patterns, elements or processes already well established in this coastal locality. It is consistent with that established environment and once constructed will tie in with the now long established nature of the modified natural environment of the Port.

Proposed dredging will alter the seabed but is proposed to avoid Pania Reef both in terms of any direct effects and in respect of the disposal of dredged material. Any associated water discolouration will be temporary and not inconsistent with natural discolouration experienced at times from the discharge of rivers into Hawke Bay during high rainfall events.

The Boffa Miskell report finds:

- In terms of visual effects the proposed introduction of the wharf associated vessels, aligned with the existing reclamation, it is not considered to generate more than minor long or short term adverse visual effects for users of the adjacent road network, walkways, coastal edge or other public places, as seen from the water, land or air. The location and relatively small scale of the proposal mean that the new wharf will have minimal additional impact and limited visibility.
- The proposal will have a minimal visual impact with the main visible element being the temporal presence of ships on a new east/west alignment. When no ship is at berth the proposed wharf itself has a negligible visual presence.
- For some people who visit Bluff Hill the Port already forms an attraction and point of active visual interest not only due to its ships but to the activity within the Port and its industrial scale and character.
- For residential viewers within the elevated catchment of Bluff Hill, who have a more frequent and static locational viewpoint, the change in the Port area resulting from the new wharf and potential ships at berth on a new alignment, it is considered that there will be a minor to negligible visual effect, consistent with the existing and long-established presence of the Port.
- For viewers both in the public realm on the foreshore or in residential properties on the flat the proposed new wharf will be out of view. The only change in the view will result from a new location and orientation for ships berthed in the Port. This change is not considered to generate an adverse visual effect with ships already comprising a habitual component of the Port and forming part of its visual interest.
- For users of the popular small swimming beach adjacent to the Port reclamation it is considered that no change will be perceived and no visual effect generated.
- From water based public viewpoints, the Port already comprises a significant element at the landward edge of the Bay, with Bluff Hill providing a strong physical containment and backdrop to the flatter profile of the Port. Views toward the coastline already encounter a modified urban environment dominated by residential housing and larger scale development including the Port seen within this existing urban context and modified coastline. The new wharf will be consistent with this existing character of the environment. Even in more proximate water based views the proposal will sit into the existing character of the landscape and land/water interface and will not create a significant change. No adverse visual effects will be generated.
- From the air the proposed new wharf will be of negligible impact and will not noticeably increase the scale of the Port and or vary activities. This established characteristic will remain relatively unchanged.

The above assessment also demonstrates the extent to which natural character values have already been lost in the area. The small modification involved in the placement of a new structure does not further reduce national character.

Cawthron has found that the capital dredging and disposal of dredged material affects small areas of two habitats which are widespread in Hawke Bay. Thus there is no reduction of natural character in the marine environment beyond the negligible.

## 16.4. Summary and Conclusion

As a whole, the project activities will not generate more than minor adverse visual effects. For the most part the proposal is considered to be negligible in its visual effects. Visually, the proposal is consistent with the established visual character and amenity of the visual environment.

In terms of the natural character of the coastal environment and its landscape character and values, the proposed new wharf represents a proportionally very small additional area within an environment that is already highly modified and industrial in character, thus the effect is less than minor.

The effects of dredging and disposal of dredged material are also considered minor or less, in terms of landscape, natural character and visual effects.

# 17. CULTURAL VALUES

## 17.1. Introduction

The special status of tangata whenua is recognised under the RMA and in particular as a matter of national importance *"the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga"* and *"the protection of recognised customary rights"*, must be recognised and provided for. In particular, the importance of specific areas which may be affected by development proposals to manu whenua hapū is recognised through the wording of section 6(e) and (g) as expressed above.

Hawke Bay and its hinterland has a rich and diverse cultural setting, and in a local coastal setting, the Hawke's Bay Regional Coastal Environment Plan says the *"tangata whenua of Hawke's Bay have strong traditional and cultural relationships with the sea"*.

Napier Port has been working with mana whenua hapū to understand the history and importance of the coastal environment to Māori. Within the coastal environment, and within a hapū/iwi context, Hawke Bay contains taonga of significant cultural value to local Māori, particularly Pania Reef and Moremore Reserve at Tangoio.

For this project, the cultural setting lies with Ngati Kahungunu Incorporated having mana whenua. Specific hapū identified as mana whenua for the Port area by Ngati Kahungunu Incorporated are Ngati Pārau, Mana Ahuriri, Te Taiwhenua o Whanganui a Orotu and Maungaharuru-Tangitū Trust. The Port has engaged with all these groups in preparing this current application.

Napier Port is aware of and acknowledges the respective applications submitted by Maungaharuru-Tangitū Trust[125] and Mana Ahuriri Incorporated[126, 127] under the Marine and Coastal Area (Takutai Moana) Act 2011. That of Mana Ahuriri directly affects the Port area, and that of Maungahuru approaches the shipping channel area from the north.

A cultural impact assessment (CIA) has been prepared for Napier Port on behalf of the four hapū identified above. This is provided as **Appendix Q**.

The CIA was prepared with the intentions of:

- documenting the cultural significance of the areas affected by the applications
- identifying potential adverse and beneficial effects on cultural values
- assisting Napier Port understand the cultural values of the area and the potential impacts of the proposed activities on those values
- identifying appropriate measures to avoid, remedy and mitigate, where practical, any potential effects on cultural values.

[125] Seeking protected customary rights only.
[126] Seeking customary marine title and protected customary rights.
[127] Mana Ahuriri Incorporated claim includes the port operational area.

## 17.2. Cultural Associations and Values of the Area

The cultural importance of the Ahuriri area, within which the project is proposed to take place, cannot be overstated. Pania, descendent of Tangaroa, was turned into a rock at the entrance to Ahuriri inlet, visible at low tide (and subsequently blown up in the late 1920s by the former Napier Harbour Board). Moremore, a taniwha and kaitiaki and caretaker of the local people, lived in a cave in the sea near the area now known as the Iron Pot. Recollections of Moremore and its influence over cultural and physical health and wellbeing are documented in the WAI 55 report on the Te Whanganui-a-Orotu claim (Waitangi Tribunal) and summarised in the CIA.

Pania Reef is of great significance to mana whenua and it is a cultural imperative that the mauri and wellbeing of the Reef is protected and maintained.

Further, the Ahuriri marine and coastal area and Te Whanganui-a-Orotu estuary were, in former times, highly prized mahinga kai and kaimoana food source areas. These values have dropped away as the wider environment has been modified and degraded although some food is still gathered in this area. Pania Reef remains a source of healthy kai moana.

## 17.3. Actual and Potential Effects

Activities and development in the area around the Port have the potential to further degrade cultural values and modify the area as a food source for mana whenua. For this reason, the Port has been engaging with mana whenua over the period that the proposed wharf and dredging project has been under investigation. This is explained in the CIA. Issues raised by mana whenua have been as far as possible addressed during the project's conceptual development, and information provided by the Port has helped to allay many of the concerns initially held.

The CIA sets out the main concerns and provides comment and recommendations, which are summarised as follows:

- Mana whenua were concerned about the potential impact of disposing of the large volume of dredge spoil in the originally-suggested inshore location as they considered it may be contributing to the degradation of Pania Reef (which they were observing). They were pleased that a new off-site disposal location has been identified and that consent is being sought for that new site, as this reduces the possibility that sediment from dredge disposal will drift onto the reef.
- Pania Reef is also a designated mahinga mātaitai from which customary divers take a range of seafood for cultural purposes. Other areas in the vicinity of Ahuriri, including the Port breakwater, are nursery areas for some species. Any adverse effect on these areas from the project is of concern.
- Mana whenua support the proposed approach to managing water quality through a management plan including an assurance monitoring programme. They seek to be included in information sharing and monitoring over the duration of the project.
- Mana whenua also support the Port's intentions in as far as possible protecting Little Blue Penguins affected by construction, and in finding alternative habitats for the population as necessary, through an inclusive management approach.
- Mana whenua also appreciate that the Port is seeking a longer-term closer relationship in managing the marine environment that it affects and in trying to ensure a healthy coastal environment.
- Mana whenua acknowledge the Port's important role in the Hawke's Bay economy and seek mitigation of any adverse effects associated with the project.

The CIA sets out a draft condition relating to the development of a Marine Cultural Health Programme. This has been included in the suite of draft conditions in section 26 of this application documentation.

## 17.4. Summary and Conclusions

As acknowledged in the CIA, Napier Port has been on a journey of discovery with mana whenua as the proposed project has been developed and its environmental implications investigated. The project has provided a catalyst for the development of a better understanding of the cultural values of the area for the Port management itself. Its intention is to continue to involve mana whenua as the project moves into development, and to continue to share information and work together on environmental management of the marine environment in the longer term. This gives mana whenua opportunities to exercise kaitiakitanga in an area that is of fundamental importance to them.

It is expected that there will be some residual adverse effects on cultural values associated with the project, but these have been assessed as minor given the proposed conditions and intentions to maintain closer relationships.

# 18. MARINE ARCHAEOLOGY

## 18.1. Introduction

Archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act 2014, and also in terms of the RMA's section 6(f).

Two of the eight historic heritage features within the Hawke's Bay CMA[128] are within proximity of Port Napier, and therefore any effects on them must be considered.

## 18.2. Existing Environment

Figure 18-1 shows the location of the two identified historic heritage features. Item 4 is listed in Schedule M of the HBRCEP as a shipwreck, and item 5 as an ex-freezing works site.

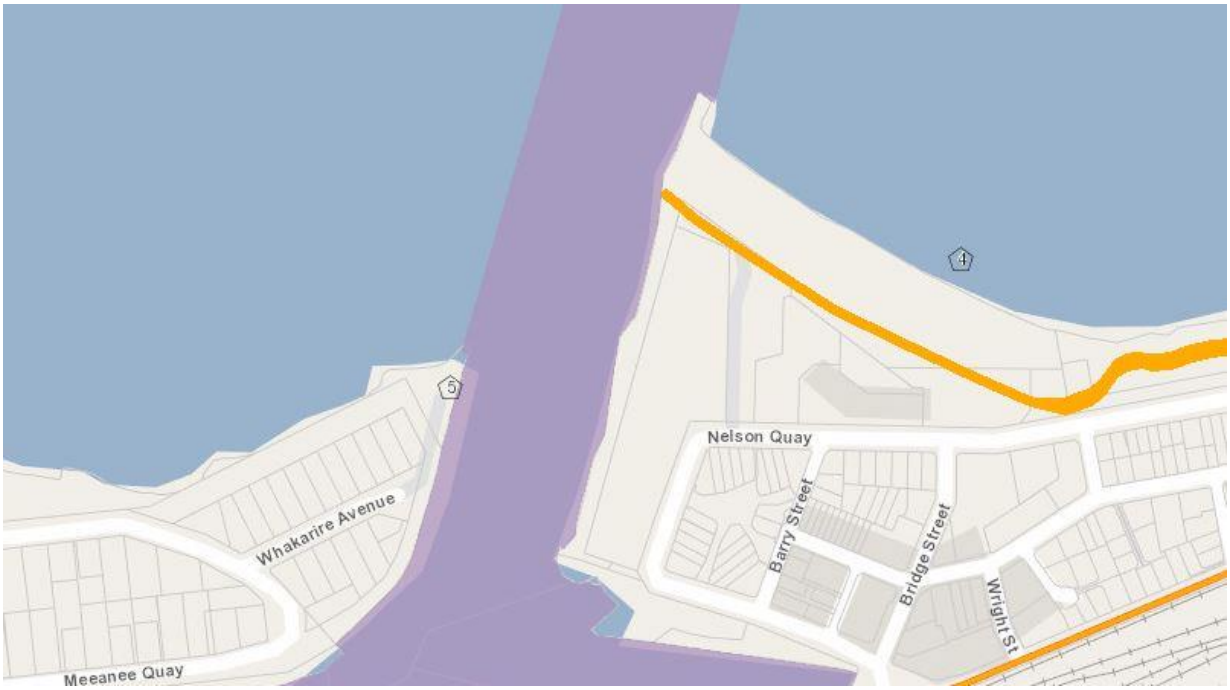



**Figure 18-1: Historic heritage features scheduled in HBRCEP**

The shipwreck is that of the Montmorency, an immigrant and cargo ship from England which was destroyed by fire while at anchor in the Port on 27th March 1867. While still burning, it was towed to its current location and ditched. The wreck lies in 2 to 3 metres of water on a rock and sandy bottom although it is largely covered by sand. Wooden wreckage breaks water at extreme low tides. Material such as portholes and brass fittings, and a substantial quantity of clay pipes have been removed from the wreck or nearby by local divers.

[128] Schedule M of the HBRCEP.

The second site is at the end of Whakarire Avenue on the north side of the entrance to the Inner Harbour. It includes the remains of a wharf in the CMA[129]. The site dates from 1888.

**Figure 18-2: Shipwreck offshore, Hardinge Road**

## 18.3. Actual and Potential Effects

Only item 4 is within the CMA in a shallow water location where it could be vulnerable if the channel and swinging basin modification was to affect the wave climate.

Investigations have been undertaken with respect to any changes to the wave climate in the area both in relation to coastal processes and to surf breaks, covering the area within which both archaeological items are located. This has indicated virtually no change in the wave height or energy, but a very minor change in direction of approach (in the order of two to four degrees) along the coast to Perfume Point. This is within the range of natural variability.

## 18.4. Conclusion

The wreck is unlikely to be adversely affected by such a small change and no mitigation is necessary. There will be no effects relating to the former freezing works.

[129] Some of the piles on Westshore foreshore themselves may have been removed as a safety hazard.

# 19. NAVIGATION AND SAFETY

## 19.1. Introduction

The purpose of the project is to provide an additional berth for the Port's use and also to dredge a channel suitable for the larger ships likely to regularly come to New Zealand in the future.

In determining the location and design of the new wharf, and the location, width and depth of the extended swinging basin it has been essential to consider both navigation and safety.

It is vital that the design is safe for all vessels using the Port and that navigational requirements are met.

## 19.2. Existing Situation

As an enclosed Port on an open and exposed coast, accessing the Port already involves complex manoeuvres. In general terms, the whole area is subject to the HBRC's Navigational Safety bylaws 2012[130]. These set out rules for all people using the CMA – from swimmers to the largest of container vessels. The whole area of the Port from the north end of Marine Parade out beyond Pania Reef and as far north as Bay View is within the Pilotage area shown in the HBRCEP. The Pilotage area is described in the HBRCEP as:

> *"The HBRC, as a Harbour Authority under the Local Government Act 1974, is responsible for navigation safety inside the Pilotage Limits. This area is shown on the planning maps in Volume 2 of this Plan. These functions are carried out by the Harbour Master under the HBRC Navigation and Safety Bylaws. Outside the pilotage limits, surface water activities are controlled by Maritime Rule Part 91 Navigation Safety. Those regulations refer to the speed of small craft, waterskiing, access lanes, surfboards, mooring areas and reserved areas for other activities. The provisions of those regulations can be enforced by:*
>
> *a) maritime safety inspectors; and*
> *b) honorary safe boating advisors appointed by Maritime New Zealand.*
>
> *At present the Navigation Safety Bylaws and Maritime Rule Part 91 are sufficient to control the navigation and safety issues associated with surface water activities in the coastal marine area and other waters within the region. This is necessary as recreational activities such as swimming and windsurfing can conflict with each other.*
>
> *Therefore, some separation of these uses is required."*

The Port also operates a Marine Guide for Ship Masters which assists visiting ships with maritime safety including Pilotage, use of tug services, communications and general procedures. However, these rely on the physical suitability of the Port for the ships it serves.

The pressures facing the Port and the shortcomings of the current facilities for future use have been described in section 4 of this report. However, the Port currently operates safely and efficiently and this needs to be maintained into the future.

[130] Currently under review.

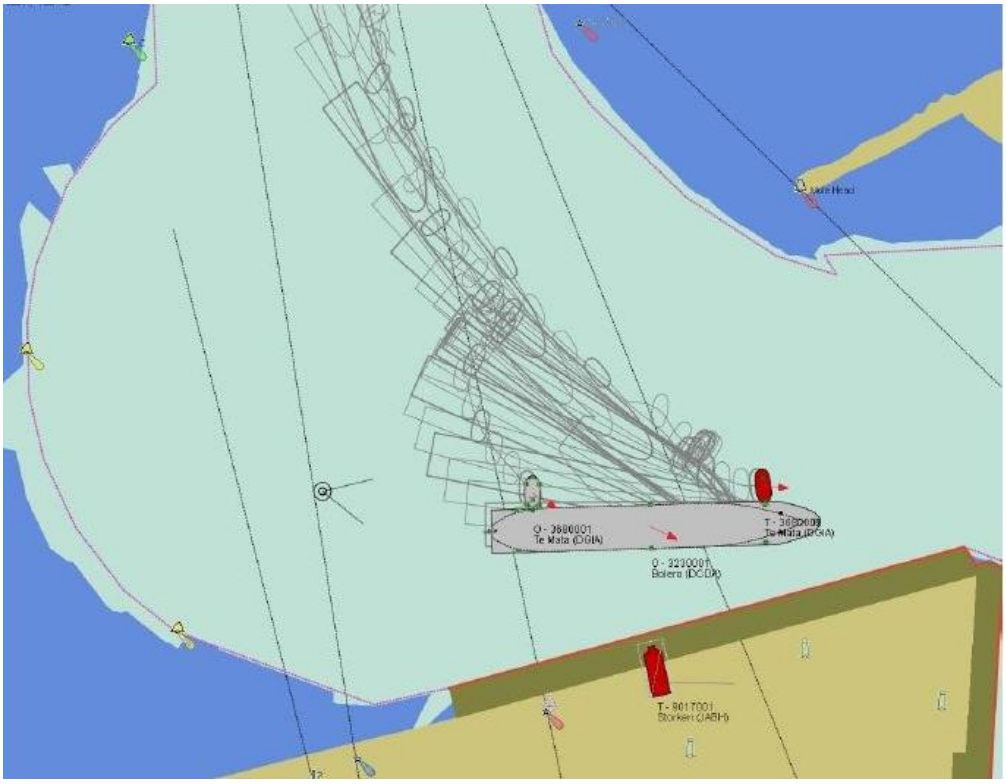
## 19.3. Actual and Potential Effects

The design process for the wharf, channel and swinging basin has involved not only consideration of the nearby physical environment (i.e. the need to ensure that the design does not cause or exacerbate coastal erosion or have adverse effects on surfing amenity, as analysed in earlier sections of this report), but also consideration of the range of vessels likely to be involved in the future, and the practical aspects of approach to the new wharf and existing harbour by larger vessels and berthing.

This has involved numerous iterations of the physical design against the parameters of the natural environment such as waves and currents to develop a shape that will minimise changes in that environment, but it has also involved simulations to ensure that the largest and least manoeuvrable ships likely to come to the Port can be safely berthed. This "optimisation" investigation has involved simulations undertaken by the Smartship Australia Simulation System[131] using different vessels[132] and different tides, wind and sea conditions.

This process has demonstrated that large ships can approach and depart from the Port under a range of conditions safely; that a range of manoeuvres can be undertaken in different wind, sea and tidal conditions within the extended swinging basin so that ships can be berthed safely at the new Wharf 6; and that Wharf 6 can be operated in conjunction with nearby Wharf 5.

Figures 19-1 to 19-6 give examples of approach or departure and berthing simulations for new Wharf 6 and other parts of the Port.



[131] Owned and operated by the Queensland Government's Department of Transport and Main Roads.
[132] Up to a length of 300m, beam of 40m and draft of 14m at different levels of loading.

**Figure 19-1: Example of berthing at Wharf 6**

**Figure 19-2: Photographic simulation of Figure 19-1**

Figures 19-1 and 19-2 show a relatively simple berthing manoeuvre at Wharf 6.

Figures 19-3 and 19-4 show a large ship swinging and manoeuvring to leave Wharf 6, and its alignment through the widened channel.

Figure19-5 and 19-6 show access to the existing harbour with several other ships at berth.

## 19.4. Conclusion

The simulations were undertaken using decision-making and assessments in real time as have to be made by pilots and captains when approaching or departing the Port and berthing. The conclusion of the simulation investigations was that the amount of space proposed for the swinging basin and the proposed channel width were necessary and sufficient for safe manoeuvring, and that all manoeuvres could be made safely while allowing the Port to operate efficiently. However, it was noted that the use of tugs was essential and that some limitations would be necessary in terms of which side a vessel could berth on at Wharf 6 in some wind and sea conditions. Further practice was recommended following consents, in order to determine appropriate operating processes.

The proposed larger channel and location and design of the proposed new wharf provides adequately for navigational safety and the needs of future large ships, as well as facilitating the operation of the Port as a whole. Additional mitigation in an RMA sense is not needed, however Port Napier will keep upgrading its operational systems as appropriate over time to continue to meet the needs of visiting vessels.

**Figure 19-3: Example of departure from Wharf 6**

**Figure 19-4: Photographic simulation of Figure 19-3**


**Figure 19-5: Example of access to inner Port area with ship at Wharf 6**


**Figure 19-6: Photographic simulation of Figure 19-5**

# 20. NATURAL HAZARDS AND CLIMATE CHANGE

## 20.1. Introduction

Recent changes to the RMA[133] have added the management of significant risks from natural hazards as a matter of national importance, serving to highlight the importance of natural hazards considerations in any use or development. The effects of climate change have been a matter to which particular regard must be had for a number of years.

These aspects, and any associated effects, have been taken into account in the proposed wharf and dredging project.

## 20.2. Description of the Existing Situation

The early days of the Napier Port involved the early construction of the breakwater in 1887-1890. Napier Port has therefore been in place as a significant infrastructure asset for nearly 130 years. The breakwater and subsequent wharves and reclamation have been subjected to less than discernible effects of climate change due to the obvious slow processes involved.

The Parliamentary Commissioner for the Environment has indicated *"the level of the sea around New Zealand is rising and will continue to rise for the foreseeable future"*. It notes further that the *"impacts of sea level rise will vary from place to place"*[134].

Known natural hazards for Napier Port, from the Hawke's Bay Regional Council, Hawke's Bay Hazards Report, include the following natural hazards:

- Liquefaction susceptibility and earthquake amplification – Napier Port is prone to liquefaction following an earthquake due to its coastal location and having been built on reclaimed land that is typically an uncontrolled fill as a result of the 1931 earthquake.
- Flooding, coastal inundation and storm surges – Coastal inundation zones are identified for Napier Port, covering only the entrance to the Port (Gate 1) of Marine Parade and the 'Port Beach' area, with entrance to this area via Gate 3. These are for the years 2065 and 2120, with a 1% annual exceedance probability (AEP). All other areas of the main Port environment are excluded from all other coastal inundation zones.
- Tsunami and inundation – As Napier Port is located on the East Coast facing the Pacific Ocean it is at a high risk of experiencing a tsunami during a significant earthquake. An earthquake of MW[135] 8-9 as a result of the subduction zone marked by the Hikurangi Trough becoming active would in high probability result in a tsunami at the Port.

However, Napier Port is excluded from the coastal hazard zones in the Hawke's Bay Hazards Report, and also in the HBRCEP, Maps 55 and 56, and from any coastal erosion areas, from present day, and 2065 and 2120. In accepting these regulatory exclusions, Napier Port has effectively undertaken the responsibility

[133] 2017 Amendment through the Resource Legislation Amendment Act 2017.
[134] Parliamentary Commissioner for the Environment reports: "Changing climate and rising seas: Understanding the science" (November 2014) and "Preparing New Zealand for rising seas: Certainty and Uncertainty" (November 2015).
[135] MW – the scale to measure the size of an earthquake in terms of energy released.

for its own natural hazards management. However, a building consent is needed for the wharf construction from Napier City Council, and this will address earthquake and flooding risk.

Napier Port is a lifeline utility, with an essential role in any major natural hazard-based or other emergency event in the wider region and possibly beyond for the community. It is built into the Hawke's Bay Civil Defence and Emergency Management (CDEM) Plan. In 2001 the Port was part of the Hawke's Bay Engineering Lifelines Project, and its importance and current risks were included in the report "Facing the Risks". It has continued to work towards addressing its own risk exposure, but also towards ensuring that it will be able to continue to function for the community's benefit within a CDEM situation.

## 20.3. Actual and Potential Effects

The management of risk of adverse natural hazard effects involves both construction and operational aspects.

The design of the wharf will meet current standards and codes as set out in the Beca report, Napier Port 6 Wharf Preliminary Design Report. This report documents the design philosophy that underpins the design, detailing and construction of all structures associated with the new Wharf 6 in particular, it refers to standards and codes including but not limited to the following:

- NZBC (New Zealand Building Code – all relevant requirements)[136]
- AS 4997-2005 Guidelines for the design of maritime structure
- BS6349:Parts 1, 2 and 4 Code of Practice for Maritime Structures
- AS/NZS 1170.0-2002 Structural design actions
- NZS 1170.5.2004 Earthquake action
- PIANC[137] - Design of Port Structures for Seismic Actions

In addition, if required, ground strengthening is proposed along the adjacent edge of the container terminal.

Overall the proposed new wharf development will be designed to the same, or better or most current standards and codes used for the construction of new wharf assets. By doing this, the new wharf will contribute to a better lifeline resilience of the Port and the community as a whole.

Climate change and sea level rise poses inundation risks and also risks of increased storminess that are faced by the whole Port and maritime industry. The wharf deck height provides for the currently-predicted best estimate sea level rise of in the order of 1m over the next 100 years. Being a piled structure, it will be possible to progressively raise the deck height over time. However, any such change would need to be tackled along with the whole of the container handling area.

## 20.4. Conclusion

The design of the wharf has taken into account the range of natural hazards foreseen for the area. This will be further developed through detailed design and building consent stage.

[136] The NZBC requirements include some requirements relating to climate change.
[137] PIANC – Permanent International Association of Navigational Congresses.

# 21. EFFECTS OF OCCUPATION

## 21.1. Introduction

The applications include Application 6, which applies to occupation of the CMA. As set out in the application, this includes the replacement of the existing applications to occupy the CMA.

Of the two applications currently held for occupation, the first was issued directly under section 384A of the RMA by the Minister of Transport in 1996 and runs until September 2026[138]. This applies to the whole of the inner harbour and current swinging basin as well as to a 20m strip generally around the whole of the land occupied by the Port, from Town Reef in the south to the small breakwater to the west of Port Beach[139].

The second permit followed a further 2ha reclamation and was issued in 2003 by HBRC[140] applying to a 20m strip adjacent to the revetment. Its expiry date aligns with the expiry date of the earlier permit.

A permit for occupation effectively provides for the exclusive access to and use of the area on the basis that such occupation is "reasonably necessary for another activity" – in this case, the operation of Napier Port. The full explanation of the term "occupy" in the RMA has been set out in section 6.1.2 of this report.

Occupation provides for access at any time for the manoeuvring, berthing and operation of craft in the CMA, and for maintenance of structures below and above the line of MHWS. It also provides for the Port's security, for biosecurity, for risk management, and the safety of other coastal users in areas which are affected by the movement of large vessels.

The application seeks to extend the area of occupation to include the new wharf and berth pocket, and the new swinging basin area. This comprises part of the total occupancy area shown in Figure 22-1 on the following page.

The reason for the extent of occupation is the same as the reason for which the original permits were issued. The greater area reflects the new facilities proposed as part of the other activities for which consents are sought – the proposed new Wharf 6 and the new swinging basin.

These new facilities, along with the increasing size of vessels, mean that more complex manoeuvres of large vessels will take place outside the traditional harbour area, to berth both within the existing harbour and at the proposed new Wharf 6.

A 35 year duration is sought for the new permit, to provide long-term certainty for port investment, operation and maintenance.

## 21.2. Description of the Existing Environment

In relation to occupation, the existing environment consists of the rights provided by the existing coastal permits. This is the area close to the Port, within which it currently undertakes its operations.

[138] This is now HBRC Permit CL940231M.
[139] Note that the occupation permit does not apply to the area between the Town Reef and the start of the breakwater, although the landward side is within the Port's secure area and the Port undertakes some maintenance in this area.
[140] This is HBRC Permit CL0303740.

Part of this environment includes the sea adjacent to the Port Beach. Both the beach area and its public use has extended during the period of the section 384A period. The occupation permit has ensured the rights of Port Napier to access and maintain this area (as with the remainder of the occupation permit) without interfering with wider public use.

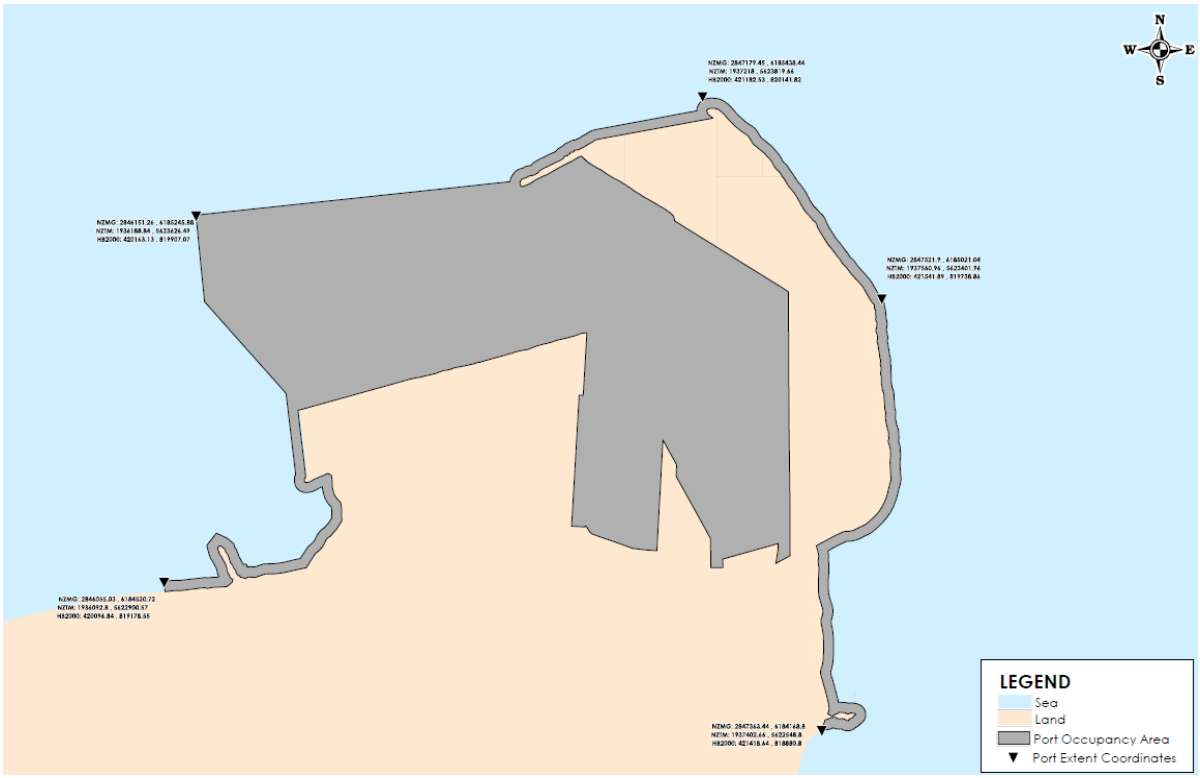



**Figure 21-1: Area of proposed occupation**

## 21.3. Actual and Potential Effects of Occupation

The rights associated with an occupation permit include that other people can be excluded from the area of the permit if necessary. For port activities, this is most likely to be on the grounds of safety, security or biosecurity. However, it also has aspects which relate to the need for 24-hour uninterrupted access for vessels seeking to access and use port facilities. It also provides certainty for the Port's commercial occupation, in that it conveys a long-term right of access for the Port's use and for any development for which consents are obtained.

The Port's current occupation permits are not known to have caused any inconvenience to other parties. The "exclusive" component of the occupation appears to have been effective for both the Port and other users. Port Napier has been able to maintain the facilities it uses commercially, and a wider area which is available for public use around Port Beach.

Navigation and use of the CMA is otherwise controlled by the HBRC bylaws. This does not limit access to the future swinging basin area where vessels will increasingly undertake complex manoeuvres.

The actual effects of the occupation permit sought consist of the ability to exclude other users from the water area as appropriate. As other uses of the future swinging basin area are transitory and very intermittent, the potential adverse effects would be less than minor. The benefits, in terms of safety, security and commercial certainty for the Port and port users (and thus the wider community which relies on Napier Port for imports and exports as described in the following section), are moderate to significant.

## 21.4. Conclusion

The applications include an application for the occupation of an extended area of the CMA, which includes the berth and new swinging basin, for a 35 year term. For the majority of the area, this will be the renewal of consents currently held. While an occupation permit provides for exclusive occupation as necessary, this will not modify public access to and use of the Port Beach area, which is already currently subject to an occupation permit.

Adverse effects of the occupancy are evaluated as less than minor, and the benefits as moderate to significant.

# 22. ECONOMIC IMPACTS AND POSITIVE EFFECTS TO THE ECONOMY

## 22.1. Introduction

The RMA requires consideration of both adverse and positive or beneficial effects. In the context of sustainable management, the economic, social and cultural wellbeing of people and communities as well as their health and wellbeing are essential considerations.

As well as undertaking a number of internal studies and investigations as the basis of a business case for the proposed wharf and development project, Napier Port engaged Economic Solutions Ltd to look at the contribution of the Port to the local and wider economy, and to assess the additional wider economic benefits which would arise from the new wharf and the access to enable larger ships to visit the Port in the future. The Economic Solutions Ltd report is provided as **Appendix O** in Volume 3 to this documentation.

## 22.2. Description of the Existing Situation

The total regional Value Added/Gross Regional Product (GRP) impact of the Port of Napier across all sectors for the 2015 year was $3,447.7 million. This means that Port activities are directly and indirectly associated with approximately 51% of total Hawke's Bay GRP at present[141]. The total regional employment contribution, at 27,801 is 38%[142]. This comprises both direct economic impacts of the Port operation, and the wider impacts on the economy through the Port underpinning and providing essential services for the wider economy.

The Port of Napier thus makes a very significant direct and indirect contribution to the overall economic scale and performance of the Hawke's Bay regional economy.

### 22.2.1. Direct Contribution

The present direct impact of the Port operation is derived from the Napier Port Annual Report (September 2015), as summarised in Table 21-1 on the following page. The base financial indicators used for the modelling and analysis were total direct operating revenue for the Port Company ($72 million) and Port based stevedores ($23.4 million) for the year, and Port Company capital expenditure for the period ($10.5 million assuming that 30% of the Port's total capital expenditure involves the purchase of machinery/plant/equipment/other resources from Hawke's Bay based suppliers).

The key results of the analysis are as follows:

(i) For the operating year being considered, the Port of Napier had a total Revenue impact within Hawke's Bay of $227.5 million. This comprised the initial direct Revenue impact of $105.9 million and the flow-on/multiplied Revenue impact of $121.6 million (the overall multiplier value inferred by these results is 2.15);

[141] Statistics New Zealand estimates that Hawke's Bay regional Gross Domestic Product (GDP) was $6.59 billion for the year ended 31 March 2015.
[142] The value added and employment information is from Table 4, Appendix 1 of the Economic Solutions Ltd report in Appendix O.

Table 22-1: Hawke's Bay Economic Impacts of Port of Napier Annual Operation 2015[143]

| Economic Impact Components | Economic Impact Measures | | | |
|---|---|---|---|---|
| | Revenue ($M) | Net Household Income ($M) | Employment (Persons) | Value Added/ GRP ($M) |
| **Initiating Total Port Based Operating Revenue and Capital Expenditure** | **105.9** | | | |
| **Total Direct Economic Impacts** | 105.9 | 20.8 | 354 | 50.2 |
| **Total Flow-on Production and Consumption Economic Impacts** | 121.6 | 16.9 | 414 | 46.4 |
| **TOTAL HAWKE'S BAY ECONOMIC IMPACTS** | **227.5** | **37.7** | **768** | **96.6** |

(ii) A total regional Net Household Income impact of $37.7 million, comprising a direct Income impact of $20.8 million and a flow-on/multiplied Household Income impact of $16.9 million. The total income figure above represents the total additional Net Household Income generated within Hawke's Bay during the year by the overall Port operation, including multiplier impacts (overall multiplier value of 1.81);

(iii) A total regional Employment impact of 768 persons/jobs, comprising a direct Employment impact of 354 persons (including the 243 people employed by the Port Company) and a flow-on/multiplied Employment impact of 414 persons (overall multiplier value of 2.17); and

(iv) A total Value Added or GRP (Gross Regional Product) economic impact for the Hawke's Bay region of $96.6 million, comprising a direct GRP impact of $50.2 million and a flow-on/multiplied GRP impact of $46.4 million (overall multiplier value of 1.92). The total GRP economic impact figure indicates the real level of the contribution of the total Port operation itself to overall economic activity in Hawke's Bay, for the year.

Napier Port plays a vital role in the ongoing performance of the Hawke's Bay cruise ship tourism sector. A 2015 report from the Cruise New Zealand organisation, entitled '*Summary Report Economic Impact of the 2014-2015 Cruise Sector in New Zealand and Forecasts to 2017*', indicates a total Value Added/GRP impact for the Hawke's Bay cruise sector over the 2014/15 cruise season of $20.7 million and a total multiplied employment impact of 549 persons. These results are additional to the regional economic impacts of the overall Port operation indicated above, and are included in the broader analysis below.

[143] These summarised regional economic impact figures are based on the detailed results provided in the Economic Impact Report Appendix 1, Table 2 in Appendix O, Volume 3.

### 22.2.2. Wider Economic Impacts of Hawke's Bay Port through User Sectors

The Napier Port is closely linked to Hawke's Bay export and import sectors which collectively, through their various business operations, represent a considerable element of total economic activity within the Hawke's Bay region.

Summarised below in Table 21-2, are the total export/import 'Free On Board' (fob) values, direct Revenue/Output and multiplied Value Added/GRP economic impact results for the various export and import sectors using the Port, in 2015. The total export/import fob value is $4.2 billion and total direct Revenue value approximately $5.7 billion. The associated total Value Added/GRP economic impact for all sectors as a group is approximately $3.3 billion.

Table 22-2: Port of Napier Export/Import User Sectors Total Economic Impact Results 2015

| Export/Import Sectors | Total Export Value (FOB $M) | Total Sector Direct Revenue ($M) | Total Value Added/GRP Economic Impact ($M) |
|---|---|---|---|
| Horticulture/Fruit | 561.5 | 688.8 | 603.9 |
| Forest/Log/Wood Products | 286.8 | 318.6 | 251.0 |
| Pulp and Paper | 264.0 | 316.8 | 246.0 |
| Meat Processing | 922.1 | 1,192.2 | 660.2 |
| Other Food Manufacturing | 249.5 | 726.4 | 455.5 |
| All Other Exports | *1,323.5* | *1,691.3* | *935.1* |
| ***Total for Exports*** | ***3,607.4*** | ***4,934.1*** | ***3,151.7*** |
| Fertiliser/Petrol/Chemicals | 65.7 | 90.9 | 25.6 |
| All Other Imports | *527.2* | *656.5* | *150.1* |
| ***Total for Imports*** | ***592.9*** | ***747.4*** | ***175.7*** |
| **Total Exports/Imports** | **4,200.3** | **5,681.5** | **3,327.4** |

## 22.3. Actual and Potential Economic Effects

### 22.3.1. Economic Impacts of Proposed New Wharf

The economic assessment of the impacts of the operation of the proposed new wharf were considered as an integral part of the forecast growth in overall Port of Napier trading activity over the longer-term. The two factors are closely intertwined. The positive growth outlook for the Port reflects in turn underlying trends in Port use and the anticipated further growth in Hawke's Bay's primary production and processing export sectors over the period. The positive impact of this on overall economic growth in the region, along with ongoing upgrading of regional transportation linkages to the Port, would be expected to encourage further significant utilisation of Port facilities and services.

The regional economic impacts of the construction stage for the proposed new wharf involves a significant level of new expenditure, and it will have short-term flow-on economic impacts within Hawke's Bay.

For the purposes of the economic cost an initial 'best estimate' new wharf development cost figure of $92.75 million was assumed. This covers the construction of the new wharf and Stage 1 dredging. The duration of the construction period is projected at 18 to 24 months. The Hawke's Bay proportion of the above cost figure is estimated at $8.64 million or just over 9%, comprising both labour and other input costs (materials, fuel, accommodation and hospitality). The balance of the total development cost is estimated to be paid to suppliers based outside the region and therefore does not add to economic activity within Hawke's Bay. Table 21-3 indicates the regional economic impacts over the construction period of the Hawke's Bay based wharf development cost figure.

Table 22-3: Hawke's Bay Economic Impacts of New Wharf Development Cost for Construction Period

| Economic Impact Components | Economic Impact Measures* | | | |
|---|---|---|---|---|
| | Revenue ($M) | Net Household Income ($M) | Employment (Labour-Years) | Value Added GDP ($M) |
| HB Based Construction Cost | 8.6 | | | |
| Total Direct Economic Impacts | 8.6 | 3.8 | 93 | 6.1 |
| Total Flow-on Economic Impacts | 9.0 | 1.2 | 33 | 3.4 |
| Total Direct Plus Flow-on Economic Impacts | 17.6 | 5.0 | 126 | 9.5 |
| Annual Impacts for Period | 8.8 | 2.5 | 63 | 4.8 |

*The results in the table have been rounded to the nearest whole figure.

The relevant key results from the table are:

(i) A Total Revenue impact of $17.6 million. This includes a direct industry Revenue impact of approximately $8.6 million and a flow-on Revenue impact of approximately $9 million, inferring an overall Revenue multiplier value of 2.04;

(ii) A total Net Household Income impact of $5 million, comprising a direct Household Income impact of approximately $3.8 million and a flow-on Household Income impact of approximately $1.2 million, inferring an overall Net Household Income multiplier value of 1.30;

(iii) A total Employment impact of 126 labour-years, comprising a direct Employment impact of 93 and a flow-on Employment impact of 33 labour-years. The associated Employment multiplier value is 1.35; and

(iv) A total regional Value Added/GRP impact of $9.5 million, comprising a direct GRP impact of $6.1 million and total industry linkage impact of $3.4 million. The associated Hawke's Bay Value Added multiplier is 1.56.

Any further staged capital dredging required along with maintenance dredging work required in the future in relation to the new wharf, annual maintenance expenditure on the wharf and any significant wharf upgrading work over the long-term, will also generate positive (relative) flow-on economic impacts for the region.

### 22.3.2. Economic Impacts of Future Activities

To quantify the regional economic impacts of the Port of Napier's future activity over the longer-term planning period 2016 - 2025, the total annual operating revenue forecasts for the period provided by the Port were used. The forecasts assume the availability of the required wharf infrastructure at the Port and the absence of any significant constraints or limitations on shipping or cargo movements arising from a lack of available Port infrastructure.

Total Port Company operating revenue is estimated to grow to approximately $111 million in 2025, in current dollar terms. This result indicates an overall nominal terms revenue growth rate of 53.5% or annual average growth of approximately 4.4%, for the full planning period.

The regional economic impacts for the forecast revenue growth path have been calculated on the same multiplier basis as earlier, referring though to just the actual Port of Napier Company operation economic impacts at the beginning of the table. The economic impact results for each year of the forecast period were scaled upwards in line with the annual increases in forecast total Port Company operating revenue.

Over the forecast period, the total Hawke's Bay Revenue impact increases from approximately $156 million in 2015 to $240 million in 2025. The total Net Household Income impact increases from approximately $27 million to $41 million. The total Value Added/GRP impact increases from approximately $69 million to $106 million. The total Employment impact increases from 526 to 809 persons/jobs; however, further improvements in work practices and increased technology application at the Port, and the labour productivity gains associated with these factors, could potentially reduce the scale of this employment gain over the forecast period.

Table 21-4 summarises the key Value Added and Employment economic impact results for the Port operation, for the forecast period. The results for the other aspects of the operation covered in the report[144] are also indicated.

Further capital expenditure (other than the new wharf development) undertaken at the Port over the forecast period, ongoing annual cruise ship visits to the Port, and Port based stevedoring operations will also continue to generate positive flow-on economic impacts in the Hawke's Bay region during the forecast period. These have been calculated at a total Value Added impact by year 2025 of $57 million and a total employment impact of 821. The main assumptions underpinning these figures are stevedoring revenues growing at the same rate over the forecast period as Port Company revenue operations, Port Company annual average capital expenditure (over and above the new wharf spend) of $12.5 million and an annual average cruise ship tourism regional Value Added impact of $20 million.

[144] Detailed in Appendix O, Volume 3.

Over the planning period, the total regional Value Added impact of the Hawkes Bay based export/import sectors using the Port of Napier is forecast to increase by approximately $1,282 million or 39% to a level of $4,609 million in 2025. This trend is based on a comparison of the overall Value Added/GDP growth trend for the 2000 - 2013 period for Hawkes Bay's combined primary production and primary manufacturing sectors with the growth during the period in the total value of export/import trade through the Port.

The comparison indicates the total value of Port of Napier international trade and associated GDP impacts growing at a higher rate than the GDP impacts for the combined primary production/primary manufacturing sectors.

At the same time, total employment for the sectors as a whole is forecast to increase by an estimated 8,588 or 32%, up to a level of 35,087. This result incorporates an estimated level of anticipated labour productivity gain during the period for the sectors as a group, which is evident from a comparison of annual GDP and employment growth results for the sectors in Hawke's Bay over the period since 2000.

Table 22-4: Hawke's Bay Total Economic Impacts of Napier Port Related Business Operations 2015 - 2025

| Port of Napier Operational Activity | Total Hawke's Bay Multiplied Economic Impacts | |
|---|---|---|
| | Value Added/GRP ($M) | Employment (Persons/Labour Years) |
| **2015 Year** | | |
| *Annual Port Company Revenue Operation* | 68.5 | 526 |
| *Port Capital Spend/Port Based Stevedore Operations/Cruise Ship Visits* | 48.8 | 791 |
| *HB Port User Export/Import Sectors* | 3,327.4 | 26,499 |
| ***Total*** | **3,444.7** | **27,816** |
| **New Wharf Construction Period** | | |
| *Proposed New Wharf Construction* | 9.5 | 126 |
| **2025 Year** | | |
| *Forecast Ann Revenue Operation* | 106 | 809 |
| *Port Capital Spend/Port Based Stevedore Operations/Cruise Ship Visits* | 57 | 821 |
| *HB Port User Export/Import Sectors* | 4,609 | 35,087 |
| ***Total*** | **4,772.0** | **36,717** |

### 22.3.3. Regional Economic Benefits

The proposed new wharf and its integration with the rest of the Napier Port operation should generate a number of opportunities for (other) significant regional economic flow-on benefits to be realised in Hawke's Bay, in addition to the economic impact gains that have been quantified in Appendix O.

Such economic benefits are currently identified in the regional context in the following ways:

- Consolidation and strengthening of the Port's roles as a key component of the Hawke's Bay industry transport and distribution infrastructure, and as the largest seaport in central New Zealand and the fourth largest container terminal in the country.
- New Zealand Transport Agency figures[145] indicate that the total annual number of TEU containers handled at Napier Port has remained above the 200,000 level since 2013 and has been increasing steadily from that point. Compared to 2015, the number of containers handled at the Port (at 247,627) was up 20.2% on the number handled during 2013; the comparable New Zealand 'all Ports' result was 11%.
- Increased overall operating efficiencies at the Port with flow-on benefits for both existing and new export/import industries in the region and elsewhere.
- Encouragement of ongoing upgrading of regional roading and rail linkages to/from the Port with resulting benefits for industry, residential and other road and rail users.
- Supporting and encouraging increased export production within the region from both existing and new industries.
- In terms of new industries, these could include new enterprises attracted to the region by the international shipping (including larger vessels) serviced by the proposed new wharf development. The wharf and services accompanying it should strengthen regional efforts to promote and attract increased business development and investment in the Hawke's Bay region.
- Possible attraction of more Port related importing industries to the region.
- Further strengthening of the primary production/primary product processing and support industry sectors in the Hawke's Bay region and increased use of the existing resource base, including available zoned land and buildings, for these sectors.

## 22.4. Summary and Conclusion

Napier Port is a significant facility for the Hawke's Bay regional economy. Port and related stevedoring operations contribute $207 million annually to regional production revenue, with ongoing capital and maintenance expenditure contributing a further $20 million annually. Furthermore, directly and indirectly about 770 Hawke's Bay employees can be attributed to Port related operations alone. When account is taken of all exporters and importers utilising the Port facilities, approximately 38% of Hawke's Bay employment is associated with the Port.

[145] Freight Information Gathering System or FIGS.

Upon completion of the proposed new wharf development, the Port Company's operations will directly and indirectly raise its Employment impact from 526 currently to between an estimated 700 and approximately 810 by 2025, depending on the level of actual resource productivity gains in Port operations over the next ten years. Napier Port expects that the proposed development will ensure that it is able to service all future requirements from the region, meaning that exporters and importers will not need to utilise any out-of-region facilities.

This is a significant benefit from the proposed project.

# 23. SUMMARY OF EFFECTS

Table 23-1 sets out in summary the various actual and potential effects that have been identified as associated with Napier Port's proposed wharf and dredging project. Each of the types of effects has been described and assessed in the relevant section of this report noted in the first column of the table.

In accordance with the RMA, the extent of each of the effects is noted following mitigation, and the mitigation either built into project design and thus part of the project description, or subject to a specific proposed condition, is indicated in the final column.

The description of the extent of effect is based on a five-level scale, as follows:

- negligible[146]
- less than minor
- minor
- moderate
- significant.

There is some flexibility in the use of this scale. For example, a moderate or significant effect may be evaluated as minor or less than minor if it is anticipated to occur only for limited period(s).

No cumulative adverse effects have been identified in relation to this project. All physical and coastal effects are within the range of natural variability.

The main effect where risk remains an issue is in relation to Little Blue Penguins. This is because the extent of the affected population cannot yet be determined. Steps have been taken to measure the population as soon as is practicable. In the meantime, the need for any offset in terms of maintaining the overall regional population is unable to be determined. However, a draft condition is proposed which would enable this to be determined by agreement, including the involvement of DoC and Iwi.

Section 26 sets out the proposed draft conditions in relation to each of the consents sought. These are expected to be the subject of discussion with Hawke's Bay Regional Council as well as suggestions from submitters before being formalised as conditions of any consents.

[146] Also referred to in the report as *de minimis*.

**Table 23-1: Summary of Effects on the Environment associated with the Proposed Wharf and Dredging Project**

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| **Coastal Processes (section 8)** | Wave height and direction (north of Port). | Small potential for changes to wave height and direction on some parts of coastline north of Port due to changes to Swinging Basin and Fairway. | Negligible | Mitigation already built into design of extended swinging basin and channel |
| | Sediment supply in coastal zone north of Port. | Already little contribution from south of Port to north of Port. | Negligible | Not needed |
| | Wave height and direction (south of Port). | Small potential for changes to wave height at Marine Parade/Town Reef due to dredge disposal.<br>No change to direction of waves. | Negligible | Not needed |
| **Water Quality (section 9)** | Discharge to water of any hazardous contaminants. | Dredged material is "clean" (i.e. contains no problem chemical or organic contaminants). | No effect | Not needed |
| | Discharge of sand, silt and clay during and following dredging and disposal of dredged material. | Localised and temporary effects of turbidity and suspended sediments near to dredged and disposal areas during dredging activity. | Less than minor | Monitoring of suspended sediments and turbidity at Pania Reef during dredging campaigns |
| | | Longer-term potential for resuspension of material disposed at offshore site to affect Pania Reef. | Negligible | Mitigated through choice of disposal location and size of area |
| **Benthic Ecology (section 10)** | Direct effect of dredging. | Removal of benthic sediments and lowering of sea bed over 117ha – associated with Stage 1 to 5 dredging. | Less than minor | Not needed |
| | Direct effect of disposal of dredged material. | Smothering of 350ha of offshore sea bed area with disposal material to a depth of approximately 1m. | Less than minor | Not needed |

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| | Indirect effects of dredging of disposal of dredged material on Pania and other reef areas through sediment plumes and elevated turbidity, during dredging campaigns. | Risk of sediment plumes in unusual and adverse conditions reaching Pania Reef, or other reef areas. | Less than minor | Not needed, but turbidity monitoring proposed.<br>Dredging would cease temporarily if Pania Reef was exposed to long duration sedimentation events associated with dredging activities. |
| | Indirect effects of dredging and disposal of dredged material on soft sediment benthos close to project areas. | Within immediate proximity (up to 100m) of active dredging and disposal areas. | Less than minor | Not needed |
| | Longer term impacts of resuspension of sediment from disposal area. | Risk of resuspension of disposal material in longer term. | Negligible | Not needed. However, ongoing monitoring of reef ecology proposed |
| **Commercial and Recreational Fishing (section 11)** | Direct and indirect effects of dredging and disposal of dredged material, and any dredge plume. | Modification of habitat in which fish breed or feed. | Negligible | Not needed |
| **Marine Mammals (section 12)** | Noise and disturbance from wharf construction. | Implications of underwater noise from pile driving and other construction activities, including disturbance or damage to hearing. | Negligible | Management plan, including observation and response to any marine mammals in proximity |
| **Avifauna (section 13)** | Disturbance of habitat during wharf construction. | Potential to disturb and/or damage Little Blue Penguins living in existing revetment. | Potentially significant | Management plan, including rescue and relocation and/or offset contribution to alternative habitat or population |
| | | Potential effects on other birds nearby. | Minor or less | Not needed, but monitoring proposed |

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| **Wharf Construction (section 14)** | Specific impacts on nearby population. | Potential impacts from noise, vibration and construction traffic. | No more than minor (will meet all standards in residential areas) | Noise management plan, construction traffic management plan (within overall construction management plan) |
| **Coastal Access and Recreational Use and Values (section 15)** | Potential impacts on recreational fishing, beach use, coastal access, boating and surfing. | Potential impacts which may change recreational fishing | Negligible | Not needed |
| | | Potential impacts which may change beach use or coastal access | No effect | Not needed |
| | | Potential impacts on boating | Negligible | Not needed |
| | | Potential impacts on surfing | Negligible – may be minor benefit on closest break | Not needed. Potential impact on surfing mitigated through design of channel |
| **Natural Character and Visual and Landscape Values (section 16)** | Landscape and visual impacts of new wharf. | Assessed from a number of local viewpoints. | No more than minor | Not needed |
| | Natural coastal character. | Assessed on the basis of additional structure and activities in the coastal area. | Less than minor. Negligible in relation to marine environment | Not needed |

| Type of Effect (AEE section in brackets) | Nature of Effect | Commentary | Extent of Effect following Mitigation | Mitigation |
|---|---|---|---|---|
| **Tangata Whenua Cultural Values (section 17)** | Adverse or beneficial cultural impact. | Implications of changes on cultural values, including Pania Reef, ecological values and customary use. | Minor | Cultural monitoring proposed |
| **Marine Archaeology (section 18)** | Effect on items identified in the HBRCEP. | Assessed on the basis of effects on coastal processes. | Negligible | Not needed |
| **Navigation and Safety (section 19)** | Risk management. | Taken into account in design of whole project. | No effect | Mitigation already built into design of all aspects of project |
| **Climate Change and Natural Hazards (section 20)** | Implications in terms of coastal natural hazards. | Considered in location and design. | No effect | Not needed |
| | Lifelines implications. | Benefit in terms of additional capacity, modern structure. | Minor benefit | Not needed |
| **Occupation (section 21)** | Occupation of defined coastal marine area for Port purposes. | Application includes replacement of existing permit to occupy, and extension to allow safe commercial operation and maintenance of new facilities (wharf and swinging basin). | Less than minor adverse effect. Moderate to significant benefit | Not needed |
| **Economic Impacts and Benefits (section 22)** | Contribution of additional wharf and larger channel. | Implications of increased business and multiplier effect in wider regional economy – both short-term and long-term. | Moderate to significant benefit | Not needed |

# 24. POLICY CONTEXT AND EVALUATION

## 24.1. Introduction

The Fourth Schedule of the RMA (clause 2(1)(g)) requires an assessment of the activity against any relevant provisions of a document referred to in section 104 (1)(b). Clause 2(2) of the Fourth Schedule explains that this assessment must include an assessment against:

- any relevant objectives, policies or rules in a document;
- any relevant requirements, conditions or permissions in any rules in a document; and
- any other relevant requirements in a document (for example, in a national environmental standard or other regulations).

In terms of section 104(1)(b) the relevant documents may be:

a) a national environmental standard;
b) other regulations;
c) a national policy statement;
d) a New Zealand coastal policy statement;
e) a regional policy statement or proposed policy statement; and
f) a plan or proposed plan.

Only items (d), (e) and (f) are relevant to the current applications.

In terms of item (a) above, the potential for the levelling of parts of the container terminal work towards the end of the wharf construction to trigger a consent requirement under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, has been noted earlier in this report (section 6.3) and will be addressed later in consultation with Napier City Council. None of the other four National Environmental Standards apply.

In relation to (b) the Resource Management (Marine Pollution) Regulations 1998 apply primarily to ships, aircraft and offshore installations, but some components apply to activities on wharves or platforms. These requirements have all been reviewed and do not apply to the project. None of the other RMA regulations[147] apply.

Similarly, in relation to national policy statements, item (c) above, only the New Zealand Coastal Policy Statement 2010 item (d) applies.

In terms of the overall section 104(b) list of documents, the following are considered relevant and their provisions are analysed below:

- the 2010 New Zealand Coastal Policy Statement (NZCPS);
- the operative regional policy statement, which is part of the Regional Resource Management Plan, 2006 (sections 2 and 3 of the Plan); and

[147] Apart from those which relate to the nature and content of application forms, Resource Management (Forms, Fees and Procedure) Regulations 2003, which have been met in the forms set out in Part 1 of this document.

- the operative Hawke's Bay Regional Coastal Environment Plan (HBRCEP) 2014.

There are no relevant proposed regional policy statement(s) or plans, nor plan changes or variations that apply to the applications.

## 24.2. New Zealand Coastal Policy Statement

The Resource Management Act (RMA) 1991 established a coastal management regime, including through the NZCPS. The NZCPS applies to the coastal environment. The CMA is thus just part of the broader area to which the NZCPS applies. The NZCPS must be given effect to through planning and decisions of regional and district councils. In the preamble, the NZCPS notes that *"the coastal environment contains established infrastructure connecting New Zealand internally and internationally such as ports, airports, railways, roads and submarine cables"*.

The NZCPS promotes the sustainable management of the natural and physical resources of the coastal environment through stated objectives and policies, including coastal land, foreshore and seabed, and coastal waters from the high tide mark to the 12 nautical mile limit. The NZCPS contains seven objectives and 29 more detailed policies.

The NZCPS guides regional and district (city) councils in the day to day management of the coastal environment, and in particular provides a coastal management framework expressed through the objectives, policies and rules in the relevant regional policy statement and the regional coastal plan.

The analysis that follows identifies only those objectives and policies that may be applicable to the consents sought by Napier Port under appropriate headings.

### 24.2.1. Integrity, Form, Functioning and Sustaining Ecosystems

**Objective 1** of the NZCPS states:

> *To safeguard the integrity, form, functioning and resilience of the coastal environment and sustain its ecosystems, including marine and intertidal areas, estuaries, dunes and land, by:*
>
> - *maintaining or enhancing natural biological and physical processes in the coastal environment and recognising their dynamic, complex and interdependent nature;*
> - *protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna; and*
> - *maintaining coastal water quality, and enhancing it where it has deteriorated from what would otherwise be its natural condition, with significant adverse effects on ecology and habitat, because of discharges associated with human activity.*

**Commentary**: This is a comprehensive overall objective for the coastal environment. While the project will add a new wharf structure into the CMA, and change the shape of the seabed due to dredging and disposal of dredged material, the integrity, functioning and resilience are sustained and existing ecosystems will be maintained. These aspects have been the subject of specialist investigations and reports, and will be subject to conditions.

In terms of water quality, the project does not introduce contaminants, other than placing some existing sediment and more consolidated strata subject to capital dredging temporarily into suspension causing some turbidity and suspended sediments. The extent of deterioration in water quality does not exceed existing turbidity experienced at times in Hawke Bay, either in extent, intensity or location. The associated adverse effects have been assessed as generally less than minor or negligible, and definitely not significant. Blue Penguins are proposed to be protected in terms of this objective through conditions (including offsets if necessary) although one site used by the species will be modified.

### 24.2.2. Natural Character

**Objective 2** of the NZCPS states:

> *To preserve the natural character of the coastal environment and protect natural features and landscape values through:*
> - *recognising the characteristics and qualities that contribute to natural character, natural features and landscape values and their location and distribution;*
> - *identifying those areas where various forms of subdivision, use, and development would be inappropriate and protecting them from such activities; and*
> - *encouraging restoration of the coastal environment.*

This is further amplified in Policy 13 and Policy 15 which sets out the methods to determine the extent of natural character and the presence of outstanding natural features and landscapes, but also provides a methodological approach to protection as set out below:

**Policy 13 Preservation of natural character**

> *1) To preserve the natural character of the coastal environment and to protect it from inappropriate subdivision, use, and development:*
> - *a) avoid adverse effects of activities on natural character in areas of the coastal environment with outstanding natural character; and*
> - *b) avoid significant adverse effects and avoid, remedy or mitigate other adverse effects of activities on natural character in all other areas of the coastal environment;*

**Policy 15 Natural features and natural landscapes**

> *1) To protect the natural features and natural landscapes (including seascapes) of the coastal environment from inappropriate subdivision, use, and development:*
> - *a) avoid adverse effects of activities on outstanding natural features and outstanding natural landscapes in the coastal environment; and*
> - *b) avoid significant adverse effects and avoid, remedy, or mitigate other adverse effects of activities on other natural features and natural landscapes in the coastal environment.....*

**Commentary**: In terms of Objective 2 and Policy 13, the part of the coastal environment affected by the project does not have high natural character values. This is apparent from looking at the Port itself (for example, Figure 7.1 of this report) and from the area's land-side zoning as Port Industrial and recognition in the HBRCEP as the Port Management Area within the CMA. In this context, the wharf and dredging are not inappropriate.

In terms of Objective 2 and Policy 15, Napier Port is backed by the feature of Bluff Hill. However, this is not identified or protected as an outstanding natural feature. In any case, the proposed wharf is at distance from Bluff Hill and represents a relatively small structural extension from the existing container terminal. There is no need to further mitigate the effects of the wharf and dredging project in terms of this policy.

However, all effects on natural character have to be avoided, remedied or mitigated. The choice of this particular option (from amongst the others outlined in section 5 of this report) means that potentially more significant adverse effects have been avoided. Mitigation and remedy for effects on some aspects of natural character – in particular local avifauna as an element of local natural character – are proposed.

### 24.2.3. Treaty Principles

**Objective 3** of the NZCPS states:

> *To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment by:*
> - *recognising the ongoing and enduring relationship of tangata whenua over their lands, rohe and resources;*
> - *promoting meaningful relationships and interactions between tangata whenua and persons exercising functions and powers under the Act;*
> - *incorporating mātauranga Māori into sustainable management practices; and*
> - *recognising and protecting characteristics of the coastal environment that are of special value to tangata whenua.*

**Policy 2 The Treaty of Waitangi, Tangata Whenua and Māori heritage**

> *In taking account of the principles of the Treaty of Waitangi (Te Tiriti o Waitangi), and kaitiakitanga, in relation to the coastal environment:*
> - *a) recognise that tangata whenua have traditional and continuing cultural relationships with areas of the coastal environment, including places where they have lived and fished for generations;*
> - *b) ....*
> - *c) ....*
> - *d) ....*
> - *e) take into account any relevant Iwi resource management plan and any other relevant planning document recognised by the appropriate Iwi authority or hapū and lodged with the council, to the extent that its content has a bearing on resource management issues in the region or district; and*
>   - *i. where appropriate incorporate references to, or material from, Iwi resource management plans in regional policy statements and in plans; and*
>   - *ii. consider providing practical assistance to Iwi or hapū who have indicated a wish to develop Iwi resource management plans;*
> - *f) provide for opportunities for tangata whenua to exercise kaitiakitanga over waters, forests, lands, and fisheries in the coastal environment through such measures as:*
>   - *i. bringing cultural understanding to monitoring of natural resources;*

*ii. providing appropriate methods for the management, maintenance and protection of the taonga of tangata whenua;*

*iii. having regard to regulations, rules or bylaws relating to ensuring sustainability of fisheries resources such as taiāpure, mahinga mātaitai or other non commercial Māori customary fishing; and*

*g) in consultation and collaboration with tangata whenua, working as far as practicable in accordance with tikanga Māori, and recognising that tangata whenua have the right to choose not to identify places or values of historic, cultural or spiritual significance or special value:*

*i. recognise the importance of Māori cultural and heritage values through such methods as historic heritage, landscape and cultural impact assessments; and*

*ii. provide for the identification, assessment, protection and management of areas or sites of significance or special value to Māori.....*

**Commentary:** Objective 3 and Policy 2 both emphasise the importance of Māori in coastal management. Some of the requirements of these provisions relate directly to the responsibilities of local authorities, but others are more directly applicable.

Napier Port has sought through formal relationships (including Board representation) to recognise Iwi and hapū relationships with the coast and coastal resources. There has been early information sharing with the relevant Iwi organisations which were identified through a consultative process[148]. Pania Reef is recognised in the HBRCEP as a significant conservation area, but is also a Mātaitai[149] where customary food gathering may be permitted by authorised kaitiaki and is understood to be a waahi tapu as the home of Moremore, guardian of this part of Hawke Bay[150].

The significance of these recognitions and protections is recognised by Napier Port. It is anticipated that monitoring conditions relating to dredging and disposal of dredged material will incorporate a level of Iwi involvement. Similarly, it is anticipated that management of Blue Penguins will also involve Iwi. These possibilities are covered in the draft conditions in section 26.

It is also noted that Mana Ahuriri Inc has submitted an application under the Marine and Coastal Area (Takutai Moana) Act 2011 for customary marine title and protected customary rights over the Port and adjacent area, and the Maungaharuru-Tangitu Trust have sought protected customary rights over an area further north which approaches the new shipping channel. The Marine and Coastal Area Act provides specific procedures that need to be followed when resource consents are sought. However, this legislation also provides a specific status for ports (see section 6.5.3 of this report).

In terms of Policy 2(e) Hawkes Bay Regional Council recognises six Iwi Management Plans associated with Ngati Kahungunu or hapū organisations. Only one appears to be potentially relevant to the Napier Port applications – the Kahungunu ki Uta, Kahungunu kit Tai Marine and Freshwater Fisheries Strategic Plan. This is a high level document dating from a series of hui in 2008. It was created because of concern about

[148] The key hapū organisations are Ngati Pārau, Mana Ahuriri, Te Taiwhenua o Whanganui a Orotu and the Maungaharuru – Tangitū Trust.

[149] Moremore Mātaitai (b) 4.6km$^2$, established by Gazette 2005 under the Fisheries (Kaimoana Customary Fishing) Regulations 1998.

[150] Cited in the Hawke's Bay Marine Oil Spill Contingency Plan 2014, referenced to E Pischief.

the state of fisheries and ecosystems within the rohe. It seeks to develop management practices which are holistic and inclusive. It expresses concern about the decline in abundance of fisheries.

The plan sets out goals, activities to be undertaken and priority and further tasks and responsibilities to help achieve the stated goals, under 12 headings ranging from fisheries and spatial management through environmental issues, capacity building, relationships and training and development.

To the extent that the Port Napier project may intersect with this Iwi Management Plan, Iwi would wish to understand whether the project would impact on fisheries-related ecosystems, including food stocks and feeding and breeding areas. These aspects have been investigated and the extent of any actual and potential effects are set out in sections 10 and 11 of this report and the specialist reports referred to within those sections. Also of interest would be any impact on coastal processes and water quality, covered in sections 8 and 9 of this report, which also relate to sections 10 and 11. In summary, Port Napier's project is effectively neutral in terms of this Iwi Management Plan. There may be a slight benefit in that new information has been yielded, and monitoring is expected to be required (subject to conditions). This may contribute in a small way to information available to Iwi and overall fisheries management.

Cultural monitoring in relation (particularly relating to Pania Reef) has been proposed as a condition of consent.

### 24.2.4. Public Open Space

**Objective 4** of the NZCPS states:

> *To maintain and enhance the public open space qualities and recreation opportunities of the coastal environment by:*
>
> - *recognising that the coastal marine area is an extensive area of public space for the public to use and enjoy;*
> - *.....*

**Commentary**: Policies 18 and 19 on the NZCPS expand on this objective, and encourage public open spaces on both sides of MHWS, and particularly walking access on the landward side of MHWS, and availability of open space on land adjacent to MHWS. Policy 19(3) sets out a number of bases for limiting walking access.

In relation to this policy, no further limitation on the existing level of access on the landward side of MHWS is proposed or needed. The Port area is already a currently restricted area due to needs of public health, safety and security (including biosecurity) in accordance with Policy 19(3)(e), (i) and (j). The Port makes publicly available for recreational use an area of foreshore and beach which is technically within the Port Operational Area in the HBRCEP and within the Port's section 384A permit[151]. This will not change.

In terms of RMA section 12(2), the replacement occupation permit sought, and its extension to provide for the new wharf and berth and swinging basin, is also justifiable in terms of the items noted for "land-

[151] Above MHWS, the land is zoned Industrial in the Napier City District Plan.

side" access restriction – that is to provide for security, health and safety as part of the Port's overall operational requirements. This is not directly addressed under this policy section and is noted in relation to Policy 9 later.

### 24.2.5. Use and Development in the Coastal Environment

**Objective 6** of the NZCPS states:

> *To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development, recognising that:*
>
> - *the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;*
> - *some uses and developments which depend upon the use of natural and physical resources in the coastal environment are important to the social, economic and cultural wellbeing of people and communities;*
> - *functionally some uses and developments can only be located on the coast or in the coastal marine area;*
> - *.....*

**Policy 6 Activities in the coastal environment**

> *1) In relation to the coastal environment:*
>
> *a) recognise that the provision of infrastructure, the supply and transport of energy including the generation and transmission of electricity, and the extraction of minerals are activities important to the social, economic and cultural well-being of people and communities;.....*
>
> *2) Additionally, in relation to the coastal marine area:....*
>
> *c) recognise that there are activities that have a functional need to be located in the coastal marine area, and provide for those activities in appropriate places.*

**Policy 9 Ports**

> *Recognise that a sustainable national transport system requires an efficient national network of safe ports, servicing national and international shipping, with efficient connections with other transport modes, including by:*
>
> *a) ensuring that development in the coastal environment does not adversely affect the efficient and safe operation of these ports, or their connections with other transport modes; and*
>
> *b) considering where, how and when to provide in regional policy statements and in plans for the efficient and safe operation of these ports, the development of their capacity for shipping, and their connections with other transport modes.*

**Commentary**: This set of policies is effectively enabling to the type of use and development proposed. Appropriate use and development is not precluded in terms of Objective 6, and the dependency of some uses (such as Port uses) to a coastal environment location and their contribution to community wellbeing is also recognised in this objective. Policy 6 follows directly in relation to the functional need for Port activities. Policy 9 recognises the importance of "*a national network of safe ports, servicing national and international shipping ....".*

In terms of Policy 9, (a) does not apply directly, as Napier Port is not subject to development by other parties. However, in part Policy 9(a) helps justifying the occupation permit sought to the exclusion of any

other activities within the area to be occupied by the wharf and berth, and the extended swinging basin which is demonstrably exclusively needed for the manoeuvring of vessels.

Policy 9(b) refers primarily to making appropriate provision in the Regional Policy Statement and plans for the efficient and safe operation of ports and the development of their capacity. The Regional Policy Statement recognises Napier Port and its use and development, and the HBRCEP effectively gives effect to both NZCPS Policy 9(b) and the Regional Policy Statement by identifying a Port Management Area and providing more detailed policy and rules relating to this area. The project is largely to be undertaken within this area, other than for part of the dredging and the dredge material offshore disposal area.

The need for and benefits of the project are set out in sections 4 and 21 of this report.

### 24.2.6. Coastal Hazards

Through Objective 5 and associated Policies 24 to 27, detailed policy for a coastal hazard management strategy, which takes into account climate change, is put in place. Hazard provisions are included in the HBRCEP, and Port Napier is excluded from the coastal hazard zoning therein. This is in line with the expectation at national level that ports are directly responsible for their own hazard management. This has been addressed in section 20 of this report.

### 24.2.7. Water Quality, Sedimentation and Contaminant Discharges

Policy 21 relates to enhancement of water quality where quality has deteriorated and the need to prioritise areas for improvement. The HBRCEP identifies areas for ecological and ecological and recreational management, as described in section 9.7 of this report. Policy 22 requires that use and development does not result in a significant increase in sedimentation in the CMA. This has been addressed earlier in section 9 of this report. As has been explained, although the dredging and dredge disposal activities do result in sedimentation, the situation is temporary and limited in areal extent and the disposal is located where it will have minimal impact.

Policy 23 provides approaches for general discharges, human sewage and stormwater, and from ports and other marine facilities. Policy 23(1) and Policy 23(5)(a), as set out below, are the key requirements.

**Policy 23 Discharge of contaminants**

1) *In managing discharges to water in the coastal environment, have particular regard to:*
    a) *the sensitivity of the receiving environment;*
    b) *the nature of the contaminants to be discharged, the particular concentration of contaminants needed to achieve the required water quality in the receiving environment, and the risks if that concentration of contaminants is exceeded; and*
    c) *the capacity of the receiving environment to assimilate the contaminants; and:*
    d) *avoid significant adverse effects on ecosystems and habitats after reasonable mixing;*
    e) *use the smallest mixing zone necessary to achieve the required water quality in the receiving environment; and*

*f) minimise adverse effects on the life-supporting capacity of water within a mixing zone.*

*2) In managing discharges from ports and other marine facilities:*

*a) require operators of ports and other marine facilities to take all practicable steps to avoid contamination of coastal waters, substrate, ecosystems and habitats that is more than minor.*

In this case, the capacity and sensitivity of the receiving environment have been identified and assessed, only "clean" natural sedimentary material is involved, the mixing zones are limited in extent before background levels are achieved. Overall, effects are very limited.

### 24.2.8. Surf Breaks of National Significance

Policy 16 provides for the protection of surf break of national significance for surfing. Schedule 1 lists the breaks to which this policy applies. There are no listed surf breaks within the Hawke's Bay region so this policy does not apply.

### 24.2.9. Implications of the Project in terms of NZCPS

The NZCPS is a comprehensive framework for coastal management. When assessed directly against its provisions, Napier Port's proposed wharf and dredging project is not opposed to or inconsistent with any policy areas. The project is largely taking place within the Port Management Area (as identified in the HBRCEP), and is subject to evaluation within the series of policies and rules that apply to that area through the relevant plan. While there are both actual and potential effects associated with the project, the mitigation which is either inbuilt within the project or is proposed through draft conditions has been able to ensure that effects will all be minor or less.

The King Salmon decision[152] explained that normally it would be expected that NZCPS policy would be given effect to within lower level policy and plan documents. These are evaluated below.

The Regional Policy Statement predates the NZCPS, but the HBRCEP was in part developed subsequent to the release of the NZCPS. As the project is consistent with the higher level policy, it would be expected to be largely consistent with these other documents. This is addressed in the following sections.

## 24.3. Hawke's Bay Regional Policy Statement

This Regional Policy Statement is incorporated in the Hawke's Bay Regional Resource Management Plan, which became operative in 2006. The Regional Policy Statement comprises Chapters 1 to 4 of the overall plan[153] with Chapters 2 and 3 setting out the main objectives and policies. Chapter 4 however recognises non-regulatory methods of achieving the objectives including information and education.

Table 24-1 sets out key objectives and related policies of the Regional Policy Statement which are relevant to the project. Note that Objectives 6, 9 and 10 are set out under the heading of Chapter 3.2 – The Sustainable Management of Coastal Resources. This section contains only objectives, as the

[152] See Environmental Defence Society Inc v The New Zealand King Salmon Co Ltd [2014] NZSC 38, 1 NZLR 593.
[153] See Chapter 1.2.1.

applicable policies are found in HBRCEP. This is explained under the heading of Policy in this section of the Plan.

**Table 24-1: Summary of Key Objective and Policy Themes of the Regional Policy Statement**

| Objective and Policy | HB Regional Policy Statement Objective and Policy Theme |
|---|---|
| **Objective 6** | **Coastal water quality** - the management of coastal water quality to achieve appropriate standards, taking into account spatial variations in existing water quality, actual and potential public uses, and the sensitivity of the receiving environment. |
| **Objective 9** | **Investment and maintenance** - requires appropriate provision for economic development within the coastal environment, including the maintenance and enhancement of infrastructure, network utilities, industry and commerce, and aquaculture. |
| **Objective 10** | **Safe and efficient navigation** – enables safe and efficient navigation for port vessels. |
| **Objective 32**<br>**Policy 56** | **Ongoing operation and development** – provides for the ongoing operation, maintenance and development of physical infrastructure that supports the economic, social and/or cultural wellbeing of the region's people and communities and provides for their health and safety. |
| **Objective 33**<br>**Policy 56** | **Regionally significant infrastructure** - provides recognition that some infrastructure which is regionally significant has specific locational requirements. |
| **Objective 34**<br>**Objective 35**<br>**Policy 59**<br>**Policy 62** | **Matters of significance to Iwi/Hapū** - requires the recognition of tikanga Maori values, such as consultation being *'kanohi ki te kanohi'* (face to face) or personal contact, and the contribution they make to sustainable development and the fulfilment of HBRC's role as guardians, as established under the RMA, and tangata whenua roles as kaitiaki, in keeping with Maori culture and traditions. |
| **Objective 36**<br>**Objective 37**<br>**Policy 64**<br>**Policy 65** | **Matters of significance to Iwi/Hapū –** requires the protection of waahi tapu and mahinga mātaitai by avoiding significant adverse effects on them. |

Objective 6 underpins the water quality provisions and "zoning" which is applied through the HBRCEP and discussed later in section 23.4.2. Objectives 9 and 10 are both free-standing supportive objectives for coastal infrastructure including the Port, and for safe and efficient navigation in relation to access through the CMA for Port-related vessels.

Objectives 32 and 33 and associated Policy 56, which relates to the role of non-regulatory methods of providing information to assist territorial authorities and the regional population understand the importance of significant infrastructure as *"the primary means of enabling the development of regionally significant physical infrastructure"*, are found in Chapter 3.13 – Maintenance and Enhancement of Physical Infrastructure. The explanation and reasons section explains that the airport and port are both in the coastal environment and have special locational requirements. It is noted here that *"the region does not have any natural harbours, so the Port's physical resources, developed over more than a century, are regionally significant. An efficient and convenient location is relation to the region's population and commercial and industrial activity is also essential from the Port and airport"*.

Objectives 34 and 35 and associated Policies 59 and 62, along with Objectives 36 and 37 and associated Policies 64 and 65 are found in Chapter 3.14 of the Regional Policy Statement – Recognition of Matters of Significance to Iwi/Hapū. The first four provisions identified address the kaitiaki role and the importance of consultation, and the last four address protection, and where necessary the need to aid the preservation of, *inter alia,* waahi tapu and mahinga mātaitai. The policies here require avoidance of any significant adverse effects on such places.

**Commentary:** The project is not inconsistent with the objectives of the Regional Policy Statement that relate to the coastal environment, and to regionally significant infrastructure. The investment and ongoing development proposed is in line with this regional policy. The single objective relating to coastal water quality underpins the water classification applied through the HBRCEP, with which the dredging and disposal activities are also consistent.

The policy relating to tangata whenua requires respectful and appropriate consultation, which Napier Port considers it is undertaking, and the recognition and protection of, *inter alia*, waahi tapu and mātaitai areas. By emphasising the intention to minimise adverse effects on Pania Reef while also providing monitoring information, again the regional-level objectives and policies are being achieved.

## 24.4. Hawke's Bay Regional Coastal Environment Plan

### 24.4.1. Introduction and General Policy Framework

Decision-makers on resource consent applications must have regard to the provisions of the HBRCEP as required by section 104(1)(b)(vi) of the RMA when considering the applications for coastal permits.

The HBRCEP became fully operative on 8th November 2014. It can be regarded as the most significant policy document directly influencing the applications. It also contains the rules which establish the status of the applications. The relevant contextual framework[154] and rules also contribute to an understanding of how the policy framework applies to the applications.

Of particular significance is the mapped Port Management Area and the Fairway and Swinging Basin. These identified mapped areas mean that some of the maintenance dredging which forms part of the overall project, is permitted or controlled[155] and the policy in the HBRCEP does not apply to these activities.

It is also important to note that the mapped area of the Special Conservation Area around Pania Reef is also associated with Rule 143, which makes any removal of sand, rock or gravel within 700m of Pania Reef (SCA 13) a prohibited activity for which an application cannot be made[156]. The application for dredging is entirely beyond 700m from the boundary shown on the HBRCEP maps, and the relevant policies apply.

As would be expected, there are a large number of objectives and policies that are directly relevant to the applications. Many have been derived from the NZCPS and the RPS, and have effectively been

[154] In terms of geographical aspects which apply in the vicinity of the Port.
[155] Under rules 139 and 140.
[156] In terms of section 87A(6) of the RMA.

analysed earlier in this section. For completeness, these are included along with other relevant provisions in summary in Table 23.2. Those which have been addressed in earlier discussion in this report are marked with an asterisk.

**Table 24-2: Summary of Key Objectives and Policy Themes of the HBRCEP**

| Objective and Policy | HBRCEP Objective and Policy Theme |
|---|---|
| Objective 2.1*<br>Policy 2.1<br>Policy 2.3<br>Policy 2.4<br>Policy 2.5<br>Policy 2.8<br>Policy 2.9<br>(this suite of provisions already evaluated in section 23.2.2 and 23.2.5) | **Natural character** – preservation of natural character and protection from inappropriate use and development; avoiding adverse effects on natural character; promoting use and development in areas where natural character is already modified; enabling the use and development of Port facilities while avoiding, remedying or mitigating (where practicable) adverse effects on natural character and processes; to mitigate effects on natural coastal processes; to mitigate effects on natural coastal processes; and to seek to maintain and enhance existing cultural and amenity values. |
| Objective 4.1*<br>Policy 4.1<br>Policy 4.2<br>Policy 4.4<br>(this suite of provisions already evaluated in sections 23.2.1) | **Indigenous species** – protecting areas of regionally or nationally significant habitat of indigenous fauna or ecosystems; avoiding adverse effects on fishing grounds, indigenous biota, etc; ensuring adverse effects are remedied or mitigate (where complete avoidance is not practicable) on outstanding or rare species or habitats; and ensuring avoidance, remedy or mitigation of adverse effects on SCAs. |
| Objective 5.1*<br>Policy 5.7<br>Policy 5.8<br>Policy 5.9<br>Policy 5.10<br>(this suite of provisions already evaluated in section 23.2.4) | **Public access** – maintaining access except where necessary for health, safety and securing reasons; excluding the Port Management Area from public access; and limiting occupation to only that which is necessary in space and time and to not unreasonably restrict other uses. |
| Objective 6.1*<br>Policy 6.1<br>Policy 6.4<br>Policy 6.5<br>Policy 6.8<br>Policy 6.9 | **Tangata whenua** – protection of the characteristics of the coastal environment of special significance to tangata whenua; recognising and supporting kaitiaki roles; ensuring adverse effects on cultural sites are avoided, remedied or mitigated; active involvement of tangata whenua in management of cultural resources; adequate consultation; and taking into account findings of cultural impact assessments. |

| Objective and Policy | HBRCEP Objective and Policy Theme |
|---|---|
| (this suite of provisions already evaluated in section 23.2.3) | |
| Objective 7.1<br>Policy 7.1<br>Policy 7.3 | **Historic heritage** – protection of historic heritage from inappropriate development; and avoid, remedy and mitigate adverse effects on historic heritage in the CMA |

Of the above policy provisions, only the last, Objective 7.1, and associated policies have not been addressed in section 23.2. Two identified archaeological sites from the HBRCEP are in proximity to the proposal. Section 18 of this report assesses the effects on these identified areas and finds there to be no adverse effects.

Subsequent sections of the HBRCEP address the actual activities and set out objectives, policies and environmental guidelines and anticipated environmental results. The remainder of this section addresses the contents of sections 16, 17 and 18 which relate directly to the activities for which consents are sought.

### 24.4.2. Discharge of Contaminants into the CMA

The following objectives and policies in the HBRCEP, Chapter 16, are considered relevant to the application to discharge dredged material at the proposed disposal site (Application 5) and the incidental discharges associated with the capital and maintenance dredging applications (Applications 2, 3 and 4) and with construction of the proposed new wharf (Application 1):

**Objectives:**

Objective 16.1 Maintenance or enhancement of water quality of the coastal marine area in order that it is suitable for sustaining or improving aquatic ecosystems, and for contact recreation purposes where appropriate.

Objective 16.3 Adverse effects on the environment associated with discharge and dumping of contaminants to the coastal marine area are avoided, remedied or mitigated.

Objective 16.4 The life supporting capacity of water in the coastal marine area is safeguarded.

**Policies:**

Policy 16.1 To manage discharges of contaminants in the coastal marine area in accordance with the environmental guidelines set out in Table 16-1.

Policy 16.2 To implement the environmental guidelines .... in the process of making decisions on consents.

Policy 16.3 When considering new applications, to take into account the existing state of the receiving environment its resources and its assimilative capacity, including seasonal fluctuations.

**Commentary**: The assessment of effects provided earlier in this document relating to water quality (section 9), benthic ecology and fisheries resources (sections 10 and 11) demonstrate that the three relevant objectives above are achieved in the applications. While there are temporary effects from elevated turbidity and sedimentation in the vicinity of the dredged areas and the disposal area these are relatively contained and are back to "background" levels within a short distance of the actual activity itself. The receiving environment is subject to "natural" turbidity events which are of the same order or greater than these that will be experienced.

In terms of the environmental guidelines the following points are made (references to relevant guideline items):

1(a) The requirement of Class AE(HB) and Class CR(HB) set out in Schedule E of the HBRCEP have been taken into account. Class CR applies to the coastal strip in the vicinity of the Port and AE applies elsewhere in the CMA. The proposed discharges are expected to result in intermittent turbidity within the CR area, but this will be restricted in time and generally not noticeable above background turbidity. In the area of actual deposition (the proposed disposal area) which has an AE classification there will be additional deposition which, as assessed in the applicable Cawthron Report (Appendix H in Volume 3), will have a temporary but less than minor effect on benthic aquatic life.

2 Reasonable mixing is provided for through recognising the extent within which different levels of turbidity and suspended solids will occur under different conditions. It is noted that temperature, pH and dissolved oxygen levels will not be changed and biological growths will not be associated with the discharges, as the contaminants are naturally-occurring sediments from the immediate area.

5(a) and (b) As noted in relation to 1(a) above, the discharges related to dredging and disposal of dredged material will at times not meet one of the requirements of Schedule E in that there will be temporary adverse effects on aquatic life in the disposal area. These discharges are justified on the basis of exceptional circumstances in (b)(ii) as they are required to provide for Port development and safe navigation to and from the Port (as enabled through policy in the Regional Policy Statement).

6(a) As the discharges are temporary and staged, they will meet the requirement of this guideline and further staging conditions are not needed.

8 Although the applications seek a disposal area which is not included in the HBRCEP maps, this is because of the volume of material involved. The new area requested has been chosen on the basis of evaluation of a range of options.

Thus it is considered that all relevant guidelines are met and the project is in accordance with the specific policy framework that applies to contaminant discharges in the CMA.

### 24.4.3. Disturbances, Depositions and Extractions in the CMA

The following objectives and policies in the HBRCEP, Chapter 17, are considered relevant to the applications to undertake capital and maintenance dredging (Applications 2, 3 and 4), to disposal of dredged material (Application 5) and disturbance associated with construction of the proposed new wharf (Application 1):

**Objectives:**

Objective 17.2 Adverse effects on the environment associated with dredging, drilling, tunnelling, use of explosives, excavation and/or removal of sand, gravel, shell or other natural material in the coastal marine area are avoided, remedied or mitigated.

Objective 17.3 Adverse effects on the environment associated with the deposition of substances within the coastal marine area are avoided, remedied or mitigated.

**Policies:**

Policy 17.1 To manage deposition and extraction of material within the coastal marine area and disturbance of the foreshore and seabed in accordance with the environmental guidelines set out in Table 17-1.

Policy 17.2 To implement the environmental guidelines for disturbances, extractions and depositions .... in the process of making decisions on resource consents.

**Commentary:** The information and assessment of effects set out earlier in this report addresses the range of effects associated with the dredging and dredge material disposal. As can be seen, the effects have been avoided or mitigated in a range of ways including project design and choice of disposal site, the staging of the dredging proposed, and the draft conditions that are put forward in section 25. The project as a whole will meet Objectives 17.2 and 17.3.

In terms of the environmental guidelines, the following points are made (references to relevant guideline items):

1(b) and (c) The material to be deposited is of a similar range of particle sizes to that at the proposed disposal site, being largely at the fine end of the range. Some of the capital dredging material will be deposited as “clumps” in the form it has been excavated, but over time it is expected that this will break down into its component particles. This is in accordance with guideline 1(c). Effects on benthic organisms and their habitats are minimised in the disposal area by identification of a large area where material will form a thin layer (approximately 1m thick) and organisms can recover. The staging of the dredging programme and its progressive nature helps meet guidelines (b) and (c)(ii), as does the distance from and location in relation to Pania Reef.

2(a) and (b) The dredging location and methodology has been shown to avoid adverse effects on Pania Reef, as there are no direct effects (the dredge site is more than 700m from the

boundary of the SCA surrounding Pania Reef) and any temporary indirect effects associated with water quality are within the range of normal conditions. This addresses item 2(a). Item 2(b) has been addressed by the location of the dredged channel and swinging basin and the proposed methodology for dredging including staging.

2(c) The dredging is to achieve a suitable alignment and size of approach channel and swinging basin for the Port for navigation, safety and commercial reasons. Alternatives have been considered and the current design is the result of an optimisation process. That addresses 2(c)(i). In terms of 2(c)(ii), it is important that the dredged channel remains as clear as possible of replenished material.

3(a) and (b) Detailed modelling undertaken for the project has demonstrated that the proposed dredging will present less than a minor risk in terms of exacerbating coastal erosion, in accordance with guideline 3(a)(iii) – see section 8. In terms of guideline 3(b) the nature of the material to be disposed of means that it is unsuitable for renourishment on the Napier city beaches. Should suitable material be identified, it will be deposited under the existing deposition permit which allows deposition in the nearshore area close to Westshore.

Thus it is considered that all relevant guidelines are met and the project is in accordance with the specific policy framework that applies to disturbances, depositions and extractions in the CMA.

### 24.4.4. Structures and Occupation of Space in the CMA

The introduction to Chapter 18 of the HBRCEP indicates the adverse and beneficial aspects of structures and occupation of space in the CMA. The following objectives and policies are considered relevant to the applications for the proposed new wharf (Application 1) and occupation of space for the new wharf, adjacent berth pocket and swinging basin (Application 6):

**Objectives:**

Objective 18.1 Adverse effects on the environment arising from the use and development of structures in the coastal marine area are avoided, remedied or mitigated.

Objective 18.2 Adverse effects on the environment arising from the occupation of space in the coastal marine area are avoided, remedied or mitigated.

**Policies:**

Policy 18.1 To manage structures and any associated occupation of space in the coastal marine area in accordance with environmental guidelines set out in Table 18-1.

Policy 17.2 To implement the environmental guidelines for structures and occupation of space in the CMA .... in the process of making decisions on resource consents.

**Commentary:** The information and assessment of effects and the choice of location for the proposed new wharf both demonstrate that the two objectives above can be met, as potential adverse effects from

alternative locations or methods of achieving the expanded berthing capacity needed would have been much greater.

In terms of the applicable environmental guidelines, the following points are made (references to relevant guideline items):

2(b) The structure has a functional need to be located in the CMA and is entirely within the Port Management Area. In terms of items (i) to (Iv) – navigation and mooring are not affected adversely; geomorphical and hydrological processes are not adversely affected; the wharf will not result in underutilisation of existing structures, and effects on the listed items have been avoided or are mitigated. Mitigation of adverse effects on Blue Penguins is proposed to include both mitigation and a level of offset by enhancing a population elsewhere as appropriate.

3 Construction materials that may include contaminants or hazardous substances are avoided.

4(a) and (b) Public access is inappropriate and the occupation sought is for the safety of Port users and others.

6(a) The location is not subject to coastal erosion, the existing revetment is to be replaced, and there is a less than minor risk that the wharf will exacerbate coastal erosion.

Thus it is considered that all relevant environmental guidelines are met and the project is in accordance with the specific policy framework that applies to structures in and occupation of the CMA.

## 24.5. RMA Sections 105 and 107

As noted in section 6.1.4, as well as the framework for decisions established in section 104 of the RMA, sections 105 and 107 provide specific additional considerations for section 15 applications (discharges, including within the CMA). The key requirements of the parts of these sections that apply to the applications, and comments on them, are set out in Table 24-3 below.

**Table 24-3: Analysis of Applications in terms of RMA sections 105 and 107**

| RMA Section | Commentary |
|---|---|
| 105(1)(a) | This provides an additional matter for decision-makers to have regard to in relation to discharge permits (RMA section 15) in the Coastal Environment – *"the nature of the discharge and the sensitivity of the receiving environment"*.<br>Consents are sought for actual or incidental discharges of sediment which is already within the local marine environment, but which is disturbed by the construction, dredging and/or disposal activities proposed.<br>The discharge is therefore of naturally-occurring sediment. The nature of the receiving environment has been taken into account, and effects assessed on that basis. Of particular relevance is the information and assessment provided in sections 9, 10 and 11 of this report and in the background reports referred to in those sections. |

| | |
|---|---|
| 105(1)(b) | This provides an additional matter for decision-makers to have regard to in relation to discharge permits (RMA section 15) in the coastal environment – *"the applicant's reason for the proposed choice"*.<br>Consents are sought for actual or incidental discharges of sediment which is already within the local marine environment, but which is disturbed by the construction, dredging and/or disposal activities proposed.<br>The reasons for the applicant's choice of project and the alternatives considered are set out in sections 4 and 5 of this report, and include the economic and functional reasons for increasing the depth of the channel giving access to the Port. The location of the disposal area has been chosen so that potential adverse effects of the discharges on the receiving environment are at a less than minor level. |
| 105(1)(c) | This provides an additional matter for decision-makers to have regard to in relation to discharge permits (RMA section 15) in the coastal environment –<br>*"any possible methods of discharge, including discharge into any other receiving environment"*.<br>Alternatives, including alternative discharge, locations for dredged material within the CMA, and discharges onto land for possible beneficial use, have been considered as set out in section 5.4 of this report. Discharges from the construction and dredging activities (as compared to the disposal of dredged material) are unavoidable, and, in the case of wharf construction, are incidental. |
| 107(1) and (2) | The first sub-section of section 107 provides "bottom line" standards relating to the actual and potential effects of discharges, and requires that any discharge does not give rise to conspicuous change in colour or visual clarity, odours, scums, foams, floatable objects, oil or grease films, or significant adverse effects on aquatic (marine) life. The second sub-section provides that a consent authority can grant a permit in such circumstances if either:<br>• there are exceptional circumstances justifying the discharge; or<br>– the discharge is of a temporary nature; or<br>– the discharge is associated with maintenance; and<br>– appropriate conditions are applied.<br>In this case there will be temporary changes in colour and clarity of the water. However, the discharges meet the requirement of being temporary in nature, except for the discharges associated with dredge material disposal, which, once completed, will result in a permanent change in the environment in the area affected. The need for the particular dredging project arises from the exceptional circumstances of changes in international shipping which are beyond the control of any New Zealand port operator.<br>Overall, the effects are minor or less and together fit within the constricts of section 107. Draft conditions, including monitoring and review conditions are proposed to address the residual effects which have not been able to be avoided through choice of location and project design. |

In summary, while RMA sections 105 and 107 provide additional considerations relating to discharge consents, these do not prevent the proposed activity being granted consents.

## 24.6. Part 2 of the RMA

Part 2 of the RMA is the Act's purpose and principles, including matters of national importance in section 6, other matters which particular regard must be had in section 7, and Treaty principles in section 8. Section 104(1) of the RMA makes all decisions on resource consent applications subject to Part 2[157].

In terms of **section 6**, subsection (a), (c), (d), (e), (f) and (g) may all be relevant. These have largely been addressed through the NZCPS analysis in section 23.2 but in summary:

- The natural coastal character values of the Port area, subsection (a), are not high, and the activities will have effects on natural character that are less than minor (landward side of the coastal environment) and negligible (within the CMA).
- The revetment which is proposed to be disturbed and reconstructed may comprise a significant habitat for Blue Penguins. In terms of subsection (c) such values are protected, so proposals to avoid, remedy (including if necessary through offsets) and mitigate effects on the species are proposed. No other area affected by the project appears to be significant in relation to indigenous vegetation or fauna.
- Public access to and along the coastal marine area, subsection (d), is already excluded from the project area as it is largely in the Port Management Area in the HBRCEP. However, the existing Port areas which are available to the public are not reduced or diminished.
- The applicant has endeavoured to consult effectively with and take into account the relationship with Iwi and hapū and the CMA and Pania Reef in this area, thereby addressing subsection (e).
- There is historic heritage, subsection (f), through two archaeological sites in the nearby area but neither will be adversely affected by the project.
- There are claims for customary rights over the whole of the Port area, however this has not progressed to the stage where it has RMA status. In terms of subsection (g), Pania Reef is a mātaitai area and the project will not directly affect it. Any indirect effects are considered to be *de minimis*.

In terms of **section 7**, matters to particular regard must be had, those which may be relevant are found in subsections (a), (b), (c), (d), (f) and (i). The following assessment is made:

- Subsections (a) relates to kaitiakitanga. In this case, the project has been developed with due care for the environment and the natural character and process of the CMA. Kaitiakitanga is inherently provided for by local Iwi and their relationship with Pania Reef and the formal status and rights as a Mataitai. In relation to the application, a kaitiaki role is provided for through an ongoing relationship between Napier Port and local Iwi and hapū, including ongoing roles in environmental and cultural monitoring.

- In terms of subsection (b), the efficient use and development of natural and physical resources, the project builds on and continues to make efficient use of established facilities such as the reclaimed area, while providing a new wharf facility in a particularly efficient location.

[157] Although the Davidson decision suggests that a Part 2 evaluation should not be necessary – see footnote under section 6.1 of this report.

- Amenity values and environmental quality, in subsections (c) and (f), will be maintained due to the location of the new wharf and the disposal area, and the proposed management of construction and dredging stages, and the strictly limited adverse effects of the project as a whole.
- The values of ecosystems, both intrinsic and other, have been recognised in the proposal, thereby satisfying subsection (d). Any effects on ecosystems are temporary and minor or less, assuming that the suggested conditions are put in place.
- The potential effects of climate change, subsection (i) are acknowledged and will be addressed through design.

**Section 8** requires that Treaty of Waitangi principles must be taken into account. Napier Port has approached the project on the basis of the need for active consultation with Iwi and hapū, as well as respect for cultural values associated with the Pania Reef area and the CMA as a whole, including the preparation of a CIA.

Finally, **section 5** sets out the purpose of the RMA as being the promotion of sustainable management as defined within the section. In this case Napier Port proposes to use and develop an area of the CMA within the Port Management Area to enable the enhancement of the Port function to meet regional and local needs, thereby contributing to economic, social and cultural wellbeing. The design of the project provides for health and safety. The project provides a new, needed, physical resource which meets the needs of the present as well as contributing a facility for the use of future generations; the life-supporting capacity of air, water and ecosystems is safeguarded, and actual and potential adverse effects which could be associated with the project have been avoided, remedied or mitigated as described in sections 8 to 22 of this document.

# 25. COMMUNITY ENGAGEMENT AND CONSULTATION

## 25.1. Introduction

A key part of Napier Port's proposed wharf and dredging project has been stakeholder and community engagement and consultation. Although the RMA does not require consultation prior to lodging applications for resource consents, it is generally considered good practice to do so. The RMA requires an identification of persons affected by the proposal, a description of any consultation undertaken and any responses to matters raised through the consultation process. Consultation which involves and informs the community about a project, such as the various activities which are the subject of the current applications, assist with identifying effects on the environment and in developing appropriate mitigation.

The key background report which explains the consultation undertaken is provided as **Appendix P** in Volume 3 of the application documentation. This section provides a summary of that report.

## 25.2. Communication and Consultation Plan

Napier Port has been committed to following a robust and transparent resource consent preparation process. An integral part of this process has been consultation with potentially affected parties, tangata whenua, statutory bodies, key stakeholders and the wider community.

The broad objective of the consultation process was:

> *"to re-establish long-term relationships with the tangata whenua and to listen to stakeholders' perspectives and gather additional information* [that Napier Port] *may not have yet considered or been aware of. The intent is that the consultation process will help shape the consent application and the Port's long-term relationship with iwi."*

In the early days of the project, during January and February 2016, a communication and consultation plan was developed. The communication and consultation plan for the project set out the intention and purpose, a situation analysis, consultation steps, and RMA focussed objectives for consultation and engagement. It also identified key stakeholders, potentially affected parties and community groups to be consulted with, key consultation messages, consultation risks, communication tools, feedback processes, and a draft programme for consultation activities.

It was developed as a "living document" with the intention that it would be updated as needed. It provided a framework to ensure that consultation was carried out effectively, in accordance with all statutory requirements and good practice guidelines, and, most importantly, to ensure that all persons potentially affected by or interested in the resource consent applications would have an opportunity to become actively and effectively involved in the process.

Within the broad objective set out above the following specific consultation objectives were developed:

- *All people and organisations interested in or affected by the project are given the opportunity to actively and fully participate in the consultation process.*

- *Best practice requirements for tangata whenua consultation are met.*
- *All participants in the process have sufficient understanding of the project to enable informed and useful responses.*
- *All participants are satisfied that consultation has been undertaken in a genuine and open-minded manner.*
- *All participants are satisfied that their responses, feedback and advice has been carefully considered.*
- *All participants have a full understanding of how the consultation output has been treated.*
- *The consent authority (HBRC) is satisfied that the consultation has been undertaken comprehensively and competently.*
- *Napier Port has a full record and an audit trail of a comprehensive consultation process to support this project and any future actions.*

## 25.3. Consultation Implementation

### 25.3.1. Methods (General)

As the consultation undertaken was also part of a communication strategy, a wide range of methods was considered appropriate. The range of stakeholders identified was scoped widely and ranged from Napier Port staff, contractors and customers, to local businesses and elected representatives as well as recreational and environmental groups[158]. Iwi were accorded specific recognition, as explained in the next section.

The following methods have been used to inform people and to seek feedback:

- **Use of dedicated project page on Napier Port's website** – this was launched in March 2016 and has been regularly updated, including with media releases and new FAQs.
- **E-updates** – these have been sent out on four occasions to almost 200 stakeholders.
- **Media releases and information** – a range of media releases have been made. In addition, media has at times sought information from Port Napier which has some bearing on the project.
- **Drop-in sessions** – these have been held at Ahuriri and Westshore, as well as at the Hawke's Bay A & P show.
- **Brochures and posters** – approximately 2,250 brochures were distributed to households near to the Port, with the posters being placed in local shops and cafes.
- **Information panels** – these were put in place near the Port beach and at the Bluff Hill lookout.
- **Presentations and Port visits** – Port personnel have made presentations at approximately 20 offsite meetings, and have hosted 15 groups in meetings about the project at the Port.

[158] The full range of stakeholders identified and the information and opportunities for comment provided are included in Appendix P.

- **Informal contact** – as a result of the various means of information provision above, the Port personnel have received numerous emails and phone calls. There have also been a number of one-on-one or small group meetings in addition to those above.

Feedback has been carefully recorded in the consultation database, acknowledged and responded to as appropriate. Details of the approach and methods are provided in Appendix P.

Overall, some 1200 individuals and representatives of organisations have been directly engaged at some level through the consultation process.

### 25.3.2. Methods (Tangata Whenua)

In the very early stages of the project, it was established that seeking input from local hapū/iwi was a priority, to enable Napier Port to gain an understanding of the cultural values and significance of the area affected by the project. From the outset, Napier Port was aware that local hapū had a particular interest in the welfare of the Pania Reef ecology and its cultural significance.

Following initial discussions with Ngati Kahungunu, Hawke's Bay Regional Council, and other advisers a 'starting list' of hapū/iwi to engage with was developed. This led to an initial round of 'kanohi ki te kanohi ('face to face') meetings.

Ngati Pārau stated its mana whenua over the project area. It was decided by hapū representatives that having a single representative of mana whenua was the most practical option, while still engaging individually with each hapū.

It was agreed between Ngati Kahungunu Iwi Incorporated, the Mangaharuru-Tangitu Trust and Ngati Pārau, that a single representative should co-ordinate cultural input through a cultural impact assessment, developed in liaison with relevant hapū/iwi groups. It was also agreed that an independent environmental consultant should undertake a technical review of the relevant studies relating to Pania Reef, to ensure that the science was well understood and considered from a Māori perspective.

Engagement with hapū and iwi, including hui, phone calls and emails has been extensive and is described in an appendix to Appendix P.

## 25.4. Issues Raised in Consultation and Port Napier responses

A comprehensive tabulation and discussion of issues and responses is set out in Table 1 of Appendix P. This section provides a summary of the main issues and responses.

#### Potential for Consequential Erosion at Westshore

This issue was raised primarily by Westshore residents. The matter has been investigated through modelling and expert review of the model results (see section 8 of this report and Appendix D and G in Volume 3 of the application documentation).

As far as can be determined, there are not expected to be any changes or adverse effects associated with the dredging programme that would contribute to coastal erosion at Westshore.

## Potential for Adverse Effects on Fisheries and Ecology

This issue was primarily raised by sports fishers, inshore commercial fishers[159], and divers and is based on concerns about the effects of dredge material throughout the marine food web, as well as the increased turbidity on and around Pania Reef that had been reported by divers.

In response, Napier Port undertook additional investigations and determined (in May 2017) to seek consent for an offshore disposal site, where there could be greater certainty that any effects associated with sedimentation and turbidity would be kept to a minimum (see section 10 of this report and Appendices E, F and H in Volume 3 of the application documentation).

The available information indicates that, with the proposed disposal site and additional mitigation through a water quality management plan for any (unlikely) circumstances where there may be effects experienced at Pania Reef, effects on Pania Reef will be negligible. Any effects on benthic ecology or other parts of the food web arising from the applications will be localised and less than minor.

## Potential for Adverse Effects on Surf Breaks

This issue has been raised by a single local surfer and the national Surfbreak Protection Society[160].

As a result of these issues being raised, Napier Port commissioned Advisian to undertake further modelling and a surfing amenity analysis to understand in greater detail whether there was any potential that the nearby surf breaks could be adversely affected. These investigations indicate that any adverse effects will be negligible and it is possible that under some conditions the surf area closest to the Port may experience slightly enhanced conditions (see section 15 of this report and Appendices D and G in Volume 3 of the application documentation). An independent peer review was also undertaken.

## Concern about Extent of Reclamation

A number of those consulted thought the project would involve reclamation, and expressed concerns particularly about any infilling of the Port beach area.

As can be seen from the applications themselves and the project description in sections 3.2 and Table 6-2 of this report, the extent of reclamation involved is very limited indeed, and is largely below the proposed wharf structure.

In terms of occupation, Napier Port is seeking replacement of its existing section 384A occupation permit with a new occupation permit. That includes a 20m strip out from mean high water springs into the CMA as far as the small breakwater north of the Port beach, which will ensure that the Port is able to continue to maintain the beach and the rip-rap and other erosion protection along the area it already maintains. There is however no proposal for any other works in this area.

[159] Specifically in relation to the paddle crab fishery and the potential for surf clam aquaculture.
[160] Despite numerous communications, engagement with this group has been problematic. The concerns stated here have not been replicated in engagement with local surfers who use the local surf breaks.

## Beneficial Use of Dredged Material

A number of people consulted have suggested that dredged material should be provided to Westshore beach to assist with replenishment.

Napier Port has undertaken a wide range of investigations which have demonstrated that most of the material to be dredged is of a size that would not contribute effectively to the maintenance of the Westshore beach. Most of the material is so small that it would be rapidly moved away from the area, if it was deposited in an active foreshore or inshore area. There is no practical way of separating out larger material for inshore deposition although the Port has made an undertaking that if viable volumes or areas of such material are identified during the dredging programme it will consider the feasibility of doing so, using its existing consents (see section 8 of this report and Appendices D, F and G in Volume 3 of the application documentation). Alternative strategies could also be considered.

Possible alternative beneficial uses of the dredged material have also been investigated. These have been addressed in section 5.4.2 of this report.

## Growth of Port Activities and Attendant Noise Levels

This issue has been raised by local residents. It is a continuation of concerns that have been expressed over a number of years and is largely independent of the proposed wharf and dredging project. Rather, it is a function of the growth of regional production passing through the Port.

Through the District Plan, provisions for ongoing management of port noise in the receiving environment have been set, including setting out various responsibilities for the Port. These responsibilities include not exceeding established noise limit beyond mapped lines, monitoring in real time of noise levels, continuing liaison with the local community, a noise management plan for port activities, and a requirement to contribute to upgrading the acoustic treatment of affected dwellings. These requirements will continue in place during the construction period and beyond, and the Port must comply with them.

Investigations have shown that the ongoing noise limits will be complied with for the Port activity including with the new wharf and larger vessels which will be able to visit and berth at the Port. Construction noise is managed separately, and has been investigated for the project. While there will be some temporary adverse effects associated with the construction of the wharf, these effects will be no more than minor (see section 14.2 of this report and Appendix I and J in Volume 3 of the application documentation).

## General Support

Many comments were in general support of the development because of its close links with economic vitality in the region.

## Issues Raised in Consultation with Tangata Whenua

The following issues were raised in the CIA report:

- the cultural importance of the Ahuriri marine area generally;
- the importance of the mauri of Pania Reef and the need to protect it;

- the desire that mana whenua have an ongoing role in monitoring, and are provided with environmental information relating to the applications and ongoing development;
- general support for the project, particularly with the proposed offshore disposal site for dredged material.

The CIA has suggested a specific condition to apply to the dredging consents, which have been included as part of the application.

## 25.5. Summary

Napier Port has adopted a particularly "open door" approach to communication and consultation for this project. The information and consultation processes have run over approximately 18 months and have engaged many people at local, regional and, in some cases, national level.

Some matters raised by the local community have contributed to changes in the project itself – particularly the concerns expressed by local divers about elevated turbidity in the vicinity of Pania Reef. Together with the improved understanding of the potential for sediment movement in the area gained from modelling, this has led to a decision to seek consent for an offshore disposal location for dredged material.

Port Napier intends to continue with its programme of Iwi engagement on a continued basis, and with its public information about the project on an ongoing basis until all construction and dredging activities are completed.

# 26. DRAFT CONDITIONS

The draft conditions set out below are intended to provide for appropriate management and mitigation of any adverse activities associated with the coastal permits which are being sought by Napier Port. Key mitigation for dredging and disposal of dredged material is proposed through a Water Quality Management Plan. A Draft Water Quality Management Plan is included in Volume 3 as **Appendix R**.

## 26.1. Conditions Applying to Applications 1 to 5

### General Accordance

1. The consent holder shall undertake all operations in accordance with all documents provided in support of the application, including Volumes 1, 2 and 3 of the Application Documentation.

   If a conflict arises between any conditions of this consent and information in the application documentation, the conditions of consent shall prevail.

### General Duty

2. a) The consent holder shall undertake all consented activities in a manner that applies all reasonable and practicable steps to avoid, remedy or mitigate actual and potential adverse effects on the environment.

   b) The consent holder shall ensure that any contractors engaged to undertake work authorised by this consent abide by the conditions of this consent. The person responsible for the work on site shall be familiar with the consent conditions and a copy of this consent shall be present on site or vessel at all times while the work is being undertaken.

### Inadvertent Discharges

3. That where, for any cause (accidental or otherwise), contaminants associated with the consent holder's operations escape to water other than in conformity with the consent, the consent holder shall:

   a) Immediately take all practicable steps to contain and then remove the contamination from the environment.
   b) Immediately notify the Hawke's Bay Regional Council of the escape.
   c) Report to the Hawke's Bay Regional Council, in writing and within 7 days, describing the manner and cause of the escape and steps taken to manage it and prevent its reoccurrence.

### Complaints Received

4. The consent holder shall notify the Hawke's Bay Regional Council of any complaints relating to the exercise of the consents within 7 days of being received by the consent holder.

## Review of Consent Conditions by the Council

5. The conditions of the consent may be reviewed by the Hawke's Bay Regional Council pursuant to sections 128 to 132 of the RMA.

   During the month of May, in any year, for any of the following purposes:

   a) To deal with any adverse effect on the environment that may arise from the exercise of this consent, which it is appropriate to deal with at that time or which became evident after the date of issue.
   b) To require the adoption of the best practicable option to remove or reduce any effects on the environment.
   c) To modify any monitoring programme, or to require additional monitoring if there is evidence that current monitoring requirements are inappropriate or inadequate.

Advice Note: *The actual and reasonable costs of any review undertaken will be charged to the consent holder, in accordance with s36 of the Resource Management Act.*

## Marine Wildlife Management Plan

6. A Marine Wildlife Management Plan (MWMP) shall be prepared in consultation with the Department of Conservation prior to commencing any construction or dredging works. The purpose of the MWMP is to avoid or minimise the potential for adverse effects on marine mammals and birds. The MWMP shall address:

   a) Responsibilities for observation and monitoring of marine mammals.
   b) Advisory practices, such as maximum vessel speeds.
   c) Responsibilities for liaison with the Department of Conservation over the project period
   d) Responsibilities for recording and reporting types of and frequencies of any marine mammal sightings during any project activity, including transiting to or from the dredge material disposal site.
   e) Measures to minimise underwater noise from construction and dredging activities.
   f) Monitoring within designated safety zones, including the use of trained marine mammal observers, during and immediately following pile driving activities (during daylight hours only).
   g) Application of soft-start procedures and other noise dampening techniques.
   h) Methods of avoiding entanglement.
   i) Methods to ensure records of all entanglement incidents or near incidents (regardless of outcome) are provided to the Department of Conservation.
   j) A description of the lighting being used, including any methods to reduce potential for bird strike.

## Cultural Monitoring and Information Sharing

1. Within the first two years[5] of the consent being granted, the consent holder shall, in consultation with Mana Whenua hapū, prepare a Marine Cultural Health Programme (MCHP) to ensure the cultural health of the marine environment and in particular Pania Reef, is surveyed, monitored and

reported upon. The purpose of the MCHP is to assist the consent holder, to assess the state of the marine environment, in particular Pania Reef, from a cultural perspective and assist Māori in marine environmental monitoring and reporting.

2. The MCHP shall include, but not be limited to, the following:

*i.* A map and description of the area to be subject to the MCHP.

*ii.* Marine cultural indicators to be surveyed and monitored, including appropriate marine cultural health limits or baseline values and triggers to measure change against.

*iii.* How the MCHP will align with the Water Quality Management Plan (WQMP) programme of dive surveys relating to Pania Reef.

*iv.* Methodology for marine cultural health surveying and monitoring.

3. The frequency and nature of any specific marine cultural health surveying and monitoring shall, where practicable, be carried out alongside other related surveying and monitoring of Pania Reef[(i)].

*i. Advice Note: The benefits of Napier Port personnel and hapū working together and sharing best practice, tikanga Māori, scientific and cultural information and indicators, are recognised. It is expected that the consent holder shall meet the reasonable costs incurred by hapū.*

4. The consent holder in partnership with Mana Whenua hapū shall ensure a MCHP surveying and monitoring summary report is provided to hapū information networks[(ii)].

*ii. Advice Note: More detailed information should be made available to hapū should they request. All of the above should be set out in a 'communication plan' developed in partnership with hapū.*

## 26.2. Conditions Specific to Application 1 – Wharf and Associated Activities

### Contaminant Release

1. The consent holder shall take all practical measures to limit the amount of sediment and to prevent external contaminants from entering the Coastal Marine Area from land or construction activities during wharf and associated construction works.

   Such measures shall include, but are not limited to:

   a) Refuelling and carrying out machinery maintenance at least 10m inland from MHWS.
   b) Ensuring that wash water from tools, equipment or machinery is not discharged into the Coastal Marine Area.
   c) Minimising the use of machinery within the Coastal Marine Area where practicable.
   d) Providing appropriate wash-down facilities for all concreting equipment to the satisfaction of the Regional Council (Manager Resource Use) to prevent wash water from entering the Coastal Marine Area.
   e) Storing any hazardous substances (as defined by the Hawke's Bay Regional Resource Management Plan, 2006) so that they will not enter the Coastal Marine Area.
   f) Ensuring that during pile or wharf installation and ancillary work no wet concrete shall enter the Coastal Marine Area.

### Noise

2. Noise resulting from construction activity shall not exceed the New Zealand Construction Noise Standard NZS 6803 (1999).

### Construction Management Plan

3. The consent holder shall submit a Construction Management Plan (CMP) to the Regional Council for certification at least one month prior to any works commencing. The CMP shall include, as appendices, the plans required under conditions [7 to 9]. The objective of the CMP is to ensure that all wharf construction and associated activities are managed in a way that is in general accordance with the information referred to in [general condition 1] and the detailed requirement of the CMP Appendices as specified in conditions [7 to 9].

   Any changes to the certified CMP shall be discussed in advance with the Regional Council and the change will be required to be submitted, certified and approved prior to any works associated with the change to the CMP commencing.

4. The CMP and the management plans included under condition [3] shall include details of:

   a) Staff and contractors' responsibilities.
   b) Training requirements for employees, contractors, any sub-contractors and visitors.
   c) Environmental incident and emergency management.
   d) Environmental complaints management.

e) Compliance monitoring.
f) Corrective actions, if necessary in specified circumstances (including, where necessary, relating to wildlife management).
g) Stakeholder and communication management.
h) The final construction methodologies.
i) Shall contain sufficient information to ensure that the CMP achieves its purpose set out in condition [3].

5. The CMP shall be consistent with, and as appropriate shall give effect to, measures within the Marine Wildlife Management Plan [general condition 6] and the Little Blue Penguin Management Plan [condition 10].

6. The CMP shall be implemented and maintained throughout the entire construction period.

## Construction Noise Management Plan

7. A Construction Noise Management Plan shall be provided as an appendix to the CMP, for the management of airborne construction noise and underwater noise. The CNMP shall be prepared by a suitability qualified and experienced person and shall be part of the documentation certified by the Regional Council.

8. The CNMP shall identify practicable noise mitigation measures, provide for effective communication between contractors and Port neighbours, and shall seek to minimise potential adverse noise effects on marine mammals.

For **airborne construction noise**, the CNMP shall include, but not be limited to, the following:

a) The performance standards that must, as far as practicable, be complied with.
b) Predicted noise levels for relevant equipment and/or activities.
c) Construction noise mitigation and management strategies to be employed where practicable.
d) Monitoring.
e) Complaints response procedures.

For **underwater noise** the CNMP shall include, but not be limited to the following:

a) Methods to minimise noise in the marine environment.
b) Visual monitoring for marine mammals during pile-driving, and steps to take should any be identified (including species and distance from pile-driving area).

The CNMP shall be consistent with relevant requirements of the Marine Wildlife Management Plan [general condition 6].

## Traffic Management Plan

9. The consent holder shall prepare a Traffic Management Plan (TMP) to be provided as an appendix to the CMP, which shall include but not be limited to the following:

a) Management of traffic to and from the construction area.
b) Access and parking for contractors.
c) Specification of any additional measures necessary during periods of activities which involve high levels of construction traffic on nearby roads (including communication and any necessary physical management steps).

### Little Blue Penguin Management Plan

10. In association with the Department of Conservation and Mana wi?], the consent holder shall prepare a Little Blue Penguin Management Plan. The purpose of the plan shall be to as far as practicable avoid, but otherwise mitigate or remedy, adverse effects on the Little Blue Penguin population established in and nearby the existing revetment, during the construction period. The Little Blue Penguin Management Plan shall address the following:

    a) Measures to minimise adverse effects on the Little Blue Penguin population during construction.
    b) Staff and contractor training.
    c) Any additional steps that are necessary to achieve no net loss of the Little Blue Penguin population in the vicinity of the Port over a 10-year period following commencement of construction.

Expert advice from a suitably qualified person shall be sought in developing the Little Blue Penguin Management Plan.

### Lapse

The lapse date for the purpose of section 125 shall be 10 years after the commencement of consent.

### Duration of Consent

The duration of consent for the construction activities is 15 years from the commencement of consent.

The duration of consent for the structure, and its use, operation and maintenance is 35 years from the commencement of consent.

## 26.3. Conditions Relating to Applications 2 to 5

### Dredging and Disposal Management Plan

1. At least one month prior to commencing any of stages 1 to 5 of capital dredging the consent holder shall submit a Dredging and Disposal Management Plan (DDMP) to the Regional Council for certification. The objective of the DDMP is to ensure that all dredging and disposal activities are managed in a way that is in general accordance with the information referred to in [general condition 1] and the detailed requirements of the DDMP Appendix.

Any changes to a certified DDMP shall be discussed in advance with the Regional Council and the change to be submitted certified and approved prior to any activity associated with the change commencing.

2. The DDMP shall include details of:

    a) A map and description of the area to be subject to capital dredging, the intended depth of dredging, and the estimated volume and nature of the dredged material.
    b) A description of the number and types of dredges to be used, the intended start date and the duration and expected hours of operation for the stage.
    c) A description of dredging methodology to be used.
    d) A description of how the location and quantities of disposed dredged material are recorded.
    e) A description of the maintenance of equipment and systems.
    f) A description of any other measures to avoid or mitigate bio-fouling, management of waste, and refuelling procedures.
    g) Staff and contractors' responsibilities.
    h) Training requirements for employees, contractors, any sub-contractors and visitors.
    i) Environmental incident and emergency management
    j) Environmental complaints management.
    k) Compliance monitoring.
    l) Corrective actions, if necessary in specified circumstances (including, where necessary, relating to wildlife management).
    m) Stakeholder and communication management.

3. The DDMP shall be consistent with, and as appropriate shall give effect to, measures within the Marine Wildlife Management Plan [general condition 6].

4. The DDMP shall be implemented during each stage of dredging, including stages that may be undertaken consecutively.

## Water Quality Management Plan

5. A Water Quality Management Plan (WQMP) for the integrated management of sediment plumes and turbidity, and monitoring of benthic ecological effects, shall be provided as an appendix to the DDMP. The WQMP shall be part of the documentation certified by the Regional Council for each stage of dredging and disposal activities.

6. The WQMP shall include, but not be limited to:

    a) Validation of modelled predictions included in the application documentation.
    b) Establishment of appropriate environmental limits (specified as turbidity at specified locations) in the water column during and immediately following dredging and disposal activities.
    c) Specifying methods of measuring and determining turbidity levels at any time.

d) Identification of sensitive localities, if any, at which longer-term ecological monitoring is required (other than at Pania Reef (see (g) below).
e) Linking of the specified environmental limits to pre-determined response steps through trigger levels and environmental response levels.
f) Establishing reporting of trigger exceedances, including any response if the exceedance is determined to be due to dredging or disposal of dredged material.
g) A detailed programme of dive surveys relating to Pania Reef, to commence within six months of the commencement of consent, and to continue until completion of Stage 5 dredging.
h) A detailed programme of benthic surveys in and around the disposal location prior to and following completion of Stage 1 dredging.
i) Reporting requirements for the various components of the WQMP.

(Note: A Draft WQMP has been developed and is provided as **Appendix R** in Volume 3 of the application documentation).

## Disposal of Dredged Material

7. Dredged material shall not be disposed of in a concentrated manner in any one part of the offshore disposal ground; it shall be distributed as far as practicable over the offshore disposal ground to ensure, as far as practicable, an even spread on the seabed over the various stages.

## Records

8. The consent holder shall keep records detailing the timing, quantities and location of seabed material dredged, and also of the disposal within the offshore disposal ground. These records shall be submitted to the Consent Authority Manager within one month of completion of a dredging stage or at any time upon request from the Hawke's Bay Regional Council.

## Notice of Completion of Stages

9. After completion of each stage, the consent holder shall advise Hawke's Bay Regional Council in writing of having finished the works. This notice shall be provided to the Council within five working days of the works having been completed.

## Bathymetric Surveys

10. A bathymetric survey of the areas dredged in accordance with this consents shall be undertaken by the consent holder as soon as practicable after each dredge stage has been completed.

11. The results of the survey required by condition [10] shall be submitted to the Hawke's Bay Regional Council within one month of the completion of the survey. At this time the consent holder shall also provide to the Council a map, identifying where the dredging occurred, and shall confirm the volume of material excavated.

### Coastal Monitoring

12. The consent holder shall, in consultation with the Hawke's Bay Regional Council, develop a monitoring programme for the beach to the east of Perfume Point and the adjacent nearshore area. The purpose of the monitoring programme is to identify any changes to and consistent trends in beach and foreshore volume east of the Ahuriri inlet. Measurements shall be by aerial and bathymetric survey.

13. The surveys shall commence within six months of commencement of consent, and shall be undertaken at least every six months until consented capital dredging activities are complete, and then annually for five years. The results shall be reported annually to the Regional Council, with an accompanying report identifying and consistent trends, prepared by a suitably qualified and experienced person.

### Lapse

The lapse date for the purpose of section 125 shall be 10 years after the commencement of the consents, but the consents shall not lapse due to the passage of time between stages of dredging and deposition.

### Duration of Consent

The duration of consent is 35 years from the commencement of consent.

## 26.4. Conditions Relating to Application 6

### Purpose of Occupation

To enable port-related commercial undertakings under the Port Companies Act 1988, and Napier Port's associated responsibilities under any other legislation.

### Duration of Consent

The duration of consent is 35 years from the commencement of consent.

# 27. GLOSSARY OF TERMS AND ABBREVIATIONS

| | |
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| **AEE** | Description and Assessment of Effects on the Environment, prepared in accordance with section 88 of the RMA. |
| **Bent** | In relation to the proposed new wharf structure, comprise elements in the traverse structure framework of wharf support piles. |
| **BHD** | Backhoe dredge |
| **Capital Dredging** | Dredging that is deeper than has been done in the past, which disturbs and removes new sediments on the seabed. |
| **CD** | Chart Datum, measured as 4.837m below BM(H40), a stainless steel pin in concrete block near south west corner of site of Napier Port Old Administration Building. |
| **CELR** | Catch effort landing returns (for fisheries) |
| **CIA** | Cultural Impact Assessment |
| **CMA** | In terms of the Resource Management Act 1991, the coastal marine area, or CMA, means *"the foreshore, seabed, and coastal water, and the air space above the water –*<br>*a) of which the seaward boundary is the outer limits of the territorial sea:*<br>*b) of which the landward boundary is the line of mean high water springs...."* |
| **CMP** | Construction Management Plan |
| **CNMP** | Construction Noise Management Plan |
| **Contaminant** | In terms of the Resource Management Act 1991, "*includes any substance (including gases, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat –*<br>*(a) when discharged into water, changes or is likely to change the physical, chemical, or biological condition of water; or*<br>*(b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical or biological condition of the land or air onto or into which it is discharged."* |
| **dBA** | The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear. A-weighting is used in airborne acoustics. |
| **DDMP** | Dredging and Disposal Management Plan |
| **DoC** | Department of Conservation |
| **Dolphin** | In relation to the proposal, means a man-made marine structure that extends above the water level but is not connected to the shore. Used to tie vessels to. |
| **Echolocate** | The biological sonar used by several marine species to locate and identify objects (also called bio sonar). They emit calls and listen to the echoes from objects around them. |
| **EEZ** | Exclusive economic zone |

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| **Effect** | In terms of section 3 of the Resource Management Act 1991, *"unless the context otherwise requires, the term **effect** includes –*<br>*(a) any positive or adverse effect; and*<br>*(b) any temporary or permanent effect; and*<br>*(c) any past, present, or future effect; and*<br>*(d) any cumulative effect which arises over time or in combination with other effects – regardless of the scale, intensity, duration, or frequency of the effect, and also includes –*<br>*(e) any potential effect of high probability; and*<br>*(f) any potential effect of low probability which has a high potential impact."* |
| **Environment** | In terms of the Resource Management Act 1991, *"includes –*<br>*(a) ecosystems and their constituent parts, including people and communities; and*<br>*(b) all natural and physical resources; and*<br>*(c) amenity values; and*<br>*(d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) of this definition or which are affected by those matters."* |
| **FAQs** | Frequently asked questions |
| **FMA** | Fisheries management area |
| **FOB** | Or fob, means "free on board". Term used in relation to import and export values. Excludes the value of shipping and other transport services. |
| **FSA** | Fisheries statistical area |
| **GRP** | Gross regional product |
| **Ha** | Hectare – land area unit (10,000 $m^2$) |
| **Hapū** | Comprises whanau of shared ancestry (extended families) |
| **HBRC** | Hawke's Bay Regional Council |
| **HBRCEP** | Regional Coastal Environment Plan, Operative 2014 |
| **Iwi** | Tribe or grouping of Māori |
| **Kaitiakitanga** | In terms of the Resource Management Act 1991 – "*means the exercise of guardianship by tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources: and includes the ethic of stewardship"* |
| **Kn** | Knots (a measure of the speed of vessels) |
| **$L_{Aeq}$** | The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. |
| **Land** | Includes land covered by water and the airspace above land |
| **Littoral drift** | The movement of non-cohesive material along the foreshore and nearshore due to the action of breaking waves and longshore currents. |
| **$L_{max}$** | The maximum noise level. The highest noise level which occurs during the measurement period. |
| **LOA** | Length overall |
| **m** | Metre as a measure of length |
| **$m^2$** | Square metres as a measure of area |
| **$m^3$** | Cubic metres as a measure of volume |

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| **Maintenance dredging** | Dredging of material which has filled in areas previously subject to capital dredging. |
| **Mana Whenua** | In terms of the Resource Management Act 1991 – *"means customary authority exercised by an iwi or hapū in an identified area."* |
| **Mātauranga Māori** | In terms of the New Zealand Coastal Policy Statement – *"means Maori customary knowledge, traditional knowledge or intergenerational knowledge"* |
| **MHWS** | Mean High Water Springs (see full description in section 6.1.2 of this report). |
| **MWMP** | Marine Wildlife Management Plan |
| **Natural character** | The qualities of the environment that give recognisable character to an area. These qualities may be ecological, physical, spiritual, cultural or aesthetic in nature. They also relate to modified and managed areas. |
| **NCC** | Napier City Council |
| **NTU** | Nephelometric Turbidity Units – an internationally recognised measured standard |
| **NZCPS** | New Zealand Coastal Policy Statement 2010 |
| **Open coastal water** | Defined in the Resource Management Act to mean coastal water that is remote from estuaries, fiords, inlets, harbours and embayments. |
| **PTS** | Permanent Threshold Shift is the permanent loss of hearing caused by some kind of acoustic or trauma. PTS results in irreversible damage to the sensory cells of the ear, and thus a permanent loss of hearing. |
| **QMA** | Quota Management Area (for fisheries) |
| **QMS** | Quota Management System (for fisheries) |
| **RCEP** | Regional Coastal Environment Plan |
| **Rebar** | Metal reinforcing within concrete including piles and decking |
| **Regional Council** | Means Hawke's Bay Regional Council |
| **RL** | Reduced Level (height above a sea level datum point) |
| **RMA** | Resource Management Act 1991 and subsequent amendments |
| **RPS** | Regional Policy Statement |
| **SSC** | Suspended sediment concentration |
| **Structure** | In terms of the Resource Management Act 1991 – *"means any building equipment, device, or other facility made by people and which is fixed to land; and includes any raft."* |
| **TAAC** | Total allowance commercial catch (for fisheries) |
| **Tangata Whenua** | In terms of the Resource Management Act 1991 *"in relation to a particular area, means the iwi, or hapū, that holds mana whenua over that area."* |
| **Taonga** | Treasure or property. Taonga are prized and protected as sacred possessions of a tribe. The term carries a deep spiritual meaning and taonga may be things that cannot be seen or touched. |
| **TEU** | Twenty-foot container equivalents – an internationally-applied descriptor or port handling capacity throughput |

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| **Tikanga Māori** | Māori customary values and practices |
| **TMP** | Traffic Management Plan |
| **TSHD** | Trailing suction hopper dredge |
| **TSS** | Total suspended solids |
| **TTS** | Temporary Threshold Shift (TTS) is the temporary loss of hearing as a result of exposure to sound over time. Exposure to high levels of sound over relatively short time periods will cause the same amount of TTS as exposure to lower levels of sound over longer time periods. The duration of TTS varies depending on the nature of the stimulus, but there is generally recovery of full hearing over time. |
| **VAC** | Visual absorption capacity |
| **WQMP** | Water Quality Management Plan |

# 28. REFERENCES

Note that the main references for this report are itemised in Table 7-1, in reference lists within each of the reports listed in Table 7-1, and in some footnotes within this report. Additional references are listed here.


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